

# User Empowerment: An Enabler of Enterprise Systems success

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## STATEMENT

To the best of my knowledge and belief, the work presented in this thesis is original, except as acknowledged in the text. The material herein has not been submitted in whole or in part, for a degree at this or any other university.

Rashi Sehgal

November 2007

Signature of author: \_\_\_\_\_

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## EXECUTIVE SUMMARY

This research project has established a new measurement model for User Empowerment as an enabler to Enterprise Systems<sup>1</sup> success. This study was inspired by the reported relationship between Empowerment and improved work outcomes. From this, it was hypothesised that empowering the users of Enterprise Systems during the implementation process would improve the reports of post implementation system success. A new related concept of system oriented User Empowerment was conceived. The outcomes of empowering users (increased worker effectiveness; (increased work satisfaction) conceptually resonates very closely to the outcomes of individual performance, quality of system outputs, goodness of system functionality and, on a broader level, effective use of the system to yield successful business outcomes. These latter outcomes represent the measures of Enterprise Systems success. Thus Empowerment as an independent variable, and Enterprise Systems success as a dependent variable, provided a launching platform for the study.

The research model was built upon the existing research into Empowerment as articulated by Spreitzer (Spreitzer, 1996) and Thomas and Velthouse (Thomas & Velthouse, 1990) and its derived systems related construct of User Empowerment, first explored by Doll, Deng and Metts (Doll, Deng, & Metts, 2003). It used a current and validated measure of Enterprise Systems Success as developed by Gable, Sedera and Chan (Gable, Sedera, & Chan, 2003); this measure is a refinement of the Information Systems Success Model of DeLone and McLean (DeLone & McLean, 2002).<sup>2</sup>

In order to test the relationships of Empowerment to (Enterprise) System success, the following research sub-problems were explored:

- What types of Empowerment are relevant in the Enterprise System context?
- Is User Empowerment different from Psychological Empowerment and if so, how?
- What is the relationship between Psychological Empowerment and User Empowerment?
- How can User Empowerment be measured?

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<sup>1</sup> In this thesis, the terms ERP, enterprise resource planning, and the more contemporary Enterprise Systems (ES) are used interchangeably. For an in-depth discussion on ERP, see Klaus et al. (Klaus, Rosemann, & Gable, 2000)

- What is the effect of Psychological Empowerment on Enterprise Systems success?
- What is the effect of User Empowerment on Enterprise Systems success?

This research project was a PhD study funded by the Australian Research Council through an industry linkage program. The industry partner in this project was SAP – the most successful vendor of Enterprise Systems. Although limited in analysis the study spanned across two industry sectors, with two Enterprise Systems (Oracle and SAP).

This research was a multimethod study and involved both qualitative and quantitative phases. The multimethod included content analysis, survey, and case study. This research was led by an explorative research strategy and paid considerable attention to analysing each research method in relation to other research methods, and also in relation to the demands of the research problem. A comprehensive literature review established extant definitions and constructs for Psychological Empowerment, User Empowerment and, Enterprise Systems success. The literature review employed a formal qualitative research method, using open coding supported through the use of Nvivo, a Qualitative software package, in order to identify and derive key themes in the referent disciplines. The responses from the email survey of Information Systems researchers, and Enterprise Systems consultants were triangulated with the findings from the categorised literature review on Empowerment. This sub-study utilised WordStat software and the findings were presented at the QualIT conference (Sehgal & Stewart, 2006). Drawing from the existing perspectives on Empowerment a *context-based perspective* on Empowerment was proposed by the researcher.

From this work, a new working definition of (User) Empowerment was derived. This construct proposed that User Empowerment involved *Computer Self-efficacy, Perceived Usefulness, Intrinsic Motivation, User Autonomy, and Problem-solving and Decision support*. Psychological Empowerment involves *Meaning, Self-determination, Competence, and Impact*.

The research project then empirically tested the relationship of both Psychological Empowerment and User Empowerment to Enterprise Systems success using a quantitative enquiry. The new User Empowerment construct was statistically tested for validity and reliability. This quantitative study found no statistical evidence for a relationship between Psychological Empowerment and Enterprise Systems success. The study findings suggest significant statistical evidence for a relationship between User Empowerment and Enterprise Systems success. Statistical analysis showed that the construct for User Empowerment was different from the construct of Enterprise Systems success. These relationships held regardless of the level of the user: senior management, operational, end users or technical. This phase of the study was presented at the Americas Conference of Information Systems (Sehgal & Stewart, 2004).

This exploratory survey was followed by another industry based case study, which confirmed the results for a different industry sector and different Enterprise System. This latter study was used in an independent confirmatory factor analysis of the Enterprise Systems success measurement which was presented at the Americas Conference on Information Systems (Sehgal & Stewart, 2004) and International Conference on Information Systems (Sedera, Gable, & Chan, 2004) by fellow researchers.

This research has demonstrated that User Empowerment, rather than Psychological Empowerment was significantly related to Enterprise Systems Success. The study findings identified potentially significant benefits to the Enterprise System implementing organisations as well as the Enterprise System vendor from empowering Enterprise System users. Of the reported benefits one of the relevant one was improved and positive reports about the implemented Enterprise System. Further, the study highlights the importance of context when measuring a construct such as Empowerment.

There are clear practical implications for the research outcomes. These include a recommendation that training programs should ensure that users have a high degree of computer self-efficacy when using the enterprise system. The validated User Empowerment instrument will be utilised as a diagnostic tool for organisational readiness prior to an ES implementation. This would assist in benchmarking the level of empowerment and predicted Enterprise Systems success. Future research will explore the effects of an Enterprise System on the components of User Empowerment as it is conjectured that there is a reciprocal relationship between the system and user attributes of Computer Self-efficacy, Problem-solving Decision Support, and understanding of business logic.

**Key Words:** User Empowerment, Enterprise Systems success, Enterprise Systems, Empowerment, User Autonomy, System-oriented User Empowerment, Enabler of Enterprise Systems success.

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# 1 Introduction

## 1.1 Chapter Overview

This chapter introduces the research topic, theory, purpose, research questions, the context, the overall research methodology, and lists the key contributions of the research. The reader is also provided with an insight into the research background that has been the catalyst for this study. This research program aims to study User Empowerment in the context of Enterprise Systems<sup>1</sup>. The scope of this research is limited to the investigation of factors influencing the users at the post-implementation stage of an Enterprise Systems. The newness of the User Empowerment topic being studied in the context of Enterprise Systems warrants an introduction to the key concepts i.e. Enterprise Systems, Psychological Empowerment, and User Empowerment.

This thesis is presented within eight (8) chapters. This chapter is organised into four (4) major sections. Following the introduction to the key concepts in section 1, section 2 describes the research justification. The research aims and objectives are described in this section, and the primary and secondary research questions are described. Section 3 describes the significance and major contributions of research. Finally, section 4 describes the thesis structure and outlines the objective of each subsequent chapter.

## 1.2 Enterprise Systems

Technologies evolve in two ways, either as a reactive response to problems people experience in using them (Rosenberg, 1982; Stinchcombe, 1990) or as proactive measures to cultivate change and forecast directions as part of a strategy to

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<sup>1</sup> In this thesis, the terms ERP, enterprise resource planning, and the more contemporary Enterprise Systems (ES) are used interchangeably. For an in-depth discussion on ERP, see Klaus et al. (Klaus et al., 2000)

sustain the growth in the future. The widespread implementation<sup>2</sup> of Enterprise Systems<sup>3</sup> in large and medium-sized companies (Everdingen, Hillegersberg, & Waarts, 2000) across all industry sectors has been one of the major developments in recent years. The journey of these organisations from custom applications software to adoption of packaged software has been challenging and rewarding and is perhaps one of the significant landmarks of the IT discipline in recent years. The Business Process Reengineering (BPR) approach dominated much of the business and academic literature in the 1990's (Craig & Yetton, 1992, 1994a, 1994b; Davenport, 1998; Davenport & Short, 1990; Hammer & Champy, 1993) However, the successes of designing a simpler new process, then implementing large enterprise wide systems through a change program (Smith & Fingar, 2002) for the users were achieved by very few organisations (e.g. Taco Bell, IBM Credit Corporation).

The Enterprise Resource Planning systems (ERPs) emerged to overcome the problems of Business Process Re-engineering (Smith & Fingar, 2002). Over the last decade these ERPs have extended in reach from resource planning to all business functions across organisations and are thus commonly referred to as Enterprise Systems. An Enterprise Systems is a software solution that has the ability to integrate all business processes across an organisation. The expanded capabilities of Enterprise Systems to manage a company's resources efficiently and effectively have allowed companies to replace their aging legacy systems. This has brought a variety of other benefits, including strategic business advantages, improved system architectures and outsourced software maintenance (Markus, Petrie, & Axline, 2000). The integrated nature of the Enterprise Systems solutions has better managed the information processing needs of organisations (Nah, Lau, & Kuang, 2001).

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<sup>2</sup> 40 percent of the ERP software implementations are not completed in the intended scope while 20 percent are abandoned (Trunick, 1999). The project objectives may also change during the project (Besson & Rowe, 2001; Nandhakumar & Rossi, 2003). In these cases it becomes difficult if not impossible to determine whether the implementation has finished and in what scope. Success of implementation refers to how well an organisation has been able to release the ERP software into use within the set budget, time, and other objectives. Turban (Turban, McLean, & Wetherbe, 1999) and Markas (Markus & Tanis, 2000) identify the main criteria for IS implementation success that the project is completed on time, on budget and with full functionality.

<sup>3</sup> ES are often interchangeably referred as Enterprise Resource Planning Systems or Enterprise Wide Systems

The evidence of Enterprise Systems success has been mixed, despite the benefits of Enterprise Systems. Some studies show positive impacts of Enterprise Systems in organisations (Barua & Lee, 1997; Lehr & Lichtenberg, 1999; Mukherjee, 2001), while others have shown nil or unfavourable impacts (Cameron & Quinn, 1988; Wilson, 1993). The business value of Enterprise Systems has been extensively debated in both the popular press and in academic literature over the past decade (Nielsen, 2002). Research points out that many high profile organisations failed in their Enterprise Systems project implementation (Akkermans & Helden, 2002; Bingi, Sharma, & Godla, 1999a; Davenport, 1998; Holland, Light, & Gibson, 1999b; Sumner, 1999, 2000). Some organisations have spent significant resources and several years implementing these Enterprise Systems only to conclude that it is an implementation that was extremely difficult and an expensive change to reverse. This disconnect between large Enterprise Systems investments and the proportionate organisational benefits yielded can be attributed to a range of reasons, including implementation approaches, and business improvements (Bowen & Lawler, 1995; Brower, 1995; Koberg, Boss, Senjem, & Goodman, 1999; Psoinos, Kern, & Smithson, 2000; Psoinos & Smithson, 2002; Sarkar & Lee, 2000; Siegall & Gardner, 2000; Sigler & Pearson, 2000; Spreitzer, 1992, 1996).

An implementation phase of the Enterprise Systems life cycle, in particular, can be viewed as a socio-technical process, affecting tasks, people, technology and structure (Leavitt, 1964). Markus and Tanis and others (Holland, 1999) (Calogero, 2000; Markus et al., 2000) also identify this element and propose the engagement of the users as a key variable because the pervasiveness of technology in today's workplace affects all employees, creating new job roles, changing existing job roles, as well as eliminating the need for some jobs.

In the ERP experience cycle (Markus et al., 2000) conducted a detailed study on problems and outcomes in ERP projects across the ERP system life cycle. Their study divided the ERP experience into three phases.

- Project phase
- Shakedown phase, and
- Onward and upward phase

The findings of Markus et al.'s study show common problems experienced during these three ERP life cycle phases, occur increasingly towards the beginning of

the onward and upward phase. These problems originated in the early project phase, but were not perceived as problems until the beginning of onward and upward phase. A closer look at the nature of reported problems clearly suggests that the implementation issues were not just technical but encompass wider behavioural factors (Skok & Döringer, 2001). The changes to organisational structure and culture further contribute to these behavioural factors, which directly affect the users who are already at the nexus of settling in the 'new world' (e.g. new job roles, new processes, possible uncertainties with regard to job security, training issues, and sometimes lack of information).

Undoubtedly, Enterprise Systems success increase the ability of organisations to integrate the disparate business functions and to gather more information in greater detail in real time (Sia, Tang, Soh, & Boh, 2002). The databases behind these Enterprise Systems provide the power to enable data sharing across traditionally disparate business functions of organisations (e.g. Financial, Human Resources, Manufacturing, Sales and Distribution). The rapid information flows within the organisation enable users to have greater visibility of real-time information in carrying out their day-to-day job activities. This lateral and horizontal dispersion and expansion of information across the organisation increases visibility of activities and processes undertaken by system users (Psoinos, Kern & Smithson, 2000). This highlights the need for users to understand cross-functional business processes. In many organisations, users understand what they do, without understanding how their work affects others (Markus & Tanis, 2000). In particular, in an Enterprise Systems context, such a limited worldview could potentially lead to errors. Thus, expanded information and wider availability of knowledge for users must accompany a matched level of understanding of business functions. Senior management and project managers often neglect such soft non-technical human issues (Mendel, 1999) and limit their focus to technical and financial aspects and post implementation training.

In summary, from the perspective of the affected users, the system introduces change in their day-to-day tasks, job roles, and processes. The orientating theory on Empowerment has the potential to assist in exploring the factors that empower employees to support and accept such large-scale changes occurring during the Enterprise Systems life cycle.

### 1.3 Empowerment

The pre-twentieth century definition of the verb 'to empower', as 'to give power to' was first used in the 17th century and has connotations like 'to authorise', 'to delegate', and 'to enable'. Perkins and Zimmerman identified 96 articles on Empowerment in the Psychological literature from the year 1974 to 1986 (Perkins & Zimmerman, 1995). This number grew to 685 articles and 283 book chapters in the next 7 years (1987-1993) (Perkins & Zimmerman, 1995). The 20th century embraced the notion of Empowerment in discussions based around the politics of such notable figures as Gandhi, Martin Luther King, and Nelson Mandela. Between the mid-1980's to 1990's, management researchers and practitioners (Conger & Kanungo, 1988; Eylon & Au, 1999; Leach, Jackson, & Wall, 2001; Psoinos & Smithson, 2002; Spreitzer, Kizilos, & Nason, 1997; Spreitzer & Quinn, 1996, 1997; Thomas & Velthouse, 1990; Wall, Cordery, & Clegg, 2002) adapted the Empowerment concept as Psychological Empowerment (as at 2000, there were 1991 articles cited in the business periodicals index that referring to Empowerment). As Hardy and Sullivan (Hardy & Leiba-O'Sullivan, 1998) suggest we were then in the 'Empowerment era'.

The concept of Empowerment has been interpreted across a wide spectra non-Information Systems management areas such as healthcare, politics, women, minority groups, and education (Lincoln, Travers, Ackers, & Wilkinson, 2002). There is a likely pattern to be observed regarding the popularity of Empowerment as well as related concepts such as job-enrichment, user-involvement, and authority delegation. The pattern shows that the Empowerment concept has been actively used during turbulent times and in the context of global competition due to its potential for enhancing employee motivation and gaining strategic benefits.

In the management discipline, Empowerment was first explicated by Thomas and Velthouse (Thomas & Velthouse, 1990) as increased intrinsic task motivation generated by *Meaning*, *Competence*, *Self-determination*, and *Impact* experienced by the individual. Thomas and Velthouse suggest the following definitions for each of these four dimensions:

1. *Meaning* - the value of a work goal as judged against the values and ideals an individual holds;

2. *Competence* - an individual's belief in his/her potential to perform activities with skill;
3. *Self-determination* - an individual's sense of having choice in initiating and regulating actions; and
4. *Impact* - the degree to which an individual believes that they can influence how a job is done or the outcomes of a job.

Research evidence suggests that, simultaneous with the rapid uptake of technological advancements in the workplace, Empowerment of employees has also attracted significant interest by the organisational researchers since the 1980's (Wilkinson, 1998). Yet Empowerment is an evolving concept and continues to attract management researchers and practitioners (Conger & Kanungo, 1988; Eylon & Au, 1999; Leach et al., 2001; Psinos et al., 2002; Spreitzer, Kizilos et al., 1997; Spreitzer & Quinn, 1996, 1997; Thomas & Velthouse, 1990; Wall et al., 2002).

Empowerment is a multi-dimensional concept whose multiple levels cannot be effectively assigned to generic categories across all work environments (Spreitzer, 1995b). Consistent with this viewpoint, the research study seeks to contribute to the understanding of different perspectives on the Empowerment concept. The literature review, chapter 2, synthesises the existing perspectives on Empowerment in detail. During the literature review phase of the research, the researcher undertook qualitative analysis to derive a working definition for the new concept of User Empowerment in the Enterprise Systems context. chapter 4 describes the email survey and qualitative analysis undertaken to derive this working definition. An email survey was undertaken to discern the perceptions that Information Systems researchers, Information Systems and Enterprise Systems consultants held in relation to User Empowerment in Enterprise Systems context. These findings further strengthened the research motivation.

### ***1.3.1 Views on Empowerment***

A review of literature presents two broad views on Empowerment, namely, Psychological Empowerment and User Empowerment. Psychological Empowerment is the most widely known type of Empowerment and is interchangeably referred to as simply 'Empowerment' by many researchers. The majority of the Empowerment literature refers to a broad concept of Empowerment. The author found a wide range



of interpretation of the Empowerment concept. However, the majority of these studies anchor around Psychological Empowerment

Based on the definition proposed by Thomas and Velthouse (Thomas & Velthouse, 1990), Spreitzer defined the Psychological Empowerment concept to be an active rather than passive orientation toward a work role (Spreitzer, 1992). The comprehensive empirical work done by (Spreitzer, 1995b) has been one of the cornerstones of this research.

The User Empowerment concept is the second of the two views. The User Empowerment was introduced by Doll and colleagues (Doll et al., 2003) who defined User Empowerment as an integrative motivational concept based on four cognitive task assessments reflecting an individual's orientation to his/her computer-mediated work. The work done by Doll et al. (Doll et al., 2003) brought some degree of clarity to developing a specific type of Empowerment and proposed a model.

Doll et al.'s (Doll et al., 2003) work has provided a trigger to view and understand a specific type of Empowerment in a defined context. The User Empowerment concept has been defined, and its underlying constructs have been investigated as part of this exploratory study; the detailed discussion of this continues in chapter 4.

#### **1.4 User Empowerment in the Enterprise Systems Context**

The majority of the literature on Empowerment focuses on theory building and measuring workers' experiences of Psychological Empowerment. It was only in the late 1990's that a few researchers investigated the relationship of Psychological Empowerment to other variables such as organisational commitment (Wiley, 1999), trust (Mishra & Spreitzer, 1998), active reflection (Cyboran, 2005), and organisational climate (Miranda, 1999). The following paragraphs discuss the key drivers for considering User Empowerment in the Enterprise Systems context.

Some researchers define Empowerment as a process of enshrining power upon people who previously perceived themselves as powerless, in other words, 'Self-empowerment'. This definition of Empowerment does not refer to the contextual setting of these people who previously perceived themselves as powerless. The author argues that this definition of Empowerment is broad and difficult to measure. Further, in the 21st century's dynamic organisational setting, a general

concept such as Self-empowerment may not be suitable without the critical consideration of the organisational context. As a result of the different perspectives of Empowerment, researchers may have resorted to defining the Empowerment as a generic concept. However, such a generic approach has contributed to a wide variety of perplexing descriptions about Empowerment. There is a lack of a clear context specific definition of the Empowerment concept.

A comprehensive review of Empowerment from mid 1980's until 2004 affirms that Empowerment is an evolving multidimensional construct. In order for researchers to meaningfully assess the relationship of Empowerment to another organisational variable two key points should be considered as below:

1. A specific type of Empowerment;
2. Empowerment to be measured in a context.

By considering these two points the researchers would contribute to:

- an increased understanding of the Empowerment concept; and
- enable measurement of an Empowerment type in relation to the contextual variables and measures.

Thus, this research focuses on exploring the relationship between User Empowerment and the context of Enterprise Systems success measures.

Some researchers suggest that an Enterprise Systems brings an inherent rigidity to work processes, to the extent that, because of the system's power and inclusiveness, the organisation is moulded in the image of the Enterprise Systems (Dillard, Ruchala, & Yuthas, 2005). These researchers express strong views about the power of these comprehensive systems (e.g. SAP Financials, Oracle Great Plains) as change agents Dillard et al., (Dillard et al., 2005) and for User Empowerment as an effective mechanism of change management in large software installations (Holland, Light, & Gibson, 1999a; Hong & Kim, 2002; Markus & Tanis, 2000; Nah, Lau, & Kuang, 2001). The concept of User Empowerment, as a focal point for managing the change impacts in organisations due to the implemented Enterprise Systems may significantly improve the successful use of such comprehensive and complex systems. This guides the first research question that this study investigates.

There have been extensive studies in Enterprise Systems implementation success, critical success factors of Enterprise Systems (Holland et al., 1999a) and measurement of Enterprise Systems benefits (Shang & Seddon, 2002a; Staehr, Shanks,

& Seddon, 2002b). However, despite the continued interest in investigating the key enablers and inhibitors of Enterprise Systems success, there has been no prior empirical research that investigates User Empowerment as an enabler for Enterprise Systems Success. It is this gap that this research addresses.

## **1.5 The Research Motivation**

The field of Information Systems success is one of the most extensively studied research topics (DeLone & McLean, 2002; Hirschheim & Heinz, 1989) (Hirschheim & Heinz, 1989). There has been an unprecedented rate of growth in the area of Enterprise Systems success studies. The major reason for such an uptake of Enterprise Systems success topic is the imbalance between the costs and potential benefit associated with the implementation of any Enterprise Systems. Some researchers provide case study evidence on Enterprise Systems implementation failures which have led to organisational bankruptcy (Davenport, 1998; Markus & Tanis, 2000). This research investigates the relationship between Enterprise Systems success and the basic unit of an organisation its users. For the purpose of this research, “the user” is depicted as a user working in a functional, operational, or management unit of an organisation. The users included in this research use at least one Enterprise Systems application to complete their daily job activities as part of their job roles (for example administrators, accountants, finance officers, Human Resource officers, and project managers). The term users can also include those who may be involved in the management (updates to database) of an Enterprise Systems application or module.

Users are required to interact with the system to complete their daily job activities. It is therefore important to identify, understand, and prioritise the impacts of the system on its direct users in order to be able to learn more about the enablers of Enterprise Systems success. An understanding of the impacts on the users of the Enterprise Systems would contribute towards improving the Enterprise Systems post-implementation process. The senior management within the organisations should recognise that there are critical human factors involved in a successful Enterprise Systems implementation and, thereby in a successful Enterprise Systems. The literature suggests that Empowerment has positive impacts on an organisation, especially in the organisations in the West.

This study aims to develop logical understanding of the specific strengths of empowered individuals. It is hypothesised that the empowered employees will contribute towards effectiveness at the individual level. In other words, effectiveness must be aimed at and inculcated from the basic unit of an organisation (i.e. the individual) in order to aim for success at the organisational level. Olson's findings further strengthen the objectives of this research i.e. management of human and organisational risk are more difficult than managing the technical risk. Olson further emphasises that managing human risks is crucial for Enterprise Systems success (Olson, 2001).

Thus, the rationale for selecting the context of Enterprise Systems in the first place, is due to the fact that in a knowledge economy where users play an active role in adapting technology to their tasks (Orlikowski, 1996a), the benefits of Information Systems may not be realised unless users of the system positively accept the new work environment and feel empowered (Spreitzer, 1995a).

## **1.6 Research Justification**

The purpose of this section is four-fold:

1. to explain the aims and objectives of the research;
2. to provide a definition of its scope in terms of the specific research questions it attempts to answer;
3. to justify the research by showing that the issue of the relevance of empowering Enterprise System users is significant and worthy of study when considering success of Enterprise Systems;
4. to demonstrate that this research will make a contribution to this field of study by determining the extent to which Empowerment and Enterprise Systems research, as evidenced by its publications, is relevant to Information Systems practice.

This section contains the following three (3) main parts:

- Aims and Objectives of the Research
- The Research Questions
- Significance and Contribution of the Research

The following section describes the research aims and objectives followed by a description of the research strategy employed to meet the research objectives and address the research questions.

### ***1.6.1 Aims and Objectives of the Research***

#### ***Primary Aim***

The primary aim of this research is to determine if User Empowerment is an enabler for Enterprise Systems success. In order to meet this aim, two pre-requisites need to be completed.

#### ***Secondary Aim***

- The concept of User Empowerment needs to be defined and the dimensions of User Empowerment identified.
- The relationship between User Empowerment and Enterprise Systems success needs to be explored.

The various Enterprise Systems research studies covered by journal articles need to be appraised so that the overall level of coverage they provide for issues relating to users and Enterprise Systems success (or lack thereof) can be determined.

#### ***The Main Objectives of the Research***

In order to fulfill its aims the research needs to produce the following major deliverables.

1. An identification and analysis of the existing Empowerment literature relevant to the Enterprise Systems context.
2. Develop a suitable classification scheme (hierarchical taxonomy) and an analysis of the various perspectives on Empowerment and the amount of coverage the target journal articles provide for the Information Systems topic.
3. To map perspectives on the User Empowerment concept as described by Information Systems researchers, Enterprise Systems practitioners, and academic literature. Chapter 4 describes the details of the definition survey conducted to provide such a mapping. This mapping facilitated a working definition for the User Empowerment concept.
4. To validate User Empowerment in Enterprise Systems context.

5. To validate Psychological Empowerment in a new context of Enterprise Systems success.

### ***1.6.2 The Research Questions***

#### ***The Primary Research Question***

The primary research question, which arose from the primary aim of the research and is:

*Is User Empowerment an enabler of Enterprise Systems success?*

This primary research question can be broken down into a number of component questions, as explained below.

#### ***Component Research Questions and Secondary Research Questions***

The component questions for this research study provide a framework guiding the methodology. Their purpose is to scaffold the study’s enquiry premise by providing a framework of secondary research questions, which will provide a rich source of data collection. By detailed analysis procedures to the datasets, the researcher is then in a position to formulate an informative response to the key question through the study’s findings.

There are two groups of component questions and one group of secondary research questions. The first two groups arise from the pre-requisite of the research. The last grouping is concerned with the secondary research aim of investigating whether User Empowerment is an enabler of Enterprise Systems success. This last group is concerned with more detailed facets of the primary research question. The specific research questions contained in each of these three groups are listed below in Table 1-1Research Questions.

**Table 1-1Research Questions**

<b>Ref</b>	<b>Component Questions</b>	<b>Secondary Research Questions</b>	<b>Related Chapter</b>
1.	Identification of perspectives on Empowerment and a definition of User Empowerment in the context of Enterprise Systems	What is User Empowerment in the context of Enterprise Systems?	Chapter 2 and 4
2.	Empowerment literature topic taxonomy and article	What are the types of Empowerment?	Chapter 2

Ref	Component Questions	Secondary Research Questions	Related Chapter
	classification		
3.	Exploration of the relationship between types of Empowerment and Enterprise Systems success measures	Is User Empowerment an enabler of ES success?	Chapter 5 and 6
Does Psychological Empowerment have an effect on Enterprise Systems success?		Chapter 6	
Does User Empowerment have an effect on Enterprise Systems success?		Chapter 6 and 7	

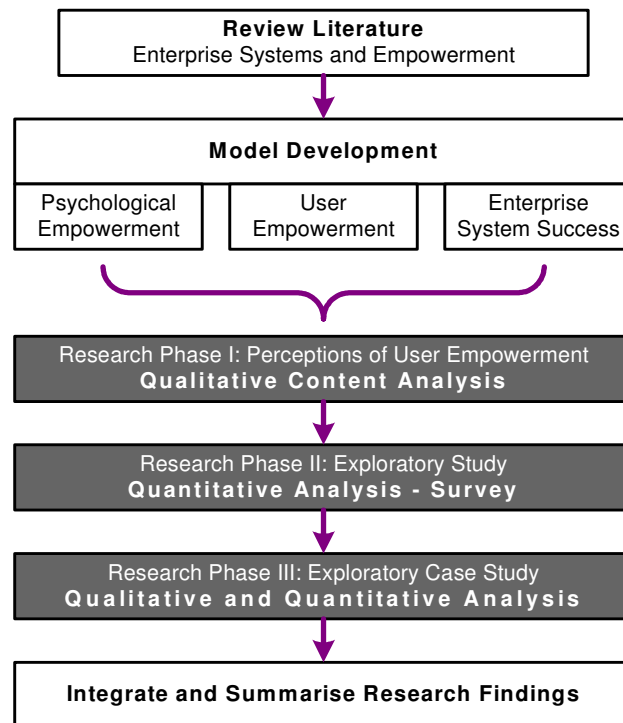
### *The Research Strategy*

This research is based on an exploratory research design using a multimethod approach. The multimethod consists of a qualitative content analysis, a survey research phase, and a case study approach to further undertake a confirmatory analysis. The tools utilised during the qualitative analysis are Nvivo and WordStat. The tools and techniques for conducting the quantitative analysis include Statistical Package for Social Sciences (SPSS version 15) and AMOS (version 6).

**Phase 1:** An email survey method is employed: (i) to seek out the perceptions of Information Systems researchers from the ISWorld mailing list on the topic of User Empowerment in an Enterprise Systems context; (ii) to discover the perceptions of Information Systems practitioners, from SAP Australia and New Zealand, on the topic of User Empowerment in an Enterprise Systems context; (iii) to seek common views between the Information Systems researchers, Information Systems practitioners, and the relevant literature on Enterprise Systems and Empowerment. This research phase 1 was carried out via qualitative content analysis to derive a working definition for the User Empowerment concept in the Enterprise Systems. Chapter 4 describes phase 1 in detail and presents the working definition derived from the analysis. The research was carried out in three main phases<sup>4</sup> as described next, and presented in Figure 1–1 below.

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<sup>4</sup> From this point onwards Phase 1, Phase 2, Phase 3 will be interchangeably referred to as research phase 1, research phase 2, and research phase 3.



**Figure 1–1 Overall Research Design**

**Phase 2:** The purpose of survey data collection method was: (i) to validate the User Empowerment model in Enterprise Systems context; (ii) to confirm the Psychological instrument in a new context i.e. Enterprise Systems; (iii) to test the effect of Psychological Empowerment on Enterprise Systems success; and (iii) to test the effect of User Empowerment on Enterprise Systems success. This research phase 2 was carried out in a large tertiary education organisation in Australia. This study was of high value to the Financial Services Division of the organisation as it was the first such study since the Oracle system was implemented in mid 1990's.

The exploratory survey employed three key constructs of Psychological Empowerment, User Empowerment, and Enterprise Systems success. The research model was tested and instrument was validated. The summary of findings was presented to the study sponsor and management team in the form of a confidential management report, followed by presentation to the managers of the Financial Services division. Chapter 5 describes phase 2 in detail and chapter 6 discusses the findings of the study.



**Phase 3:** The purpose of the exploratory case study method was: (i) to develop deeper understanding of the User Empowerment constructs; (ii) to confirm some of the findings from phase 2; and (iii) to study the effect of an Enterprise Systems on experienced Enterprise Systems users who use more than one module of an Enterprise Systems as part of their daily job activities. This study phase 3 was carried out as part of an Organisational Change Management program in a large manufacturing organisation across Australia and New Zealand. This organisation had implemented all modules of an SAP Enterprise System across geographically diverse business units of the organisation in 2003.

The confirmatory survey facilitated limited yet powerful descriptive analyses that complemented the findings from the exploratory survey conducted during phase 2. Chapter 6 describes phase 3 in detail and discusses the findings of the study.

This multimethod research approach aimed to address the research questions and overall research problem by viewing the success of Enterprise Systems from an operational perspective. This operational perspective is measured in terms of the functionality of the modules, the system use by its users, and how the system impacts the users' work. The findings of this research should be of particular relevance to the organisation in the long term because the operational perspective tries to measure how well the Enterprise System manages the organisational business processes once the system is in place. No attempt is made in this study to address the organisational success dimensions. Thus, the research strategy is outlined as follows:

1. A theory-then-research strategy or deductive approach was adopted.
2. The orienting theories of Empowerment, Social-cognitive theory, and Value theory were examined as potential enablers of Enterprise Systems success;
3. Examined ES lifecycle phases and ES success factors reported in the literature.
4. Based on the research objectives, the focus was narrowed down into more specific hypotheses that could be tested according to the research design.
5. Defined a specific type of system-Oriented empowerment as derived from research phase I.
6. Operationalised Constructs.
7. Developed a research model with the three constructs of: Psychological Empowerment, User Empowerment, and ES success.
8. Designed and Validated a survey instrument (Pilot, Scale Validation, Revision)

9. Data was collected, collated, codified, cleansed, entered, described, and analysed using MS Excel, SPSS Version 15 and AMOS 6 statistical packages.
10. Developed model and tested hypothesis.
11. All constructs were tested for reliability and validity during phase 2. Given the newness of the research subject area, this would be a contribution in itself.
12. Statistical analysis was conducted on the data to test the research model and address the research questions. The results of the analyses were interpreted and reported.
13. Finally, the study was summarised.

The next section discusses the unit of analysis and unit of observation pertaining to this study.

#### ***The Unit of Analysis: Individual User of the Enterprise System***

The individual Enterprise Systems user is the unit of analysis in this research. A simple definition of a unit of analysis would translate it as that entity or entities about which we collect data and about which we seek to generalise or make inferences.

The unique characteristic of Enterprise Systems users is their ability to make decisions during their daily job activities through use of the Enterprise Systems. Hirschheim (Hirschheim & Heinz, 1989) interprets users as the organisational agents who interpret and make sense of their surroundings. An ERP system involves many users ranging from top executives to data entry operators, many applications that span the organisation, and a diversity of capabilities and functionality (Gable et al., 2003). Thus, considering users in isolation to their current work environment may lead to an incomplete understanding of the context (Enterprise Systems). Many Information Systems and Enterprise Systems success studies acknowledge the relevance of incorporating the 'soft' people aspect in Enterprise Systems success. This thesis: (i) acknowledges the role of multiple stakeholder groups of users in the context of Enterprise Systems success; and (ii) seeks to empirically validate a potential enabler of Enterprise Systems success.

#### ***The Unit of Observation: The Enterprise System as Perceived by its Users***

The unit of observation is the Enterprise System as perceived by its users. The adequacy of the selected unit of observation pivots around the concepts of ease

of use and learning; enhancement of the daily tasks; and effectiveness of *Problem-solving and Decision-making* by the adequate use (or not) of the Enterprise Systems. For the purpose of this study, *use* is defined as the period of time from finalisation of the implementation to a major change in the employment of the ERP software. The goal of the '*use*' is to realise as much of the business benefits that can be accomplished through the Enterprise System software as possible.

(DeLone & McLean, 2002) argue that the usage construct is not pertinent when the use of a system is mandatory. This study assumes mandatory use of the Enterprise Systems; thus, the number of hours a system is used conveys little information about the adequate use of the system by its users. Seddon and Kiew (Seddon and Kiew 1994) argue that the underlying construct Information Systems researchers have been trying to gauge is Usefulness, not Usage. However, (Gable et al., 2003) argue that the 'Usefulness' of a system derives from such factors as the quality of the system, quality of information, and satisfaction of users. (Gable et al., 2003) further argue that Usefulness is not an independent construct, but rather a surrogate measure of *System Quality*, *Information Quality*, and satisfaction. On the basis of this argument, therefore, 'Usefulness' was excluded from the à priori model.

This research makes the following propositions: when users are engaged actively during the early stages of an Enterprise Systems implementation, User Empowerment would enable users to develop a better understanding of the system, and the system would then be better tailored to the needs of the user. In this way, the users of the system will be more inclined to adapt to the system and be more satisfied with the use of the system in their day-to-day job activities. Unfortunately, this is the opposite the current common trend, where the users are not involved until the entire implementation process is completed. No direct empirical evidence was traced regarding User Empowerment and Enterprise Systems success to date.

### ***1.6.3 Significance and Contribution of the Research***

The study defined a specific type of Empowerment (User Empowerment) in the new context of Enterprise Systems. The study revealed assumption that Information Systems researchers and practitioners hold about User Empowerment in Enterprise Systems context.

The exploratory survey findings evidenced that Psychological Empowerment has no correlation to Enterprise Systems success measures. This is somewhat contrary to what the literature on Empowerment and general belief suggests i.e. high level of Psychological Empowerment increases concentration, initiative, and resiliency and thus heighten employee effectiveness. Spreitzer et al. (Spreitzer, Kizilos et al., 1997) have suggested work satisfaction as an outcome of high Psychological Empowerment of the worker. Reduced job related strain is stated to be the third anticipated outcome of Empowerment as a means of getting employees to work to their full potential (Spreitzer, Kizilos et al., 1997) and eventually leading to improved work outcomes.

This study undertook a confirmatory factor analysis of the Psychological Empowerment model in a new context.

The high response rate and the quality of data yielded in the exploratory survey have been instrumental in allowing the researcher to be able to undertake advanced statistical analysis.

- The study validated the survey instrument, undertook an exploratory factor analysis for the User Empowerment model.
- The exploratory survey evidenced a significant correlation between User Empowerment and Enterprise Systems success.
- Further testing was undertaken to explore the presence of potential mediating relationships between User Empowerment and Enterprise Systems success or Psychological Empowerment and Enterprise Systems success.

A detailed case study was undertaken to confirm the findings from the exploratory study. Further analysis was undertaken via a case study in another large organisation that had implemented a different Enterprise Systems (SAP). The key findings of the case study are outlined below.

- *Individual Impact* on Enterprise Systems users was evidenced where users had high levels of autonomy and decision-making ability. Most of the users were experts and used more than one module of the Enterprise Systems to do their work.
- The results indicate that different employment cohorts have different views as to the success of the Enterprise Systems, which suggests that they may use the Enterprise Systems for different activities. Prior research has suggested that one should always be mindful of from whose perspective the success is being

measured, (Shang & Seddon, 2002). This is borne out by the results of this study – the Senior Managers rated the Enterprise Systems highest on *Information Quality* possibly due to the need for MIS, Decision Support Systems (DSS) and Executive Information Systems (EIS). The highest score for overall Enterprise Systems score was achieved by the Senior Manager cohort where the overall Enterprise Systems success score of 5.80 was the highest score by all categories and for all respondents on a Likert scale of 7.0.

- Across each Geographical Unit the findings present reasonably uniform Enterprise Systems success results. Across the various Geographical Units there was little variation, the sample variance was .09 and the Standard deviation was .31 indicating a very narrow range of values.
- The overall User Empowerment score for Information Technology (IT) Business Unit as well as individual sub-constructs of User Empowerment for the IT Business Unit was highest as expected. The '*Computer Self-efficacy*' mean scores were highest for IT Business Unit employees as compared to the rest of the organisation. However, the author argues that IT Business Unit seeks to support end users of the Enterprise Systems rather than 'true' end users themselves.

## **1.7 Key Research Outcomes**

The purposes of theoretical and practical outcomes are to build and contribute to the current literature on the research topic and to assist organisational Change Management challenges associated with Enterprise Systems implementations. Therefore, the intended theoretical and practical outcomes of this research are presented in the following sections. These outcomes address the three key objectives outlined in the research problem section but not limited to the following.

### ***1.7.1 Achieved Theoretical Outcomes***

The study achieved the following theoretical outcomes:

1. Derived a working definition for User Empowerment in the context of an Enterprise Systems.
2. Provided a unique insight into post-implementation factors of an Enterprise Systems in an Australian Tertiary Education organisation.

3. Contributed to the body of literature on Enterprise Systems success by introducing a new enabler of Enterprise Systems success from the overarching concept of Empowerment.
4. Adapted User Empowerment dimensions to suit the Enterprise Systems context.
5. Empirically tested the Psychological Empowerment construct as a contributor to increased work effectiveness. In this study work effectiveness is an indirect indicator of Enterprise Systems success.
6. Highlighted the key explanatory construct behind one of the Enterprise Systems success measures (Individual Impact) thereby, contributing to the Enterprise Systems success measurement model of Gable et al. (Gable et al., 2003).
7. Increased awareness of the potential value of User Empowerment amongst researchers and practitioners. Additionally, to create a potential value case that promotes further exploration of User Empowerment in the context of Enterprise Systems success or in other words, promote the User Empowerment factors which do impact on Enterprise Systems implementation success.
8. Identified User Empowerment in relation to the implemented Enterprise System.

There is potential for further research to understand each impact on the user due to the Enterprise Systems in their current work environment. The dependencies of the different impact categories may also provide meaningful insights for the Enterprise System project managers, Enterprise Systems implementation partners and vendors. Such a categorisation of the impact types can help the implementation team to apply this knowledge when developing strategies for a systematic roadmap of Organisational Change Program. The positive acceptance<sup>5</sup> of the Enterprise System by its users would be the cornerstones of the effectiveness of the Change Program. This last theoretical outcome could be a valued extension to this current study at hand and presumably, lead to practical outcomes for organisations.

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<sup>5</sup> IT acceptance is the act of receiving IT use willingly (Saga & Zmud, 1994). Acceptance is the fourth stage in six-stage model of IT implementation (R. B. Cooper & Zmud, 1990). The stages are: initiation, adoption, adaption, acceptance, routinisation, and infusion. Thus acceptance is part of a process that unfolds over time. Resistance may manifest itself at any of the stages. Resistance may be active or passive. Although not stated explicitly in the definition of acceptance, both acceptance and resistance may be referred to in the context of individuals, groups, or entire organisations.

### ***1.7.2 Achieved Practical Outcomes of the Study***

The study targeted organisations that had implemented Enterprise Systems at least 2 years prior to the conduct of the study. The findings across the two organisations studied address the potential relevance of User Empowerment in the Enterprise Systems life cycle (post-implementation). The research phases derive appropriate conclusions, which seek to benefit all parties involved in the Enterprise Systems implementation process i.e. senior management, Implementation team, Enterprise Systems vendor(s), Implementation partner (external), Organisational Change Management Team, and Training team. Further, the validated User Empowerment instrument could be potentially used as an organisational readiness check of the multiple stakeholder groups in any organisation across different stages. These stages are listed below.

1. Before and after a major upgrade to an Enterprise Systems.
2. As part of a feasibility check to assess the readiness of the employees prior to a new Enterprise Systems implementation.
3. As part of the general review of the ‘health’ of the system post-implementation.
4. Most importantly the analysis derived from such a dataset delivers a valuable footprint to the organisation in assessing the benefits from the implemented ES.

### ***1.7.3 Key Research Outputs***

Several interim findings from this study have already been presented to the Information Systems community during: (i) National and International refereed conferences; (ii) Seminars; (iv) Colloquia; and (v) Research seminars organised by industry forums. This thesis includes material from research papers previously published in the proceedings of conferences. The conferences selected for research publications are double-blind refereed conferences of rating E1. A summary of the papers in the order of their occurrence and the chapters that draw on them is provided in Table 1-2 below.

**Table 1-2 Previously Published Research Papers and Associated Chapters**

<b>Refereed Research Papers and Other Outputs</b>	<b>Thesis Chapter</b>
ICEB 2003 Sehgal, R., & Stewart, G. (2003). Understanding user empowerment in enterprise systems context: Is user empowerment predictive of enterprise systems	Chapter 2

Refereed Research Papers and Other Outputs	Thesis Chapter
success. Paper presented at the International Conference for E-Business, Singapore.	
A seminar presentation on the application of Qualitative analysis tool Nvivo to conduct literature review was presented to the QUT research and academic group.	Chapter 2
Australasian Conference on Information Systems (ACIS) 2003 Doctoral Consortium, Chairs: Professor Graham Pervan and Professor Shirley Gregor	Chapter 3
Colloquia Series 2003 A seminar presentation on the preliminary findings from the phase 1 & 2 of the research was presented to the former Information Systems Management Research Group (ISMRG) colloquium at QUT for feedback before the 'confirmation of candidature' seminar.	Chapter 3 and 5
Sehgal, R., & Stewart, G. (2004, 6-8 August, 2004). <i>Exploring the relationship between user empowerment and enterprise system success measures</i> . Paper presented at the Americas Conference on Information Systems (AMCIS) 2004, New York, U.S.A. The findings from chapter 5 and preliminary discussion on data collection approach for chapter 6 were reported in a paper presented to this conference.	Chapter 5
Sehgal, R., Stewart, G., & Sedera, D. (2004, 1-3 December 2004). Assessing the impact of user empowerment on enterprise system success. Paper presented at the Fifteenth Australasian Conference on Information Systems 2004, Hobart. Findings from chapter 3 and 5 are published in a research paper, which was a 'best paper' nominee at the conference.	Chapter 3 and 5
2005 An SAP Research seminar was presented to the practitioners and researchers at SAP Australia where the final results of the phase 2 statistical analysis was progressively discussed.	Chapter 6
Sehgal, R., & Stewart, G. (2006). Using qualitative analysis for deriving evidence based construct definition: A case narrative of user empowerment. Paper presented at the QUALIT, Brisbane, Australia. A research paper reporting the findings from chapter 4 was presented at the conference.	Chapter 4

QUT rules stipulate the following conditions for including previously published material in the thesis:

*Original work by the candidate arising from the research reported in the thesis and which has been published prior to the submission of the thesis may be included. Such inclusion may be either by way of elaboration or explication of the previously published work, or by verbatim inclusion of published work either in appendices<sup>6</sup> or as part of the main text.*

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<sup>6</sup> The appendices generally contain supporting detail and tables that are too long to insert into the body of the chapters. Where references to the appendices are given, in the body of the chapters of the soft copy version of the thesis, the references are hyper-linked to the soft copy appendices. The (soft copy) reader can return from the followed hyperlink back to the body of the chapter by clicking on the 'Back' arrow if the Word Web toolbar is active (View/Toolbars/Web).



## **1.8 Thesis Structure**

### ***1.8.1 Thesis Organisation and Presentation***

In this introductory chapter, the overview section is utilised to enable signposting for the reader. The early sections from 1.1 through to 1.3 provide the necessary background to the concept of Empowerment and Enterprise Systems. Next, the research problem is positioned along with the motivation to study a type of Empowerment in a specific context followed by the research questions. The later part of this chapter is devoted to presenting the research strategy and outlines the key phases of the research. The unit of analysis and unit of observation are presented to give an explanation for the research strategy that follows.

### ***1.8.2 Chapter Outlines***

The structure and organisation of the thesis chapters is described below and graphically presented in Figure 1–2 below.

#### ***Chapter 1: Introduction***

The focus of the introduction Chapter 1 is to understand the background on Enterprise Systems and Empowerment. This chapter positions the research problem and, research questions, and presents the overall research strategy to the reader. Next, the potential research contributions are set forth before providing an overview of the remaining chapters of this thesis.

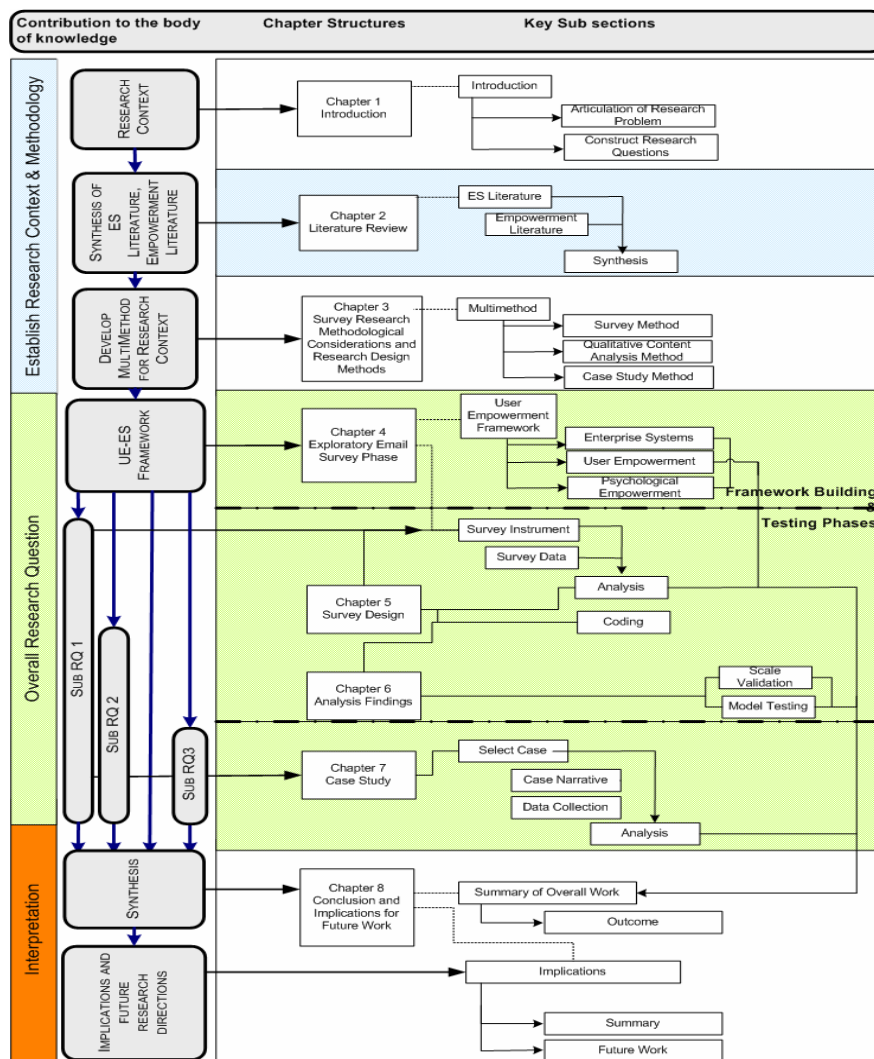
#### ***Chapter 2: Literature Review***

This Chapter reviews prior research in Empowerment and selected Enterprise Systems success research relevant to the study objectives. Essentially, this chapter describes the processes involved in building an argument from a body of literature via a process quite similar to analysing a qualitative dataset. The processes involved includes: reading and reflecting; interacting with the literature/data and making annotations on it; identifying key themes and coding for them; extracting from the codes what is most pertinent to addressing the research questions posited; linking similar ideas from different articles/transcripts; identifying contradictions in arguments; comparing dissimilarities in articles/transcripts; and building one's own

argument/analysis with links to supporting evidence in the data/literature (Gregorio 2000).

### Chapter 3: Research Method

This chapter discusses the survey research approach and conduct as part of the multimethod. The chapter describes the overall research methodological position of this research. This chapter further explains the research model and the approach to operationalising the research variables.



## **Figure 1–2 Thesis Structure and Approach**

### ***Chapter 4: Research Phase I- The Definition Survey***

The email survey chapter describes the preliminary email survey design and content analysis phase of the research design. In particular the chapter describes the literature review categorisation process.

### ***Chapter 5: Research Phase II -The Exploratory Survey Design***

This chapter describes the process carried out to design, conduct, and analyse the data collected and discusses the model development and construct operationalisation process.

### ***Chapter 6: Research Phase II -The Exploratory Survey Findings***

This chapter presents the scale validation and model testing findings from Research phase II.

### ***Chapter 7: Research Phase III -The Case Study***

The confirmatory survey chapter is made up of two parts. The first part describes the processes carried out to refine the instrument design. The second part presents the descriptive statistical findings of the survey along with the interpretation of the results.

### ***Chapter 8: Conclusion and Future Research***

This chapter summarises the thesis from a global perspective. This chapter seeks to address each of the research questions laid out in chapter 1 as well as the underlying investigative questions. A cross case analysis between research phase 2 and research phase 3 is described where the author compares and contrasts the findings across the research phases in light of their limitations. It further summarises the key contributions of the research, addresses the limitations of the study and takes the opportunity to position the potential directions for follow-on research based on the strengths, weaknesses, and opportunities of the research at hand.



## **2 Literature Review**

### **2.1 Chapter Overview**

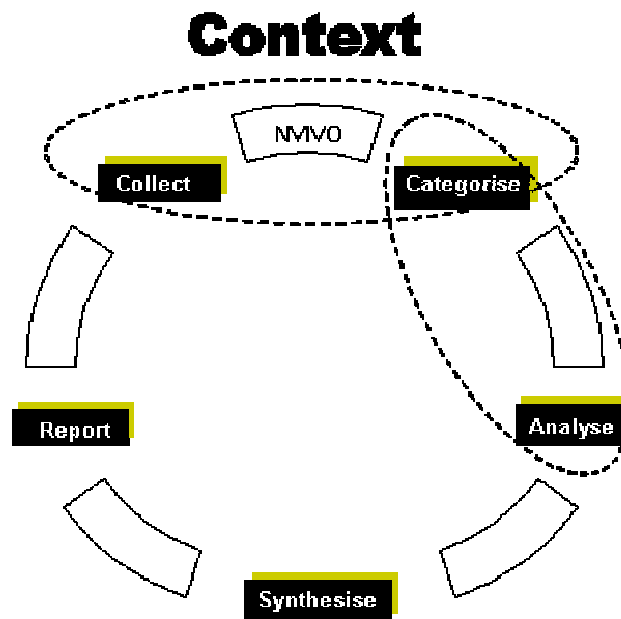
The purpose of this chapter is to examine those publications and articles that have provided a rich background in understanding the issues around Enterprise Systems success. Comprehensive review of Enterprise Systems literature revealed core non-technical issues that potentially impact the Enterprise Systems success adversely across the Enterprise Systems life cycle. The unprecedented growth in the area of Enterprise Systems success studies evidences that a large number of organisations are yet to see tangible business benefits from their investments in these complex packaged systems. SAP, Oracle, and Mincom remain the most eminent vendors of these integrated packaged systems. The chapter describes orienting theory of Empowerment as an enabler for Enterprise Systems success, and examines types of Empowerment in a new context of Enterprise Systems.

The chapter begins by providing the research study background of Enterprise Systems including key trends in Enterprise Systems and the rationale for Enterprise Systems adoption. The Enterprise Systems life cycle is also described. The next section describes the general concept of Empowerment and its significance in the workplace. This discussion then proceeds to distinguish the concept of Empowerment from similar concepts. The next section then describes a specific type of Empowerment, namely User Empowerment in the context of Enterprise Systems. Finally the chapter concludes by providing a summary of the key findings of the literature review.

### **2.2 Literature Review Cycle**

Literature review is the most important phase of any research (Hart, 1998). The literature review is conducted through the cycle depicted in Figure 2–1 below. The knowledge gained from past work done in an area presents the researcher with an increased understanding of how a subject has evolved thus far, what is already known about a topic, what else has the potential to be explored, and how else could this knowledge be applied in different context to gain new insights. The author

would like to note that there may be other benefits of literature review and the ones listed here are simply the most generic ones. Chapter 4 describes the categorisation process used to derive a working definition for the new concept of User Empowerment in an Enterprise Systems context.



**Figure 2–1 Literature Review Cycle**

The cycle depicted by the schematic in Figure 2–1 above is a simple and pragmatic method for conducting the literature review. The researcher has benefited by following this iterative cycle. Many benefits achieved support the suggestions of eminent researchers such as (H. M. Cooper, 1998; Leedy & Ormrod, 2001, p.70). The steps in the Literature Review Cycle are described next. . It is to be noted that all of the steps in the Literature Review Cycle are iterative.

The cycle kick-off is marked by the Collection Step; this is essentially a data gathering phase and continues across the entire research process. However, the level of sophistication and refinement varies, across research phases. The early research phase, for example, was devoted to searching existing literature on Enterprise Systems, issues relating to Enterprise Systems implementations, and orienting theories of Empowerment etc. as compared to data gathering during the later stages

of research, where the researcher focused on updating and refining the existing concepts.

The next step is categorisation of the data collected into an ordered theme. The researcher acknowledges the benefit of categorisation in the early research phase when the research required crystallising research questions. Categorisation is useful but is not sufficient to complete the review process: although categorisation provides some level of confidence in the topic and overall business or research need, it is during the penultimate analysis step where the researcher provided ideas and approaches which presented new insights about the topic. The following step is synthesis of all the previous steps to interpret; make sense of study findings; and ultimately, help tie one's own results to preceded work.

The final step is to document the findings in a way that the process is repeatable to a certain extent. The researcher is then in a position to report the findings back to the research and practitioner community and can advance knowledge of the topic in some way that is beneficial to the future research in the research area.

Having described the general process adopted to review literature the next section presents a synopsis on Enterprise Systems.

### **2.3 Enterprise Systems**

Enterprise Systems are commercial packages; that is, they are purchased or leased from software vendors rather than being developed from scratch in-house (M. L. Markus & C. Tanis, 2000). These commercial packages are software applications that connect and manage information flows across the organisation. This characteristic of integration, between enterprise functions, enables users to make decisions based on information that reflects the current state of their business. Enterprise Systems provide service to many industries and have evolved to support all organisational business processes. Enterprise Systems are arranged into distinct functional modules, covering the typical functions of an organisation. The most widely used modules are Financials and Controlling (FICO), Human Resources (HR), Materials Management (MM), Sales & Distribution (SD), and Production Planning (PP). These modules, as well as the additional components of the Enterprise Systems, are detailed below in Table 2-1.

**Table 2-1 Business Functions Supported by Enterprise Systems (Source: Davenport HBR July-August 1998)**

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Please consult the hardcopy thesis  
available from the QUT Library

Each module of an Enterprise Systems handles specific business tasks on its own, but is linked to the other modules where applicable. For instance, an invoice from the billing transaction of SD will pass through to accounting, where it will appear in Accounts Receivable and cost of goods sold.

The Enterprise Systems modules are integrated, and span most functions required by large corporations, including Manufacturing, Finance, Sales and Distribution (Bancroft, 1998). The data is processed in real time i.e. the data is entered to the system only once: no re-entering or double-checking is required. If one enters data in accounting, for example, it will simultaneously affect the purchasing department in materials management and also inventory planning and so on in other related departments. For manufacturers, Enterprise Systems applications typically support the operational processes of materials sourcing, manufacturing planning, and product distribution. To its end-users, an individual application of an Enterprise Systems may appear seamless; however, to those who procure, implement, and/or maintain Enterprise Systems, they are complex software systems which require varying levels of customisation and support both centrally and across applications.

Up until 2007 the key Enterprise Systems vendors are SAP (Software, Application and Products), Oracle, People Soft, Baan Co, and JD Edwards.



Acquisitions in the last couple of years have left SAP and Oracle as the two large vendors shaping the Enterprise Systems landscape across the globe. However, other Enterprise Systems vendors still continue to exist and function. In this study one module of Oracle (Financials) and all modules of the SAP R/3 are studied to investigate and to address the research questions. SAP R/3 is an integrated suite of applications from SAP that form the client/server version of its R/2 mainframe applications. SAP R/3 included Information Systems for Manufacturing, Distribution, Order Processing, Accounting; and Human Resources.

Enterprise Systems implementations pose difficult technological and organisation wide challenges as compared to traditional Information Systems implementation. This is emphasised by Strong et al (Strong & Volkoff, 2004) who state that implementing an Enterprise Systems can be the “corporate equivalent of a root canal” (Strong & Volkoff, 2004) (p. 22). In other words, an Enterprise Systems implementation is ‘painful’ and complex for the organisation. This is mainly because an Enterprise Systems is never used the same way in any two organisations: Cadbury Schweppes, for instance, can have a different implementation of SAP R/3 from Procter & Gamble and so forth. There exist two key issues that are the root of the complexity and lead to differences. The next describes these two issues.

**Customisation configuration:** In any Enterprise Systems module there are tens of thousands of database tables that may be used to control how an application behaves. Enterprise Systems, with their single database, replaces myriad special purpose legacy Information Systems that once operated in isolation. In general, configuration tables control the behaviour and appearance of nearly every screen and transaction. This gives the implementing organisation great power to make the application behave differently for different environments. This power inherently brings considerable complexity. For example a typical SAP module contains 8,000 to 10,000 configuration tables and 800 to 1,000 business processes (Alvarez, 2002). At the technology level itself, the management of these configuration tables for implementation requires substantial knowledge about the package, as well as experience from configuration experts. The level of complexity increases when other parts of the organisation interact with the users in accomplishing their job activities in the new business processes, in their new work roles, and in the organisational

structures that may impose controls to accommodate the implemented Enterprise Systems.

**Integration effort:** In any organisation there is a need to develop interface programs to communicate with the existing Information Systems. This requires considerable effort of systems integration i.e. to determine what information is to be extracted out of the Enterprise Systems or to interface into Enterprise Systems to load data into the system.

Figure 2–2 below depicts a typical scenario before and after an Enterprise Systems has been implemented in an organisation. In the before model, each business function (for example, Human Resources, Finance, Operations) is supported by multiple applications and interfaces. In the after model, a single application module within the Enterprise Systems system supports each function, and all applications leverage from a common data source.

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Please consult the hardcopy thesis  
available from the QUT Library

**Figure 2–2 Before and After Enterprise Systems, Source: [www.army.mil](http://www.army.mil)  
(19/06/2006)**

Enterprise Systems have several layers, such as, the underlying programming language (back-end) and the GUI (front-end). The first layer is not visible to the managers and other end users but is the focus of implementation partners. The Enterprise Systems implementing organisations generally choose to recruit expert external Enterprise Systems consultants to complete the implementation based on best practice.

From the viewpoint of the manager or a typical end user, the heart of the software is the front-end of the application module. The author suggests that there is a conflict in the fundamental viewpoints of the implementation team and the end users of the Enterprise Systems. Sammon et al. (Sammon & Adam, 2002) describe these viewpoints as two components of Enterprise Systems as the solution to “operational” integration problems and “informational” requirements of managers.

This study is interested in investigating the Enterprise Systems success from the viewpoint of the end users in the organisation which has implemented the Enterprise Systems. It is the end users who must not only learn a new system, but must take on additional, sometimes unfamiliar, tasks and responsibilities. In other words, a potentially significant change occurs to the way business users undertake their job activities.

Sceptics of the soft socio-cultural issues approach may argue that it is a new technology, and training tools and programs are sufficient to manage the implementation process. An Enterprise Systems module implementation, however, requires changes to the way people carry out their job activities, their tasks due to either an implicit or explicit assumption of the Enterprise Systems module(s), the business processes, and sometimes the organisational structure. Leavitt's (Leavitt, 1965) so-called “diamond” echoes this same argument. The model proposed by Leavitt (Leavitt, 1965) supports that any change in one of the four components of the “diamond” (i.e. task, technology, people, and process), is likely to have an impact elsewhere in the socio-technical system. Thus, based on Leavitt's (Leavitt, 1965) model, an Enterprise Systems implementation should be seen as but one aspect of the socio-technical approach. Following this line of thought, it is logical to include those affected directly (end users of the implemented Enterprise Systems module), by the change in ‘technology’ and ‘business processes’ to be part of the change. Carton and Adam's (Carton & Adam, 2005) research in the area of Enterprise

Systems impacts, acknowledges that the biggest impact has been on people and their jobs and that these effects are better defined in terms of Organisational Change.

### ***2.3.1 Rationale for Implementing Enterprise Systems***

Due to the wide scale uptake of Enterprise Systems in the late 1990's market research projected a growth in the uptake of Enterprise Systems applications by a further 32% and predicted that the total market would reach \$66.6 billion by 2003 (Bonasera, 1999), representing 43 per cent of the applications' budgets of organisations (AMR Research, 1999b). The value proposition of adopting Enterprise Systems from SAP, JD Edwards, Oracle, PeopleSoft and their software packages enticed organisations to invest heavily in these systems. The key drivers in the trend to adopt these complex systems can be summarised as globalisation of business; increasing national and international regulatory environments e.g. standardisation of processes i.e. ISO 9000; scalable and flexible emerging client/server infrastructures; and a trend for collaboration among software vendors (Skok & Döringer, 2001).

The organisations adopting Enterprise Systems had certain expectations, such as, for example incurring lower Information Technology costs to support their core business processes in the long run. Ideally, standardisation of processes is simpler and imposes minimal effort in terms of technology support to an organisation. In practice, however, the cost benefits often remain unrealised (Davenport, Prusak, & Wilson, 2003), due to changes in business environments which demand best practices, and failure to anticipate the degree of user needs (Nah et al., 2001). The training budgets in Enterprise Systems projects often exclude the hidden costs of reduced productivity as users cope with the complex Information Systems landscape while continuing to accomplish their day-to-day jobs.

According to Poston and Grabski (Poston & Grabski, 2001) the Enterprise Systems are expected to deliver two key benefits:

1. To reduce costs by improving efficiencies through computerisation; and
2. To enhance decision-making by providing accurate and timely enterprise-wide information to the users.

However, their view of Enterprise Systems benefits is limited as compared to the benefits listed by Shang & Seddon who classify types of managerial level benefits based on 233 research publications on Enterprise Systems-Vendor success stories

(Shang & Seddon, 2002b). Their study reveals that each organisation achieved benefits across a minimum of two dimensions:

- Operational benefits;
- Managerial benefits;
- Strategic benefits;
- IT infrastructure benefits; and
- Organisational benefits.

Table 2-2 below summarises the rationale for implementing Enterprise Systems along with anticipated benefits for the adopting organisation. The question of whether Enterprise Systems are capable of delivering the above benefits to the organisation has been debated for some time as evidenced by the rapid increase of Enterprise Systems success and Enterprise Systems benefits discussions across scholarly articles, research journals, and business press. Regardless of this, the astounding uptake of Enterprise Systems by organisations, and rapid growth within the associated service markets in the past decade, has significantly shaped the type of research articles, books, and studies that have been published by the research community to date. Enterprise Systems adoption continues to grow globally, despite the difficulties and risks encountered by organisations when adopting and implementing these systems (Markus & Tanis, 2000).

**Table 2-2 Rationale for Implementing Enterprise Systems**

<b>Key Driver</b>	<b>Rationale</b>	<b>Anticipated Benefit</b>
Technology	Powerful and Integrated Systems.	- Greater flexibility. - Lower Information technology costs.
Business Practice	Improve ways of accomplishing business processes.	- Better operational quality. - Greater Productivity.
Strategy	-Short term cost benefits gained via efficient systems. -Long-term evolutionary benefits gained via effective use of the systems.	- Improved decision-making. - Support business growth. - Develop external linkages.
Competition	-Sustain growth in the presence of competitors adopting Enterprise Systems, and Greater cost efficiencies.	-Improved service delivery to customers.

