A human factor oriented risk mitigation methodology for manufacturing information system implementation

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A HUMAN FACTOR ORIENTED RISK MITIGATION METHODOLOGY FOR MANUFACTURING INFORMATION SYSTEM IMPLEMENTATION

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

PHD

I certify that I have read this dissertation and that in my opinion it is fully adequate, in scope and quality, as dissertation for the degree of Doctor of Philosophy.

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ABSTRACT

Manufacturing Information Systems (MIS) form the backbone upon which manufacturing organisations assess past performance, manage operations and plan strategic objectives. There are however persistently high rates of problematic and even failed implementations of these types of system. The evidence suggests that although technical risk factors in an MIS implementation have been well addressed, to date, human risk factors in implementations have not been reasonably acknowledged in a manner that allows them to be incorporated into an implementation methodology. This research seeks to address this divide by developing a practitioner oriented methodology to mitigate human risk factors by augmentation of existing methods of MIS implementation.

The model developed by the research was achieved by combination of two distinct research methods. The research propositions were developed by means of three retrospective narratives of MIS implementations conducted by the author in the action research tradition. These case study narratives then informed subsequent research and were used as a benchmark against which theories supporting end user engagement from the domain of organisational behaviour were compared. The second research method employed was to empirically test the tenets of the model by deploying a survey instrument. The proposed model was subsequently validated by qualitative analysis in the form of interviews.

The resulting research validated the proposition that while competent technical design of an MIS was necessary, it was not sufficient to reasonably ensure a successful implementation. The methodology developed addresses the human risk factors identified in the research and incorporates these as part of a validated implementation framework, thus providing a means to address the human risk factors adaptable to each unique instance of an MIS implementation scenario. The augmented methodology provides the Organisation, end user and implementer with the means to negotiate human oriented factors of an implementation from System inception, to post implementation review.

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DEDICATION

This thesis is dedicated to my parents, Josephine and John, without whose support, this thesis, and much more besides would not have been possible.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1 MANUFACTURING INFORMATION SYSTEMS

Since the inception of the mass production assembly line in Ford's River Rouge plant in the late 1920's the world of manufacturing has undergone a number of evolutions. Concepts such as mass customisation, flexible, lean, agile and virtual manufacturing with a global focus have emerged in rapid succession and taken hold. The single most significant change in manufacturing which has most affected a manufacturing organisations ability to respond to customer requirements however has been the advent of communication and information based technology. As data from customers, suppliers, subcontractors and competitors has become instantly available, computational resources have become unleashed and demand has become global, the dynamic of manufacturing has changed radically. The volume of information available to firms continues to increase at an unprecedented rate, but the emphasis for organisations has shifted from simply obtaining data, to the identification and extrapolation of information that is meaningful (Bendoly, 2002). This desire in turn has led to organisations investing heavily in operationally based information technologies in order to achieve competitive advantage. Thus, in the last thirty years, Manufacturing Information Systems (MIS's) have become the information infrastructure organisations rely upon to plan and execute their corporate strategy. Systems such as Baan, JD Edwards and SAP have become the accepted standard for use in running manufacturing organisations and much depends on the organisations ability to effectively deploy and use these systems (Markus, 2000b).

This research focuses on a means to address the risks associated with MIS implementations, in particular the risks inherent in human factor elements of implementation of one of the subsets of Enterprise Resource Planning known as Manufacturing Information Systems.

The fundamental purpose of an MIS is to allow the planning, support and execution of manufacturing activities and functions in order to produce quality product, in the correct volume at the correct time. These systems may be company wide or function isolated with end users ranging from one to many hundreds using the same system. They may also vary in complexity from scheduling a handful of machines, to planning of thousands of sequences of operations. An MIS will come from one of two stables. Existing software such as SAP or JD Edwards comprising the MIS may be purchased (also referred to as Commercial Off The Shelf Software or COTS) and adapted to suit requirements. The second option is developing of software either in house or from an external developer that is bespoke and designed solely to meet the firms' business requirements. This is summarised in Figure 1 below.

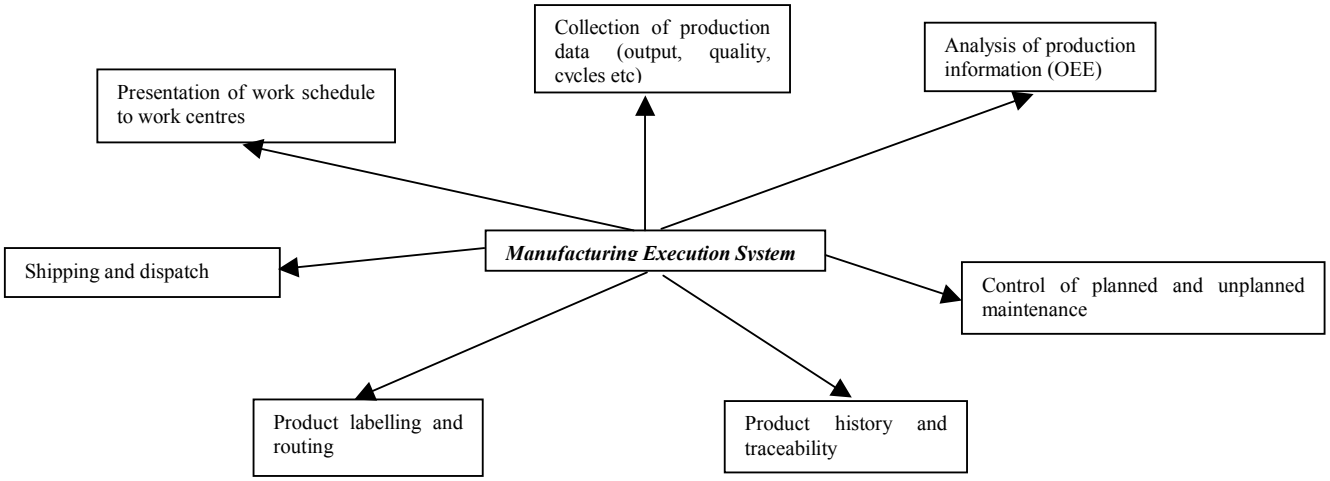

Figure 1 Typical Components of an MIS

1.2 CHALLENGES FACED BY ORGANISATIONS IN IMPLEMENTING MIS

Implementation of these systems requires a substantial investment in time, money and internal resources (Bailey, 1999, Druker, 2000, White, 1997) A typical ERP implementation will cost in the region of fifteen million dollars, although for large firms this can run into the hundreds of millions (Rettig, 2007). The average length of implementation is 21 months, with benefits only

starting to accrue after 31 months (McAfee, 1999, O'Leary, 2004) The implementations themselves are fraught with technical and more specifically, organisational risks. There are many reasons a firm will choose to implement an MIS, not least of which is that these systems are so fundamental as to be perceived as part of the cost of entry to a market (Hunton, 2002, Shang, 2002). Classified below are the main reasons organisations decide to undertake an implementation:

- Operational; Including cost and cycle time reduction, quality, productivity and cycle time improvement.
- Managerial; Improved quality and criteria for decision and improved management of resources and performance.
- Strategic; Improved business growth, business alliances and innovation and product differentiation.
- IT infrastructure; improved business flexibility, IT cost reduction and IT capability.
- Organisational; Supports organisational change, business learning, empowerment and builds common visions.

These systems are often touted as a panacea for an organisations' challenges (Wood, 2002) however, there is much evidence to indicate that there are yet significant problems with the implementation of such software despite the long history of implementation experience and obvious benefits (O'Leary, 2004, Shang, 2002). Nearly 90% of implementations are late or over budget and the average success rate with implementation is 33% (Martin., Feb 1998). Perhaps the most revealing statistic however is that 70% to 75% of companies who implemented these systems perceived the implementation a 'failure' (Hong., 2001, Eckartz, 2009). The consequences of a failed implementation in terms of time, cost, customer relationship and corporate brand are grave (Allen., 2002, Worthen., 2005, Ferguson, 2004, Nash, 2002). Most recent research puts forward a view that these systems may in fact be viewed as "a stopgap that largely back fired by entangling companies in even more system complexity and even higher IT costs" (Rettig 2007). Given the average implementation cost of $15,000,000 and an average of 21 months of lost internal resources,

disruption and opportunity cost, the consequences of a failed implementation have the potential to seriously harm or even close a firm. Depending upon the perspective of the reviewer, a number of reasons have been put forward to explain the level of difficulty faced by firms implementing ERP. Reasons such as 'poor organisational fit between the firm and software' (Hong 2002), 'resistance to change' (McLaughlin, 1987, Markus, 2000a) 'software issues/transition from legacy systems' (Vogt, 2002) to 'insufficient planning at the design stage' (Stedman., 1999).

The initial literature review conducted for this research evidenced that there are a wide variety of causal explanations for implementation failures and herein lies the crux of the issue for firms. There is no single accepted 'best way' to undertake a Manufacturing Information System implementation. While Organisations are aware of both the need for a well functioning system, and the consequences of a poor or failed implementation, there is no international standard that can be reliably referenced. Normally, over 60% of implementation cost is subsumed by set-up, installation and customisation of the software with majority of firm's organisation relying upon a consulting partner such as Anderson to assist or take full responsibility for the implementation (Dolmetsch, 1998, Oesterle, 2000). Even with substantial budgets, experienced implementing partners and prior knowledge of methods of successful implementations, a system install can still fail. Examples include Goretex having to abandon a system in its entirety (Chapman, 2007). The Firm Foxmeyer was eventually bankrupted by a MIS implementation (Scott, 1999). The challenge facing firms in equipping themselves for a successful implementation is in understanding how they need to redress the levels of risk currently being experienced with MIS implementation.

1.3 SOFTWARE 'SUCCESS' AND RESEARCH BACKGROUND

Prior to continuing with facets of implementation, the term 'software success' had interpretations that had to be explored. Hongs' (1996) statistic that 75% of systems were deemed failures did not indicate what factors the organisation had used to judge their perception of implementation, whether purely financial or whether there were other criterion. Regardless, it is obvious that the end result of the implementation did not meet the expectation set of the

organisation. Definition of the term success for software has often proven difficult to establish. There are as many interpretations of what success is as there are reasons for implementing the software in the first instance and it is yet an enduring topic in research (Ballantine, 1996)**.** It may simply be that the software was implemented on time and within budget, especially if viewed from the perspective of third party vendors or implementation consultants and partners. From the perspective of the organisation however, the definition will include not only these factors, but whether the software achieved the outcomes it was designed for from an operational and strategic viewpoint. (Markus, 2000a) has delineated three overall headings and within each category, the success metrics have been defined:

1) Success in the project phase;

- Project cost relative to budget.
- Project completion time relative to schedule.
- Completed and installed functionality relative to original scope.

2) Success in the 'Shakedown' phase;

- Short term changes occurring after the system go live in Key Performance Indicators such as operating labour costs.
- Length of time before Key Performance Indicators achieve 'normal' or expected levels.
- Short term impacts on the organisations adopters, suppliers and customers such as average time on hold when placing an order.

3) Success in the 'Onward and upward phase'

- Achievement of business results expected from the project such as reduced operating cost or reduced inventory days.

- Ongoing improvements in business results after the expected business results have been achieved.
- Ease in adopting new software releases, other New IT's, improved business practices, improved decision making etc. after the system has achieved stable operation.

According to Markus (Markus, 2000b) success metrics include indicators of both human and organisational learning. It is important not just how well the system performs, but also how well people in the organisation know how to use, maintain and upgrade the system and most conclusively perhaps, how well the business improves its performance subsequent to the system being installed. This also evidences the criticality of clear objective setting in order to accurately assess the impact and 'success' of an implementation.

1.4 THE RESEARCH QUESTION

The rationale for this research is grounded in the authors experience in implementation of manufacturing information systems in three separate organisations, PWA International, Dell Computers and Garrett Engine Boosting Systems in Ireland. For the duration of each project the author worked as a full time employee in the organisation. Each system fell under the category of a manufacturing information system, but the means by which each of the individual systems were designed and implemented had to change significantly in order to successfully put the system in place. Throughout the duration of these industry projects, the factors that the author discovered were significant to the end results and eventual uptake of the MIS were found, for the most part, to bear poor relation to what was espoused by the systems literature. This was encountered as a consequence of first hand experience in the implementation of systems.

By the early 1980's, the capability of software to transform the planning and operation of enterprise functions had emerged and inspired a new discipline of Operations based research into design and development of manufacturing information systems.(Jacobs, 2007). The focus of the

research at this time was in developing the capacity of the software to accurately reflect and capture the operations of a plant and enable planning the length of the value chain in the firm. The complexities inherent in this discipline dominated research on these systems until it became obvious that more than the technical aspects of systems influenced the eventual success or failure of an MIS implementation. In 1983, ML Markus(Marcus., 1983) published a seminal paper describing first hand the implementation of an MIS. The paper presented research that opened the domain of MIS implementation research into factors outside of the purely technical, to concepts such as power and politics with respect to an MIS.

The publishing of Markus's paper in communications of the ACM sparked interest from a number of domains outside of MIS design as it was evident that an MIS implementation was in fact an ideal vehicle for researching a number of organisational behaviour topics ranging from change management, in Organisational behaviour (Keen, 1981) to exploring the role of individual psychological traits in implementation (Compeau, 1999). The justification for this research was well supported - although the technical competence of MIS systems progressed nearly exponentially as hardware limitations disappeared, the levels of implementation problems experienced by organisations refused to abate (Eckartz, 2009, Rettig, 2007)

Research into implementation of systems continues to grow in many directions but dependant upon the researcher; a different bias presents itself at each failure review. The technical risks of MIS implementation have been comprehensively reviewed, structured and resolved due to the specificity of the language and structure of software development but there is no such parallel for the description of human factor issues. Even the language currently used to describe organisational behaviour based issues is fraught and open to varying interpretation by both the organisation and the end user. Statistically speaking, the behaviour of groups or populations lends itself to prediction very well as depended upon and evidenced by sciences such as epidemiology or advertising, but prediction of behaviour of individuals is notoriously difficult and prone to error. While MIS inspired investigations into global concepts of change management explored by research into Management (Kotter, 1979), 'Resistance to Change' (Waddell, 1998) and

performance research (Bagranoff, 2002), practitioners of MIS implementation still have no methodology of mitigating the risk factors as posed by the lack of engagement by individuals with a system . It has not been with the 'knowns' of MIS where systems have failed; it has been with the unknowns as presented by different individuals in differing organisational set-ups, whether exhibited on a group or indeed individual basis.