### ***2.3.2 Enterprise Resource Planning (ERP) Trends***

The enduring themes across published journals between late 1990s and early 2007 can be broadly divided as per ERP lifecycle (adoption decision, acquisition, implementation experiences, use and maintenance, evolution, retirement), extensions and integration of existing ERPs, value from ERPs, education curriculum, and finally publications that focused on trends in ERPs across specific industry sectors. The early ERP publications encompassed ERP lifecycle whereas the advanced publications represent truly multidisciplinary views on ERP.

The ERP researchers, implementers, users, and vendors agree that Enterprise Systems increasingly change people's lives, including relationships, communications, transactions, data collection and decision-making. These systems facilitate and influence business models and innovation, and thus generate newer services. For these reasons, studies on ERP systems and the impact on users have become an emerging research area.

The early Enterprise Systems related publications dealt mainly with software selection (Adams, Nelson, & Todd, 1992; Butler, 1999; Everdingen et al., 2000; Piturro, 2001; Stefanou, 2000) and then implementations (Esteves & Pastor, 2001; Strong & Volkoff, 2004). Since most large organisations have now adopted an Enterprise System the publications and research focus trends have also progressed proportionately. The Enterprise Systems literature shows studies concerning Enterprise Systems success and failure (Furumo & Pearson, 2004); benefits of Enterprise Systems (Shang & Seddon, 2000) and reasons for adoption of Enterprise Systems (Brown & Vessey, 2000; Knapp & Shin, 2001); critical success factors of Enterprise Systems success (Akkermans & Helden, 2002); user related aspects of Enterprise Systems success (Esteves, Pastor, & Casanovas, 2003), Somers and Nelson 2001,(Shang & Su, 2004); measurement model for Enterprise Systems success (Gable et al., 2003); dimensions of Enterprise Systems and impacts (Arvey, Bouchard, Segal, & Abraham, 1989; Ifinedo & Nahar, 2006; Sedera et al., 2004); and influences on Enterprise Systems success for e.g. culture (Hwang, 2004; Soh & Sia, 2000)

The exploration around ERP critical success factors continue to be an area of strong concern (Wu, Shin, & Heng, 2007) however, the research trends observed

over the last three (3) years seek to address unanswered issues around technology acceptance, ERP complexity, evaluating individual impacts, value of leadership, targeted training for technology acceptance, knowledge management.

The key focus areas within the technology acceptance are: examining readiness to use ERP (Shivers-Blackwell & Charles, 2006); Applying Markus And Robey's Causal Structure To Examine User Technology Acceptance (Sun & Zhang, 2006); computer self-efficacy on ERP usage (Shih, 2006); Computer self-efficacy and System complexity (Bassam, 2007); User expectations and leadership (Lim, Pan, & Tan, 2005); Charismatic leadership and user acceptance (Neufeld, Dong, & Higgins, 2007); Panoptic empowerment in enterprise systems-enabled organizations (Elmes, Strong, & Volkoff, 2005).

The emerging literature relating to Enterprise Systems Performance impact presents the following focus areas: organizational impacts (Velcu, 2007); Corporate impact of Enterprise Systems (Hendricks, Singhal, & Stratman, 2007); value of ERP (Park, Suh, & Yang, 2007); Performance improvement through ERPs (Tsai, Fan, Leu, Chou, & Yang, 2007); Strategic impact of ERPs (Chand, Hachey, Hunton, Owhoso, & Vasudevan, 2005); and Individual and organizational impacts on ES success (Sedera & Gable, 2004).

The studies that show end-user training as a factor in the success of IS and ES presented the following focus areas: ERP Training and User Satisfaction studies (Bradley & Lee, 2007; Choi, Kim, & Kim, 2007; Kim & Kim, 1997); and Process alignment and ERP (Soffer, Golany, & Dori, 2005).

Extension into the practice of Knowledge Management is another recent area of research. Some examples focus on: knowledge management and continuous improvement (Ehie & Madsen, 2005); Merits of types of knowledge during the ERP implementation (Pan, Newell, Huang, & Galliers, 2007)

Another indirectly related, yet potentially significant area of ERP research is along the lines of issues relating to ERP outsourcing (Olson, 2007).

Of the above outlined focus areas, technology acceptance, computer self-efficacy, complexity, training and charismatic leadership are closely related to the unit of analysis of this research hand.

In the ERP literature up to 2007, generic people factors are consistently demonstrated to be critical ERP success factors. Rigorous evaluation of user related

factors such as self-efficacy, involvement and empowerment remain at the bottom of the list. In spite of such an uptake of Enterprise Systems studies within the last two decades, only a handful of these studies are relevant from the point of view of enablers of Enterprise Systems success. The furthest that these ERP studies have progressed is in identification of some user related ERP success factors such as user involvement, participative decision-making, user training, and self-efficacy.

Enterprise Systems impose changes on users in many areas: job content, interpersonal relationships, decision-making approaches, and work status (Shang & Su, 2004). Thus, an exploration of the user related aspects that potentially play a key role in: (i) user acceptance of the system, (ii) users' readiness to adapt to the resultant business transformation following an ERP implementation, and (iii) eventual competent use of the Enterprise Systems positioned a valuable research agenda contributing towards the Enterprise Systems success agenda.

The next section describes the Enterprise Systems life cycle and related phases. The objective of the discussion on the Enterprise Systems life cycle and phases is primarily: (i) to provide an overview of the issues in the Enterprise Systems implementation life cycle; and (ii) to better position the need to investigate user related constructs of Enterprise Systems Success.

### ***2.3.3 Enterprise Systems Life-Cycle and Phases***

All Enterprise Systems projects follow a life cycle, which can be structured in phases. Each phase consists of the several stages that an Enterprise Systems system undergoes during its lifetime within an organisation. (Esteves et al., 2003) suggest these stages as listed below:

1. Adoption decision — includes the goals and benefits, and an analysis of the impact of adoption at a business and organisational level.
2. Acquisition — selecting the right product, to analyse the return on investment.
3. Implementation — deals with the customisation or parameterisation and adaptation of the Enterprise Systems package, use and maintenance.
4. Evolution — here additional phases are suggested to gain increased benefits.
5. Retirement — when the current Enterprise Systems does not meet the business' needs.



In another academic study (Esteves & Pastor, 2001) scanned 180 Enterprise Systems related articles in key Information Systems journals and conferences during the period 1997-2000 and found that almost 79% of research work was on the Enterprise Systems project life cycle out of which 43% of the research is focused on the implementation phase. Figure 2–3 below shows a breakdown of Enterprise Systems research into project phases (2001).

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**Figure 2–3 Breakdown of Enterprise Systems Research into Project Phases,  
source-Esteeves & Pastor 2001**

Amongst these Enterprise Systems life cycle phases, an implementation is the most complex phase, requiring management of large groups of people sharing resources, working to strict timelines, and facing many unforeseen developments (Akkermans & Helden, 2002). Livermore and Ragowsky (2002) highlight a number of challenges associated with Enterprise Systems implementations. The two key challenges posed by packaged software or Enterprise Systems are, firstly that their implementation involves the whole organisation and require a combination of technical and human expertise to select, develop and implement successfully. Secondly, Enterprise Systems involve re-engineering of the organisation's business processes thereby resulting in organisational cultural change of a certain order across all business units and/or levels of the organisation, as outlined earlier.

FoxMeyer Drug, a holding company in the health care services industry, is one of the most studied implementations by practitioners and researchers alike. Although, the ultimate cause is debatable, some key issues seem relatively clear. A summary of the key project failure issues is captured in Table 2-3 below (adapted from Scott 1995 article) along with an alternative approach suggested by the author.

**Table 2-3 Summary of Key Enterprise Systems Project Failure Issues at FoxMeyer Drug Company (adapted from Scott 1995 article)**

Issue	Risk Analysis	Change Management	Human Issues
Problem Description	Failure to consider the possibility of project delays	FoxMeyer's reliance upon key customers which is a risk-related factor as well	A Warehouse Automation System was included in the strategic plans to reduce cost by achieving more with fewer employees. However, the system suffered from late orders, lost shipments, and operating losses of more than USD 15 million.
Analysis	Gartner group cites the possibility of Information System project delays in the range of 70%.	The loss of key customers during the Enterprise Systems implementation project negatively affected by seeking replacement business based on the assumption that the system will deliver the projected returns at the initial cost planned.	The employees perceived the negative impact of the automated system on their future and did not cooperate with management.
Alternative Approach	Due to the magnitude of their Enterprise Systems project, and its criticality to operations, a more conservative approach would be the recommended alternative by the author.	FoxMeyer should not have bid low on new projects in anticipation of the projected benefits of the ERP.  They should have focused on regaining their lost business as top priority.	FoxMeyer could have phased the implementation i.e. waited until the organization had recovered from the SAP R/3 post-implementation dip and then implemented the Warehouse Automation System.
The system imposed tremendous changes in the end-user jobs (over 3000 end users) thus a careful analysis of the impacts of this change (via focus groups, surveys, targeted training and demonstrations) as part of the planned preparation towards the next phase would have possibly managed this problem.			

The author recognises that the majority of the publications surrounding FoxMeyer's SAP implementation regard it as a technical success. Interestingly, the net impact of such a technical success is quoted ultimately as a spectacular failure, leading to bankruptcy of the adopting firm. The vendor SAP believes that the system was successfully installed and functioned appropriately at FoxMeyer Drug Company. The confidence of the company's project management component appears to be the major contributor to project failure. In particular, risk analysis, change management, and human issues were the key concerns. These three issues appear to be closely linked and the lack of cautious planning for such a large-scale rollout schedule disrupted business operations in a very short period of time.

This is followed by sections on Enterprise Systems failures and Enterprise Systems successes in different organisations, and will show how an Enterprise Systems can produce unintended and highly disruptive consequences.

### ***2.3.4 A Review of Enterprise Systems' Failures and Successes***

Despite the positive motivations for Enterprise Systems adoption, there exists much controversy surrounding the success of these systems (Bingi, Sharma, & Godla, 1999b; Chung & Snyder, 1999; Gable, Scott, & Davenport, 1998). There have been extensive studies of Enterprise Systems implementation success, critical success factors of Enterprise Systems (Holland et al., 1999a), and measures of Enterprise Systems benefits (Shang & Seddon, 2002a; Staehr et al., 2002b). At the same time, there is a paucity of research that describes the post-implementation impacts of an Enterprise Systems, and whether the organisations have achieved the projected benefits (Staehr, Shanks, & Seddon, 2002a). Although the term *Failure* here can be debated Table 2-4 below presents a list of negative publications on failed Enterprise Systems implementations.

**Table 2-4 Examples of Enterprise Systems Failures (Nielsen, 2002)**

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available from the QUT Library

The above examples show that organisations have spent significant resources implementing these Enterprise Systems and realised that implementation was extremely difficult and proved an expensive change to roll back (Akkermans & Helden, 2002; Bingi et al., 1999a; Davenport, 1998; Holland et al., 1999b; Sumner, 1999, 2000). The reasons and causes of Enterprise Systems implementations reported as failures provide examples for the executives, and for those involved in implementation of Enterprise Systems to think rationally, about their large-scale investments in this technology (Davenport, 1998).

Enterprise Systems impose their own logic on a company's strategy, culture, and organisation, often forcing companies to change the way they do business (Davenport, 1998). One of the reasons suggested for failure, includes their off-the-shelf nature (Shanks, 2002) because adopting organisations often implement Enterprise System by setting parameters (called configuration) rather than by programming, as done traditionally in Information Systems development. The scope of Enterprise Systems packages is much more complex than traditional packages (like PC based personal productivity tools) and requires more knowledge, effort and skill to tailor them to the business process requirements of particular organisation, and to allow greater flexibility by enabling adopters to integrate data and processes across the organisation (Brehm, Heintz, & Markus, 2001). However, it remains debatable whether extensive tailoring promotes user acceptance and business success. Table 2-5 below summarises Enterprise Systems implementations that have been reported as 'successful' in the literature along with a summary of the stated indicators of successful Enterprise Systems implementation projects in the listed organisations.

**Table 2-5 Examples of Enterprise Systems Successes (Nielsen, 2002)**

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### ***2.3.5 Enterprise Systems success Measurement Model***

The success of IT systems has been discussed using different attributes of “Quality” and “Impact” (DeLone & McLean, 1992; Grover, Teng, Segars, & Fiedler, 1998). The DeLone and McLean (DeLone & McLean, 2002) model is an integrated, multi-dimensional, and inter-related Information Systems success model. Their Information Systems success model is the most widely used model for Information Systems evaluation research (Ballantine et al., 1998; Seddon, 1997). In the original framework of Information Systems Success, DeLone and McLean (DeLone & McLean, 1992) described the quality of systems with two dimensions, namely, System Quality and Information Quality; a third called Service Quality was added later. This research excludes the Service quality dimension because the Enterprise Systems

success measurement framework that this study draws from (Gable et al., 2003) uses the other two perspectives only.

There is a clear lack of agreement among Information Systems researchers with regards to the conceptualisation and operationalisation of IT systems impacts or benefits evaluations (Ballantine et al., 1998; DeLone & McLean, 1992). Among these, the research undertaken by (DeLone & McLean, 1992) provides the most comprehensive list of measures used in assessing IT systems' impacts relating to the individual and organisation. Gable and colleagues (Gable et al., 2003) validated a few of these measures in the context of Enterprise Systems. They also considered measures from other frameworks for assessing Enterprise Systems and Enterprise Systems benefits. In order to facilitate better understanding of the research goals, the Information Systems success dimensions suggested by Seddon, Staples, Patnayakuni, and Bowtell (Seddon, Staples, Patnayakuni, & Bowtell, 1999) are addressed in the context of this research in Table 2-6 below.

**Table 2-6 Summary of Information Systems Success Frameworks Reviewed**

Number	IS Success Dimension Framework	In The Context of this Research
1.	How is effectiveness of the system to be judged?	Enterprise Systems success measures validated by Gable et al. (2003). The 4 success measures are based on two dimensions namely, impact (Individual and Organisational) and Quality (Information and System). The active users of the Enterprise Systems would judge the Enterprise Systems based on these two dimensions with the past performance of the organization as well as the stated goals of the organisation.
2.	From whose perspective is effectiveness being judged?	All users who use the Enterprise Systems actively to complete their day-to-day jobs. These include senior, operational, administration, and technical users.
3.	What is the system being evaluated?	One or more modules of an Enterprise Systems. In this research the two Enterprise Systems evaluated are Oracle Financials module from Oracle Corporation and SAP R/3 (all modules) from SAP.
4.	What is the purpose of evaluation?	To learn the effects of system use on its users. It is proposed that an increased understanding of these effects on the user, will contribute to a successful future Enterprise Systems upgrade or implementation.
5.	What time frame is employed?	Long-term. Both the Enterprise Systems selected in this research have been implemented for at least 2 years.

Since objective measures such as operational performance and productivity data are a difficult piece of information to gather from organisations (Mabert & Soni, 2003) this research uses subjective perceptive measures (Sedera, Gable, & Chan, 2003b; Sedera & Tan, 2005) similar to the approach adopted by (Gable et al., 2003). The revised model for Enterprise Systems success deviates from the traditional Delone and McLean model (DeLone & McLean, 1992) in the following ways:

- It depicts a measurement model.
- It omits the use construct.
- Satisfaction is an overall measure of success, rather than a dimension of success.

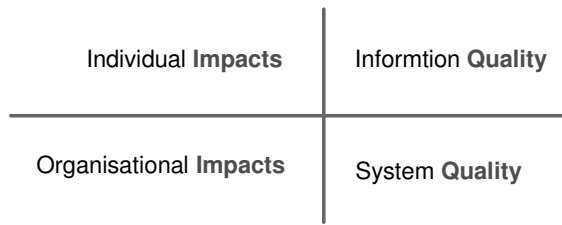
New measures were added to reflect the contemporary IS context and organisational characteristics; and includes additional measures probing a more holistic *Organisational Impact* construct. (Gable, Sedera, and Chan 2003) refer to Figure 2–4 below.

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**Figure 2–4 Enterprise Systems Success Measurement Model (Gable, Sedera, and Chan 2003)**

The *Impact* dimensions are an assessment of benefits that have followed (or not) from the system. The quality dimensions reflect future potential. When evaluating an Enterprise Systems, measures of these dimensions represent a snapshot of the organisation's experience of the Enterprise Systems at a point in time. The eight parameters for packaged software success according to (Seddon et al., 1999) are system, stakeholder, and purpose of evaluation, unit of analysis, measure, referent, time period, and informant. Figure 2–5 below illustrates the two dimensions of Enterprise Systems success evaluation.





**Figure 2–5 The Two Dimensions of Enterprise Systems Success Evaluation**

Empirical findings from Gable et al. (Gable et al., 2003) have shown that there are four independent dimensions: *System Quality* (i.e. how a system performs from a technical and design perspective); *Information Quality* (here the focus is on the quality of system outputs; issues as the relevance, timeliness and format of reports, and the accuracy of information generated by the system), *Individual Impact* (i.e. how the Enterprise Systems system has influenced the performance of individual users), and *Organisational Impact* – (i.e. overall objectives of the organisational performance). These dimensions are posited to be correlated and additive measures of Enterprise Systems impact or Enterprise Systems success. Specifically, it is the purpose of this research to examine the User Empowerment and Enterprise Systems success relationship, where Enterprise Systems success is measured using the four dimensions above.

Sia et al. (Sia et al., 2002) suggest that the inherent design of Enterprise Systems tends to give users more job discretion than their functional need. This increased discretion generally comes at the cost i.e. an Enterprise Systems expands the scope of the user’s job activities due to increased integration of front and backend processes and increased visibility of information about the process at hand. This clearly suggests a changing environment for the users, leading to a work environment that may be bundled with a sense of uncertainty about their changes job activities. Organisational Change Management researchers suggest that such an uncertainty in the minds of users (employees) would potentially be a hurdle for these users to overcome to embrace the change and to actively engage with the Enterprise Systems. From the perspective of the executives, the potential advantages of an integrated Enterprise Systems are evident i.e. an Enterprise Systems would lead to less expenditure, enable the company to focus on optimising processes and

streamlining the business, for example. However, as stated, to the users of the system the advantages are usually unclear or even imperceptible (source).

The next section provides a background to the overall Empowerment concept and discusses its potential significance in the workplace. The two key views on Empowerment, namely Psychological Empowerment and User Empowerment are then discussed.

## 2.4 Empowerment

This section provides an understanding of a potential enabler of Enterprise Systems success. The literature on Empowerment presents insights into various non-Information Systems related disciplines such as, mental health, sociology, politics, education, women, children, and psychology. This last notion of Empowerment is known as Psychological Empowerment. Psychological Empowerment has been the most widely used form of Empowerment (Psychological, A1, A2, and A3) and has been validated across multiple sectors and organisations. A closer look at the literature on Empowerment of nurses, children, and women revealed that majority of these studies employed the Psychological Empowerment measurement scale to measure Empowerment. Most of these studies addressed Empowerment as a motivational concept in the workplace across varied industry sectors (e.g. community care and health, manufacturing, banking, and engineering). For the purpose of this study, the literature draws mainly upon the Information Systems related studies and specifically literature around Enterprise Systems success.

According to some researchers, to feel empowered means several things, few examples are quoted below.

*“We feel our survival is in our own hands...”*

*“We have an underlying purpose...”*

*“We commit ourselves to achieving that purpose, now.” (Block, 1987)(p.65)*

Some other researchers (Blanchard & Bowles, 1998; Blanchard, Zigarmi, & Zigarmi, 1985) have dedicated books to define Empowerment. Yet others provide varied perspectives of Empowerment without mentioning the word even once (Freedman, 1998).

In the field of Information Systems, Empowerment has been commonly perceived in terms of power and authority, rather than as a motivational process shaped by individual differences (Conger & Kanungo, 1988). In fact, Information Systems management researchers see the idea of authority delegation and the decentralisation of decision-making power as being central to the Empowerment notion (Burke, 1986). Conger and Kanungo seek to analyse Empowerment through diverse theoretical foundations based on a comprehensive review of research from psychology, sociology, leadership, and management. They see Empowerment as a process of enhancing feelings of *Self-efficacy* among organisational members through the identification of conditions that foster powerlessness (Conger & Kanungo, 1988). Their analyses indicate that most management publications on the topic depict Empowerment as a management method, with insufficient attention being paid to the nature of processes underlying the construct as such (Conger & Kanungo, 1988). Building on this notion, other researchers broadly conceptualise Empowerment as a pattern of:

1. experienced Psychological state, and
2. social influence and power in the organization (Spreitzer, 1992; Thomas & Velthouse, 1990).

A large number of Empowerment studies that relate to organisational behaviour tend to agree that Empowerment of employees is significant in a workplace. The author would like to note that the majority of these studies refer to the term Empowerment and Psychological Empowerment interchangeably.

Another perspective on Empowerment proposes that Empowerment should be viewed as a motivational construct—*Meaning* to enable<sup>1</sup> rather than merely to delegate (Conger & Kanungo, 1988). The conceptual model proposed by Conger and Kanungo (Conger & Kanungo, 1988) provides little support beyond logical reasoning. In their model, there seems to be no recognition that an organisational culture change must occur, or for the fact that employees will need training and resources to increase their sense of *Self-efficacy*, or for the need for continued management support during an Empowerment program. Nonetheless, the discussion

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<sup>1</sup> Enable means fostering conditions for heightening motivation for task accomplishment through the development of a strong sense of personal efficacy. (Thomas & Velthouse, 1990)

suggested by Conger and Kanungo provides an excellent conceptual framework to study Empowerment.

Thomas and Velthouse (Thomas & Velthouse, 1990) build on the conceptual model of Conger and Kanungo. They not only extrapolate from past writings from a number of theorists, but they also provide empirical support. Thomas and Velthouse were one of the first to provide a formal definition for Psychological Empowerment. Their conceptualisation of Empowerment defines Psychological Empowerment as a pattern of experienced Psychological states and argues that the dimensions of Empowerment uniquely combine to make up an individual's experience of Empowerment (Thomas & Velthouse, 1990). Their model of Psychological Empowerment consists of four cognitive variables. These variables are impact, competence, meaningfulness, and choice. Further, they (Thomas & Velthouse, 1990) note the benefits of their model.

The model developed by Thomas and Velthouse echoes a synthesis of Hackman and Oldham's (Hackman & Oldham, 1980) work on the motivation construct. Here, for example, the implementation of employee Empowerment enables management to change the environment and enable completion of the tasks intrinsically rewarding for the employees. There are several Empowerment related studies that draw upon Hackman and Oldham's motivation construct. Some noteworthy examples are listed below:

- Empowerment and leadership behaviour (Fuller, Morrison, Jones, Bridger, & Brown, 1999; Kanungo, 1998; Spreitzer, De Janasz, & Quinn, 1999; Spreitzer & Quinn, 1996, 1997)
- Power and Control as relational constructs (Conger & Kanungo, 1988; Spreitzer & Mishra, 1999)
- Power perspective in work groups (Liden & Arad, 1996)
- Autonomy and Decision-making Empowerment (Krzysztof, Fox, & Shrobe, 2002)
- Organisational culture (Cook, 1994; Eylon & Au, 1999; Sigler & Pearson, 2000)
- User satisfaction (Doll & Torkzadeh, 1991)
- Organisational Impact (Deci & Ryan, 1985; Gardner & Avolio, 1998).

Bowen and Lawler (Bowen & Lawler, 1995) conducted a study on Empowerment and its implementations across different organisations. Bowen and

Lawler (Bowen & Lawler, 1995) discuss the factors which contribute to an empowered state of mind, and provide evidence that a positive correlation exists between employee satisfaction and customer satisfaction. Their assessment presents an equation for Empowerment as below:

$$\text{Empowerment} = \text{Power} \times \text{Information} \times \text{Knowledge} \times \text{Rewards}$$

In the above Empowerment equation a multiplication sign, rather than a plus, indicates that if any of the four elements is zero, nothing happens to redistribute that component and Empowerment will be zero. (Bowen & Lawler, 1995) In other words, power, information, knowledge, and rewards must exist for an individual to have any level of Empowerment. Bowen & Lawler (Bowen & Lawler, 1995) discuss the factors which contribute to an “empowered state of mind”. These include: “Control over what happens on the job, awareness of the context, and accountability for work output”. They provide evidence of effectiveness through anecdotal and case evidence, and also through “research on individual management programs, work teams, job enrichment, and skill-based pay”.

#### ***2.4.1 Significance of Empowerment Concept in the Workplace***

Organisations are constantly challenged to sustain and succeed in today’s dynamic economic environment of fierce global competition, changing consumer needs, government regulations, and globalisation. In such an environment of uncertainty, organisations embrace Change Management initiatives in order to adapt and remain a performance driven business (Psoinos et al., 2000). Empowerment is seen as a solution to manage the change. This is evident from the fact that Empowerment is often considered to be an integral part of a Business Process Re-engineering (BPR) and Total Quality Management (TQM) programs in organisations (Psoinos et al., 2000). Empowerment programs are also often employed as a strategy to enhance employee satisfaction and towards improving the productivity of their organisation. This is believed to contribute towards an increased work effectiveness for the employees (Liden & Arad, 1996).

The views of Conger and Kanungo (Conger & Kanungo, 1988), Thomas and Velthouse (Thomas & Velthouse, 1990), and Spreitzer (Spreitzer, 1995b) can be

clustered together under one common aspect. This aspect focuses on Empowerment as the Psychological state of an employee resulting from his/her supervisor's empowering.

Lee and Koh (2001) define Empowerment as “the Psychological state of a subordinate perceiving four dimensions of Meaningfulness, Competence Self-determination and Impact , which is affected by empowering behaviours of the supervisor.”

As compared to the views of Conger and Kanungo (Conger & Kanungo, 1988), Thomas and Velthouse (Thomas & Velthouse, 1990), and Spreitzer (Spreitzer, 1995b), the perspective presented by Lee and Koh (Lee & Koh, 2001) suggests that the Empowerment concept represents a new managerial approach. Lee and Koh (Lee & Koh, 2001) further emphasise that the uniqueness of the Empowerment concept denies substitution with any related concept such as job enrichment, employee involvement, participative decision-making, and authority delegation. Their work articulates a set of two views on Empowerment. One view is ‘behaviour of the supervisor’ which empowers his/her subordinate employees and the other is ‘Psychological state of an employee’ as a result of their supervisor's empowering. The former considers the behaviour of a supervisor as the cause of Empowerment, while the latter is the resulting perception of employees.

The review of the above cited body of work produced by researchers and social scientists affirms that the Empowerment is an evolving construct. The point to be noted is that all the studies that relate to the concept of Empowerment or Psychological Empowerment until 2003 focus on the Empowerment vis-à-vis *Intrinsic Motivation* of employees. Increased *Intrinsic Motivation* then contributes towards increased work effectiveness. In 2003, Doll et al. studied a specific type of Empowerment in the computer-mediated environment. Their study referred to this type of Empowerment as User Empowerment and draws upon the work done by Spreitzer (Spreitzer, 1995b). The Psychological Empowerment model validated by Spreitzer (Spreitzer, 1995b) and the User Empowerment model validated by Doll et al. (Doll et al., 2003) have been the key research models that have shaped the framework of this research. These two Empowerment models are described and discussed in the next section. The conceptual analysis of the two key research models follows, with a section that distinguishes the concept of User Empowerment from

similar concepts, for example authority delegation, organisational impact, job enrichment, employee ownership, autonomy, self-determination, self-management, self-control, self-influence, self-leadership, high-involvement and participative management. Each of the above mentioned concepts have been widely discussed by management researchers as being potential enablers of employee effectiveness. The resulting positive outcomes arising from these concepts have one central motive i.e. to increase the effectiveness of employees in order to produce improved outcomes for the organisation.

#### ***2.4.2 Psychological Empowerment***

One of the first consolidated studies on Psychological Empowerment was reported by Spreitzer (Spreitzer, 1992). Spreitzer defines Psychological Empowerment as:

“A motivational construct manifested in four dimensions: *Meaning, Competence, Self-determination, and Impact*. Together these four dimensions reflect an active, rather than a passive orientation toward a work role” (Spreitzer, 1995b)(p.38).

Spreitzer conducted a construct validity check of the Psychological Empowerment instrument by combining and refining previous instruments that measured the dimensions noted above. The study conducted by Spreitzer reports that “both internal consistency and the test-retest reliability are established for the Empowerment scale items” (Spreitzer, 1995b) (p.1458). There were some results that did not confirm; yet support for several hypotheses was provided at a significant level. One of the suggestions from Spreitzer’s (Spreitzer, 1995b) work supports the need to better explain the degree to which situational changes may produce positive motivational changes in employees. One of the possible ways to achieve this would be to bind Psychological Empowerment to certain organisational factors. The assumptions underlying this study are in agreement with the assumptions made in Spreitzer’s study. These assumptions are:

1. Empowerment is not an enduring personality trait which is generalisable across situations, but rather, a set of cognitions shaped by a work environment;
2. Empowerment is a continuous variable i.e. people can be viewed as more or less empowered, rather than empowered or not empowered;

3. Empowerment is not a global construct generalisable across different life situations and roles, but rather, specific to the work domain, and any additional assumption;
4. Organisational culture shapes the individual's Empowerment experience and thus impacts the organisational outcomes. The fourth assumption would be a potential predictor of organisational performance. It is therefore vital to clearly define the specific type of Empowerment within a specific context in order to be able to establish the role and measurement of Empowerment against organisational performance.

### ***Psychological Empowerment Model***

Spreitzer (Spreitzer, 1995b) operationalised the four-dimensional conceptualisation of Thomas and Velthouse (Thomas & Velthouse, 1990) and provides the first validated Psychological Empowerment measurement model. The four dimensions of Psychological Empowerment have been found to contribute to an overall “gestalt” of Empowerment that has been found to be stable over time and reliably measured (Spreitzer, 1995b).

In continuation of Spreitzer's (1995a) work on individual Empowerment in the workplace, Spreitzer's (Spreitzer, Kizilos et al., 1997) work further examined the four dimensions (*Competence, Meaning, Self-determination* and *Impact*) of Empowerment in predicting three hypothesised outcomes of Empowerment: effectiveness, work satisfaction and reduced job related strain. In Spreitzer's 1997 study, theoretical connections of Empowerment being a multidimensional construct are set (Spreitzer, Kizilos et al., 1997). Differential relationships between the four dimensions of Empowerment and each proposed outcome of Empowerment are described: *Competence* and *Impact* were found to be related to effectiveness, work satisfaction was most powerfully associated with the *Meaning* dimension, and *Self-determination* dimension showed a marginal influence on work satisfaction, and the *Impact* dimension had no effect on work satisfaction in either sample. A sense of *Meaning* and a sense of *Competence* (in both samples analysed) were found to be related to job-related strain. Contrary to prior expectations in the research, job-related strain was not found to be related to either *Self-determination* or *Impact*, in either sample. The next section explains each of these dimensions and outcomes.



These four dimensions (*Meaning, Competence, Self-determination, and Impact*) are argued to combine additively to create an overall construct of Psychological Empowerment. In other words, the lack of any single dimension will deflate, though not completely eliminate, the overall degree of Empowerment. This additive construct is in contrast to Bowen & Lawler's (Bowen & Lawler, 1995) Empowerment construct which is multiplicative, indicating that the absence of any one of the four elements of their model (power, information, knowledge, and rewards), will completely eliminate Empowerment. Each dimension of the Empowerment model of Spreitzer (Spreitzer, 1995b) is described next.

**Meaning** — according to the job characteristics model (Hackman & Oldham, 1980), the degree to which jobs are motivating can be measured through five core job characteristics: skill variety, task identity, task significance, autonomy, and job feedback. Their research concludes that as a result of the above five job characteristics, three psychological states are produced – experienced meaningfulness of the work, experienced responsibility for outcomes of the work, and knowledge of the actual results of the work activities (Hackman & Oldham, 1980). Spreitzer further developed their meaningfulness of work as the *Meaning* dimension of Empowerment. *Meaning* is believed to be a vital component of an individual's Empowerment experience (Spreitzer, 1992) since it acts as the fit between the requirements of one's work role and one's beliefs, values and behaviours (Brief & Nord, 1990).

**Competence** — this dimension is specific to one's work and is defined as the belief in one's capability to perform work activities with skill (Gist & Mitchell, 1992). An indicative outcome of *Competence* would be self-confidence in one's ability to perform one's job activities.

**Self-determination** — this dimension is defined as a sense of choice in initiating and regulating one's actions along with the ability to endorse one's actions at the highest level of reflection (Deci & Ryan, 1985).

The *Self-determination* Theory (SDT) evolved by Deci and Ryan (Deci & Ryan, 1985) posits that self-determined individuals experience a sense of freedom to do what is interesting, personally important, and vitalising. Deci and Ryan (Deci & Ryan, 1985) have contributed heavily in the area of SDT and view it as a macro-theory of human motivation concerned with the development and functioning of personality within social contexts. The theory aims to depict the degree to which

human behaviours are volitional or self-determined, i.e., the degree to which people endorse their actions at the highest level of reflection and engage in the actions with a full sense of choice. Their theory is based on the assumption that individuals have certain innate tendencies of growth and development that strive to master the current set of challenges faced and to integrate their experiences into a coherent sense of self. Deci and Ryan's (Deci & Ryan, 1985) study has been useful to draw the key motivational aspects of individuals that further explain the individual differences of users within a workplace. The definition of *Self-determination* emerging out of the SDT builds a dialogic link to the User Empowerment view of Empowerment.

**Impact** — this dimension is a state of belief in individuals that they can influence the system that they are an integral part of. The examples of indicative outcomes include personal initiative – which is characterised by an individual's proactive attitude to work without prompting or direction from others (Frese, Kring, Soose, & Zempel, 1996); voice – which is a behaviour exhibited by group members making suggestions and speaking up in the interest of the company or group even when the group is not appreciative (LePine & Dyne, 1998); taking charge – a discretionary behaviour where organisations motivate employees to go beyond the boundaries of their jobs to undertake constructive efforts that effect how work is executed (Morrison & Phelps, 1999); proactive coping – when individuals undertake proactive measures to avoid potential events that may cause stress (Aspinwall & Taylor, 1997); and Empowerment – which is a direct result of a sense of belief that an individual's actions are influencing the system (Spreitzer, 1995b).

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**Figure 2–6 Partial Nomological Network of Psychological Empowerment (Spreitzer 1997)**

Figure 2–6 above illustrates the Psychological Empowerment model proposed by Spreitzer (Spreitzer, McCall, & Mahoney, 1997). The next section explores the three proposed outcomes of Empowerment to develop logic for linking the above described dimensions (i.e. *Meaning, Competence, Self-determination* and *Impact*) of Empowerment as depicted in Figure 2–6 above. The three outcomes of Empowerment are effectiveness, work satisfaction and reduced job related strain.

**Effectiveness** — the majority of research publications and business press views effectiveness in context of managerial effectiveness since most management theorists have dealt with Empowerment as a management method with limited processes underlying the construct (Conger & Kanungo, 1988). Thomas and Velthouse (Thomas & Velthouse, 1990) argue that Empowerment will increase concentration, initiative, and resiliency and thus heighten managerial effectiveness. Spreitzer and Quinn’s (1996) model of middle managerial change links managerial effectiveness with transformational change.

This study aims to develop logical understanding towards synthesising the strengths of empowered behaviours of individuals and collective Empowerment of users. This study supports the empowered behaviours of employees contributes toward effectiveness at individual level before targeting effectiveness at managerial levels. In other words effectiveness must be aimed and inculcated right from the basic unit of an organization (i.e. the individual) for success at the organization level.

**Work Satisfaction** — Herzberg’s (1966) motivator-hygiene theory was the first major attempt to explain work satisfaction and the factors that affect it. This theory is based on the assumption that workers have two types of needs: hygiene needs and motivator needs. Hygiene needs include extrinsic factors (e.g. the working

environment, supervision and salary). Motivator needs include intrinsic factors (e.g. achievement, recognition and tasks). When hygiene needs are not fulfilled the worker is dissatisfied and when they are met, the worker is not dissatisfied. Fulfilling hygiene needs does not produce satisfaction, but a state of neutrality. When motivator needs are met the worker is satisfied; when they are not fulfilled the worker is not satisfied. Thus the motivator- hygiene theory, more commonly known as two-factor theory implies that a worker can be simultaneously satisfied and dissatisfied because the states exist separately.

The model proposed by Hackman and Oldham (Hackman & Oldham, 1980) established that work satisfaction may be defined as a positive emotional state of contentment arising from the presence of certain characteristics in a job. These characteristics result in a positive experience for the worker. Further, where good performance of workers is internally reinforced this reinforcement then serves as an incentive for continued performance.

The antecedents of work satisfaction are summarised under three general categories (i.e., situational, personal and person-situation interaction). Situational characteristics are those influenced by the reactions of others (Salancik & Pfeffer, 1978), while personal characteristics are defined as personal dispositions like self esteem and affectivity (Arvey et al., 1989; Staw & Ross, 1985) combined with person-job fit as established by Locke's (1976) Value theory. Value Theory asserts that people will attain satisfaction in their work if the job characteristics enable them to achieve what they desire of value (1976).

Depending upon the type of antecedents considered the outcomes of work satisfaction will differ. Spreitzer et al. (Spreitzer, Kizilos et al., 1997) have suggested work satisfaction as an outcome of high Psychological Empowerment of the worker. There appears to be agreement on the relationship of high Empowerment leading to work satisfaction; however the equation remains unexplained in terms of Empowerment being the main contributor to work satisfaction.

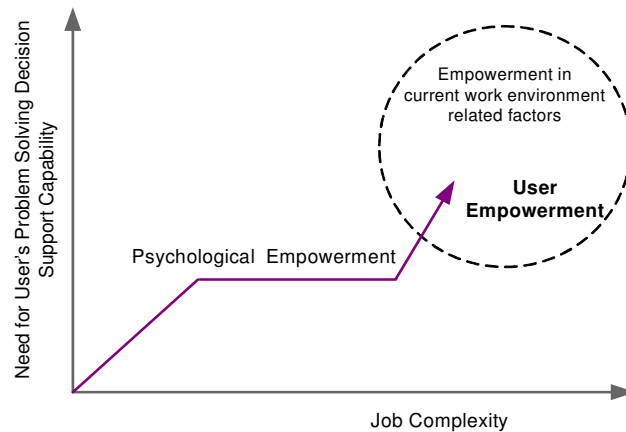
**Job Related Strain** — Reduced job related strain is stated to be the third anticipated outcome of Empowerment as a means of getting employees to work to their full potential (Spreitzer, Kizilos et al., 1997). Due to the constant change within the internal work-environment as well as the external environment, organisations require employees who cope well with ambiguity, complexity, and change (Thomas

& Velthouse, 1990). However, from the perspective of employees who sustain these pressures and succeed in such dynamic work environments, stress and strain are inevitable.

### 2.4.3 Psychological Empowerment Model- An Alternative View

This section describes a conceptual extension of the Empowerment model (Spreitzer, 1995a), from the point of view of the author. The intent of this extended analysis is to position job-complexity and its impact on Psychological Empowerment.

Psychological Empowerment may be a necessary fuel for Empowerment; however, it is shown by Figure 2–7 that Psychological Empowerment plateaus as job complexity increases. In this research Job complexity relates to increased *Problem-solving* by workers whose daily job activities largely depend upon effective use of the Information Systems.



**Figure 2–7 Psychological Empowerment Plateaus Over a Period of Time**

The individual requires another type of Empowerment which is more specific to his or her work role and current work environment. The author proposes that the work environment plays a vital role considering the fact that their daily job activities are tightly coupled with an Enterprise System. The author is of the view that as job complexity increases (using a complex Enterprise System) the individual would require increased *Problem-solving* capabilities. Psychological Empowerment alone may not be sufficient for such workers.

Every organisation has its own unique culture –“the way things work here”. Some aspects of culture can be easily observed e.g., the way employees dress and conduct themselves, the general environment, the way people work. Other aspects are less tangible, e.g., how senior management deals with their employees, the objectives and values that are common to the entire organisation. These aspects are called organisational culture or one's work environment. Studying Empowerment with reference to organisational culture makes logical sense. First, it is in accordance with Spreitzer's (Spreitzer, 1996) influence of work unit context, which asserts that the culture defines what is valued (Spreitzer, 1995a) and is consistent with the thought that organisational context is vital to the creation of effective Empowerment (Siegall & Gardner, 2000). Second, there are strong suggestions that there exists a logical link between an organisation's level of Empowerment and the strength of that organisation's culture (Mallak & Kurstedt, 1996). Mallak and Kurstedt present a model of the stages employees go through as they internalise the organisation's culture. In a similar vein, the author suggests that a positive interaction between empowered employees (with high *Meaning, Competence, Self-determination, and Impact*) and their organisational context (e.g. a culture that encourages Empowerment) may lead to incremental positive outcomes i.e. work effectiveness and satisfaction etc. This suggestion is further supported by Bandura's (Bandura, 1978) positive feedback loop. According to Bandura (Bandura, 1978) an initial positive job activity result (through successively moderate increments in task complexity and responsibility, along with training to acquire new skills) would make an individual feel more capable in carrying out a certain job activity or task (s) and, therefore, empowered.

Spreitzer (Spreitzer, 1995a) proposed that workers who perceive an employee-centred culture were empowered. At the same time, continuous proactive behaviour of empowered employees, affects their work environment (Thomas & Velthouse, 1990). Such an exchange between an employee's individual Empowerment level and their perceived empowering environment should then be the necessary fuel to moderate the Empowerment process (for successful individual and organisational outcomes).

The author recognises that the level of Empowerment and the individual's need for Empowerment may vary. The level of Empowerment, for example, may differ based on job roles – a data entry operator vs. a senior business analyst; and the

need for Empowerment may differ based on national culture- certain Asian cultures do not perceive Empowerment in a positive way, as compared to western culture (source), where the need for Empowerment is relatively higher (source). The general variability of Empowerment across national cultures must be acknowledged. However, a detailed analysis on national culture is beyond the scope of this study.

The author notes that attention must be directed towards other factors such as: (i) work organisation, (ii) the nature of the workforce, (iii) existing technology and business strategy, and (iv) whether organizational initiatives are designed to create the climate in which changes can be introduced where required (Wilkinson, 1998). Psoinos et al (Psoinos et al., 2000) conclude that organisational culture is important and strongly influences the success (or not) of Empowerment initiatives. As a result, Empowerment initiatives would benefit if analysed in alignment with the organisational culture. However, any further discussion on this potential relationship between organisational culture and Empowerment is beyond the scope of this study.

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**Figure 2–8 Applying Bandura (1978) Positive Feedback Loop to Psychological Empowerment and its Organizational Outcomes (Spreitzer 1997)**

Figure 2–8 above depicts the four constructs of Meaning, Impact, Self-determination, and Competence as the collectively exhaustive set that results in employee Empowerment. Based on Spreitzer's 1997 work, Psychological Empowerment of employees would potentially lead to work effectiveness, work-satisfaction and reduced job-related strain. These positive outcomes on the right – hand-side of the model may be seen as more in the interest of the organisation than in the interest of the individual. Once employees achieve these positive organizational outcomes, their level of Empowerment would be continually increased. An initial positive job activity result (through successively moderate increments in task complexity and responsibility along with training to acquire new skills) would make an individual feel more capable at carrying out a certain job activity or task (s) and, therefore, empowered (Bandura, 1978). Bandura suggests this process is mutually reinforcing through a feedback loop between empowered behaviours and work context. Thus, Empowerment could potentially be viewed as a process as well as an outcome in itself.

The author suggests that in spite of an empowering culture, the individuals' Psychological Empowerment is likely to plateau after some point in time. This may be attributed to two main reasons: (i) individuals believe that they are empowered or (ii) individuals believe that they do not need any further Empowerment. The author suggests, however, that once the Psychological Empowerment of an individual plateaus then individuals need a different type of Empowerment to achieve the positive organisational outcomes. It is clear that those individuals whose jobs require analysis and decision-making, and whose decisions and actions are likely to have a wider impact on other business processes, would benefit from another type of Empowerment. This other type of Empowerment may or may not leverage from the individual's existing level of Psychological Empowerment. Following this line of thought, the researcher was encouraged to investigate User Empowerment in further detail.

At this point in the discussion it is worthwhile to distinguish the meaning of Empowerment from common motivational concepts like authority delegation, organisational impact, job enrichment, employee ownership, autonomy, Self-determination, self-management, self-control, self-influence, self-leadership, high-involvement and participative management.



### ***Authority Delegation and Empowerment***

Authority delegation means that subordinates are given power for actions and decisions (Lee & Koh, 2001). In other words, delegation is the assignment of duties, responsibilities and authority to subordinates in order to achieve the desired results. Delegating allows managers to extend: (i) their influence, (ii) their power beyond their own limits of time, energy, and knowledge. In fact, management researchers see the idea of authority delegation and the decentralisation of decision-making power as being central to the Empowerment notion (Burke, 1986).

The concept of authority delegation, however, lacks the dimension of *Competence*, a core constructing dimension of Empowerment (Spreitzer, 1995b). The focal point in authority delegation is usually the behaviour of the supervisor or manager and does not include the Psychological state of delegated employee (Conger & Kanungo, 1988). If authority delegation does not include the Psychological state of employees, the dimensions of meaningfulness and *Impact* are to be easily influenced. If the delegated employee, for instance, does not perceive their work as meaningful or influential in the organisation, he/she cannot be empowered, regardless of the designated authority. Thus, the conceptual scope of Empowerment is wider than authority delegation (Ford & Fottler, 1995). Clearly, authority delegation is narrow in scope, and does not contain all the facets of Empowerment and cannot substitute for Empowerment.

### ***Participative Decision-making and Empowerment***

Empowerment is similar to participative decision-making yet distinct from it in many ways (Hollander & Offerman, 1990). Both constructs relate to an autonomous approach by involving employees to manage tasks beyond the day-to-day work, but Empowerment is defined more broadly than simply involvement in decision-making. Participation in decision-making may range in levels from the manager's asking the opinion of selected employees to involving all employees in a group decision (Vroom & Yetton, 1973). Empowerment is not simply sharing power but distributing power (Hollander & Offerman, 1990), whereby employees may be given task based power or control over some or all aspects of the task, from scheduling jobs to making decisions to implementing ideas (Schermerhorn, Hunt, & Osborn, 1991). Furthermore, Empowerment strengthens employees, providing them

with a sense of ownership and control over their jobs (Bass, 1997; Kanter, 1983; Kouzes & Posner, 1998); thus Empowerment has a broader scope that includes direct decision-making.

### ***Job Enrichment and Empowerment***

Hackman and Oldham (Hackman & Oldham, 1980) were the first to develop the job characteristics enrichment model which aimed at increasing five (5) core job characteristics. These are skill variety, task identity, task significance, autonomy, and job feedback. The model suggested that the levels of job characteristics may affect three Psychological states: experienced meaningfulness, experienced responsibility and knowledge of the results. These Psychological states, in turn, can lead to a number of positive personal or work outcomes.

Lawler (Lawler, 1992) points out that Empowerment and the job characteristics enrichment model bear common roots. Spreitzer's (Spreitzer, 1995b) dimensions of Psychological Empowerment does bear some similarities to the Hackman and Oldham model. Meaningfulness is synonymous with their 'experienced meaningfulness'. *Competence* involves their 'knowledge and skill', although Hackman and Oldham are concerned with objective knowledge and skill, rather than perceived knowledge and skill, which Spreitzer's *competence* dimension reflects (Spreitzer, 1996) *Self-determination* refers to their 'autonomy'. Nevertheless, Hackman and Oldham's (Hackman & Oldham, 1980) model does not involve the *Impact* dimension of Empowerment. Thus, workers may perceive meaningfulness, *Competence* and *Self-determination*, but may not perceive that they can have an impact on organizational outcomes.

### **The common threads between Empowerment and job enrichment are listed below:**

1. Job enrichment, Empowerment and transformational leadership are business and behavioural strategies or in other words, organisations' attempts to expand the employee role with the goal of increasing organisational performance.
2. When managers empower employees, they encourage employees to take responsibility, provide support for employees, and express confidence in the employees' ability. Such Empowerment strategies should increase employees' feelings of *Self-determination* and *competence*, giving them the confidence they need to cope with additional expectations (Mishra & Spreitzer, 1998). Empowering

practices of management as well as job enrichment should reinforce their feelings of loyalty.

3. Job enrichment and Empowerment (Spreitzer, 1995b) are both continuous management functions and not one time initiatives. Employees will be considered more or less empowered, rather than empowered or not empowered.
4. Not all jobs can be enriched, nor do all jobs need to be enriched (Lee & Koh, 2001). Similarly not all cohorts of employees need to be empowered.

### **Differences between Empowerment and Job Enrichment**

The four dimensions of Empowerment are considered from an individual perspective; it is possible for individuals to perceive Empowerment even if their 'objective' job characteristics at the organizational level are not enriched. Empowerment extends the notions of job enrichment in the following ways (Spreitzer, 1996):

First, the *Impact* dimension of Empowerment extends the notion that subordinates have some control over their own jobs with the implication that they have some influence over organisational activities (Ford & Fottler, 1995). Second, the job enrichment framework focuses mainly on the job characteristics whereas Empowerment emphasises the perception of subordinates and therefore interpersonal relationships as well. Job enrichment does not therefore necessarily reflect the relationship between a superior and subordinates, but Empowerment means being influenced by the behaviour of a superior.

The argument for job enrichment (responsibility) can be summed up quite simply: Empowerment initiatives enlarge the employee role by tapping the natural initiative and sense of responsibility of employees (Forrester, 2000). By allowing employees to exercise their inherent Problem-solving, organizing, and leadership talents, the firm assumes that individuals will experience a significant sense of ownership in the organization and its goals. These initiatives highlight commitment to the organization, job and work expertise, *Problem-solving* and leadership skills, work involvement, initiative, feelings of ownership of firm goals, sense of responsibility for firm achievements, and positive work attitudes. Consequently, job enrichment is different from Empowerment.

### ***Differentiating Empowerment from Autonomy, Self-Determination, Self-Management, Self-Control, Self-Influence, Self-Leadership, and Empowerment***

Autonomy, Self-determination, self-management, self-control and self-influence are popular words in the organizational literature (Deci & Ryan, 1985; Evans & Fischer, 1992; Luthans & Davis, 1979; Manz & Sims, 1991; Mills, 1983). The above cited constructs are all directly related to making decisions for self (including autonomy). These seem to cover only the *Self-determination* dimension of Empowerment. Consider employees who are responsible for making decisions, but are incompetent, and do not perceive their *Impact* and meaningfulness. Based on the (Manz & Sims, 1991) definition, we can say that the concept of self leadership refers to subordinates' perception of *Competence*, *Self-determination* and meaningfulness. It is generally formed through interactive processes between a supervisor and his/her subordinates. Nevertheless, self-leadership lacks the dimension of *Impact*, a core dimension of Empowerment. Self-leadership may not necessarily generate the perception of influencing strategic, administrative, or operational outcomes. They are apparently not empowered.

None of these constructs, therefore, can replace Empowerment, which includes three additional dimensions beyond *Self-determination*. In addition, self-related dimensions can be independent of a manager's empowering behaviour, whereas the concept of Empowerment necessarily involves the relationship between a manager and his/her subordinates. In conclusion, autonomy and self-related constructs are to be differentiated from Empowerment.

### ***User Involvement and Empowerment***

Job involvement is one's willingness to exert effort on the job. User involvement is a need-based motivational attitude toward Information Systems and their development (Zaichkowsky, 1985). Involvement is conceptualised as a need-based cognitive (or belief) state of Psychological identification with some object. Such a state depends upon (i) one's salient needs, and (ii) one's perception about the need-satisfying potentialities of some object or situation (Kanungo, 1979; Zaichkowsky, 1985). Since human motivation is about the satisfaction of needs (Herzberg, 1966) a Psychological state of involvement is a result of the perceived

(and/or actually experienced) motivational potentialities of some object. Involvement and motivation are closely related, and sometimes synonymous, phenomena (Price, 2001). Thus, Empowerment is linked with user involvement through the common outcome of increased employee motivation and does not suggest substitution.

### ***High-involvement, Participative Management and Empowerment***

High-involvement management is an approach to management that involves employees in decision-making affecting their specific work area (Lawler & Mohrman, 1989). In high-involvement management, employees at all levels of the organisation share information, knowledge, power and rewards so that they can influence and be rewarded for organisational performance (Lawler & Mohrman, 1989).

In participative management, in turn, managers share goal-setting, information-processing and Problem-solving activities with employees, as well as decision-making (Wagner, 1994). Participative management techniques include management by objectives, quality circles, total quality management and goal setting by subordinates (Conger & Kanungo, 1988; Wilkinson, Godfrey, & Marchington, 1997). Thus, the key element of high-involvement and participative management is to urge employees to play a role in decision-making processes.

Participative management is conceptually consistent with the idea of *Self-determination* (Deci & Ryan, 2000). Furthermore, a participatory climate allows employees to experience meaningfulness (Spreitzer, 1996) since it emphasises individual contribution and proactive behaviour rather than top-down control (Lawler, 1992), and the climate even causes some change in the *Competence* dimension over a continuous period of time. Because of this, employee participation is often equated with Empowerment (Likert, 1967). However, allowing participation in organisations is drastically different from giving power.

Participation does not imply receiving full-scale power and direct responsibility. Changes in the four dimensions, therefore, should be limited as a result of participation. Traditional participative techniques are especially weak on the *Competence* dimension; they are centred instead on fostering employees' suggestions (Evans & Fischer, 1992). Employee involvement under total quality management (TQM) also seems to be distant from Empowerment. There are variations among organisations regarding the initiative in involving employees under TQM (Wilkinson

et al., 1997). Even with the organisations taking the strongest initiative, it can be argued that the involvement of employees is far from Empowerment, in that TQM neglects the *Competence* dimension and does not allow significant power sharing or participation in higher-level decisions (Wilkinson et al., 1997). Hence, there a need arises to have a new term that is distinguished from high involvement or participative management.

### ***Self-efficacy and Empowerment***

*Self-efficacy* is a construct rooted in social cognitive theory (Gist & Mitchell, 1992). The theory posits a three-fold reciprocal causation framework where behaviour, cognition and environment influence each other dynamically (Bandura, 1978). When considering *Self-efficacy* along with rational models of decision-making, their explanatory and predictive power is increased (Ajzen & Madden, 1986; Bandura & Locke, 2003).

Venkatesh and Davis (1996) posited that self-efficacy should act as a precursor to perceived ease of use. Individuals who are confident in their ability to learn to use information technologies are likely to view specific Information technologies as being easier to use than their counterparts who are less confident in their ability to learn. Thompson, Compeau, and Higgins (2006) suggest that innovativeness and self-efficacy perceptions could help in developing more effective training programs prior to the introduction of new information technologies.

In relation to empowerment, Spreitzer (1995b; Spreitzer, 1996) emphasises that the *Competence* dimension of Psychological Empowerment is closely related to *Self-efficacy* specific to work. Thus, *Self-efficacy* is simply the *Competence* dimension in the proposed definition.

*Self-efficacy* is different from Empowerment, which contains three more additional dimensions. For example, if the delegated employees are competent, but have a weak perception of either their ability to influence the organisational unit they are embedded within or of their actual autonomy in their work role, this will prevent them from feeling empowered. Furthermore, *Self-efficacy* does not necessarily involve the empowering behaviour of supervisors. *Self-efficacy* can be increased without supervisors' empowering. Thus, *Self-efficacy* lacks the behavioral aspect of Empowerment and cannot be substituted for Empowerment. A more specific form

of self-efficacy named computer self-efficacy is one that is relevant to the user empowerment construct and is discussed as a dimension of user empowerment model.

### ***User Empowerment***

The literature review has shown that research on Psychological Empowerment has made some important first steps in empirically examining the relationships between the four Empowerment dimensions and the three key anticipated outcomes of Empowerment in the workplace (effectiveness, work satisfaction, and job-related strain). These dimensions of Empowerment are not predictors or outcomes of Empowerment but rather comprise its very essence. More recently, Doll et al. (Doll et al., 2003) studied a type of Empowerment called User Empowerment in computer-mediated work environment. According to Evans and Wurster (Adler, 2001; Evans & Wurster 1997), Adler (2001), and Neef (1998), the confidence, competence and motivation of users has a strong link to productivity improvement in the knowledge economy. User Empowerment may act as a lever that builds the underlying motivation of users and helps them achieve productivity improvements through Enterprise Systems use and use of Enterprise Systems outputs. User Empowerment may enable the user for Enterprise Systems related efficacy and effective use of Enterprise Systems outputs for *Problem-solving and Decision Support* in their job.

In today's knowledge economy, *Problem-solving and Decision Support* continue to be of high-value to users. Employees are required to apply *Problem-solving and Decision Support* across their daily job activities: with advances in technology, an increase in complexity of processes, and together with the need to have a business strategy that helps organisations remain competitive, the employees require the ability to innovate, to resolve issues, and to adapt to a dynamic work environment.

The author proposes that User Empowerment is affected by the context within which the Empowerment is viewed. The previous research on Empowerment, described above, has examined how an overall Empowerment relates to various outcomes, but there is little understanding regarding whether the context of the individual is considered. After all, the individual's context e.g. work environment does affect the individual in some way and would contribute to the expected

outcomes of Empowerment. As described in chapter 1, the context is the work environment of Enterprise Systems, and the desired outcome of Empowerment is to enable Enterprise Systems success in the organisation. In order to measure the 'complete' Empowerment one must consider the current work environment along with the Psychological Empowerment.

The literature review builds on and extends the emerging literature on Empowerment by analysing the existing literature in the context of Enterprise Systems. At a more advanced stage in the research, the relationship between each of the four dimensions of Psychological Empowerment and the anticipated outcomes of Psychological Empowerment is examined. Further, the Enterprise Systems success measures (*Individual Impact, Organisational Impact, Information Quality, and System Quality*) are examined in relation to the Psychological Empowerment.

Previous research has focused primarily on the more behavioural outcomes of Psychological Empowerment; an additional contribution of this study is the development of a theoretical and empirical linkage between User Empowerment and the explicit and measurable outcomes relating to Information Systems and Enterprise Systems (i.e. impact and quality dimensions).

User Empowerment is a concept proposed to be distinct from Psychological Empowerment of employees, the author recognises the need to: (i) define User Empowerment; and (ii) to measure Empowerment in a context (Enterprise Systems). Chapter 4 and 5 will describe the two parts in detail respectively. The following section provides a background on User Empowerment model proposed by Doll et al's (Doll et al., 2003).

#### ***2.4.4 User Empowerment Model***

User Empowerment is a multifaceted concept and is based on the Management Empowerment theory Thomas and Velthouse 1990 (Thomas & Velthouse, 1990). Up to 2005 only one single study was cited on the topic of User Empowerment (Doll et al., 2003). In that study, the target participants were engineers who were undertaking engineering design work, which involves intensive and diverse range of tasks (e.g. CADD, CAM).

In Doll et al's (Doll et al., 2003) study, User Empowerment is found to predict the effective use of information technology for *Problem-solving/ Decision Support*



better than its first-order factors. The model of User Empowerment proposed by Doll et al. (Doll et al., 2003) consists of a second-order factor with four first-order factors (User Autonomy, Computer Self-efficacy, Intrinsic Motivation, and Perceived Usefulness). The author derives the following definition of User Empowerment in an Enterprise Systems context. (Chapter 4 describes the detailed process of deriving this definition through a qualitative content analysis.)

This study will demonstrate that User Empowerment requires formal support from the management of an organisation and is expected to build the capacity of an individual, a team, and an enterprise to set priorities and control resources essential for increasing organisational performance. It is a strategy aimed to give users more control and responsibility for their work. Figure 2–9 below depicts the original User Empowerment model proposed by Doll et al. (Doll et al., 2003).

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**Figure 2–9 User Empowerment Model (Doll et al. 2003)**

In view of the original research questions, computer self-efficacy (CSE) is still a relevant determinant of an ES User's task performance (Mun; Kun, *Journal of Organizational & End User Computing*, Apr-Jun2004, Vol. 16 Issue 2, p20-37). Contrary to the significant interest in understanding the role of CSE, Perceived Usefulness, and User Autonomy in enhancing decision-making and task performance, little attention has been given to understanding the role of User Empowerment, which can be as powerful as or more powerful than CSE in predicting and determining computer task performance. Employing CSE, PSDS, and Autonomy as three mutually exclusive factors of User Empowerment, the present research develops and validates a theoretical model to improve ES success reports in organisations.

**Computer Self-efficacy** — *Computer Self-efficacy* (CSE) is distinct from the general *Self-efficacy* concept and specifically relates to an individual's capability to use a computer in the accomplishment of a job activity and related tasks (Compeau & Higgins, 1995). The one key distinguishing aspect is the focus on the utilisation of a computer to accomplish the job activity at hand. *Computer Self-efficacy* has been considered to play an important role in technology acceptance (Compeau & Higgins, 1995); software training (Gist & Mitchell, 1992) (Gist 1989); computer usage (Igbaria & Iivari, 1995); and software adoption.. While these *Computer Self-efficacy* studies in non-Enterprise Systems contexts have conducted explorations to manipulate *Self-efficacy* in the specific context of a computer mediated environment, their goal is an ongoing change in work behaviour and performance. Thus, it continues to be of potential relevance in the Enterprise Systems Success context.

Computer self-efficacy provided a strong, positive influence on ease of use and perceived usefulness. The Doll (Doll, 2003) UE study results show a much stronger role for computer self-efficacy than what Taylor and Todd (Todd 1995a) and Venkatesh (Venkatesh et al. 2003) hypothesised in their models.

The one key distinguishing aspect is the focus on the utilisation of a computer to accomplish the job activity at hand. *Computer Self-efficacy* has been considered to play an important role in technology acceptance (Compeau & Higgins, 1995); software training (Gist & Mitchell, 1992) (Gist 1989); computer usage (Igbaria & Iivari, 1995); and software adoption. While these *Computer Self-efficacy* studies in non-Enterprise Systems contexts have conducted explorations to manipulate *Self-efficacy* in the specific context of a computer mediated environment, their goal is an ongoing change in work behaviour and performance. Thus, it continues to be of potential relevance in the Enterprise Systems Success context.

In Doll et al.'s (Doll et al., 2003) view, individuals with high *Computer Self-efficacy* set higher goals and are more committed to accomplishing challenging goals. *Computer Self-efficacy* works through enhanced effort and persistence to improve learning and performance (Compeau & Higgins, 1995; Igbaria & Iivari, 1995). According to Marakas et al. (Marakas et al. 1998), *Computer Self-efficacy* is a multi-level construct operating at two distinct levels:

1. At the general computing level (general *Computer Self-efficacy*), and
2. At the specific application level (application-specific *Self-efficacy*).

General *Computer Self-efficacy* is defined as an individual judgment of efficacy across multiple computer domains, and application-specific *Self-efficacy* is defined as an individual perception of efficacy in using a specific application or system within the domain of general computing. Prior research on user acceptance of technology also focused on examining the effects of general *Computer Self-efficacy* on perceived ease of use (e.g., Venkatesh 2000; Venkatesh & Davis, 1996), exploring its role as an anchor for the subsequent development of ease of use and ease of learning perceptions.

Thong, Hong, and Tam (Thong, Hong, & Tam, 2004) define CSE in relation to ERPs and state that CSE is the individual judgment of one's capability to use the new system. CSE provides training and support to users who lack confidence in using a new system which leads to increased user acceptance. Compeau et al. (Compeau & Higgins, 1995) suggest that training significantly improves computer and internet self-efficacy. A more recent study by Another driver of increased computer self-efficacy is charismatic leadership (Torkzadeh, Chang, & Demirhan, 2006). Another study, examining the effects of Computer Self-Efficacy and System Complexity on Technology Acceptance indicated that computer self-efficacy and system complexity poses significant direct effects on perceived usefulness and perceived ease of use as well as indirect effects on attitude and behavioral intention (Bassam, 2007). These recent publications on CSE further strengthen the need for CSE as a relevant construct in the ERP success subject area.

**User Autonomy** — *User Autonomy* is defined as the degree of choice individuals have in how they use the system in accomplishing their daily job activities. The one distinct aspect of *User Autonomy* and job autonomy is that the former should be viewed as a subsume level of the latter. In other words, *User Autonomy* relates specific usage of a system (Enterprise Systems) within the bounds of their job autonomy (i.e. they may be doing other jobs that do not require use of an Enterprise Systems (Doll et al., 2003). This study uses *User Autonomy* in the Enterprise Systems success context to suggest that individuals use enabling Enterprise Systems resources and their own discretion to resolve problems or make decisions (i.e., choices of methods and effort) about how they use the Enterprise Systems to accomplish their work goals. This view is strongly supported by Gill (Gill 1996) who reports that autonomy enhances the usage of expert systems (e.g. a packaged Enterprise Systems).

**Intrinsic Motivation** — For the purpose of this study, *Intrinsic Motivation* relates to a user's internal satisfaction derived from a positive achievement at work. This internal satisfaction enables employees to continue to remain motivated. In Enterprise Systems context, the Enterprise Systems users utilise *Intrinsic Motivation* as the means by which individuals attain goals or purposes that are inherently valuable to them. This value attainment mechanism for motivating Enterprise Systems use enhances user satisfaction and productivity (Doll & Torkzadeh, 1988).

**Perceived Usefulness** — In Doll et al's (Doll et al., 2003) study, perceived usefulness Davis (Davis, 1989), is defined in terms of the consequences (impact) of using the Enterprise Systems. Applications that are perceived as enhancing the user's work productivity are considered useful. *User Autonomy*, *Computer Self-efficacy*, *Intrinsic Motivation*, and perceived usefulness represent concepts that, are potential motivational factors contributing to the effective use of Information Systems. These potential motivational factors, however, have been developed in separate lines of inquiry rather than as an integrated model of motivation or by the predictive power of their shared variance (Davis, 1989; Igarria & Iivari, 1995). Based on this argument and on Empowerment theory in management literature (Spreitzer, 1995a), Doll et al. (Doll et al., 2003) argue that these motivating task assessments (*User Autonomy*, *Computer Self-efficacy*, *Intrinsic Motivation*, and perceived usefulness) are first-order factors that share a common variance that reflects a single second-order factor called User Empowerment.

The theoretical discussions presented by Doll et al. (Doll et al., 2003) form a useful base to study User Empowerment in this new Enterprise Systems success context. In this research, however, Enterprise Systems applications and its outputs are utilised to:

1. informate, stimulate, and to make decisions; and
2. the Enterprise Systems users are required to have an adequate understanding of the business process as well as the knowledge and skill to apply business logic using the Enterprise Systems application to accomplish their job activities.

**Problem-solving and Decision Support** — *Problem-solving and/Decision Support* is defined as the ability of an individual to effectively utilise at least one or a combination of: (i) knowledge, (ii) skills, (iii) information, (iv) technology, (v) social-network to resolve a problem or develop a strategy to support the resolution process.

Doll et al. (Doll et al., 2003) hypothesised that *Problem-solving* and *Decision Support* for effective IT use is proportional to User Empowerment. (Orlikowski, 1996b) support this view by suggesting that *Problem-solving and Decision Support* ability increases innovation and idea generation at the task level where users may improvise by acting independently during contingencies, or opportunities relating to the Enterprise Systems or business process at hand.

According to Doll et al (Doll et al., 2003) User Empowerment's position in the socio-technical system and its value in predicting user performance suggest that User Empowerment may also have an important role in upstream research as a design criterion or an indicator of system success. This research concurs with Doll et al's (Doll et al., 2003) argument that User Empowerment may be appropriate as an enabler of system success in specific situations only. These specific situations may be attributed to the following work situation of employees (Thomas 1994, MacDuffie 1995).

1. Intellectual work;
2. Complexity;
3. Rapid change where the users, by necessity, play an active role in adapting the technology to their changing task requirements;
4. Where the design/implementation philosophy stresses continuous improvement throughout the life of the technology as opposed to a one-time quantum leap; and
5. Where software is conceived, designed, and implemented in ways that make full use of the ingenuity, skills, and motivations of the future users of the system being implemented.

This last one may be partially relevant in the case of Enterprise Systems implementations because the software is configured, instead of being developed.

Interestingly, the above situations and characteristics of contexts have attracted an increasing amount of attention by management researchers and Information Systems practitioners alike. A closer look at each of the above characteristics suggests a strong similarity with large scale integrated Enterprise Systems across disparate business units of organisations. The past failures of large Enterprise Systems implementation projects have drastically tarnished the promise of value from IT (source). Thus, in order to realise the full potential of investments in

Information Systems-Enterprise Systems it is potentially important to recognise the impact of such systems upon its users.

## **2.5 User Empowerment and the Enterprise Systems Context**

Traditionally, Information Systems methodology has been concerned with functionally discrete, custom made systems. Against this backdrop, Enterprise Systems are certainly a departure. Intuitively, two issues are paramount. First, the very scale of Enterprise Systems, with their ability to support and integrate a host of organisational functions, adds complexity to the implementation task. Secondly, their standard packaged nature limits tailoring for specific user needs or even organisational goals. It seems when taking these two issues together, that the problems of developing Enterprise Systems applications might be quite different from those problems with which Information Systems methodology has hitherto been concerned.

Consequently, when an organisation decides in favour of a new Enterprise Systems, its implementation is a socio-technical process, affecting tasks, people, technology and structure. Many authors identify change management as a critical success factor for Enterprise Systems success, but fail to clearly articulate the means of engaging the user in the change, and Empowerment theory may assist here.

In the framework for analysing business value of Enterprise Systems, Markus and Tanis (2000) (Markus & Tanis, 2000) elaborate upon the off-the shelf nature of the Enterprise Systems packages and suggest that organisations tailor their organisation's ways of working to fit these Enterprise Systems packages. Configurations are made to suit the needs of a particular organisation and are undertaken by key teams of users which builds the argument that Enterprise Systems relies heavily on acquiring new IT skills. Markus and Tanis; Holland (Holland & Light, 1999) also proposed the engagement of the users as a key variable.

Employees in any workplace differ in their knowledge, skills, and cognitive abilities. In the Enterprise Systems context, these differences in knowledge, skills, and cognitive abilities could play a much more vital role when combined with their potentially new job roles and new business processes. In other words, engaging and relying on the users at such a pivotal point with no prior involvement in the implementation process itself poses a question: Does empowering the users during

early phases of Enterprise Systems implementation have any impact on Enterprise Systems success?

Empowerment is not a global construct across all situations, but specific to the work context in organisations (Spreitzer, 1995b)., A work-based measure of Empowerment, therefore, should be developed (cf. (Spreitzer, 1996)). Following Spreitzer's findings, further investigation to develop an Enterprise Systems work-based measure for User Empowerment that focuses on Enterprise Systems context specifically.

A Standish Group Report entitled "Chaos speaking about Information Technology software projects in general", classified failure of IT projects as due to cost or time overruns, unfulfilled objectives, cancelled projects etc. The percentage of successful projects (projects that met client expectations on time, cost, objectives) in large companies was estimated at 9% (StandishGroup, 1995). The top three success factors reported by the research report ranked in the following order: User-involvement, executive management support, and clarity in requirements. These Standish Group Report findings could well have applied, and arguably still do, to the implementation of Enterprise Systems solutions. Despite the positive motivations for Enterprise Systems adoption, there is much controversy surrounding the success of these systems e.g. (Bingi et al., 1999b; Chung & Snyder, 1999). There have been extensive studies of Enterprise Systems implementation success, critical success factors of Enterprise Systems (Holland et al., 1999a), and measures of Enterprise Systems benefits (Shang & Seddon, 2002a; Staehr et al., 2002b), but there has been no prior research that assesses Empowerment as an enabler of Enterprise Systems success.

Based on the extensive literature review of Enterprise Systems and Enterprise Systems success the author has established that **there has been no previous study relating the orienting theory of Empowerment to the Enterprise Systems success.** The three key focus areas of this study are to investigate:

- The relationship (if any) between Psychological Empowerment and Enterprise Systems success,
- The relationship (if any) between User Empowerment and Enterprise Systems success, and

- Which one of the two (Psychological or User) Empowerment types has a stronger relationship with Enterprise Systems success.

Ann Miller's (Miller, 2001) viewpoint further strengthens the à priori case of User Empowerment in Enterprise Systems implementation processes and eventual successful use to achieve business benefits for the company.

*"People are always key to any process improvement, so methods to help staff ramp up on the learning curve of a technology or process are extremely important."(Miller, 2001) (p.56).*

Thus, organisations adopting Enterprise Systems or considering major upgrades to their existing Enterprise Systems may benefit by focusing on specific aspects of technical and human factors in order to translate their efforts to anywhere close to an Enterprise Systems success.



**Table 2-7 User Related Success Factors Studied**

Researcher	Domain	Success Factors Studied				
		User Participation	User Training	Communication	User Empowerment	User-involvement
Delone and Mc Lean (1992)	IS	•				
Sumner (1998)	ES		•			
Holland et al. (1999)	ES	•	•	•		
Bailey and Pearson (1983)	IS	•				
Evans (1994)	BPR	•				
Ginzberg (1981)	IS	•		•		
Hammer and Champy (1993)	BPR			•		
Ives and Olson (1984)	IS	•				
Lucas (1981)	IS	•				
Lucas et al (1998)	IS	•				
Raymond (1995)		•				
Fisher (2000)		•				
Davis (1989)		•				
Inchusta et al. (1998)	IS		•			
Burkhard (1990)	CASE	•	•	•		
Brash (1999)	Enterprise Modeling	•				
Rosemann (1998)	Process Modeling - quality	•		•		
Srivihok (1999)	IS –EIS	•	•	•		
Rainer and Watson (1995)	IS –EIS	•		•		
Doll Deng and Metts (2003)	IS				•	•
Goodhue (1995)	IS	•				•
Jose Esteves (2003)	IS – ES	•				•
Joshi (1991)	IS					•
Kapleman (1995)	IS					•
Shih 2006	IS – ES	•				
Shivers-Blackwell 2006	IS – ES	•				

Table 2-7 above presents a summary of some key studies on Information/Enterprise Systems success factors. The table shows that there is one single study that investigates User Empowerment in the Information Systems success context which strengthens the position of this study. The selection was based on the fact that these studies present results from replicable research and more importantly, these studies identify the sources of potential error and limitations of the study.

Table 2-7 above maps the study contexts, which suggest that the majority of these studies consider ‘user participation’ as the basis for studying Information Systems success factors. The potential value in revisiting the issue (Information Systems/Enterprise Systems success) via an alternative approach (i.e. User Empowerment—an enabler of Enterprise Systems success) is to reveal the effects of the system on its users, which may be useful to address the existing ‘gap’. Further, identification and strategic utilisation of such valuable information about the users of the system may lead to benefits such as:

1. Identification of positive and negative impacts on the users of the system as part of their day to day job activities;
2. Improvement in training initiatives to ensure that there is targeted training for each category (cohort) of user;

Provision of a current state assessment that may help future business improvement initiatives (both short and long term). It would be useful to review the user attributes that focus on the impacts of the system on the user. In other words, focus on realising the net effect on the system users’ improvement in daily tasks as a result of using the system.

Given this backdrop, the author planned the research journey to capture the views, experiences, and conceptions of Information Systems management researchers and practitioners on User Empowerment. Chapter 4 describes the qualitative content analysis phase of the research to derive a definition for User Empowerment in the newly adopted Enterprise Systems context. By gaining an insight into the perceptions and experiences of Information Systems researchers and practitioners the author seeks to increase the confidence of this research path taken. The findings of this phase would serve as a basis to operationalise User Empowerment constructs in the subsequent phases of research.

## 2.6 Chapter Summary

This chapter has provided a review of the Enterprise Systems literature to set the context for a potential enabler of Enterprise Systems success. Next, the chapter described the literature on Empowerment in an Information Systems context, discussed the potential relevance of User Empowerment in the new Enterprise Systems context, and presented an understanding of the existing frameworks on Empowerment and Enterprise Systems which are relevant to the study. The chapter traces related lines of research, drawing upon the issues, studying fundamental variables, and existing theories in order to understand the impact of change in an organisation. Further, the discussions provide example based scenarios that may impact the Enterprise Systems users, for example relearning their jobs. User Empowerment is proposed as an enabler of Enterprise Systems success. Finally this chapter builds an understanding that would hold across a range of contexts and remain valid for some time to come.

The literature review provided an insight into some of the issues to be considered during planning and design of subsequent research phases. The literature review revealed three key focus areas of the study:

- The relationship (if any) between Psychological Empowerment and Enterprise Systems success,
- The relationship (if any) between User Empowerment and Enterprise Systems success, and
- Which one of the two (Psychological or User) Empowerment has a stronger relationship with Enterprise Systems success.

Chapter 3 discusses the multimethod research approach adopted in the execution of this research.

# 3 Research Methodology and Design

*Behind every quantity there must lie a quality.*

*Gertude Jaeger Selznick*

## 3.1 Chapter Overview

The purpose of this chapter is to describe the research methodology and design adopted in this research. The research design for this study is then described along with the multimethod employed across each research phase. A description of the research approach then provides an orientation of the study across the different phases of research (Prescott and Conger, 1995), looking specifically at, how the research approach shaped the research design and helped in selecting the research methods. The rationale for the selection of research methods reflected a ‘fit for purpose approach’ i.e. a research design that best-suited the research objectives was adopted. In essence, the research methodology implied the logic and theory of method(s) utilised to address the investigative research questions.

This chapter is organised into two parts. The first part discusses the philosophical underpinnings of this study. The discussion then leads to the philosophical position that this research has taken based on the classification of theory relevant to Information Systems.

The second part discusses research framework and design. First, the multimethod is explained and the selected research methods employed in the research design are described. The subsequent sections will further expand upon each selected methodology. This expansion will include a description of the methodology and its relevance to this research. The research questions related to each method are presented, providing a context for the individual phases of the study and describing how these phases were carried out.

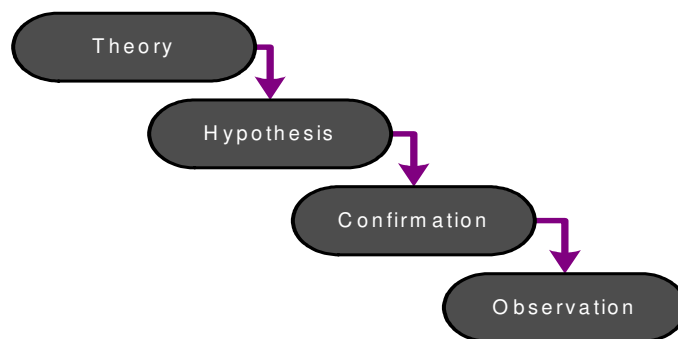
## 3.2 Philosophical Underpinnings

The description of the philosophical underpinnings of any science is a difficult task. This research is one that overlaps Information Systems research and Social Science research. Social Science is a particularly complex field, encompassing

not only conventional philosophies of (natural) science but also a variety of other contemporary ontological and epistemological viewpoints. The following subsections describe some of the key decisions made in pursuit of the current research.

### ***3.2.1 Theory-then-research vs. Research-then-theory***

An initial decision was required regarding the conceptual position of this study. In other words, should the study begin with some existing conceptual (or theoretical) position which the author would then seek to refine further through the research process. Alternatively, the study could remain reasonably free from existing conceptual (or theoretical) positions and seek to develop its own conceptual position. Theory-then-research is directed purely at verifying and testing the propositions of a theory (Popper, 1972) whereas research-then-theory seeks to construct theory (Merton, 1949).



**Figure 3–1 The Deductive Reasoning Approach**

In view of the nature of the study, a theory-then-research strategy or deductive approach was adopted (refer to Figure 3–1 below). In this deductive approach Empowerment theory was investigated to develop an understanding of the potential enablers of Enterprise Systems success. Based on the research objectives, the focus was then narrowed down into more specific hypotheses which could be tested according to the research design. The observations were collected to address the hypotheses. Finally, this led to testing the hypotheses with specific data -- a confirmation (or not) of the original Empowerment theory in the context of Enterprise Systems. The theory-then-research approach provided a rich insight into the role of theory in research problem formulation. The theory of theories

framework suggested by (Gregor, 2002b) was utilised to explain the philosophical position of this research which is described in Section 3.3 next.

### **3.3 The Research Approach**

The research approach is dependent on the researcher's ability to assimilate and synthesise the relevant descriptions and arguments that have been collected during the literature review and then to articulate the same in a comprehensive way. The key reason for such a dependency on the literature review was this newness of the subject area at two levels. The first level was the limited knowledge available on the User Empowerment phenomenon. The second level was the application of User Empowerment as an enabler in the Enterprise Systems context, which was again previously un-researched. In this study, this process benefited from the philosophical and research literature that was identified during the early stages of the research.

This study utilised a combination of qualitative and quantitative research approaches and aligns with two research categories derived by (Pham, Bruce, & Stoodley, 2002). These categories are outlined below:

- The Outcomes for the Technology End User Conception – where the outcomes of research are aimed at benefiting the Information Technology end users and assisting them in achieving improved work outcomes.
- The Solving Real-World Problems Conception – under this category the research problem addresses a contemporary problem area (Enterprise Systems); one that has practical applications.

At the outset, there was a need to investigate the appropriateness of Empowerment and value theory as orienting theories in the context of Enterprise Systems. The context of accumulated theoretical knowledge and empirical knowledge was considered in order to make a determination on this. Aspects of Enterprise Systems life cycle that appeared to be problematic were then analysed in the light of the elementary organisational components of people, task, technology, and organisational structure. The Enterprise Systems life cycle was viewed from the perspective of the users of the system. The orienting theories of Empowerment and social-cognitive research supported the relevance of considering individual users of the system.

Presented in the literature review (chapter 2) there is limited existing research on the topic of User Empowerment construct and research evidence on User Empowerment in the Enterprise Systems context is even scarce. This posed additional complexity for the research at hand. In order to overcome the two levels of complexity in this research, both qualitative field-based methods and quantitative methods were utilised. The qualitative research methods helped

- to understand the User Empowerment phenomenon;
- to formulate the research questions;
- to guide the investigation of User Empowerment as a potential enabler of Enterprise Systems success.

The main objectives of the qualitative approach were:

- to gather perceptions of Information Systems practitioners and researchers on the concept of User Empowerment
- to understand the type of conceptual vocabulary used by them to refer to User Empowerment
- to derive a possible definition for User Empowerment in the Enterprise Systems context. This last objective was actioned by extracting the common subset of terms in the responses received from Information Systems practitioners and researchers. The final sub-set was mapped to the varied definitions of Empowerment that exists in the literature. Section 4.2 of chapter 4 describes the conduct of this definitional phase in detail.

The quantitative research method complemented the qualitative research method by testing the research assumptions following a systematic basis. The quantitative approach was also used: (i) to validate the User Empowerment scale, (ii) re-validate the Psychological Empowerment and Enterprise Systems measurement scales; (iii) observe any potential relationship between Psychological Empowerment and Enterprise Systems success and/or User Empowerment and Enterprise Systems success.

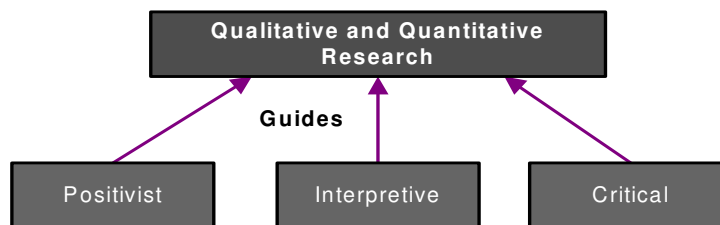
The theory-then-research approach yielded the following benefits to the research: Firstly, this approach provided clarity and structure to the research which was then further shaped by the specific methodological inclinations, available background knowledge/experience on Enterprise Systems, and the various practical and contingent factors related to research such as access to evidence. During the

course of this doctoral project all these factors have played an important role in guiding the course of the research.

The perspectives of ethnographic research (Sanday, 1979), grounded theory approach, heuristic research (Moustakas, 1990), intervention research (Freyer & Feather, 1994), and naturalistic inquiry (Lincoln & Guba, 2002) were excluded because there was a pre-conceptualised theoretical position in this study. However, the à priori classification of research material was considered only after the first definitional phase of research was completed. This à priori model assisted in exploring patterns between User Empowerment and Enterprise Systems success. However, the path direction between the phenomenon (User Empowerment) and context (Enterprise Systems) was unclear until the preliminary findings from the qualitative research phase 1 of this study. The deeper and more implied patterns are potentially important to understand and test once the basic relationship is explored. These deeper patterns are beyond the scope of this study.

### ***3.3.1 Philosophical Perspectives***

A widely accepted classification defines three distinct philosophical perspectives or categories as positivist, interpretive, and critical (Klein & Myers, 1999; Orlikowski & Baroudi, 1991). This three-fold classification is the one that was considered in this research. Figure 3–2 below illustrates the classification. The following section describes each category, and then sets out the philosophical position that this study adopts.



**Figure 3–2 Fundamental Philosophical Perspectives**



### ***Interpretive Research***

Interpretive studies generally attempt to understand phenomena through the meanings that people assign to them – interpretive methods of research in Information Systems are “aimed at producing an understanding of the context of the Information System, and the process whereby the Information System influences and is influenced by the context” (Walsham, 1993) (p.45). Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human intelligence as the circumstances emerge (Kaplan & Maxwell, 1994). Prior to the definitional research phase there was no presupposition for either Empowerment influencing the context or being influenced by the context of Enterprise Systems. Thus, the research process echoed an interpretivist approach during the initial stages of the research. The findings of the qualitative definitional phase help develop a firm basis for testing the direction, where User Empowerment was assumed to be an enabler of Enterprise Systems success.

### ***Positivist Research***

Positivist researchers generally assume that reality is objectively given and can be described by measurable properties that are independent of the observer (researcher) and his or her instruments. Positivist studies generally attempt to test theory, in an attempt to increase the predictive understanding of phenomena.

This thesis aimed to test the Empowerment theory to be explored in the context of Enterprise Systems for the first time. The literature review, when analysed along with the qualitative research method, indicated that perhaps a specific type of Empowerment would be an enabler to Enterprise Systems success. Orlikowski and Baroudi (Orlikowski & Baroudi, 1991) classify Information Systems research as positivist if there is evidence of formal propositions and quantifiable measures of variables. A positivist research was therefore appropriate for the remainder of the research design. Such a positivist approach provided the ability to draw inferences about the target population from a sample of the population of interest (Orlikowski & Baroudi, 1991). Yin (Yin, 2003) and Benbasat et al's (Benbasat, Goldstein, & Mead, 1987) work on case study research are two examples of a positivist approach that have been considered in this research.

### ***Critical Research***

In general, the researchers who assume that social reality is historically constituted are the critical researchers. These critical researchers further suggest that social reality is produced and reproduced by people. Although people can consciously act to change their social and economic circumstances, critical research recognises that their ability to do so is constrained by various forms of social, cultural and political domination. The main task of critical research is seen as being one of social critique, whereby the restrictive conditions of the status quo are the focus of attention. Critical research focuses on the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination. The examples of critical approach studied include (Ngwenyama & Lee, 1997) and (Hirschheim & Klein, 1994) work. The research questions in this research were not emancipatory or concerned with critically analysing the situation(s) to expose limitations or constraints. In line with the explanation of critical research perspective above, the critical approach is therefore not appropriate in this research.

### ***3.3.2 Philosophical Position of This Study***

It is vital to define the philosophical position from which this research derives. This belief is emphasised by Walsham (1995), who suggests that it is necessary for all researchers to reflect on the basis, conduct and reporting of their work, especially those engaged in Information Systems research. In order to clearly define and document the stance that this research adopted, it was rewarding to consider multiple perspectives and to reflect on their philosophical positions.

There is a general debate based around the above philosophical perspectives being mutually exclusive and whether they could be combined in a research study (Myers, 1997). As a contemporary researcher, the author supports that there is no single philosophical position or methodology which is the 'best way of doing research'. The approach for this study has been to define what is to be achieved, and then determine the way of achieving it. This approach facilitated a wider pool of choices rather than drawing a philosophical boundary. Garcia (1997) and Walsham (1995) recommend this approach since it compels the researcher to undertake a reflection on how well the research objectives are achieved (or not).

Traditionally, researchers view the concept of causality as a key to understanding different types of theory (Benbasat, 2001; Gregor, 2002b; Watson, 2001). In the interpretivist tradition, the research methods adopted were aimed at uncovering how User Empowerment (phenomena of interest) may influence the Enterprise Systems success. Following from the explanations on philosophical perspectives, this thesis contains elements of both the interpretivist and positivist approaches.

In science the techniques for (i) collecting and analysing data; (ii) interpreting the data; and (iii) the application of research techniques, helps in the creation of knowledge. This analogy could very well hold true for Information Systems (Pinsonneault & Kraemer, 1993). Further, science utilises the invention of concepts, models and schemes to make sense of events, and to test and to modify these constructions in the light of new experiences. Likewise, in the field of Information Systems, concepts, models, and frameworks are the key aspects of theory development (Gregor, 2002a).

In order to advance the development of a research model, a classification of theories proposed by Gregor (Gregor, 2002a) is utilised. This classification sought to (i) analyse and describe, (ii) understand, (iii) predict, (iv) explain and predict, and (v) design and execute the research at hand. Such a classification is particularly useful in Information Systems because existing knowledge will be applied to advance further knowledge use and knowledge creation (Gregor, 2002a).

This research came under Social Sciences, and included some degree of generalisation. One of the views on generalisation is that the natural sciences must aim at strictly universal statements and theories of natural laws in social sciences, however, it is thought unlikely that social phenomena are determined in accordance with strict laws of nature. Nevertheless, in the social sciences (and Information Systems), theory may still include generalisations to some degree (Gregor, 2002a). A simple way to understand generalisation is when people try similar actions in similar settings and achieve similar outcomes. It may be argued, then that generalisability has been demonstrated.

This research is linked to ideas of causation because a theory is understood to involve explanation and understanding. Gregor (Gregor, 2002a) points out that, often, to ask for an explanation of an event is to ask for its cause. For example, the

knowledge that Psychological Empowerment contributed to the increased work effectiveness of employees led to the inference that, if employees were not psychologically empowered in their work environment, the effectiveness level of workers was then less likely to be increased. According to Hume (Hume, 1999 (1772)) causes are sufficient conditions for their effects:

*“We may define a cause to be an object, followed by another, and where all the objects similar to the first, are followed by objects similar to the second(Hume, 1999 (1772)) (p.146)*

### ***3.3.3 Types of Theory across Research Phases***

According to Gregor (Gregor, 2002b) the classification of theories in Information Systems serves the purpose of knowledge building because Information Systems is an applied discipline. Further, the Information Systems discipline is one in which knowledge can be expected to be put to use. This research extends Gregor’s argument further i.e. even when such a classification is available in Information Systems research, it is difficult to complete the research without touching upon most of these classifications. Refer to Appendix 1 for a tabular summary of the theory of theories classification. This table presents the five classifications along with their brief explanation, research approach adopted, examples in Information Systems, and what is considered as contribution to knowledge within each of these theory types.

The following sections describe and discuss the way this research has utilised a combination of three (3) classifications of theory during progressive stages of this research.

#### ***Descriptive Theory***

Descriptive theory is a basic type of theory which is necessary for the development of all other types of theory and which was utilised during the initial research phase. Although, a validated model and significant empirical work existed around the notions of Empowerment, there was a lack of a clear definition of User Empowerment and its sub-constructs. Descriptive theory was appropriate in the initial research phase as very little was known about the User Empowerment phenomenon. Fawcett and Downs (Downs 1986) believe that descriptive theories are needed in situations where there is limited understanding about the phenomenon in

question. The existing evidence on Empowerment, as well as related concepts such as self-assertion, job-enrichment, control, power, user-involvement, and motivation were compared. This discussion was previously described in chapter 2, Section 2.4.3. The descriptions presented limited understanding on the categories under the overarching phenomena of Empowerment. Based on the literature review two broad categories were identified: (i) Psychological or self-Empowerment, and (ii) User Empowerment. As mentioned earlier there is one single study undertaken by Doll et al (Doll et al., 2003) that introduced the term User Empowerment. In this regard, there was clearly a paucity of previous enquiry and empirical observation on the User Empowerment concept.

As suggested by Miles and Huberman (Miles & Huberman, 1984) the descriptions presented should correspond as far as possible to '*what is*'. Thus, the two questions obtained out are listed below:

*What is User Empowerment in an Enterprise Systems context?*

*What are the measures of User Empowerment?*

A detailed application of descriptive theory is presented in chapter 4 which seek to describe the above questions in detail. Gregor (Gregor, 2002b) points out that it is difficult to test this type of theory. In fact, following the qualitative empirical analysis from the survey responses, the relationship between the two components of the first question (User Empowerment and Enterprise Systems) remained unclear. Therefore, theory for understanding was utilised to explain the relationship between the dependent and the independent variables in this research.

Generally, *theory for understanding* addresses '*how*' and '*why*' an event occurs. However, a weakness of the theory for understanding is its limitation to forecast or predict regarding future occurrences or test future scenarios. Based on this, Orlikowski (Orlikowski, 1993) developed a structurational model of technology which claims that technology is both constituted by human agency and constitutes human practice. Along this line of thought, the relationship between users of the Enterprise Systems and their perception of the Enterprise Systems needs to be explained. Thus, the role that theory played in this phase of research could be summarised as below:

- To guide the selection of data to be collected (Sawyer, 1992); and

- To enable new and different types of questions to be asked (Calhoun 1995).

The quantitative exploratory phase was conducted to further understand:

- How is the system perceived by its users; and
- Why the users believed the way they did.

Since the *theory of understanding* was limited in causal power, the *theory for predicting* was utilised to overcome the limitation. Thus, combining different types of theory led to development of a more traditional theory. Such a traditional theory encompasses both an explanation of the User Empowerment concept and its relationship with Enterprise Systems success. The role of theory in this research was to form a basis for informing practice (Benbasat & Zmud, 1999). In essence, considering Empowerment theory as the mediating discourse to achieve desired outcomes (enabler for Enterprise Systems success) linked theory with practice (Gustavsen 2001).

### ***3.3.4 The Multimethod Research Approach***

This research proposed a multimethod approach based on a combination of quantitative and qualitative methods, including content analysis, survey, and case study. This research project paid considerable attention to analysing each research method in relation to other research methods, and also in relation to the demands of the research problem. Surveys, case studies, conceptual study, and action research are most appropriate research methods in Information Systems (Avison & Fitzgerald, 1991) out of which the first two – surveys and case studies – were selected in line with the context i.e. Enterprise Systems. For example, empirical measurement was essential to determine the nature of impacts perceived by the Enterprise Systems user. However, measurement is only a step in the overall process. In order to determine what to measure and then select appropriate methods, it was necessary to define the research problem first. This was broken in to the following steps:

1. To define User Empowerment in the context of Enterprise Systems;
2. To develop and validate a User Empowerment measurement scale for the Enterprise Systems context;
3. To test the User Empowerment measurement model; and
4. To test the relationship between User Empowerment and Enterprise Systems success.

While certain research objectives may be suitable to fit a single research methodology, the majority of the research objectives in this study warranted multiple data sources across the research phases. Thus, one should appreciate the balance that multimethod offers to deal with the multiple types of data sources. For example, one of the research objectives of this study was to build a measurement model of User Empowerment. This research objective benefited from a combination of survey and case study methods.

Interestingly, eminent Information Systems researchers recognised and accept that Information Systems utilises many different research methodologies, models, and frameworks (R. Baskerville, Pentland, & Walsham, 1994; R. L. Baskerville & Wood-Harper, 1998; Galliers, 1992; Shanks, 2002; Straub, Gefen, & Boudreau, 2004). Yet, the supporters of multimethod approach were limited until the mid 1990's (Brewer & Hunter, 1989; Gable, 1994; Hirschheim & Klein, 1994; Kaplan & Duchon, 1988). However, as the advantages of multimethod were published, the uptake of multimethod increased proportionally. Gable (Gable, 1994) remains the pioneer in drawing attention to the advantages and benefits of multimethod. Gable (Gable, 1994) (pp.112) argues that “some journals tend to specialise by methodology — thereby encouraging purity of method”; he also highlights that “journal editors and reviewers of papers should be sensitised to the relative superiority of multimethod designs and that junior researchers and doctoral students should be encouraged to combine methods as far as is feasible”.

This research applied multimethod approach to multiple research stages (Brewer & Hunter, 1989). For example during phase 2 the survey method was utilised. Interviews were conducted for non-respondents and those who participated in the pre-testing of the survey instrument. During the design phase, key stakeholders were presented with the research study aims and objectives. Although implicit, the above two steps demonstrate a systematic approach to gain information and insights required during the design of the data collection protocol. Although survey design was a part of the quantitative research approach, it depended upon a range of information gathering methods. The qualitative data sources included observation, interviews, documents, stakeholder analysis, analysing the target organisation's Information Systems portfolio, and the researcher's own impressions (Myers, 2003).

Thus, a multimethod is truly a balanced approach. This approach emphasises that no single methodology or philosophical perspective is superior, but that their individual rationalities should be respected within the discipline as a whole (Mingers, 2001). Each method addressed a different facet of the overall research problem. It is brought to bear, therefore, that each method only provided a partial view of the overall research problem. Many social scientists recognise such a multiple measurement<sup>1</sup> or triangulation<sup>2</sup> as a multimethod strategy that has wider uses and implications. These include: (i) theorising and theory testing; (ii) problem formulation and data collection; (iii) sampling and generalisation; (iv) hypothesis testing and causal analysis; and (v) social problem and policy analysis.

**Table 3-1 Qualitative Method vs. Quantitative Method**

Type	Quantitative research methods	Qualitative research methods
Development Realm	– Natural sciences	– Social sciences
Purpose	– To study the natural phenomena	– To study the social and cultural phenomena and reactions
Examples of Accepted Methods	– Survey methods – Laboratory experiments – Formal methods (e.g. econometrics) numerical methods (e.g. mathematical modeling)	– Action research – Case study research – Ethnography
Data Sources	– Document analysis (Cassell and Symon, 1994, p.10; Denzin and Lincoln, 1994; Easterby-Smith, et al., 1991)	– Observations and participant observations (fieldwork), – Interviews and questionnaires, documents and texts, and the researcher's impressions

Brewer and Hunter (Brewer & Hunter, 1989) further emphasise the benefits of a multimethod. They advocate that the goal of considering a phenomenon from the point of view of the participants and their social context is lost when textual data is quantified. Groth-Marnat (Groth-Marnat, 1999) warn that the terms Qualitative and Quantitative are often confused by Information Systems researchers and require clarification. The author recognised this and compared these terms by presenting a

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<sup>1</sup> Broadly speaking, measurement is the operation of assigning either qualitative or quantitative values to social phenomena

<sup>2</sup> Throughout the thesis triangulated measurement is referred to as triangulation.



summary in the Table 3-1 above. The next section compares the multimethod in the research context.

### 3.4 Multimethod in the Research Context

In this research multimethod tries to pinpoint the value of User Empowerment and its influence on the individual user more accurately by evaluating it from different methodological viewpoints. The simplified logic behind multimethod is that when the findings of different methods agree, the confidence about the result is increased.

The level to which an Information System is adopted by the users has been widely used as a determinant of the success of the system (DeLone & McLean, 1992). Following this line of thought, the author argues that the lack of adoption may be seen as an indication of the failure of those systems, or processes, related to the system. However, the above argument requires rigorous research and validation by employing a combined qualitative and quantitative approach to the study. As Patton (Patton, 1990) notes, all studies have some defects of quality, and the defect of quantification is that it does not always support, as well as qualitative work does the understanding of complex, dynamic, and multi-dimensional ‘wholes’. Table 3-2 below depicts the proposed multimethod research framework.

**Table 3-2 Multimethod Research Framework Proposal**

Research Phase	Type	Research Methods used					
		Literature review	Coding procedure	Case study	Survey	Statistical analysis	Goals/questions/metrics
Definition Phase	QUAL	✓	✓				✓
Exploratory Phase	QUAN		✓		✓	✓	✓
Confirmatory Phase	QUAN			✓	✓	✓	✓

In the above example, where the multimethod approach is utilised during data collection protocol design, instead of maintaining a tight comparative focus, the researcher benefited from seeking contrasts in the different methods. Table 3-3 below provides a summary of the relative strengths of the selected research methods

based on five criteria of controllability, repeatability, deductibility, generalisability, and discoverability. Each of these criteria is explained next.

**Table 3-3 Comparison of Case Study, Survey Method and Tool Analysis (Gable, 1994)**

This table is not available online. Please consult the hardcopy thesis available from the QUT Library
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**Controllability refers to the researcher's control and influence over the environment in which the study is conducted.** In this research, content analysis is conducted to derive a definition for the User Empowerment construct in the context of Enterprise Systems, and it may be argued that the email survey questions may potentially control the response to a certain extent. Case studies<sup>3</sup> are generally conducted via interviews, whereby the researcher has little control over what the participant may say in response to a series of questions. On the other hand, surveys allow the researcher to allocate scales and measurement instruments so that the input from the survey participants may be monitored.

**Repeatability refers to the extent to which one study can be repeated with the same results.** The Content analysis method is highly repeatable, since by using the same rules for the coding of the same sampled documents, coders are likely to arrive at similar results.

**Deductibility refers to the extent to which logical results can be made in a controlled way.** Making controlled or logical deductions from the content analysis is possible through the use of mathematical propositions. In this research, since the text analysis is conducted by triangulating the responses with the literature review findings, this enabled a logical deduction. In the case of the case study the

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<sup>3</sup> It should not be interpreted that case studies stipulated in the research publications have been exclusively interpretive, nor is it absolutely true for the case of surveys and positivism. Rather, it has been shown in selected publications that case studies may often contain multiple paradigms e.g. (Hassard, 1991; Lewis, 1999)

deductibility was relatively low, as it is often difficult for a researcher to manage qualitative data with its verbal propositions.

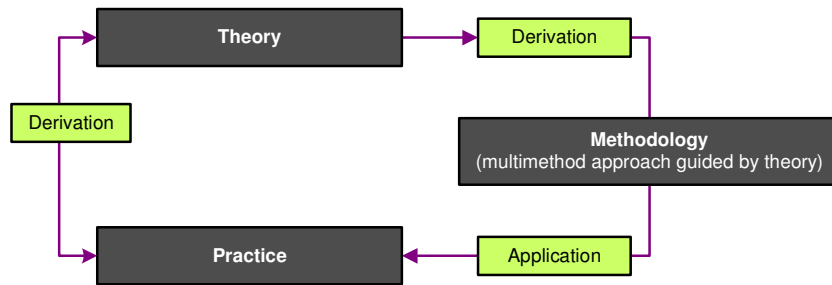
**Generalisability refers to the applicability of the findings to a range of settings.** Case studies are known to be marked by single and unique events that do not allow the findings to be extended to other settings. Lee and Baskerville (Lee & Baskerville, 2003) provide a framework of four types of generalisability (i.e. from empirical statements to other empirical statements, from empirical statements to theoretical statements, from theoretical statements to empirical statements, and theoretical statements to other theoretical statements).

This research involves generalising from theoretical statements (in particular, a theory that has already been developed, tested and confirmed – in the case of the survey and the content analysis) to empirical statements (the descriptions of what the practitioner can expect to observe in his/her specific organisation if he/she were to apply the theory). Lee and Baskerville The only way in which a researcher may properly claim that the theory is indeed generalisable would be for the theory to be actually tested and confirmed in the new setting.

**Discoverability is the ability to bring out new findings and new theories.** It is higher in case studies as they cater for a rich set of data that enables the researcher to bring out new theories in unique situations. As content analysis refers to the explicit use of rules to provide an objective view of the data, the discoverability of new propositions is limited by the methodology. It is apparent from the table that the weaknesses of the case study and survey methods are complemented by the tool analysis and vice versa. It is noted that although the combination of methods may have inherent faults and limitations, the approach also allows one to fully benefit from the strengths and advantages of the methods used.

The model of the relationship between theory, methodology and practice is as shown in Figure 3–3 below. The methodology considered in this research is derived from Empowerment theory. This methodology was then applied to an industry setting to influence some event, or activity. Next, based on the observations and analysis, further understanding was gained regarding the real world setting, environment or context in order to link the theory through a deductive process. This model was used as a framework for classifying the candidate research methods described in this thesis. These research methods covered in this research design were

a broad spectrum of quantitative and qualitative methods. The research design is discussed in the next section followed by a discussion of the research methods and their application in the context of research.



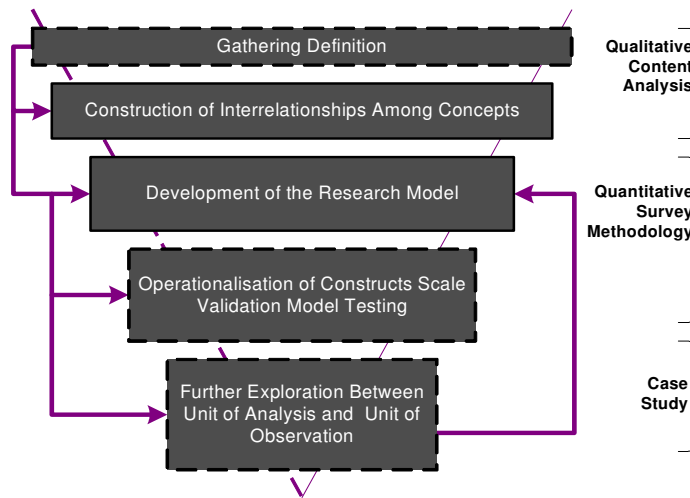
**Figure 3–3 Relationships between Theory, Methodology and Practice**

### 3.5 Research Design

This study considered research design as an overall plan for collecting and analysing data and its fluidity<sup>4</sup> is based on the research approach adopted (Polit & Hungler, 1999). Qualitative research designs tend to be more fluid as compared to quantitative designs. The field of Information Systems research is young and has generated a significant debate on the topic - '*what is an Information System?*' (B. M. Ives & Olson, 1984; Seddon, 1997; Shanks, 1997). Lamp and Milton (Lamp & Milton, 2003) suggest that both the nature and scope of the Information Systems domain is diverse; the approaches to researching Information Systems are diverse; that the approaches to teaching Information Systems are diverse, and that there is a lack of any single clear theoretical basis for the study of Information Systems.

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<sup>4</sup> Connotation of being flexible

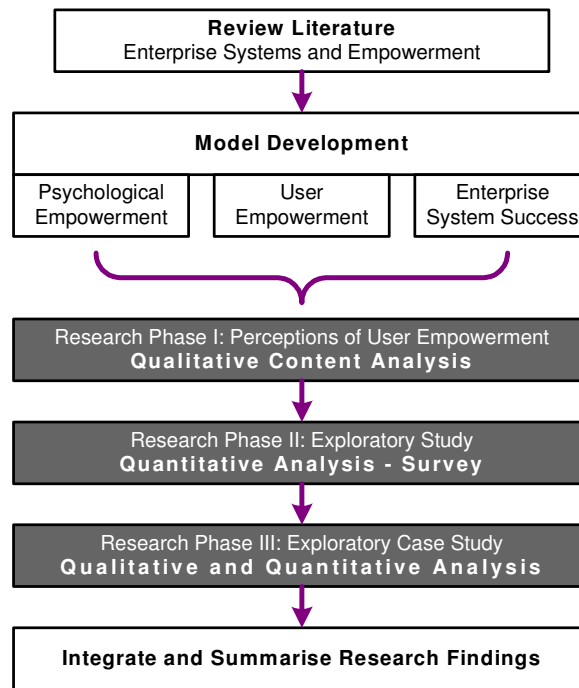


**Figure 3–4 Steps in Research Design**

The research design consisted of five broad steps as depicted in Figure 3–4 above. The researcher paid considerable attention to the potentially important independent and dependent variables. If the research focused only on what is already known to be quantified, the researcher would then risk ignoring factors that are potentially significant in explaining important realities and relationships.

### ***3.5.1 Evaluation of Research design***

The broad steps mapped to present the application of the multimethod approach adopted across the research phases represent the nature of the research design of this study.



**Figure 3–5 Multimethod Applied across Overall Research Design**

Figure 3–5 above illustrates the research design. The research design can be further analysed from three standpoints: (i) exploratory, (ii) descriptive, and (iii) contextual. These are described next.

- exploring the User Empowerment phenomenon (exploratory);
- describing a new User Empowerment concept (descriptive); and
- Set within the Enterprise Systems context (Contextual)

### ***Exploratory Research Design***

This research is concerned with the experiences of users of Enterprise Systems. User Empowerment is considered as a potential enabler for building positive experiences of the Enterprise Systems use. Thus, the research taps into the users' perception of the success of Enterprise Systems. By embedding a qualitative phase to the research process, it is possible to explore the users' views and perceptions on User Empowerment in Enterprise Systems context. The findings from this phase guided further exploration of the User Empowerment construct. This qualitative phase of the research process yielded clarity on the meaning of User Empowerment.

### ***Descriptive Research Design***

Descriptive design is used in this research to provide information about the users and their current Enterprise Systems work environment. The purpose of describing participants' experience fully and accurately is to increase visibility of the state of the Enterprise Systems and its use (or not). However, this does not necessarily require that all data studied be fully described. The descriptive design is utilised to describe the following:

1. the experiences of users of large scale Enterprise Systems in a tertiary education sector based organisation where the system was implemented for over 3 years;
2. the snapshot of Psychological Empowerment experienced by the intense users of the implemented Enterprise Systems;
3. the snapshot of User Empowerment experienced by the users; and
4. the impact of the Enterprise Systems on the individual users and, to a certain extent, the organisation.

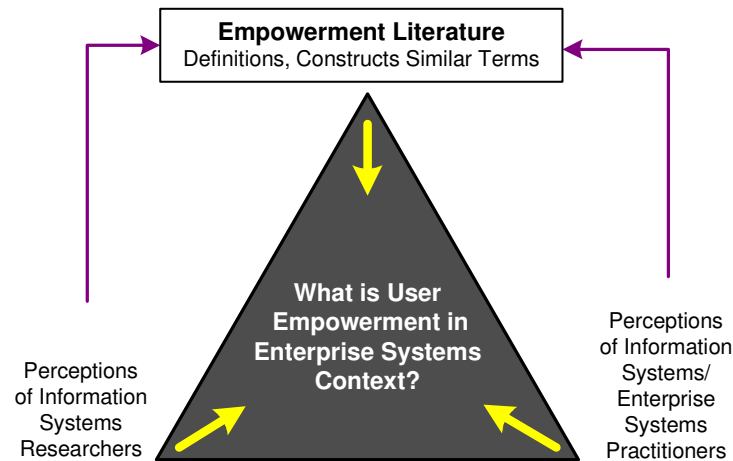
### ***Contextual Research Design***

A 'context' represents the location of the phenomenon to be studied. There are specific conditions implied in this statement which may arise and be applicable to actions, time, space, and environment. The context is only valid within the time and context specified (Holloway & Wheeler, 1996). Consequently, this study was bound by exploring the experiences of Enterprise Systems users (minimum 2 years post implementation) in an Australian setting. The context of each of the organisations will be described in further detail in chapters 5 and 7.

#### ***3.5.2 The Qualitative Content Analysis Method***

The qualitative content analysis is utilised as a peripheral method to derive a working definition of the User Empowerment construct. In this research, the qualitative content analysis method has been adapted to suit the purpose of the research phase. In this phase, the author sought to combine the key descriptions on Empowerment embedded in the literature with the perceptions of Information Systems researchers (subscribers to the Information Systems world mailing list) and Information Systems consultants (SAP consultants). Figure 3–6 below depicts the

conceptual sketch of this definition phase which combined three data sources using qualitative content analysis to derive a working definition for User Empowerment.



**Figure 3–6 Analysis Approach Adopted During Definition Phase**

The main purpose of the definition phase was to map the common terms and themes in the definitions provided by Information Systems researchers and Enterprise Systems practitioners and the existing Empowerment literature. A number of text analysis approaches are available to undertake such an analysis. In order to select an appropriate method and to justify the use of content analysis, alternatives for text analysis were explored: grounded theory (Glaser & Strauss, 1967); discourse analysis (Stubbs, 1983; Tannen, 1984; 1989; Nunan, 1993); and narrative analysis (Manning & Cullum-Swan, 1994). Bernard and Ryan (1998) note that grounded theory and content analysis are the most widely used methods across social sciences for analysing text. A brief description of the text analysis methods follows next.

Grounded theory is a methodology that develops theory that is grounded in data systematically gathered and analysed. The methodology is presented initially by (Glaser & Strauss, 1967). It does not test a hypothesis. It sets out to find what theory accounts for the research situation as it is. As grounded theory employs an emergent method whereby literature is taken into account after the formation of theory, it did not fit into the research design as the theoretical framework was built based on the literature review.



Discourse analysis assumes that the study of language is an action that shapes reality and that language can be used to study behaviours. Discourse analysis studies the entire structure of the conversation and allows the researchers to relate the sequence and organisation of a dialogue to the social relationships that arise from a conversation (Lacity & Janson, 1994). Discourse analysis was not employed, as the focus of the analysis was not on the intrinsic structure of conversations or interviews.

Narrative analysis looks at the use of stories and metaphors or reports, in which they are used, in social practice. Narrative analysis<sup>5</sup> was not adopted because the structure of the documents to be examined in the analysis was not in the form of stories or metaphors but, rather, was presented as descriptive text.

It is noted that the research questions at hand were not to argue for/against the classification schemes by the experts, as the modes of analysis and their classifications vary according to the centrality of evidence provided and the fields that govern them. Rather, it is noted that there are many similarities to the modes of analysis. In summary, the majority of text analysis approaches require some form of rule setting, and then coding based on these rules.

The qualitative content analysis method was selected based on the following reasons:

1. The method is unobtrusive. As the observer probes deeper, acts of measurement create increasingly contaminated observations; therefore, the distance of the observer from the data reduces this influence substantially.
2. It is context sensitive and able to process figurative forms. Content analysis is a methodology that seeks to find patterns in textual data. In line with a key objective of this study i.e. to derive a context specific definition of a type of Empowerment (User Empowerment), the content analysis methodology was limited to qualitative analysis of the textual data for each of the responses received. The purpose of selecting this approach was to facilitate a deeper understanding of the views of respondents regarding User Empowerment by harnessing a blend of analyses prescribed under content, as well as qualitative analysis (Philipp, 2000). In a purely content analysis approach, the researcher typically creates a dictionary which clusters words and phrases into conceptual

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<sup>5</sup> Narrative analysis is adopted by Alvarez and Urla (2002) in the context of ES for examining how clients use narratives to convey information during the ES requirements analysis

categories for purposes of counting. However, for the purpose of this study qualitative analysis (Weber, 1990) was deemed a better fit due to the limited number of email responses.

Flick's (Flick, 1998) recommendation further increased the confidence in selecting this research method. Flick (Flick, 1998) recommends four points of reference for selecting the text analysis method: the first point of reference is the criteria based on the comparison of approaches. The second point of reference is the selection of the method and checking its application. This is followed by assessment of the appropriateness of the method to the issue and, lastly, fitting the method into the research process. Table 3-4 below presents an extract from Flick's (Flick, 1998) recommendation.

**Table 3-4 Comparison of Methods for the Interpretation of Data**

Criteria	Theoretical Coding	Thematic Coding	Qualitative Content Analysis	Discourse Analysis	Narrative Analysis
Openness to each text by:	Open coding	Principal case analysis short characterisation of the case	Explication content analysis	Reconstructing participants version	Sequential analysis of the case.
Structuring (e.g. deepening the issue by:	Axial coding Selective coding Basic questions Constant comparison	Elaboration of a thematic structure for case analysis Core and social distribution of perspectives	Summarising content analysis Structuring content analysis	Integration of other forms of text	Assessing formal qualities of the text(narrative versus argumentative)
Contribution to the general development of interpretation as method:	Combination of induction and deduction Combination of openness and structuring	Comparisons of groups in relation to the issue after case analysis	Strongly rule based procedure for reducing large amounts of data	Reorientation of discourse analysis to contexts and social science topics	Concrete model of interpreting narratives
Domain of application	Theory building in all possible domains	Group comparisons	Large amounts of data from different domains	Analysis of the contents of everyday other discourses	Biographical research
Problems in application	Fuzzy criteria for when to stop coding	Time consuming due to case analysis as intermediate step	Apply the schematic rules often proves difficult	Hardly developed genuine methodology	Analyses stick to the bas which makes generalisation difficult
Limitation of the method	Flexibility of methodological rules can be learned mainly through practical experience	Limited to studies with pre-defined comparative groups	Strongly oriented to quantitative methodology	No concrete definition of the concept of discourse	Assumption of homology between narrative and reality
References	Strauss (1987) Strauss and Corbin (1990)	Flick (1995, 1996)	Krippendorff (1980)	Harre (1998) Potter and Wetherell (1998)	Hiddenbrand and Jahn (1988)

The following sections review content analysis as defined by some of the eminent researchers in the content analysis field. These definitions demonstrate the pluralist themes that exist inherently<sup>1</sup> in content analysis method.

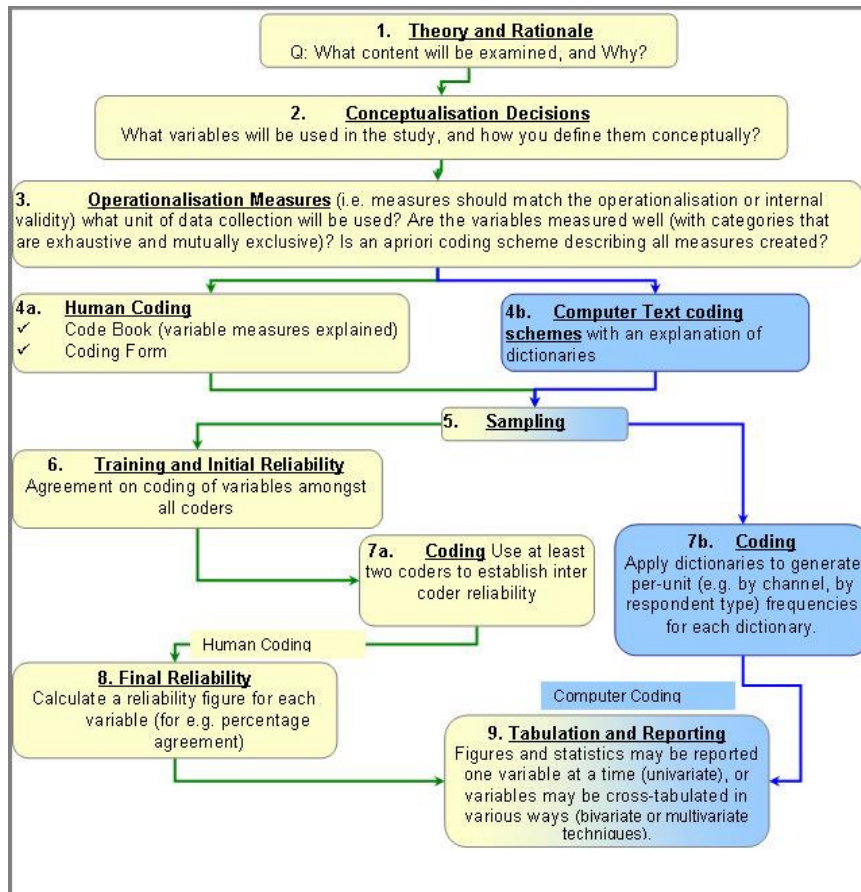
Holsti (Holsti, 1969) defines content analysis as “any technique for making inferences by objectively and systematically identifying specified characteristics of messages” (p.14). In this definition, Holsti is suggesting the need for objectivity in general, rather than objectivity from other content analysis authors. Objectivity stipulates that each step in the research process must be carried out on the basis of explicitly formulated rules and procedures. Systematic means that the inclusion and exclusion of content or categories is done according to consistently applied rules. Generality requires that the findings must have theoretical relevance.

Krippendorff defines content analysis as a research technique for making replicable and valid inferences from data to their context. Within this definition, Krippendorff (Klaus. Krippendorff, 1969) emphasises that it is the analyst to whom a text may become informative about unobserved states, events, or phenomena of the source; furthermore, analytical constructs for making the inferences should be explicit so that detailed examination is possible, independent of the particular situation in which they are applied; and finally, inferential procedures must be justifiable in reference to a particular source whether by validation or evidence.

Neuendorf (Neuendorf 2001) provides an accessible diagram for content analysis by providing clear step-by-step instructions. In order to provide an overview of the processes in content analysis, Figure 3–7 is adapted from Neuendorf’s (Neuendorf 2001) content analysis handbook. Neuendorf’s interpretation provides a succinct account of the content analysis approach. The adapted qualitative content analysis is further justified by addressing each of the essential parts of the content analysis definition proposed by Neuendorf (Neuendorf, 2002). It has been useful to frame a complete definition of content analysis by defining each of the parts as suggested by Neuendorf (Neuendorf, 2002).

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<sup>1</sup> In that, content analysis is often categorized into quantitative content analysis and qualitative content analysis. Quantitative content analysis deals with using a positivistic oriented approach that uses predefined categories and assumes the independence of the researcher from the analysis. In contrast, qualitative content analysis derives its categories from the material itself in a more interpretive manner, recognizing the role of the analyst in doing this (Mingers, 2003, p. 239).



**Figure 3–7 Adapted Flowchart for Content Analysis research**

The flowchart depicted in Figure 3–7 above is coded with a dotted arrow showing the path taken in this study.

1. Content analysis relies on the scientific method of generalisability;
2. The response or message is the unit of analysis. The basic unit of data collection for this survey are the email responses from ISWorld mailing list and Information Systems/Enterprise Systems practitioners;
3. Content analysis is utilised for summarising; and
4. Content analysis is applicable to all contexts of individual messaging.

The use of content analysis is widely accepted in Information Systems, as evidenced in the following studies. (Lacity & Janson, 1994) applied content analysis method to analyse over 600 letters to shareholders contained in annual reports. The number of information technology (IT) phrases in the letters is analysed as indicative of the importance of IT to corporate strategy.

Means (Means, 1987) conducted content analysis on three pairs of introduction to computer science textbooks to determine if there were any significant differences in their content. The objective of this last study parallels the objectives in the study at hand i.e. email responses from Information Systems researchers, Enterprise Systems Consultants, and extracts from existing literature on definitions of Psychological and User Empowerment were analysed for common terms and phrases used.

### ***3.5.3 Relevance of the Content Analysis Approach to this Study***

In line with the purpose of selecting this method, Krippendorff's (K. Krippendorff, 1980) definition of content analysis was adopted. Krippendorff's methodology has been clearly established in the field of content analysis and is reflective of the study undertaken.

In general, the use of content analysis method tends to enhance peripheral vision, which is especially important at the early stages of research. This study adopted a qualitative content analysis of the perceptions of User Empowerment. In the context of this research, qualitative content analysis not only served the desire to describe, it also helped to move inquiry toward more meaningful explanations. The study took an emic perspective or an insider point of view with no predetermined assumptions (Holloway & Wheeler, 1996). As a measure to minimise ambiguity in the process of concept definition the rules suggested by Rossouw (Rossouw, 1994) were applied. The rules considered are listed below, along with a brief explanation relevant to the context of the research:

1. The definition must indicate the core characteristics of the User Empowerment concept.
2. Definitions must not be circular i.e. should not be a repetition and must clarify new thoughts about the term being described.
3. Definitions must not be too broad or too narrow, as broad definitions may increase ambiguity and narrow definitions may exclude some key aspects.
4. Definitions must not be stated in figurative language i.e. it is essential to use simple language, which aims for clarity and conciseness.
5. As far as possible, definitions should not be formulated negatively i.e. establish what one knows about the characteristics of the concept and avoid suggesting

what the concept is not. Otherwise, the reader will remain ignorant of what the concept is purporting to be.

The research questions related to the objectives of this research and the Content Analysis method to study the documents are listed below:

- What is User Empowerment in the context of Enterprise Systems?
- How is User Empowerment distinct from Psychological Empowerment?

The conduct of the study phase, sampling and coding, is described in chapter 4 where context of the data and the methodology are related and discussed.

### **3.6 The Survey Method**

Survey research is the method of gathering data from respondents thought to be representative of a target population so that the findings advance scientific knowledge (Pinsonneault & Kraemer, 1993). This method is the most widely used mode of data collection in the social sciences. By studying a representative sample of organisations, the survey approach seeks to discover relationships that are common across organisations and hence to provide generalisable statements about the object of study (Gable, 1994). Ultimately, the purpose of survey research is to generalise from the sample to the population about some substantive issue (Kraemer & Dutton, 1991). In positivist research, surveys are particularly useful in determining the actual values of variables under study, and the strengths of relationships among them. In social sciences, positivism refers to the belief that social research should emulate how research is done in natural science (Lee, 1999). However, often the survey approach provides only a 'snapshot' of the situation at a certain point in time, yielding little information on the underlying meaning of the data. Moreover, some variables of interest to a researcher may not be measurable by this method (e.g., cross-sectional studies offer weak evidence of cause and effect) (Gable, 1994).

The first phase was the development of the research question, including defining the research area, locating and analysing relevant theories, developing the research model and delineating the hypotheses. The second phase included formulating the research design, determining *what* and *how* to measure, identifying the sample, developing and validating the data collection instruments and the collection of data. The survey method was operationalised using an instrument composed of closed structure and open-ended items (questions). The third phase was marked by

the analysis and documentation of the survey process, including the analysis of the data and the testing of the hypotheses, interpreting the results, the developing of implications and the write up. The survey process utilised in this research is described next.

### ***3.6.1 Survey in the Context of this Study***

In the context of this study, the purpose of the survey was explanatory in the sense that it tested existing theory. Wimmer and Dominick (Wimmer & Dominick, 1991) suggest two common types of survey used by researchers: (i) Descriptive survey that attempts to document current conditions or attitudes, that is, to describe what exists at the moment; and (ii) Analytical surveys attempt to describe and explain why certain situations exist. In the latter type of survey approach, two or more variables are usually examined to test research hypotheses. The results allow the examination of the interrelationships among variables and the drawing of explanatory inferences.

The research model, as described later in this chapter, is based on the assumption that a relationship between the dependent and independent variables exists, and also assumes directionality as the starting point to test the relationship (e.g. Psychological and/or User Empowerment influences Enterprise Systems success). It is useful to point out that, given the nature of the phenomena; it may not be possible to extend these explanatory questions to ask why the relationship exists i.e. analytical survey.

Surveys can be conducted using a range of media such as email, postal mail, or telephone. This study adopted a blended approach by combining these media. In order to maximise the response rate, a combination of email, personal delivery of surveys, and self-administered collection point media was adopted. The survey required the respondents to rate items on a scale (i.e. Likert scale of 1-7). The survey also allowed respondents to write their attitudes or response about a particular event or to elaborate in more detail on an item, or to express suggestions, etc. The detailed design and development of the survey instrument containing User Empowerment, Psychological, and Enterprise Systems success Scales is described in chapter 5, followed by Scale validation in chapter 6.



The key informants who agreed to be part of the case study formed the population who undertook the pilot testing of the survey instrument and provided feedback on the following aspects:

1. Time taken to complete the survey
2. Existence of any question which was unclear to comprehend
3. Ease of understanding the scale or lack thereof
4. Feedback on the demographical questions included.

This study utilised complementary strategies relative to those suggested by the bulk of the survey research methods in general. Instead of focusing on the Enterprise Systems implementation process at the target organisation alone, there were other aspects that were considered during the survey design and development. The focus on: (i) data collection strategy within the organisational structure; and (ii) understanding the people - characteristics of the job activities undertaken by the users of the business unit where the Enterprise Systems is implemented, is of particular relevance. These are described in chapter 5.

### ***Relevance of the Survey Approach to this Study***

A personal drop-off and pick-up survey approach was adopted for the purpose of the research. An online survey or a more traditional “snail mail” survey method was intentionally excluded. Online survey is popular since this approach facilitates efficient deliveries of the survey instrument, is cost effective, and application of data analysis procedures is a quick and less onerous process compared to manual data entry from a paper based survey. Along with these advantages, however, it has also brought about new issues and problems that need to be resolved. It is assumed that there is no issue of sample bias i.e. the survey is conducted online and is well represented and all respondents<sup>2</sup> have access to the Internet. The one major problem with the online surveys is the lack of trust respondents have with regard to a possible compromise of confidentiality or of anonymity or of both. This lack of trust may potentially reduce the response rate across online and “snail mail” data collection methods. It is for this reason that an online survey approach is not

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<sup>2</sup> This can be remedied by targeting the surveys to newsgroups and listservs devoted to or specialising in the common subject area to reduce the sampling error.

chosen for this study. However, the author recognised the practical limitations in pursuing a personal drop-off approach.

In an interpretivist context, surveys are appropriate as a complement to other forms of data or observations. Thus, it is important to realise that while surveys are typically used in quantitative research, they can also help qualitative researchers (Newsted, Chin, Ngwenyama, & Lee, 1997). The research questions relating to the survey are:

1. Does Psychological Empowerment have an effect on Enterprise Systems success?
2. Does User Empowerment have an effect on Enterprise Systems success?
3. What is the impact on individual users as a result of using an Enterprise System?

Thus, design of the survey method primarily sought to gather awareness from the perceptions of users of the Enterprise Systems. The author justifies the appropriateness of the unit of analysis (Enterprise Systems user) to the unit of observation (the Enterprise Systems in use) in the next paragraph. Each individual user of the mandatory Enterprise Systems has a specific role in the organisation wide business processes that are affected by the Enterprise Systems directly or the output of which impact the decisions of staff. By no means would one user have a view of the entire system. Thus, each individual user has their 'view of the world' in terms of the specific involvement in the process. Therefore, individuals express their views and perceptions of the system based on their experience and day-to-day tasks with a specific view of the Enterprise Systems system and features.

In the target organisation, the Enterprise Systems was implemented in 1996. This study provided the first opportunity for its users to give formal feedback on the implemented Enterprise Systems. Secondly, this study is the first to investigate Empowerment in the context of Enterprise Systems. Empowerment has neither been related to Enterprise Systems success nor empirically validated previously. It is thus emphasised that the survey is an exploratory one.

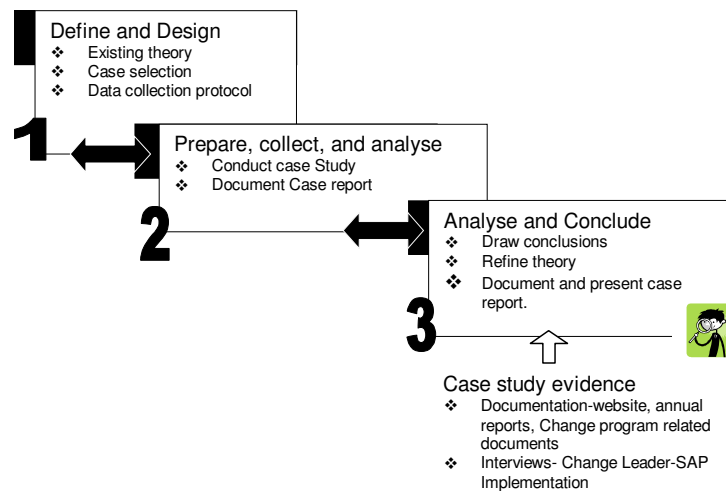
### 3.7 The Case Study Method

A case study<sup>3</sup> is an empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when the boundaries between the phenomenon and context are not clearly evident (Yin, 1994). The case study approach seeks to understand the problem being investigated; Yin (Yin, 1981) further states that a single case study is appropriate if the research objective has been a previously un-researched topic. It provides the opportunity to ask penetrating questions and to capture the richness of organisational behaviour, but the conclusions drawn may be specific to the particular organisation studied and may not be generalisable (Gable, 1994). Data may be collected from a single or multiple organisations through methods such as participant–observation, in–depth interviews, and longitudinal studies.