Assuming the technical exigencies of a system have been addressed, it is posited that the level of granularity for how to address MIS at an individual level for implementers is the unnamed, but critical factor underpinning many of the problems encountered in implementation. Thus, the fundamental question addressed within the research is to determine how to move towards addressing the theory practice gap between system implementation and the engagement of individual end users, to understand how risks associated with human factors of MIS implementation may be reasonably addressed. The research does not propose a panacea to the Manufacturing Information System failure. Nor does it propose to replace existing methods of MIS implementation within which there is much relevant and valid research and models, but instead, seeks to augment existing implementation methodologies by incorporating the means to reduce the level of human factor risks associated this lack of engagement by end users. A point corroborated by Avison (Avison, 1999); "Systems analysts have to address the fundamental human aspects of organisations. Failure to include human factors may explain some of the dissatisfaction with conventional information systems development methodologies: They do not address real organisations."

1.5 RESEARCH OBJECTIVES

Given the challenges faced by organisations in undertaking an MIS implementation, focus of the thesis is not to supplant existing models of Implementation, but on development of methodology to augment the human factors side of implementation. The Key research aims of the thesis are identified as follows;

- Identification of the underlying causes of MIS implementation failures and successes from both experiential evidence and relevant empirical literature domains and delineate technical from human risk factors.
- To research where organisational behaviour based literature may be used to redress the gap between human risk issues encountered in the installation of information systems in manufacturing contexts and system based literature.
- Development of a practitioner oriented methodology of MIS implementation focused on mitigation of human risk factors by facilitation of the context specific nature of individuals and organisations.
- To empirically test the human factors identified in the proposed methodology for their applicability in the broader industrial domain.

1.6 RESEARCH METHODOLOGY

1.6.1 INTRODUCTION

To address the stated research objectives, a merging of two separate research traditions is used. The first of these, a qualitative approach known as Participatory Action Research (PAR) is used and the findings from this are then explored using a the quantitative approach of statistical analysis. The three case studies formed the benchmark against which the second research approach, that of traditional literature review into supporting themes researched as a consequence of the case study experiences are compared and contrasted. The research approach is outlined in Figure 2 on the following page.

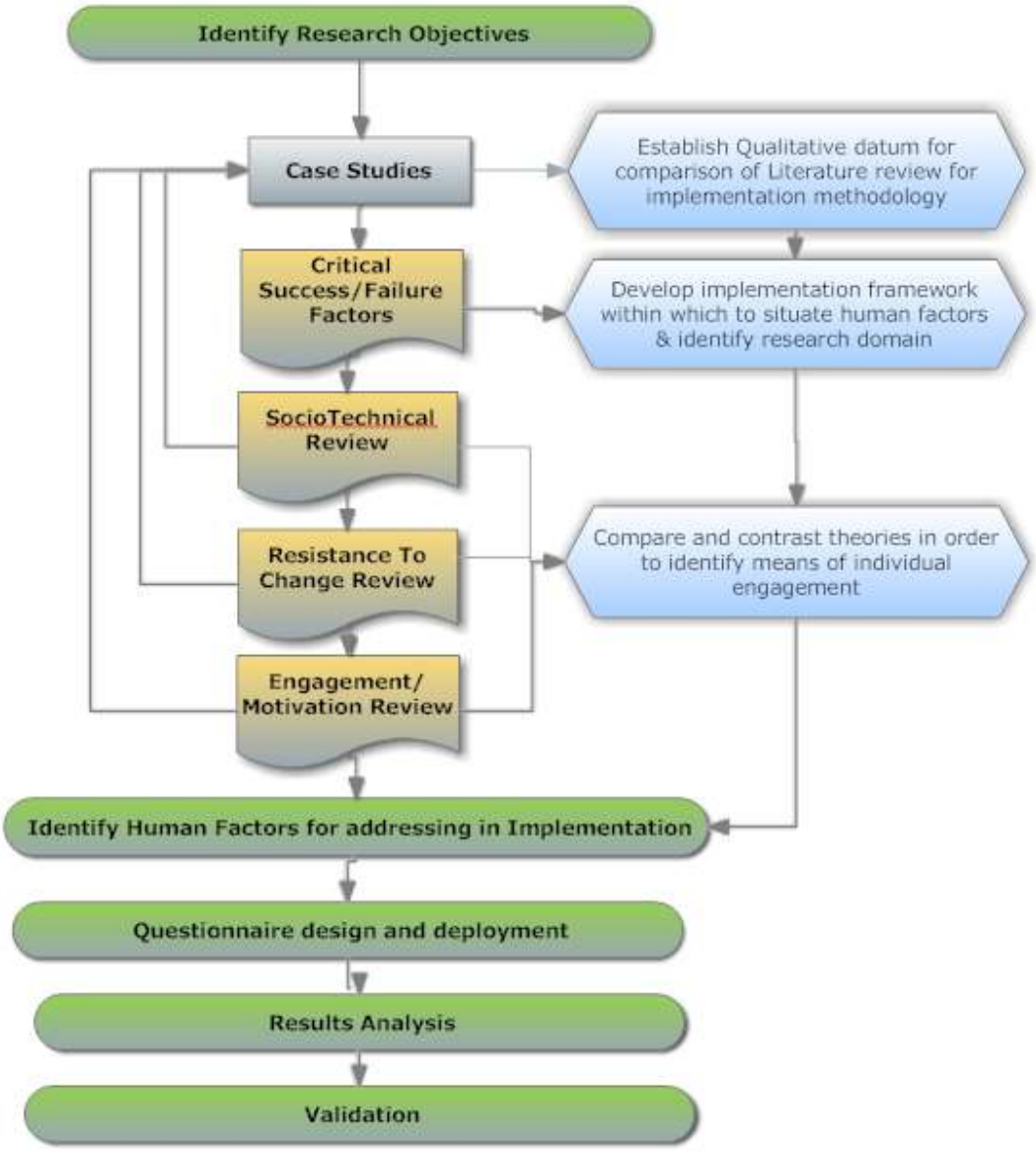

Figure 2 Thesis Research Approach

1.6.2 VALIDATION

Once the key human factors to be negotiated within an MIS implementation had been developed through the case studies and accompanying literature review, the key salient features for the proposed methodology were identified. The means to test these features identified were validated via construction of a Questionnaire to test the perceived relevance of the tenets proposed from a broader population in an effort to test relevance and broader applicability of the methodology. The reasoning for selecting this vehicle to research the applicability of the methodology is discussed fully in the introduction to chapter five and in the validation of the model in chapter six.

1.7 INDUSTRIAL CASE STUDIES

Between 1996 and 2006 the author was employed as a full time project manager in the manufacturing industry in Ireland. During this time, in three separate American multinational companies, the opportunity to develop and implement a Manufacturing Information System as a full time employee in each of the organisations arose. This provided an excellent opportunity to study the topic of system implementation in depth and over a prolonged period of time in three different contexts. In each case, the author had full responsibility for both the design and implementation of the system required and as a full time employee, had full access to company data, company records, was immersed in and part of the company. These case studies were used as datum against which the human factors reviewed in the subsequent literature review could be compared and contrasted.

Case Study 01; PWA International.

PWA International is a division of Pratt and Whitney, the US based commercial and military jet engine manufacturer. PWA are based in Rathcoole, Co. Dublin and employ over one hundred and twenty full time employees. The company specialises in the overhaul of jet engine cases and use state of the art non-destructive testing and fracture detection technologies. Their

customers included Korean Air Lines, Japanese Air lines, Lufthansa and Singapore airlines. A strong engineering and quality bias was evident in its focus. The author was hired to the firm in 1996 to develop and implement a Computerised Maintenance Management System(CMMS)

Case Study 02; Dell Computers.

The author commenced employment in Dell in 1998 as a business analyst in the Production Control facility in EMF01 and was subsequently tasked with development and implementation of a Downtime Management system to facilitate tracking and control of lost manufacturing units and lost hours of production. At this time, Dells Limerick facilities had over three thousand employees working three shifts across three separate manufacturing facilities. Dell Computers initiated the concept of building of custom PC's to meet customers requirements and employed no resellers or agents in the retail of their servers, laptops or desktop PC's and the Limerick plants were responsible for supplying Europe, Middle East and Asia.

Case study 03; Garrett Engine Boosting Systems.

Garrett Engine boosting systems is a subsidiary of American multinational Honeywell International Technologies and specialises in the manufacture of compressor and turbine wheels for car and truck Turbo-charging systems. The company is based in Waterford and employed just over five hundred employees in three adjacent but separate business units. The author was employed in 2002 as Manufacturing Engineer and was in the company one year when the opportunity to develop and implement an integrated manufacturing execution system in the machine cell business unit arose. The system was to allow for the planning and analysis of production in the machine cell across each of the twenty two individual manufacturing cells.

1.8 LITERATURE DOMAINS OF INTEREST;

1.8.1 CRITICAL FAILURE AND SUCCESS FACTORS IN MIS IMPLEMENTATION

To establish a baseline from which to proceed with the literature review and develop an outline framework within which the proposed methodology for addressing human risk factors could be established, it was necessary to first explore modes of failure of systems in organisations. Once patterns and trends in key critical failure and success modes were identified and the initial implementation methodology developed, the relevant domains of literature for subsequent research in accordance with the case studies could be established. By the very nature of these systems, reasons allocated for their failure will depend upon the perspective of the organisation, the implementing partner/consultant or the software provider. Experiential evidence though critical is not sufficient. Thus, for investigations of this nature to elicit a true picture of the state of the art, the research must necessarily span and cross over a number of disciplines the outline of which is now introduced. For the purposes of this research it was not possible to address every domain of research contributing to facets of implementation research but the following were identified as having the most to contribute with respect to development of an augmented, practitioner oriented means of MIS implementation.

1.8.2 SOCIOTECHNICAL SYSTEMS

Noted in the review of critical success factors was the tendency for consulting partners to allocate responsibility for system failure in the realm of organisational behaviour or means of implementation and interplay between sociological and technical factors, hence a review of Sociotechnical systems was identified as a key critical area of research. The next challenge was to determine how far the theory had been applied in industrial settings and what the resulting effects were. Sociotechnical theory espoused human oriented principles of user involvement, with respect to the 'breaking down' and re-organisation of tasks into complete functions and emphasises autonomous work groups, group based reward systems, performance feedback loops, information sharing, flexible responses and parallel learning techniques (Shani, 1992). As such, Sociotechnical

design provides a formal method of incorporating end users into the design of a system and this was an area that was indicated as weak from the perspective of consulting partners. The literature review for this section formally analyses the method and investigates three separate case studies where the procedure was used to determine whether this domain is capable of closing the theory practice gap established in the review of Critical success factors between purported successful methods of implementation, and actual results.

1.8.3 RESISTANCE TO CHANGE

Answers to human factors associated with implementation failings were not immediately apparent in research conducted in Sociotechnical systems. Neither was the language for what had been experienced in the case studies discovered. This necessitated further exploring the literature for means to better understand and describe the role of human factors. The language for what had been encountered in the case study experience had not yet been discovered in the literature and from the original success factor review, explanations for failures were terse and of a diplomatic orientation. The extent of the theory practice gap was becoming more profound and the question still remained, why was failure so endemic? The concept of resistance to change or 'organisational difficulty' was a recurring theme, not only from the literature review but also as supported by first hand case study experience.

The literature review in this section is in five parts. The first of which deals with the origin, definitions and development of the theory of resistance to change from its initiation as valid research concern in the 1940's to a brief review of research to date. Within the remit of the review are also categorisations of resistance to change, the concept of resistance to change as positive outcome and strategies proposed for overcoming the phenomenon. Research in this area was concerned with resistance to change in the context of change management, a label under which an MIS implementation settles. On comparison of the case study experience the literature, while relevant and supported continuing research into human factors, still dealt in brushstrokes too broad for use in a real implementation scenario where human factors must be understood and incorporated

at the level of the individual. Thus, the final domain of research explored to find means to reduce the divide between theory and practice lay in factors leading to motivation to use or perhaps more accurately, engagement with the system by the end user.

1.8.4 System Engagement Motivation

The notion of 'Resistance to change' can be attributed to the organisation as a whole but the 'resistance to change' of the organisation cannot be measured without determining the sources and levels of resistance as presented by the key end users of a system. The phenomenon of working with individuals, which had emerged as a key point in both prior case study experience and the literature, was not dealt with in any direct or applicable way. What was put forward were prescriptive linear models of change for the organisation as a whole. Individual theory of change in organisations was not addressed by any of the models, thus the final section of literature review was dedicated to researching a means to navigate the continuum from 'resistance to change' to 'engagement' for individual users as at this juncture of the research, this was what had been identified as the burgeoning gap between the theory and the practice as supported by the case studies, and now, a means of understanding the causes as provided by motivation literature. This was the domain of research chosen to both investigate and develop the means for mitigating the risks associated with human centred aspects of an individually orientated means of MIS implementation which resistance to change literature had described, but not provided adequate theories with how to address within an MIS implementation methodology.

The purpose of this section of the literature review was to cover in brief the main theories of motivation and discuss each in terms of an elucidation of

1) The core points of the theory.
2) It's robustness in the context of an industrial setting.
3) It's sensitivity with respect to providing causal reasoning for adoption or rejection as key criteria for determining the concepts usefulness.

4) With respect to reducing the theory practice gap in MIS implementation, suggested criteria for assessment of the model include its parsimony, validity and coherence (Furnham., 1997).