There have been several case studies conducted in the context of Enterprise Systems. Esteves and Pastor (Esteves & Pastor, 2001) present a total of 189 Enterprise Systems – related articles from the period between 1997 and 2000 out of which 33 are Enterprise Systems implementation case studies. Benbasat *et al.* (Benbasat, Goldstein, & Mead, 1987) identify three strengths of case study research in Information Systems. The first is in accordance with Yin (Yin, 1994b) which states that the researcher can study Information Systems in a natural setting, learn about the state of the art, and generate theories from practice. The second strength of the method is that it allows an understanding of the nature and complexity of the process taking place; the third strength being the valuable learning about emerging topics associated with the rapidly changing Information Systems field. In view of the strengths of the case study method, the problems are also worthwhile acknowledging. The key weaknesses of a case study method are lack of rigour, difficulties in generalisation, and excessive amounts of data (Yin, 1994). Figure 3–8 below illustrates the key steps involved in the case study method.

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<sup>3</sup> Benbasat *et al.* (I. Benbasat, D. K. Goldstein et al., 1987) state that there is no standard definition of case study. For them, a case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations). The boundaries of the phenomenon are not clearly evidently at the outset of the research and no experimental control or manipulation is used.



**Figure 3–8 Case Study Method Based on Yin’s Approach (1984)**

The process of the case study method consists of three main phases as prescribed by Yin (Yin, 1994). Each of these three phases is described next.

**Define and design:** The components of the research design are defined in relation to the study’s questions, its propositions, its units of analysis, the logic linking the data to its propositions and the criteria for interpreting the findings. In this phase, the type of case study is determined in relation to the context of the study.

**Prepare, collect and analyse:** This phase consists of the main part of the case study whereby the data is collected and analysed. In the preparation for data collection, the author identifies the skills required for data collection. The development of a case study protocol consists of the procedures and general rules to be followed when using the instrument. The protocol is a tactic that is used to increase the reliability of the case study research. It is intended to guide the investigator in carrying out the case study. In the data collection process, the author decides on the sources of evidence to use. Yin suggests six sources of evidence (documentation, archival records, interviews, direct observations, participant observations and physical artefacts). In this phase, Yin suggests three principles of data collection to aid in establishing the construct validity and reliability of a case study: use multiple sources of evidence, create a case study database, and maintain a chain of evidence.

**Analyse and conclude:** In the final phase of the case study, the outcomes from the exploratory survey (phase II of the research) are analysed along with the

original objectives and design of the case study. These research objectives reflect the research questions, reviews of the literature and new insights. Besides this strategy, a case description is also developed. The descriptive approach allowed the author to identify appropriate causal links that can be further analysed. The main modes of analysis employed in this case study were pattern matching and explanation building. Finally, a confidential case report is developed for the sponsor. The report mainly presented the descriptive analysis of the quantitative survey data and revealed specific characteristics of the Enterprise Systems users and linkages with the perception of Enterprise Systems success.

The case study was especially appropriate in the penultimate research phase II. At the outset of this research, the boundaries between phenomenon (User Empowerment) and context (Enterprise Systems) were not clearly evident. It is relevant to note that there has been one single study cited on User Empowerment in computer-mediated environments. Any study that explores the concept of User Empowerment in the Enterprise Systems success context is rare. The two existing models of Empowerment were explored in the context of Enterprise Systems through an exploratory survey as explained in the previous section. The findings of this exploratory survey have been useful in converging data in a triangulating<sup>4</sup> manner. This phase of the study employed a descriptive survey in a case study setting. Eminent methodological researchers also support the use of case study as a scientific and recommended way to research an area in which few previous studies have been conducted (Lee, 1989; Yin, 1994a).

### ***3.7.1 Case Study in the Context of this Study***

The research phase III followed a quantitative descriptive analysis circumscribed in the context of the case organisation's strategic objectives. The case organisation in question was undergoing an organisational change management program. The validated instrument from the exploratory phase was employed to measure the success of the Enterprise Systems as perceived by the core group of

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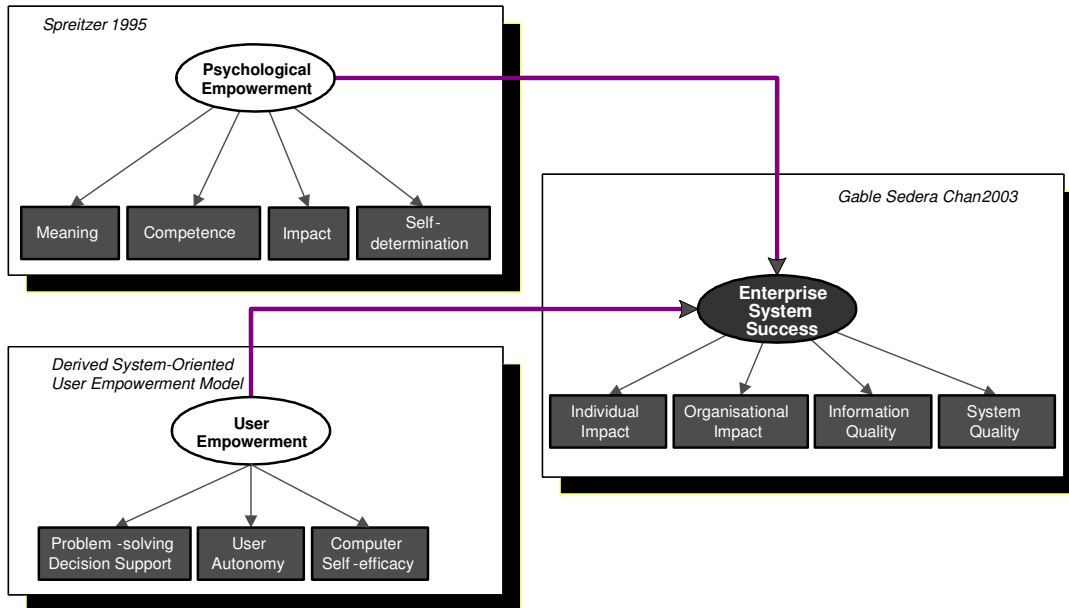
<sup>4</sup> Triangulation is the application and combination of several research methodologies in the study of the same phenomenon.

- It can be employed in both quantitative (validation) and qualitative (inquiry) studies.
- It is a method-appropriate strategy of founding the credibility of qualitative analyses.
- It is the preferred line in the social sciences

users (population of interest). These core users were identified as the champions in the organisational change program. The rich comments received as part of the exploratory survey contributed to the phase III of research in many ways. Firstly, they guided in the development of a refined instrument. Many respondents from phase II survey provided detailed comments in the free-text space provided below each section. The feedback received from the comments was actioned upon to improve the layout and format of the survey in phase III. The demographics in phase III were much more detailed compared to the phase II survey instrument. Additional open ended questions were incorporated in the phase III, which provided deeper insight into the relationship between users (unit of analysis) and the system (unit of observation).

The case study approach involved a single case and could be classified as medium term as it spanned a period of over 2 year in a different organisation to the one studied in the exploratory phase. Survey was the main method of data collection and was supported by key informant interviews, observations of documents relating to events (e.g. organisational change program), and the analysis of relevant documentation (e.g., to help establish the facts, timeframes across the SAP Enterprise Systems implementation since 2003, the assumptions, values and priorities, or to illuminate differences in perceptions within the different geographical business units of the organisation). The majority of these documents were provided by the research study sponsor in the case organisation. Where the tracking of events in relation to the Enterprise system was unclear, key informants were asked to clarify the facts. It was agreed to maintain confidentiality of information sources as agreed with the sponsor. The case study design, conduct, and findings of the research phase III are described in chapter 7.

### 3.8 The Research Model



**Figure 3–9 a priori Research Model**

As evident from the discussion so far, the research design utilised a combined qualitative and quantitative method approach. Gable (Gable, 1994) illustrates in detail how the characteristics of the two methods complement each other and recommends using them together, when new insight into a phenomenon is required and is warranted to be tested. The research model was derived by focusing on the effect of Psychological and User Empowerment on Enterprise Systems success, as depicted in Figure 3–9 above. The Enterprise Systems success was measured using the four dimensions of the Enterprise Systems success measurement model (Gable et al., 2003; Sedera, Gable, & Chan, 2003a), which is based on the original DeLone and McLean Model of Information Systems success (DeLone & McLean, 1992).

#### **3.8.1 Developing the a Priori Model**

The premise of this research was to investigate User Empowerment as an enabler of Enterprise Systems success and as a competitive strategy to achieve Enterprise Systems success. Thus, the specific aims of this study have been to develop and validate the survey scale for measuring User Empowerment in the

Enterprise Systems context; and to explore the User Empowerment — Psychological Empowerment — Enterprise Systems success relationship.

À priori model, Figure 3–9 above, has been developed on the basis of the review of relevant literature and the findings of the qualitative content analysis research phase. The partial nomological network of Psychological Empowerment (Spreitzer, 1995a) and User Empowerment in computer mediated environment (Doll et al., 2003) form the basis of the à priori model developed in this research. The dependent variable in this research is Enterprise Systems success, and utilises the Enterprise Systems success construct validated by Gable et al. (Gable et al., 2003).

Spreitzer's (Spreitzer, 1995b) Psychological Empowerment construct is made up of four sub-constructs (meaning, impact, competence, and Self-determination) that reflect an active, rather than a passive, orientation toward a work role.

The Doll et al. (Doll et al., 2003) User Empowerment construct is conceptually based on Spreitzer's (Spreitzer, 1995b) Psychological Empowerment framework. The findings of Doll et al.'s (Doll et al., 2003) study suggests that User Empowerment predicts the effective use of information technology for problem solving/decision support better than its first-order factors of: User Autonomy, Computer Self-efficacy, perceived usefulness, and Intrinsic Motivation. In this research the sub-constructs of 'perceived usefulness' and 'Intrinsic Motivation' have been excluded from the à priori model. The justification to exclude these two sub-constructs is described in chapter 5.

Models of Information Systems success have been developed (DeLone & McLean, 2002) and exploited in the measurement of Enterprise Systems success (Sedera et al., 2003a; Shang & Seddon, 2002a). This research utilised the Enterprise Systems success construct validated by Gable et al. (Gable et al., 2003). The Enterprise Systems success model suggests that there exist four independent dimensions (System Quality, Information Quality, Individual Impact, and Organisational Impact) which are additive measures of Enterprise Systems success (Sedera et al., 2003a) as listed below. The literature review chapter 2 has explained the dimensions of Enterprise Systems success measurement model.



### **3.9 Chapter Summary**

This chapter presented the philosophical position of this research followed by a review of the multimethod employed. In order to formally employ the multimethod, the underlying methods that have been selected to carry out this research, were explained and justified. The strengths and weaknesses of each method have been discussed. This comparison of methods shows how these methods complemented each other across the various research phases. The description of each method follows a discussion on the method in relation to the context of this study.

An overview of the proposed research model is described along with the underlying research frameworks. The chapter concluded with a description of the development process of the *à priori* model for this research. The next three chapters in this thesis describe each of the three research phases and the application of multimethod across each research phase. Chapter 4 describes research phase 1, chapter 5 and 6 flows on research phase 2 and its findings. Finally chapter 7 describes the case study carried out under research phase 3.

# 4 Research Phase 1: The Definition Survey

## 4.1 Chapter Overview

The newness of the User Empowerment phenomena warrants the undertaking of a rigorous study. Thus, the focus of this chapter is to describe the investigative process designed and conducted to derive a working definition of the User Empowerment construct in the Enterprise Systems context. The researcher considers this as phase I of the overall research design. This phase I was conducted as an email survey followed by a qualitative content analysis. Figure 4–1 below highlights the position of this phase I in the context of the overall research design. This study was undertaken during the Literature Review process and sets the foundation for the subsequent phases of the study.

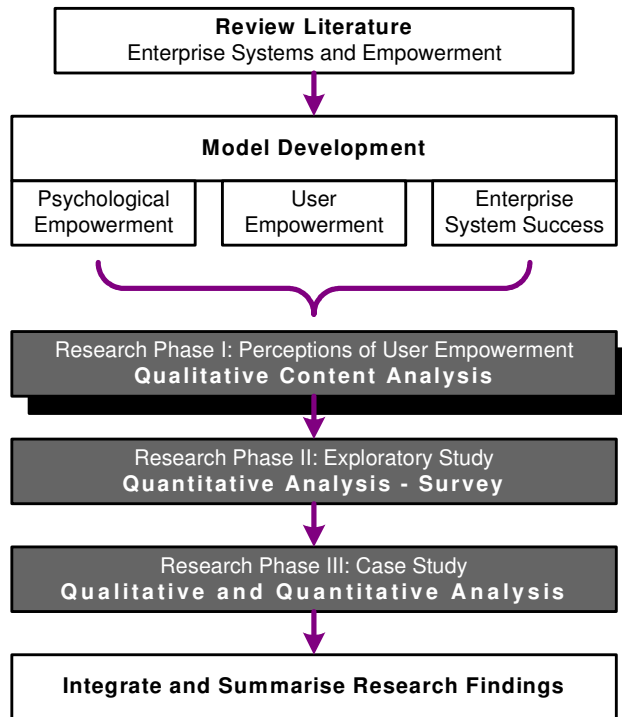


Figure 4–1 Overall Research Design

The researcher applied phase I as a strategy to categorise and review the relevant literature in order to derive a definition for the User Empowerment concept in Enterprise Systems context. This chapter is structured as follows. Section 4.2 states the goals and objectives of this definition survey phase. The next section, 4.3, describes the strategy employed to undertake the literature review during this research. The survey design and conduct is then described. Section 4.5 presents the definition for User Empowerment—the ‘key takeaway’ from this chapter and discusses the other findings of the qualitative content analysis. The chapter then concludes by acknowledging the contributions and limitations of this research phase

## **4.2 The Definition Survey Objectives**

The overall research goal is to understand whether User Empowerment is an enabler of Enterprise Systems success. In other words, does User Empowerment enable users to accept the change brought as part of the Enterprise Systems implementation and thereafter? The research proposes that User Empowerment is distinct from the Psychological Empowerment of employees. Thus, the author recognises the need to (i) define; and (ii) to measure User Empowerment in a context (Enterprise Systems) by rigorously validating the propositions of the research.

The notion of the overarching concept of Empowerment is one that has been easier to approach from a generic perspective. This is evident across all the Empowerment literature reviewed till 2004. Empowerment is a complex concept. It tends to mean different things to different people (Spreitzer & Quinn, 1997). There is lack of a clear definition of a type of Empowerment specific to a context. As a result, a wide variety of perplexing descriptions about Empowerment have been initiated and the value of the concept remains somewhat unclear. Thus, this phase I study is called the definition survey and its goals are to:

- Understand the perceptions of Information Systems/Enterprise Systems practitioners and Information Systems/Enterprise Systems researchers on the topic of — ‘User Empowerment in the context of Enterprise Systems’.
- Derive a working definition for User Empowerment concept.

### 4.3 Strategy to Review Literature

The notion of Empowerment has been interchangeably referred to as self-Empowerment or Psychological Empowerment. The following definition of Psychological Empowerment is an extract from chapter 2.

*Psychological Empowerment is defined as a motivational construct manifested in four cognitions: Meaning<sup>1</sup>, Competence<sup>2</sup>, Self-determination<sup>3</sup>, and Impact<sup>4</sup>.*

Together these four cognitions reflect an active, rather than a passive, orientation toward a work role (Spreitzer, 1992). The study conducted by Doll et al. (Doll et al., 2003) considered a type of Empowerment which is different to Psychological Empowerment or self- Empowerment. This Empowerment is referred to as User Empowerment in computer mediated environments.

*User Empowerment is an integrative motivational concept that is based on four cognitive task assessments reflecting an individual's orientation to his/her computer-mediated work (Doll et al., 2003).*

The task assessments that form the basis for User Empowerment, include *User Autonomy* (Brancheau, Janz, & Wetherbe, 1996; Venkatesh & Vitalari, 1992), *Computer Self-efficacy* (Compeau & Higgins, 1995b; Marakas, Yi, & Johnson, 1998), *Intrinsic Motivation* (Davis, 1993; Venkatesh, 1999), and perceived usefulness (Davis, 1989). However, as established in previous chapters, there is a need for another type of Empowerment that must be understood and measured along with its context of play. The following section drills deeper to address the 'how' component of the literature review. It is noted that the Empowerment literature relevant to the Information Systems discipline is of primary concern to the research objectives. The literature review was conducted through the cycle described in Section 2.2 chapter 2 (Literature review) and the schematic is repeated in Figure 4–2 below.

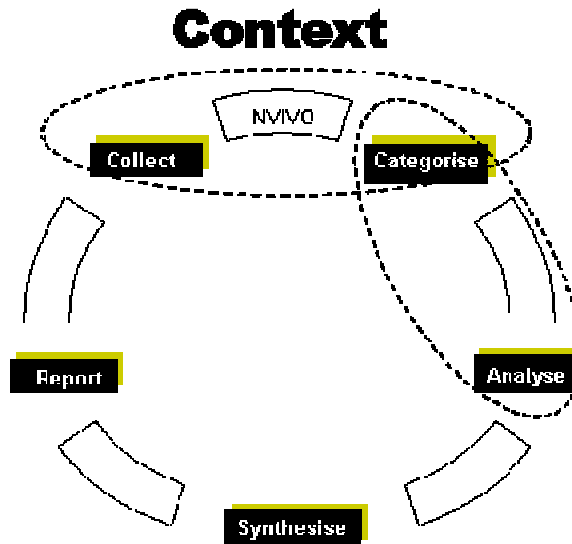
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<sup>1</sup> the value of a work goal or purpose as judged in relation to an individual's own ideals or standards;

<sup>2</sup> an individual's belief in his or her capability to perform activities with skill;

<sup>3</sup> an individual's sense of having choice in initiating and regulating actions and;

<sup>4</sup> the degree to which an individual can influence how a job is done and its outcomes.



**Figure 4–2 Literature Review Cycle**

The literature is collected and simultaneously categorised for ease of analysis at a later stage. The literature was searched from various sources such as Information Systems Journals, books, articles and eminent Information Systems conference proceedings (ICIS<sup>5</sup>, AMCIS<sup>6</sup>, PACIS<sup>7</sup>, ACIS<sup>8</sup>) on the Empowerment subject. Concurrent to this gathering of literature, the collected articles, and other publication types on the topic of Empowerment are categorised into two broad ‘buckets’. The qualitative tool named Nvivo is utilised to manage the literature categories. The first ‘bucket’ is labelled as Empowerment studies cited relating to the management literature. The second ‘bucket’ consists of non-management disciplines e.g. healthcare, sociology, psychology, and education. The first ‘bucket’ is the one that the author then focused on for remainder of research. However, the insights from prior Empowerment studies across other disciplines have been rewarding, mainly in understanding the issues faced by other researchers on the topic of Empowerment, and recognising existing frameworks of Empowerment. However, as the literature base expanded, this crude categorisation was insufficient. The main limitation in this categorisation process was the broad ‘buckets’ created during the early stage. In order

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<sup>5</sup> International Conference of Information Systems (ICIS)

<sup>6</sup> American Conference of Information Systems (AMCIS)

<sup>7</sup> Pacific Asia Conference of Information Systems (PACIS)

<sup>8</sup> Australasian Conference of Information Systems (ACIS)

to create more homogenous groupings or themes, the author then classified these categories further. The aim of this next level of classification was to identify varying perspectives on the Empowerment concept relating to management in organisations. This strategy has posed certain challenges for the author. From a retrospective view, the author suggests that these challenges could be seen as checkpoints to ensure that the core set of research questions align with the literature being studied. One key challenge was:

- Which type of employees and their Empowerment should be reviewed?
- Does one consider, for instance, Empowerment of nurses in healthcare?

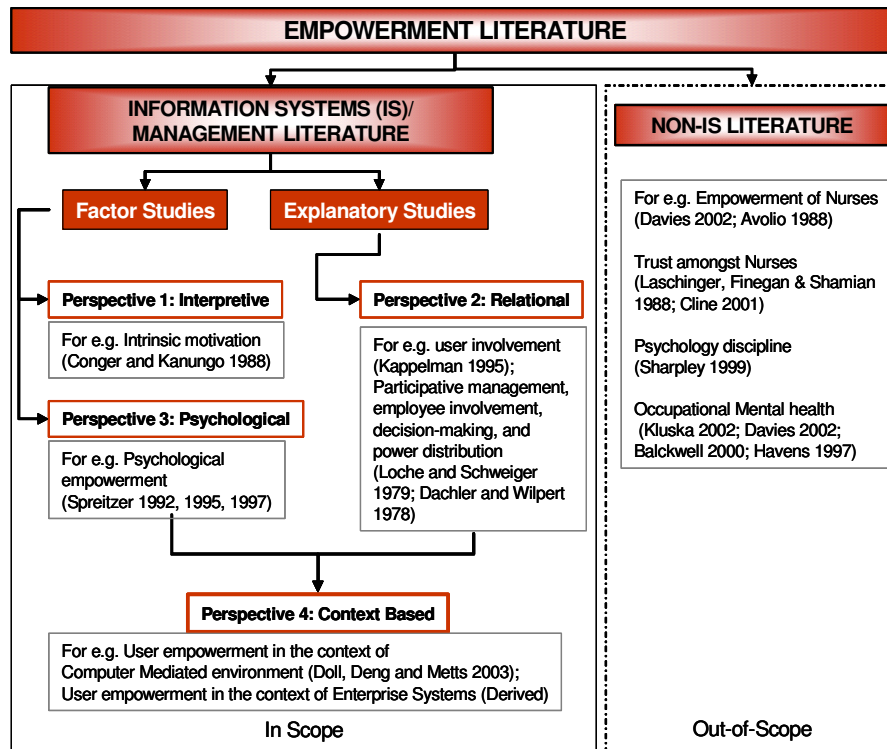
Although, healthcare is a discipline/ field that is not directly related to the research at hand, Nurses are also employees. So in which category do we put the studies that have investigated Empowerment of nurses? This issue was resolved by creating certain rules of categorisation and then classification. Thus, studies that related to employees working in the management context were focused on. Although beneficial, the Empowerment studies relating to women, children, nurses, politics, mental health etc. were separated.

The next level of classification resulted in two categories of studies based on the focus of a study as listed below:

(i) Factor based studies: These studies focus on antecedents and consequences of empowering employees. These studies generally utilise large samples and statistical methods. These studies also employ interviews, surveys, and case studies as reported in some of the studies. Figure 4–3 provides example of these studies.

(ii) Explanatory Studies: In general, it is observed that majority of the explanatory studies focus on the role and impact of leadership upon the Empowerment process. These studies generally utilise in-depth case studies spanning several years.

Interestingly a majority of the studies addressed Empowerment as a motivational concept in the workplace across varied industry sectors (e.g. community care and health, manufacturing, banking, and engineering) and only a limited number of studies considered Information Technology based organisation.



**Figure 4–3 Process of Categorising the Literature**

The strategy of simultaneously reviewing and classifying the literature within the context of Information Systems proved effective. This strategy revealed a pattern of three main perspectives of Empowerment: (i) interpretive, (ii) relational, and (iii) Psychological. Figure 4–3 above depicts the categorisation process along with some example studies. These 3 perspectives are described below:

**The interpretive perspective** describes Empowerment as intrinsic task motivation, meaning to enable<sup>9</sup> rather than merely to delegate (Conger & Kanungo, 1988) and suggests that Empowerment is driven by *Intrinsic Motivation*.

**The relational perspective** is the one that encompasses research on user involvement (Kappelman & Guynes, 1995), participative management, employee involvement, decision-making, and power distribution (Dachler & Wilpert, 1978).

**The Psychological perspective** is validated by (Spreitzer, Kizilos et al., 1997) and possibly is an outcome of the relational Empowerment perspective. This

<sup>9</sup> Enable means fostering conditions for heightening motivation for task accomplishment through the development of a strong sense of personal efficacy.

perspective on Empowerment is seen as a generic type of Empowerment approach that is relevant for all workers.

Empowerment is a multifaceted concept (Doll et al., 2003; Spreitzer, 1995b). In spite of the strong support for the theory based conceptualisation and measures of Empowerment in the management discipline, the empirical support and a succinct measurable approach (i.e. one that provides clear dimensions to measure) has remained largely unexplored. Even within the theoretical studies there appears to be limited attention given to the context within which Psychological Empowerment was being studied.

The lack of a clear definition of Empowerment may be because Empowerment has not been investigated as a specific 'type' (of Empowerment) and measured within a specific context. Those who advocate that Empowerment can only be fully understood through such a contextual synergy (Pearson & Chatterjee, 1996) are clearly in the minority. A comprehensive search of the main Information Systems conference proceedings from 2002-2005 (ICIS, AMCIS, PACIS, ACIS,

ECIS<sup>10</sup>), and major Information Systems Journals from 2002-2005 (ISR<sup>11</sup>, MISQ<sup>12</sup>, and<sup>13</sup> JMIS) showed lack of such a context based measurable perspective of Empowerment. Drawing from the perspectives illustrated in Figure 4-3 above the *context based perspective* on Empowerment is proposed. This is referred to as User Empowerment circumscribed in the context of Enterprise Systems. The author believes that this fourth perspective on Empowerment draws upon the other three (interpretive, psychological, and relational) perspectives of Empowerment. However, what makes User Empowerment distinct to the existing perspectives is its measurable context. The author emphasises that Empowerment as a concept can be translated into a meaningful and measurable program of work (e.g. embracing change in organisations) only when it is measured in the light of its contextual variables.

Researchers seeking to research in the realm of Empowerment as an enabler or influencing factor must spend reasonable effort in analysing this context based perspective as the starting point for their journey.

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<sup>10</sup> European Conference of Information Systems

<sup>11</sup> Information Systems Research

<sup>12</sup> Management Information Systems Quarterly

<sup>13</sup> Journal of Management Information Systems



### 4.3.1 Using Nvivo for Literature Review

This is the first study that reports the distinctions amongst broad and somewhat perplexing perspectives on the concept of Empowerment. Nvivo was utilised to initially categorise literature, and to reveal clusters through concept maps developed (Gregorio, 2000). The literature was studied from a number of angles, for example, based on: types of study; unit of analysis; focus discipline; methodology applied; and common Empowerment constructs across studies etc. The Nvivo coding categories and concept maps were documented. This strategy to review and classify literature is distinctive and is a contribution to undertaking a literature review on a topic that consists of perplexing viewpoints. Figure 4–4 below shows a sample Nvivo model showing the nodes coded from Empowerment literature (antecedents, conceptions, levels etc.) using the Nvivo tool.

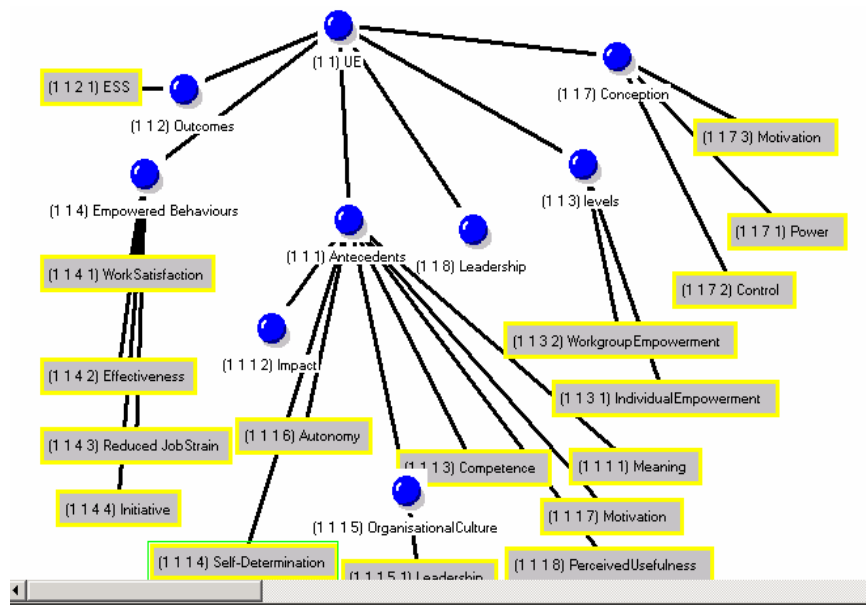


Figure 4–4 Examples of the Nvivo Nodes

The discussion in chapter 1 and 2 has posited that the companies adopting Enterprise Systems need to focus on specific aspects of technical and human factors (Miller, 2001) in order to translate their efforts into anywhere close to an Enterprise Systems success. Given this backdrop, there arises the need to understand enablers of Enterprise Systems success. The views and experiences of researchers and

practitioners are triangulated with the existing literature on Psychological Empowerment in the management context. The purpose is to consolidate the findings and derive a definition for User Empowerment in an Enterprise Systems context. The next section describes the conduct of the study. The findings of this study serve as a basis to operationalise User Empowerment constructs in the exploratory phase of the research.

## **4.4 The Email Survey**

### ***4.4.1 Conduct of the Study***

An email survey method was employed to seek the general view on User Empowerment along with the perceived indicators of User Empowerment. The data collection was approached via two concurrent channels. The first channel was an email survey sent to Enterprise Systems practitioners. For the purpose of this study, experienced Enterprise Systems practitioners include Enterprise Systems implementation specialists and project managers who are responsible for large-scale Enterprise Systems projects for over 5 years. These experienced practitioners were nominated by the senior management team of a global organisation<sup>14</sup>. The global organisation that supported this research was SAP Australia New Zealand. The State Manager of SAP Australia and Head of SAP Research Asia Pacific Area endorsed the data collection and forwarded the survey request to SAP consultants in Australia. The responses were to be directly sent to the research team for analysis.

The second channel was an ISWorld<sup>15</sup> mailing list, which was utilised to reach the world Information Systems community. The ISWorld list was founded in November 1994 by John Mooney at University College Dublin. The initial subscription was drawn from an amalgamation of the ICIS-L list, then maintained by Rick Watson at the University of Georgia, and the CIS-L list, then maintained by Al Bento at the University of Baltimore. The ISWorld mailing list is designed to serve the needs of the Information Systems academic community and is supported and funded by the Association for Information Systems.

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<sup>14</sup> <http://www.sap.com/australia/index.epx>

<sup>15</sup> <http://www.aisnet.org>

Both these data collection channels were non-anonymous and a summary of the responses was posted back to the ISWorld mailing list and individually to each of the practitioners. The purpose of selecting these channels was two fold as listed below:

- Firstly, to make the practitioner as well as the research community aware that a study on User Empowerment in the context of Enterprise Systems is underway; and
- Secondly, to capture a representative view of the two communities that are so heavily engaged in what is popularly known as ‘realising the value from an Enterprise System’ (Davenport, 2000a; Deloitte Consulting LLC, 1999).

Given that a significant amount of resources are being utilised to investigate the organisational readiness to achieve successful use of these large scale Enterprise Systems (Bingi et al., 1999a; Davenport, 2000b; Somers & Nelson, 2001) the latter reason is a more compelling one for selecting the data collection channels.

#### ***4.4.2 Survey Design***

The intentions of the request in the email survey are outlined below:

- Firstly, to seek the view on the concept of User Empowerment; and
- Secondly, to provide an example, or use an anecdote that further explains their view on User Empowerment.

The overall question was designed to be simple and the number of related investigative sub-questions was kept to a minimum. The main reason for this consideration of survey design was the fact that the data collection means is an email list. The response format was clearly described to the respondents to maximise clarity and quality of answers. The email survey consisted of one single open-ended question with a sub-question attached to it. Figure 4–5 below presents the email survey instrument utilised in this study.

**RE REQUEST FOR PARTICIPATION**

Some researchers and consultants have suggested that user empowerment is an important factor in information systems success. User empowerment is not well understood as a construct. We are conducting research on Organisational Readiness for Enterprise Systems Success and one construct that we are studying is user empowerment.

**This email seeks to capture your views and conceptions of user empowerment. It would be most helpful if you answer a simple question.**

**In 1-3 BULLET POINTS, and/or a DESCRIPTIVE PARAGRAPH (maximum words: 50-150), please tell us your understanding of the term USER EMPOWERMENT in an ENTERPRISE SYSTEM CONTEXT. You may wish to use an anecdote to describe the same.**

**In your opinion what would be the indicators of USER EMPOWERMENT in an organisation?**

I would also appreciate any comments, thoughts, ideas, questions, etc.  
As customary, I will summarize the replies I receive to ISWORLD.

Please send your response to [rsehgal@qut.edu.au](mailto:rsehgal@qut.edu.au)  
or by mail to EASHI SEHGAL  
Researcher

Information Systems Management Research Group (ISM RG)  
Centre for IT Innovation (CITI), QUT  
P.O. Box 2434 Brisbane Queensland 4001

phone: 07 3864 9475  
fax : 073864 9390  
email: [rsehgal@qut.edu.au](mailto:rsehgal@qut.edu.au)

Any queries of this study can be directed to  
Ms. Sehgal on 07 3864 9475 or Professor Guy Grant Gable on 07 3864 9472

**Figure 4–5 Email Survey Request**

### ***4.4.3 Profiling the Responses***

The survey yielded a total of sixteen (16) responses out of which twelve (12) email responses were received from the ISWorld mailing list and four (4) from the Enterprise Systems practitioners. The responses received from the Information Systems research community were difficult to quantify. The key reason for this difficulty is the fact that only those researchers who subscribe to the ISWorld mailing list; have an interest in the Empowerment topic; and are willing to participate in the study may have responded. However, 6 responses were unusable and were eliminated during the qualitative content analysis phase described in the next sub-section.

The responses received via the ISWorld mailing list were analysed based on the response content. The first category consists of cases that provide a direct answer to the question. The second category consists of cases that partially answer the question i.e. provides the indicators of User Empowerment or just an example to articulate their experience and views on User Empowerment. Then there is a third category of cases which simply pointed to a reference article relating to Empowerment. In the final content analysis the first and the second categories were included. The basis for eliminating category three (3) was due to the fact that reference to an article on Empowerment was an ambiguous response and not their personal view on User Empowerment.

A general observation regarding the respondents shows that respondents who answered succinctly preferred the bullet point format. Some respondents preferred to utilise both the formats i.e. bullet points as well as a short paragraph. This provided a mutually exclusive and collectively exhaustive set of points to articulate their view. This was followed by a descriptive paragraph to describe the concept further. In the latter approach respondents used specific examples that illustrated their view on User Empowerment when working with Enterprise Systems.

### ***4.4.4 Method: Qualitative Content Analysis***

Qualitative analysis method seeks to find patterns in textual data. In line with the key objectives of this study i.e. to derive a context specific definition of a type of Empowerment (User Empowerment) the qualitative text analysis method was employed for each of the email responses (cases) received. The purpose of selecting this approach was to facilitate a deeper understanding of the views of respondents

regarding User Empowerment by harnessing a blend of analyses prescribed under qualitative research methods (Philipp, 2000). In a purely content analysis path, the researcher typically creates a dictionary which clusters words and phrases into conceptual categories for purposes of counting. According to Weber (Weber, 1990) when there are a limited number of responses then a qualitative approach is useful. In line with Weber's (1990) suggestion a qualitative analysis approach was adopted. The coding scheme utilised the following dimensions.

**Dimension 1— Content:** this dimension described what type of information was requested.

**Dimension 2—Strategy:** This dimension described what we want to know about the information that the respondents indicated and what form the question took. The strategy dimension adopted a 'What' type of a question request. 'What' requests are for clarification, content, or definition of the content information and non-descriptive requests for information to be illustrated through an example. (e.g., "Please send me information about . . .").

**Dimension 3—Requestor:** This dimension attempted to identify the type of person responding to the information request; this information was easily identifiable through the email message as the respondents stated their identity (such as "I am an Enterprise Systems implementation specialist").

This strategy to align the coding dimensions with the actual questions has been extremely useful in this study. However, a more rigorous testing of this strategy across a large number of qualitative studies would contribute to the further development of the qualitative research method development. The coding rules were implemented when conducting the analysis based on the aforementioned coding scheme which is modelled after the taxonomy developed by Hert and Marchionini, (Hert & Marchionini, 1997) and other standard references on content analysis methodology suggested by Krippendorff (K. Krippendorff, 1980). Figure 4–6 below presents the coding rules applied during analysis.

- ✓ Each case was coded on all three dimensions (content, strategy, and requestor).
- ✓ Used the respondent's language to help determine which type of question it is; followed the descriptions given for each category within the dimensions.
- ✓ In this scenario there were no requestors coded as "general public". In two cases the respondents were coded under both categories (e.g. "Jay Harris, Project Manager" with an email address of [j.harris@university.edu.com](mailto:j.harris@university.edu.com)). We examined the content of the email to determine in which vein the person responded. It was clear to review the email content, in both these cases. (For example in Jim Harris, M.D-respondent was coded as 1-ES Practitioner/IS Researcher).

**Figure 4–6 Coding Rules Applied**

The qualitative analysis applied in the context of the study was based on the framework suggested by Neuendorf (Neuendorf, 2002). There were minor deviations:

- the message is the unit of analysis. The basic unit of data collection for this survey is the email responses from ISWorld mailing list and Information Systems/Enterprise Systems practitioners.
- in addition to key constructs from previous research on Empowerment, we decided to use senior Enterprise Systems practitioners and Information Systems researchers themselves to suggest a list of indicators that they perceive related to user Empowerment.

#### ***4.4.5 Tool Used for Computer Coding***

WordStat software was used to conduct the coding process during the content analysis cycle. The module utilised to conduct the analysis was QDA Miner - a text management and qualitative analysis program. The first step in qualitative analysis mapping (aside from mechanical steps of cleaning data) was selection of key terms for analysis. The set of meaningful terms in relation to User Empowerment were chosen from a combination of sources i.e. existing Empowerment definitions, the perspectives received from Information Systems community of researchers, and views of Enterprise Systems practitioners. The computer program automated this logic by analysing the expected value for occurrences of a word in each case (text file) included in the analysis. In this analysis, these calculations were limited to the twenty

six highest frequency terms. The function words such as, articles, prepositions, conjunctions, and auxiliary verbs, were eliminated from consideration because they can have high occurrence count even though they do not carry substantive meaning. For example, the auxiliary verb “will” is relatively dense in responses about future events, but it says little about the theme of the event or topic.

#### ***4.4.6 The Analysis and Categorisation Process***

Since the purpose of the content analysis for this study was to suggest a definition for a specific type of Empowerment relevant to the context of Enterprise Systems the process was limited to the following types of analysis.

The most basic form of text analysis was conducted via a simple frequency analysis of all words contained in one or several text fields of each case (email response text file). The software permitted more advanced forms of analysis that involved automated categorisation, inclusion or exclusion of words based on frequency criteria. One of the features provided a composite criterion of inclusion of words that involved both a minimum word frequency and a minimum case occurrence. 40% of the total cases met this composite criterion.

The analysis included simple word frequency analysis (most frequent words) and simple frequency analysis of semantically significant words as per categorisation<sup>16</sup> process and addition of frequent words. Stemming is the process used to reduce the various word forms to a more limited set of words or word roots. Such a process is typically used for lemmatisation, a procedure by which all plurals are transformed into singular forms and past-tense verbs are replaced with present-tense versions. Word count with stemming and word count of specific words for example ‘decision’, ‘involvement’, ‘individual’ was conducted. Frequency analysis on the most frequent categories revealed ‘components’<sup>17</sup> as a dominant one.

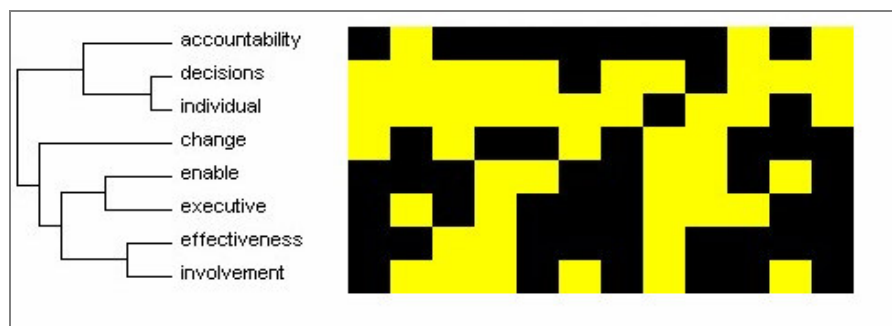
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<sup>16</sup> A categorisation dictionary was specified with a new list of words or codes. This dictionary was used to remove variant forms of a word in order to treat all of them as a single word. For example, words such as "good", "excellent" or "satisfied" may all be coded as instances of a single category named "positive evaluation", while words like "bad", "unsatisfied" or expressions like "not satisfied" may be categorised as "negative evaluation".

<sup>17</sup> Component category included words that have been cited as dimensions of Empowerment across literature or words that are used to describe the concept of Empowerment.

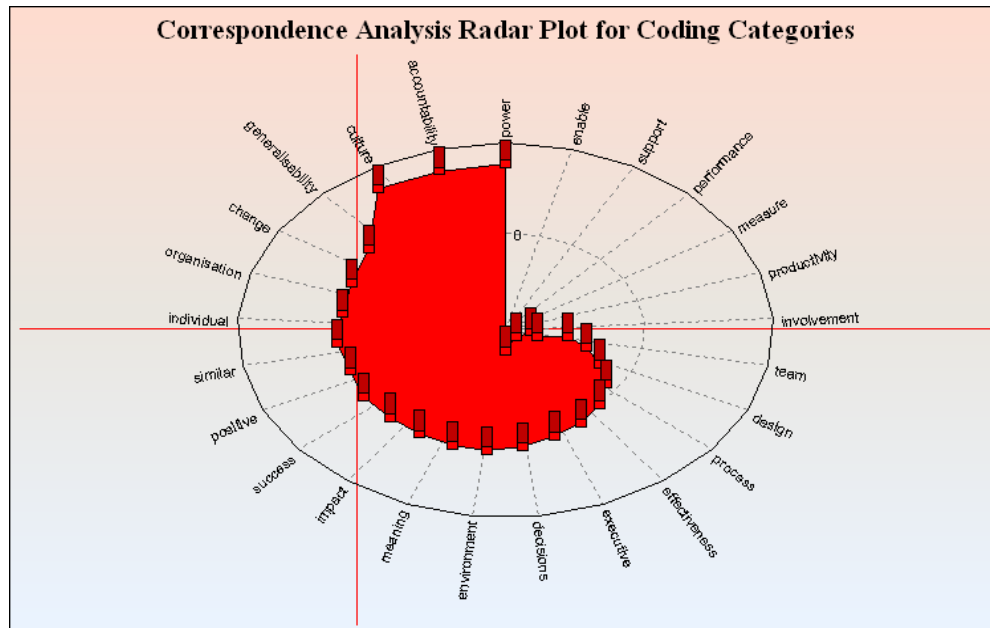


All valid cases were coded for the frequency of each of the chosen words using the content analysis software. In addition each email response was coded for the respondent category from which it originated (ISWorld mailing list or practitioners). This resulted in a data matrix of rows (one for each case) and columns (1 for each chosen word/phrase and one for each origin type). The coded data were submitted to the content analysis procedure which calculated a matrix which is indicative of the degree of co-occurrence of the selected terms. This coefficient is described by Salton and Lesk (Salton & Lesk, 1968). Figure 4–7 graphically illustrates the most commonly cited codes (the light colour boxes) and the way in which they cluster together across cases (email responses). The analysis yielded common themes in the responses, their relative importance, and their relationship to one another in a format that is quickly interpretable.



**Figure 4–7 Heat Map Showing the Commonly Cited Clusters of Coded Terms**

Interestingly, practitioner responses clustered together, while majority of the ISWorld responses formed another cluster. Similarly, the terms ‘decision’ and ‘discretion’ showed a vital common theme across all the responses irrespective of the cluster. It was interesting to find that practitioner cluster did not form a separate cluster but instead clustered along with ISWorld responses when it came to categories of outcome and components i.e. the codes such as ‘enable’, ‘support’, clustered with terms that are generally used to describe outcomes (such as ‘performance’, and ‘enhance’). Figure 4–8 below shows an intermediate radar plot of the coding categories.



**Figure 4–8 Plot of Coding Categories and Codes**

#### 4.5 Proposed User Empowerment Definition

The journey taken to synthesise the current literature has revealed gaps and issues that prevail in the Empowerment research domain (as described earlier in the chapter). This journey has provided a further degree of appreciation of the scope of study. It has helped in acknowledging the bias that the researcher’s perception of the phenomena of User Empowerment holds. Based on the analysis from the email survey responses, a working definition of the User Empowerment construct is presented below:

*User Empowerment is a construct that enables the users to: enhance their operational and decisional activities, improve their individual performance metrics, and contribute to the overall organisational performance by the usage of adequate Information System (s).*

The author recognises a critical shortcoming in this definition. This definition describes User Empowerment phenomena in terms of outputs of User Empowerment. It seems that the respondents have expressed their views by answering the second question where they define User Empowerment in terms of the indicators of User Empowerment in Enterprise Systems context. This reveals their assumption that the User Empowerment attributes are same as the outcomes of

User Empowerment. The findings from this analysis show that people have assumed that User Empowerment enables employees to improve their individual performance metrics and contributes to overall organisational performance. However, this has not been empirically validated. Although this assumption may seem to be intuitively sensible, these implicated links are a common assumption yet to be empirically tested. Thus, the position of this research topic and its relevance is further strengthened. This study seeks to demonstrate these implicated links of User Empowerment as an enabler of Enterprise Systems success.

Further, the research seeks to demonstrate that User Empowerment is shaped by the level of formal support received from the management in an organisation. User Empowerment is expected to build the capacity of an individual, a team, and an enterprise to set priorities and control resources essential for increasing organisational performance. It is a strategy aimed to give users more control and responsibility for their work.

#### **4.6 Contribution and Limitations**

The findings of this study contribute to the body of Empowerment research by highlighting the key issues that all researchers must consider when studying Empowerment in the Information Systems domain. The literature review cycle and the application of the literature review strategy have enabled a synthesis of the relevant literature.

There exists a lack of literature that expresses a type of Empowerment studied in a specific context, which is one of the key reasons for the incomplete measurement of the Empowerment concept. This study was developed to fill this gap in understanding User Empowerment. The analysis suggests that User Empowerment must be understood with the dynamics of the context against which it is being assessed. This scoping exercise will ensure that any future research conducted to advance the Empowerment concept is measurable against a context. This process further helps in validating that the most relevant and complete set of variables are used to understand the relationship between an Empowerment type and the unit of analysis.

The approach to align the coding dimensions with the actual questions has yielded benefits in this study and could potentially become a guideline when

undertaking qualitative content analysis in a similar situation as this research. However, a more rigorous testing of this approach is required. The outcomes of this study has also initiated the development of taxonomy and provided pointers for future researchers.

It is important to note that the email responses from the practitioner population represent a selected sample of the overall population. The results of this analysis positioned us to better anticipate the practitioner community's perceptions and minimise possible disagreements at a later stage. The purpose of qualitative analysis was to ensure that perceptions of Information Systems/Enterprise Systems researchers and Information Systems/Enterprise Systems practitioners are included during this preliminary phase of the study. Inter-coder reliability was applied at an advanced stage during the operationalisation of the User Empowerment constructs.

#### **4.7 Chapter Summary**

This chapter has consolidated the major themes and gaps in the current Empowerment literature. The identification of gaps has provided a starting point in the definition development phase of the study. The findings of this phase I of research points in the direction that contextual variables play a significant role in understanding User Empowerment. In other words, in order to be able to measure User Empowerment, one must understand the underlying context.

Qualitative analysis is applied to reveal the most common denominator of words, phrases, and expressions that the Information Systems/Enterprise Systems researchers and practitioners in the Enterprise Systems have used to articulate their views on User Empowerment. The common themes revealed from the email survey present a working definition of User Empowerment. The chapter concludes by suggesting this working definition of User Empowerment in the context of Information Systems/Enterprise Systems, derived from the literature triangulated with the email survey responses.

The next steps were to undertake a more rigorous study to validate the implicated links between User Empowerment and the outcomes related to Information Systems/Enterprise Systems success. In order to achieve this larger objective, the researcher seeks to operationalise the User Empowerment construct in

the next phase of research. This research phase II is presented in chapter 5 and 6 of the thesis.

# 5 Research Phase II: The Exploratory Survey

## 5.1 Chapter Overview

The purpose of this chapter is to describe the relevance of survey research to this study, to describe the survey design employed in this research, to describe the construct operationalisation and research model derivation, and to discuss the conduct of the survey. Alternative research models are also discussed. Having completed the first qualitative phase of research in order to understand the perception about User Empowerment in the context of Enterprise Systems, this chapter describes the exploratory survey – phase II of research design. The key objectives achieved from this research phase II are:

1. scales for Psychological Empowerment,
2. user Empowerment and Enterprise Systems success; and
3. an à priori User Empowerment measurement model.

This chapter is organised as follows: the chapter begins by describing the background on survey research. The characteristics of the survey are discussed. This is followed by a discussion focussed on the objectives of this survey research. Then the survey design, beginning with construct operationalisation through to the preparation for data analyses, is discussed.

## 5.2 Background on Survey Research

In day-to-day business activities, managers are confronted with data about business. However, data in its raw form is of limited use. Statistics, in short, is the science of collection, classification, analysis, and interpretation of data. Interpretation of data provides insights into interesting phenomena, reveals relationship between variables, and assists in problem solving to facilitate decision-making. Data can be obtained from published resources, from experiments, from surveys, from interviews, and from non-intrusive observations. Irrespective of the mode of data collection data is categorised as either quantitative or qualitative. Thus any observation and investigation regarding the data or facts about a situation may be termed as survey method. In social sciences, Babbie (Babbie, 1990) provides the best

overview of survey research. Babbie's technique of explaining survey research is convincing and has laid the foundation for the author's efforts in developing an understanding of survey research.

Surveys are among the most popular research method used by the Information Systems research community (Newsted, Munro, & Huff, 1991). Surveys can be divided into two broad categories: questionnaire and interview. In this study, a questionnaire category was employed. The survey methodology was approached by framing a set of issues relating to the survey population and its accessibility, sampling, question, content, bias, and finally administrative issues. Teng and Galletta's survey of researchers reported that almost 25% of all research projects in 1991 used the survey methodology (Teng & Galletta, 1991) which was similar to the results found by Farhoomand (Farhoomand & Drury, 2000).

The key strengths of survey research (Newstead, Munro, & Huff, 1991) are listed below. Surveys:

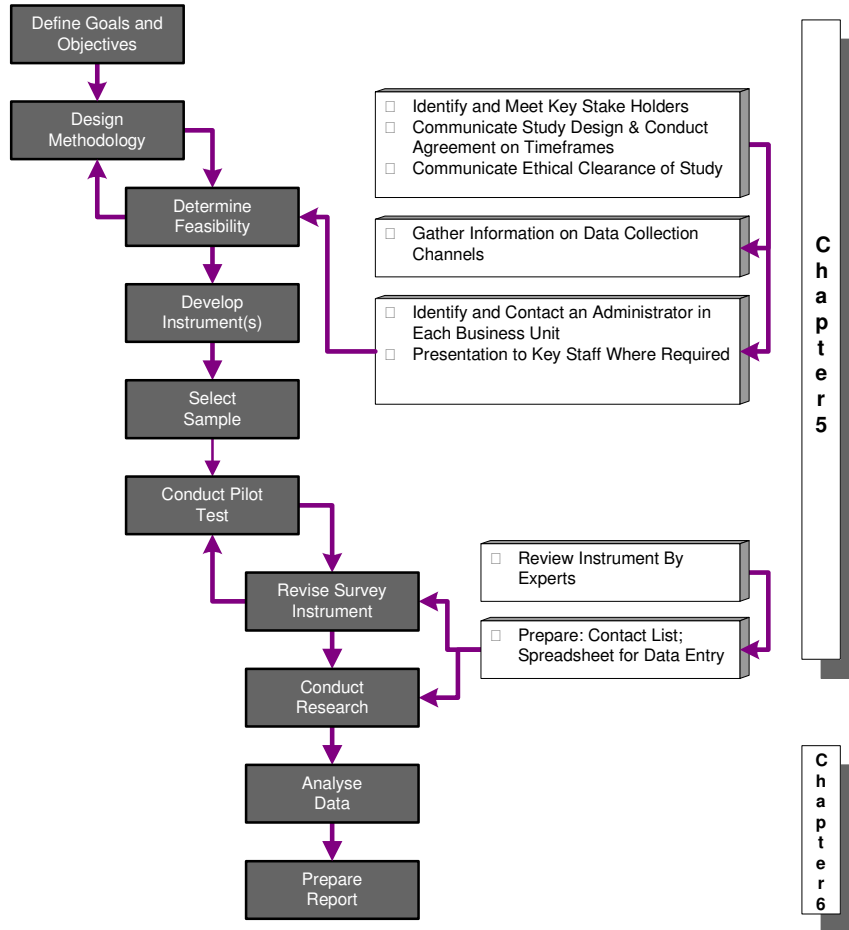
1. are easy to administer and are simple to score;
2. allow the researchers to determine the values and relations of variables and constructs;
3. provide responses that can be generalised to other members of the population studied and often to other similar populations;
4. can be reused easily and provide an objective way of comparing responses over different groups, times, and places;
5. can be used to predict behaviour;
6. permit theoretical propositions to be tested in an objective fashion; and
7. help confirm and quantify the findings of qualitative research.

Despite these strengths of the survey method, there exist some inherent weaknesses, which can be minimised through cautious undertaking of the survey. These weaknesses are summarised as below.

1. Surveys are just a snapshot of behaviour at one place and time.
2. They may produce different results across different cultures thus one must be careful about assuming they are valid in different contexts (W. J. Kettinger, Teng, & Guha, 1997). Two effective ways to minimise this weakness are proposed by Kettinger, Lee, and Lee (Kettinger, Lee, & Lee, 1995). Surveys do not provide:

- as rich or “thick” description of a situation as a case study, and
- as strong evidence for causality between surveyed constructs as a well designed experiment.

In line with the general attributes of a good survey research the following key systematic steps were undertaken, depicted in Figure 5–1 below.



**Figure 5–1 Survey Design Flowchart**

Each step in the above flow chart depends upon the successful completion of all the previous steps. The two feedback loops in the flow chart allow revisions to the method and to the survey instrument. The steps in the above flowchart indicate the flow of the survey design in this research. The details will unfold as this chapter progresses.



When deciding the appropriateness of the survey method to be applied in the research design careful consideration was required. The author placed measures in place to ameliorate the effect of the above weaknesses during each stage of survey design, analysis and reporting of results. The index of ideal survey attributes developed by Grover (Grover et al., 1998) has been employed as a checklist to insure that the survey method weaknesses are minimised. Originally this index was suggested as a tool to measure the total quality of the survey (Grover et al., 1998). Table 5-5 section 5.7.2 depicts this checklist on survey attributes considered and employed in this research.

In line with the research questions presented in chapter 1 (Introduction), an exploratory survey was planned as part of the research design. The research questions that specifically relate to the survey are reiterated below:

*RQ1: Does Empowerment of enterprise users enable Enterprise Systems success?*

*RQ2 – a: Does Psychological Empowerment have an effect on Enterprise Systems success?*

*RQ2 – b: Does User Empowerment have an effect on Enterprise Systems success?*

*RQ3 – What are the impacts on individual users as a result of using Enterprise systems?*

The users provide detailed information required for the specification of the system. A typical user performs both manual and automated Information System tasks.

### **5.2.1 Characteristics of the Survey**

Survey research involves gathering information from a sample of a population using standardised instruments. Survey research is a quantitative method, requiring standardised information from and/or about the subjects being studied (Pinsonneault & Kraemer, 1993). Table 5-1 below lists the three survey characteristics suggested by Pinsonneault and Kraemer and presents the corresponding details relevant to this research.

**Table 5-1 Key Characteristics of the Survey in this Research**

Survey Characteristics Prescribed by Pinsonneault and Kraemer (1991)		In This Research?
1	The purpose of survey is to produce quantitative descriptions of some aspects of the study population.	The objectives of this research were to focus on: The perceptions of individual users of the Enterprise System (Enterprise Systems) on the Enterprise Systems success; on the Enterprise System and its outputs; and to investigate User Empowerment as an enabler of Enterprise Systems success. The study population can also be groups or organisations, projects, or applications.
2	The main way of collecting information is by asking people structured and predefined questions.	The data was collected using a paper-based survey questionnaire with structured questions.
	Their answers, which might refer to themselves or some other unit of analysis, constitute the data to be analysed.	The unit of analysis was the individual user of the Enterprise Systems. Users provided their perception of: the impacts of the system (individual and organisational level); level of Psychological Empowerment; and Level of User Empowerment in relation to the ORACLE Financial Enterprise Systems in use.
3	The information is generally collected about only a fraction of the study population referred to as a sample.	The sample was made up of Financial System Users of the target organisation.
	Data is collected in such a way as to be able to generalise the findings to the population--like service or manufacturing organisations, line or staff workgroups, MIS departments, or various users of Information Systems such as managers, professional workers, and clerical workers.	These users of an Enterprise Systems were required to meet the following criteria to be eligible to participate in the study.  Criterion 1: active use of at least one Enterprise Systems module (for example Oracle Financials or SAP HR module). Active users mean those who require the Enterprise Systems module and its outputs as part of their day-to-day job activities.  Criterion 2: affiliation with a business unit of the target organisation. In this research the target organisation was a large tertiary education organisation- and the business unit was Financial Services Division (FSD).  Criterion 3: The Enterprise Systems in use must be implemented at least 2-3 years before the survey. At the target organisation, the ORACLE Financials was implemented in 1996 and the survey was conducted in 2003.
4	Sample Size: Usually, the sample is large enough to allow extensive statistical analyses.	200 active ORACLE Financials users

### ***5.2.2 Objectives of Survey Research***

The focus of this study was to measure the User Empowerment concept and its relationship to Enterprise Systems success. The survey aimed to test the à priori research model (refer chapter 3 Figure 3.9). The research model incorporated the Psychological Empowerment, User Empowerment, and Enterprise Systems success constructs. The scales for User Empowerment, Psychological Empowerment, and ES success were validated. Additionally, the survey tested Psychological Empowerment's correlation with Enterprise Systems success. As noted, this is the first study, which has empirically tested a linkage between the Psychological Empowerment construct and the Enterprise Systems success construct. Ultimately, the aim of this survey research was to generalise from the sample to the population about the specific issue of User Empowerment as an enabler of Enterprise Systems success. This objective aligns well with the objectives suggested by Kraemer (Kraemer & Dutton, 1991). The specific objectives of this survey are outlined below.

- Gather awareness from the field with regard to the existing theoretical frameworks on types of Empowerment and Enterprise Systems success research;
- Validate the adapted version of User Empowerment model;
- Test the User Empowerment model and the proposed relationship between Enterprise Systems success and User Empowerment. As a matter of importance, this objective required users who participated in this study be active users of the Enterprise Systems module and/or its outputs. The expected high-level outcomes of this survey research are listed below:
  - to obtain and validate knowledge about the business processes;
  - to create an awareness of the extent to which the research model was applicable, while gaining an understanding of what the respondents perceived as important characteristics across each survey dimension.

### ***5.2.3 Reasons for Adopting Survey Research***

In order to test the theoretical proposition of Psychological Empowerment and User Empowerment a survey approach was selected as the most appropriate one. Newstead (Newstead, Huff, & Munro, 1998) strongly recommend a survey approach for this purpose. To further confirm the feasibility of applying a survey

method, the overview provided by Straub (Straub, 1989) has been useful. The methodology overview presents a useful resource and includes:

- establishing the theoretical foundation for the research;
- selecting an appropriate research design and data collection method;
- proper implementation of the study; and
- using correct data analysis techniques and interpretation of the results.

The main reasons which contributed towards a decision for survey research can be categorised as: (i) contextual and (ii) methodological. Thus it is appropriate to state that survey method was decided on the basis of a combination of the above reasons. These reasons are discussed next.

### ***Contextual Reason***

There was a strong level of executive commitment and support within the business unit Financial Services Division (FSD) in the target organisation. The organisation implemented ORACLE Financials in 1996. Interestingly, since the implementation in 1996, there had been no organisation-wide initiative that formally sought feedback on the ORACLE Financials system, or any feedback from the users of the system for issues and areas of improvements. The target organisation has seen a significant change in its size, structure, service offerings, and regulatory environment since 1996. The newly appointed director of FSD recognised this change and its implications on their current operations and long-term strategic vision.

The above contextual circumstances provided a fertile ground to undertake a high-level review of the ORACLE Financials system at FSD. In other words, a survey provided an excellent opportunity to undertake a 'health check' of the system and to measure the perceptions of its users. The key proposed business outcome for the management team at FSD was to identify business process improvement opportunities.

The senior management of the target organisation strongly supported the view that users are key players in delivering process efficiencies in the short to medium term. Further, these short to medium term process efficiency gains would act as the necessary 'fuel' in the achievement of the long-term strategic vision. Thus, the executive team at FSD sponsored this study and the executive team endorsed this

study as relevant to the achievement of the goals of the operational plan. A survey method provided convenient access across the large Oracle Financials user base (185 users) within a short period of time.

Another contextual reason involved the cost-effectiveness of a survey method. The co-location of the author and the research project sponsors in the same state assisted to maximise the response rate of the survey.

#### ***5.2.4 Methodological Reason***

Surveys allow theoretical propositions to be tested in an objective fashion (Newsted, Huff, Munro, & Schwarz, 1988). In contrast to Case study or an experiment method, survey research involves examination of a phenomenon in a wide variety of natural settings (Pinsonneault & Kraemer, 1993). The researcher has very clearly defined independent and dependent variables and a specific model of the expected relationships, which is tested against observations of the phenomenon. In the à priori research model the independent variables are User Empowerment; and Psychological Empowerment. The dependent variable of the à priori model is the Enterprise Systems success construct.

Survey research is most appropriate in the following instances (Pinsonneault & Kraemer, 1993):

- Firstly, the central questions of interest to explore the phenomena are “what is happening?” and “how and why is it happening?” The research questions in the study at hand relates to ‘what’ and ‘how much’ types of question i.e.

*What is the effect of User Empowerment on Enterprise Systems success?*

Survey research is especially well-suited for answering questions about what, how much and how many, and, to a greater extent than is commonly understood, questions about how and why.

*Does the Empowerment of the users enable Enterprise Systems success?*

This question is close to a ‘how much’ type of investigation i.e. how much is the contribution of User Empowerment, if any, towards Enterprise Systems success.

- Secondly, the control of the independent and dependent variables was not possible or desirable in this organisation because the phenomenon of User

Empowerment in an Enterprise Systems context was required to be studied in its natural setting.

- Thirdly, the phenomenon of interest occurs in current time.

As mentioned earlier, in section 5.2, surveys have certain weaknesses inherent in their nature. In contrast to the above instances where surveys are appropriate, they are seen as less appropriate (than other methods such as case studies and naturalistic observation) when detailed understanding of context and history of given computing phenomena is desired (Pinsonneault & Kraemer, 1993). Based on the objectives of survey in this research the research propositions are presented in the following section.

### **5.2.5 The Research Proposition**

- Proposition 1: Users who have a high level of Psychological Empowerment (*Impact, Self-determination, Meaning and Competence*) report high levels of Enterprise Systems success.
- Proposition 2: Users who have a high level of User Empowerment (*User Autonomy, Computer Self-efficacy, and Problem-solving and Decision Support*) report high levels of Enterprise Systems success.
- Proposition 3: Users working in complex Enterprise Systems work environments requiring problem *solving*/decision support activities in their daily job-activities generally report an increased need for User Empowerment.

The methods used to test these propositions are discussed in the survey design section that follows next. Each of these methods is further discussed in detail in chapter 6.

## **5.3 The Survey Design**

The survey design is a component in the strategy for addressing the research questions and testing the research propositions which have motivated the research. In order to introduce methodological robustness in the survey design, an impact evaluation may be a useful estimate (i.e. it may be asked what might have happened had the survey design been different. For example, if the survey type selected had been face-to-face interviews instead of drop-off paper based questionnaires, or if the unit of analysis was the business unit instead of individual users within the business

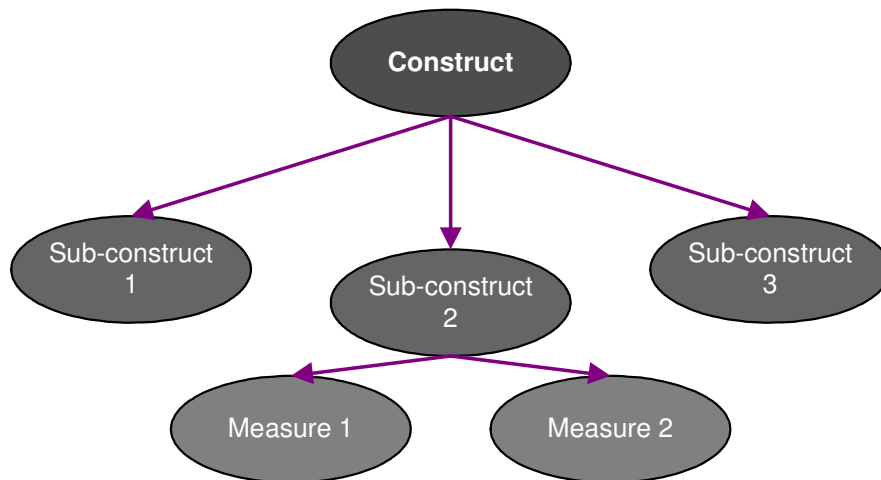
unit). In the words of Straub (Straub, 1989) the importance of survey design is further emphasised as follows:

*"Attention to survey design issues brings greater clarity to the formulation and interpretation of research questions. In the process of validating an instrument, the researcher is engaged, in a very real sense, in a reality check. He or she finds out in relatively short order how well conceptualization of problems and solutions matches with actual experience of practitioners." Source: (Straub, 1989 pp. 148).*

Thus, the description of each activity in this survey design process is described in detail along with the key outputs. A systematic approach was followed during the process of survey design, based on the flow chart illustrated in section 5.2 Figure 5–1.

### **5.3.1 Construct Operationalisation**

Construct operationalisation is the process of identification of constructs and the related strategy to validate and to measure the construct(s). It is important to clarify the terms used in the discussions from this point in the chapter. Figure 5–2 below illustrates the relationship between Construct, Sub-construct, and measures in this research.



**Figure 5–2 Example of a Typical Relationship Between Key Terms**

Operationalisation of the research model proceeded as per the following steps.

- Described the operationalisation approach as applied to the key research constructs;

- Introduced each of the model constructs and sub-constructs in the proposed Psychological Empowerment and Enterprise Systems success research model 1;
- Introduced Doll et al.'s (Doll et al., 2003) User Empowerment construct and related sub-constructs;
- Described relevance of new User Empowerment sub-constructs in the Enterprise Systems context;
- Introduced each of the model constructs and sub-constructs in the proposed User Empowerment and Enterprise Systems success research model 2; and
- Optimised the research model by eliminating the sub-constructs and/or measures that were inappropriate in this study's context.

### ***Construct Operationalisation Approach***

The Literature Review (chapter 2) describes the process of searching, categorisation, and synthesis of potentially useful constructs from the Empowerment literature. The dependent variable in the investigation was established before the independent variable(s) were finalised. According to Hinkin (Hinkin, 1995) there are two main approaches for undertaking a feasibility analysis on constructs and sub-constructs — a deductive or inductive approach. A combination of these two approaches was employed to derive the constructs and sub-constructs in the proposed research model. The next sub-section provides an overview for the application of deductive and inductive approaches in relation to the research model constructs. Finally the proposed research model then presents the links between the independent and the dependent variables.

**Deductive Approach:** The first approach is a deductive approach where the constructs and sub-constructs must be validated and qualified prior to deriving the measures (Sedera et al., 2003b). This deductive approach is theory driven. In the case of Psychological Empowerment, the construct and sub-constructs were based on Empowerment theory (Thomas & Velthouse, 1990) and the Psychological Empowerment model was validated (Spreitzer, 1995b). Psychological Empowerment is the independent variable and Enterprise Systems success is the dependent variable in the proposed research model. The constructs and sub-constructs of Psychological Empowerment and Enterprise Systems success had been validated and qualified prior to item derivation.



The measures underlying each sub-construct have been used in this study without any revision or adaptation. Figure 5–3 below depicts the Psychological Empowerment model validated by (Spreitzer, 1992, 1995a), followed by a discussion on the Psychological Empowerment construct.

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**Figure 5–3 Validated Psychological Empowerment Model, Spreitzer (1995)**

Spreitzer’s dissertation is the first consolidated work on Psychological Empowerment (Spreitzer, 1992). Since then the construct of Psychological Empowerment has been widely studied across a range of industry sectors including manufacturing, nursing, general healthcare, managerial effectiveness of software workers, and generic Information Systems context.

Spreitzer’s paper claims that the gestalt of Psychological Empowerment construct lies in its four sub-constructs — *Impact (I)*, *Competence (C)*, *Self-determination (SD)*, and *Meaning (M)* (Spreitzer, 1995b). In statistical terms, the sub-constructs of the Psychological Empowerment construct are multiplicative in nature. However Spreitzer (1995) emphasises that her model is a partial-nomological network of the Psychological Empowerment construct. Within a span of 2 years, Spreitzer (Spreitzer, Kizilos et al., 1997) extended this model to undertake a detailed dimensional analysis. This extended model is the complete Psychological Empowerment model which presents the antecedents and outcomes of Psychological Empowerment. This later Psychological Empowerment model has been the most widely accepted model (refer Figure 5–4). The citation analysis of articles on Psychological construct evidences its validity and acceptance across many industries, sectors, and geographical locations Spreitzer (Spreitzer, 1995b; Spreitzer, Kizilos et al., 1997).

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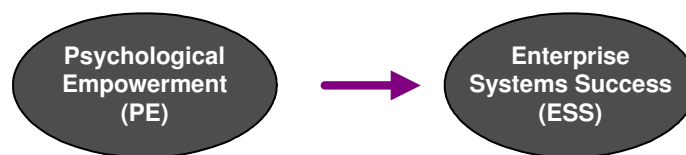
**Figure 5–4 Dimensional Analysis of Psychological Empowerment Model Spreitzer  
(Spreitzer, Kizilos et al., 1997)**

In the case of the Enterprise Systems success construct, the sub-constructs were based on the Information Systems Success theory (DeLone & McLean, 1992) and a validated Enterprise Systems success measurement model (Gable et al., 2003). The sub-constructs of the Enterprise Systems success measurement model proposed by Gable et al. are: *Individual Impact* (II), *Organisational Impact* (OI), *Information Quality* (IQ), and *System Quality* (SQ). The sub-constructs underlying the Enterprise Systems success construct were used in this research without any revision. The Enterprise Systems success sub-constructs bear relevance to two dimensions of impact (upon its users and organisation) and quality (Information and System Quality) of the Enterprise System. However, the items underlying each sub-construct were adapted to suit the Enterprise System utilised in this research (for example, each item that referred to the Enterprise System implemented in the target organisation was replaced by Oracle Financials). The survey instrument design section 5.3.3 will justify each revision and adaptation to the validated Enterprise Systems success items.

***Link between the independent Psychological Empowerment (PE) and  
dependent Enterprise Systems success (ESS) variables***

The findings from Spreitzer's (Spreitzer, Kizilos et al., 1997) dimensional analysis of the Psychological Empowerment construct evidenced three positive outcomes: '*Increased Work Effectiveness*', '*Increased Work Satisfaction*', and '*Reduced Job-related Strain*'. However, the results for '*Reduced Job-related Strain*' were neutral. '*Increased Work Effectiveness*' and '*Increased Work Satisfaction*' both bear positive connotations to 'success' in the organisational context. The line of logical reasoning behind Psychological Empowerment as independent variable and Enterprise Systems success as dependent is the linkage between the dependent variables in the PE

measurement model and the outcomes of the Enterprise Systems success measurement model. The outcomes of empowering users (increased worker effectiveness; increased work satisfaction; reduced job-related stress) conceptually resonate very closely to the outcomes of individual performance, quality of system outputs; goodness of system functionality and, on a broader level, effective use of the system to yield successful business outcomes. These latter outcomes represent the measures of Enterprise Systems success. Thus Empowerment as an independent variable and Enterprise Systems success as a dependent variable provided a launching platform in the development of the research model. Figure 5–5 below depicts a parsimonious relationship for the above constructs of Psychological Empowerment and Enterprise Systems success. From this point onwards this model will be referred to as research model 1.



**Figure 5–5 Research Model 1**

### ***Need to consider an alternative research model***

As discussed earlier in chapter 1 (Introduction) and chapter 2 (Literature Review) the concept of Empowerment is one that has been easier to approach from a generic perspective. Empowerment tends to mean different things to different people (Spreitzer & Quinn, 1997). This is perhaps due to the diverse range of disciplines and domains that Empowerment has been associated with. There was lack of a clear definition for a type of Empowerment specific to a context, making it difficult to measure in a meaningful way. As a result, a wide variety of perplexing descriptions about Empowerment have been initiated and the value of the concept remains somewhat unclear.

The categorisation of literature revealed a pattern of Empowerment in terms of its application across varied domains and disciplines from the 1960s through to the 1990s. Conger and Kanungo (Conger & Kanungo, 1988) were the pioneers to study Empowerment of workers in organisational management discipline. Two main types of Empowerment studies were identified in the Information Systems discipline:

factor studies and explanatory studies. The next level of categorisation yielded 3 perspectives of Empowerment. These perspectives were: Interpretive; Relational; Psychological. These three perspectives can be broadly classified under a specific type of Empowerment i.e. Psychological Empowerment. It is interesting to observe a trend across all the studies that related to Empowerment of employees, ranging from antecedents of Empowerment, outcomes of Empowerment, affect of leadership on Empowerment etc. The trend reveals that although these studies presented various perspectives of Empowerment across varied industry segments, nearly 80 percent of these studies employ Psychological Empowerment type and use Spreitzer's (Spreitzer, 1995b; Spreitzer, Kizilos et al., 1997) measurement model. In other words, these researchers accepted a 'one size fits all' approach regarding Empowerment, to the extent that the term 'Psychological Empowerment' was interchangeably referred to as 'Empowerment'.

Drawing from the above described perspectives this research sought to measure a type of Empowerment within the context of Enterprise Systems. One single study has been cited to date which presented User Empowerment in computer mediated environments (Doll et al., 2003). Their study was the first attempt to measure a type of Empowerment in a computer-mediated environment.

The research aims warranted a more compelling reason than this to search for a new type of Empowerment – User Empowerment circumscribed in the context of Enterprise Systems. What makes User Empowerment distinct to the existing Empowerment types is its measurable context. The author emphasises that Empowerment as a concept can be translated into a meaningful and measurable program of work (e.g. embracing change in organisations) only when it is measured in the light of its contextual variables.

In pursuit of further evidence an email survey was undertaken to understand the perceptions of Information Systems/Enterprise Systems practitioners (SAP) and Information Systems/ Enterprise Systems researchers (subscribers of ISWorld mailing list) on the topic of User Empowerment in Enterprise Systems context. The details about this email survey were documented in chapter 4.

The responses from the email survey of Information Systems researchers, and Enterprise Systems consultants were triangulated with the findings from the categorised literature review on Empowerment. The findings of this analysis

evidenced that people had assumed that User Empowerment enables employees to improve their individual performance metrics and contributes to overall organisational performance. Although their assumptions seemed to be intuitively sensible, these implicated links evidenced a common assumption yet to be empirically tested. The position of this research topic and its relevance was therefore further strengthened. Thus, this study sought to demonstrate these implicated links (or not) of User Empowerment as an enabler of Enterprise Systems success. The alternative research model needed to be tested. This alternative research model 2 comprised of User Empowerment as the independent variable and Enterprise Systems success as the dependent variable.

### ***Inductive Approach: Deriving Sub-constructs of User Empowerment***

The inductive approach is where the researcher determines the sub-constructs for the construct of investigation. Typically, the researcher would gain detailed understanding of the construct of interest through a case study to derive the potential sub-constructs of a particular construct. Further, in this instance a series of qualitative and quantitative methods to test the validity of the sub-constructs. In the case of the alternative research model 2, the independent variable User Empowerment was derived using a combination of the deductive and inductive approaches. The existing User Empowerment model validated by Doll et al. (Doll et al., 2003) is based on Empowerment theory. User Empowerment is an integrative motivational concept based on four cognitive task assessments reflecting an individual's orientation to his/her use of computer applications for a specific task (Doll et al., 2003).

Thus, following an initial deductive approach, these four (4) task-assessments or sub-constructs were identified as: *User Autonomy* (UA), *Intrinsic Motivation* (IM), *Perceived Usefulness* (PU), and *Computer Self-Efficacy* (CSE). In statistical terms, the UE model proposed by Doll et al. consists of a second-order factor with four first-order factors (User Autonomy, Computer Self-efficacy, Intrinsic Motivation, and Perceived Usefulness). The User Empowerment model was validated using a sample of 192 knowledge workers doing engineering design work. User Empowerment was found to predict the Effective Use of Information Technology for *Problem Solving and Decision Support* better than its first-order factors. Figure 5–6 below depicts the User Empowerment model proposed by Doll et al. (Doll et al., 2003)

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**Figure 5–6 User Empowerment Model Proposed By (Doll et al., 2003)**

In this research an inductive approach was applied to derive the User Empowerment sub-constructs and to derive alternative research model 2. These sub-constructs were then included in the alternative research model 2. The following subsections discuss the rationale for deriving the adapted sub-constructs for the User Empowerment construct. The proposed User Empowerment model and its sub-constructs were validated using a two-phased approach. As described previously in the Literature Review (chapter 2) User Empowerment in the Enterprise Systems context is a new construct. With the above validated User Empowerment model in hand, the author employed qualitative content analysis to triangulate the views of Information Systems researchers and practitioners on the topic of User Empowerment in an Enterprise Systems context. This research phase was discussed in chapter 4. The qualitative content analysis phase was used as confirmation for the proposed User Empowerment model sub-constructs. The author then sought to validate the proposed sub-constructs of User Empowerment through a quantitative survey method during the second research phase. Figure 5–7 below depicts the alternative research model 2, followed by a discussion on the new User Empowerment sub-constructs included in the research model.



**Figure 5–7 Research Model 2**

The operationalisation of Model 2 proceeded as follows:

- Included Problem-solving and Decision Support as a key sub-construct (first order factor) as being relevant to the Enterprise Systems context;
- Revisited the relevance of Doll et al.'s (Doll et al., 2003) Perceived Usefulness sub-construct;
- Revisited the relevance of Doll et al.'s (Doll et al., 2003) Intrinsic Motivation sub-construct;
- Adapted or dropped measures that were inappropriate for this study.

The above actions undertaken during the construct operationalisation process are discussed in the next four sections.

As previously mentioned, the independent variables (first order factors) in Doll et al.'s (Doll et al., 2003) User Empowerment model are: *User Autonomy* (Janz, Wetherbe, Davis, & Noe, 1997; Venkatesh & Vitalari, 1992), *Computer Self-efficacy* (Compeau & Higgins, 1995), *Intrinsic Motivation* (Davis, 1989; Igarria & Iivari, 1995), Venkatesh 1999, 2000), and perceived usefulness (Davis, 1989) Davis et al., (Davis 1992).

As previously mentioned findings of Doll et al.'s study (Doll et al., 2003) suggest that the User Empowerment construct is found to predict the effective use of information technology for problem solving/decision support better than its first-order factors. It is to be noted that Doll and colleagues consider general IT and any computer-mediated environment. While the Doll et al. model proposed *Problem-solving and Decision Making* as the dependent variable, the author included *Problem-solving and Decision Making* as a sub-construct of User Empowerment in this study. The author justified this on the basis of literature and the qualitative analysis outcomes of the email survey (research phase 1). Additionally, this study sought to examine the role of *Problem Solving and Decision Support* in Enterprise Systems success.

It is to be noted that Doll et al's User Empowerment instrument was adapted from Spreitzer's Psychological instrument. Thus, in order to avoid any potential overlap between the self-specific (*Meaning, Impact, Self-determination, and Competence*) dimensions and the system-specific (*User Autonomy, Computer Self-efficacy, and Problem-solving and Decision Support*) two constructs were intentionally dropped from the User Empowerment instrument. The following sub-section discusses the reason for including *Problem-solving and Decision Support* as a sub-construct in the alternative research model 2 (see Figure 5–7 above), and the reason for excluding the sub-constructs of *Intrinsic Motivation* and perceived usefulness is discussed.

### ***Revisit Problem-solving and Decision Support – as an independent variable of User Empowerment***

*Problem-solving and Decision Support* is a dependent variable in the proposed User Empowerment model by Doll and colleagues (Doll et al., 2003). The extensive literature review on Enterprise Systems suggests that *Problem-solving and Decision Support* is enhanced via the successful use of the Enterprise Systems. Enterprise Systems play an instrumental role in improving decision-making for its users (Holland et al., 1999b). The operative word is 'improving'. The qualitative analysis



phase of research yielded significant support in favour of '*Problem-solving and Decision Support*' as one of the vital components of User Empowerment as perceived by Information Systems researchers and Enterprise Systems consultants.

It is important to clarify that problem-solving/decision support capability of the user is different to *Problem-solving and Decision Support* capability of the system. The ability of Enterprise Systems to disseminate timely and accurate information enables improved managerial and worker decision-making (Hitt, Wu, & Zhou, 2002). The literature on both Empowerment and Enterprise Systems critical success factors supports the view that without the *Problem-solving and Decision Support* capabilities of the user, timely and accurate data alone may not result in effective problem solving or enhancing decision-making through the Enterprise Systems. The inclusion of *Problem-solving and Decision Support* as a component of User Empowerment is concerned with the user's problem solving capability that may or may not harness the Enterprise Systems capability. *Problem-solving and Decision Support* directly affects the effort required by the user to take advantage of the system (Davis, 1989).

The underlying assumption to include the *Problem-solving and Decision Support* sub-construct was to ensure that the derived sub-constructs of User Empowerment were user based and yet remained system-specific. The term system-specific pertains to yielding positive outcomes from the Enterprise Systems use eventually contributing to Enterprise Systems success. This separation between self-specific and system-specific was useful to ensure that: Psychological Empowerment included all self-related dimensions, whereas User Empowerment included all system-specific dimensions only. Further, these sub-constructs were required to be mutually exclusive from each other and yet form a collectively exhaustive set of sub-constructs.

Some of the industry surveys (KearneyAT, 1996, 1998, 2000; Monograph, 1996, 1998, 2000) also point to the relevance of the workers' ability to undertake problem-solving via effective use of packaged systems. The author observed some linkages and some gaps from the industry survey. The linkage is between Enterprise Systems use and yielding business benefit of improved decision-making. The gap is how the user delivers these business benefits to the organisation. Without the user's *Problem-solving and Decision Support* skills the user would not be able to include the system-generated information into their decision-making process adequately. In other

words, the users would not be able to extrapolate and synthesise information or leverage the sophisticated Enterprise Systems functionality. Those tasks that are repetitive, routine and have systematic procedures will help improve a user's decision-making structure by utilising the Enterprise Systems. However the level of complexity in the user's overall work environment will not be reduced due to the Enterprise Systems *Information Quality*, or Enterprise Systems quality alone. In order to reduce the degree of complexity in their work environment the users of the Enterprise Systems rely largely upon their problem solving/decision support ability.

Thus the author justifies that *Problem-solving and Decision Support* appeared to be a potentially important sub-construct of User Empowerment in the Enterprise Systems context. This potentially important sub-construct was included therefore in the à priori research model. This à priori research model was tested for content validity, construct validity and reliability. The findings of the User Empowerment scale validation are described in chapter 6.

### ***Revisit Perceived Usefulness – excluded from the User Empowerment measurement model***

The perceived usefulness construct is defined as the degree to which an individual believes that using a particular system would enhance his or her job performance. This definition follows from the root word 'useful' (Derek Says redundant, I don't think so). The study by Davis (Davis, 1989; Davis, Bagozzi, & Warshaw, 1992) found (i) 'perceived usefulness' to be significantly correlated with system usage and (ii) that perceived usefulness positively affects user satisfaction (Mahmood, Bum, Gemoets, & Jacqucz, 2000).

The research on 'perceived usefulness' up until the mid 90's was based on a focussed as to what causes people to accept or reject information technology. Today, however, Information Technology (IT) is an inseparable and pervasive part of modern organisations. Organisational researchers such as (Pfeffer, 1994; Vroom & Yetton, 1973) have been strong advocates of the view that management seeks to reinforce good performance of employees by job appraisals, bonuses, other non-financial incentives and financial rewards. Thus, Davis relates the above aspects of performance to Information Systems i.e. a system high in perceived usefulness, in turn, is one for which a user believes in the existence of a positive use-performance relationship (Davis, 1989).

Gable et al. (Gable et al., 2003) advocate that the usefulness of a system derives from such factors as: the quality of the system, quality of information, and satisfaction of users. The following excerpt further evidences the synonymity in definition and purpose between perceived usefulness and user-satisfaction.

*“User satisfaction has been variously associated with terms such as “felt need.” “System acceptance,” “perceived usefulness,” “MIS appreciation.” “feelings” about a system (Ives, Olson and Baroudi 1983) and, more generally, “attitudes and perceptions” (Lucas, 1981). Specific definitions for the related constructs range from the “extent to which users believe the Information System available to them meets their information requirements”(Ives, Olson, & Baroudi, 1983) to the “manifold of beliefs about the relative value of the MIS”(Swanson, 1974).*

*Source: (Melone, 1990a) (p.80).*

From the above discussion it is clear that there exist varying conceptual definitions. However, these varying conceptual definitions relate essentially to the user evaluation of the system. Perceived usefulness is related to the user's evaluation of the system or Enterprise Systems and does not directly relate with the User Empowerment level. Perceived usefulness does not take into account the role of user behaviour in the transformation of inputs to outputs generated through the Enterprise Systems (Melone, 1990b). Consistent with the findings of Teo and Wong (Teo & Wong, 1998), who, having studied the impact of IT investment and performance impact measures the work of Gable, Sedera, and Chan (Gable et al., 2003) concluded that satisfaction was not a distinct dimension. The Enterprise Systems success measurement model proposed by Gable et al. expressed concerns with the validity of the satisfaction construct as a dimension of success and with its inclusion in the à priori model. Further validation of the Enterprise Systems success measurement model by Gable et al. excluded satisfaction from the Enterprise Systems success measures (Gable et al., 2003).

Perceived Usefulness depends on the extent to which an application contributes to the enhancement of the user's performance – for example, producing higher quality outputs in reduced time.

Prior to making a decision on the Perceived Usefulness construct, Enterprise Systems success expert researchers, who have undertaken in-depth analysis over a

number of years studying the Enterprise Systems success construct and sub-constructs, were consulted. Their comprehensive study and analysis (Gable et al., 2003; Sedera et al., 2003a, 2004) has been widely accepted by the Information Systems research community including 'Delone' & 'Mclean'. It is inferred that inclusion of Perceived Usefulness sub-construct as an independent variable will result in mis-specification of measures because measures of user-satisfaction exist within the holistic measures of Enterprise Systems success on the dependent side.

***Revisit Intrinsic Motivation – excluded from the User Empowerment measurement model***

Intrinsic Motivation directly relates to the Psychological rewards an individual receives from his or her work (Kenneth 2000). The premise underlying Intrinsic Motivation is that workers who are intrinsically motivated genuinely care about their work and continually seek to improve their work for achieving better outcomes for the organisation. On the other hand, extrinsic motivation concerns the economic rewards that workers receive in return for their work performance for example, pay raises, bonuses and benefits.

There exist several widely cited studies and standard instruments that measure Intrinsic Motivation (e.g. (Doll & Torkzadeh, 1988; Ryan & Deci, 2000; Venkatesh & Vitalari, 1992). Intrinsic Motivation tends to dominate extrinsic motivation as a factor indicative of success in organisations (William 2005). The researcher agrees with the above and extends that choosing and hiring the right people who are self-motivated is much more important than attracting workers with rewards and bonuses in order to provide performance in return. Peter Bock, the eminent management thinker, further emphasises that Intrinsic Motivation is destroyed when work is reduced to mere economic transactions Strickler (Strickler 2006). Meaningfulness and Choice are two vital components of IM (Thomas & Velthouse, 1990). Meaning, or the sense of choice, is one of the dimensions of Psychological Empowerment and Intrinsic Motivation sub-construct is very similar to the Meaning construct.

Further, the author concurs with the in-depth discussions presented by Gable et al (Gable et al., 2003) which suggest that Intrinsic Motivation is a surrogate measure of measuring system success. Measures of Intrinsic Motivation resonate with a user's self-related sub-construct of 'Meaning', which already exists in the

Psychological Empowerment model. To avoid any overlap of constructs when measuring User Empowerment vs. Enterprise Systems success and Psychological Empowerment vs. Enterprise Systems success the Intrinsic Motivation construct was therefore excluded from the User Empowerment model.

### ***Adaptation to measures of constructs: Enterprise Systems success, User Empowerment, and Psychological Empowerment***

**Enterprise Systems success Construct:** one of the measures of the *Information Quality* sub-construct was considered unsuitable for the target organisation and was omitted from the à priori model. This measure was pertaining to electronic commerce and appeared irrelevant in the target organisation's Information Systems landscape and Enterprise Systems under investigation.

**User Empowerment Construct:** All measures underlying the User Empowerment construct were adapted to reflect the target organisation's implemented Enterprise Systems i.e. Oracle Financials. Where the questions referred to system or system outputs, for example, the questions were reworded to reflect the existing Enterprise Systems in the target organisation i.e. Oracle Financials instead of the word 'system'.

**Psychological Empowerment Construct:** the measures of Psychological Empowerment were utilised in the à priori model as originally proposed and validated by Spreitzer (Spreitzer, 1995b). Thus, Psychological Empowerment was evaluated as an independent variable adapted from previously validated empirical studies (Boudrias, Gaudreau, & Laschinger, 2004; Konczak, Stelly, & Trusty, 2000; Kraimer, Seibert, & Liden, 1999) as depicted in alternative research model 1 above.

The dependent variable across both the research models 1 and 2 in this study is the Enterprise Systems success. Enterprise Systems success construct is based upon the review of several studies (DeLone & McLean, 2002; Gable et al., 2003; Gefen, 2002). The Enterprise Systems success construct is described next.

#### ***5.3.2 Enterprise Systems success Construct***

There exist multiple Information Systems success assessment approaches using different attributes of "quality" and "impact" (DeLone & McLean, 1992; Myers, Kappelman, & Prybutok, 1997; Rai, Lang, & Welker, 2002; Wilkin & Castleman, 2002) present the first validated approach in the Enterprise Systems

success domain. The basis of their model is the well accepted Delone & Mclean model and the multiple-stages of analyses provide a robust model of Enterprise Systems success measures. The Enterprise Systems success construct was employed as the dependent variable in this study. The utilisation of this validated Enterprise Systems success measurement model was a logical choice because the context of this study was Enterprise Systems success. This overarching Enterprise Systems success construct has four sub-constructs as listed below:

1. Individual Impact;
2. Organisational Impact;
3. Information Quality; and
4. System Quality.

As explained in chapter 2, these sub-constructs are mapped across two key dimensions of “impacts” and of “quality” of the system. The measures for the Enterprise Systems success construct regarding *Individual Impact*, *Organisational Impact*, *Information Quality*, and *System Quality* constitute the dependent variable in this study.

Having decided the constructs that needed to be measured, the indicators or items that measure each construct were selected. Some constructs cannot be reliably measured by a single item. For example, *User Autonomy* cannot be measured by a single item since the response depends on the way the question or item is framed. Having multiple indicators to measure a sub-construct (such as *User Autonomy*) provides a more complete picture and a much more reliable measure (Robson, 2002). Thus, the survey instrument design adhered to the survey design guidelines prescribed by (Dillman, 1991; Nunnally, 1978; Straub, 1989).

## **5.4 The Survey Instrument Design and Development**

A cross-sectional survey was conducted to collect the data for this study. Lloyd (Lloyd 2005) suggests that most data is cross-sectional i.e. it is collected at one point in time. Following recommendations for developing survey instruments (Nunnally, 1978), a seven-point Likert scale was utilised to ensure statistical variability among survey responses for all constructs. The basic guidelines adhered to during the design included:

- consistent layout and formatting across each of the sections;
- systematic sequencing of the sections from the respondent’s perspective;

- consistent application of the 7-point Likert scale except for section C where two 7-point scales were used (One was for a retrospective response and one was for current response);
- where possible the items were adapted from validated constructs from relevant research frameworks and research models, and additional open-text comment sections were included to provide an opportunity to the respondents to express their views in detail. This provided the additional advantage of collecting complementary quantitative and qualitative data (Burrows, 2003).

All the above described guidelines were strictly adhered in order to minimise potential weaknesses of the survey research i.e. clarity of questions to facilitate a high quality response, along with an overall clean layout and self-explanatory design to contribute towards maximising quality and maximising the response rate.

The next sub-section describes the survey instrument design approach. Each section of the survey instrument is described and the design is justified.

#### ***5.4.1 Instructions to Complete and Return the Questionnaire***

Each respondent was requested to complete all sections of the questionnaire. . Figure 5–8 below presents a snapshot of the first page of the survey instrument.

<b>General Instructions for Completing and Returning the Questionnaire</b>	
<p>It will take you approximately 10-15 minutes to complete this questionnaire.</p> <p>Please return the completed questionnaire by the 10/11/2003. Once you have completed the survey it should be inserted into the blank envelope provided. The sealed envelope can be dropped into the sealed survey collection box located at your Administration Manager's desk. The nominated administrator will simply tick your name on the list of participants to evidence your submission. The box will not be cleared until the deadline. If you have any queries concerning the questionnaire or the process, please do not hesitate to contact the research team members.</p>	
<p>Associate Professor Glenn Stewart            Ms. Rashi Sehgal, Research Associate (<u>Empowerment Expert</u>)            Mr. Darshana Sedera, Research Associate (<u>Impacts Expert</u>)</p>	<p>Tel: 3864-9480 g.stewart@qut.edu.au            Tel: 3864-9475 r.sehgal@qut.edu.au            Tel: 3864-5074 d.sedera@qut.edu.au</p>
<p>Information Systems Management Research Group            Centre for Information Technology Innovation            Queensland University of Technology</p>	<p>GPO Box 2434, Brisbane 4001            Fax: 3864-9390</p>
<p><b>PLEASE ANSWER ALL QUESTIONS.</b></p>	

**Figure 5–8 Introducing the Research and Instructions to Complete and Return the Questionnaire**

The survey questionnaire provided a brief introduction to the study topic and objectives. This follows the ethical stance this study took in regards to the survey responses and which explicitly states that the anonymity and confidentiality of responses is maintained at all stages of the data collection process and through to the reporting of results (Section 5.7.1 describes the ‘double-blind’ paper-based data collection approach adopted).

The instructions to complete the questionnaire were in simple language and informed the respondent of the approximate time taken to complete the survey. Additionally, the instructions informed the participant of the survey completion and return method in the agreed time frame

The 7-point Likert scale employed was explained at the outset. Each section of the survey preceded a brief introduction relevant to that particular section. Figure 5–9 below presents two screen shots from Section B and D of the actual survey instrument to illustrate this.



SECTION B							
We seek to learn from your experiences with Oracle Financials in your faculty or division (ORACLE-FINANCIALS at QUT are henceforth referred to as ORACLE-FINANCIALS)							
	Strongly Disagree		Neutral			Strongly Agree	
13. I am confident in my ability to use ORACLE-FINANCIALS to complete my work.	1	2	3	4	5	6	7
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I believe in my capabilities to use ORACLE-FINANCIALS							
SECTION D							
<p>In this section, the statements are grouped within the following FIVE categories for ease of understanding: A) Individual Impacts, B) Organisational Impacts, C) Information Quality, and D) System Quality. Your answers should relate to your own experiences and perceptions of ORACLE-FINANCIALS in your faculty or division. Responses to the questions can be selected by crossing <input checked="" type="checkbox"/> one check box per question. <b>Comment</b> fields have been included at the end of each section. Feel free to include any comments you have on ORACLE-FINANCIALS or on this survey. There is no word limit to these fields.</p> <p><b>Category A: Individual Impacts</b> are concerned with how the system has influenced your individual performance. This section seeks to assess whether the system has helped your (e.g.) ability to interpret information accurately, understanding of information and work related activities in your faculty, decision making effectiveness, and overall productivity.</p> <p>For each statement in this section, please select a number between 1 and 7 (inclusive) where '1' means you 'strongly disagree' with statement and '7' means you 'strongly agree' with the statement.</p>							
	Strongly Disagree		Neutral			Strongly Agree	
28. I have learnt much through the presence of ORACLE-FINANCIALS.	1	2	3	4	5	6	7
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 5–9 Instructions for Respondents

### 5.4.2 Choice of Item Wording in the Survey Question

The way items or questions are worded plays an important part in how they are answered or understood (Robson, 2002). Thus, careful attention was paid to finalising the choice of words. For example, in the survey Sections B and D which relate to the system, each item (question) explicitly stated the words “Oracle Financials” or “Oracle Financials system”. This ensured that the respondents continually thought in terms of the Oracle Financial system when answering the questions. As described previously, the current organisational landscape is made of a number of complex Information Systems – by employing this simple technique of repetition it ensured that the respondents focussed their thinking on the system when responding to each question.

Although the items utilised in this survey were from existing scales, based on the suggestions of de Vaus (De Vaus, 1991) and Robson (Robson, 2002), the survey design guidelines listed below Figure 5–10 below were considered.

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**Figure 5–10 Guidelines for Item Design in a Survey Questionnaire (De Vaus, 1991)**

***5.4.3 Item Wording: Negative or Positive?***

Measurement experts present somewhat mixed opinions on using negatively worded items. There are experts who suggest use of negatively worded items as well as positively worded items to reduce response bias or responding to every item in a similar way (Nunnally, 1978). However, other researchers have found that negatively worded items have the propensity to load on a single, separate factor (Roberts, Lewinsohn, & Seeley, 1993). Accordingly, in this study the survey questions were worded positively.

***5.4.4 Response Scales: Neutral or not?***

When it comes to the choice of response scales, measurement experts have divided opinions. The argument for an odd number of choices contends that it permits the use of a middle value such as “neutral,” “neither agree nor disagree,” or

“no opinion.” This is thought to make subjects more comfortable in providing ratings, and allows for the fact subjects frequently have neutral reactions that should be measured (Nunnally, 1978). However, Nunnally argues against the use of a neutral value because it introduces response styles or patterns. The researcher overcame this issue by eliminating any respondent who provided a neutral response consistently for majority of the items. The use of negative items can be avoided especially when “strongly disagree to strongly agree” response categories are used (Schriesheim & Eisenbach, 1995). In this questionnaire, items were measured on a **Seven (7) point Likert scale** with the end values (1) ‘Strongly disagree’ and (7) ‘Strongly Agree’, and the middle value (4) ‘Neutral’.

**Checklist** is the second type of response format used in this survey. It generally consists of three or more exclusive categories that can either ask for a single answer or multiple answers. This survey employed a Checklist response format to seek responses on the demographical question relating to the level of education. This demographical question consisted of four (4) exclusive categories with the inclusion of an ‘other’ category allowing for the possibility of an option that is not listed.

#### ***5.4.5 Demographic Data Request Placement: Beginning or End of the Questionnaire?***

The instrument design included a paper survey divided into four (4) sections preceded by a demographics section. The additional demographic data was collected for descriptive analyses purpose. This data included: (i) respondent demographics; (ii) the organisational unit; (iii) experience with the Oracle Financials System; (iv) type of work they do with the system; and (v) education level. According to Dillman (Dillman, 2000) placing additional data requests such as demographic data towards the end of the survey questionnaire increases the attrition rates. Dillman (Dillman, 2000) also supports the view that the location of the request for personal (demographic) data in the survey seems to affect the attrition rates. Andrews, Preece, and Turoff. (Andrews, Preece, & Turoff, 2001) go to the extent to suggest that placing the demographic data request in the beginning may be perceived as honesty on the part of the researcher. In this research, therefore, the demographic data was located at the beginning of the main survey section.

### ***Layout and Format of Instrument: Graphical or Plain design?***

The layout<sup>1</sup> of the survey design was simple, with no graphical design elements except the organisation logo (where the researcher did not have a choice). The open-ended questions placed in this survey provide sufficient space for them to be answered, but not so much space that respondents feel discouraged (De Vaus, 1991).

Some measurement experts (Preece, Rogers, & Sharp, 2002) suggest that successful email surveys include informed consent information, rating definitions and examples, rating scale formats such as Likert type, and a set of demographic items similar to paper based surveys. In addition to the above listed attributes of successful surveys, open-ended questions have been included in this survey. Many researchers share the common view that respondents write lengthier and more self-disclosing comments than they do on mail surveys (Dillman, 1991; Kiesler & Sproull, 1986a; Loke & Gilbert, 1995). Interestingly, in this survey the researcher received high quality comments and relevant explanations in the open questions section including specific examples relevant to a section.

How survey subjects are invited to participate in the survey, and how survey completion is encouraged through reminders, can affect response rates (Crawford, Couper, & Lamias, 2001). Thus, the combined pre-survey email communication followed by a personal drop-off strategy yielded high quality responses.

Section 5.5.1 describes each section of the questionnaire and justifies the adaptation of items (questions) as required. Refer to Appendices 2 to Appendix 6 for a copy of the original survey instrument.

The discussion so far shows that the survey design guidelines help to ensure a high quality of response. In addition to the survey design, the author emphasised the value of a communication to maximise the response rate. The communications strategy adopted in this study is described in the next section.

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<sup>1</sup> Dillman (Dillman, 1991) strongly suggest that attrition rates are significantly lower with plain designs as compared to graphical designs.

## 5.5 Communications Strategy

Firstly, the author stresses the need for a systematically planned communication strategy. This communication strategy must take into account within the holistic picture within the target organisation. In other words, there should be sufficient communication at the required levels of the organisation or target business unit within the organisation.

In this study, the author communicated the proposed benefits of the study, and the level of commitment necessary to achieve the benefits, to some key stakeholders in the targeted business unit i.e. Financial Services Division (FSD). Prior to making contact with these key stakeholders the author communicated the aims of the study and conduct of the intended survey to other members of the organisation who were not directly part of the FSD. The author classified these other staff members as the ‘coaches’ within the organisation. The role of these so called ‘coaches’ is limited to understanding the business needs in the organisation and mapping these business needs with the value proposition of the proposed study. In this study, the value proposition which interested the coaches was the benefit from a ‘360 degree’ feedback from the ORACLE Financials system users. The 360 degree refers to a well-represented cross section of users from all employment cohorts (managerial, operational, and technical users) Such feedback encompassing the views of users (for example on their work relating to the system, quality of the information received from the system, effect of the system and its outputs upon their daily job activities etc.) would potentially provide insights for any future upgrades to the system. Thus, these coaches introduced the author to the key stakeholders and provided a valuable context of the organisation. The contextual information included overview of the current organisational structure, emerging needs of the organisation etc.

The following stage of the communication strategy included personal and email communication with the senior management<sup>2</sup> in the FSD who were the sponsor of this study.

The financial users’ email list was used to channel the pre-survey communication. This is again a key element of the communications strategy. The

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<sup>2</sup> The author once again stresses the value of this principle i.e. securing the commitment of the sponsor.

email provided: an overview of the study design and conduct; relevance of the study to FSD; indicated timeframes; and obtained the consent of FSD staff for participation in the study. The key element of this pre-survey communication was the endorsement of the study by the executive sponsor. Refer to Appendix 7 for the extract of the study proposal sent to FSD ORACLE Financials users by the executive sponsor.

This was immediately followed by a number of one-to-one meetings with the nominated contact personnel in the FSD and in the Technical Services Department. The email sent by the sponsor was sent to all the Oracle Financial users across the organisation. From the point of view of the sampling requirements of the survey, however, the researcher required the active and intense users of the ORACLE Financials system implemented in the FSD. Thus, this requirement was communicated to the Technical Services staff who provided meaningful insight into ORACLE account usage.

As a result, close coordination with the nominated administrative staff and technical staff along with support from the senior managers expedited the pre-survey phase. Some of the target survey respondents contacted the researcher to seek clarification on the anonymity of their responses, and further clarification in regards to timeframes. Some staff members openly communicated their consent to participate and expressed their full support for the study. Below is an excerpt:

*“Our department is willing to participate in your study. This is the first time in 7 years that someone has asked us to express our views of a system that we have been using for 7 years”.*(A nominated administrator in a department)

However, some indicated that they were not willing to participate for other reasons, for example: excessive workload on the staff; staff on leave during the nominated timeframes. Since the focus of this section is to describe the communication strategy, the details of data collection technique and survey administration will be discussed later in the chapter.

During the data collection process, the researcher was required to present the study aims and articulate the benefits to the Financial Services Division within some of the departments and offices. The researcher recalls this phase as a particularly interesting one because this form of during-survey communication strengthened the rapport with staff members. These presentation sessions varied in scope. Some, for

example, were more like information sessions relating to the aims of the study whereas some were simply to address any questions that the participants may have, for example:

*“How would you ensure that our response will remain confidential and not attributed to an individual?” (A respondent at FSD, Organisation)*

During-survey communication was useful because it facilitated contact with the nominated administrator who marked the names of the staff members as they submitted their response in the survey collection box. The administrator then provided the number of responses received and the information regarding the number of non-responses. This list was destroyed by the administrator once the survey collection date was over.

Once the nominated data collection timeframe was completed the researcher initiated the post-survey communication. This was conducted in a combination of ways. There were personal phone calls made to acknowledge the efforts of the administrator and to thank the participants. Follow-up emails helped increase response rates (high response rates are desirable as the sample is more representative and response bias is reduced (Babbie, 1990)). Some participants were thanked via direct email, while in some business units the administrator initiated a face-to-face meeting with their team and encouraged the non-respondents to complete their surveys. A formal “Thank you” email from the sponsor further complemented the personal post-survey communication of the researcher.

The next section provides a description of each section of the survey questionnaire. The questions or items within each section were designed with the objective that the respondents’ answers must relate to their own experiences and perceptions of the target system (ORACLE Financials) in their business unit (faculty or division).

### ***5.5.1 Description of Survey Sections***

#### ***Demographics***

Respondent demographics were included at the start of the survey sections as discussed above. Respondent demographics collected are listed followed by the proposed operationalisation method:

1. Organisational unit;
2. experience with the Oracle Financials system;
3. type of work they do with the system; and
4. education level.

Two of these variables, experience and education, were measured using a ratio scale, with the remainder being measured by use of a nominal scale. The variable (Conger & Kanungo) represented the two sources of data collection with the following values: 1=Faculty and 2=Division.

**Experience** with the Oracle financial system, or (OF experience) is represented by the number of months that a user used the system to undertake their day to day job activities.

The variable (**cohort**) had four Enterprise system user categories based on the type of work they do with the system and their role in the organisation:

- 1= senior management users,
- 2=Operational users,
- 3=End-Users and
- 4=Technical users.

The fourth variable aimed at collecting the **level of education** of the respondents and was represented by (Education) where:

- 1=Senior Secondary level,
- 2=TAFE,
- 3=Bachelors level,
- 4=Masters Level, and
- 5=other (these included higher awards, professional certifications, and other courses).

### ***Section A: Psychological Empowerment Measures***

The Psychological Empowerment Instrument (refer Appendix 3) consisted of 12 items developed by Spreitzer (Spreitzer, 1995b) and measured *Meaning*, *Competence*, *Impact* and *Self-determination* constructs for an individual. Spreitzer's measure, comprising four 3-item subscales, taps the Empowerment dimensions of *Meaning* (e.g. "The work I do is very important to me"), perceived *Meaning* (e.g. "I am confident about my ability to do my job"), self-determination (e.g. "I have significant



autonomy in determining how I do my job”) and impact (e.g. “My impact on what happens in my department is large”) by asking respondents to indicate their degree of agreement, or disagreement, with 12 Likert-type statements.

### ***Section B: User Empowerment Measures***

The User Empowerment instrument consisted of 10 items from Doll et al’s (Doll et al., 2003) User Empowerment instrument and measured *Computer Self-efficacy*, *User Autonomy* and *Problem-solving and Decision Support* sub-constructs. The items have been adapted in order to suit the target system (ORACLE Financial) context as explained in Section 5.3.1 Construct Operationalisation above, for example, words like ‘system’ or ‘application’ are changed to ‘Oracle Financials. Thus the new User Empowerment construct comprised of two 3-item subscales, and one 4-item subscale to tap into the User Empowerment dimensions of:

- *Computer self-efficacy* (e.g. “I am confident in my ability to use SAP R/3 to complete my work”);
- *User autonomy* (e.g. “I have considerable opportunity for independence in how I use SAP R/3 for my work processes”); and
- *Problem-solving and Decision Support* (e.g. “I use Oracle Financials to improve the efficiency of the decision process”).

The questionnaire responses for Section B were recorded on a seven-point Likert scale the same as Section A. The responses range from “strongly disagree” to “strongly agree”. The construct operationalisation section has already discussed the reason for modifying the original User Empowerment model proposed by Doll and colleagues (Doll et al., 2003) and for including their second-order factor as a sub-construct in the proposed User Empowerment model.

### ***Section C: Users’ Need for Empowerment***

The survey instrument section 4 is intended to tap into the Enterprise Systems user’s need for Empowerment. A selected set of 4 questions from the existing Spreitzer’s (Spreitzer, 1995b) instrument were amended to meet this objective. This section used a different scale, ranging from low importance to high importance as perceived by the respondent. This section was designed and included in the survey instrument, based on three (3) criteria listed below:

1. Based on the Qualitative Content analysis phase analysis:

2. Based on the Pilot testing phase analysis:
3. Based on the judgment of the expert panel's feedback during the survey instrument design phase.

These three criteria are described next. Some of the email survey respondents pointed towards case studies where Empowerment programs had failed in organisations. One of the common reasons identified by these studies is national culture i.e. in certain cultures such as with those organisations that operate in the Asia-pacific area, Empowerment is not a desirable attribute. This negative view on Empowerment is an individual's personal view i.e. some individuals are more content to be led rather than to be empowered in their jobs. The researcher drew the inference that not all individuals believe that they need to be empowered. This section was included to gauge if the need to be empowered alters with time.

The expert panel reviewed the survey instrument and concurred with the above logic and suggested inclusion of this section in order to seek perceptions of respondents in regards to their need for Empowerment. The objective was to observe any pattern(s) to justify, if at all, the level of Empowerment changes over time.

#### ***Section D: Enterprise Systems success Measures***

In this section, the statements were grouped within the following four (4) categories. As described earlier, each of the section of the survey questionnaire and the sub-sections were introduced to the respondent for clarity and ease of understanding. These form part of instructions for the respondent. The categories are as listed below:

- Individual Impacts;
- Organisational Impacts;
- Information Quality; and
- System Quality.

Besides these four categories, there were two (2) overall criterion measures included towards the end of section D. These overall criterion measures were concerned with 'individual impacts' and 'organisational impacts' and aimed at gaining insight into overall scores that the respondents perceived relating to:

- System's impact on the users overall; and

- System's impact on their organisation overall.

Each of the above listed categories from 1-4 is defined next:

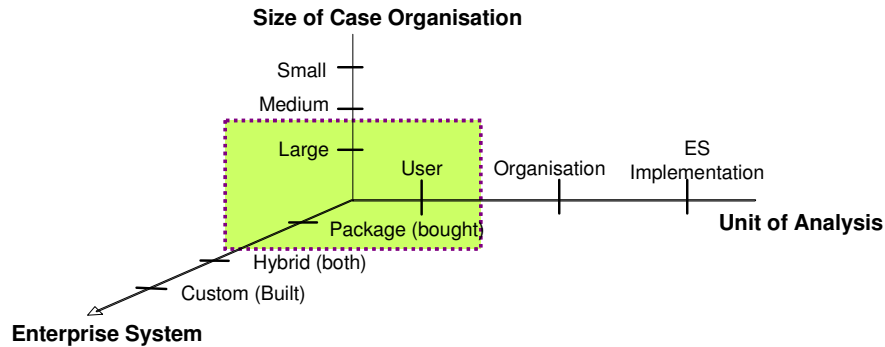
- *Individual Impacts* are concerned with how the system has influenced individual performance.
- *Organisational Impacts* refer to impacts of Oracle Financials at a broader level for e.g.: costs of organisational resources dedicated to run the system, number of applications replaced/introduced, changes in staff requirements, and changes in business processes, due to the introduction of the system.
- *Information Quality* is concerned with such issues as the relevance, timeliness and format of reports, and the accuracy of information generated by Oracle Financials. Here the focus is on the quality of system outputs: namely, the quality of the information Oracle Financials produces in reports and on-screen.
- *System Quality* of the Oracle Financials System is a multifaceted construct designed to capture how the system performs from a technical and design perspective. The *System Quality* aspects identified for this study included: consistency of the user interface, ease of use/ease of learning, quality of documentation, and the quality and maintainability of the program code. System quality also refers to the goodness of system functionality, sophistication and integration of the system.

These Enterprise Systems success measures comprised four Likert type subscales with a total of 27 items or questions. These 27 items in their final standardised Enterprise Systems success measurement model tap into the previously validated Enterprise Systems success measures of individual impact (e.g. "I have learnt much through the presence of Oracle Financials System."), organisational impact (e.g. "Oracle Financials has resulted in an increased capacity to manage the growing volume of activity" (e.g. transactions), *Information Quality* (e.g. "Information from Oracle Financials System is easy to understand."), and *System Quality* (e.g. "Oracle Financials is easy to learn."). The next section describes the sampling procedures followed in this research.

## **5.6 Sampling Procedures**

Generally, the sampling procedure is concerned with representing individuals or entities in a population, with the aim of allowing generalisation (from the sample

to the population) about the phenomena of interest. Thus, the most critical element of the sampling procedures is the choice of the sample frame which constitutes a representative subset of the population from which the sample is drawn. Figure 5–11 below depicts a 3-D axis; the size of the target organisation, desired unit of analysis, and the type of Enterprise Systems software implemented in the target organisation.



**Figure 5–11 Target Organisation, Unit of Analysis, and Enterprise Systems Software**

***Representativeness of the Sample Frame***

In this survey, the sample frame of 200 ORACLE Financials System (OFS) users out of a total of 800 users adequately represented the unit of analysis (Vitalari & Venkatesh, 1991). These 200 OFS users are active and intense users of the system. A majority of these active users had undergone a formal training, and had witnessed at least one implementation to the system during their tenure. Those who were not part of this business unit (FSD) or even QUT at the time of OFS implementation in 1996, and are included in this sample frame, had witnessed an upgrade to the existing OFS.

Sampling is concerned with representativeness in selection of individual respondents from the sample frame (Pinsonneault & Kraemer, 1993). One aspect of representativeness in this study concerned giving each potential respondent an equal chance of being included in the target sample. This required random selection of: faculty and divisional offices from the sample frame.

### ***Representativeness of the Target Sample***

Another aspect of representativeness concerns selecting a specific target sample of respondents from each faculty or division included in this survey. In this study, this requires non-purposive choice of the users who use the Enterprise System most intensely. It becomes evident from this discussion that all sampling issues involve judgment rather than simple application of a generic technique.

### ***Target Participants and their Characteristics***

The target participants included senior administration managers, accounting managers, payroll officers, faculty administration managers, deputy administration managers, executive officers, deans of faculties, finance officers, budget officers, centre administrators, travel management staff, data entry, report generation staff, and database maintenance staff. These staff members were categorised into four (4) cohorts as part of the preparation of data for analyses. These cohorts are listed below:

1. Senior Management Users;
2. Operational users;
3. End users; and
4. Technical users.

These cohorts were chosen as the target participants as they were likely to be most informed about their experience of the Enterprise Systems in their business unit (faculty or division). The above cohorts of respondents in the sampled organisation will be referred to as 'the respondent types' throughout the remainder of this chapter. It is to be noted that a common characteristic of these target participants was they were all intense users of the Enterprise Systems i.e. their day-to-day job activities required intense use of Oracle Financials ranging from one day a week to more than four days a week. Their frequency of use was largely dependent on their role and involvement in the different business processes of the Financial Services Division (FSD). The business processes related to clients who were internal to FSD, as well as clients who were external to FSD i.e. other business units of the organisation and clients external to the organisation.

### ***5.6.1 Conduct Pilot Test***

Proponents of survey research in general agree that pilot testing is essential as a rigorous way to evaluate a survey. It cannot be emphasised enough that any change to the survey after the data collection has commenced is bound to have a negative impact on the data collected thus far. In this study it was a condition to maintain anonymity and confidentiality of responses, making it very difficult to make changes or go back to the respondents to clarify responses. Pilot testing is an important part of questionnaire development, even when employing previously published items; this was true in this study.

There are many ways to conduct a pilot test for a survey. One way, for example, is to conduct a focus group with people from the sample pool and ask them to complete the survey, followed by a discussion on item difficulty, ambiguity, instructions, sequencing of items, layout, length of survey and any other issues that may arise. De Vaus (De Vaus, 1991) suggests that it is desirable to conduct the pilot survey with approximately 10 percent of the required sample size. Other eminent researchers, however, (Dillman, 2000; Schwarz & Sudman, 1996) have developed other procedures for survey pretesting where the need for a necessary pilot test sample size can be overcome. The multi-stage testing process, for example, as suggested by Dillman (Dillman, 2000) is one such process which was employed in this study.

**Table 5-2 The Survey Pilot Process Prescribed by Dillman (Dillman, 2000)**

<p>This table is not available online. Please consult the hardcopy thesis available from the QUT Library</p>
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This survey pilot process integrated testing techniques which were applicable to both paper and electronic surveys. In this study the total time frame to complete the pilot testing process can be quantified as 3 months August 2003-October 2004. Table 5-2 above illustrates these four (4) pilot testing stages prescribed by Dillman (Dillman, 2000) and illustrates how each of these stages was addressed in this study. The results from the pilot testing are described under the Instrument Revisions section that follows next.

### ***5.6.2 Instrument Revision***

The pilot testing reviews from stages 1 to 3 provided the researcher with further clues about the appropriateness of the questions (De Vaus, 1991) and increased confidence in the way the questions are asked. The instrument revision process in this study is best described as an iterative process of improvement where the key indicators are as listed in their order of priority:

- 100% completion of the survey questionnaire;
- Reduction in time taken to complete all sections of the survey questionnaire including the open-ended questions;
- Zero negative feedback on the formatting, layout, or grammar;
- Additional feedback from respondents on any type of difficulty encountered, for example, understanding a question or question(s);
- Confusion in understanding the instructions; and alternative ways to word a question if the respondent perceived the question to be too intrusive.

The response scale was changed from an “agree” and “disagree” spread across a 5 point Likert type scale to “Strongly Disagree” to “Strongly Agree” spread across a 7 point Likert type scale.

As advised by measurement experts (De Vaus, 1991; Dillman, 2000), the researcher items were checked if they clustered under a construct as intended i.e. were the items homogeneous? During the pilot testing phase this type of checking was limited to face validity. Since the response numbers were limited, the researcher was unable to statistically test whether the coefficient alpha was high enough. Some of the pilot testing respondents chose not to respond to a certain item from the 'organisational impact' category. During the retrospective interview it was revealed that the respondents expressed their inability to make any judgement on the organisational level impacts of the system.

One common criticism during the pilot testing was the use of the word system in the majority of the items within section B, C, and D. When completing the survey the respondents became perplexed as to which system the question was referring to. This feedback was most valuable to the researcher. Thus, in agreement with the experts, each item or question where the term 'system' was used previously was then replaced by 'ORACLE Financials' or 'ORACLE Financials system' as appropriate.

One key issue raised by an expert who tested the survey instrument was the fact that the responses were anonymous. The dependent variable utilised in this study (Enterprise Systems success construct) was previously validated in the public sector where the Enterprise Systems was SAP R/3 and the responses were kept public. Some researchers suggest that lack of anonymity may not affect response rates (Couper, Blair, & Triplett, 1999) while others suggest anonymity is important to response rates (Kiesler & Sproull, 1986b). These conflicting suggestions may be the result of differences in the topic under discussion. Sheehan and Hoy (Sheehan & Hoy, 1999) further recommend the researcher explaining the method for keeping the confidentiality to the survey takers. For these reasons, in this study the researcher assured both confidentiality (i.e. no one would see an individual's personal data or know that they participated in this study), and anonymity (i.e. the researcher would not be able to attribute a particular response to a respondent).

The researcher has opted to maintain the anonymity of responses based on two aspects listed below:



- Firstly, as indicated in the contextual reasons (section 5.2.3), the objectives of the sponsor did not require the survey findings to be attributed to any particular individual;
- Secondly, based on the pre-survey communication process, the researcher obtained evidence regarding the inclination of the potential respondents on two accounts:
  - their keenness to participate in this survey which was apparently the first formal survey since the Enterprise Systems was implemented 8 years ago;
  - their concern relating to their identity being revealed.

The researcher recognised that, although the potential participants expressed their consent to participate in this study, there was a risk of receiving a low response rate based on the second point. Thus the survey responses were designed to be anonymous and confidential to the research team. The ethical clearance for this study entitled the researcher to own the data file until such time that it was required by the research at hand. Section 5.7.2 discusses the ethical stance that the study takes. Appendix 11 presents the actual ethical clearance approved by the ethics committee of the Office of Research.

Following this decision to maintain anonymity of respondents the next issue was mode of data collection. The common feedback after stage three of pilot testing was to adopt a means of data collection that:

- required minimum effort from the respondent; and
- did not reveal their identity, or raised any similar concern in the minds of respondents.

The options for the researchers were to use one of the three most popular means of data collections:

- any electronic medium such as email, web-based survey hosted on an external website or web-survey hosted on one of organisations own servers;
- post paper surveys; or
- a combination of paper based and web-based survey to provide alternative options to the study participants.

The researcher adopted the second means of data collection and adopted the method of a paper-based survey which was personally dropped-off to each group of respondents based in 4 different physical locations (campuses) spread across one

state of Australia. This decision was an easy one for the researcher. To ensure that anonymity and confidentiality is maintained during the data collection phase the use of any electronic medium may be perceived as a means that may potentially compromise the anonymity or confidentiality of responses. It is to be noted that any such incident could occur without the knowledge of the researcher. Although it was a time consuming and physically demanding task to deliver the paper copies of surveys, the researcher recognised the advantages of this approach in data collection. Section 5.6.2 describes the data collection phase in detail.

Thus, based on the feedback received, issues raised by experts, research colleagues, and pilot testing respondents, the survey was revised and the process of pilot testing and revision was repeated until the survey could be completed by respondents without any problems or queries. The survey was ready to be printed and distributed to the target participants in November 2003. The following section describes the conduct of the final survey.

## **5.7 Conduct of Survey**

Each respondent was requested to complete all sections of the questionnaire relating to Psychological Empowerment, User Empowerment and Enterprise Systems success measures specific to the Enterprise System in question. The success of this approach to data collection was evidenced by the high response rate yielded and the fulfilment of the objectives from the survey. Refer to Appendix 7 to view the original email sent to all target participants providing an overview of the conduct of the study prior to data collection.

### ***5.7.1 Administration of Survey***

All participants who consented to participate in this study were handed a blank envelope and a survey by their Senior Manager. The participants were given clear instructions for completion and submission of the survey in a sealed collection box located within their office. The completed surveys were required to be sealed in a blank envelope and then dropped in the survey collection box and the nominated administrator ticked off their name on the list of participants. This protocol was positively accepted by all participants as it preserved their anonymity and at the same time enabled the administrator to remind the non-respondents of the closing date.

This double-blind process directly aided the researcher in preserving the anonymity as respondents had the freedom to express their views openly without being identified. The submission of this sealed envelope was acknowledged by the nominated administrator, and once it was dropped in the sealed survey box there was no way to differentiate between similar looking sealed envelopes.

In some exceptional cases the respondents chose to fax the completed survey to the researcher directly as they were the only participant from their business unit. This clearly reduced the time and effort expended to administer the survey.

### ***5.7.2 Data collection***

As previously stated the data for this study was collected using an email introducing the study as described in the Communication Strategy Section 5.5, followed by a paper-based survey questionnaire, and with a drop-off survey type approach was adopted. In this approach, a researcher goes to the respondent's business unit location and hands the respondent the instrument. Due to the confidentiality and ethical clearance considerations a mail back approach was not considered. The researcher personally dropped off and collected the surveys from all business units across the four locations. This approach enabled the data collection process to blend the advantages of the mail survey and the group administered questionnaire i.e. the respondent could work on the instrument in private, when it was convenient while the personal contact with the respondent helped to increase the number of people who were willing to participate in the study.

The survey data was collected from all active Oracle Financial users within the target organisations two main business units: 5 divisions and 7 faculties. As stated earlier, the respondents were further classified into 4 main cohorts: Senior Management, Operational, End-users, and Technical users. Based on the information received from the Financial Services Division (FSD) office, a list of all experienced and active users of the system was identified. Supporting information regarding the system, its historical background, implementation history was sought from coaches within the organisation (refer Section 5.5 of the Communication Strategy), as well as secondary sources such as intranet, and documents relating to existing business processes.

### ***5.7.3 Time Frame for Data Collection***

The researcher would like to acknowledge the valuable coaching received as part of the pre-survey communication, where the coaches indicated the 'best time' to conduct the survey. The 'Best Time' refers to the availability of staff to complete the survey, which also highlighted the advantage that during this period there was no other concurrent survey which the staff were expected to complete. Based on this experience, the researcher suggests that the following criteria to be used as a checklist when determining the timeframe for data collection:

- The time of the year specific to the geographical location of the organisation (i.e. check for financial year ending, which is generally characterised by additional work load for employees);
- type of core business that the organisation is involved in,
- Check for any other parallel organisation wide activity (for example, another survey) where the target participants actively seek to escape from any additional activity that may increase their work. In large organisations it is often difficult to know if there is another survey being conducted. This could significantly lower the response rate for both the surveys.

As discussed earlier, due to the confidentiality and ethical clearance considerations, a web-based survey or mail back approach was avoided. Instead, all responses were dropped-off and collected personally.

A total of 154 responses out of the 185 surveys distributed were attained, to provide a substantial base for the assertions, to increase the applicability of the findings, and most importantly to test the survey instrument. A MS Excel response collection sheet was created, representing the data in a quantitative format and then transferred to SPSS Version 12 (Statistical Package for Social Sciences) for analysis. The contact list of key administrators was continually updated since its creation as part of the communications strategy. Once all the survey collection boxes were collected from each location, the researcher used this master contact list to thank individual administrators and ask the number of non-respondents from their list of participants. These non-respondents were contacted by the administrators in most cases. However, a few exceptions exist where the researcher was asked to contact the participant directly. It is to be noted that the participant had provided their consent to be contacted by the researcher.

## 5.8 Preparation for Data Analysis

A pre-condition to the preparation of data analyses is data management. Lloyd (Lloyd 2005) strongly recommend that in research it is imperative to keep good records of the development or sources of the variables used, the kind of data analysis performed, and the various datasets created in order to trace these steps back when querying or replicating results. In view of this, a spreadsheet was prepared as a template to enter data under each sub-construct. It was useful to gradually build the spreadsheet and enter each item together with the construct they belong to and where they came from. The data was set up in a way that each column represents an item in the survey. For example, the *Meaning* (M) sub-construct had a total of 4 items which were coded as M1, M2, M3, M4 and so on, and the rows presented the responses of the participants. Each survey returned was marked with a unique identification number. The first column of the spreadsheet then indicated this identification number. The purpose of adopting this method was to resolve any queries about the veracity of the data as, this way, one can trace the entry back to a particular survey. Table 5-3 illustrates a sample database structure in SPSS and Excel.

**Table 5-3 Sample Database Structure to Enter Data**

Survey ID	D1	D2*	D n	M1	M2	M n	CSE1	CSE2	CSEn
001	2	4	4	2	7	3	6	4	5
002	6	5	6	3	7	..	..	3	4
003	5	5	5	3	5	..	6	3	5
And so on...									

Once the data file was set up, the data was explored and checked to ascertain whether all the entries are reasonable, i.e. (within the given parameters – for example, D2 coding is for demographical item 2 which asks for level of education (where 1=Senior Secondary level, 2=TAFE, 3=Bachelors level, 4=Masters Level, and 5=other) and having an entry of 6 would be mistake because the choices only list options 1-5 in the survey). Thus, in addition to a thorough repeat check of each data entry undertaken by the researcher, a research assistant was employed to undertake random entry checks of questionnaires to ensure the correctness of data entry. Once the data set was cleaned and checked, it was saved, locked and kept in its original state. The Statistical Services Centre of the University of Reading points out that for

any further data manipulations, only copies of this data set should be used. Thus, only copies of the original dataset were used for subsequent analysis for joint publications with other researchers and included a subset of the original dataset.

### 5.8.1 Proposed Analysis Plan

This section marks the completion of the survey design phase. The two remaining steps of the survey research are data analysis; interpretation and reporting of findings.

Aldridge and Levine (Aldridge & Levine, 2001) describe the three types of analysis – descriptive, analytical and contextual and recommend that the research potential of a questionnaire is fully realised when all the three types of analysis are applied. They claim that this approach leads to much richer outcomes (Aldridge & Levine, 2001). The author however questions the ‘completeness’ of outcomes. Chapter 6 is dedicated to reporting the data analyses undertaken in this exploratory survey followed by an interpretation of the survey results. Table 5-4 presents the intended purpose of analysis and the corresponding statistical analysis technique. For ease of reference the related thesis sections are mapped against each statistical technique.

**Table 5-4 Proposed Analysis Plan and Corresponding Statistical Analysis Technique**

No.	Purpose	Statistical Analysis Technique	
1	Descriptive Analysis	Frequency Distributions	
		Standard Descriptive Statistics (Means and Standard Deviations)	
		Chi-square tests	
		Correlation Analysis- Crosstabs	
		For testing Normality	Kolmogorov-Smirnov & Shapiro-Wilks Statistics
		How do the scores of Problem-solving and Decision Support variable compare with overall Individual Impact i.e. how their scores cluster uniformly about the regression line?	Assumption Testing-Homoscedasticity
2	Analytical Analysis	Construct Validity	
		Factor Analysis	
		Criterion Validity	
		Correlation	
		Reliability	
		Second Order Factor Analysis	

No.	Purpose	Statistical Analysis Technique
		Correlation
		Path Analysis using Structured Equation Modeling
3	Contextual Analysis	
	Was Individual impact different across the different cohorts (Senior, Operational, Technical and End Users)?	One-way ANOVA tests Independent-Samples T Test

### 5.8.2 Checklist for Survey Attributes

The index of ideal survey attributes developed by Grover (Grover, Lee, & Durand, 1993) has been employed as a checklist to insure that the survey method weaknesses were minimized (refer to Table 5-5 below). Originally this index was suggested as a tool to measure the total quality of the survey (Grover et al., 1993).

**Table 5-5 Survey Methodological Attributes Index Applied to This Survey**

Type of Survey Research		This Research...
Exploratory (XPY) or Explanatory (XNY)		Exploratory (XPY)
Cross Sectional (CS) or Longitudinal (L)		Cross Sectional
General		
1	Is the unit of analysis clearly defined for the study?	Individual Enterprise Systems User
2	Does the instrumentation consistently reflect that unit of analysis?	Yes.
3	Is the respondent(s) chosen appropriate for the research question?	Minimum 2-3 years post-implementation of an Enterprise Systems. Must be active users of the system/ its outputs to carry out their day-to-day job activities.
4	Is any form of triangulation used to cross validate results?	
Measurement Error		
5	Are multi-item variables used?	Yes.
6	Is content validity assessed?	Yes.
7	Is field-based pretesting of measures performed?	The pretesting of measures was performed and the final survey instrument was refined based on the findings of the pre-test phase.
8	Is reliability assessed?	Yes.
9	Is construct validity assessed?	Yes.
10	Is pilot data used for purifying measures or are existing validated measures adapted?	The existing validated measures are adapted for Psychological Empowerment, User Empowerment, and Enterprise Systems success constructs.
11	Are confirmatory methods used?	A descriptive survey conducted as part of a case study in a different organisation.
Sampling Error		
12	Is the sample frame defined and justified?	Yes.
13	Is random sampling used from the sample frame?	No.
14	Is the response rate over 20%?	Yes. The response rate was 83%.