1.9 THESIS OUTLINE

Chapter 1; Introduction; This chapter has introduced the topic of research and its background. The research objectives are introduced and reasoning for selection of the research approaches and subsequent literature review.

Chapter 2; Three Case Studies; A Retrospective; This chapter describes in detail the three MIS implementation projects conducted between 1994 and 2001. The authors role, company background, system imperatives and implementation in each instance is described and are concluded with a retrospective evaluation of the system and discussion as to causal reasoning of the outcomes experienced.

Chapter 3; Literature Review & Framework Development; Four key research areas are identified to address in order to facilitate development of an augmented model of Implementation, those of : critical failure and success factors in IT implementation, Sociotechnical systems, resistance to change and theories of motivation. Where applicable, each of the case studies is compared to the literature and similarities and differences identified and discussed [Figure 2]. In conclusion, subsequent research required to address the theory practice gap and further supporting focus on human centred factors is identified. The research then progresses to address the areas of research identified as having most to contribute in bridging the gap between the practical implementation experiences and the domains of literature. The field identified to best address human factor risks was that of human factors with respect to motivation to adopt and individual levels of engagement. The review focuses on exploring the principles and application of the theories to implementation of MIS projects in organisations.

Chapter 4; Regulatory focus of the Psychological Contract: Theory Testing: This chapter explores the means by which the theory developed as a result of the literature reviews, and case studies can be applied and tested across a much wider platform. This necessitated developing a means from which to test the tenets of the theory and includes a discussion on the selection of the method for testing the theory developed. Concepts such as selection of variables, questionnaire design and validity testing are discussed. The chapter concludes with the finalised research instrument.

Chapter 5; Results: Discusses in detail the procedure followed for survey deployment, response rate and participating organisations. The chapter continues with a discussion on selection of method of statistical analysis and concludes with an analysis of the results of the survey instrument.

Chapter 6; An Augmented MIS Implementation methodology: Summarises the results from the three case studies, the interviews conducted and the results of the survey and further refines and presents a finalised model for human centred MIS implementation.

Chapter 7; Discussion: Discusses the results of the thesis and the contribution of both the domains of research chosen and the research methods. The chapter concludes with unexpected research outcomes and enumerates the limits to the research conducted.

Chapter 8; Conclusion: The thesis concludes with the contribution of the research to the domain and attendant effects of the use of the model for the organisation, the implementer and the individual end user. The chapter concludes with reflections on the research and recommendations for future research.

CHAPTER 2: THREE CASE STUDIES: A RETROSPECTIVE NARRATIVE.

2.1.1 INTRODUCTION

The function of this chapter with respect to the thesis is two fold in that first, it seeks to describe the experience of system implementation from the perspective of a practitioner in order to establish a qualitative datum for assessing relevance of the theories reviewed in the subsequent literature review chapter and secondly, it seeks also to identify the domains of research applicable to the exigencies encountered in the implementation of these systems. The discipline of participatory action research as a research tool for MIS is discussed followed by a review of factors for ensuring the validity of the method. Each of the three implementations, including company background, system imperatives and discussion of each of the projects are presented.

2.1.2 PARTICIPATORY ACTION RESEARCH

There are a number of schools of thought with respect to investigation of a research topic but the method determined for this thesis was chosen by necessity. A more traditional empirical research based survey would not have captured the essence and experiential learning which was crucial for the building and refinement of the theory derived from the three case studies described. The case studies are written as a historical narrative in the tradition of Participatory Action Research (PAR). There are two aspects to this approach, namely the use of case studies as a research vehicle and the reasoning and justification of Action Research as a valid method for conducting information systems implementation and operations research.

Perhaps the most apt definition of action research that emerges from the literature reviewed is that of the originators of action research as a bona fide method of

inquiry, Argyris and Schon (Argyris, 1981) indicated “Action research takes its cues, its questions, puzzles and problems from the perspective of practitioners within particular, local, practice contexts. It bounds episodes of research according to the boundaries of the local context, it builds descriptions and theories within the practice context itself and tests them there through intervention experiments that bear the double burden of testing hypotheses and effecting some desirable change in the situation”. This describes the reality of how the research was conducted. The MIS’s described were naturally formed case studies, particular to the organisation at the particular point in time for the given set of circumstances. The case studies had naturally set starting and finishing boundaries and the theories formed were described and developed as a direct result of first hand experience within the implementation.

Participatory Action Research moves out of the realm of standard empirical research where the researcher takes the role of observer and indeed must take care not to influence or bias the subject in any way. While an empirical method is suitable for a number of disciplines, in particular the natural sciences, when the research topic moves into areas of social change, the modes of research must necessarily change, particularly in the instances of more socially based research and change management. The famed physicist and sociologist Kurt Lewin (Lewin, 1948) intimated that it was in fact “not possible to understand a social system without trying to change it”. This view has been echoed and reiterated in many studies since Coch and French’s seminal Harwood factory investigations (1948). Action research is unique in its approach of “uniting two central themes; improvement in practice and increase in knowledge and understanding by integrating them into a cycle of linked activities in which “each phase learns from the previous one and shapes the next” (Winter, 1989)The method does have its detractors, these reasons are perhaps best described by Campbell (Campbell, 1963): “Such studies have a total absence of control as to be of almost no scientific value….any appearance of absolute knowledge, or intrinsic knowledge about singular isolated objects is found to be illusory upon analysis…it seems well nigh unethical at the present time to allow, as theses or dissertations in education case studies of this nature.” A number of years later, having had opportunity to reflect, Campbell then wrote “after all, man, in his way,

is a very competent knower, and qualitative common sense knowing is not replaced by quantitative knowing…this is not to say that such common sense naturalistic observation is objective, dependable or unbiased, but it is all we have….It is the only route to knowledge. Noisy, fallible and biased though it may be"{Campbell, 1975).

The opportunity to research and take responsibility for implementation of three similar projects in three very different organisations was a rare opportunity and one that afforded itself to participatory action research method as at each juncture in that the best interests of the organisation were also served by developing the best means of system implementation. Action research is not the only approach and the argument is not that rule based knowledge should be discounted. It is important in every way and especially to novices, but to make rule based knowledge the highest goal of learning is incomplete. There is need for both approaches. "The highest levels in the learning process, that is virtuosity and true expertise are only via a persons own experiences as practitioner of the relevant skills" (Flyvbjerg, 2006).

From the action researchers' perspective, the challenge is to define and meet 'appropriate standards of rigor without sacrificing relevance' (Argyris, 1981). Participatory Action Research by use of case studies involves; Formulating an approach to the problem; design planning; acquiring data; analysis and reflection/interpretation (Whyte, 1991). While this deals with the mechanics of planning the research and the implementation, a scientific approach must be adopted. The principles of ensuring integrity of case study research include; making controlled observations; Making controlled deductions; Allowing for replicatibility; Allowing for generalisability; A focus on falsifiability; Logical consistency and predictive power exceeding that of competing theories. These factors were taken into consideration in both the historical narrative and subsequent literature reviews. A second set of criteria for supporting the quality and verification of the research suggested by Stake (Stake, 1998) includes; Prolonged engagement; Persistent observation; Triangulation; Negative case

analysis; clarifying researcher bias and Rich thick description. Each of these methods was employed in the case studies conducted.

2.2 CASE STUDY 01: PRATT & WHITNEY AIRMOTIVE INTERNATIONAL.

2.2.1 INTRODUCTION

This Manufacturing Information System was undertaken in 1998 and was the first system design, development and implementation undertaken by the author. The purpose of the system was to put in place an IT based method for the planning, ordering and execution of activities undertaken in the maintenance department of PWAI. The prime objective of the system was to allow for a reporting structure that would assist the company in monitoring and control of maintenance issues, including recording and analysis of machine breakdown and preventive maintenance planning. Prior to this system, a manual method of reporting was in use and maintenance was run on an entirely paper based system. The author was employed as a project engineer as part of a Co-Operative Education program from the University of Limerick in 1998 and reported to the Operations Manager for the duration of the placement. The Operations Manager initially requested the author to review the possibility of developing a scheduling and operations planning software but when reviewed, the cost, time and expertise required to develop such a program was outside the budget remit of the company. It was possible however to address a section of the project within the time allotted. The Operations Manager reassessed options and requested the author to address maintenance as this was the source of a number of data collection problems. This was the authors' first industrial placement and as such, had no prior experience of working in a production and engineering orientated organisation. The following describes the approach and logic followed in designing and developing an MIS based system from first principles.

2.2.2 COMPANY BACKGROUND

As a subsidiary of an American Multinational, PWAI had expended significant resources in implementing World Class Manufacturing (WCM). This system included Cellular Manufacturing, Continuous Improvement, Process Certification and 5S. The end result of this was an efficient and progressive working environment underpinned by a strong working relationship between the union and management in the plant. With respect to the adoption of new techniques and initiatives, this relationship resulted in what was experienced by the author as a predominantly positive attitude from both workforce and management alike. A significant part of this WCM system is Total Preventive Maintenance (TPM).

At the time of project inception there were four full time employees in the maintenance department. Excluding buildings and ground work, the maintenance department had responsibility for over forty pieces of capital intensive equipment including Computer Numerically Controlled (CNC) Universal Milling and Boring Machines, Vacuum furnaces, Electron Beam Welders, Computerised Co-ordinate Measuring Machines and Fluorescent Penetrant Inspection Booths. Although PWAI was classified as a small to medium sized company, they employed one hundred and twenty employees and had equipment worth in excess of €20,000,000. The maintenance department was entirely dependent upon paper-based methods of information storage and retrieval. The vast majority of work undertaken by the department was of a corrective nature but by implementing a computerised maintenance management system, the organisation hoped to accelerate the process of changing the balance of maintenance based work from a corrective to a preventive orientation.

2.2.3 SYSTEM OBJECTIVES.

The author initially met with the Operations Manager in order to understand the motives and objectives of implementing an IT system for maintenance. The list of requirements was derived from issues the paper-based system had been failing to address. Added to this were the objectives from a TPM perspective, reporting requirements from maintenance but also from

production scheduling. For the purpose of clarity, the objectives of the project were broken down into three sections;

Maintenance Department Requirements:.

- Scheduling of Preventive Maintenance (PM) checks detailing all checks to be conducted on machines for a user defined time period (per day, week, month etc.).
- Recording of completed checks.
- Inventory control of maintenance equipment and spares.

Operations Department Requirements:

- A means of determining the performance of equipment on a plant wide, cellular and individual machine level.
- Gauging the effect of machine breakdown in terms of labour cost and loss of production capacity.
- Tracking the effect of a Preventive Maintenance strategy.
- Ability to easily review machine performance and steps taken to address earlier breakdowns.

Shared Maintenance and Operations objectives:

- Of critical importance was that the system be easy to learn and easy to use, in effect "User Friendly"
- That the system be easy to update and allow fast and efficient data input and retrieval and remove duplicated data entry.
- That the system be secure and reliable.

2.2.4 Premise of System Design

That a comprehensive understanding and addressing of key system design requirements will ensure implementation success.

With the list of end user requirements compiled, the first step taken by the author was to assess Commercial Off The Shelf (COTS) maintenance management systems for their suitability. What became quickly apparent was that the level of modifications necessary to adapt the system to a Job Shop manufacturing environment set up were both costly and onerous. Thus, in agreement with the Operations Manager, the decision to develop a system in-house was made. The consequence of this was the author would have to both develop and implement the system and at this time, had no prior experience of system development. The author undertook to learn to develop a database application in order to design the system and research was focused on fundamentals of system design and architecture. The underpinning premise at this juncture was that the eventual success of the system rested on the ability of the software to meet end user requirements as stated above.

2.2.5 System Development/Implementation

On completion of the system design, build and test, the author had agreed to meet with all four members of the maintenance department to conduct the system training session which was estimated would take between thirty and forty minutes. Two of the members were absent. The two available maintenance personnel were trained and the remaining two were contacted to organise a subsequent meeting. It was in fact the end of the week by the time each member had been trained so the start of the trial period was renegotiated to the start of the following week. During this time, the author made a point of securing feedback with respect to the system and system usage was monitored over the final month of the co-operative placement.

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2.2.6 PROJECT EVALUATION.

From a broad IT project perspective, the author accomplished the following;

- Development and application of sound enterprise architecture and software design principles for the particular instance found in PWAI
- Documentation of function and resolving these processes into relevant system design criteria
- A concise determination of the system requirements, and perhaps more importantly, why these requirements existed in the first instance.
- Manipulation of data using a recognised database design technique to deliver on user requirements.

From an IT project perspective, what the system achieved was a full and comprehensive reporting system for a minimal amount of data input. The reporting system allowed for control and evaluation of the maintenance function where previously there was no system or method in place for this. Although the database was comprehensive, it was still deemed "user friendly, secure and updatable"

After a period of one month, the maintenance department, who had remained running the paper based method while attempting to use the new program in tandem, abandoned use of the MIS entirely. The system was validated and technically competent, but the Implementation had failed.

2.2.7 CASE STUDY DISCUSSION

The system had failed. Not for its design or technical content but in the means that was used to implement the system and failure to understand imperatives that lay outside specifics of system design. Although all parties to the system had been polled for "system output requirements" there was a lack of understanding on behalf of the author of what

the impact of the system was on the end users in the maintenance department. The main end users, maintenance, had no vested interest in using the system. The following reasons underpinned the project results.

- The extent of the inexperience in use of PC's of the maintenance department.
- The extent to which employees in the maintenance department felt that there was "nothing wrong with the old system"
- The main perceived benefit of the system for the maintenance department was the means to keep a list of preventive maintenance checks that were due.
- The main perceived benefit from Operations Management however was the means to track machine performance and breakdown repair times. The expression "Big brother will be watching us" was mentioned in jest, but in retrospect related the actual feeling of the maintenance end user.
- There was insufficient acknowledgement of the time required to input the data required for the system on behalf of the author.
- There was a feeling that the system was a) being imposed and b) was an encumbrance. This was not sufficiently acknowledged or catered for on behalf of the author.
- There was insufficient interaction by the author during the design and testing phase of the system, the focus of the end user interaction was end user training.
- Resistance to use of the system was experienced in statements such as "I forgot to use it", or "I didn't have time" or simply by the target end user changing the subject of conversation.

- In retrospect the author failed to harness the support of the Operations Manager in supporting the implementation and failed to ensure there was dialogue between all end users of the system.

In a final review of the system the following was noted;

"A major factor in the success of any project and in particular for introducing a computer program where the end users of the system have very little prior computer knowledge is the presence of someone with a vested interest to "drive" and encourage people to use a system, and be directly at hand should difficulties arise. This is even more applicable where the end user does not see the system as necessary, but as a "nice to have". For the first two weeks, data entered on to the system had been as a result of constantly visiting the department and repeatedly requesting data to be recorded. On returning to the system after a two week absence, little to no data had been entered and the data that had been entered was of insufficient quality to be of use.

At project conclusion the only solace was that implementation failure was not an experience peculiar to PWAI. The Meta Group statistic that "The average ERP implementation takes 23 months, has a total cost of ownership of $15 million and rewards(so to speak..) the business with a negative net present value of $1.5million'' confirmed this. The PWAI project was more than an order of magnitude smaller than an ERP implementation and PWAI was a small to medium sized company and yet, despite using established system design methods and significant effort in planning and implementation, the project had failed. The premise of "*That a comprehensive understanding and addressing of key system design requirements will ensure implementation success"* was a necessary, but insufficient premise of MIS implementation.

2.3 CASE STUDY 02: DELL COMPUTERS

2.3.1 INTRODUCTION

Dell was the authors' first employment directly upon Graduation and followed less than twelve months after the Co-Operative education placement in PWAI. The role was as Business Analyst in the Production Control department reporting to the Production Control Manager. The department was responsible for the receiving, organising and scheduling of Dell's Customer orders into manufacturing lots and employed twelve full time employees under the remit of the Operations Manager. The initial request of the department manager was to review a report issued by the finance department indicating that in excess of £100,000 punts per month was lost as compared to projected income based on set engineering run rates for the production lines based on product mix. Dell were unable to source the reasons for variance between planned and actual income and this in turn provided the impetus to develop a system to accurately record the impact of manufacturing downtime. Although there were many systems in place in Dell and the organisation's business was production of PC's, the collation of production, downtime, rework and scrap figures were paper based, time consuming and error prone.

Despite the completely different business objectives, environment and system imperatives, the author was confident that given the experience garnered from the PWAI project, that a system to allow Dell to account for and further manage the variances could be achieved. A method to resolve the variance accounting was presented and a deadline for project completion (four months) agreed. Significant implementation refinement from the PWAI system was required if the eventual outcome of the system was to be successful, thus the author sought to find a more nuanced means to work with those who would be the eventual end users of the system. This first necessitated understanding firstly how Dell's environment differed from that of PWAI.

2.3.2 COMPANY BACKGROUND

At the time of the project inception Dell was the leading direct computer systems company with over 29,000 employees in thirty three countries. Dell's mission statement was "To be the most successful computer company in the world at delivering the best customer experience in the markets we serve" In so doing, Dell hoped to "meet customer expectations of the highest quality, leading technology , competitive pricing and individual and company accountability"

Dell Computers still operates a "Direct to Customer" business model. Direct refers to the company's relationship with its customers, from home PC users to multinational corporations. There were no retailers or resellers. Every Dell system was built to order. Since Dell did not build to stock or involve retailers in any stage of the business cycle, component price cuts and latest available technology could be passed on to the customer very quickly.

Although now considerably reduced, Dell is still the largest PC manufacturer in Ireland. At the time of the project Dell was at its zenith. There were three manufacturing facilities in the Limerick region employing over three and a half thousand people. The product range included Desktops, Laptops, Servers and Workstation PC's with the Limerick facilities responsible for supplying the Europe, Middle East and Asia markets. Dell is not a unionised corporation. The project was deployed in European Manufacturing Facility (EMF01) where the desktop product was manufactured. There were seven production lines operating on a three shift basis, seven days per week with between 25 and 30 employees required to operate a line. Each line had a Line Manager who in turn reported to a Shift Manager, in turn reporting to the Production Manager who reported to the Operations Manager. Each line had a dedicated office with PC for the Line Manager to download schedules and general line managing and reporting duties.

2.3.3 System Objectives.

As with PWAI, the objectives of the project grew from a list of issues that the existing production measurement system had been failing to address;

- An increasing fixed cost per unit due to inefficiencies caused by downtime.
- Lost revenue and sales arising from downtime affecting the organisation as a whole.
- A false picture of plant capacity had been generated which in turn was affecting short and long term capacity planning.
- Ineffective plant maintenance procedures due to a "fire fighting" role being adopted as opposed to a preventive focus.
- Significant manufacturing time and resources were being spent on tackling re-occurring issues.
- A climate of acceptance of the status quo with respect to regular issues as the full impact of these problems was not well understood.

As a result of the experience amassed from the first case study, the implications of differing production policies with respect to manufacturing downtime were already apparent, however, downtime with respect to a high volume manual assembly enterprise was significantly different from the previous case study which was by necessity, a Job Shop type manufacturing environment. To tackle the issues described, the system would have to be deployed across all shifts and manufacturing lines. For the purpose of Dell's manufacturing facility, downtime was defined as "anything that prevented the line from meeting its set engineering standard run rate." Thus downtime in this instance would necessarily include software download system downtime, absenteeism, contractors, engineering, new system pilots, material shortages, line changeover times, equipment etc. At the time of system

development, line efficiency was averaging 80%, equivalent to a full day of production every week was being lost due to these issues. Every key metric in plant was being affected by these efficiency issues including Units Per Person Per Hour (UPPH), Ship To Target (STT) and Ship To Commit (STC).

A number of finite objectives arose at inception of the project, during the design phase and even after project implementation, these included;

- System to record all issues that happen on the production floor which in any way impeded production of units for any length of time.
- System to allow for calculation of a percentage downtime per day, week, quarter etc. and allow for Pareto comparison of the major causes of downtime.
- For the system to have the capability to incorporate elements such as run rate, headcount, absenteeism and all other factors necessary to allow Dell to gauge the impact of manufacturing and headcount changes.
- Allow a comparison of downtime between manufacturing lines, shifts, Lines of Business, and departments and allow tracking and monitoring of performance.
- That the only people to input issues and their subsequent effect were the Line Managers. In the event of the absence of the Line Manager, the Line Supervisor was to input the data. This was to allow tracing and validation of the input.
- Access to the system for all staff and for them to have responsibility for obtaining the information relevant for them. It was also decided that the information be openly available so issues could be monitored and resolved by the responsible function.

2.3.4 PREMISE OF SYSTEM DESIGN

Given a sound system design, understanding individual requirements is critical to a successful MIS implementation

In the case of PWAI the premise that a sound system was a necessity was upheld, but the realisation was that although a sound system design was necessary, it was not sufficient for a successful implementation. The failure of the PWAI system was due in essence to lack of engagement of the maintenance department, which was manifested on a continuum ranging from resistance to apathy with respect to using the system. The focus of the interaction with the end users had been on end user training where the system was presented as a fait accompli. It was hypothesized that this reaction was a consequence of the lack of understanding of the imperatives and perceptions of the end users on behalf of the author. Intuitively, it was felt that if users had simply been more involved that the resistance encountered could have been more appropriately addressed. Thus, the research for the Dell system necessitated supplementing implementation method used in PWAI with a means to involve end users earlier in the system.

Without neglecting the technical imperative of a sound and well functioning piece of software, the emphasis for the author for this implementation shifted to the implementation side of the project. Considerably more effort with respect to user interaction was planned for the Dell system to ensure that the same issues experienced in PWAI's implementation were prevented from re-occuring. Thus the premise for the system, and essentially the author bias was "Given a sound system design, understanding individual requirements is critical to a successful MIS implementation"

2.3.5 SYSTEM DEVELOPMENT/IMPLEMENTATION.

The Implementation planning was conducted by piloting the system over the space of a week to estimate how long an implementation across all seven lines would take. Company support had been garnered, interdepartmental communications were ensured by holding an

implementation planning meeting with representatives from each end user group. Notices were posted with information about the system and the planned implementation, each action conducted with an end view with the imperative of ensuring readiness for the system had been addressed as far as possible and the process of monitoring and feedback for the system pilot was instigated. For line D5 for the designated pilot week there were twenty nine separate instances of downtime recorded, accounting for eight hundred and forty six systems lost on the line. Feedback from the line managers was positive, for the first time they had a written record of what had happened during the previous shift, which were able to search if issues they were encountering on their own shift had occurred in any previous shifts. The time required to input the data electronically was equivalent to what had been previously required to assemble the shift report. Minor system glitches were reported and addressed. A second interdepartmental meeting was then held and each department, most crucially including Line Managers, agreed to progress to a full roll out of the system. The task now was to deploy the system across all shifts on the remaining manufacturing lines.

Implementation

The following is a direct transcription from the original system report "For the first two months of use of the system a great deal of vigilance was needed to ensure correct and continued use of the system. Correction of mistakes in the data and follow up in explanation to the relevant manager of what was wrong, or if data was missing, the manager was requested to update the system prior to the end of that shift. Notices were posted across all lines to remind people to use the system for any occurrence of downtime, "regardless of how insignificant" The production and operations managers were also enlisted to enquire on a regular basis on how the line managers were progressing and to notify the author if issues were encountered. After a short period of use and as Line Managers realised that line downtime issues in the system were being addressed and was providing accurate explanations

for productivity losses, they requested a "Shift Passdown" report (full shift report for scrap, rework, quality, production and downtime) facility into the system and over the space of the next two months, a number of new downtime codes were added on the system as the system updated to as accurately as possible reflect the production environment".

With the support of production control, this "Passdown" report became the basis of the daily operations meeting as this meeting had the necessary cross representation required to address the production issues encountered. As a consequence, there was a sustained interest on behalf of the Senior managers to ensure the system was used, and that responses to downtime and re-occurring issues became faster as production performance now had visibility (Appendix B). With this meeting being managed effectively, longer term success became assured. Following the success of the system in EMF01, the author was then requested to implement the system in the remaining two manufacturing plants, EMF02 and EMF03. This required only simple amendments to the system to address minor variations in Downtime codes, Line Names and Line of Business. These amendments were conducted within a week and the author proceeded to meet with the Production, Shift and Line Managers in both plants to agree on an implementation schedule.

2.3.6 PROJECT EVALUATION

The technical means to design and develop the system implemented in Dell was very similar to that used in PWAI. However, the means by which the author worked with those who would in the end be using the system was substantially different and significantly more emphasis was placed on including the end users both at a design and a review phase of the project. As discussed, the author employed the "Voice of the Customer" technique and by the time the system was ready for implementation, all end users were familiar with the project and with the outcomes it had planned to achieve. The project succeeded in vastly raising awareness of downtime and its impact. It focused attention on first maximizing use of available resources to reduce the effect of "absorption" of productivity improvements being

put in place. The system, according to the measurement criteria employed at the time of project inception had been fully met and in EMF01 the project success was acknowledged. The reduction in downtime experienced between the first and second quarter of use of the system was an overall downtime reduction of three percent. This equated to 1500 systems per week or 78,000 systems per annum at full capacity.

As mentioned in the previous section however, constant vigilance was still required for a period of two to three months after the project and in retrospect, despite the emphasis on and benefits of the database, the system would have been in peril were it not for continuation of support in terms of constantly chasing missing downtime records when the shortfall in engineering run rates was not fully accounted for. Interestingly, Line D5 where the system was piloted was the least problematic. The author makes reference in the final system report at the time that " although used, the system did not experience the same level of success in plants EMF02 and EMF03" on review, the following reasons explain why this outcome variance was experienced.

As only one line, D5, was used for piloting the system, for that week, the author had regular daily contact with Line Managers from each of the three shifts and there was sufficient time to discuss the full system workings with the end users. Updates or changes to the system were completed within a very short time of the request being made. It was not possible for the author to return to every other end user (line managers from D1, D2, D3, D4, D6 and D7 across three shifts) and to interact or review the system to the same extent with each end user.

Although the author had gone to significant lengths at the design stage to involve people, as much focus yet was required to allow room for discussion at the implementation stage. After the results of the pilot on D5, management had a vested interest in seeing the system deployed in as short a timeframe as possible. Thus when the time came to implement the system across the rest of the lines, the system was presented much more assuredly by the

author with respect to any of its design or operating parameters as it was now acknowledged from senior management that the system "had to be used." Changes could be made, but the approach taken on behalf of the author was as mentioned much more assured and less room was left for negotiation. With a one week implementation timeframe, there was less time available to spend with remaining individual line managers. Sufficient time and effort had gone into debate at the early stage so that "resistance" wasn't an issue per se, but the level of engagement with the system was felt by the author to be at a lower level. This was exhibited by fewer requests for help, less detailed explanation of downtime being recorded, missing records and if there was a system crash or problems in accessing the network preventing access to the system, neglecting to inform the author.

With respect to the implementation of the system in the second and third plants, the author referred to the level of success as not being on a par with that experienced in EMF01. As the system had been developed, the time span requested for implementation of the project in EMF02 and EMF03 was much shorter, three weeks were allocated to the author for the two plants. The same subset of reasons attributed to the differing engagement level between D5 and the remainder of the production lines were experienced. Missing records, one-line downtime descriptions that were insufficient to allow root causing of the issue, lack of notification of system inaccuracies or changes needed and in some cases apathy. It was significantly more difficult, impossible in some instances to establish the type of relationships that had preceded the EMF01 implementation, these factors combined with the fact that the author was not present on site in either EMF02 or EMF03 meant less footwork could be employed to address these issues.

2.3.7 Case Study Discussion

With respect to end user requirements specified, performance of the system and reduction in downtime achieved, the system had achieved all that had been hoped for. If success was measured by level of resistance it had also achieved what it set out to do. Resistance to the

system in terms of outright avoidance of use or in strongly voiced objections were not experienced as it had been with the PWAI project. However, if the author was to arbitrarily rate the level of success of the system with respect to the level of engagement experienced, the system would have been rated at 80/85% for line D5, 60/70% for the remaining lines in EMF01 and averaging at 50% for EMF01 and EMF02. The author realized that in fact the success dictum for the system was if the author wasn't there to constantly encourage and reinforce use of the system and if production and operations management had not lent as much support, would the end user still have used the system?