Type of Survey Research		This Research...
15	Is non-response bias estimated?	Yes
Internal Validity Error		
16	Are attempts made to establish internal validity of the findings?	Yes.
Statistical Conclusion Error		
17	Is there sufficient statistical power to reduce statistical conclusion error?	Yes.

## 5.9 Chapter Summary

In this chapter, background on survey research method adopted was presented, and details of the survey design were described. The research methods used to test the research propositions were discussed in the survey design section (the methods applied to test each of these propositions will be discussed in detail in chapter 6). The construct operationalisation approach was described along with a discussion on each of the constructs of Psychological Empowerment, User Empowerment, and Enterprise Systems success scales. In section 5.3 the link between the dependent and independent variables of the à priori research model was discussed. This section also included a discussion on the operationalisation of the à priori model. Sections 5.3.3 to section 5.4.1 describe the survey instrument sections in detail and provide rationale on selecting the item wordings, choice of response scales and other relevant details including the communications strategy adopted during each stage of the survey design and development through to data collection.

In section 5.6, conduct of the survey was described followed by a description of the process undertaken to prepare the data for analysis in section 5.7. The proposed analysis plan was presented. The chapter concluded by presenting a checklist on survey attributes to ensure that the survey method weaknesses were minimised in this research.

Chapter 6 then continues from this chapter and reports on the data analyses and results of the exploratory survey. A range of statistical analyses were utilised to validate the survey instrument and to test the research model and hypotheses. Finally, the chapter 6 concludes with a summary of the findings from this phase II of research design.



# 6 Research Phase II: Scale Validation and Model Testing Results

## 6.1 Chapter Overview

The purpose of this chapter is to present the results of the validation of the Psychological Empowerment (PE), User Empowerment (UE), and Enterprise System<sup>1</sup> (ES) Success scales, as well as to present the analyses of the hypotheses concerning the relationships between these constructs. This analysis follows the Empowerment scale design and development described in chapter 5. In order to test the relationship of Empowerment to Enterprise Systems success (ESS), the following research sub-problems examined and the findings are discussed in this chapter:

- How can UE be measured?
- What is the relationship between PE and UE?
- What is the relationship between PE and ES success?
- What is the relationship between UE and ES success?

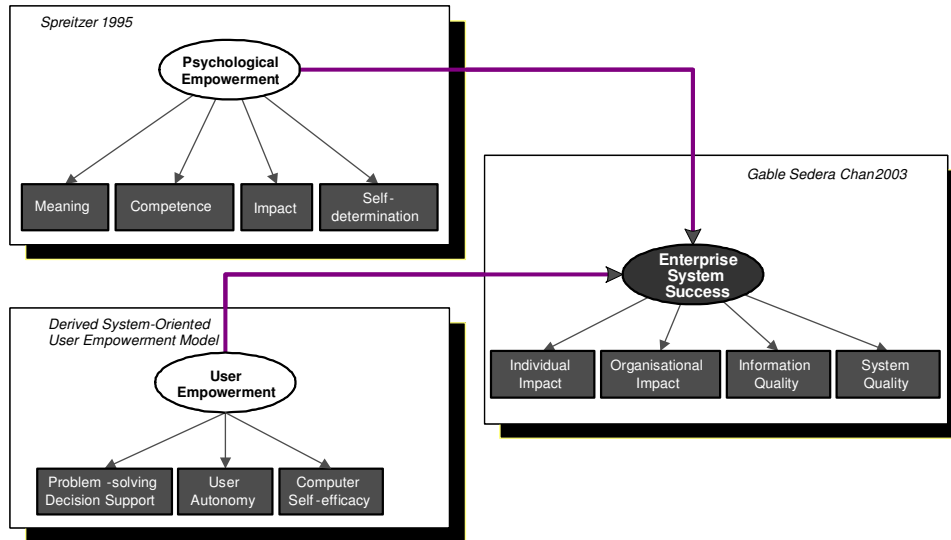
Related to these research questions, the following hypotheses were developed and the test results are presented in this chapter.

- **H1:** That *User Autonomy*, *User Problem Solving-Decision Support*, and *User Computer Self-efficacy* are valid and reliable measures of UE in the ES context. (Validation of the UE measurement model).
- **H2:** That a structural model which hypothesises a mediating effect of PE on the relationship between UE and ESS will demonstrate good fit to empirical data.
- **H3:** That PE will correlate more strongly with ESS than will UE. In line with the above research questions and hypotheses, several methods were employed to, firstly, undertake Scale Validation for each of the three scales: PE, UE, and ESS; and, secondly, to undertake model testing. The next section details the analytical

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<sup>1</sup> In this thesis, the terms ERP, enterprise resource planning, and the more contemporary Enterprise Systems (ES) are used interchangeably. For an in-depth discussion on ERP, (Klaus, Rosemann & Gable, 2000)

processes employed to test each hypothesis. The research model is illustrated in Figure 6–1 below.



**Figure 6–1 Research Model**

**Hypothesis H1** was tested using factor analysis techniques. First an unrotated principal components analysis was performed on the data to ascertain the probable number of factors. This was followed by a series of principal components and principal axis factoring analyses with both orthogonal and oblique rotations to identify the most appropriate factor solution. The reliability of the resulting subscales was calculated. The extent of the convergent, divergent and concurrent criterion-related validity of the UE and the ESS Scale was next assessed using bivariate correlations between UE subscales and the comparison measures. For all analyses, statistical significance was set at  $p < .05$ . Analyses were performed using the Statistical Package for the Social Sciences (SPSS) statistical program (Version 15) (2006). Data was checked and found satisfactory in terms of bivariate normality, linearity, and presence of outliers. Variance was largely homogeneous in most measures and showed considerable negative skewing as the majority of the respondents agreed with the questions.

**Hypothesis H2 and H3** were tested using AMOS software. Measurement scales were assessed for reliability, content, convergent validity, and discriminant

validity. Reliabilities were assessed using Cronbach's alpha (Cronbach, 1971) where an alpha of 0.7 or above was considered acceptable (Nunnally, 1978).

The adequacy of the measurement model for UE (H1) was evaluated based on model data fit and the magnitude of first-order factor loadings on the second order UE factor. Model-data fit was evaluated using a combination of fit indicators, including the chi-square test, Steiger and Lind's (Steiger & Lind, 1980) Root Mean Square error of approximation (RMSEA), Bentler and Bonnet's (1980) Non-Normed Fit Index (NNFI); and Comparative Fit Index (CFI) (Bentler & Bonett, 1980).

**Hypothesis H2** was examined using structural models which postulated PE as the mediating variable between UE and ESS. In an exploratory effort to learn more about the relationship between Empowerment and ESS the direct and indirect effects of PE and UE upon the dependent variable ESS were also examined.

**Hypothesis H3** was examined using bivariate correlations coefficients between PE and ESS, and UE and ESS, and PE and UE. The statistical significance of these estimates provided the viability of two probable relationships: PE – ESS; and UE – ESS

## 6.2 Data Cleaning

Prior to analysis, data was checked to ensure satisfaction of assumptions relevant to particular statistical procedures. The responses were collated, cleansed and codified. There were no missing values in UE and PE responses. In the ESS scales '*Organisational Impact*' (OI) and '*Individual Impact*' (II) (2/154), a small number of missing values were identified. In the case of the OI, 3.2 percent of the respondents did not attempt the OI items. In the case of the II scale, 1.3 percent of the respondents<sup>2</sup> did not attempt the scale items. These proportions were very small and were unlikely to introduce bias into responses. All paper-based responses were perused to check for completeness at the point of data collection. Over 50 per cent of the respondents completed the optional open-ended items (which were designed for descriptive data collection purposes in the form of open ended text fields).

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<sup>2</sup> Some respondents provided explanation along such as: "not in a position to comment on the organisational impact of the Oracle Financials system."

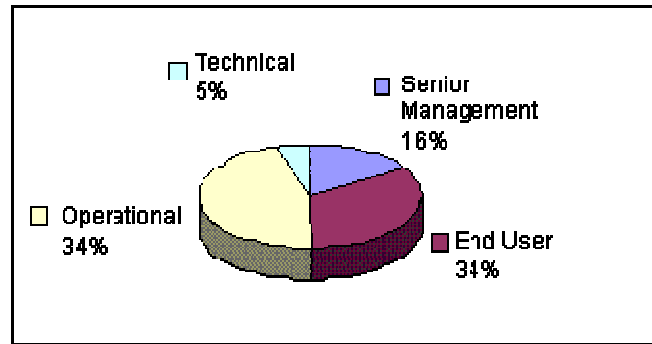
All the critical items (UE, PE, and ESS measures) were checked for completeness and correctness through descriptive statistical methods. The data set was examined to identify any systematic bias in responses to questions, and to identify any frivolous answers. While a small number of records potentially containing frivolous responses were noted, there was no compelling reason to remove any records. To check the impact of these records on data analysis, analytic procedures were re-run after removing these records and no noticeable change in the results occurred. At the completion of this initial data-cleaning phase, a total of 154 responses remained.

### **6.3 Descriptive Analysis: Profile of Respondents**

The descriptive analysis sought to describe the characteristics of the ES users who participated in the study. It is to be noted that in order to preserve the anonymity of the respondents, a limited number of demographic questions were included in the survey. The respondents were asked to describe their role in relation to the ORACLE Financials system they used to undertake their day-to-day job (refer Appendix 2 for the copy of instrument).

#### **6.3.1 Role**

As part of the inter-coder reliability process, a random sample of 20 responses was coded independently by four coders. One of the open-ended demographical questions requested the respondents describe the type of work they did with the system. Based on the responses the coders classified each of the 20 responses into the most relevant category i.e. “senior management”, “operational”, “end user” and “technical”. The inter-coder reliability was deemed suitable where at least 3 coders agreed on a response. This was sufficient to undertake the coding of the remaining 134 responses. The distribution of the coded roles are shown in Figure 6–2



**Figure 6-2 Distribution by Role**

It was difficult to conclude whether all the responders under the “Technical” role were capable of commenting on *Individual Impact*, *User Autonomy*, and *Information Quality* in particular. A justification could be that simply because these 5 percent “Technical” Users from the sample were part of the original ES implementation team, this does not justify excluding them from the analysis. These technical role respondents were working as end users or operational users of the ES over the last 7 years. These respondents also possessed sufficient knowledge on the matter and a genuine interest in contributing to the study.

The description of these roles is further illustrated with examples in Table 6-1 below. Completed spreadsheets were largely identical in their responses with the exception of one case where three coders marked ‘operational users’ for a description and one marked ‘senior management’. In such cases the researcher took the view of the majority and coded the responses as ‘operational users’.

**Table 6-1 Spreadsheet Used for Classification of Cohorts Based on Role Description**

<b>Instruction to Complete: Please select a level you think is appropriate based on the type of work. Tick only one of the cohorts based on the role description on the left. See example in row 1.</b>				
Role description by respondents	End-User	Operational Users	Technical Users	Senior Management
Approval of Orders	E x a m p l e			√
Purchase orders, Requisition Orders, Receipting, Invoicing, and Flexi-Purchase.				
Approving Day to Day				√

Reporting, project account transactions, Journals to transfer funds and error correction	√			
Approving or rejecting orders up to \$10000		√		
Requisition, receipting for recruitment selection costs		√		
Run Requisition reports, receipt against them, run reports	√			

### 6.3.2 Business Unit

One of the main goals of the analysis was to justify the claim that this study was conducted across all Oracle Financial Users of the target organisation. The two business units included in the data collection will be referred to as Facilities Management and Administration. These are the aliases provided to preserve the anonymity of the business units and organisation. Table 6-2 below depicts the distribution across the two business units.

**Table 6-2 Sample Distribution by Business Unit Response**

Business Unit	Frequency	Percent
Administration	106	68.8
Facilities Management	48	31.2

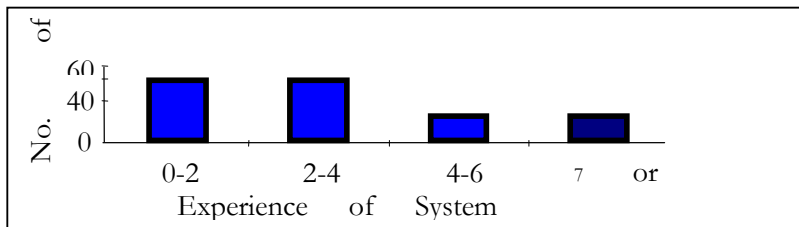
The Facilities Management respondents were characterised by those users who undertook specialised job activities using the Oracle Financials Module. Some examples of these specialised job activities were related to General Ledger, Accounts Payable, Accounts Receivable, and Asset Accounting. Their involvement with the system was a critical component of their job role within the procure-to-pay process. The Administration Business Unit generally undertook more organisation wide administrative functions which required daily operational activities involving intensive usage of the ES and its outputs.

154 of 200 users (77%) of Oracle Financial users participated in this study. Of these users, all user types were represented: end-users, operational users, senior management users and technical users. Users were drawn from different organisational units within the parent organisation. Thus, the sample size was representative of all users of Oracle Financials within the target organisation.

### 6.3.3 Experience with the Enterprise System

The survey instrument requested respondents provide their experience in years using the ES (ORACLE Financials). This item (question) yielded a response rate of 88.96 percent. The remaining 11.04 percent opted not to respond. There is a possibility that these participants associated responding to this item with revealing their identity.

Approximately 26 percent of the respondents reported to be experienced ORACLE users with experience ranging between 4-7 years within the current organisation. Nearly 1/3 of respondents (31.2 percent) reported to be new users with their experience ranging between 0 to 2 years in the current organisation. However, these 31.2 percent had previous ES experience. Overall, the respondents reported to be experienced users. Some of the respondents who reported to be ‘new users’ had used a different ES at their previous employment. Figure 6–3 below depicts a bar graph of the total number of ES users based on their experience in years.



**Figure 6–3 Respondents by Years of Experience**

It was observed that less than 50 percent of these ‘new users’ (under 12 month’s experience) listed reporting tasks, journal entries, or general enquiries when responding to their current ‘role’ in relation to the ORACLE system. However, it is difficult to justify whether all those respondents under the ‘new user’ category could also be classified under the ‘end-user’ employee cohort. A full range of experience with the system was included in analysis from <1 year to > 6 years experience with OF.

### 6.3.4 Descriptive Analysis across Constructs

The descriptive statistics for all sub-constructs are depicted in Table 6-3 below.

**Table 6-3 Descriptive Statistics**

Descriptive Statistics					
	Construct	N	Mean	Std. Deviation	Std. Error
PE	Meaning	154	5.49	1.20	0.10
	Impact	154	4.04	1.69	0.14
	Self-determination	154	5.25	1.34	0.11
	Competence	154	6.05	0.93	0.07
UE	Self-efficacy	154	5.43	1.35	0.11
	Autonomy	154	4.27	1.71	0.14
	Problem Solving and Decision support	154	3.81	1.70	0.14
Enterprise System success	Individual Impact	154	4.04	1.58	0.13
	Organisational Impact	153	3.83	1.24	0.10
	Information Quality	153	3.61	1.33	0.11
	System Quality	154	3.51	1.11	0.09

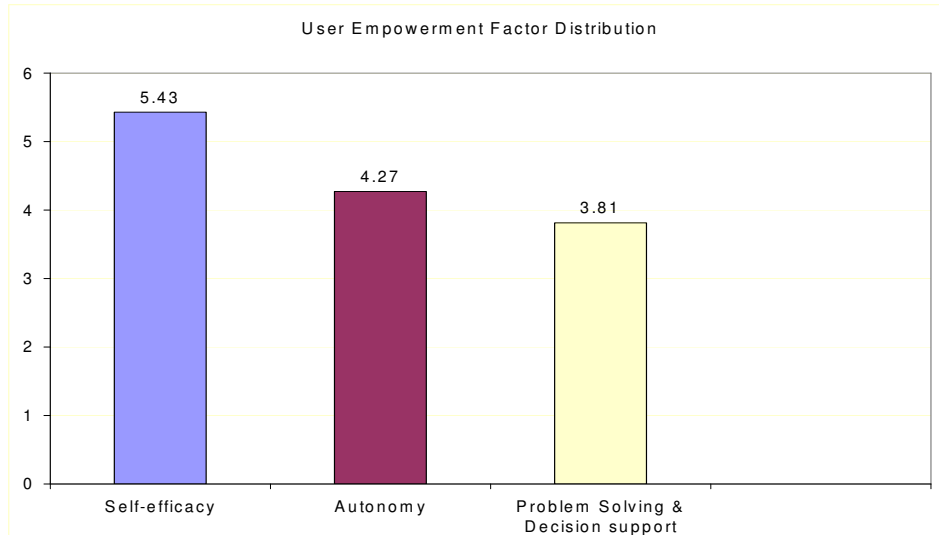
The distributions for each of these factors (PE, UE and ESS) are shown in Figure 6–4, Figure 6–5 below. The rank order for the factors of PE for this community rated *Competence* (6.05) and *Meaning* (5.49) highest and *Self-determination* (5.25) and *Impact* (4.04) as lowest, giving an overall PE score of 5.21. *Competence* had the smallest standard deviation (0.93), while *Impact* had the highest standard deviation (1.69). Thus all users of ORACLE reported a high level of PE.





**Figure 6–4 Distribution of Psychological Empowerment Factors**

The UE results are shown in Figure 6–5 below.



**Figure 6–5 Distribution of UE Factors**

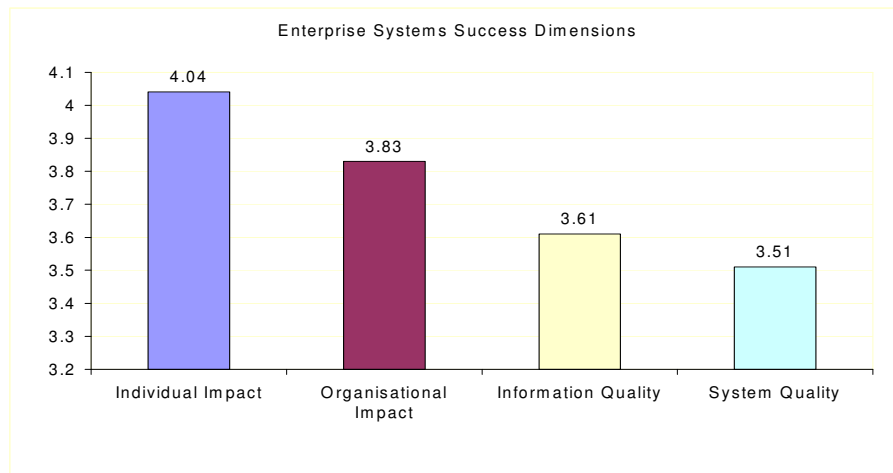
*Self-efficacy* was reported strongest (5.43), with *Problem-solving and Decision Support* (PSDS) the least (3.81). *Self-efficacy* had the least standard deviation (1.35) with Autonomy and PSDS about the same (1.7 and 1.71 respectively). The overall UE construct was 4.50 on a 7-point scale. Thus, it was concluded that this population reports moderate levels of UE.

All UE sub-constructs had means above the scale mid-point, with the overall UE construct having a mean of 4.5 suggesting a relatively moderate level of UE. The mean '*Computer Self-efficacy*' of users was reported to be (5.43), which suggested a relatively high level, but is lower than the '*Competence*' score. This may be indicative that generally users believed they had a high level of *Competence* but in relation to the actual ES, their efficacy was lower.

Across the literature reviewed in relation to ES and ESS, the User's *Problem-solving and Decision Support* is indicated as an important antecedent (independent variable) when measuring the ES users' perception of ES. Chapter 5 Section 5.3.1 discussed this aspect in detail as part of the construct operationalisation step of the UE scale development and design. The *Problem-solving and Decision Support* score was

reported as low overall with a score of (3.8). This could be attributed to a range of reasons, (for example, lack of relevant training or insufficient understanding of business process execution via the current ES). The character of the target sample frame could be another possible reason with relatively few decision making staff. However, since the survey instrument did not include any specific questions on the level or adequacy of training in the ORACLE ES, this proved difficult to justify.

The outputs of this analysis would be utilised for gauging the appropriateness of these items for further statistical tests. Figure 6–6 below shows the distribution of the ESS factors.

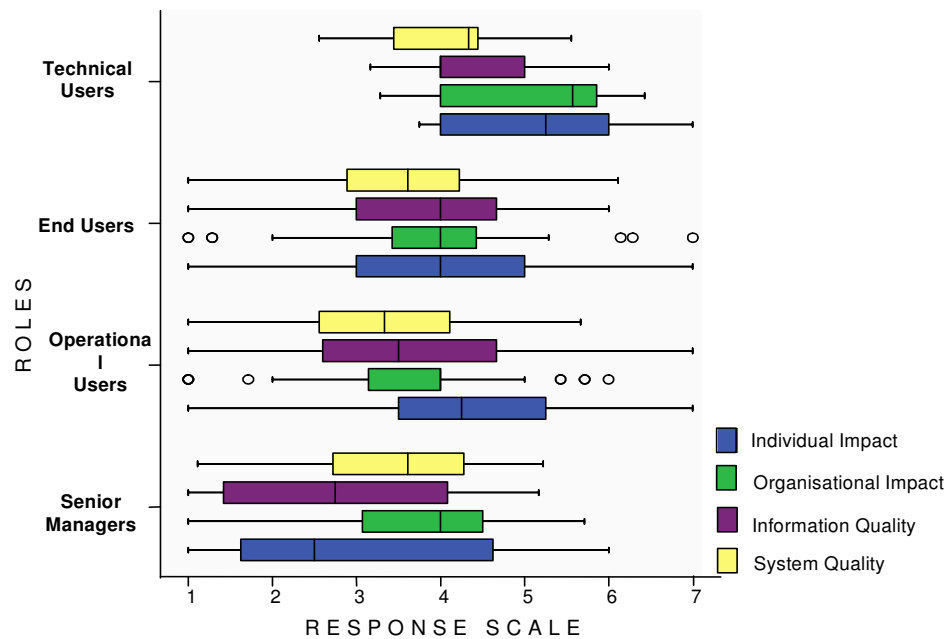


**Figure 6–6 Distribution of Enterprise Systems success Factors**

*Individual Impact* (II) was rated highest (4.04 on a 5 point scale), followed by *Organizational Impact* (OI) (3.83), *Information Quality* (IQ) (3.61) and *Systems Quality* (SQ) (3.51) for an overall ESS measure of 3.75 on a 5-point scale. This is a moderate level of ESS. *Individual Impact* had the greatest standard deviation (1.58) followed by information quality (1.33), *Organizational Impact* (1.24) and *Systems Quality* (1.11). The next section examines variation across the cohorts: end-users, operational users, technical users and senior management.

### 6.3.5 Enterprise Systems success: Across Cohorts

Figure 6–7 below provides a box plot depicting a quick, visual summary of the four cohorts. All the cohorts within a single sub-construct (II, OI, IQ, and SQ) are arrayed on the same axes, making *comparisons* easier. The circular dots represent the outliers. These outliers are mainly within the OI sub-construct for end-users and operational users. The result show that Technical respondents scored the ES relatively high and Senior Management scored it relatively low, being particularly derisive of IQ. Overall, the SQ scores remained relatively below average across all 4 cohorts.



**Figure 6–7 Means of ES success Measures as Dispersed across Roles**

The questions which the respondents left blank, or responded that they were not in a position to comment on were excluded in the inferential analysis. Appendix 8 illustrates the valid responses across each cohort. The next section presents the scale development and validation analyses pertaining to each of the three scales analysed in the research: UE Scale, the PE Scale and the ESS Scale.

## **6.4 Scale Development and Validation: PE, UE, and ESS**

The content validity, item selection, and construct validity analyses related to PE scale development are discussed first, followed by the UE scale and then the ESS scale. Observed scale reliabilities are also presented.

### ***6.4.1 Psychological Empowerment Scale***

As discussed in chapter 3, the research model built upon existing research into Empowerment as articulated by Spreitzer (Spreitzer, 1995b) and Thomas and Velthouse (Thomas & Velthouse, 1990). The PE scale validity and reliability is discussed next.

#### ***Content Validity***

The content validity of the PE scale was established by drawing content from the literature. This study utilised previously validated PE instrument developed by Spreitzer (Spreitzer, 1995b). These questions have also been utilised by several other psychological and sociological researchers to measure PE of employees in diverse settings, (as discussed in the Literature review chapter 2.) The pilot instrument was tested by senior researchers and experts who are methodological experts and who have undertaken survey research. The appropriateness of the PE instrument in this study was thoroughly reviewed by experts until a formal consensus was reached. This approach is suggested by Cronbach (1971) and Kerlinger (1964) who suggest that an instrument is valid 'in content', if that (instrument) (i) has drawn representative questions from a universal pool, and (ii) has been reviewed by experts.

#### ***Item Selection***

Item selection refers to the process of examining distributions for each item, response variability, and skewness. Table 6-4 lists all items, their mean, Standard deviation, minimum and maximum, and valid responses obtained. Descriptive

information for all items within the PE Scale was first obtained to assess the degree of response variability and range of response. However, for almost all of these items, all scale points were endorsed, and items differed in their means, which indicated different average responses depending on the item. Standard deviations also indicated variability in response. All items were therefore retained for their usefulness across a range of organisational settings (Clark & Watson, 1995). The majority of the items were negatively skewed, indicating that the respondents agreed with the majority of the questions

**Table 6-4 Descriptive Statistics for Items of the Psychological Empowerment Scale**

Item	Label	Mean	Std. Deviation	Min	Max	Skewness with Std. Error = .195	Skew Ratio
<b>Valid N= 154 for all 12 items.</b>							
1.	The work I do is meaningful to me.	5.60	1.18	2	7	-.62	-3.18
2.	The work I do is very important to me.	5.59	1.22	2	7	-.75	-3.84
3.	My job activities are personally meaningful to me.	5.27	1.42	1	7	-.88	-4.51
4.	I have a great deal of control over what happens in my department.	3.93	1.81	1	7	-.21	-1.07
5.	I have significant influence over what happens in my department.	3.99	1.85	1	7	-.163	-0.83
6.	My impact on what happens in my department is large.	4.19	1.75	1	7	-.30	-.94
7.	I have considerable opportunity for independence and freedom in how I do my job.	5.12	1.45	2	7	-.61	-3.12
8.	I can decide on my own how to go about doing my job.	5.34	1.37	1	7	-.92	-4.71
9.	I have significant autonomy in determining how I do my job.	5.30	1.41	1	7	-.81	-4.15
10.	I have mastered the skill necessary for my job.	5.88	1.07	2	7	-1.35	-6.92
11.	I am confident about my ability to do my job.	6.15	.97	2	7	-1.67	-8.56
12.	I am self-assured about my capabilities to perform my work activities	6.13	.92	2	7	-1.44	-7.38

### ***Construct Validity***

Construct validity was assessed through a series of analyses. Both exploratory and confirmatory analyses were conducted to examine convergent and discriminant validity and reliability. The means of the items ranged from 3.93 to 6.15 (on a seven point scale). These means suggested that individuals in the sample reported feeling moderately to very highly empowered. On the basis of the obtained eigenvalues<sup>1</sup>, the principal components analysis extracted four factors with an eigenvalue greater than 1. The eigenvalue is the percent of variance in all variables explained by a factor. Factors will be extracted in order from high to low eigenvalues, with the first factor being the most important (Tabachnick & Fidell, 2001).

Cattell's *Scree test* (Cattell, 1966), was applied for a visual exploration of a graphical representation of the eigenvalues. In this method, the eigenvalues were presented in descending order and linked with a line. Afterwards, the graph was examined to determine the point at which the last significant drop or break took place—in other words, where the line levelled off. The logic behind this method suggests that this point divides the important or major factors from the minor or trivial factors. The eigenvalues were plotted in a scree plot (see Appendix 9), and visual inspection of this plot suggested a four-factor solution. Consequently, a four-factor solution was analysed using rotated principal axis factoring techniques. Principal axis factoring was selected as the factoring technique given that the purpose was to determine the underlying structure of the scale, rather than simply to summarise the data (Tabachnick & Fidell, 2001).

This four-factor solution, using principal axis factoring with an oblique rotation and accounting for 84% of the variance, was considered the most appropriate and theoretically meaningful solution. This solution was particularly appropriate as the responses were likely to correlate between conceptually related factors. All items loaded on only one factor ( $>|.20|$ ) indicating that the solution exhibited simple structure. Each factor was comprised of three items. Modest correlations were observed between some factors ( $r < .60$ ). Table 6-5 presents the factor loadings for each of the 12 PE scale items.

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<sup>1</sup> eigenvalues is a statistic which is calculated and used in deciding how many factors to extract in the overall factor analysis (Tabachnick & Fidell, 2001).

**Table 6-5 Pattern Matrix of Obliquely Rotated Factor Loadings of the Psychological Empowerment Scale**

Name	Item	Factor 1	Factor 2	Factor 3	Factor 4
Self Determination	I can decide on my own how to go about doing my job.	.972	.047	.026	-.051
	I have considerable opportunity for independence and freedom in how I do my job.	.893	-.082	-.017	.050
	I have significant autonomy in determining how I do my job.	.891	.036	-.020	.025
Competence	I am confident about my ability to do my job.	-.009	1.011	.026	-.008
	I am self-assured about my capabilities to perform my work activities	-.031	.943	-.039	-.004
	I have mastered the skill necessary for my job.	.038	.780	.009	.025
Meaning	The work I do is very important to me.	.059	.018	-.962	-.041
	The work I do is meaningful to me.	-.020	.049	-.913	-.025
	My job activities are personally meaningful to me.	-.024	-.057	-.864	.071
Impact	I have a great deal of control over what happens in my department.	-.006	-.007	.036	.992
	I have significant influence over what happens in my department.	.001	-.020	.037	.966
	My impact on what happens in my department is large.	.031	.053	-.097	.725

Note. n=154



The four factors identified were labelled ‘*Meaning*’ and ‘*Impact*’, ‘*Self Determination*’ and ‘*Competence*’. Factor 1 accounted for 43.5% of the variance (Eigenvalue of 5.225); factor 2 accounted for 18.9% of the variance (Eigenvalue of 2.265); factor 3 accounted for 13.6% of the variance (Eigenvalue of 1.631) and factor 4 accounted for 8.4% of the variance (Eigenvalue of 1.008). While most of the factors scored high, Factors 1 and 4 presented the largest correlations ( $r = .57$ ). Table 6-6 presents the inter-correlations among factors.

**Table 6-6 Factor Inter-correlations of the Psychological Empowerment Scale**

Factor	Factor 1	Factor 2	Factor 3	Factor 4
Meaning	1.00	-	-	-
Impact	.25	1.00	-	-
Self Determination	-.33	-.31	1.00	-
Competence	.57	.17	-.40	1.00

Cronbach’s alpha coefficients were calculated for *Meaning* ( $\alpha = .93$ ), *Impact* ( $\alpha = .93$ ), *Self-determination* ( $\alpha = .95$ ) and *Competence* ( $\alpha = .93$ ). Coefficients were high, indicating a high degree of internal consistency and construct homogeneity. All scale items contributed to the total reliability coefficient for each scale and were therefore retained. The above discussion establishes that PE has content and construct validity.

#### **6.4.2 User Empowerment Scale**

UE was first explored by Doll, Deng and Metts (Doll et al., 2003) in computer mediated environments.

##### ***Content Validity***

In the absence of any quantitative empirical studies which explored the relationship of UE with ESS prior to this research the UE instrument was tested for content validity by: (i) consultation with experts, and (ii) a pilot survey to obtain feedback on the instrument.

In order to boost content validity and comply with the guidelines suggested by Kerlinger (Kerlinger, 1964) which recommend that a scale to be validated must be reviewed by experts, a series of expert workshops were undertaken. These workshops included leading academics and practitioners who were experts in the ES study domain, who also, had strong experience in survey methodology.

The pilot survey was discussed in chapter 5 in detail. The feedback received from the pilot survey provided rich feedback in terms of scale selection (seven point Likert scale); layout of sections within the instrument and provided specific direction to include the actual system name (i.e. Oracle Financials) instead of the generic term 'system'. This modification ensured that the respondents answered the questions on UE in the context of Oracle Financials and not any other system present in their work environment.

### ***Item Selection***

Descriptive information for all items within the UE Scale was obtained to assess degree of response variability and range of response. The mean score, standard deviation, maximum and minimum for each item are presented in Table 6-7 below. The majority of the items were negatively skewed, indicating that the respondents agreed with the majority of the questions.

For almost all of these items all scale points were endorsed and items differed in their means, indicating different average responses depending on the item. Standard deviations also indicated variability in response. All items were therefore retained for their usefulness across a range of organisational settings (Clark & Watson, 1995).

**Table 6-7 Descriptive Statistics for Items of the User Empowerment Scale**

Item	Label	Mean	Std. Deviation	Min	Max	Skewness with Std. Error = .195	Skew Ratio
Valid N= 154 for all 10 items.							
1.	I am confident in my ability to use ORACLE-FINANCIALS to complete my work.	5.45	1.40	1	7	-1.17	-6
2. 3.	I believe in my capabilities to use ORACLE-FINANCIALS for my work.	5.56	1.33	1	7	-1.26	-6.46
4.	I have mastered the skills necessary for using ORACLE-FINANCIALS for my work.	5.27	1.48	1	7	-.96	-4.92
5.	I have considerable opportunity for independence in how I use ORACLE-FINANCIALS for my work processes.	4.40	1.73	1	7	-.42	-2.15
6.	I have significant autonomy in determining how I use ORACLE-FINANCIALS for my work processes.	4.34	1.82	1	7	-.34	-1.74
7.	I have a say in how I use ORACLE-FINANCIALS for a particular work process.	4.07	1.79	1	7	-.22	-1.12
8.	I use ORACLE-FINANCIALS to improve the efficiency of the decision process.	3.77	1.79	1	7	-.11	-0.56
9.	I use ORACLE-FINANCIALS to help me make explicit the reasons for my decisions.	3.58	1.72	1	7	-.05	-0.25
10.	I use ORACLE-FINANCIALS to make sense out of data.	4.05	1.87	1	7	-.28	-1.43
11.	I use ORACLE-FINANCIALS to analyse why problems occur.	3.86	2.05	1	7	-.08	-0.41

### ***Construct Validity***

On the basis of the obtained eigenvalues, the principal components analysis extracted three factors with an Eigenvalue greater than 1. The eigenvalues were plotted in a scree plot (Appendix 10), and visual inspection of this plot suggested a three-factor solution (Cattell, 1966). Consequently, a three-factor solution was analysed using rotated principal axis factoring techniques. Again, principal axis factoring was selected given the purpose of determining the underlying structure of the scale (Tabachnick & Fidell, 2001).

A three-factor solution, using principal axis factoring with an oblique rotation and accounting for 85% of the variance, was considered the most appropriate and theoretically meaningful solution. All items loaded on only one factor ( $>|.20|$ ) indicating that the solution exhibited simple structure. Factor 1 was comprised of four items; factor 2 contained three items and factor 3 contained three items. Moderate correlations were observed between some factors ( $r < .65$ ).

The three factors identified were labelled '*Problem-solving and Decision Support*', '*Self-efficacy*' and '*User Autonomy*'. Factor 1 accounted for 57.8% of the variance (Eigenvalue of 5.781); factor 2 accounted for 17.1% of the variance (Eigenvalue of 1.707); and factor 3 accounted for 10.4% of the variance (Eigenvalue of 1.039). Factors 1 and 3 were moderately correlated ( $r = .61$ ). Table 6-8 presents the inter-correlations among factors and Table 6-9 presents the factor loadings for each item.

**Table 6-8 Factor Inter-correlations of the User Empowerment Scale**

<b>Factor</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>
Problem Solving Decision Support	1.00	-	-
Self Efficacy	.46	1.00	-
User Autonomy	.61	.38	1.00

**Table 6-9 Obliquely Rotated Factor Loadings of the User Empowerment Scale**

Factor	Item	Factor 1	Factor 2	Factor 3
Problem Solving Decision Support	I use ORACLE-FINANCIALS to analyse why problems occur.	.914	.025	-.052
	I use ORACLE-FINANCIALS to help me make explicit the reasons for my decisions.	.898	-.062	.097
	I use ORACLE-FINANCIALS to make sense out of data.	.890	.061	-.090
	I use ORACLE-FINANCIALS to improve the efficiency of the decision process.	.757	-.007	.172
Self -Efficacy	I am confident in my ability to use ORACLE-FINANCIALS to complete my work.	-.035	.994	.020
	I believe in my capabilities to use ORACLE-FINANCIALS for my work.	-.024	.982	-.013
	I have mastered the skills necessary for using ORACLE-FINANCIALS for my work.	.079	.833	.020
User Autonomy	I have considerable opportunity for independence in how I use ORACLE-FINANCIALS for my work processes.	-.047	.038	.977
	I have significant autonomy in determining how I use ORACLE-FINANCIALS for my work processes.	.002	.012	.968
	I have a say in how I use ORACLE-FINANCIALS for a particular work process.	.087	-.010	.836

Note. n=154

Alpha coefficients were calculated for *Problem-solving and Decision Support* ( $\alpha = .93$ ), *Self-efficacy* ( $\alpha = .96$ ), and *User Autonomy* ( $\alpha = .96$ ). Coefficients were high, indicating a high degree of internal consistency and construct homogeneity. All scale items contributed to the total reliability coefficient for each scale and were therefore retained. The above discussion establishes that UE has content and construct validity.

***Concurrent and Discriminant Validity of PE and UE***

Another aspect of validity is the concurrent and discriminant validity of Empowerment from related constructs. As described in chapter 1, in this study the concurrent and discriminant validity of PE with UE was examined. UE was hypothesised to be related, yet distinct from, PE.

The relationship between PE and UE was first examined using simple bivariate correlations (see Table 6-10). To demonstrate presence of concurrent and discriminant validity, the correlation needed to be significant and high, yet distinct

from unity (Bagozzi 1981). As expected, PE (particularly the *Competence* dimension) was found to be significantly related to UE. It is noted that a correlational approach does not take into account measurement error explicitly; this finding was confirmed with AMOS.

**Table 6-10 Correlation between UE and PE**

UE	PE			
	Meaning Mean Impact	Impact Mean Competence	Self-determination Mean Impact	Competence Mean Competence
Self-efficacy	.130	.077	-.006	.537**
User Autonomy	.106	.137	.259**	.179**
Problem Solving Decision Support	.133	.149	.078	.107

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

### 6.4.3 ESS Scale

The ESS scale measures the dependent variable of the research model and employs a current and validated measure of ESS as developed by Gable, Sedera and Chan (Gable et al., 2003); this measure is a refinement of the Information Systems Success Model of DeLone and McLean (DeLone & McLean, 2002).

#### *Item Selection*

Descriptive information for all items of the ESS Scale was obtained to assess degree of response variability and range of response. The mean score, standard deviation, maximum and minimum for each item are presented in Table 6-11 below. For almost all of these items all scale points were endorsed, and items differed in their means, indicating different average responses depending on the item. Standard deviations also indicated variability in response. All items were therefore retained for their usefulness across a range of organisational settings (Clark & Watson, 1995).

#### *Construct Validity*

An initial principal components analysis was first performed on the data from the ES success scale to ascertain the likely number of factors. On the basis of the obtained eigenvalues, the principal components analysis extracted four factors with an Eigenvalue greater than 1. The eigenvalues were plotted in a Scree plot (see

Appendix 11), and visual inspection of this plot also suggested a four-factor solution (Cattell, 1966). As the intent was to examine the underlying dimensions of the ESS scale, a four-factor solution was analysed using rotated principal axis factoring techniques.

Table 6-11 below presents the factor loadings for each item. Construct validity was further established using the Kaiser-Meyer-Olkin (KMO) to measure the sampling adequacy and the Bartlett's test of Sphericity (BTS).

- For PE KMO = 0.791; BTS Chi Square = 1924, DF = 66;
- For UE KMO = 0.853; BTS Chi Square = 1754, DF = 45; and
- For ESS KMO = 0.924; BTS Chi Square = 3943, DF = 325.

**Table 6-11 Descriptive Statistics for Items of the Enterprise Systems success Scale**

Item	Label	Mean	Standard Deviation	Min	Max	Valid N	Skewness with Std. Error = .195	Skew Ratio
1.	I have learnt much through the presence of ORACLE-FINANCIALS.	4.08	1.555	1	7	154	-.33	-1.69
2.	ORACLE-FINANCIALS enhances my awareness and recall of job related information.	3.99	1.678	1	7	154	-.21	-1.07
3.	ORACLE-FINANCIALS enhances my effectiveness in the job.	4.14	1.727	1	7	154	-.32	-1.64
4.	ORACLE-FINANCIALS increases my productivity.	3.96	1.741	1	7	154	-.27	-1.38
5.	ORACLE-FINANCIALS is cost effective.	3.92	1.303	1	7	153	-.37	-1.89
6.	ORACLE-FINANCIALS has resulted in reduced staff costs.	3.54	1.356	1	7	152	-.25	-1.28
7.	ORACLE-FINANCIALS has resulted in cost reductions (e.g. inventory holding costs, administration expenses, etc.)	3.61	1.333	1	7	152	-.30	-1.53
8.	ORACLE-FINANCIALS has resulted in overall productivity improvement.	3.80	1.410	1	7	152	-.19	-0.97
9.	ORACLE-FINANCIALS has resulted in improved outcomes or outputs.	3.89	1.421	1	7	152	-.32	-1.64
10.	ORACLE-FINANCIALS has resulted in an increased capacity to manage a growing volume of activity (e.g. transactions, population growth, etc.).	3.98	1.462	1	7	152	-.22	-1.12
11.	ORACLE-FINANCIALS has resulted in improved business processes.	4.01	1.433	1	7	152	-.34	-1.74
12.	ORACLE-FINANCIALS provides output that seems to be exactly what is needed.	3.58	1.463	1	7	153	-.33	-1.69
13.	Information needed from ORACLE-FINANCIALS is always available.	3.78	1.589	1	7	153	-.12	-0.61
14.	Information from ORACLE-FINANCIALS is in a form that is readily usable.	3.47	1.526	1	7	153	-.09	-0.46
15.	Information from ORACLE-FINANCIALS is easy to understand.	3.51	1.522	1	7	153	.08	-0.41



Item	Label	Mean	Standard Deviation	Min	Max	Valid N	Skewness with Std. Error = .195	Skew Ratio
16.	Information from ORACLE-FINANCIALS appears readable, clear and well formatted.	3.56	1.547	1	7	153	-.09	-0.46
17.	Information from ORACLE-FINANCIALS is concise.	3.76	1.557	1	7	152	-.19	-0.97
18.	ORACLE is easy to use.	3.71	1.699	1	7	154	-.06	-0.30
19.	ORACLE-FINANCIALS is easy to learn.	3.84	1.598	1	7	154	-.04	-0.20
20.	ORACLE-FINANCIALS meets the Business Unit 1 or Business Unit 2's requirements.	4.03	1.393	1	7	153	-.55	-2.82
21.	ORACLE-FINANCIALS includes necessary features and functions.	3.90	1.432	1	7	153	-.29	-1.48
22.	ORACLE-FINANCIALS always does what it should.	3.42	1.450	1	7	153	-.07	-0.35
23.	ORACLE-FINANCIALS' user interface can be easily adapted to one's personal approach.	3.04	1.437	1	7	153	.17	-0.87
24.	ORACLE-FINANCIALS requires only the minimum number of fields and screens to achieve a task.	3.05	1.390	1	7	154	.19	-0.97
25.	All data within ORACLE-FINANCIALS is fully integrated and consistent.	3.53	1.382	1	7	154	-.32	-1.64
26.	ORACLE-FINANCIALS can be easily modified, corrected or improved.	3.01	1.455	1	7	153	.04	-0.20
27.	Overall the impact of ORACLE-FINANCIALS on the Business Unit 1 or Business Unit 2 has been positive.	4.14	1.326	1	7	150	-.52	-2.66
28.	Overall the impact of ORACLE-FINANCIALS on me has been positive.	4.11	1.546	1	7	151	-.50	-2.56

**Table 6-12 Obliquely Rotated Factor Loadings of the Enterprise Systems success Scale**

Factor	Item	Factor 1	Factor 2	Factor 3	Factor 4
Information Quality	Information from ORACLE-FINANCIALS is in a form that is readily usable.	.860	-.020	.005	.026
	ORACLE-FINANCIALS provides output that seems to be exactly what is needed.	.813	-.060	-.109	-.080
	Information from ORACLE-FINANCIALS is concise.	.783	-.097	-.091	-.037
	Information needed from ORACLE-FINANCIALS is always available.	.755	.000	.065	.048
	Information from ORACLE-FINANCIALS appears readable, clear and well formatted.	.690	-.026	-.165	.100
	Information from ORACLE-FINANCIALS is easy to understand.	.674	.089	-.258	.157
	ORACLE-FINANCIALS meets the Business Unit 1 or Business Unit 2's requirements.	.480*	-.284	-.039	.134
	ORACLE-FINANCIALS includes necessary features and functions.	.389*	-.150	.111	.379
Organisational Impact	ORACLE-FINANCIALS has resulted in cost reductions (e.g. inventory holding costs, administration expenses, etc.)	-.005	-.944	.005	-.101
	ORACLE-FINANCIALS has resulted in reduced staff costs.	-.028	-.900	.069	-.079
	ORACLE-FINANCIALS has resulted in overall productivity improvement.	-.039	-.862	-.125	.062
	ORACLE-FINANCIALS has resulted in an increased capacity to manage a growing volume of activity (e.g. transactions, growth).	.070	-.778	-.066	.098
	ORACLE-FINANCIALS is cost effective.	.077	-.728	.013	.091
	ORACLE-FINANCIALS has resulted in improved outcomes or outputs.	.134	-.709	-.117	.044
	ORACLE-FINANCIALS has resulted in improved business processes.	-.013	-.689	-.087	.255
Individual Impact	ORACLE-FINANCIALS enhances my effectiveness in the job.	.047	-.141	-.869	-.049
	ORACLE-FINANCIALS enhances my awareness and recall of job related information.	.065	-.056	-.833	.059
	ORACLE-FINANCIALS increases my productivity.	.197	-.098	-.780	-.047
	I have learnt much through the presence of ORACLE-FINANCIALS.	.042	.009	-.773	.150
System Quality	ORACLE-FINANCIALS requires only the minimum number of fields and screens to achieve a task.	-.168	-.135	-.035	.807
	ORACLE-FINANCIALS always does what it should.	.199	.035	.095	.696
	ORACLE-FINANCIALS can be easily modified, corrected or improved.	.079	-.064	-.052	.667
	All data within ORACLE-FINANCIALS is fully integrated and consistent.	.197	-.040	.166	.664
	ORACLE-FINANCIALS' user interface can be easily adapted to one's personal approach.	-.016	-.026	-.210	.651
	ORACLE is easy to use.	.012	-.055	-.286	.526

Factor	Item	Factor 1	Factor 2	Factor 3	Factor 4
	ORACLE-FINANCIALS is easy to learn.	.122	.025	-.215	.520

Note. n=150. \* denotes item removed from final factor.

A four-factor solution, using principal axis factoring with an oblique rotation and accounting for 70% of the variance, was considered the most appropriate and theoretically meaningful solution. Most items loaded on only one factor ( $>|.30|$ ) indicating that the solution generally exhibited simple structure. It was noted that the following item (listed below) loaded on both factors 1 and 4.

*“Oracle-Financials includes necessary features and functions”*

Thus this item was removed given its ambiguous contribution (refer highlighted sections in Table 6-12). The resulting factor 1 was comprised of seven items; factor 2 contained seven items, factor 3 contained four items and factor 4 contained seven items. Moderate correlations were observed between some factors ( $r < .65$ ).

The four factors identified were labelled ‘*Information Quality*’, ‘*Organisational Impact*’, ‘*Individual Impact*’, and ‘*System Quality*’. Factor 1 accounted for 51.5% of the variance (Eigenvalue of 13.380); factor 2 accounted for 8.34% of the variance (Eigenvalue of 2.168); factor 3 accounted for 6.17% of the variance (Eigenvalue of 1.605) and factor 4 accounted for 4.44% of the variance (eigenvalue of 1.155). Factors 1 and 4 presented the largest correlated ( $r = .60$ ) Table 6-13 below presents the inter-correlations among factors.

**Table 6-13 Factor Inter-correlations of the Enterprise Systems success Scale**

Factor	Factor 1	Factor 2	Factor 3	Factor 4
Information Quality	1.00	-	-	-
Organisational Impact	-.49	1.00	-	-
Individual Impact	-.48	.49	1.00	-
System Quality	.60	-.49	-.41	1.00

Alpha coefficients were calculated for *Information Quality* ( $\alpha = .94$ ), *Organisational Impact* ( $\alpha = .96$ ), *Individual Impact* ( $\alpha = .96$ ) and *System Quality* ( $\alpha = .89$ ). Coefficients were high, indicating a high degree of internal consistency and construct homogeneity. All scale items contributed to the total reliability coefficient for each scale and were therefore retained. In sum, the construct validation of the PE, UE, and ESS constructs was established. Evidence was provided supporting the convergent and discriminant validity of the measures across each construct’s dimensions using exploratory and confirmatory factor analyses.

The development of a valid and reliable instrument to assess UE is an important contribution to the literature and is necessary for further substantive research. Given the construct validity of the UE construct, the relationship between ESS and UE was then examined and presented in the next section.

## **6.5 Model and Hypothesis Testing**

The purpose of this section is to describe results of testing the research model introduced in chapter 3 Figure 3–9. This model was tested using structural equation modeling which is a well-accepted method of analysing and presenting results of causal models in Management of Information Systems (Tait and Vessey 1988).

The model tested relationships among three main constructs: (i) PE; (ii) UE; and (iii) ESS. Several different models were tested for fit with the data. These models present the relationship between PE and ESS, which was hypothesised to be significant, positive and moderately strong; UE and ESS, which was hypothesized to be positive and moderately strong; and the mediating relationship of UE between PE and ESS, which was hypothesised to be moderate and positive. The derivation and validation of these constructs was described in detail in chapter 5 and Section 6.4.

### ***6.5.1 Assumptions***

Data were checked for multivariate normality, linearity and outliers. Single outliers were identified in ESS, and two outliers were identified in OI. These were deleted from the data set, as outliers have a disproportionately large influence on variance calculations in SEM (see below) and lead to biased results (West, Finch, & Curran, 1995). Once outliers were removed, no variable was significantly skewed ( $p < .05$ ). Since variables were normally distributed, no bootstrapping procedures were undertaken and standard path analyses were conducted. Finally, 4 respondents were missing all the data for OI; these respondents were deleted. Analyses were performed using 153 cases, with no missing data. Table 6-14 below presents a correlation matrix of the model variables.

**Table 6-14 Correlation Matrix of Hypothesised Model Constructs: UE and Enterprise Systems success**

	CSE	UA	PSDS	II	OI	IQ	SQ
Computer Self-efficacy (CSE)	1	.395	.456	.405	.305	.295	.367
User Autonomy (UA)	.395	1	.610	.540	.341	.252	.267
Problem Solving Decision Support (PSDS)	.456	.610	1	.705	.519	.321	.415
Individual Impact (II)	.405	.540	.705	1	.601	.621	.577
Organisational Impact (OI)	.305	.341	.519	.601	1	.574	.620
Information Quality (IQ)	.295	.252	.321	.621	.574	1	.719
System Quality (SQ)	.367	.267	.415	.577	.620	.719	1

### **6.5.2 Sample Size and Model Fit**

The Structured Equation Modeling (SEM) literature has never been definitive about what constitutes an appropriate sample size to undertake SEM, however it is generally agreed that the important factor is the ratio of cases to parameters to be estimated. Some authors (e.g., (Bentler & Bonett, 1980)) suggest a minimum of five cases per parameter to be estimated is required; others suggest that at least 15 cases per measured variable or indicator are required (Byrne, 2001). These minimums are increased substantially if data are non-normal (e.g., skewed).

The measurement model is that part (possibly all) of a SEM model which deals with the latent variables (includes both independent and dependent factors) and their indicators (Byrne, 2001). The structural model is generally contrasted with the measurement model as a set of exogenous and endogenous variables along with the direct effects connecting them, and the error terms (Byrne, 2001). The SEM is performed in two key steps: validating the measurement model and fitting the structural model. In this study, the former was accomplished primarily through goodness of fit measures followed by confirmatory factor analysis, while the latter was accomplished using structural equation modeling with latent variables.

**Table 6-15 Model Fit Summary**

Specified Model	P	DF	CMI N	CMIN/DF	GFI	NFI Delta 1	TLI rho2	CFI	RM SEA	RMR
PE	.378	2	1.947	0.973	.994	.980	1.002	1.000	.000	1.489
UE	.650	1	.206	.206	.999	.998	1.022	1.000	.000	1.244
ESS	.198	3	.198	0.066	.988	.984	.981	.994	.060	1.580

Maximum likelihood estimation was used to test the fit of the three models described above.

Table 6-15 Model Fit Summary above presents fit indices for PE, UE, and ESS models. Well-fitting models generally display non-significant chi-square overall fit statistics (the test of the difference between the theorised and estimated models). Statistics such as the root-mean-square error of approximation (RMSEA), which estimates the lack of fit, and standardised root-mean-square residual (SRMR), which is based on the residuals, should be low (i.e., < .06). Other comparative goodness-of-fit indices, such as the comparative fit index (CFI), the normed fit index (NFI), and the Tucker-Lewis index (TLI) should ideally approach 1.00 (i.e., >.90 is considered acceptable; >.95 indicates an excellent fit) (Byrne, 2001; Hu & Bentler, 1999).

The UE model was specified on the basis of theory, and each variable in the UE measurement model (*User Autonomy*, *User Computer Self-efficacy*, and *User Problem-solving and Decision Support*) was conceptualised as a latent variable, measured by multiple indicators. Based on an n=153 representative sample, factor analysis was used to establish that indicators seem to measure the corresponding latent variables, represented by Factors.

Table 6-15 above presents the model data fit statistics across the three measurement models of PE, UE, and ESS. Whilst all three presented acceptable GFI, (NFI being <.9) the p value was best for UE along with the lowest RMR value. The values across TLI, CFI, and RMSEA were all approaching 1.00 which is ideal.

**P** is the model chi-square significance level. It should be > .05 for an acceptable model. All specified models of PE, UE, and ESS were acceptable at .378; .65; and .198 respectively.

**CMIN/DF** is the minimum sample discrepancy divided by degrees of freedom. This is called *relative chi-square* or normal chi-square. Some researchers allow values as large as 5 as being an adequate fit, but conservative use calls for rejecting models with relative chi-square greater than 2 or 3. Kline (Kline, 1998) says 3 or less is acceptable. **By this criterion the present models are acceptable.**

By convention, GFI should be equal to or greater than .90 to accept the model. **At .994 (PE); .999 (UE); and .988 (ESS) models are acceptable.**

The normed fit index, NFI, was developed as an alternative to CFI, but one which did not require making chi-square assumptions. It varies from 0 to 1, with 1 = perfect fit. NFI reflects the proportion by which the researcher's model improves fit compared to the null model (random variables). At NFI all values being <.97 the three models were acceptable.

The **Tucker-Lewis index** (TLI), also called non-normed fit index, NNFI, is similar to NFI, but penalizes for model complexity as reflected in the degrees of freedom of the independence and research models. TLI close to 1 indicates a good fit. By convention, TLI values below .90 indicate a need to respecify the model. Some authors have used the more liberal cut-off of .80 since TLI tends to run lower than GFI. However, more recently, Hu and Bentler (Hu & Bentler, 1999) have suggested NNFI  $\geq$  .95 as the cut-off for a good model fit. It is one of the fit indexes less affected by sample size. PE, UE, and ESS models were acceptable and meet the requirement suggested by HU and Bentler (Hu & Bentler, 1999).

**CFI** close to 1 indicates a very good fit and was achieved in PE and UE models. ESS models presented CFI =.994 indicating that over 90% of the covariation in the data could be reproduced by the given model. Tabachnick and Fidell (Tabachnick & Fidell, 2001), following Hu and Bentler (Hu & Bentler, 1999) uses .95.

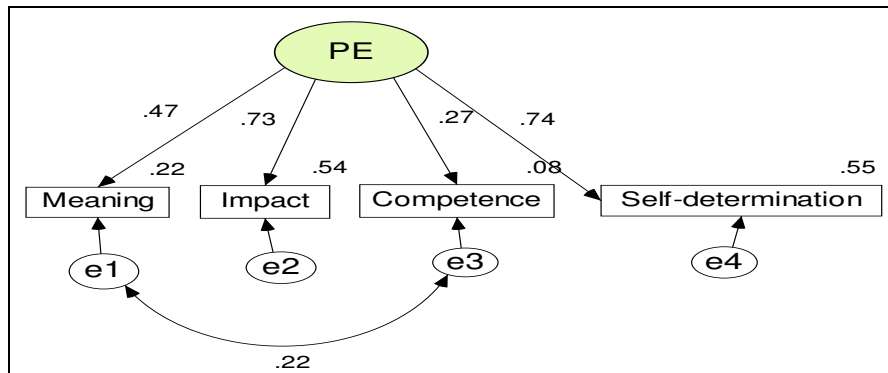
**Root mean square error of approximation** (RMSEA), showed a good model fit for PE and UE models with RMSEA being less than .05 and lack of close fit for ESS Model with RMSEA=.060. RMR is the root mean square residual, or is the square root of the mean squared amount by which the sample variances and covariances differ from the corresponding estimated variances and covariances, estimated on the assumption that your model is correct. The smaller the RMR, the better the fit.



### 6.5.3 Testing the Measurement Models

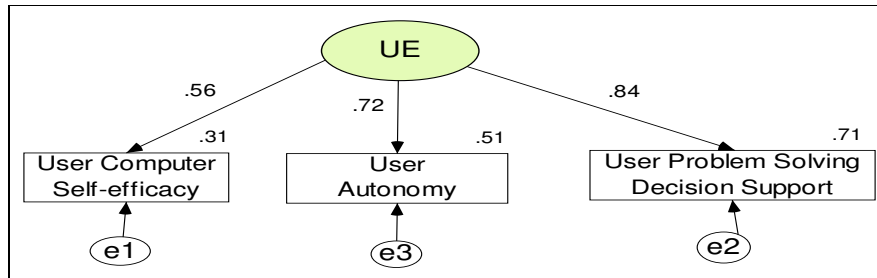
Testing the Structural model included: (i) testing the causal and correlational links among theoretical variables, as well as constituent paths, variances, and covariances; (ii) assessing model fit of competing models. In the following models each of the factors are the “saved factor scores” or observed variables as depicted by the rectangles. The factor scores were calculated using data reduction analysis technique in SPSS and the saved variables were migrated in AMOS. This facilitated a simpler model to be tested at the PE, UE, and ESS measurement level.

The modification indices produced by AMOS suggested error terms associated with each indicator. Figure 6–8 following, shows the measurement model for PE with error terms for *Meaning*, *Impact*, *Competence*, and *Self-determination*. This yielded the best fit for the PE measurement model.

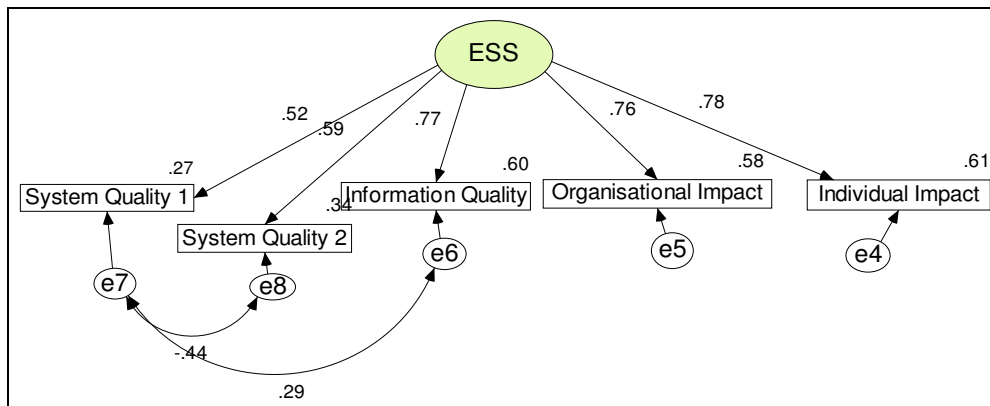


**Figure 6–8 Measurement Model of Psychological Empowerment**

Figure 6–9 below shows the measurement model for UE with its three indicators of *User Autonomy*, *Computer Self-efficacy*, and *Problem-solving and Decision Support*. Analysis of the measurement model for UE showed that the three factors of UE are not inter-correlated. The observed variables load on the factors in the following pattern: *Computer Self-efficacy*, *User Autonomy*, and *Problem-solving and Decision Support* load on one, and only one, factor i.e. UE. The errors of measurement associated with each observed variable (e1-e3) are uncorrelated.



**Figure 6-9 Measurement Model of User Empowerment**



**Figure 6-10 Measurement Model of Enterprise Systems success**

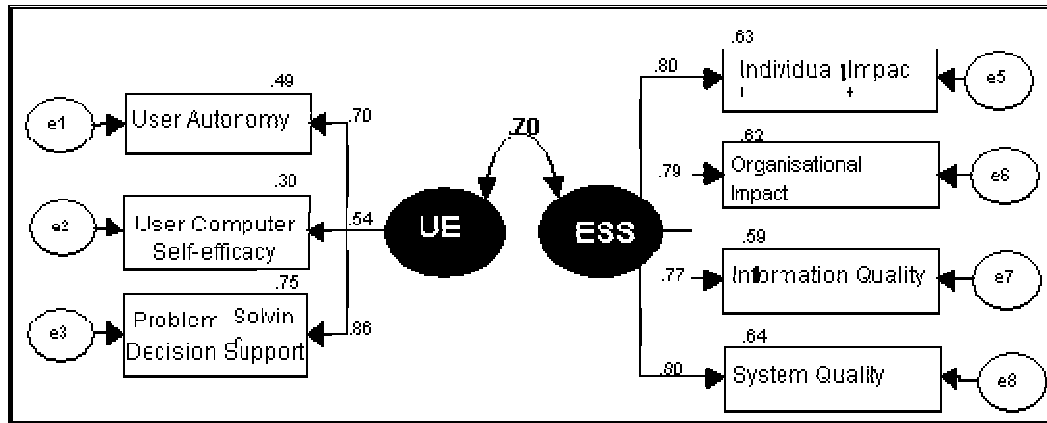
ESS construct consists of four indicators of *Individual Impact*, *Organisational Impact*, *Information Quality*, and *System Quality* refer Figure 6-10 above.

#### 6.5.4 Testing the Structural Models

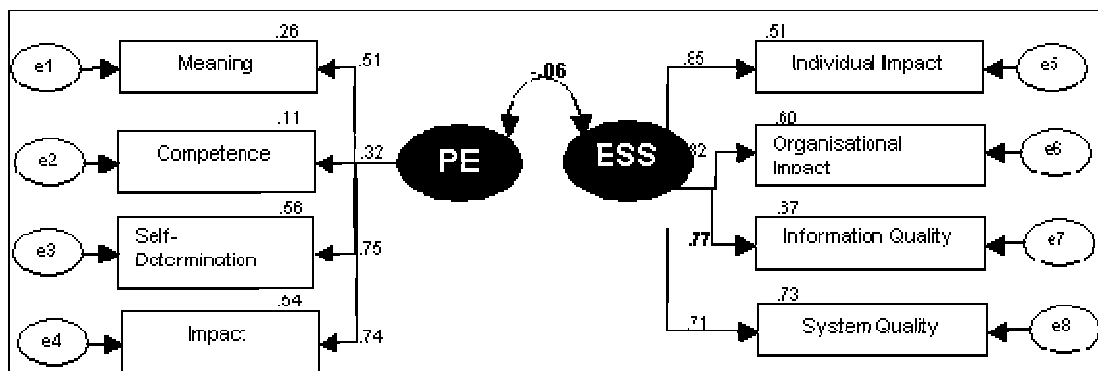
Testing the Structural model included: (i) testing the causal and correlational links among theoretical variables, as well as constituent paths, variances, and covariances; (ii) assessing model fit of competing models.

#### Correlations

To establish the relationship between Empowerment and ES success, a correlation matrix was developed. It is noteworthy that there is a positive correlation between UE and ESS refer to Figure 6-11 below, but no correlation between PE and ES success as illustrated in Figure 6-12 below.



**Figure 6-11 User Empowerment and Enterprise Systems success: Significant**



**Figure 6-12 PE and ESS: Negligible Correlations**

### ***Model Assessment***

There is no universal agreement for a ‘good fit’. The researcher sought to explore a meaningful pattern of loadings (and paths) to best reproduce the original covariance. In other words, the emphasis was on meaningfulness and was relative to the status of the theory, adequacy of the measures, and the representativeness of the sample. Model specification is the process by which the researcher assesses which effects were null, which were fixed to a constant (usually 1.0), and which vary. Model 1 and Model 2 displayed good fit, as measured by cluster of fit indices. Model 3 displayed poor fit, even after model respecification where the Modification Indices (MI) were analysed and the error values were adjusted for covariance. Table 6-16 below presents the fit statistics for path analyses’ predicting the UE and PE relationship to ESS.