Thus emergence of the realisation that while resistance had not been an issue, varying levels of engagement had been. There had been a direct correlation between the approach, level and type of relationships developed by the author and the resulting level of engagement by end users in a way that had not been dealt with by the VoC method employed. With respect to the premise for system implementation;"Given a sound system design, understanding individual requirements is critical to a successful MIS implementation"*:* This was held to be true and certainly contributed to a significant improvement in the methods used in Case study 01 but was still insufficient to explain the varying levels of engagement experienced. The question most frequently reflected upon at the end of the cycle of implementations across the plants was what would the effect of the system have been, if all end users were committed to the same extent as experienced from line managers on Line D5? The answer is;

- A significantly better quality and level of information being recorded.
- Significantly less "legwork" on behalf of the implementer post implementation.
- No requirement for issuing of dictates from management such as "the system has to be used".
- An improved level of openness and sharing of information, and establishment of trust.

In conclusion, an increased likelihood of long-term success and self-sustaining of system development. There was realisation that there was a series of effects experienced on Line D5 that had not been experienced in the remainder of the lines in EMF02 and the other two plants and this phenomenon was simply best described as engagement. An understanding of how to formalize and support the type of engagement, in effect, the motivation to adopt and use the system as it was encountered on line D5 was required. The opportunity to explore this question and to further develop and test a model of implementation became possible less than two years later with the opportunity to develop and implement a third Manufacturing Execution System for Garrett Engine Boosting Systems.

2.4 CASE STUDY 03: GARRETT ENGINE BOOSTING SYSTEMS

2.4.1 INTRODUCTION

In 2002, the author left Dell to take up a position as Manufacturing Engineer within the machine cell business unit of Garrett Engine Boosting Systems. The machine cell was comprised of twenty two manufacturing cells, each comprising four pieces of heavy plant. There were in excess of one hundred and eighty part numbers which were supplied by a separate business unit (Compressor Wheel Foundry) adjacent to the machine cell. The plant operated twenty four hours a day, seven days per week employing one hundred and sixteen people. A short time into the role, an IT development budget of two hundred thousand punts was allocated to the machine cell. The business unit manager, to whom the author reported, convened a meeting with the shift managers and engineers to discuss how best to deploy the available budget and the opportunity of developing a real time Manufacturing information System was put forward by the author. The requirements for such a system for Garrett however was of an order of magnitude greater than either of the prior systems, as was the complexity of the manufacturing set up in the machine cell. The outline agreed purpose of the system was to put in place the means for real time capturing and reporting production output and downtime, scheduling and batch tracking, maintenance and quality in real time for each

of the Cells. As IT requirements of the project were significantly more involved than the prior two systems, a hardware engineer was contracted to develop the coding and hardware cabling and interfaces needed. The written proposal was accepted as a consequence of a myriad of production issues with respect to quality, mixed product, productivity and customer delivery times.

2.4.2 COMPANY BACKGROUND

Garrett Engine Boosting Systems, a subsidiary of the transportation and power systems division of Honeywell, is one of the world's leading manufacturers of engine boosting systems for passenger cars and commercial vehicles. The facility is split into three business units and employs approximately 500 people, producing turbine wheels and aluminium compressor wheels for both commercial and passenger vehicle turbochargers. Honeywell supplied components both to sister plants based in Thaon Les Vosges, France, Skelmersdale in the UK and Atessa, Italy. Customers included BMW, Chevrolet, Citroen, Fiat and Peugeot. The product range was broad and included making turbo compressor wheels used in one litre Fiats, to sixteen litre Volvo tractor units. The work environment in Garrett was one that was highly unionised with partnership agreements only in very early stages. The project was implemented at the same time as intense union/management negotiation over an annualised hours method of direct labour remuneration.

2.4.3 SYSTEM OBJECTIVES.

The set up of the machine cell was significantly different to the previous two system installations in that there were twenty two individual manufacturing cells. Each requiring one operator to cycle the compressor wheels through four different types of equipment. For every two cells, a third operator was allocated for materials handling and for cover during a staggered break system. The manufacturing issues being experienced at the time were complex and broad ranging. For ease of analysis these were segregated into their separate functional areas.

Production Efficiency.

1) The machine cell was consistently missing target production rates.

2) Poor levels of record keeping of levels of scrap and rework.

3) High levels of discrepancy between actual levels and reported levels of downtime between maintenance, production and supervisors.

Material Tracking and Control

1) Inconsistency between the reported level of material being delivered into the cells and resulting finished goods.

2) Unless stock was physically counted, there was no means to track levels of material at each individual cell.

3) No means of early flagging of a stock out at individual cells, resulting in loss of production time in changeovers and under-utilised labour.

Quality

1) Given manual means of recording production data there was little emphasis placed on accuracy of the reported levels of scrap.

2) For defective products returned by customers, it was extremely difficult to trace back the product to the time, batch and cell where the product originated.

3) Little or no ability to measure the effect of engineering or quality interventions made.

Scheduling

1) A significant time lag between the delivery of a production schedule for a shift and gauging the performance of production with respect to the schedule. By the time scheduling had received word back on the issues, customer shipments had often been missed.

2) Operator and production managers had no visibility on planned schedules and often had difficulty in making fully informed decisions on what parts to run on particular cells or pre plan for changeovers.

3) No facility for amending or changing precedence of customer orders once a production batch had been started.

A provisional report was compiled on how an MIS could address these issues. The project application was approved and the full annual IT budget for the Machine Cell was allocated to develop the system Controls and Automation.

2.4.4 Premise of System Design

That given a sound system design and comprehensive understanding of user requirements, the level of engagement with the system is influenced by the implementers ability to fully understand and negotiate with the full range of end user reasoning with respect to the MIS.

2.4.5 System Development/Implementation

As discussed in the introduction, the system for Garrett was by its nature an order of magnitude more complex that either of the systems in the two previous case studies. The design intent was to have a system that recorded, processed and returned data on a real time basis from the twenty two separate manufacturing cells that seamlessly integrated operations requirements with functional support requirements. Because a significant budget had been allocated, there was opportunity to develop the system on “real time” basis.

The framework for implementation complete, the Garrett MIS project was begun. By virtue of the size of impact of the system on the end users and as informed by the prior two systems, a significant amount of time was dedicated for user interaction at the design and development phase of the system. As a consequence, the first task undertaken by the author was to meet with each of the proposed end users as had been detailed in the original budget submission. This included scheduling, quality, operations managers, production operators and maintenance. Where a Voice of the Customer questionnaire had been used in Dell, it was felt that this step was not a wise course of action to adopt in Garrett as the strength of the union was such that the author surmised use of such a formal instrument would automatically have generated a sense of apprehension on behalf of the end users. Two months prior to the author joining the organisation. there had been a strike by the shop floor employees with respect to working conditions. Although the industrial action had been resolved without having to revert to the Labour Relations Committee, there was a felt lack of trust and the focus for both management and workers was on resolving disputes regarding existing work practices rather than introduction of new ones. The plant was heavily demarcated between job functions to the extent that Engineers were not permitted to use tools other than measuring equipment, as this was regarded as an infringement on the role of the maintenance function. Plant output had fallen considerably below capacity and in comparison to the performance of sister production plants, questions were raised by Garrett's European headquarters as to the sustainability of the plant in Waterford. The proposed system would introduce visibility of every aspect of the performance of each cell in a very visceral way and was a significant departure from existing methods of performance tracking.

Implementation

An implementation schedule was drawn up and again negotiated with the end users and posted on the Machine cell notice board. At the suggestion of the author, a pilot including all cells was to be conducted over a week, for the duration of which, operators were asked to continue using the paper based production recording sheets as well as the new

system. This was agreed to without any issue and was on the understanding that assuming the system preformed according to its design intent, that all production sheets would be eliminated from use. By now each operator was familiar with the individual functions and screens on the system, of what the system was designed to do and what their role in the system was.

In total, the project took just over 18 months to implement but the actual end system implementation happened over a very short period of time. When the system launch date was chosen, the author booked the company boardroom and requested Shift Managers, managers from each of the representative production support functions, the business unit and overall operations manager and system contractors to be present at a system launch for each shift over the space of a week. This was agreed to and fully attended for each shift.

2.4.6 PROJECT EVALUATION

In this system instance, the use of system architecture design methodology to develop the system was more applicable than to PWAI or Dell as it was warranted by the increased complexity of the planned system. The development of the software and hardwiring of the system was completed by the contract control engineering company Kalem Technologies. As described in the methodology, the implementation effort was focused on the end users in the production area of the machine cell. While stated user requirements were finite and relatively simple to understand and record, this in fact formed only a part of the set of concerns and expectations such that even a VoC process was incapable of capturing. The culture of the organization in Garrett was significantly more difficult than in either of the other two case studies and had not the prior experience of both the failure in PWAI and the varying levels of engagement experienced in Dell been experienced, failure of the implementation in Garrett would have in fact been a certainty. It was not within the remit of the author to deal with any of the “cultural” elements experienced in Garrett, it was however,

possible to work on an individual basis to work towards system engagement. The key critical observations between the implementation in PWAI, Dell and Garrett were as follows;

- Front loading the implementation effort at design and development stage as opposed to focusing on "training" at the end of the system development cycle - this was far more critical than type or length of training mechanisms chosen.

- Allocation of sufficient time to work with each individual end user. With previous implementations timeslots of between fifteen and thirty minutes had been allocated per end user. In majority of instances this took much longer and much more revisiting than in either of the previous two case studies.

- The approach adopted was to ask users from the outset what their concerns/expectations with respect to a system were but this was not a particularly useful exercise until the system design had been developed and represented in an understandable format. 'Ground' and the objectives of the system and how it was planned to achieve them had to be established by the author before meaningful discussion was possible.

- For negotiations to be meaningful it was necessary that there was sufficient flex in the system design to allow modifications and input from the end users and the modifications had to be followed in a relatively short space of time. If it was not possible to make the modification to the system, clear reasons had to be provided, again in a timely way.

- The means of interacting with production operators was more effective when understood from the perspective of individuals focused on protecting their established work practices, workload and attitude to 'new technology'.

Interactions with support functions were more effective when these concerns were addressed but also by making it possible to understand how the system could be used to improve and make efficient existing methods of information management and access to a much greater suite of information.

2.4.7 CASE STUDY DISCUSSION.

With respect to end user requirements specified, recording of production, scrap, rework, maintenance and scheduling, the system succeeded in meeting both company objectives and end user requirements. Given that the authors definition of implementation success had changed from the Dell system from ensuring there was no resistance to the system to meaningful engagement, the system achieved its objectives with a high rate of adoption and usage by both production and production support functions ranging from a rating of between 80 and 90% and five years after the author had left the company the system is still in use. The realisation that there had been a direct correlation between the approach, level and type of relationships developed by the author and the resulting level of engagement by end users was corroborated by the level of engagement with the system despite the difficult environment. With respect to the premise for system implementation;

"That given a sound system design and comprehensive understanding of user requirements, the level of engagement with the system is influenced by the implementers ability to fully understand and negotiate with the full range of end user reasoning "

This was upheld to be necessary and certainly contributed to a significant improvement in the methods used in either of the prior case studies. In conclusion, an interesting phenomenon emerged whereby in groups, even towards the end of the system there would occasionally be 'disparaging' remarks with respect to the system. When the data was returned to and analysed, the quality, consistency and detail of the information required from the end users was in fact excellent. Where as in Dell and PWAI while there had been few voiced objections, often the phenomenon of a rationed contribution was encountered.

The journey undertaken in search of an effective means of deploying Manufacturing Execution Systems was fraught, as was difficulty in finding literature to accurately describe the circumstances encountered and means to address this that would work regardless of where a MIS was deployed. The Meta Group statistic that over 50% of these types of systems implementations fail and that over 90% are late or over budget was no longer a revelation.

While the authors understanding had been refined by each case study as to what differentiated the varying levels of success, the next step was to seek to meaningfully structure research in an attempt to organise the experience synthesized from case studies with a view to determining whether these insights could be developed into a MIS implementation framework more universally applicable. The subsequent chapter deals with the theory reviewed in order to develop a research instrument to establish whether or not the framework developed had relevance and validity in domains and implementations conducted independently of the author or the domains of application described.

CHAPTER 3: LITERATURE REVIEW & FRAMEWORK DEVELOPMENT

3.1 INTRODUCTION

The first body of literature reviewed in order to establish the state of the art in implementations is an introduction to ERP systems and specifically for the purpose of this research Manufacturing Information Systems or MIS's. The subsequent section deals with critical success and failure factors in implementations of this type. Exploration of this literature allowed development of a framework of corroborated phases and factors in implementation to be established but also allowed identification of subsequent research required to identify a means of mitigating human risk factors.

On completion of the review of critical failure and success factors, issues other than engagement at the level of the individual which, according to the literature can affect the eventual success of an MIS implementation are addressed, these include MIS perspectives such as hardware, interfaces, customisation, modelling of enterprise systems and project management issues. These are then placed in context with respect to individual engagement.

Within methodologies known to address human factors, the most referenced of these is Sociotechnical design and the tenets of this theoretical approach are discussed via three industrial case studies, the litmus test of the suitability of research addressing human factors. The review concludes by discussing the applicability of the approach to the case study experiences. The critical success factors are again revisited in light of the case study experience and Sociotechnical review and the domain of research of resistance to change was indicated as the most opportune domain to research in order to synthesise the case study experience. The resistance to change research domain is introduced, current considerations including re-interpretation of the meaning of the term, prescriptive linear methodologies, classification of the

effects of change and methods for dealing with the phenomenon are reviewed and discussed. At this juncture, while a significantly improved understanding of the case study experiences had been developed and strong basis of understanding critical failure factors, resistance to change literature did not provide a means of addressing individual human risk factors in an industrial setting.