**Table 6-16 Fit Statistics for Path Analyses (maximum likelihood estimation) <sup>1</sup>**

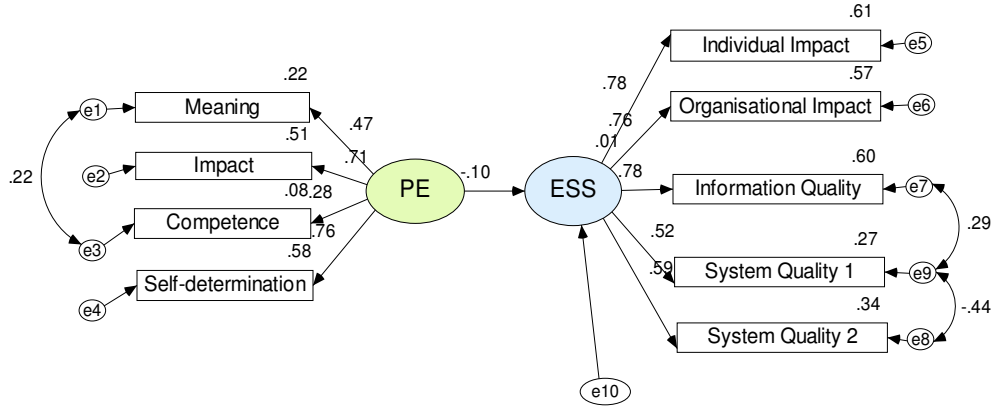
Specified Model	P	DF	CMIN	GFI	NFI Delta1	TLI rho2	CFI	RMSEA	RMR
Model 1: PE→ES success -.10									
Independence Model	.000	36	425.051	.584	.000	.000	.000	.266	18.955
Specified Model	.086	23	32.713	.953	.923	.961	.975	.053	4.310
Model 2: UE→ES success .86									
Independence Model	.000	0	552.137	.436	.000	.000	.000	.060	27.172
Specified Model	.071	16	24.939	.960	.955	.970	.983	.350	3.113
Model 3: PE→UE→ES success					PE--(.15)--UE--(.85)--ES success				
Independence Model	.000	66	766.146	.478	.000	.000	.000	.263	20.674
Specified Model	.000	48	139.160	.879	.818	.821	.870	.111	6.619
Model 3:UE→PE→ES success			UE--(.22)--PE---(-.26)---ES success			UE--(.93)---ES success			
Independence Model	.000	66	766.146	.478	.000	.000	.000	.263	20.674
Specified Model	.000	47	127.709	.887	.833	.838	.885	.106	5.983

One of the primary goals of SEM is to test the extent to which any hypothesised model “fits” or, in other words, adequately describes the sample data. Goodness of fit indices were analysed as the first logical step. The measurement models were individually adjusted on the basis of the modification indices (MI). The model estimates were recalculated with the relevant covariance drawn amongst the error terms of the specified model sub-constructs. The model data fit was concerned with the: (i) feasibility of the parameter estimates, (ii) appropriateness of standard errors, and (iii) statistical significance of the parameter estimates.

**Model 1:** The strength of the relationship between PE and ES success was weak, bearing a path coefficient of -.10 and a statistical non-significance at  $p > .001$  as seen in Model 1 Figure 6–13 below. Figure 6–13 below depicts related structural

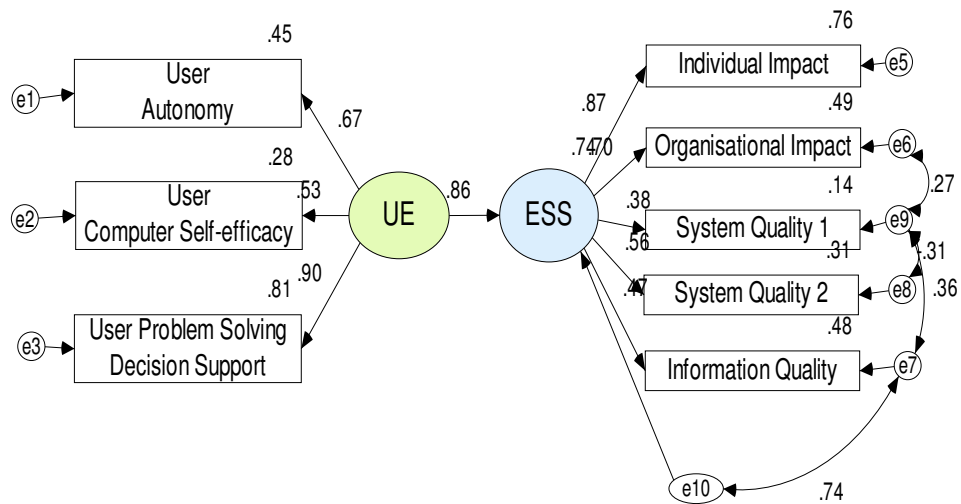
<sup>1</sup> PE= Psychological Empowerment; UE= User Empowerment; ES success = Enterprise System Success; P= P is the probability of getting as large a discrepancy as occurred with the present sample; DF= Degrees of Freedom; CMIN= CMIN is the minimum value; GFI= goodness of fit index; NFI = normed fit index; TLI = Tucker-Lewis index or non-normed fit index ( NNFI); CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardised root-mean-square residual.

model that provides further evidence to support the correlational model. In other words, PE was not an enabler of ES success as originally hypothesised.



**Figure 6–13 Model 1 Structural Model of PE and ES success**

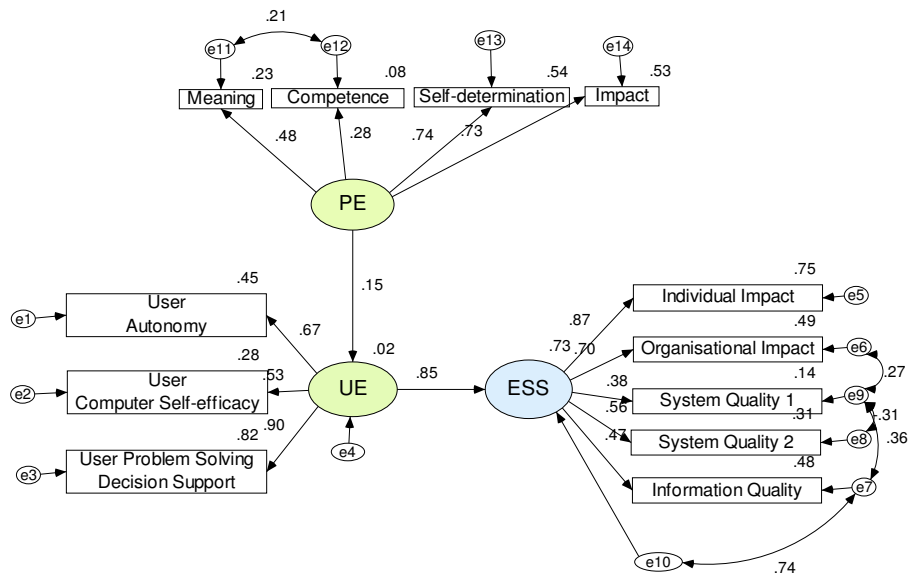
**Model 2:** The strength of the relationship between UE and ES success was strong with a path coefficient of  $-.86$  and statistical significance at  $p < .001$ , as seen in Model 2 Figure 6–14 below. The related structural model provided evidence to support the correlational model presented in Figure 6–12 earlier. In other words, UE was an enabler of ES success as originally proposed in the à priori research model and hypothesis. The TLI (Tucker & Lewis, 1973) was consistent with the other indexes noted in Table 1-16, above yielding  $TLI=0.97$ , being indicative of good fit (Hu & Bentler, 1999).



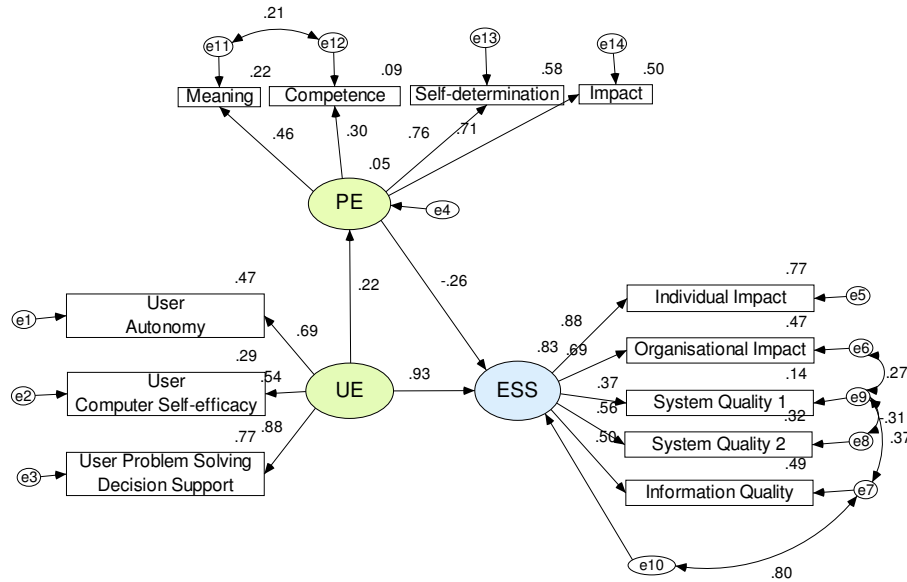
**Figure 6–14 Model 2 Structural Model of UE and ES success**

*Testing for potentially mediating effects*

Two alternative path models were tested, namely Model 3 and Model 4. The path coefficients between UE and ESS were strong, with a value of (.85). No evidence was seen for any mediating relationship between PE and ES success by UE (Model 3) or UE and ESS by PE (Model 4). Figure 6–15 below presents the structural model fit with UE mediating the PE and ES success relationship. This statistical output appears to be inconsistent with the theoretical argument that PE of individual workers is a potentially necessary ingredient to achieve increased work effectiveness and positive outcomes at work related to success. Figure 6–12 above further evidences the negligible correlation between PE and ESS (-.06).



**Figure 6–15 Model 3 UE as the Mediating Variable between UE and ESS**



**Figure 6–16 Model 4 PE as the Mediating Variable between UE and ESS**

The findings from the UE measurement model showed a different situation. The UE measurement model facilitated a new perspective that presented a potentially significant relationship to success and reports of increased work outcomes. The direct effect of UE on ES success was significant, with a factor score of .93. The direct effect of PE on ES success is -.26 and refutes the theoretical propositions. **Figure 6–16 indicates that UE and PE both have separate effects on ES success, and that UE has a significant relationship with ES success.**

As seen in the fit statistics and depicted in Model 3 and Model 4, even when PE was added to the model it did not weaken or remove the UE and ES success relationship. Significant paths between all 3 variables in Model 4, however, showed that UE was associated with ES success both directly as well as indirectly through PE.

## 6.6 Chapter Summary

This chapter presented the results of a rigorous scale development procedure followed to establish a reliable and valid instrument for measuring UE in an ES environment. The SEM results show that UE is an enabler of ES success. PE is not

an enabler of ES success nor does it have a mediating relationship with ES success. This is evidenced based on the model testing findings.

This chapter provided a discussion of the results of the scale development and validation for PE, UE, and ES success constructs. Each of the hypotheses in chapter 1 was also tested. These tests were rerun for selected segments of the data, to further the generalisability of the observations made, where no differences were observed. The chapter then depicted how these validated constructs have been applied for model testing. The UE instrument was tested and validated. The PE instrument and ES success instruments were re-tested with a new data set which provided justification and validity for the instrument and the goodness of the data-model fit.

Strong support was provided for valid and reliable measures for the theory-based conceptualisation and measure of PE. Equally strong support was provided for the theory-based and practically derived measure of UE.

The results suggest a ten-item instrument to measure three components of UE in an ES environment: *User Autonomy*, *User Computer Self-efficacy*, and *User's Problem-Solving and Decision support*.

In terms of the hypotheses regarding the relationship between PE and ES success, no empirical support was found at .10. Interestingly, highly supportive evidence was found regarding a relationship between UE and ES success. Further, there was absence of any mediating influences of UE on the PE and ES success relationship; and PE on the UE and ES success relationship.

Chapter 7, describes a case study as a confirmatory study undertaken in a new organisation which had a different ES (SAP R/3 modules) implemented.



# 7 Research Phase III: Case Study

## 7.1 Chapter Overview

The purpose of this chapter is to describe the exploratory case study that was conducted in a different industry sector using a different Enterprise System (multiple modules of SAP R/3). This case study set out to confirm the results of a clear set of hypotheses tested during the exploratory survey phase. As part of the multimethod approach, the case study method complemented the previous exploratory survey method and assisted further in understanding the relationship between User Empowerment and Enterprise Systems success. This case study represents the research phase III of the research design as illustrated Figure 7-1 below

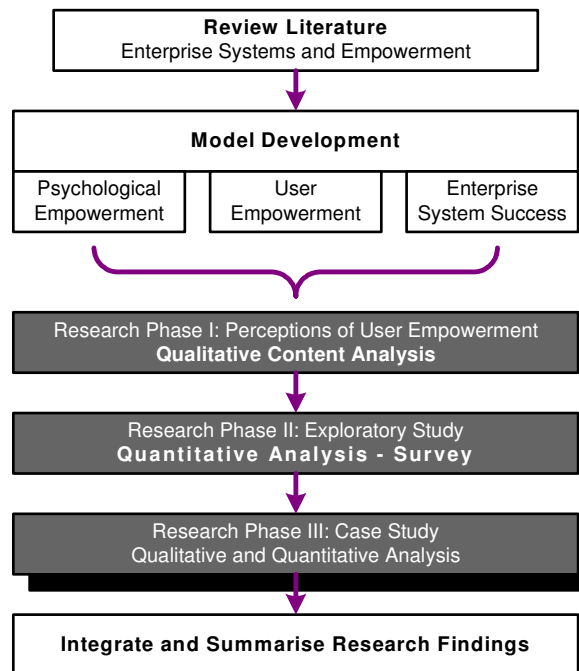


Figure 7-1 Research Design

Using the Empowerment scale validated during the phase II exploratory survey this revelatory case study sought to determine patterns between the phase II study and the current case study. The selected case organisation facilitated an excellent opportunity to study the User Empowerment and ES success relationship across the different cohorts of the employees.



**Figure 7–2 High-level Flow of this Case Study Chapter**

This chapter is structured as follows: Section 7.2 describes the nature of the case study,<sup>1</sup> Section 7.3 discusses the Case Selection, next the case study protocol design is explained, section 7.4 provides an overview of *The Food Company's* Case narrative, section 7.6 steps through the conduct of the case study including preparation, collection, and analysis of data, followed by the description of case study findings. The chapter concludes with cross-case findings from research phase I and research phase II. in Figure 7–2 illustrates the chapter structure above.

## **7.2 Nature of Case Study: Exploratory and Explanatory**

The main goals of the case study phase in relation to the overall study design were to confirm the findings from the à priori model derived from phase II<sup>2</sup>. These goals were:

- To revisit the constructs in the à priori User Empowerment model for relevance.
- To further analyse the hypothesis outcomes from phase II.
- To extract evidence from case study has been extracted and reused in the cross-case analysis to support triangulation of observations and provide further explanation. This mainly involved qualitative analysis to extract any patterns relating to management level, *Problem-solving and Decision Support* of enterprise users, and length of experience with the implemented Enterprise Systems.

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<sup>1</sup> Annual Report 2004 and 2005; Case study by the Change Management Organisation; and Press Releases.

<sup>2</sup> To recap the overall study design, refer section 3.3.4 and Figure 3.1

This case study included several “what” type of research questions which also justify an exploratory study. The investigative questions include:

- What is the pattern in the correlations between Enterprise Systems success construct in terms of:
  - Employment cohort; and
  - Geographical location.
- What is the reported level of User Empowerment across the selected levels of management i.e. senior managers, middle managers, operational staff, and end-users?

This case study also includes several “how” type of questions which justify the study as an explanatory one (R. Yin, 1994b). The investigative questions included:

- How do the employees rate the training on the implemented Enterprise Systems? Section 7.6.1 discusses the modifications to the survey instrument that discusses the need for the additional questions in the demographics section.
- How does the organisation evaluate the current Enterprise Systems in relation to the management of SAP R/3 the business as well as customer satisfaction?

The above question was measured by including two questions in the User Empowerment scale:

*“Overall SAP R/3 has improved the management of the business.”*

*“Overall SAP R/3 has improved customer satisfaction.”*

In discussion with the project sponsor it became apparent that, following the Enterprise Systems implementation (in 2001), the business received less customer complaints. However, due to the absence of any prior benchmarked data on the level of customer satisfaction it was difficult to make any conclusions about the level of customer satisfaction after the Enterprise Systems implementation.

Although the project sponsor was able to get a limited view from the respondents on both the questions above, it was useful to have included an overall question to assess whether the implemented Enterprise Systems improved the management of the business and improved customer satisfaction. Any further detailed discussion is out of scope of this case study.

### ***7.2.1 Unit of Analysis: Individual User of an Enterprise System***

This case study sought to further explain and support the two issues which are fundamental to the underlying purpose of this study i.e. examining the User Empowerment-Enterprise Systems success relationship. These two issues were to understand Enterprise Systems:

- The impact on users of the Enterprise Systems;
- In addition to the 'Individual Impact' items in the Enterprise Systems measurement scale, two additional questions were asked to measure the impact of the Enterprise Systems upon the users.

*“Overall the impact of SAP R/3 on my work has been positive” and;*

*“Please comment on how SAP R/3 impacts your work.”*

This second question was an open-ended free text question added towards the end of the questionnaire. Most respondents utilised this space to comment upon how they could improve their work or how they could enhance their effectiveness by suggesting improvements to the Enterprise Systems module they currently used. It is interesting to note that all respondents who provided comments to the second question undertook cross-module processes and required increased decision-making during their day-to-day job activities. Further details are discussed in Section 7.6.1 of this chapter.

The same survey instrument that was employed in phase II was again used in this case study. The instrument included Psychological Empowerment questions, validated User Empowerment questions, the validated Enterprise Systems success measurement questions, and additional questions that were part of the demographics. The questionnaire also included further open-ended questions in order to gain additional insights about both existing and new issues. Section 7.6.1 (page 7-21) describes the survey instrument design in detail. Based on the research phase II findings from the exploratory survey, it was expected that Psychological Empowerment would present either negligible or zero correlation with Enterprise Systems success and User Empowerment would present significant correlation with Enterprise Systems success.

### 7.3 Case Selection

The unit of analysis and the selection of case organisation are crucial factors in case study research. (R. Yin, 2003) suggests five possible units of analysis: individuals, decisions, programmes, implementation processes, and organisational change. The unit of analysis of this study was an individual. Hence, intense users of the Enterprise Systems were sought as candidate case study participants. The Food Company was chosen as the Case organisation for the following reasons:

- The Organisation had implemented multiple modules of SAP R/3 and the nominated participants were intensive high-end users of these modules;
- The implementation timeframe was ideal to measure the success of the system;
- the Enterprise Systems implemented in this case were different to the researcher's previous phase II of study;
- Senior Management were willing to participate in the study;
- Geographically diverse locations of the users; and
- Ready access to target participants assisted in the feasibility of the data collection phase.

The Food Company's sponsor was the Senior Manager leading the Enterprise Systems implementation under the Change Management Program in the organisation. The strong commitment of senior management, coupled with the 3-4 year post-implementation time lag provided a fertile ground to undertake this study. The case study design was significantly shaped by the sponsorship attached to the Enterprise Systems implementation.

This large organisation offered an opportunity to investigate the research questions in a suitably rich and diverse private sector setting. The remainder of this chapter and the thesis will refer interchangeably to 'the case organisation in phase III of the research design' as 'the organisation' and 'case organisation'. This section describes the following characteristics of the case organisation which provided the researcher with an ideal environment to undertake this case study i.e. [Access to Study Participants, Large User Base, Diverse User Base, and Enterprise Systems implementation timeframe.](#)

### ***7.3.1 Access to Study Participants***

The senior management kindly agreed to participate in the study and granted full access to the various business units of The Food Company's Head Office and Branch network. Being located in Australia, the organisation afforded convenient access to the researcher and presented a viable opportunity for data collection.

In order to yield maximum benefits as the participating organisation, the Change Manager and the researcher agreed upon the necessary resource commitment. The documents and reports that the sponsor deemed appropriate (e.g. company annual reports and external case studies conducted on the case organisation) were also provided upon request.

The project sponsor acknowledged that it was easy to evaluate the implementation costs such as software licences and training whereas other costs such as the productivity dip and end-user resistance were difficult to measure. This strongly echoes the views of Murphy and Simon (Murphy and Simon 2002b) who concluded similar findings from their study.

The benefits of participation, and other related matters of administrative support during data collection etc., were communicated to the study sponsor (Benbasat, Goldstein, & Mead, 1987). The confidentiality, ethical issues, overall sampling procedures, and the data collection procedures were discussed with the study sponsor during subsequent correspondence. A summary of these documents was, in turn, communicated to the wider audience of this study (study participants, experts). Tailored documentation was utilised for communication with the Project Sponsor and Study Participants. These documents were ethical clearance documents, overall case procedural guidelines, introductory study abstracts, case narratives, and reports.

### ***7.3.2 Large Enterprise Systems User Base***

The organisation was a large business and one of sufficient size to allow access to expert Information Systems users who had worked across a varied level of SAP R/3 modules. The staff members working in each of these Business Units were spread across the various manufacturing Plants and the Head Office. There were four types of employee cohorts included in the target sample. These were senior

managers; middle managers; operational staff; and end users. The majority of the respondents were intense high-end functional users.

A majority of the operational staff within the organisation were based in farming, dairy production/collection, manufacturing, and processing of food products. Thus, a large percentage of these operational staff used the various equipment and machinery in the manufacturing units extensively and had very limited use of the SAP R/3 system in their daily job activities. However in the Head Office and other processing Plants, approximately 200 employees were identified as intense users of the SAP R/3 system. Some of the senior managers needed to use all implemented modules of the SAP R/3 system. These senior managers were mostly situated in the corporate head office of the organisation. Thus, the organisation provided an ideal user base to conduct this case study.

The Food Company's Project sponsor was keen to participate in this study on the condition that a representative set of intense and expert users must be included in the data collection. These experienced and intense users were included because these nominated users were leading the ongoing Change Management program within their respective business units across the organisation. The selection criteria for including intense Enterprise Systems users yielded a smaller sample of respondents as compared to the research phase II survey. This is discussed as a potential limitation of the case study is discussed further 7.6.

### ***7.3.3 Geographically Diverse User Base***

The Food Company was a geographically diverse organisation with several regional locations and a central Head Office. The Head Office itself employed over 400 staff. Across these diverse geographical locations several business units existed, which offered a degree of segregation and functional departmentalism for study.

The organisation had performed well nationally and had recently moved into the global market. This growth led the organisation to develop strategic alliances with a focus on mutually beneficial relationships with suppliers and customers. In order to meet the objective of streamlining its supply chain and to keep up with the organisation's growth into global operations the organisation invested in an Enterprise System. The case organisation embraced new technologies to provide innovative solutions for its customer base. This is supported by the quote that

supports that the organisation embraced new technologies and new approaches to supply chain as shown below:

*The Case Organisation has recognised that it must also secure its future through strategic investment in the supply chain. The supply chain includes the development of strategic alliances with a focus on mutually beneficial trading relationships, embracing providers of services and products as important inputs to its business-nationally and internationally. Source: Undisclosed*

Such diversity offered an opportunity to study any potential User Empowerment and Enterprise Systems success variances across geographic boundaries and organisational structural entities (business units).

#### **7.3.4 Timeframe for Data Collection: Post-implementation**

The organisation completed its second phase of SAP R/3 implementation in 2002. The data was collected in July 2005 which represented a sufficient amount of time from Go-Live phase. This was one of the criteria which further supported the selection of this organisation in the case study research phase III. Table 7-1 below presents the SAP R/3 modules that were implemented to support all five (5) business units within the organisation.

**Table 7-1 SAP R/3 Modules implemented in Case Organisation**

No.	SAP R/3 Module Name	Year implemented
29.	SAP Financials FI-CO	2001
30.	Sales & Distribution (SD)	2001
31.	Plant Maintenance (PM)	2002
32.	Materials Management (MM)	2002
33.	Production Planning PP-PI (Production Planning for the Process Industry)	2002

The Case organisation met the case selection criteria and provided the researcher with an ideal opportunity to undertake the case study research phase III. The following section describes the case study Protocol design, followed by the Case narrative and conduct of the case study.



## 7.4 Case Study Protocol Design

The starting point in this case study was the development of a case study protocol. A case study protocol is a set of rules that were developed in order to execute the case study in a systematic way. Yin (Yin, 1994b) emphasises that there is more to a protocol than the instrument. Yin argues that the protocol consists of the following:

- Project objectives and case study issues;
- Field Procedures;
- Questions to be kept in mind during data collection;
- Guide for the report.

The next four sub-sections describe each of the above case study protocol components.

### ***7.4.1 Case Study Objectives and Case Organisation's Objectives: an Overview***

A detailed overview of this case study project was developed jointly with The Food Company's Project Sponsor, a fellow researcher involved in the parent Organisational Readiness Program of Research, and the research supervisor Associate Professor Glenn Stewart. The key objective for each part of the case study, along with the benefits for the participating case organisation was presented to The Food Company's prospective Project Sponsor<sup>3</sup>. Appendix 17 and appendix 18 provides the case study participation proposal and case study protocol to the project sponsor. At the time of data collection (in February 2005), the organisation was in the early stages of identifying the feasibility for an upgrade to SAP Version 4.6. They were interested in participating in this case study with the objectives of:

- Receiving benchmark data on the Enterprise Systems implemented at The Food Company; and
- Identifying business improvements from the feedback received.

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<sup>3</sup> From this point onwards The Food Company's Project Sponsor will be referred to as the 'Project Sponsor'.

Since this case study was embedded within the Change Management Program the case study objectives from the Change Management Program's perspective were to assess:

- The reports on the current SAP R/3 system use.
- The perceptions of the effectiveness of the system to meet higher order decision-making.
- As employees in the target sample were those leading the Change Program in their respective operational areas and were those classified as intense and high-end cross module users of the SAP R/3 system, an additional objective was to assess the impact of the Enterprise Systems on these high-end users.

The case study objectives of the research are listed below:

- to assess the level of User Empowerment, Psychological Empowerment, and Enterprise Systems success of the case organisation, and
- To assess the state of the Organisational Culture since the Enterprise Systems was implemented – part of a separate doctoral study by another researcher.

Thus the researcher's case study objectives and the organisation's Change program objectives achieved a good fit. This development of a general analytic strategy for the case study guided the decision regarding the outcome objectives and for the relevant variables to be analysed accordingly. Yin (Yin, 1994b) suggested three types of analytic techniques: (i) exploratory pattern-matching<sup>4</sup>, (ii) explanation-building, and (iii) time-series analysis. In line with the objectives of this study, pattern-matching<sup>5</sup> and explanation-building were the two key analytic techniques employed in this case study.

#### **7.4.2 Field Procedures**

The Case study project sponsor attended a special-interest group session organised as part of the SAP Users Group 25<sup>th</sup> plenary held in March 2004. A set of field procedures were agreed upon, based on the objectives of the ongoing Change Management Program as listed in section 7.4.1. The project sponsor agreed to take

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<sup>4</sup> Pattern matching technique compares an empirically based pattern with a predicted one and in general, high internal reliability is evidenced with the existence of matching patterns (Trochim 1989).

<sup>5</sup> Explanation-building is another form of pattern-matching, in which the analysis of the case study is carried out by building an explanation of the case.

up an active role in organising resources and to facilitate access to sites for data collection across each geographical location. Since the survey method was the primary source of data collection, the need for detailed field procedures was limited.

### ***Sampling Procedures***

The survey participants were selected based on the following criteria. These criteria are over and above the requirements listed for the representativeness of the sample frame.

- The Enterprise Systems was implemented over a period of 2001-2002 and this study was undertaken in early 2005. The study participants were therefore required to have worked with the Enterprise Systems since implementation i.e. 3-4 years post go-live;
- In line with one of the objectives of the Change Management Program it was required that the employees with higher order decision-making commented on the Enterprise Systems and its outputs.

Thus the study participants were required to be a middle to senior level position in the organisation so that they were able to comment on the Enterprise Systems and its outputs. These elements (experience, time with the organisation) ensured that the participants had the necessary experience to provide meaningful answers to the research questions raised in the protocol. However, these elements reduced the number of possible participants within the organisation. The representativeness of the target sample was judged on the user's level of intensity in terms of day-to-day use of the Enterprise Systems; tenure; and their authority to comment on the Enterprise Systems implementation. The researcher acknowledges that this latter aspect is one that may be argued could have contributed to a biased sample. However, this decision was beyond the control of the researcher and is recognised as a limitation in this study (section 7.6).

### ***Data Collection and Administration of Survey***

A nominated administrator was recruited for the 3 weeks of the data collection timeframes. The project sponsor supplied a list of those staff members who suited the selection criteria to each administrator across the locations, except for Head Office staff where the data collection was facilitated by the project sponsor himself. The location administrators were responsible for distributing the paper

copies of the questionnaire and a set of blank unmarked envelopes to each of the staff member who was on the list.

In order to preserve the confidentiality and anonymity of responses a double envelope approach was adopted – similar to the one employed in the phase II. Appendix 17 describes this double envelope approach in detail. At the end of the data collection period all the sealed envelopes were collected and mailed to the research team for data entry and analysis. A couple of respondents, who were away during the data collection period and so were unable to submit in time, directly faxed their responses to the research team.

### ***7.4.3 Questions that the investigator must keep in mind during data collection***

Interviews are the most common source of case study information. However, in this case study, the interview source was limited to the Organisational Culture Assessment part of the study. In case of the User Empowerment Study, survey was the primary source of data collection. The key considerations during data collection are listed below:

- to ensure that the selection criteria were met;
- to follow the sampling procedure;
- to demonstrate proactive communication with the study sponsor.

### ***7.4.4 Guide for the report***

The case study protocol included an outline of the format for the case narrative as well as a detailed list of the protocol content. Appendix 16 presents the Protocol Content list derived prior to commencing the case study.

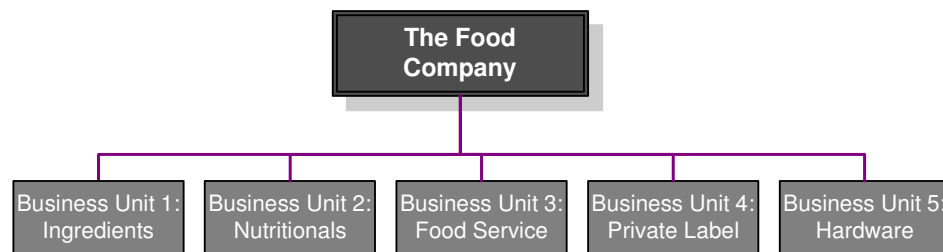
The selected Case organisation fulfilled the key criteria which evidence its suitability for inclusion into this case study enabling investigation into the User Empowerment-Enterprise Systems success relationship within a Private Sector organisation. An in-depth understanding of the organisational characteristics helped the researcher to limit the scope and the type of analyses. The next Section provides an overview of *The Food Company*.

## 7.5 Case Narrative: Overview of the Case Organisation

The Australian dairy industry employs around 100,000 people through activities such as farming, farming services, manufacturing, research, and transport, mostly in regional areas. The Food Company is one of the leading players in the global dairy industry, and a major employer in the regional areas. The Food Company was founded in the mid 1990's has subsequently grown to become a significant player in the Asia-Pacific region. This is demonstrated by its ranking in the top 10 of all regional producers.

*The Food Company* sources its raw food products direct from independent farmers who work in a cooperative. The milk is collected by special purpose trucks, which take the food to the regional processing plants. These Processing Plants undertake the following production tasks and then transport to distribution centres. The Food Company has a number of processing plants which processes quality products, which are sold on both domestic and export markets. The main export products include dry groceries, dairy, and other food products across the globe.

The manufacturing plants of *The Food Company* are geographically dispersed across Australia. Each retail line is classified as a Business Unit. Figure 7–3 below presents these five (5) Business Units within the organisation.



**Figure 7–3 Business Units of the Food Company**

The Project Stakeholders included in this case study ranged from administrators, production process owners, project sponsor, planners, logistic experts, sales personnel, and finance personnel. In order to capture the range of perspectives, different stakeholders were included in the data gathering (following (Seddon et al., 1999)).

### ***7.5.1 Emerging Business Needs and Information Systems' Landscape***

The enthusiastic adaptation of technology allowed *The Food Company* to simplify its business and generate major growth in export volumes with minimal additional cost. Comments by one of the middle managers support this claim. When asked about the ES the middle manager reported that “the accuracy of transactions has been substantially enhanced and repetitive work eliminated which adds to the efficiencies already gained.”

Prior to the SAP R/3 Enterprise Systems implementation the organisation relied upon multiple Information Systems of which some were developed in-house, together with packaged type applications. In 1999 the organisation implemented EDIsoft integrated Information Systems. EDIsoft is an Electronic-Data-Interchange (EDI) electronic-commerce software that provides integration with other systems in an organisation. The purpose of EDIsoft was to harmonise some of the key export shipping documentation procedures by adopting a common processing methodology in the rapidly changing electronic environment. As a large exporter of dairy products the case organisation used many shipping companies world-wide and was thus required to interface with other Information Systems internationally.

With the growth and diversification of the business there was an emerging need to improve the organisation's e-commerce capability and to have a single view of all suppliers and customers. In 2001 the organisation decided in favour of implementing SAP's R/3 Enterprise Systems – the world's leading Enterprise Systems vendor. The organisation rolled out SAP Financials and Sales and Distribution modules in its first phase in 2002. This was followed by Materials Management, Production Planning, and Plant Maintenance modules which were implemented as part of phase Two in 2003. The key business objectives implementing an Enterprise Systems, as described by the project sponsor during an SAP User's Group Session in March 2004, are listed below:

- to enhance the organisation's ability to use e-commerce to trade with its customers and suppliers;
- to integrate its logistics; and
- to streamline its supply chain.

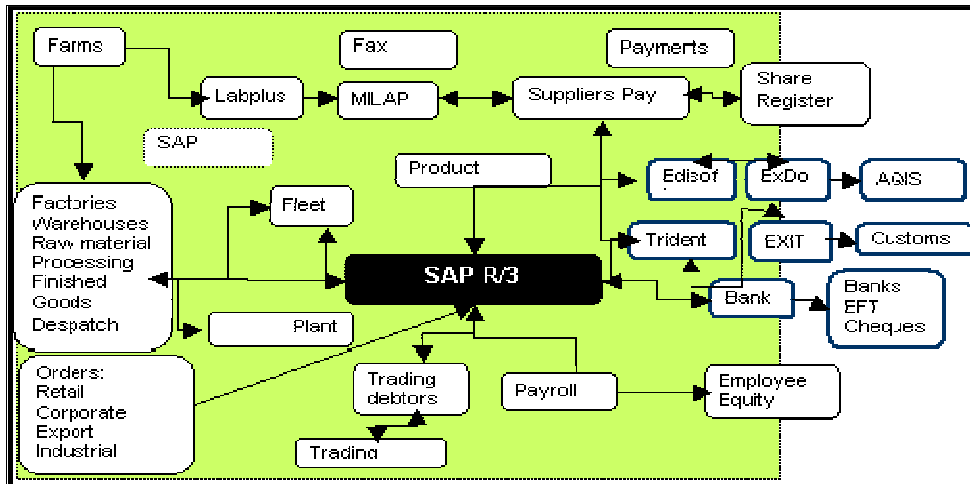
The case organisation required other applications for international trade. One of them was TridentGlobal, which was chosen to interface with the organisation's

SAP R/3 and business-2-business partners such as: customers, Banks, Customs, Quarantine, and Shipping organisations and other customers. In particular, TridentGlobal interfaced with the Quarantine and Inspection Service and the Customs Service. The Customs electronic clearance and reporting system for exports is called EXIT (Export Integration). EXIT enhances the ability of Customs to monitor high risk exports without impeding the majority of exports; and provides timely export information to the Bureau of Statistics and the Taxation Office; a mandatory process which would otherwise be a time-consuming and expensive exercise for the organisation.

In addition to EDIsoft, SAP R/3, and TridentGlobal, the organisation also implemented an Electronic Export Documentation System (ExDoc) in the mid nineties. The purpose of this system was to simplify communication and expedite the processing of export related documentation. Over a period of approximately four years the organisation's Information Systems environment expanded to include multiple application systems that catered for the need to expand in the areas of: electronic commerce, improve logistics, effective distribution, and improve integration with the relevant trading partners. To this effect a senior manager commented that:

*“The existing IS landscape provides the company control of its inventory and ensures that the quality of product is maintained by ensuring an environment for storage which sets new levels of excellence in logistics and Supply Chain Management.” Source: A Senior Executive*

Figure 7–4 below presents the Information Systems overview illustrating the linkages of the various applications and systems to the SAP R/3 Enterprise Systems as well as external alliances such as the organisation's suppliers and regulatory organisations. The purpose of this illustration is to provide a snapshot of the multiple Business applications that existed in the organisation at the time. Each new application which integrated with the existing systems added to the overall complexity of the work environment of the users.



**Figure 7-4 Overview of the SAP R/3 Integration with Other Business Application Systems (Source: undisclosed)**

In early 2003 the organisation embarked on a Change Management Program to deliver Training Development and Communication work for their SAP implementation. This Program of work was outsourced to a consultancy firm who specialised in training development. All staff members who required access to the Enterprise Systems were provided generic training on the implemented Enterprise Systems. Any further details on the training program were unknown to the researcher.

## 7.6 Conducting the Case Study

This section describes the conduct of the case study which follows the second stage of the Case Method prescribed by Yin (Yin, 1994b). This stage included three key tasks following Yin's recommendation, which is below:

- Preparation for Data Collection;
- Distribution of the Questionnaire; and
- Conducting Interviews.

These tasks are described in the subsequent sub-sections together as they are interrelated. The following excerpt from Yin's book, is quoted to emphasise the relevance of the first task in the conduct of the case study i.e. preparation for data collection.

*"Data collection should be treated as a design issue that will enhance the construct and internal validity of the study, as well as the external validity and reliability".*



*Source: (Yin, 1994b) (p.64).*

The construct validity and reliability was enhanced in this case study by utilising multiple sources of evidence, creating a case study database, and maintaining a chain of evidence. In general it is good to use multiple sources of evidence (Yin 1994) to triangulate the findings. Yin (1994) prescribes the following six (6) sources of evidence depending on the situation: (i) documentation, (ii) archival records, (iii) interviews, (iv) direct observation, (v) participant observation, and (vi) physical artefacts. The survey data source is deemed similar to an interview source of evidence.

The survey participants were remotely located and the study's intent was to confirm the findings from the previous research phase II. Thus, specific information was sought – this information could be sourced through survey, documentation and archival records. There was no need for direct or/and participant observation as the Sponsor provided existing artefacts relevant to the project objectives. These three (3) sources of evidence employed in this case study – documentation, archival records, and survey are described next.

### ***Documentation***

Documentation as a source of evidence was included because it is stable i.e. it offers the ability to undertake a repeated review; it was unobtrusive and existed prior to this case study; and it had broad coverage in terms of time span. The types of documents utilised in this study were:

1. Organisational Chart: to understand the organisational structure along with Business Units and locations.
2. Annual reports (2003, 2004, and 2005):
  - to analyse the business growth, and
  - to triangulate findings from other sources of evidence.
3. Description of product lines: to understand the emerging business needs.
4. Information Systems landscape of The Food Company to understand:
  - the various applications that were required to integrate with the Enterprise Systems,
  - the level of complexity such an Information Systems landscape presents to its users, and

- A large consultancy case study report on their Document Management System.
- 5. A case study from the food-processing sector to gather any benchmark data about the: case organisation, and its competitors.
- 6. Information on the Export Distribution Centre in one of the locations (the name of the location is kept anonymous).

### ***Archival Records***

The archived records utilised in this study presented similar advantages to the documentation, already mentioned, with the addition of two additional strengths i.e. preciseness and quantitiveness. Some of the archival records were in the form of media and press releases (only those press releases which were relevant to Enterprise Systems and Enterprise Systems implementation were included in the final review). The validity of the documents and archival records was carefully reviewed so as to avoid inclusion of incorrect data evidence in the analysis. The information gathered from the archival records and the relevant publications corroborated evidence gathered from other sources of documentation provided by the project sponsor.

### ***Survey***

Survey was the third main source of evidence gathered from the case organisation. The questionnaire developed for phase II of research design was modified to suit the assessment needs of the case organisation and the case selection criteria of the overall research. The modifications in the questionnaire reflected both the current Case organisation and the Enterprise Systems context under investigation. The modified instrument was piloted on a group of research colleagues within the research centre. This modified survey instrument was then sent to the Project sponsor for review and feedback. The survey instrument was modified with additional demographical questions to tap into details of the Enterprise Systems users and revised layout for ease of response. The survey still assessed Psychological Empowerment, User Empowerment and Enterprise Systems success as in the revelatory case study, here the only changes made to stem construction was to specify the type of Enterprise System in use. The need to gather more demographic data was of particular importance, in order to attain the desired research and organisational goals. The demographic data collected is summarised below in

Section 7.6.1. The survey data obtained met the original criteria requirements, which illustrated the representativeness of the sample frame in this study. These criteria are listed below:

- All users intensely use the system and work with at least two modules of the implemented SAP R/3 system as part of their daily-job-activities.
- All users have received some level of formal training.
- The users must have experienced at least two (2) major implementation or Enterprise Systems upgrades during their tenure with the case organisation.

### ***7.6.1 Revised Survey Instrument Design***

The new User Empowerment questionnaire was appropriately modified to meet the objectives of the case organisation. A 7-point Likert scale was utilised in the survey instrument. An expanded set of demographical questions were included in this round of data collection. The data collection procedures were based on the ethical clearance received for the research study. Please refer to Appendix 13 for the revised questionnaire and Appendix 12 for the ethical clearance certificate. The next section presents a discussion on the revised survey instrument.

The respondent demographics were included at the start of the survey sections. The individual question labels are listed below in Table 7-2 in the same order as in the survey instrument.

**Table 7-2 Demographic Section of Survey Instrument: Description of Items**

Question Label <Purpose of the Question>
Business Unit
This question provided a high-level comparison of the business units to the Project sponsor. In relation to the goals of the User Empowerment study such a breakdown has provided an opportunity to analyse and report on any variances across the Business Units.
Geographic Location
This question was captured in order to seek any patterns between the branch/head office Enterprise Systems users.
Role
This question captured the role types that were grouped based on the employment cohort category listed (Anthony, 1965); such a categorisation of employment cohorts was followed in order to parse the data along lines of their role type.
Length of Service
This question requested the length of service within the organisation and was required to be answered in terms of number of years. This assisted in understanding the variances in experience and User Empowerment and Enterprise Systems success based on their tenure with the organisation
Education
This question was aimed to capture the level of education. This question was retained from the previous instrument. Data was collected to identify the exact Enterprise Systems Module that the respondent was reporting upon i.e. all SAP R/3 modules or just a selection of the various modules (All, MM, SD, PP-PI, PM, FI-CO) in their day to day role. Individual modules were listed to parse the data along lines of module type where all users worked with at least more than one module.
Enterprise Systems Module Use Type
This question was formatted for respondents to name the module(s) they used along with the frequency of use. The first response that they could select was 'ALL' when listing the modules used. This was done in order to increase the ease of response for the respondent so that they do not have to mark each module individually. This further reduced the total time taken to complete the survey. The frequency of use ranged from 'less than once per day' to 'most of the time'. Appendix 13 presents the demographical questions and the Questions on Training and Experience of the SAP R/3 system. In addition to which modules were used, data was also collected as to how well the functional users rated the use of the SAP R/3 system.
Training
<p>This question was composed of two parts: i) Part One requested the respondent to simply answer whether he/she had received a formal training on the SAP R/3 Enterprise Systems, ii) Part Two was an extension to the first and was intended to understand the respondent's view on the relevance of the formal training received (or not). Figure 8 below provides a screenshot for reference.</p> <p>It is well established in academic literature and business press that training is a critical component of any new software implementation. The project sponsor expressed their willingness to assess: (i) whether the staff undertook training on the implemented Enterprise Systems; and (ii) whether the training was relevant to their current job.</p> <p>Thus, the demographical data in this case study's survey included two questions relating to training. In addition to the Project Sponsor's requirement, one of the findings from the phase II survey related to the need for targeted training in organisations. This need of Enterprise Systems users was revealed from the rich textual comments provided in the questionnaire. Based on the feedback received from the respondents in research phase II additional training related questions were included in the demographics section of the instrument in this case study.</p>
Experience of the System
Finally, the last modification to the demographics section sought to confirm whether the target sample rated their experience of the Enterprise Systems as that of an expert user or not. By including this question, the researcher aimed to confirm whether the target sample perceived the same about their level of expertise in the Enterprise Systems (or not). Figure 5 below provides a screenshot for reference.

*Format and Layout of Sections*

Organizational Chart

<COMPANY NAME REMOVED TO PRESERVE CONFIDENTIALITY> ORGANISATIONAL UNITS

Please tick which unit you currently work within. e.g. Business Unit

Executive

Operations

Export

Shipping & Export Logistics

Finance

Sales & Marketing

R&D Quality Services

IT

**Question 1: BUSINESS UNIT-**  
A schematic of the Organisational Chart was included to provide a quick and easy graphical layout for the respondents to select their business unit.

Please indicate where you are geographically located

Location 1	Location 5
Location 2	Location 6
Location 3	Location 7
Location 4	Head Office

**Question 2: LOCATION -**  
The respondents were required to select their geographical location in order to profile the respondents based on their location.

**Current Role**  
In this business sub unit are you a....

Strategic/Senior Manager <input type="checkbox"/>	Middle Manager <input type="checkbox"/>
---	---

**Question 3: CURRENT ROLE-**  
This question captures the respondent's current role within the business unit and provided 4 options. These options were: Strategic/Senior Manager, Middle Manager, Operational Staff, and other staff. The respondents were instructed to tick one checkbox to make a selection.

**Business Sub Unit**  
In 1 or 2 sentences please describe your role in this business sub unit.

**Question 4: BUSINESS SUB-UNIT**  
This question was an open-ended paragraph style question. This question provided the respondent with an opportunity to describe their role within their business unit in further detail.

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**Figure 7–5 Revised Demographical Section Snapshot to Illustrate the Layout Design**

Section A relates to the Organisational Culture (part of another doctoral research project within the parent Organisational Readiness for Enterprise Systems success Program of research). This is not in scope of this research study.

Section B<sup>1</sup> relates to the SAP R/3 System, which was identical to the one utilised in the phase I exploratory survey with the exception of one additional category. This category was labelled ‘Satisfaction’ and consisted of one (1) single item (question). This item was measured on an agreement scale and aimed to assess whether ‘Satisfaction’ was a subjective evaluation of the various consequences of SAP R/3. Figure 7–5 above provides a screenshot for reference.

		<i>Strongly Disagree</i>		<i>Neutral</i>	<i>Strongly Agree</i>			
		1	2	3	4	5	6	7
1	I have learnt much through the presence of SAP R/3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	SAP R/3 enhances my awareness and recall of job related information.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Figure 7–6 Section B: Enterprise Systems success Instrument**

Section B relates to the SAP R/3 System, which was identical to the one utilised in phase I exploratory survey with the exception of one additional category. This category was labelled ‘Satisfaction’ and consisted of one single item (question). This item was measured on an agreement scale and aimed to assess whether ‘Satisfaction’ was a subjective evaluation of the various consequences of SAP R/3. Figure 7–6 above provides a screenshot for reference.

Section C relates to the SAP R/3 User Empowerment. Figure 7–7 below provides the screenshot, with a brief description to the second C. The Psychological Empowerment questions were followed by the User Empowerment questions, which was similar to the previous round of survey. However, some additional questions were added as part of revision to the User Empowerment scale.

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<sup>1</sup> The original ES success measurement instrument validated by Gable et al (2003) consists of one item (question) that relates to e-commerce. This item was excluded at the exploratory survey phase II since the target organisation did not use any electronic commerce component of the ES. However, this particular item has been included in this case study survey instrument since the case organisation employed a number of electronic systems which integrated with the implemented SAP R/3 ES.

		SAP/R3 User						
<b>Section C: SAP R/3 User Empowerment</b>								
<i>In this section, we seek to learn from your own experiences and perceptions of SAP R/3 in your Business Unit at Murray Goulburn. We are measuring how the system affects you and your work and the way in which you use and relate to the system.</i>		Strongly	Neutral			Strongly		
		Disagree				Agree		
		1	2	3	4	5	6	7
1.	The work I do is meaningful to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Figure 7–7 Section C: Psychological and User Empowerment Questionnaire**

Inclusion of additional items in Section C

Items 23 through to item 32 were added with the intention to measure how the system affected these users, their work, and the way in which these users related to the system. These questions represent the additional research sub-question which was conceived on the basis of the findings from the exploratory survey. The related finding was that the construct for User Empowerment was different from the construct of Enterprise Systems success, and that User Empowerment loaded most significantly on individual impact, as predicted by the literature review and as perceived by researchers and Information Systems practitioners. Thus additional item (s) were added in the case study survey to check for an opposite path direction i.e. in what ways does Enterprise Systems affect its users. All the items were worded in a positive tone as before.

Item 32 seeks to measure the impact of the Enterprise Systems upon work on an overall basis similar to the approach adopted in the original Enterprise Systems success instrument.

*“... the impact of target system Name on my work has been positive.”*

Items 31 and 32 aligned more closely with the broader level business benefits characterised by a set of positive outcomes, generally to be achieved over a period of time.

*“... SAP R/3 has improved the management of the business.”*

*“... SAP R/3 has improved customer satisfaction.”*

This was followed by three open-ended questions positioned to gather any additional comments/information that the respondents wished to include.

*“Please comment on how comfortable you feel in using SAP R/3.”*

The first question essentially extended the demographical question from the exploratory survey; this question on the Experience of System. The term comfortable relates to the user's perception of the Enterprise Systems installed and relates to their level of confidence and competence to undertake daily tasks as well as learn new tasks if required.

*"Please comment on how SAP R/3 impacts your work"*

The inclusion of this open-ended question has been beneficial in gaining rich textual descriptions which enabled increased understanding of the level of: (i) complexity faced by users; (ii) and job-activities that users undertake using multiple modules.

This second open-ended question was placed strategically just below the question which seeks the user's level of experience and nature of complex job-activities undertaken. Again, the key objective was to provide another opportunity for the respondent to comment on the impact upon their work other than the ones listed in items 23 through to item 32.

*"Any other comments you wish to make"*

Finally, the questionnaire concluded with the third open-ended question. This question requested the respondent to comment on design, layout, or general format of the questionnaire. Some of the respondents have used this space to express a concern which they felt strongly about. Such comments do not have a direct linkage to the objectives of this study. However, the researcher utilised such comments to draw any plausible logical linkages and recorded separately to analyse at a later stage. The next sub-section describes the preparation of data for analyses.

### ***7.6.2 Preparation for Data Analysis***

The database structure was set up in SPSS and MS excel as described previously in chapter 5. The data was keyed into the MS excel spreadsheet by another fellow researcher who was undertaking the research on the cultural aspect of the case organisation. Once the data file was set up, the data was checked for validity within the given parameters. This second level check for the accuracy of data entries into the database was conducted by the researcher. Once the data set was cleaned and checked, it was saved, locked and kept in its original state. This is followed by the



coding of qualitative data received as part of the open-ended questions. These open-ended questions<sup>2</sup> were mainly focused on the impact of the Enterprise Systems upon their work and requested suggestions for improving their effectiveness at work. The analyses included in the next section pertain to the original research questions of the research.

### ***7.6.3 Case Study Analysis and Findings***

Twenty four valid responses were received out of the total 35 that were distributed in the case organisation. The response rate was approximately 68.6 percent. The purpose of the case study was to confirm some key findings from the User Empowerment measurement model which was first validated in the research phase II in a different organisation and different Enterprise Systems. The other main objective of undertaking the analysis was to refine the User Empowerment construct. (Eisenhardt, 1989) advocates a two step process to refine constructs. Based on this two step process this research first refined the definition which better explained the User Empowerment construct; secondly this research sought for verification that the emergent relationships between constructs (User Empowerment and Enterprise Systems success) existed. During both these steps the qualitative data was utilised to support the quantitative findings of the overall research.

Enterprise Systems success showed significant correlation with two of the User Empowerment sub-constructs. Rather than presenting an item-by-item description it was preferred to present results in ordered themes. These ordered themes allowed observing pattern matching in the responses. The following section describes the ordered themes based on: Geographical locations of sites, Business Units of the Case organisation, employment cohorts, level of training, and relationship between Enterprise Systems success and User Empowerment. The subsequent sections present the descriptive statistical analysis related to the case study survey. The discussion of case study findings are organised to support three basic goals.

- First, the characteristics of the sample are presented;

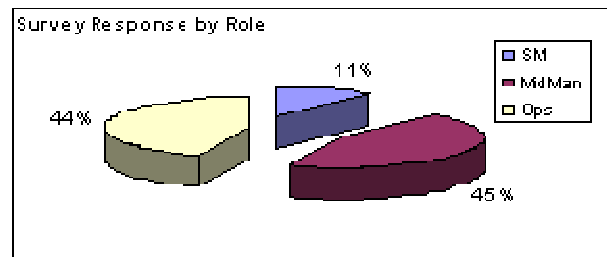
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<sup>2</sup> “Please comment on how SAP R/3 impacts your work?” “What improvements would you suggest to the SAP R/3 system in order to make you more effective in your work?” “Any other comments you wish to make...”

- Second, the data is submitted to a range of tests to justify its suitability for the statistical tests that were conducted for construct validation and model testing (presented in chapter 6 - correlation analysis); and
- Third, the final section presents some general observations that were made in relation to the descriptive data that was gathered from this study.

### ***Characteristics of the Study Sample***

As discussed earlier, the unit of analysis of this study was ‘an individual user of the Enterprise Systems’. In order to characterise the sample, this section describes characteristics of the individual respondents, as well as the response rate based on individual geographical units they belonged to.



**Figure 7–8 Response Rate By Role**

The demographic data collected as part of this case study survey identified the current role that the respondents undertook within their BU in terms of the employment cohort perceived by the respondent. According to (Anthony, 1965) such a role identification based on the perception of the respondents is a useful way to view the categories within the organisation because their actual positions may vastly differ from their current roles within the organisation. The response rate of Middle Managers was 45 percent, Operational staff was 44 percent and the fewest number of respondents were Senior Managers (11 percent). This response rate ratio was representative of the organisation and reflected the pyramid hierarchy present in *The Food Company*. Figure 7–8 above presents the survey response rate based on the three roles.

The Senior Managers reported high scores (5.80) on the overall Enterprise Systems success and ranked *Individual Impact* (II) as the highest (6.8) amongst the Enterprise Systems success dimensions and *Information Quality* (IQ) as the second

highest (6.0). In other words, the Senior Manager group reported the Enterprise Systems success level to be highly positive when compared to the Middle Managers (5.20) and Operations Staff (4.93). Table 7-3 below provides the summary scores on Enterprise Systems success as reported by the three roles.

**Table 7-3 Enterprise Systems success Scores by Role**

Enterprise Systems success by Role					
Role	Enterprise Systems success	Individual Item Score			
		OI	II	SQ	IQ
Senior Manager	5.80	5.44	6.38	5.39	6
Middle Manager	5.20	4.98	5.53	4.97	5.29
Operational Staff	4.93	4.76	5.34	4.95	4.68

In particular the Senior Managers found the *Information Quality* to be highly effective. Such a variance on the perception of the overall Enterprise Systems success level can be explained by analysing the qualitative comments that assist in revealing plausible reasons. Although the Senior Managers rated the Enterprise Systems success highly (6.0) possibly due to the need for MIS, Decision Support Systems (DSS) and Executive Information Systems (EIS), the Operational Staff rated the Enterprise Systems success low (4.93). At the Senior Management level there seem to be higher number of staff conducting *Problem-solving and Decision-making* (PSDS) tasks using the System. However, there is a possibility that the respondents at senior level may have excluded the use of system outputs (reports generated from the system) answering this question and have purely considered the actual use of the system.

The '*Individual Impact*' score reported by the Operational Staff is moderate (5.34) the qualitative comments on the level of reporting from cross-module data have largely been unsatisfactory. This is further supported by their lower score of IQ (4.68). The results suggest that the 'role' of the employee has a strong influence on the degree of perceived Enterprise Systems success. The results support that different roles have different views on the success of the Enterprise Systems, since they use different functionalities of the Enterprise Systems. This finding further strengthens the findings of prior research which suggested that one should always be

mindful of whose perspective the success is being measured (Shang & Seddon, 2002).

**Table 7-4 User Empowerment and Psychological Empowerment Scores across different Levels of Management**

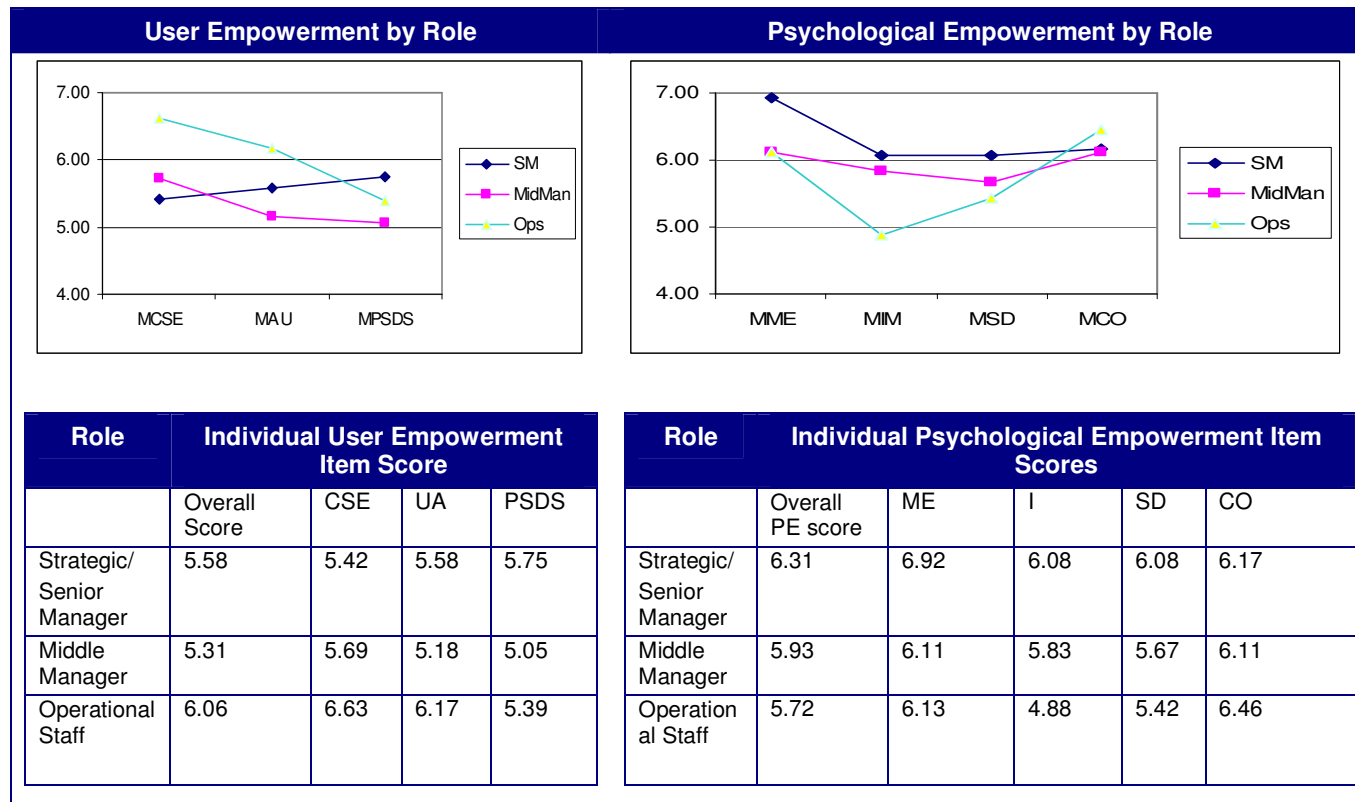
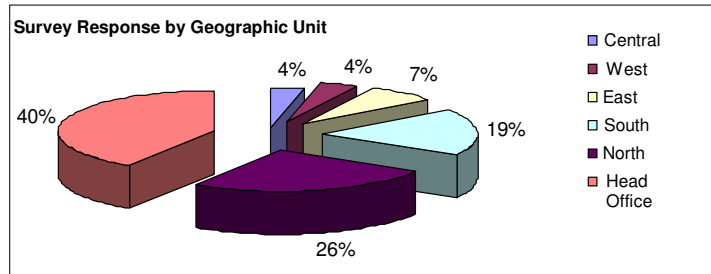


Figure 7–9 below shows the response rate listed by the Geographical Units of the case organisation. The majority of the survey responses were received from the Head Office (40%), with the next largest coming from the plant located in North (26%).



**Figure 7–9 Survey Responses by Geographical Units of the Case Organisation**

**Table 7-5 Enterprise Systems success by Geographical Unit 1**

Enterprise Systems success across Geographical Location					
Location	Overall Score	Individual Item Score			
		Organisational Impact (OI)	Individual Impact (II)	System Quality (SQ)	Information Quality (IQ)
1	5.27	5.11	5.64	5.02	5.29
2	5.48	5.63	6.00	4.78	5.50
3	5.47	5.06	5.75	5.38	5.66
4	5.54	5.38	5.81	5.19	5.80
5	4.94	4.81	5.25	4.80	4.88
Head Office	4.94	4.66	5.40	4.94	4.63

All Geographical units indicated an overall positive Enterprise Systems experience with little deviation across each Geographical Unit from the mean results. Table 7-5 above presents a summary of the Enterprise Systems success scores distribution across each Geographical Unit. The overall Enterprise Systems success score reported by the South and Head Office Users was moderate (4.94) and the Central Geographical Unit reported high level of Enterprise Systems success (5.48). The mean Enterprise Systems success score of Geographical Units was moderate (5.27) with individual impact as the highest rated dimension at 5.64. This is followed by *Information Quality* rated at 5.29, *Organisational Impact* at 5.11, and *System Quality* 5.02 which would still be rated as moderate to high. Across the Central, West, and

East Geographical units there was little variation; the sample variance was .09 and the Standard deviation was 0.31 indicating a very narrow range of values.

The aggregated results of User Empowerment dimensions across the business units seem to be an outcome of the overall organisational structure and the organisation's decentralised operations. A related pattern is observed for the User Empowerment levels across the Head Office location as shown in Table 7-6 below. The Head Office measures low on Problem Solving Decision Support as compared to User Autonomy and Computer Self-efficacy. A possible explanation for such an outcome could be because Head office staff experiences direct corporate control and the organisation hierarchically may be more rigid as compared to the smaller regional units who undertake the same business processes in a more flexible way. The overall User Empowerment scores across all business units are quite consistent and are all between 5.3 and 6.0.

**Table 7-6 User Empowerment by Geographical Unit 2**

User Empowerment by Geographical Location				
Location	Overall User Empowerment Score	Individual Item Score		
		User Computer Self-efficacy (CSE)	User Autonomy (UA)	Problem Solving Decision Support (PSDS)
1	5.4	6.0	5.1	4.9
2	5.9	5.3	6.0	6.5
3	5.6	5.8	5.4	5.6
4	5.8	6.3	6.3	4.8
5	5.4	5.3	5.3	5.5
Head Office	5.8	6.2	6.0	5.3

Reviewing the overall Enterprise Systems success results, we see a high of 5.43 (returned by the Operations business unit) and a low of 3.98 (returned by Sales and marketing). The Enterprise Systems success scores range from a moderate to high level of success perceived by the Operations unit users to a relatively low level of success reported by the sales and marketing users. This variation in the level of Enterprise Systems success perceived can be attributed to the level of functionality that each of the two groups utilise the SAP R/3 modules. The qualitative comments received from the operational unit employees (regardless of their employment levels)

relate to the need for high-end functionality such as their need for increased integration with other modules, or increased access for configuring reports etc. The Sales and Marketing users provided limited comments. Out of the 4.2 percent responses from the Sales business unit only a couple respondents provided additional qualitative comments. Both these comments suggested a clear need for further training. Table 7-7 below summarises the Enterprise Systems success and User Empowerment scores across each business unit.

**Table 7-7 Summary of Enterprise Systems success and User Empowerment by Business Units**

Business Units	ESS Overall Score	Individual Sub-Construct Score				User Empowerment Overall Score	Individual Sub-Construct Score		
		OI	II	SQ	IQ		CSE	UA	PSDS
Operations	5.43	4.83	5.77	5.46	5.65	6.3	7.0	6.7	5.3
Information Technology	5.05	4.8	5.5	5.3	4.6	6.0	6.0	7.0	5.0
Shipping	4.92	5.0	4.75	4.67	5.25	5.82	6.50	5.83	5.12
Finance	4.74	4.61	5.46	4.32	4.58	5.70	5.83	5.78	5.50
Sales & Marketing	3.98	5.0	4.75	1.67	4.5	5.39	5.77	5.16	5.24

Examining the factors, we see the highest score within the Operations unit – Individual Impact (5.77) followed by information Quality (5.65). The pattern between Operational Unit and Sales Unit continues at the individual factor level as well. The Sales Unit reported extremely low *System Quality* score (1.67) which may explain their need for further training with the system Table 7-7 above shows that all but ‘OI’ scores are relatively low for Sales and Marketing. The Sales Business Unit only S & D and had limited exposure to MM modules. On the other hand Operations Business Unit utilised all modules. Their appreciation of having an integrated solution is clearly evidenced in the rich qualitative data provided by the Operations staff members. Thus, operational staff members see greater benefits as compared to the Sales & Marketing respondents and could be a possible reason for the above observed pattern in the scores.

Further, there a pattern in the scores of User Empowerment and Enterprise Systems success across all business units except for Sales and Marketing. High User Empowerment scores present moderate to high Enterprise Systems success scores

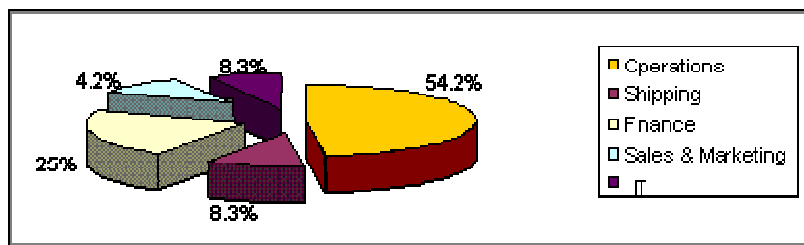


that provides some level of confidence to conclude that high level of User Empowerment is correlated with high level of overall Enterprise Systems success. These results could possibly be linked to the level of training within the Sales and Marketing Business unit users who reported dissatisfaction with the Enterprise Systems success. The chapter will discuss the training on SAP R/3 by drawing from direct quotations provided by users across business units and a range of roles across *The Food Company*. The next sub-section discusses the findings across individual Business Units.