Given the assertion that resistance and engagement are at either end of the motivation to adopt continuum, the research domain of work motivation literature was chosen as the domain of research from which to develop the augmented methodology. Theories including Needs and presses, Value theory, Trait/personality theories, Expectancy models, dissonance, Equity, Social Cognitive, Value, Organisational Behaviour Modification, regulatory focus of the hedonic principle and psychological contract theories are explored to develop a suitable method for addressing the concept of individual engagement in relation to an MIS implementation. The theories of motivation are assessed under the criterion of validity, robustness and sensitivity in the context of an industrial implementation. In the light of the case study experience, it emerged that no one theory addressed the exigencies encountered, hence two theories, which address the human factors encountered are combined. The ramifications of the merging of these two theories are discussed, and how they may have affected the case studies had the approach been adopted. The theories are then compared to prior motivation theories reviewed in order to ensure that no established tenets of motivational theory are contravened. In conclusion, the implications of the theory for augmentation of an MIS implementation are discussed.

3.1.1 ENTERPRISE RESOURCE PLANNING SYSTEMS AND MIS.

Manufacturing Information Systems (MIS's) have for the main part been provided as the operational backbone to Enterprise Resource Planning (ERP) systems since the 1980's. The eleventh edition of APICS defined ERP as "A framework for organising, defining and standardising the business processes necessary to effectively plan and control an organisation so

that the organisation can use its internal knowledge in order to gain external advantage".(Blackstone Jr., 2004) The advent of client server functionality in the 1990's dramatically affected the way in which information could be input, retrieved and manipulated across all levels of the organisation and opened panoply of opportunity for manufacturers in terms of managing real time processing of information and supporting business functions that drove the lifecycle of an order from inception to delivery. Order planning, processing and tracking became visible and traceable at all stages of the lifecycle of the order. The performance of the overall organisation could be remotely managed and global sales and operational efficiency instantly calculated and acted upon.

Indicating the scale to which these systems have been adopted by industry by 1999, JD Edwards, an established ERP provider, had more than 1700 customers in over 1000 sites worldwide, Oracle currently has over 41,000 customers and SAP is the world's largest inter-enterprise software company and the world's fourth largest independent software retailer employing more than 20,000 people in over 50 countries (Jacobs, 2007). These statistics prove the proliferation and the rate at which these systems have become an integral part of organisations globally. As Manufacturing Information Systems have become a global phenomenon, they are no longer seen as a differentiating factor. MISs are now seen as part of the cost of entry to a market if an organisation seeks to build markets and trade internationally (Hunton, 2002).

The term ERP is most often used to describe the collection of a subset of IS systems in use within an organisation. They may include any or all of a Customer Relationship Management software (CRM), the Sales Order Processing System (SOPS), and Order Management system(OMS), WIP Tracking and Control Systems (WTCS), Warehouse Management Systems (WMS) and Supply Chain and Human Resource Management systems (SCM and HRM).

The focus of this research is upon information technology focused on supporting and executing the manufacturing functions within an organisation. These systems typically focus on scheduling of production, real time information processing with respect to the functions of quality,

operational efficiency, downtime, maintenance, standard operating procedures and material and work in progress tracking and control.

3.2 CRITICAL FAILURE AND SUCCESS FACTORS IN MIS IMPLEMENTATION.

In order to address the research objectives as outlined in Chapter 1 and identify key risks, both from a human interaction perspective, the literature was reviewed for critical factors, both in successful and failed implementations. To accomplish this, it was necessary to research these accounts from multiple perspectives, hence this review is split into a) factors sourced from business oriented publications and b) factors sourced from peer reviewed academic publications. This approach facilitated the understanding of implementation risks from a number of perspectives, the organisations themselves, the practitioners and those of researchers into the domain and was deemed the most appropriate platform upon which the state of the art of implementations could be established and subsequent key areas of research identified.

3.2.1 BUSINESS BASED CRITICAL SUCCESS FACTORS

The area of research chosen to develop an initial framework within which human factors associated with implementation would be situated was that of business based literature available under the heading of Critical Success Factors (CSF's) for ERP implementation. References to MIS's were scarce and as MIS's are components of the majority of ERP systems, it was determined that a sufficiently solid relationship existed between the two to draw on the experiential evidence from the ERP literature as it related to critical success factors for MIS's. Reasoning these systems are sufficiently close in technical scope, content and motives for implementation further supported this. The purpose in selecting this domain as a starting point for the literature review was to establish a framework within which a human factor implementation methodology could be incorporated and also;

- To map the current state of the art in industrial software implementations.

- Identify perceived critical failure and success factors for MIS projects.
- Establish a datum against which academically constructed CSF's could be compared.

Perhaps the most widely publicised case of a problem implementation was with the firm Foxmeyer, whose $5.5 billion yearly turnover business was in the distribution of pharmaceuticals. The background to the case was that Foxmeyer, the first distribution based company to attempt to implement a commercial off the shelf based SAP system. By the end of 1995 expenditure on the project had more than doubled on previous estimates to over $64 million and in August 1996, Foxmeyer filed for bankruptcy. The company subsequently filed suit against both Anderson consulting and SAP for $500 million.

A second widely publicised case of a problem ERP project was Hershey candy manufacturer in the US. After a $115 million spend on ERP, Hershey conducted a simultaneous implementation of all modules during one of their busiest times of year approaching a holiday season (Stedman., 1999). The company consequently announced a 19% drop in third quarter earnings, issued two profit warnings (Wheatley., 2000) accompanied by a 29% increase in inventories after the system ran into issues processing orders and subsequently misreporting of levels of stocks (Koch, 2002).

In 1999 'Gore' founding company of Goretex™, sued PeopleSoft and Deloitte and Touche for $10 million after having to remove 'inoperable' enterprise software. Whirlpool AG, manufacturer of domestic appliances share price dropped from over $70 per share to under $60 after it was announced that they had run into serious shipping delays as a result of having implemented enterprise software. Nestle corporation's ERP software was only implemented after a spend of $280 million and six years (Worthen., 2005). After eighteen months of development and a $19.2 million spend, Russ Berrie toy manufacturer took a charge of $10.4 million to end the SAP project and had to revert back to their legacy system (Nash, 2002). In Ohio, the attorney general has filed a lawsuit against Peoplesoft Inc

for $510 million in damages stemming from an allegedly faulty installation of the company's ERP and student administration packages (Songini, 2004).

The above is typical of the kinds of reports recounted in the business press with respect to ERP implementations. An indicator of the state of Enterprise software's rates of success was issued by Meta Group (1999) after surveying sixty firms who had undertaken an implementation reporting; 'that the average ERP implementation takes 18 to 26 months, has a total cost of ownership of $15 million and 'rewards' the business with an average negative net value of $1.5 million.' In order to elicit if there is a divergence of opinion as to causes of failure within the business community, Table 3.1 in the following pages was constructed to give a comparative view as to the firms own reasoning for failure or issues with respect to the ERP system along with consultants view of the same issue where available. The table is divided into;

- The nature of the business
- The expenditure in time and capital on the ERP system
- Net business effect on the Organisation

A comparison of this nature allowed the author an introduction into the typical language and perspectives into unsuccessful implementations thus giving valuable clues about where to focus on causes of these failures.

Firm and business type	Capital expenditure & time rqd.	Company perspective	Third party Perspective	Business Legacy
Hershey Food Corp; Food manufacturer.	$112 million and four years.	Declined to specify whether issue was from configuration or from the software.	No technical issues reported with system. Issue with how business processes operated.	19% share price drop in 3rd Qtr 1999. 29% increase in inventory.
FoxMeyer Corp; Drug distribution.	$64 million and three years.	Faulty interfaces between old and new systems. Inexperienced implementers. System routinely crashed. Incapable of transacting required level of orders.	First 'Commercial off the shelf' application of SAP R/3 in a distribution company.	Lost orders. Bankruptcy. Consulting firm sued.
W.W. Grainger Inc; MRO supplies and services.	$9 million Two years	Over counted inventory. Insufficient performance. Routine crashes.	Consultant not used.	$19 million in lost sales $23 million in lost profit.
Cleveland University; Education.	$510M lawsuit filed. Four years project.	''Woefully deficient'' software.	Poor relationship between vendor and customer.	$5M lost revenue. Consulting Firm sued.
Gore; Fabrics for outerwear clothing.	$3.5 M (cost of software not included)	'Software failed to perform as promised' Employee acknowledgement that Org culture/ structure issues.	'Cause of the apparent failure may be indeterminable'	'H.R., benefits and payroll administration in chaos' $10 M Lawsuit filed(Peoplesoft)

Firm and business type	Capital Exp& time.	Company perspective	Third party Perspective	Business Legacy
National Australia Bank; Financial services provider.	Au $200M. Project duration not available.	Complex business structure, restrictive policies and practices poor compliance and lack of clear cultural framework.	Organisational problems and a failure to supply documentation that would have allowed investigators to assess integrity of the system.	$ 200 Million writedown.
US Navy; Military	$1 Billion From 1998 – 2005 on four ERP pilots.	Denial of any issue and 'happy' with how pilots have been conducted.	'Installations incompatible and redundant' [Govt. Acc. office]	$ 1 Billion on existing pilots and further $800M 'in jeopardy'
Russ Berrie; Soft toy manufacturer	$19.2 Million and 18 months	The System lost orders. Orders were 'un-traceable.'	Expectations set too high.	Lost orders Lawsuit filed against SAP & Ernst & Young.
Omni Hotel Group. Hotel and Leisure.	$250,000 Project duration not available.	Incapable of use by 40 hotels. Difficult to use. Slow.	Lack of system sponsor. Vague scope. Technology.	System scrapped. Relationships Damaged.
Nestle; Food and Beverage manufacturers.	$200 M including consultancy. four years.	Scale and complexity. (80 diverse and autonomous units. Resistance to change	Key stakeholders not involved. Lack of understanding of system.	$200M capital spend. Project timeline effectively extended by three years.
Whirlpool AG; Consumer durables.	Not available.	Introduction despite system issues being flagged. Delays..	Transitioned from legacy to SAP before SW ready.	Up to 8 week order delivery delays.

Firm and Business Type	Time & Expenditure	Company Perspective	Third Party Perspective	Business Legacy
Jo Ann stores; US based fabric retailer	$30 Million. 2 years	Software incapable of covering retail function	First deployment of retail based version of SAP	Project completion date missed by one year.
Volkswagen Automobile manufacturer	Not available	Company unable to deliver parts after SAP installation	System was heavily customised to suit the organisation	13 employees assigned to resolve issues. Delay of several weeks for repairs for customers.

Table 3.1 Business Press Failed Software Implementations and Effects

What was observed from the reports is namely that implementation issues do not appear to be specific to business type, size, location, software package, consultant used, size or business environment. Judging from the range of perspectives from both the company itself and third parties, no single or even few human factors emerge as having determined the failure of these systems, although there is a tendency on behalf of the firm to lay blame at the doorstep of the ability of the software to complete the function expected of it in the manner it is expected to execute (Songini, 2004, McGeever., 1999). There is however no over riding 'set' of factors definable. Each case study exhibits characteristics that are specific to that particular implementation of software.

In conclusion, business based case studies and analysis of factors leading to problems with installations yield a variety of different perceived causes. It must be remembered that these perspectives are only two sets; both were subject to censure with respect to what views could be expressed. Even when views were likely to have been honestly expressed, these perspectives were still biased and coming from only two of a number of possible viewpoints; invariably, a senior member of an organisations management team and in the case of the consultant, views were

delivered in a manner expedient to maintenance of business relationships. The views of end users and other associated parties in the literature were noticeably and consistently absent.

In Independent analysis of the results, the tendency is to lean towards 'software implementation' or human factor issues, not the software itself. Although the review of the business literature provided a starting point, it was difficult to derive knowledge that could be directly applied to the project. Fuller descriptions and more structured analysis of system issues were required in order to construct an initial implementation framework. Thus the literature review progressed to academically assessed case studies and papers.

3.2.2 RESEARCH BASED CRITICAL FAILURE AND SUCCESS FACTORS

In order to understand whether there were characteristics repeatedly featured across successful implementations and secondly, to provide a counterpoint to the business reports, literature where critical success factors were empirically assessed was reviewed. The research revealed a number of different methods for determining what the salient features for a successful implementation were. Included in the review is analysis from individual case studies, questionnaires conducted across similar roles and across similar size companies. Examples of how systems have failed or succeeded are taken from case studies in public institutions as well as private. The purpose of this section of the review is to compare and contrast the results of the review and collect those features deemed 'critical' as they pertained to either a successful or failed implementation.

What may be seen from the following section is the variety of means used to assess key features of a successful implementation. Methods used include analysis of variance from returned questionnaires, grounded research results in terms of comments and attitude statements recorded from end users. There are instances of a number of individual results across function and across level within the same company and instances of collated results from a single role or function. Included is one longitudinal study of implementation recorded over eight years and a pedagogically appealing instance of a study comparing features from both a successful and an unsuccessful implementation of information systems at the same enterprise. Given the variety of

methods, proof of the key features will be if they are listed consistently, regardless of the method used to determine what they are, in essence a triangulation of factors

While the size, scope and justifications of an MIS projects change from firm to firm, a baseline for comparing factors can be established under the two broad headings of 'system based' and 'organisational' issues .Each paper presenting a success factor listing is divided into these headings and will be further delineated into the type of study, the enterprise type and 'perspective'. The factors are numbered in accordance with their significance. Although there were a number of possible classifications, Milis & Merckens' four categories (Goal Congruency, Project team, Project Acceptance and Implementation Process) accounted for the majority of critical success factors encountered in the review of the literature. 'Other' was used for factors not classifiable under these four headings. (Table 3.2)

Study type	**Enterprise Type.**	**Success?**	**View.**	**Goal Congruence**	**Project team**	**Project Acceptance**	**Imp. Process/ 'other'**
Multiple case study (Muscatello., 2003)	Private.	Two out of four companies assessed successful.	Author	Strong relationship between mfg strategy & ERP	Committed project sponsor key.	Function of sponsor and congruence.	Need to re-engineer processes prior to implementing. ERP.
Literature review. (Pettigrew., 1997)	N/A	N/A	Author	Coherence between strategy and change processes.	Committed top mgt. support.	'Adroit use of reward and recognition'	N/A.
ERP in four 3rd level institutions	Public	Over budget and over time allocation and poor levels of	End users & Author	N/A	Triangular relationship between consultants, mgt and end	Analysis of culture and environment critical.	Effective communication cited as key.

(Allen., 2002)		acceptance In all four.			users.		
CSF Literature review. (Holland., 1999)	N/A	N/A – model proposed.	Author	'Business mission' ERP strategy, Legacy systems	Project schedule and plans, Top mgt support	Client acceptance, monitoring and feedback, communication and feedback	Trouble - shooting
Case study (Motwani., 2002)	Private	One success. one fail.	Author	Stimuli, formulation scope, decision making, strategy led.	Open communications, level of risk aversion.	Management and scope of change, 'cultural readiness	IT leveraging/ Cross training, Process capturing.
Mail Survey (Zhiang., 2003)	Private.	Multiple responses.	Mixed	Not stated	Effective project mgt./ Company wide commitment	Education and training. Data accuracy. Vendor support.	Re-eng of business processes software Suitability..
Mail survey (Somers, 2001)	86 private and public organisations.	Not stated	CEO, CIO,presidents, senior VPs, director, mgr.	4)Clear goals and objectives.	Project champion. 1)top management support. Project mgt	User training and education. 'expectations mgt.' Steering committee. BPR. 2)Project team competence. Change management.	Vendors relations/ Use of consultants /Minimal Customising of Architecture.) inter - departmental co-operation.
Case study and literature [illegible]	Banking and insurance.	Range.	Authors	Selection and justification. IT strategy. Project	Mgt. involved and support. Project team	Change management. Relationship management.	Proper project resources

review (Milis & Mercken 2002)				definition. Project plan. Business alignment. Success criteria.	selection. Urgency built in. Competent manager.	User participation. Training.	
Literature Review (Umble., 2003)	N/A	Author	Range.	Clear understanding of project goals	Commitmen t by top mgt	Excellent project and Organisational change management A great implementation team. Training	Data accuracy Performance measures
Case study (Parr., 2000)	Private;	Author	First project failure. Second project Success.	Goal and scope definition	Commitmen t to change.	Management support, empowered decision makers. Project champion	Vanilla ERP Balanced team
Survey (Gyampah., 2004)	Private	End users and mgt.	Range	Clear understanding of goals. Solid argument for change.	Shared belief	Ease of use. Personal relevance of technology. Satisfaction with technology. Training. communication	N/A
Case study (Barker., 2003)	Private	Author	Failure	N/A	Employee involvement .Mgt. support	Recognition and retention of employees.	N/A
Survey	Private.	End users	Range	N/A	Project mgr.	Project team	Implementation

/interview (Kumar., 2003)					selection criteria. Project planning	constitution. Training	partners Existing infrastructure. Software configuration.
Survey (Soja., 2006)	private	End users	Range	Project definition and organisation. Link with strategy	Top Mgt. involvement .Team composition and involvement	Implementation promotion. Detailed schedule. Pre implementation analysis. Fast effects. Experience in implementation.	Monitoring and feedback Budget/ System reliability. Minimal customisation.
Survey and literature review. (Ehie., 2005)	Private	End users & Mgt.	Range	Feasibility/ evaluation of ERP project.	HR dvlpmt. Top managemen t support	Consulting services Cost/Budget	Process re engineering IT Infrastructure.

Table 3.2 Academically Assessed Implementations

On first review of the factors, the concept of committed management support and change management are immediately evident as a recurring theme. The concept is further developed by (Muscatello., 2003) stating 'managerial issues from planning to implementation, present major barriers to the effective adoption of ERP systems'. What can also be observed from the table is that this factor reoccurs from private enterprise to public enterprise. Allens' (Allen., 2002) research into the implementation of systems in third level institutions in the United Kingdom denoted the management of organisational change as key. This stand is corroborated by Slevin and

Pinter (Slevin. D.P. Pinter, 1987) and Holland (Holland., 1999). Elaboration of the concept and how management commitment and support are pivotal is further discussed by Somers (Somers, 2001) in his study on CSF's.

A second dominant theme that emerged from the review was that systems needed situating within the strategic plan of the firm with 'clear definitions of goals, expectations and deliverables and that the firm must carefully define why the system is being implemented and what critical business needs the system will address (Umble., 2003). Essentially, that the correct business motivation was in place for implementation of the system and that being a substantial part of an overall strategic plan was a prerequisite to system success. Sharing of the vision with the workforce was also instrumental (Markus, 1983). The reason why was perhaps best explained; "Because implementations usually exceed the timeframe for a typical business project, clear goals, a business plan and vision are needed to guide ongoing organisational effort" (Nah, 2003).

Project acceptance concepts such as 'adroit use of reward and recognition (Pettigrew., 1997), analysis of organisational culture (Allen., 2002)and an experienced project implementer (Kumar., 2000) are common across the reviews. Project acceptance, although a broad term, is accepted across the board from popular literature as is system design/architecture analyses. The research premise of there being an issue with respect to how human factors, in particular end user engagement are addressed are borne out by numerous instances of failure to win project acceptance. The corresponding effects are well detailed in numerous case studies both in journals (Markus, 2000a, Muscatello., 2003, Allen., 2002) and also in business press (Vogt, 2002, Collet., 1999, Songini, 2005).

What the author understood from the research was that while there was consensus with respect to many CSF's, interpretation as to the meaning of each of the terms was still highly subjective, susceptible to individual interpretation and without guidelines for implementation or operationalisation. What was observed from each of the studies were that critical failure factors were compiled by researchers in order to facilitate projects at the planning and management stage

with few, rarely referring to the implementation with end users except in reference to training. Also noted was the 'generality' of the factors proposed. They are applicable not simply to just an implementation of Manufacturing Information Systems, but are applicable across any large process or business operations change. This may account for the similar high level of abstraction encountered in the views of the researchers in suggestion of critical factors. For the most part ,critical factors in the failure of systems were simply the opposite or indeed absence of the success factors reviewed.

Comparison of factors as enumerated by business literature as opposed to the journal reviews resulted in an interesting finding however. Although not as explicitly stated in the business literature (table 3.1), the views of the third party or consultant to implementations erred on the side of issues with "management of the implementation process" which was in accordance with responses from the academic literature, but as may be seen from the review, a substantial problem in identifying key risk areas in human factors associated with implementations emerged from the review. The language used to describe human factors was vague, non specific and capable of only broadly indicating where end user difficulties lay. These failures were couched in terms such as 'organisational problems' or 'management of the implementation process' as described above. The identification of key areas for human factor research would have to be informed by the experiential evidence from the case studies and terms where resonance lay with respect to language and description of human factors from the literature.

A second key observation from the CSF literature was the divergence in the views of external sources and the enterprises' own explanations of an implementation failure. The consensus view from businesses or firms would indicate that the system was technically problematic, which from their perspective accounted for the failure. Technical competence and ability however were only briefly referenced in the literature (Reel., 1999, Kumar., 2000). Possible explanations for this dichotomy of opinion may be that a) the enterprise believed technical issues were the root cause of failure as this is the information directly reported to them, b) it may not have been expedient for the purpose of business reputation and shareholders for the enterprise to admit there were problems

with management of the implementation and c)There may indeed have been poor design or programming of software.

To summarise, the review of CSF's in both the business literature and academically reviewed journals has provided;

- Solid basis from which to proceed as it was now established that extensive data existed. Making possible a preliminary framework for implementation.
- Realisation of congruence between implementation consultant's point of view and the results of academic surveys and case studies.
- Identification of a theory practice gap between these entities and the enterprises own assessment of failures.
- A definitive set of prerequisite success criteria for inclusion into the framework (Figure 9). Evidence suggests there is a lower rate of success if these key factors are absent.

The framework derived from the literature below in Figure 3 comprises the total CSFs identified across the literature delineated into successive stages or waves of a MIS project.

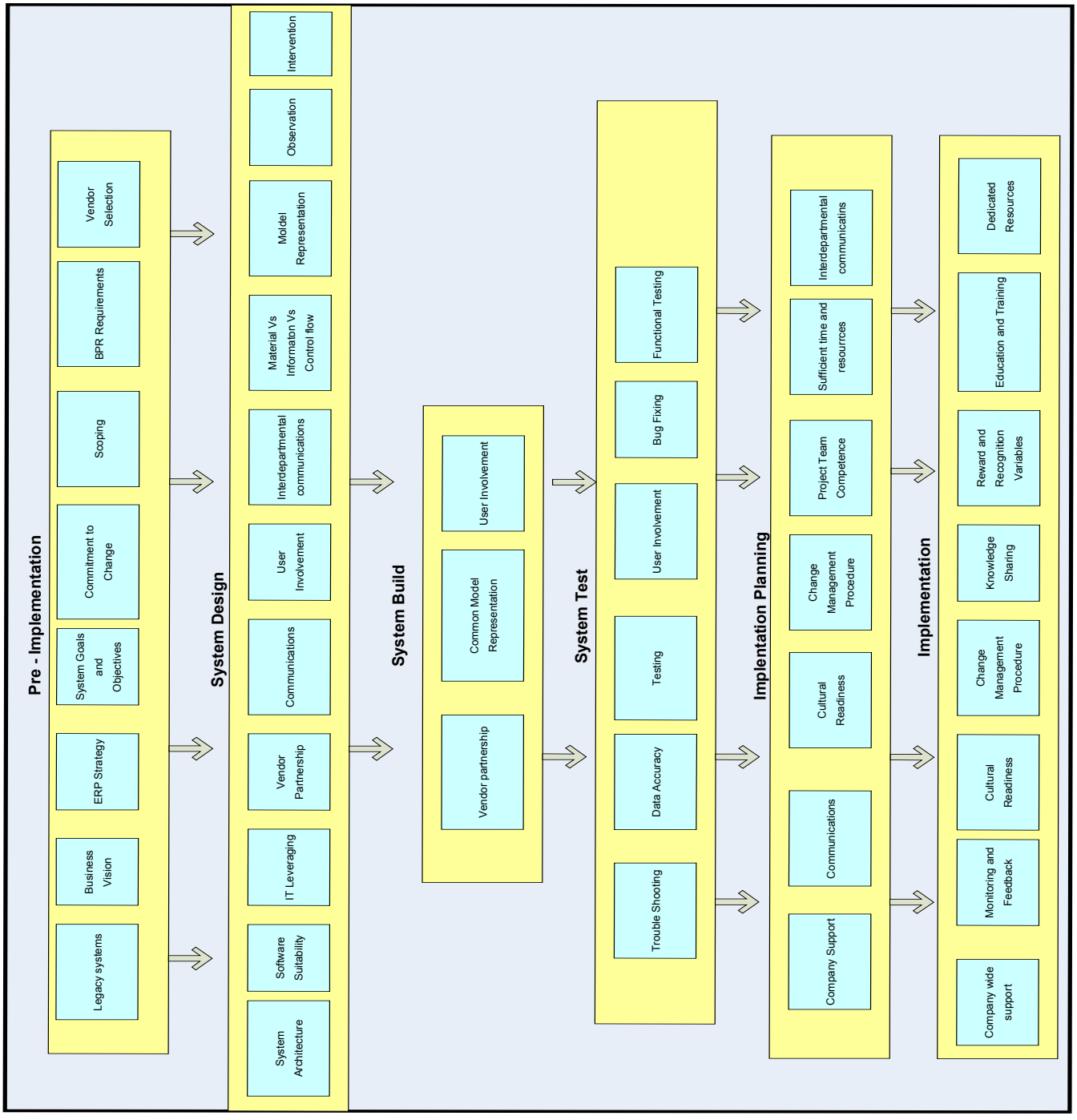


Figure 3 Implementation Framework (CSF's)

No single research domain held answers to the questions that emerged from the case studies encountered. The initial research question was how to most usefully conduct this initial review as so many discrepancies were encountered, not only between perspectives of implementers, end users and organisations, but also between business and academic publications. Given the width of domain issues unearthed from the review of critical failure and success factors, prior to exploring human factors, Information Technology imperative were incorporated in the outline implementation framework and are addressed in the subsequent section in order to ensure the human factors explored and done so in the context of an overall implementation.

3.3 MIS TECHNICAL IMPERATIVES

The review of critical failure and success factors identified a number of information technology oriented issues with MIS implementation that are critical to address before issues of individual engagement become a factor. Unless the MIS is functioning in a way that is useful for end users the issue of engagement is a moot point. The ability of the MIS to process the functions it was designed to in an efficient, timely and reliable way is an accepted tenet and one that must be addressed prior to any MIS design and installation.

The first technical problem that emerged in the review of critical failure and success factors was the ability of the system to reflect "the way the business operated" and this in turn opens a number of system design issues. First and perhaps most notable of these is whether the organisation decides to design a bespoke system that is uniquely tailored to meet their requirements or whether they decided to purchase a commercially available off the shelf package. Should they decide to purchase a pre designed commercial package, the decision to what level to customise the package then has to be made. Even though these packages are designed to work in all organisations, they often do not provide all the functionality to meet the organisation needs (Rotherburger, 2009). Traditionally the cost of implementation grows exponentially with the degree of customisation

required. If the organisation however decides to adapt their processes to suit the software package this brings with it the prospect of also having to implement a Business Process Re-engineering project which is costly, timely and risk prone in its own right. Although some customisation will always be required, the key is to keep the level of customisation to a minimum (Somers, 2001).