***Business Unit - Analysis and Findings***

The Operations business unit yielded 54.2 percent of the total responses. This unit was responsible for overseeing the day-to-day operational activities of the organisation – plant maintenance, administration, production, and production planning. Figure 7–10 below illustrates the same.

The Operations business unit reported a relatively high level of Enterprise Systems success (5.43) and Information Technology (IT) business unit reported the second highest overall Enterprise Systems success score. Employees from both Operations and IT business units indicated that they were generally satisfied with the Enterprise Systems functionality. The qualitative data supported this finding.



**Figure 7–10 Response Rate by Business Unit**

The Sales and Marketing unit reported an Enterprise Systems success score of 3.98 and was lowest on the level of *System Quality* (1.67). When the individual item scores for the Operations business unit users were reviewed the ‘Individual Impact’ dimension showed high scores across each item resulting in an overall Individual Impact score of 5.77. Shipping business unit indicated a positive experience of the Enterprise Systems in relation to its *Information Quality*. Employees in the Finance

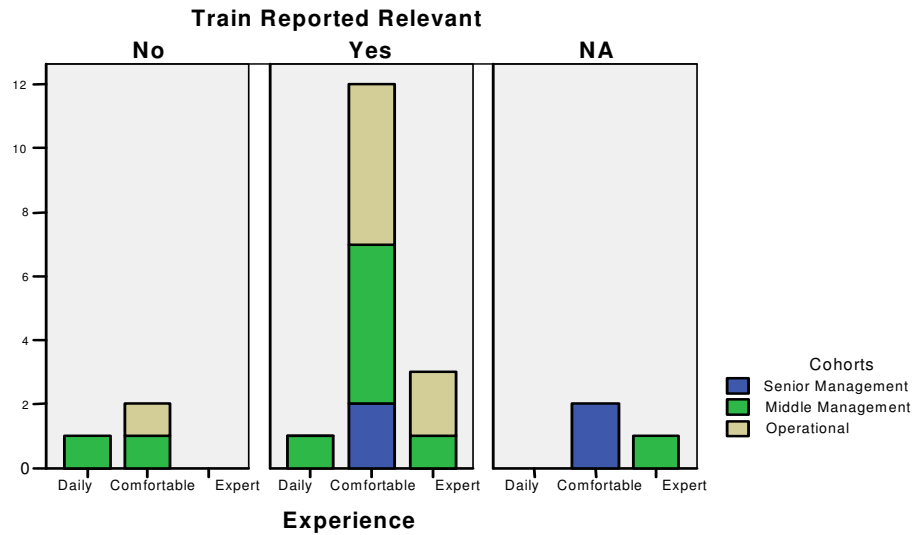
Business Unit (25 percent of responses) indicated the second lowest levels of satisfaction with the Enterprise Systems (4.74). Finance also reported the second highest *Information Quality* score for all the BU's which was similar to IT business unit, but lowest *Organisational Impact* and *System Quality* scores. This pattern can be attributed to a potential dependency of a business unit in delivering its core business functions and the Enterprise Systems module (s) they use.

Generally, the User Empowerment scores ranged between 5.39 and 6.3 with the overall high User Empowerment score for the Information Technology business unit. As expected, the User Autonomy scores were highest (7.0) which was a very predictable result. The researcher is of the view that the IT business unit provided support to the rest of the organisation and was possibly involved in the initial Enterprise Systems implementation. Thus, their perception of the Enterprise Systems success may hold a potential bias. In addition, their daily job activities did not include working with the core SAP R/3 modules implemented.

The Operations unit reported highest Enterprise Systems success (5.43) on the contrary Sales and Marketing business unit reported lowest Enterprise Systems success (in particular their *System Quality* score=1.67) but their User Empowerment scores were the second highest. Such a polarised result derived from the quantitative analysis was rather challenging to explain. The researcher relied on the qualitative comments provided by the respondents to extract any plausible explanations for such a pattern. The low satisfaction with the Enterprise Systems can be explained by the reported need for further training. The next section discusses the findings from the survey question pertaining to the Enterprise Systems training.

### ***Level of Training***

The relevance of training is depicted in Figure 7–11 below where a bar graph represents a summary of all the respondents who have received formal training on the SAP R/3 system vs. those who reported the training to be relevant to their current job roles. It is to be noted that the quality of training was not the focus of the question but rather to assess whether relevant training has a linkage to the cohorts and their level of experience with the system.



**Figure 7–11 Relevance of Formal Training across Employee Cohorts**

The above graph indicates that the majority of Middle management users found the SAP R/3 training to be relevant to their jobs. Around 50 per cent of the senior management employees who used the SAP R/3 system have also reported to be competent users when responding to one of the questions listed under the demographics section. These Senior Managers noted that they did not find the training relevant to their job roles. This can be explained by the fact that these senior managers utilise limited functionality during their day to day job activities whereas the training received was more generic and perhaps comprehensive. This finding points in the direction of having a customised training that matches the user’s job roles.

*“There is a lack of clear & understandable “How To” sheets for production related transactions. Getting training for these transactions has been difficult due to the limited human resources and unwillingness of the experts to train the co-workers. They too are busy in doing their real job. “*

*“The super user concept does not work. There should be experts solely for training in SAP.”*

Such a comment indicates these users need a more targeted training specifically designed for their current job roles. There was a mixed response from the senior and middle managers who commented on the need for further integration

with Budget and SAP Payroll modules. The primary reason for this could be their need to move away from the existing non SAP systems that were being utilised for the Budget and Payroll functions. This provides some level of evidence from both these employee cohorts in terms of their positive perception of the SAP R/3 system. This finding may represent an indirect indicator of their need to enhance The Food Company's seamless integration across all systems. For example, qualitative comments from the middle managers stated the need for further integration with Bill of materials would further enhance the organisation's ability to trade with its suppliers and customers. These middle managers were mainly from the locations outside of the Head Office location and were a minority (11 percent). The following comments from middle managers are listed to support the above conclusions:

*"Further integration with SAP R/3 modules would clean up the inventory, cost, and payroll issues that we currently face. For example, stock reporting issues..."*

*"Integration of maintenance / Garage activities into SAP will increase flexibility in analytical reporting."*

*"..We should have more transactions to find out what else is available to help do our job better."*

The remainder of the middle managers who use more than one module several times a day report to be satisfied with the current level of integration with the other non-SAP systems. Although majority of Middle managers reported satisfaction with the current level of integration, about another 15 percent expressed their keenness to have increased transaction level access to be able to do their current job better. This can be attributed to their higher PSDS levels that possibly explain the above findings. Further, it is noted that both groups of middle managers had some prior involvement during the SAP R/3 implementation. On the other end of the spectrum are some Operational users who commented as follows:

*"Require fewer transactions; to perform critical tasks would be an advantage..."*

*Source: Extract from an operation user's response*

However, the latter were clearly in the minority. Other publications of an external case study confirmed achievement of cost-efficiencies in business operations at the case organisation. It is noted that cost reductions in manufacturing and supply

chain efficiencies were directly credited to the SAP system implemented within the case organisation.

*The Food Company achieved operational productivity gains of 21% in 2003 over the previous year. The organisational structure was streamlined by integrating its manufacturing, processing and logistics operations to standardise processes across the business, and improve its cost position by reduction of waste. Its marketing, selling and product development activities were also brought together under one umbrella to achieve a lower cost approach. The Food Company achieved cost reductions in its manufacturing and logistics division by implementing SAP Information Systems, which enable streamlining of supply chain operations from procurement to the market.*

*Source: extract from internal communications*

### ***Enterprise Systems success relationship to User Empowerment***

The comments provided rich insights into a potentially strong relationship between the User's Autonomy for work outcomes related to the Enterprise Systems modules and overall productivity. One of the responses from the operational cohort is quoted below:

*"If each team has control and responsibility for a given task, they can observe the outcomes of their work as well as maintain the quality of the outcomes more effectively."*

*Source: An Operational User*

The quote points in the direction of perceived lack of autonomy, which may breed weak task identity, and low perceived significance of the quality of work output. Thus, involving employees in Decision-making and encouraging them to monitor their own tasks and work processes would potentially engender feelings of User Autonomy leading to increased commitment. The feedback received from the Change Manager suggested that in The Food Company it was part of the culture that high performing employees and teams exhibited strong commitment.

In light of the culture that prevailed in the case organisation it may be concluded that User Autonomy would lead to increased commitment that is likely to result in higher performance. In order to deliver work outcomes these employees rely

heavily upon the effective use of the Enterprise Systems modules and the outputs generated from them.

**Table 7-8 Correlation between Enterprise Systems success and User Empowerment**

Pearson Correlation Sig. (2-tailed) N=23	Computer Self-Efficacy	User Autonomy	Problem-solving and Decision Support
Individual Impact	.282	.130	.154
Organisational Impact	.261	.532(**)	.681(**)
Information Quality	.352	-.093	.112
System Quality	.331	.063	.234

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

Table 7-8 above supports this conclusion as seen in the correlations reported between Enterprise Systems success sub-constructs and User Empowerment sub-constructs. The high levels of User Autonomy and Problem solving decision support sub-construct correlate with positive Organisational Impact in the case organisation. Thus increased work performance is an indicator of the success of the implementation in the case organisation.

Those that use all the modules reported the highest levels of success for the Enterprise Systems at 5.66, whilst those that used SD predominantly had the lowest overall score at 4.82. OI and II are overarching measures of the perception of the success of the Enterprise Systems to the organisation as a whole and upon the individual. Measures of the actual Enterprise Systems itself are *System Quality* and *Information Quality*. Whilst the highest individual item score reported was for Individual Impact at 6.25 – a measure of overall individual satisfaction with the Enterprise Systems, for the actual Enterprise Systems elements the highest reported score was *Information Quality* (6.08).

#### Impact of Enterprise Systems on SAP R/ 3 User's Work: Based on Current Roles

This section provides a synthesis of the overall feedback received from the 'Operational Staff', Senior Manager, and Middle Managers from the various business units spanning all locations. The questionnaire included the below quoted open-ended question:

*"Please comment on how SAP R/ 3 impacts your work"*

Operational Staff members spent most of their day working with the multiple SAP R/3 modules. The Operational Users are intensely involved day-to-day activities in materials management, plant maintenance, administration, production, and production planning activities.

*“If other people do not enter requirements in to SAP, I cannot control Materials effectively”*

A critical review of the respondents who resonate with the above answer presented that although these users reported positively on the Individual Impact items (5.5. as the lowest and 7.0 as the highest) their overall effectiveness with the system was dependent upon other users. Most of these Operational Users work involves combination of Materials Management, Sales and Distribution and minimal use of FI-CO modules. This may be a potential reason for the low scores against ‘User Autonomy’ and possibly ‘Problem Solving Decision Support’. These users gauge their effectiveness with the system based on other users in the organisation and their overall reported level of User Empowerment is low.

Strategic/ Senior Mangers reported positive impact of the system at both levels: individually upon their own work as well as at the business unit level. At the individual level these Senior Managers comment very highly on the level of reporting and drill-down functionality of the modules. Further, these users reflect positively on the logic and data that the system provides/demands which significantly assists them in their decision-making tasks that have an impact at the Organisational Level. Some examples include: evaluating supplier quality and performance via reports, supporting documentation during negotiations, and increased visibility of the company’s purchasing profile.

Middle Managers responded positively when asked about the impact of the SAP R/3 on their work. Around 40 percent of the middle managers who participated in the study commented that the system enabled them to collate and synthesise relevant information with ease and thereby contributed as well as enhanced their decisions making.

#### ***7.6.4 Limitations to the Case Study Analysis and related Findings***

The researcher acknowledges that in spite of the high response rate the small number of responses limited the type of analyses to be largely descriptive. The

researcher acknowledges that this latter aspect is one that may be debated to have led to a biased sample. However, this decision was beyond the control of the researcher and is recognised as a limitation in this study. However, selecting a concentrated subset of respondents that matched the Case selection criteria provided some benefits towards the study findings.

The demographical section of the survey included self-rating questions for example, asking the respondents to rate themselves as ‘novice’ or ‘expert’ users of the system. Generally, such self rating is considered to be plagued by bias. However, in this case situation the one of the eligibility criterion was to be an expert user of the Enterprise Systems.

The revised User Empowerment scale and the detailed demographic information together provided rich insights into the User Empowerment-Enterprise Systems success relationship for users who work across multiple Enterprise Systems modules. However, lack of any benchmark data on both Enterprise Systems adoption and User Empowerment prompted the researcher to rely on secondary sources of data to triangulate the findings.

## **7.7 Chapter Summary**

This chapter described the case study phase of the research design which was undertaken to further explore the relationship between the User Empowerment construct and Enterprise Systems success. The documentation collected as part of the case study analysis has provided insights to the organisation: (i) structure; (ii) overall business strategy; (iii) current Information Systems landscape; (iv) and integration of the Enterprise Systems system with other business functions. In particular, the case study findings improved the researcher’s understanding of the relationship between User Empowerment and Enterprise Systems success in the following ways:

The statistical evidence demonstrating the correlation between User Empowerment and Enterprise Systems success requires further advanced empirical analyses. However, the findings from the mean scores between User Empowerment and Enterprise Systems success grouped by Roles do echo a proportional relationship between User Empowerment and Enterprise Systems success scores. Increased *User Autonomy* over work outcomes is needed to achieve effective/better



operational planning and estimation business processes which bear a proportional link to the Enterprise Systems success.

Despite the high level of (above 6.06) User Empowerment reported by the Operational staff the same cohort reported average (4.93) Enterprise Systems success. The statistical data was further analysed in the light of the qualitative comments and the core finding derived suggested a strong need of a dedicated training and support team. In addition it was found that there was a need to provide tailored training to staff. In other words, the training programs should be developed in accordance to the needs of specific roles.

Geographical locations do not have an impact on either Enterprise Systems success or User Empowerment. The senior managers have expressed that this is a good outcome that evidences that the case organisations' operations are truly standardised and geographical variations do not impact the outcomes. In business units where the business processes are not standardised or are not sufficiently documented, the staff who reported high User Empowerment and high Computer Self-efficacy still reported low Enterprise Systems success.

## 8 Conclusions and Future Work

### 8.1 Chapter Overview

The purpose of this chapter is to describe the research from a global perspective and to present the opportunities for further research. This research project was a PhD study funded by the Australian Research Council through an industry linkage program. The industry partner in this project was SAP – the most successful vendor of Enterprise Systems. The research project was inspired by the reported relationship between empowerment and improved work outcomes. Extrapolating from this literature, it was hypothesised that empowering the users of Enterprise Systems during the implementation process would improve reports of post-implementation system success. This contextualisation focusing on enterprise systems users led to a concept called context based user empowerment.

Two distinct forms of empowerment were discerned from the literature: Psychological Empowerment (PE) and User Empowerment (UE). The overarching goal of this exploratory study was to assess which form of Empowerment User Empowerment (UE) or Psychological Empowerment (PE), if any, was an enabler of Enterprise System (ES) success.

The research was executed using a multimethod approach with three distinct research phases: the definition survey via email (Research Phase I), exploratory survey (Research Phase II), and case study (Research Phase III).

A UE measurement model was developed, validated and tested across two different ES environments implemented in two different Australian organisations. The study demonstrated that UE, rather than PE was significantly related to Enterprise Systems success.

The study findings identified potentially significant benefits to the ES implementing organisations as well as the ES vendor from empowering ES users. Of the reported benefits one of the relevant one was improved and positive reports about the implemented ES.

The chapter is organised as follows. First, the research background is presented to position the research context and research problem area. Then the

research objectives are summarised. Next, the three research phases are summarised, followed by the main findings of each phase. The following section enumerates each of the primary and secondary research questions. This discussion is organised in the sequence that the research study unfolded. After this, the study limitations and their impact on the research are discussed. Then main contributions to knowledge are presented, including implications of the research for practice. This then leads to clues for further research on the topic of User Empowerment and Enterprise Systems success. These implications are discussed by detailing the areas of specific benefit and generalisable benefit. Finally, the chapter is summarised.

### ***8.1.1 Research Synopsis***

This research project was prompted by the continued organisational demand to achieve business benefits through effective use of Enterprise Systems (ES) by its users, coupled with the increased number of studies of IS success from 1990's to 2007. These have included ES success study that has specified an ES success measurement model. While previous ES studies have focused mainly on the potential benefits, critical success factors, and ES lifecycle issues associated with ES implementation, very few have explored the important issues of impediments encountered, especially from a socio-technical human perspective.

The growing body of literature and industry proceedings acknowledge that knowledge workers require applying business acumen using the pervasive ES environment. Thus, further research relevant to ES knowledge workers would benefit the organisations as well as the ES vendors.

Enterprise systems are a specific breed of packaged information systems that are implemented to suit business needs. A large number of unsuccessful ES implementations have further raised the need to investigate enablers of ES success.

User levels as a focal point of managing the organisational change brought by the implemented ES would potentially improve the acceptance of the implemented ES. The outcomes of empowering users (increased worker effectiveness; increased work satisfaction) conceptually resonate very closely to: the outcomes of individual performance, quality of system outputs, goodness of system functionality, and on a broader level, effective use of the system to yield successful business outcomes. These latter outcomes represent the measures of ES success. Thus, empowerment, as

an independent variable, and ES success, as a dependent variable, provided a launching platform for the study.

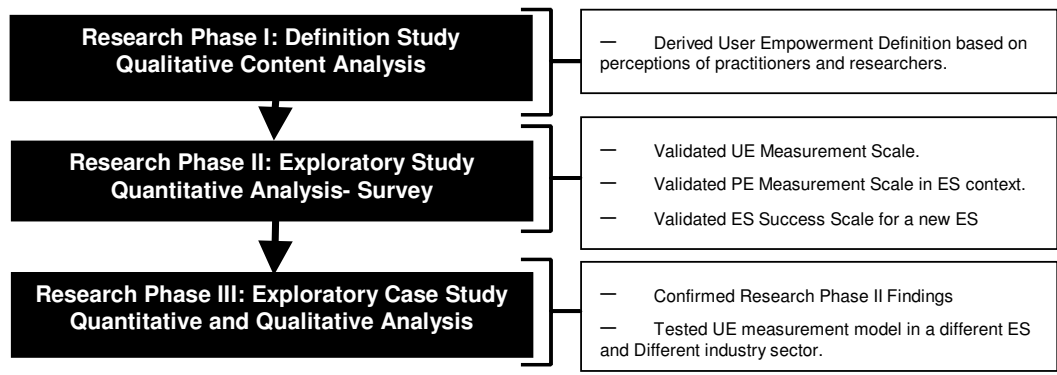
### ***8.1.2 Research Objective, Design, and Method***

The literature on Psychological Empowerment suggested a strong linkage between empowerment and success of an IS. However, no empirical evidence was cited in the reviewed publications till early 2007. The purpose of the study was to assess empowerment as an enabler of ES success. Extrapolating from this, it was hypothesised that empowering the users of Enterprise Systems during the implementation process would improve the reports of post-implementation system success.

The research project commenced with a comprehensive literature review of ES literature including ES success, ES lifecycle, and ES success factors. The vast literature on empowerment of workers showed that empowerment leads to positive organisational outcomes such as increased work-effectiveness, improved organisation performance, and increased worker satisfaction.

There are different understandings of the term Empowerment, with two central concepts being Psychological Empowerment (PE) and User Empowerment (UE). This study examined which of these were related to ES success. In order to test the relationships of empowerment to (enterprise) systems success a multimethod approach was employed in order to strengthen the overall research design. This multimethod approach was a combination of quantitative and qualitative methods including content analysis, survey, and a case study. The approach adopted involved analysing each proposed research method in relation to other research methods and also in relation to the demands of the research problem.

The research approach was applied in three research phases as illustrated in Figure 8–1 below. These three (3) distinct research phases align with the overall research design and are summarised next.



**Figure 8–1 Key Findings Across Each Research Phase**

**Research phase I:** An email survey was undertaken with a view of understanding the perceptions of IS/ES practitioners (SAP) and IS/ES researchers (subscribers of IS World mailing list) on the topic of User Empowerment in an ES context. The responses from the email survey of IS researchers, and ES consultants were reconciled with the findings from the categorised literature review on empowerment.

This research phase I sought to differentiate the varieties of empowerment. This was accomplished through the identification of perspectives on empowerment and the definition of User Empowerment in the context of ES. It used a formal literature review technique to develop a topic taxonomy and article classification to derive the identified types of empowerment.

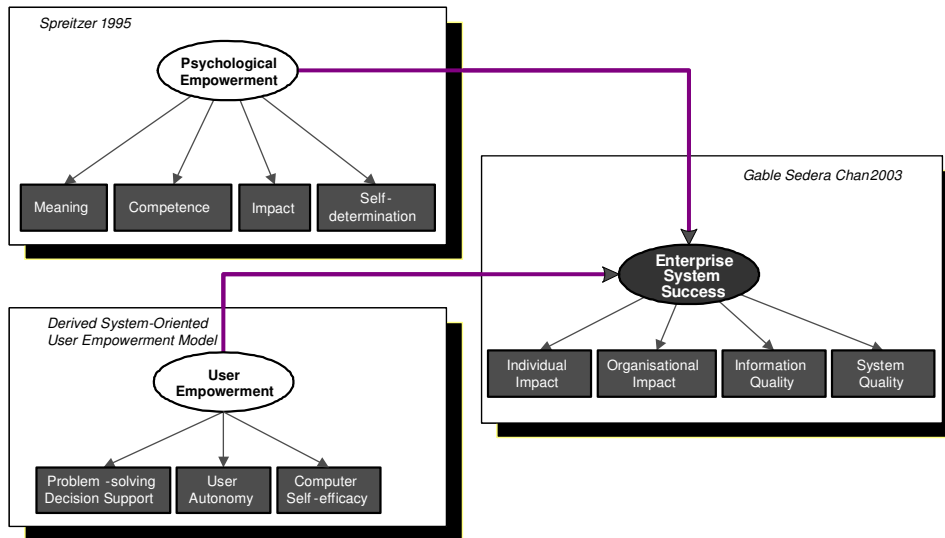
The main findings of this phase of the research demonstrated the existence of two broad types of empowerment: Psychological Empowerment, and System Oriented User Empowerment. The Empowerment literature topic taxonomy and article classification was developed as a means to filter down to these two types of empowerment relevant to organisational management within the IS discipline

The common central theme of the User Empowerment concept as described by IS researchers, IS/ES consultants, and the literature is enhanced decision-making ability and improved outcomes from operational activities as a result of using a specific ES module. The User Empowerment definition derived from this Research Phase I is quoted below.

*User Empowerment enables the users to: enhance their operational and decisional activities, improve their individual performance metrics, and contribute to the overall organisational performance by the usage of adequate Information System (s).*

A critical shortcoming observed in this definition was the fact that the definition described User Empowerment phenomena in terms of the outputs of User Empowerment. In other words, the findings of this analysis evidence the fact that people have assumed that User Empowerment enables employees to improve their individual performance metrics and contributes to overall organisational performance. This assumption has not been previously studied in the context of ES. Thus the position of this study was further strengthened to empirically validate this implicit assumption and led the researcher to further explore User Empowerment as a potentially critical antecedent of ES success.

**Research phase II:** The research project then empirically tested the relationship of both PE and UE to ES success, using quantitative enquiry in an industry based study. The a priori UE measurement model was established. This model drew upon the existing research into Empowerment as articulated by Spreitzer (1996) and Thomas and Velthouse (1990) and its systems-related construct of UE, first explored by Doll, Deng and Metts (Doll et al., 2003). The model also used a current and validated measure of Enterprise Systems success as developed by Gable, Sedera, and Chan (Gable et al., 2003). This validated ES measurement model is a refinement of the Information Systems Success Model of DeLone and McLean (DeLone & McLean, 1992). Research Phase II sought to investigate the relationship between UE and ES success and to compare this relationship to the relationship between PE and ES success. The research model is illustrated in Figure 8–2 below.

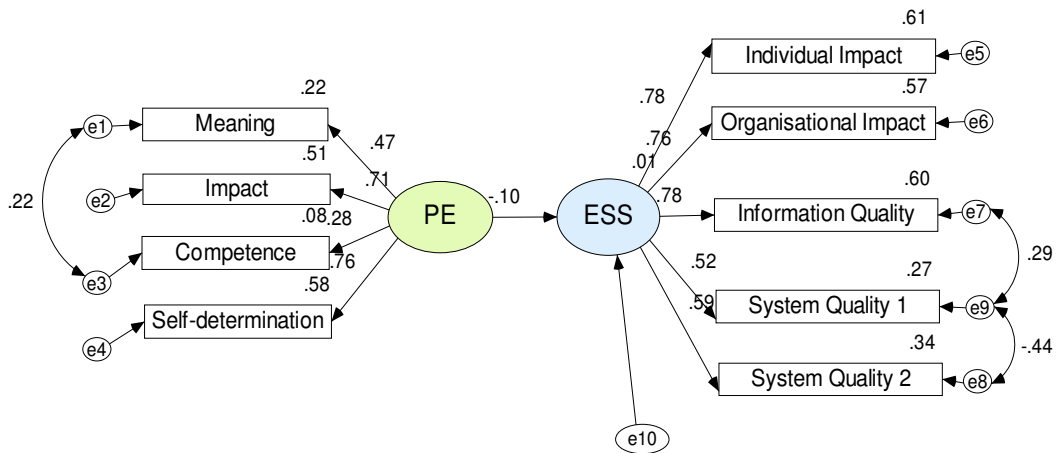


**Figure 8–2 Research Model**

The main findings from this exploratory survey are presented below in conjunction with the relevant research questions of this study.

*“Does Psychological Empowerment have an effect on ES success?”*

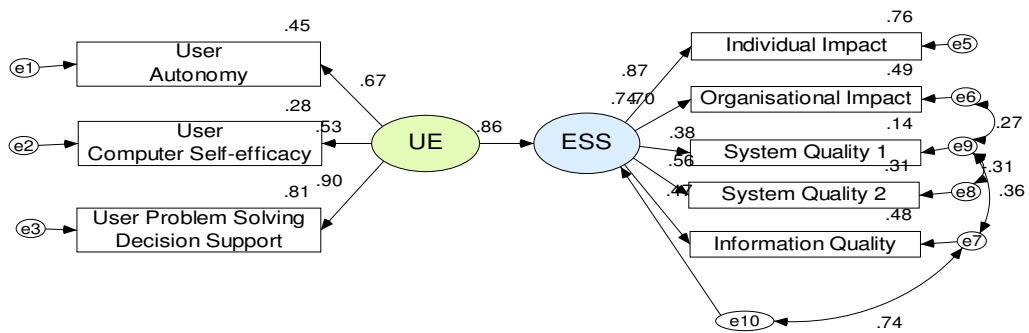
The exploratory survey outcomes demonstrated that, theoretical discussions and intuitive linkages, between psychological empowerment and all positive outcomes associated with empowering users (work-effectiveness, increased performance etc.) remain un-evidenced. On the contrary, the empirical analysis evidenced negligible correlation (-.06) between PE and ES success. The Structured Equation Modeling (SEM) analysis conducted in AMOS evidenced a weak path coefficient of -.10 between PE and ES success. **Thus, the research concludes that Psychological Empowerment does not have an effect on Enterprise Systems success.**



**Figure 8-3 Structural Model of PE and ES success**

*“Does User Empowerment have an effect on ESS?”*

When the same empirical testing and analysis was undertaken for the UE construct, the findings were significantly different. The empirical analysis showed significant correlation (.70) between UE and ES success. The SEM analysis conducted showed a positive and strong path coefficient of .86 between UE and ES success. **Thus, the research affirms the hypothesis that User Empowerment has an effect on Enterprise Systems success.**



**Figure 8-4 Structural Model of UE and ES success**

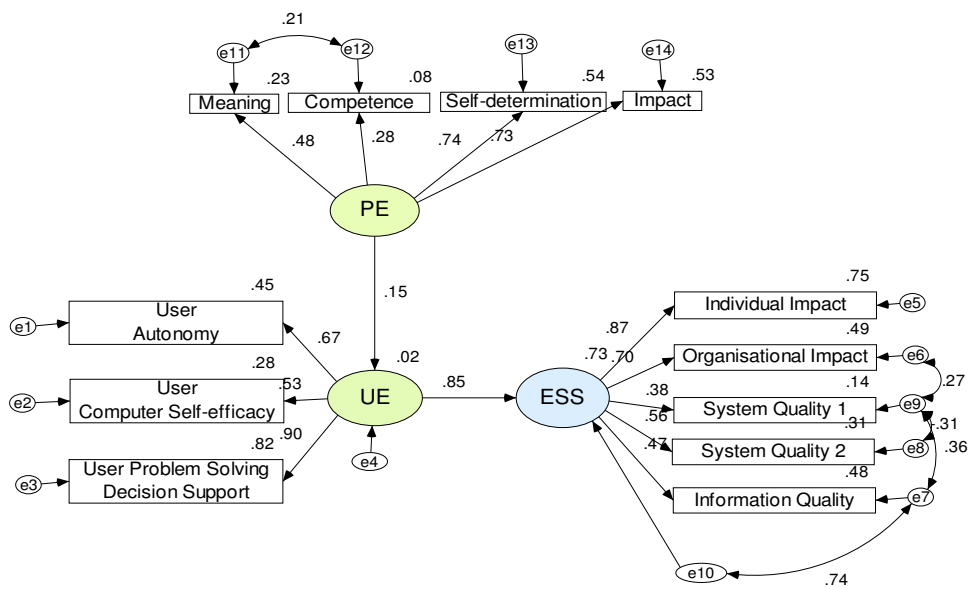


In order to further substantiate the strength of the above findings, the researcher pursued further evidence to show that psychological empowerment had no relationship with ES success. At this point, the study investigations unfolded into further refined questions during Research Phase II. The key investigative questions that emerged during Phase II are listed below.

*“Does User Empowerment mediate the relationship between PE and ES success?”*

*“Does Psychological Empowerment mediate the relationship between UE and ES success?”*

The findings relating to the above research questions showed the absence of any mediating relationship with ES success. In order to investigate this potential mediating relationship, two alternative models were tested rigorously.



**Figure 8–5 UE as the Mediating Variable between UE and ES success**

Of the two structural models the one presented in Figure 8–5 above evidenced that even after Psychological Empowerment is included as a potential mediator the direct effect of User Empowerment on Enterprise Systems success is substantially significant. The alternate conceptual model that tested for User Empowerment as the mediator also strengthened the finding that **User**

**Empowerment and Enterprise Systems success have a statistically significant relationship.**

**Research phase III:** An industry-based case study was undertaken following the Research phase II. The case study's findings confirmed the results for a different **industry** sector and different enterprise system. This confirmatory analysis was undertaken with a subset of ES users in another large organisation. This manufacturing organisation had implemented all modules of an ES (SAP R/3) and only a specific subset of users was included in the target sample of 35. The respondents ranged from a minimum of 1-year experience to over 6 years, across multiple ES modules. The majority of ES users in the sample were intense users and experienced users across the organisation's complex IS applications. The key findings confirmed via this case study are summarised next.

It was found that a user's experience with the ES is not a sufficient indicator of the ES success level. Understanding of the business logic and the user's experience with the business processes together with the level of relevant training received on the ES complements ES use. Then, over time, and with experience users increase their level of User Empowerment that leads to ES success. In relation to the level of User Empowerment, the researcher concludes that User Autonomy, Users' Problem-solving decision capabilities, and Computer Self-efficacy are the key ingredients. A definition of User Empowerment is provided below.

*User Empowerment is a System-oriented empowerment manifested in three key dimensions: User Autonomy, Computer Self-Efficacy, and Users' Problem Solving and Decision support.*

One of the observations from the research hints that job-complexity increases with cross-module ES use. Further, effective ES use generally requires a good balance of the following:

a superior level of business process understanding in the extended business environment; and

an understanding of the implications of tasks and job activities undertaken in each module.

Based on qualitative and descriptive analysis, the study supports the view that both fundamental understanding of business processes as well as User Empowerment are necessary components when evaluating ES success (at User's

level). The computer self-efficacy component plays an increasingly critical role for users that require high level of cross-module ES use and business decision-making in organisations.

## **8.2 Limitations**

Though limited through analysis of but two industry settings, the project studied two enterprise systems (Oracle and SAP) in two different industry sectors. The research phase II was conducted in a single organisation with one module of an ES, Oracle Financials. The research phase III was conducted in a single organisation with multiple modules of a different ES (SAP R/3)

The small number of participants (total and per profession) in the confirmatory survey during research phase III causes limitations to this study and limits the generalisability of the conclusions of this study to a bigger population. However, since the study validated the user-empowerment model and since the ES success model has been previously validated, it can be assumed that conclusions could successfully be expanded to a broader population, if research is performed in that direction.

The next section compares and analyses the limitations across Research Phase II and III and discusses some of the key findings that represent contributions to knowledge.

### ***8.2.1 Limitations across Research Phase II and III: Key Findings***

In this research, the cross-case analysis was undertaken by examining pairs of cases, categorising the similarities and differences in each pair on each of these dimensions. Then similar pairs for differences and dissimilar pairs for similarities were examined.

In research phase II, the response rate was 83 percent, with 154 valid responses out of 185 surveys that were distributed in one business unit of the organisation. In research phase III, the response rate was 68 percent, with 24 valid responses out of 35 that were distributed across all business units of the organisation. The target audience in research phase III was selected on the basis of their involvement in the Change Management Program, cross-module ES use, and advanced usage of more than one SAP modules implemented. In research phase II

this selection criterion was much broader and limited the target audience selection to all Oracle Financial module users.

Although the data quality across both cases was high, lower number of responses during case study phase III was restricted to descriptive analysis. The research phase II yielded a high response rate with good quality data and, hence, allowed the researcher to conduct advanced statistical analysis. However, one possible limitation of the instrument design in research phase II was the high level of anonymity, leading to limited demographics data. This was overcome in the subsequent research phase III where it was a requirement of the senior management to identify groups that required further training, or assess any patterns amongst the geographic locations.

Both cases differed in terms of spread business units versus nation wide spread of business units in the case study organisation. Further, the target sample frame during phase II applied a blanket approach to invite all Oracle users for the participation versus a selected group being nominated to participate in the study. However, both these obvious differences do not appear to have impacted the observed patterns significantly.

The level of alignment in relation to the Information Systems environment within both case organisations studied further revealed interesting patterns. The analysis showed that users who work in Information Systems landscapes with multiple applications integrated to implemented ES modules presented higher scores of computer self-efficacy, and an overall higher User Empowerment score. The intense users (middle and operational level staff members) of the ES supported a higher need for targeted training based on their job roles.

In both cases, senior management reported a high level of success of the system and rated themselves high on User Empowerment and Psychological Empowerment as well. This pattern was in contrast to operational and middle level staff members who worked on same system (s) as the senior managers but had increased day-to-day interaction with the ES and with outputs of ES.

The level of psychological empowerment reported across both cases and across all employment cohorts was consistently positive and high. Interestingly, this pattern continued neither for User Empowerment nor for Enterprise Systems success. UE and ESS showed positive correlation i.e. increasing the level of user

empowerment along with optimum training based on prior analysis would lead to improved reports of the implemented ES. Another potentially important extension to this finding would be to assess the change in the users' User Empowerment and Psychological Empowerment level after another year or so of ES use and post-training.

The findings of the study are generalisable to the extent that by increasing the level of UE (*Computer Self-Efficacy, User Autonomy, and Problem-solving and Decision Support*) one can better predict the impacts on the individual due to ES use. However, in order to be able to generalise this finding, further investigation is warranted across: multiple organisations, multiple ES modules, and a complex IS landscape. The study contributions are discussed next.

### **8.3 Main Contributions of Study**

The key contribution of this study is the rich insight afforded into the relationship between ES success and User Empowerment, an area that has not been previously explored to resolve the ES success puzzle. The findings of this study are potentially opposite to what has been suggested in the literature i.e. PE is related with successful IS reports. In pursuit of testing this potential positive relationship PE measures were correlated with ES success measures. The research findings are noteworthy and yielded no correlation between PE and ESS constructs as proposed in the literature. Further, a context specific user empowerment emerged as a potentially significant construct. As hypothesized, all User Empowerment measures (*Problem-solving and Decision Support (PSDS), User Autonomy (UA), and Computer Self-efficacy (CSE)*) demonstrated a significant role as enablers to ES success.

Interestingly, the majority of users who reported high levels of Enterprise Systems success also reported high levels of problem solving decision support and user autonomy. Both the studies have confirmed that user attributes such as decision-making, access to both general and task-specific information, and user autonomy enable ES success.

The case study method, with its use of multiple data collection methods and analysis techniques, provided opportunities to triangulate data in order to strengthen the above research findings and patterns.

The level of user's problem solving and decision making ability, the level of user autonomy, and the level of complexity in the immediate Information Systems environment evidenced substantial positive link to the Individual Impact of the Enterprise Systems and eventually overall Enterprise Systems success reported by the Users. To this effect, it can be further suggested that User Empowerment has a positive effect on the level of ES acceptance by its users. A summarised view of the main contributions of the study to the research agenda is outlined next. The study:

- Defined a range of empowerment concepts
- Derived the User Empowerment definition based on the perceptions of IS researchers and practitioners.
- Developed a refined definition for the new System-oriented User Empowerment along with operationalisation of the User Empowerment constructs to derive a User Empowerment measurement model.
- Validated the measures for PE and User Empowerment
- Tested the effect of PE on ESS and found no significant effect
- Tested the effect of User Empowerment on ESS and found a significant effect
- Tested the mediating effect of PE on User Empowerment and found no significant effect
- Tested the mediating effect of User Empowerment on Psychological Empowerment and found no mediating effect
- Tested the relationships in a rich case study using a different industry sector and different ES and found that the need for User Empowerment increases as job-complexity increases due to cross-module Enterprise Systems usage and other Information Systems environments that exist in the organisation. The case study further supports the findings of research phase II. Some new aspects discovered from this case study suggest that understanding of business logic is vital for effective Enterprise Systems use. In fact, this need becomes critical for higher end users who require decision making tasks from the ES and its outputs.

In light of the Enterprise Systems literature up until 2007 these findings remain valid and relevant. In fact, one of the key sub constructs of UE i.e. *Computer Self-efficacy* has become a key focus area for Enterprise System researchers. This research serves two key goals: first, the study findings will be useful to all future

researchers and possibly Enterprise Resource Planning practitioners. Secondly, the findings of this study can be used as a benchmark by future researchers.

### ***8.3.1 Implications for Practice***

Practical implications for the research outcomes are that training programs should ensure that users have a high degree of computer self-efficacy in using the enterprise system. In addition, those users who have a need for higher order problem solving and decision support from the enterprise system require good training and customised interfaces which specifically support their job needs. Different training packages are required for different levels of users within the organisation.

For example, a cost centre manager would benefit from a manager's desktop where instead of multiple transactions from the system, the manager is able to draw most commonly used transactions and reports in a single click.

A targeted training program, which separates the tool training (ES module based) with business process training (customised to individual role needs). In this research, however, the findings suggest that a targeted training program would assist the end users to be job-ready for implementation. This suggests that there is still a need to develop ongoing learning paths for each level of users within the organisation. The research points that continued reinforced learning paths will lead to increased computer self-efficacy levels of the users.

This research emphasises the need for addressing both organisational issues (for example, clarity of roles and responsibilities, and accountability) as well as technological issues (for example, a structured methodology to be followed, integration issues with existing legacy systems ) in order to overcome the barriers to Enterprise Systems success. The research findings further suggests careful attention to be paid in implementing a suitable Change Management Program and may possibly warrant changes needed in terms of the provision of the power, knowledge, and rewards for empowerment to succeed.

### ***8.3.2 Implications for Theory***

This study has contributed a new and validated model of user empowerment. In addition, it has discovered a statistically significant relationship between User

Empowerment and the individual impact component of Enterprise Systems success. Further, the study highlights the importance of context when measuring a construct such as empowerment.

The study provides guidelines for other researchers to undertake research on topics that require consideration of contextual variables. The understanding of the impacts upon the ES users that has been built from the data gathered in this study can assist future researchers. The findings have been consistent across both surveys that targeted training that aligns with the individual ES user's job activities is the key to increasing their computer self-efficacy levels.

The findings of this research should be of particular relevance to the organisation in the long term because the operational perspective tries to measure how well the Enterprise System manages the organisational business processes once the system is in place.

The approach to align the coding dimensions as executed during the definition survey content analysis has yielded benefits in this study. This approach where the researcher derives coding dimensions and aligns then with the questions prior to data collection could potentially become a guideline when undertaking qualitative content analysis in a similar situation as this research. However, a more rigorous testing of this approach is required.

In summary, this research project has validated the ES success instrument, validated the User Empowerment model, shown that there is a significant relationship of User Empowerment to ES success and shown that there is not a significant relationship of PE to ES success.

#### **8.4 Directions for Further Research**

Further research should address the limitations identified above, order to provide more valid and generalisable outcomes. This can be achieved through applying the research design across a range of industry sectors and Enterprise Systems. This will require assured access to the participating organisations. Ideally, the data set generated should have the following characteristics:

- Non-anonymous responses
- Response rate: no less than 150 valid responses per organisation
- ES users using at least 2 ES modules as part of their daily job activities



- The data collections to commence at least 2 years post implementation or a major upgrade to the system.
- The potential study participants to receive sufficient notice and clear communication from senior management addressing key points such as, design and conduct of study, its relevance to organisation, contact person, data collection timeframes)
- Ideally the cohorts across each target organisation must be comparable
- ES users to have undertaken some form of Enterprise Systems training

As stated earlier, this study is a first step towards understanding User Empowerment as an enabler for Enterprise Systems success and communicating ways that lead to Enterprise Systems success for the organisation. Researchers can focus on individual results about Enterprise Systems users or interaction between the varied results, thus organising efforts to better comprehend and understand facets of perceived Enterprise Systems success (or not). Such an understanding can be a valuable resource to set and test benchmarks for Enterprise Systems users.

The findings of this research provide a potentially valuable benchmark to compare the generic Information Systems success enablers that have been studied in the past (e.g. perceived ease of use).

Future research will explore the effects of a complex system on the components of User Empowerment as it is conjectured that there is a reciprocal relationship between the system and user perception of computer self-efficacy and problem – solving decision support.

The findings of this empirical study lead the research to further test if Enterprise Systems empowers employees. A further extension to this would be to test the Enterprise systems, success in an organisation where the conditions are conducive and the level of user empowerment is positive.

Furthermore, this study can also be extended to look into the specific tasks of cross-module Enterprise Systems users in more detail. In this case, the findings of this study provide context for further research. This context is important when researching individual tasks in a given job-activity in that it gives information on what outside factors (for the specific task) have to be accounted for, or implications understood.

Further research in this area should be performed by validating the conclusions of this study using a sample of cross module Enterprise Systems users across multiple organisations. The study findings provide a preliminary framework for future researchers and practitioners to undertake further research from, when investigating the following topics.

- User Empowerment and ES lifecycle
- Relationship of User Empowerment and Knowledge Management Systems
- Deployment of Organisational Change Management and Communications Strategy prior to large scale packaged solutions in organisations.
- Practical strategies in to make new and existing ES users to be job-ready post Go-live
- Pitfalls in achieving value from Enterprise Systems: a multiple stakeholder perspective
- Emerging markets for new Enterprise Systems applications
- The above topic areas reflect the future publications roadmap of the researcher.



## APPENDICES

### 1. Classification of Theory in Information Systems adopted from 'Theory of theories' Gregor (2002)

This table is not available online.  
Please consult the hardcopy thesis  
available from the QUT Library

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<sup>1</sup> A naming theory is a description of the dimensions or characteristics of some phenomenon.

<sup>2</sup> A classification theory is more elaborate in that it states that the dimensions or characteristics of a given phenomena are structurally interrelated. The dimensions may be mutually exclusive, overlapping, hierarchical, or sequential. Classification theories are frequently referred to as typologies, taxonomies or frameworks.

**2. Demographical Questions**

Your Faculty or Division Name:	
Your length of experience of Oracle-Financials (months):	
Your highest education award	<input type="checkbox"/> Senior <input type="checkbox"/> TAFE <input type="checkbox"/> BACHELOR <input type="checkbox"/> MASTER <input type="checkbox"/> OTHER _____

**In one or two sentences, please describe your involvement with Oracle-Financials, outlining the type of work for which you use the system or its outputs.**

---

**3. Section A: Psychological Empowerment Scale Items**

**SECTION A**

For each statement in this section, please select a number between 1 and 7 (inclusive) where '1' means you 'strongly disagree' with statement and '7' means you 'strongly agree' with the statement.

	<i>Strongly Disagree</i>		<i>Neutral</i>			<i>Strongly Agree</i>	
	1	2	3	4	5	6	7
1. The work I do is meaningful to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. The work I do is very important to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. My job activities are personally meaningful to me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I have a great deal of control over what happens in my department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I have significant influence over what happens in my department.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. My impact on what happens in my department is large.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I have considerable opportunity for independence and freedom in how I do my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I can decide on my own how to go about doing my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. I have significant autonomy in determining how I do my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I have mastered the skill necessary for my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. I am confident about my ability to do my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I am self-assured about my capabilities to perform my work activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**4. S**







## 6. Section D: Enterprise Systems success Scale Items

### SECTION D

In this section, the statements are grouped within the following FIVE categories for ease of understanding: A) Individual Impacts, B) Organisational Impacts, C) Information Quality, and D) System Quality. Your answers should relate to your own experiences and perceptions of ORACLE-FINANCIALS in your faculty or division. Responses to the questions can be selected by crossing one check box per question. **Comments** fields have been included at the end of each section. Feel free to include any comments you have on ORACLE-FINANCIALS or on this survey. There is no word limit to these fields.

**Category A Individual Impacts** are concerned with how the system has influenced your individual performance. This section seeks to assess whether the system has helped your (e.g.): ability to interpret information accurately, understanding of information and work related activities in your faculty, decision making effectiveness and overall productivity.

For each statement in this section, please select a number between 1 and 7 (include where '1' means you strongly disagree with statement and '7' means you strongly agree with the statement.

- |   | Strongly Disagree        |                          | Neutral                  |                          |                          | Strongly Agree           |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| 1. I have learnt much through the presence of ORACLE-FINANCIALS.                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. ORACLE-FINANCIALS enhances my awareness and recall of job related information. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. ORACLE-FINANCIALS enhances my effectiveness in the job.                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. ORACLE-FINANCIALS increases my productivity.                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Comments

**Category B: Organisational Impacts** refer to impacts of ORACLE-FINANCIALS at a broader level. Here we are interested in (e.g.): costs of organisational resources dedicated to run the system, number of applications replaced / introduced, changes in staff requirements, and changes in business processes, due to the introduction of the system.

- |   | Strongly Disagree        |                          | Neutral                  |                          |                          | Strongly Agree           |                          |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 1                        | 2                        | 3                        | 4                        | 5                        | 6                        | 7                        |
| 1. ORACLE-FINANCIALS is cost effective.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. ORACLE-FINANCIALS has resulted in reduced staff costs.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. ORACLE-FINANCIALS has resulted in cost reductions (e.g. inventory holding costs, administration expenses, etc.)                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. ORACLE-FINANCIALS has resulted in overall productivity improvement.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. ORACLE-FINANCIALS has resulted in improved outcomes or outputs.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. ORACLE-FINANCIALS has resulted in an increased capacity to manage a growing volume of activity (e.g. transactions, population growth, etc.). | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. ORACLE-FINANCIALS has resulted in improved business processes.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Comments

**Category C: Information Quality** is concerned with such issues as the relevance, timeliness and format of reports, and the accuracy of information generated by ORACLE-FINANCIALS. Here the focus is on the quality of **system** outputs: namely, the quality of the information ORACLE-FINANCIALS produces in reports and on-screen.

	1	2	3	4	5	6	7
	<i>Strongly</i>		<i>Neutral</i>			<i>Strongly</i>	
	<i>Disagree</i>					<i>Agree</i>	
1. ORACLE-FINANCIALS provides output that seems to be exactly what is needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Information needed from ORACLE-FINANCIALS is always available.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Information from ORACLE-FINANCIALS is in a form that is readily usable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Information from ORACLE-FINANCIALS is easy to understand.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Information from ORACLE-FINANCIALS appears readable, clear and well formatted.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Information from ORACLE-FINANCIALS is concise.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Comments</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

---



## 7. Research Study Proposal sent to Study Sponsor

**CITI** | Centre for Information Technology Innovation

*Effects of User Empowerment on Enterprise Systems Success in  
<Organisation Name>*

---

The Gartner Group reports that industries engaged in appropriate research and development have a two year lead on organizations not so involved in applying the findings to improved practices. Consequently you should consider the issue of benefits realisation of critical value. Although there have been several studies undertaken to measure Enterprise Systems (ES) success, there is lack of empirical study on the effects of user empowerment on ES success. Perhaps the concepts of user empowerment as a focal point of the change management process would improve the successful use of such complex systems as Oracle Financials.

**Purpose:**

- To determine the effect of Empowerment on Enterprise Systems Success.
- To develop a set of strategies designed for organisations to more rapidly achieve business benefit in their investments in (extended) enterprise systems.

**Rationale:**

This study will allow us to determine the strength of association of Empowerment construct to ES success (or failure). From this basis, we will analyse the implementation methodology and change management programs and make valuable recommendations on variation of those methodologies in order to allow the organisation to achieve better use of their systems. Participation in these projects will benchmark current practices within participating faculties.

**Key Business Benefits to Your Faculty:**

- to identify potential inhibitors to success of the Oracle Financials system in your Business Unit;
- to determine strategic management goals and means for achieving promised business benefits from the Oracle Financials system;
- to incorporate the survey outcomes and recommendations for better alignment of targeted training of staff;
- to identify areas that require specific technical as well as human resources attention and hence make informed decisions for future; and finally
- to develop appropriate change management strategies, which will lead to earlier attainment of business value from the system.

**Research Benefits:**

- Develop a complete measure for User Empowerment.
- Correlate the underlying theoretical factors found in User Empowerment that may assist in achieving Enterprise Systems Success.

**Methodology:**

We are seeking to pilot the instrument in a representative sample of respondents across the organisation. From this pilot, we will revise the data collection processes and then seek to collect further data from a wide range of industries and across a range of enterprise systems application areas. We will not be collecting data that will allow the identification of an individual. We do need to correlate the perception of success, the levels of user empowerment and thus need to identify the work unit.

**CITI** | Centre for Information Technology Innovation

**Data Collection:**

- **The Survey** (small-based and paper): will collect information the perception of ESS.
- **Target participants:** All employees at Oracle Financials-usi being contacted and encouraged to participate in this survey they have had direct involvement with the Oracle system.
- **Target systems:** The system will be Oracle Financials at Orgau
- **The instrument:** The UE instrument reports on 11 factors an than 50 questions.

**Ethical Clearance:**

- This research project will be governed by the [University Rese](#)
- Summary data will be kept and reported with no iden individuals in public.
- Once the transcripts of data are confirmed, all index sheets wi audio or video recording of activities. Survey data will not l individual.
- All identification codes will be held in-confidence and only a Paper copies will have surrogates inserted, thus disabling trac
- The results of the survey will neither be compared across amongst business units.

**Project Team:**

The research team consists of two senior academics ([Associate P Professor Gini Gable](#)) of the ISMRG within the Centre for IT Innovati established track record of completing industry relevant research b partners. Both have published widely about their research. Both hav industry. Professor Gable is the Head of the Information Systems I and Associate Professor Stewart is the Deputy Head.

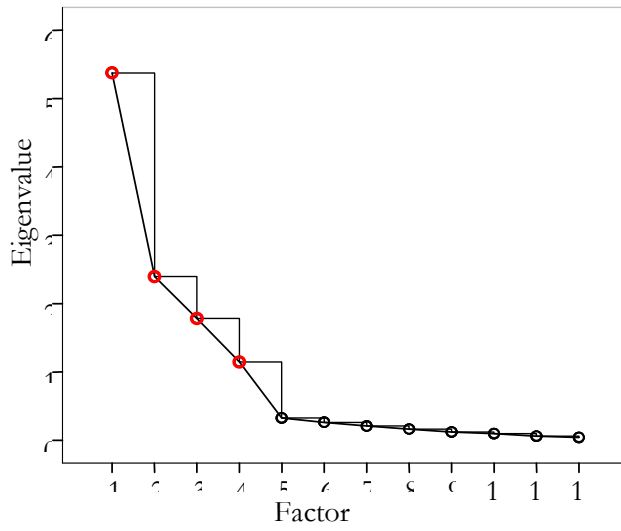
This team of senior academics is working with [Rashi Sehgal](#) a very k complete this research. Rashi has worked in industry as an IT Cons Information Technology from Queensland University of Technology.

## 8. ESS sub-constructs under each cohort

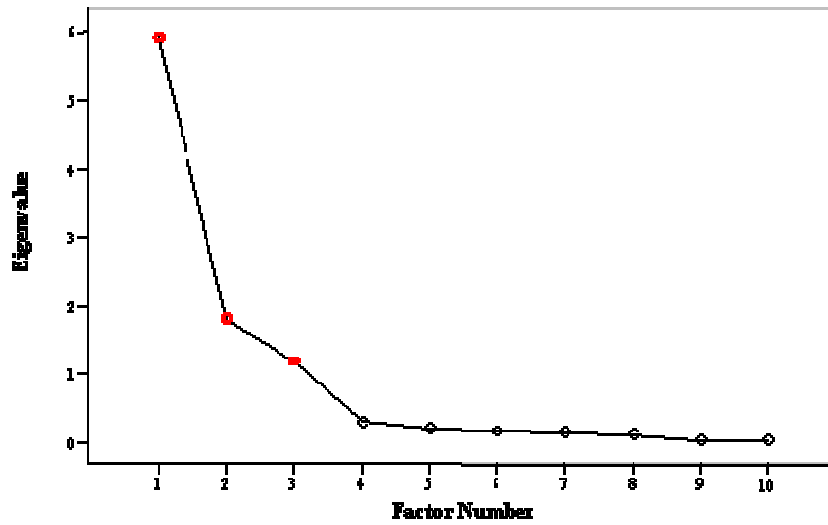
Enterprise Systems success Sub-Construct	Cohort	Total	
		N Observed	N Expected
Individual Impact (II)	Senior	24	24
	Operational	49	50
	End-Users	66	67
	Technical	9	9
Organisational Impact (OI)	Senior	24	24
	Operational	49	50
	End-Users	66	67
	Technical	9	9
Information Quality (IQ)	Senior	24	24
	Operational	49	50
	End-Users	66	67

	Technical	9	9
System Quality (SQ)	Senior	24	24
	Operational	49	50
	End-Users	66	67
	Technical	9	9

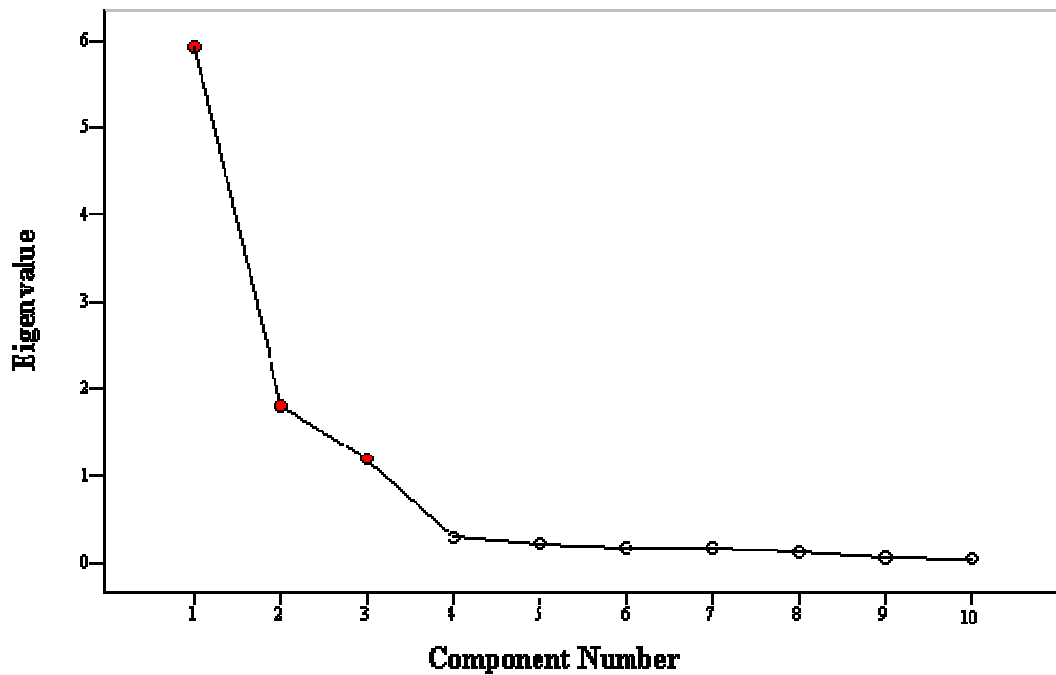
9. Scree Plot illustrating the 4-factor solution for PE Scale



10. Scree Plot illustrating the 3-factor solution for UE scale



11. Scree Plot illustrating the 4-factor solution for ES success scale



## 12. Ethical Clearance Document

X-Sender: Heffernw@pop.qut.edu.au  
 X-Mailer: QUALCOMM Windows Eudora Version 5.1.1  
 Date: Tue, 04 Nov 2003 15:53:03 +1000  
 To: Rashi Sehgal <r.sehgal@qut.edu.au>  
 From: Wendy Heffernan <w.heffernan@qut.edu.au>  
 Subject: Confirmation of Exemption - 3261H  
 Cc: Glenn Stewart <g.stewart@qut.edu.au>, Guy Grant Gable  
 <g.gable@qut.edu.au>

Dear Rashi

I write further to the Checklist for Researchers received in relation to your project, "User empowerment in enterprise systems context: Is user empowerment predictive of enterprise systems success?" (QUT Ref No 3263H)

The Chair, University Human Research Ethics Committee, has considered your Checklist and requested I contact you on her behalf. The Chair has confirmed that the project is in fact exempt from full ethical clearance.

The approval is subject to:

- Clarification regarding the actual number of participants involved in the project; and
- Clarification as to why Q.14 (Liability) has been answered "yes".

**However, you are authorised to immediately commence your project.** This authorisation is provided on the strict understanding that the above information is provided as soon as possible.

Please do not hesitate to contact me further if you have any queries regarding this matter.

Regards

Wendy





### 13. Research Phase III Revised Survey Instrument: Modifications to Demographical Section

Demographics

<b>Length of Service</b>						Q5			
How long have you been employed at Murray Goulburn?						Years			
<b>Education</b>								Q6	
What is your highest education award?									
Senior	<input type="checkbox"/>	Tafe	<input type="checkbox"/>	Bachelor	<input type="checkbox"/>	Masters	<input type="checkbox"/>	Other	<input type="checkbox"/>
<b>R/3 Modules</b>									
Which R/3 modules do you use in your day-to-day role?					How often do you use this?				
Please describe what you use it for?					Less than once per day	Once a day	Several times a day	Most of the time	
All	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
MM	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
SD	<input type="checkbox"/>				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

### 14. Questions on Training and Experience of the SAP R/3 system

<b>Training</b>			
Have you received any formal training to use SAP R/3?		Yes <input type="checkbox"/>	No <input type="checkbox"/> (Tick one)
If yes, was the training relevant to your work?		Yes <input type="checkbox"/>	No <input type="checkbox"/> (Tick one)
<b>Experience of System</b>			
I see myself as...			
Novice User	Can Easily Do Daily Tasks	Feel Very Comfortable with Most Features	Consider Myself An Expert
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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## 15. Case Study Protocol Content and Organisation

No.	Case Study Protocol Content
1.	<a href="#">Case study objectives</a>
2.	<a href="#">Unit of analysis</a>
3.	<a href="#">Conceptual framework</a>
4.	<p><a href="#">Sample frame</a></p> <p>Identify <a href="#">data management tools and techniques</a></p> <ul style="list-style-type: none"> <li>◆ Address <a href="#">data management issues</a></li> </ul>
5.	<a href="#">Sources of evidence</a>
6.	<p><a href="#">Case Study data base</a></p> <ul style="list-style-type: none"> <li>◆ <a href="#">Code the data</a></li> <li>◆ <a href="#">Data analysis techniques</a></li> <li>◆ <a href="#">Present the analysed data</a></li> </ul>
7.	Case study report structure
8.	Cross referral
9.	<p>Initiate first contact(s)</p> <ul style="list-style-type: none"> <li>◆ Outcome: To derive the interest of the project member(s)</li> </ul> <p>Follow up on first contact(s)</p> <ul style="list-style-type: none"> <li>◆ Outcome: To understand the context of the participant's background and interest (in relation to the project at study)</li> <li>◆ Educate the participant/contact on the case study's procedures (ethics, typical tasks, outcomes)</li> <li>◆ Identify advantages (and disadvantages, if any) for the contact when participating in this project</li> <li>◆ Identify added contributions (to the study and to the organisation) from the project conduct</li> </ul>
10.	<p>Project initiation meeting - 1</p> <ul style="list-style-type: none"> <li>◆ Outcome: To provide a more detailed overview of the study and its methodology</li> <li>◆ To get the confirmed commitment from the case participants(s)</li> </ul> <p>Project initiation meeting – 2</p> <ul style="list-style-type: none"> <li>◆ Outcome: To derive the 'environment' to commence field study (relevant awareness of the project within the organisation , relevant support from key contacts)</li> <li>◆ Identify the "areas" in the organisation that can be analysed</li> <li>◆ Define scope of the project</li> </ul>
11.	<p>Collect the potentially useful documentation</p> <ul style="list-style-type: none"> <li>◆ Analyse the documentation: Analyse finding in relation to the survey (constructs, questions, and items)</li> </ul>
12.	Commence Case Study

## **16. Double Envelope Data Collection Approach**

In this approach, participants are handed the questionnaire in paper form along with two envelopes. They are instructed to complete the questionnaire, insert, and seal it in the first envelope. The administrator then marks the respondent who submits the sealed envelope and may contact other to encourage and complete by the due date. All respondents then get their names marked off as they submit their sealed envelopes into another large envelope or a box. This list which is maintained by the administrator is purely for a roll-call purpose and is destroyed at the completion of the data collection period. This sealed box or envelope was then couriered to the Head Office directly to the project sponsor. The sponsor ran a similar data collection process in the Head Office.

## 17. Research Phase III: Revised Survey Instrument Introduction

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Dear |

### Exploring the relationship between Organizational Culture, Empowerment and IT Innovations in the context of Enterprise Systems

Thankyou for participating in the first phase of our research project into the relationship between organizational culture and IT innovation success in the context of extended Enterprise Systems.

We would like to invite you to participate in the main phase of our Australian Research Council supported research project, which involves a wider investigation into the phenomenon in both public and private sector organizations. This will be achieved through revelatory case studies into one private sector organization and one public sector organization, and QUT would like to invite Murray Goubum as the private sector case study.

As you know the research is conducted within QUT's Faculty of Information Technology, Centre for IT Innovation and has the support of leading vendor and industry groups. The centre has achieved an international reputation for research excellence and is committed to serving the needs of the Information Technology industry. The industry partner for this research is SAP.

#### Purpose of Study

We are seeking to establish normative values for each of these dimensions known to affect the perceptions of enterprise systems success. From these values, we are able to study their relationship to the various measures of success, from which we may be able to derive better implementation processes and management strategies aimed at earlier achievement of business benefits from enterprise systems.

For the statistical data to be meaningful in terms of evaluating user empowerment and perceptions of enterprise systems success, we need 150 responses or more. The study can be completed with about 30 participants, and will provide meaningful insights into the effectiveness of the training program however; the results may not be meaningfully correlated with Enterprise Systems Success.

#### Scope of Participation

The data collection for this next phase of the research will take place during January 2005 and involves surveys and interviews with staff and users who have experience of the IT innovation being investigated. The surveys that will be run through the organization are the OCAI, Empowerment, and Enterprise System Success measures. The surveys can be completed on paper and the survey respondents will be anonymous at the individual level. No personal details will be recorded nor company identity attributed to any statements. There is no financial cost to the organization associated

## 18. Exhibit from Information Package Supplied to Case Study Organisation

### Benefits to Food Company as a research participant

We hope that this work will reveal to you key characteristics of , from which you can frame further change management projects and hopefully, accelerate achieving business benefits from your investments in Enterprise Systems.

The results of this research will give you data on how your employees measure the success of an IT Innovation such as an Enterprise System. In addition you will receive findings as to how organizational culture, empowerment and leadership dimensions are impacting the success of the system. These elements will be presented along with the summary benchmark data from the study giving you data on which to frame strategies for improvement. Finally, you will be informed of the findings of the overall study, which will assist you on how to gain additional benefits from your extended Enterprise Systems and how to position future implementations or upgrades.

#### Competitive Advantage

Researchers from Oxford University in the UK have found that companies who participate in research have up to 2 years advantage on companies who simply read the papers published about it. Thus, participation in this study will enhance your understanding of the role of culture, and empowerment of users in implementation and success of these IT innovations.

#### Academic Involvement

Joint industry and academic projects allow the transfer of expert knowledge. This research team brings considerable expertise and provides detailed researched knowledge and consultancy at no cost to industry participants. Joint research projects also provide an excellent base for further industry involvement in developing leading edge methods and techniques. We cannot licence to use the instruments in subsequent internal studies, as some items are copyright and SAP has primacy of use in accordance with our research and IP agreements with SAP.

#### Exposure

The opportunity to be involved with this collaboration provides a unique setting for frank discussion with industry peers and academic experts. Also, where appropriate (and with your approval), your company, if involved in this project, will be identified in publications submitted to trade journals and magazines but direct attributions of statements to your company or individual from your company will NOT be made. This exposure, as a collaborator in innovative real world research spanning the industry and academic worlds, will provide company branding as market innovators.

#### Knowledge

Involvement in this research project, which is based upon the knowledge and experience of practitioners within this industry, will provide opportunities for participants to gain tangible, valuable knowledge.

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