The second set of factors that may underlay functional problems of the deployed MIS is the inability of the system to accurately represent and transact the information processes required to conduct the manufacturing requirements. Under this heading there are a number of possible causal explanations. A key critical requirement of an effective MIS is that it accurately represents the organisations processes. In order for this to happen, the system designer/s must have a means of accurately modelling both the physical and informational process transactions as they currently exist and understand how to align these to the level of customisation possible in a way that fits with the organisational imperatives for implementing the system in the first instance. Enterprise modelling is the set of activities, processes, representations and conceptualisations used to develop an enterprise model (Goul, 2007). There is no agreed modelling standard although UEML (Unified Enterprise Modelling Language) is attempting to bridge this divide (Vernadat., 2002). Modelling is a necessarily complex phenomenon and a key part of the process is the ability to set parameters and scope the model. Schalla et al (Schalla, 2004) in researching the phenomenon concluded that the hierarchical premise on which most planning processes are based is very difficult to capture and that "users and organisations typically circumvent this problem by creating their own workflows independent of the systems prescribed one".

A third set of technical imperatives settles on the physical design of the interfaces used within the MIS and the interoperability of the MIS with other critical systems. Along with data quality requirements such as accuracy, completeness, timeliness and consistency (Xu, 2002), Factors that affect perceived ease of use must be taken into careful consideration at system design. End user interfaces must allow for;

1) Easy to understand error messages

2) Possibility to do useful work with the system without having to learn the whole system

3) Availability of undo option to reverse control actions

4) Confirmation questions before executing risky commands

(Calisir, 2004)

The final set of technical imperatives is that of the existing IT infrastructure within the firm. Questions such as the capability of existing hardware such as servers and communication protocols and the ability of the planned system to interact with pre existing software packages if necessary are critical considerations. The IT infrastructure is perhaps most simply defined as "The enabling foundation of shared information technology capabilities upon which business depends" (Broadbent, 1999). If the planned MIS must integrate with other systems it must perform this function seamlessly while still ensuring data quality.

Each of these factors discussed, hardware issues, Information Technology Infrastructure, System interoperability and integration, level of customisation, data quality and modelling and setting parameters of the MIS and interface design must all be comprehensively addressed and resolved before working with engagement of the end user. There is the possibility however of incorporating end users even at this early design stage of an MIS. As inclusion and involvement of end users from an early stage has been proven to support long term engagement (Buonanno., 2005). Thus, the next requirement of the research was to investigate means of incorporating end users at the stage when these types of questions are under consideration, thus the first domain of research reviewed in addressing human factors in implementation was that of the 'SocioTechnical' method of IT implementation.

3.4 SOCIOTECHNICAL SYSTEMS REVIEW

The development of a Sociotechnical system describes the means of approaching the design of systems from both a technical and a social perspective. A Sociotechnical system is made up of three subsystems incorporating the social, technical and the environmental subsystem (Shani, 1992). Although the concept of Sociotechnical design had been in place since the 1950's a formal rule set for application of the methodology wasn't developed until 1976 (Cherns, 1987). They included the ten principles of: compatibility, minimal critical specification, variance control, boundary location, information flow, power and authority, the multifunctional principle, support congruence, transitional organisation and incompletion. These factors were classified and expanded on by Clegg (Clegg, 2000) and separated into meta content and process factors. Sociotechnical design was acknowledgement that social factors could play a significant role in the design of any type of business process or information system while retaining the end goal of forming a well functioning system. Given that social factors had inadequately accounted for two of the three case studies, the concept merited further research. This was further supported by lack of accounting for organisational environment being put forward as an issue from the CSF review ((McGeever., 1999).

Having established that Sociotechnical design incorporates sociological and technical design, the next point was to determine how far the theory had been applied in industrial settings and what the results were. Sociotechnical theory espoused principles of user involvement, with respect to the 'breaking down' and re-organisation of tasks into complete functions and emphasises autonomous work groups, group based reward systems, performance feedback loops, information sharing, flexible responses and parallel learning techniques (Shani 1992). Sociotechnical design provided a formal method of incorporating end users into the design of a system. A procedure with respect to development of IS systems known as 'Effective Technical and Human Implementation of Computer Based Systems' or 'ETHICS' was developed by Mumford (Mumford, 1995) working under the presupposition that user participation was a major factor in the eventual success of any computer based system. This proceduralisation of factors allowed application of the theory as described in the following case studies.

A practical application of the ETHICS method was examined by Adman (Adman, 2000) in the IS department of a third level institution. The project required that the organisational set up be reorganised in conjunction with the design and implementation of an information system. Adman defines the end goal of ETHICS as not necessarily to produce a usable IS system, but places the emphasis on 'participative design with an appropriate balance between the social and technical aspects of the system'. The process and methodology were described and assumptions such as 'consensus can somehow be reached through participation' and 'organisational needs are known or drawn by management' were noted along with the absence of a means to provide 'discussion on the context and conditions suitable for its use' or perhaps most notable 'guidelines for its implementation'. Although not meeting its deadline, the system was deemed a success by the institution due to the fostering of 'good supporting relationships'. Feedback from participants indicated increased confidence in the system as a result of the 'methodological underpinning' providing a means to explore the problem situation. Most notably, end users felt that what was important was not the end solution but 'actually being part of finding the solution and participating in working towards them' A point of interest from Adman's view was the necessity of 'steering' the work design around 'personalities'. In this subjective context however, the application of 'Effective Technical and Human Implementation of Computer-based Systems' (ETHICS) methodology was deemed appropriate by the author.

A second application of a socio-technical design methodology was in US based telecommunications company Northern Telecom and it's private bank exchange or 'PBX' operation (Shani 1992). The environmental subsystem was described with respect to the market environment, competition, strengths and weaknesses of the firm. The Technical subsystem was described with respect to the technological processes in use, both hardware and software. Included in the description of the social subsystem was the repetitive nature of the tasks, low skill level requirement and communication barriers due to a diverse workforce. The organisation structure was described as being functionally based. Changes in accordance with Sociotechnical design principles were initiated across the three subsystems in parallel. Main conclusions reached from results of the study were that using the methodology facilitated insight into the 'constraints on the adoption of advanced

new manufacturing technology and the organisational transformation required to accommodate new technology'. Also indicated was that 'the problems of interpersonal relations and organisational structure are far less transparent and much less easy to define than those of technology' as corroborated by the PWAI experience. The end results of the project was near elimination of inventory between processes and a substantial reduction in inventory of incoming materials , a 33% reduction in vendors, a reduction in external warehousing from 75,000 Sq ft. to 30,000 Sq ft. The final benefit was from notification of the requirement of an engineering change order from the customer to the first modified product being shipped to the customer was brought from weeks down to under seven days. These changes were over two years in the making.

A third sample application of a Sociotechnical method was in the initiation of a change project in a Swedish production unit supplying packaging material was analysed by Berger (Berger, 1992). The approach was Sociotechnical in that it incorporated 'participative teams' with representatives from operator to management level. New routines 'concerning order processing, production planning, job enrichment, employee introduction and follow-up systems were intended to be gradually implemented.' The author describes the intense effort input by members of the organisation to effect change. After eighteen months however, the project was put to rest after most of the intended results were not achieved. The only lasting improvement was made in delivery performance which was mainly due to 'increased attention through implementation of a follow-up and feedback system.' Analysis of the failure was delineated into two viewpoints: A) 'Managerial' which discussed the fact that genuine commitment was not made by management. Resources to effect changes were not provided when required and as a consequence, there was a corresponding reduction in commitment from involved employees. B) Structural factors: discussed under this heading was 'lack of adequate routines for communication and information among project teams.' The very function which a Sociotechnical method should have supported.

The nature of change programs and success factors with respect to implementation seems to be highly context specific as can be observed from the sample case studies chosen. This analysis bears out comparing case study analysis of factors considered prerequisites to success (Muscatello

etc al 2003, Barton 2001, Reel 1999, Allen et al 2002). Possible reasons for the context specific nature of these elements are synopsised by (Loughman, 2000) and include; 'people do not always use rational methods to make decisions, they view their world metaphorically, symbolically as well as literally, they will not always do what they are told to do, they can be very creative in sabotaging structures and processes they fear or dislike and the formal organisation chart inadequately describes how organisation members conduct their business.' The question then is: what is the capability of Sociotechnical theory to provide a model for the context specific nature emerging from the review of literature? What are it's strengths and weaknesses as noted from the practical application of the methods espoused in light of the case study experience?

The strengths of Sociotechnical theory are in its provision of an effective framework to allow consideration of social constructs while capturing a systems design requirement. It allows for a high level of user participation, supports communication while retaining the notion that the end deliverable must be a sound and functioning system. It makes tentative steps in crossing the divide between social and systems design theory but interestingly, does not borrow on any established theory or schools of thought from either discipline. It is however an important advance in the toolset in the capture of systems requirements.

As a tool, Sociotechnical theory has a number of limitations however. It is still subject to the vagaries of lack of support, whether in terms of time, resources or commitment. It requires an extremely perceptive and able practitioner to deploy correctly and requires a large amount of resources. It should also be realised that 'the notion that participation is always beneficial is arguable'(Shani, 1992) and detail concerning the operationalisation of the theory are scant as are those regarding implementation of a completed system (Adman, 2000). The ramification of this is that there is no allowance made for dealing with an adverse political climate, poor realisation of strategic imperatives and/or consequences of a poor analysis of the three constituent subsystems. Sociotechnical theory fails to account for many values, norms, relations and their structures (Van Der Zwaan, 1975). The argument being, that as a means of analysis of social structures and certainly for interpersonal relationships in a business context, it is incomplete and in closing, there

are no temporal considerations with respect to times between design and implementation phases (Sawyer, 2002).

Sociotechnical theory makes a definitive contribution but as a method or process, it is prone to the same afflictions as a means of achieving a transaction or completing a function. It is susceptible to innumerable tacit and explicit social issues both at an individual and at an aggregate level. The means for dealing with individuals and groups are left to the received wisdom of the practitioner. The cornerstone of Sociotechnical system contribution is in the requirements capturing and design stage. As a discipline it is to be lauded for making a positive step towards bridging the systems design/environment divide, its focus however was limited to participative requirements. A group or individually based method for interaction with key system users thus is not deemed an overarching factor in successful implementation.

In retrospect, application of the methodology would have made a negligible difference to the outcome of the first case study and no discernible difference to the Dell and Garrett implementations. A method that provides a structured method for analysing or understanding resistance to change of these groups (if any) and level of motivation to adopt an MIS system is not broached by Sociotechnical theory. Its imperative is definitively participative design as opposed to achieving successful implementation.

With the systems architecture and design addressed and contribution of Sociotechnical reviewed, the case studies and the CSF review were returned to in order to identify a more focused means of dealing with human risk factors in MIS implementation. The subsequent domain of interest identified was that of resistance to change in that the term captured within it a plausible reasoning for the effects encountered during all three of the authors MIS implementations and was deduced as a likely underlying cause of the “organisational difficulty” as described in the review of CSF’s, Resistance to change was the most commonly appearing term.

3.5 RESISTANCE TO CHANGE

3.5.1 INTRODUCTION

The following literature review of resistance is divided into five sections. The first of which will deal with the origin, definitions and development of the theory of resistance to change from its initiation as valid research concern in the 1940's to a brief review of research to date. Within the remit of the review are also categorisations of resistance to change, the concept of resistance as a positive phenomenon and finally, strategies proposed to address resistance. A heuristic is put forward for assistance in understanding modes and levels of resistance encountered and incorporated into the framework developed at the close of the chapter as a first step in addressing implementation risks associated with system end users.

While reference to 'Resistance to change' has been made during the review of CSF's, (Pettigrew 1997; Allen et al 2002; Muscatello et al 2003), it was described in terms of poor project sponsorship or cultural readiness. The term 'Dealing with resistance to change' was never explicitly stated as a CSF but was couched in a number of obfuscating terms such as culture or lack of operational prepaparedness. In fact examining resistance to change with respect to IT implementations had been relegated to a function of end user training and this was where the author had focused the lions share of interaction with the user with the PWAI case study to the detriment of the project. While end user training is indeed a common critical success factor, increasing the amount of training will have little effect on user resistance if this resistance is not rooted in lack of system understanding. 'Training' and or 'organisational readiness' have become accepted euphemisms for a simple phenomenon. The maintenance department in PWAI and to a lesser extent some of the end users in Dell, simply had little or no desire to use the system developed and in fact on occasion, expended effort to avoid using it. This again did not appear to be a unique experience.

The question to elicit from end users is why do they not wish to use a system? It is hypothesised, given the first two case study experiences, remedying the approach adopted by the author to system end users, acknowledging the possibility of user resistance, its sources and means

to address the phenomenon would positively affect software adoption in these two organisations. The requirement is not for further generation of generic critical success factors but a method to deal with the context specific nature of implementations, and secondly, understanding that this context specificity is due to circumstances unique to that organisation environment and the individuals who work within it.

There remain a number of other unexplored factors in relation to the successful implementation of MIS systems as evidenced from the case studies that simply had not been encountered in the literature reviewed. Had the author the opportunity to return to the time of project inception, the phenomenon of "Resistance" would have been researched prior to implementation. This was the closest terminology that could be found to describe what has been experienced in PWAI , in pockets in Dell and initially in Garrett. The proposition being that by developing a means of more closely involving end users in the design, in conjunction with a means to cater for resistance on top of pre-requisite critical success factors being met, would have provided for a more effective means of MIS implementation. These observations, in tandem with recommendations from the literature review, led directly to a search for methods for dealing with implementations at the level of the individual that incorporate more than simply the functional transactions of the system. One that would take into account experiences encountered during the case studies, in particular, PWAI and Dell.

The concept of resistance to change was first proposed in the writings of Lewin (Lewin, 1963) in his discussion on 'field theory'. Lewins' background was as a physicist who migrated to the study of social science and applied principles of physics in his writings. For the concept of field theory, Lewin describes people or groups as being in a state of 'quasi stationary equilibria' and proposed that there was in effect a force field, where equal and opposite forces were being applied that kept the person in this state of quasi stationary equilibria. He described phases of change as 'freezing, unfreezing and refreezing'. This notion of resistance to change was quickly adopted both in practical and academic arenas and the work was key in generating research into the concept.

Lewins work was closely followed by a seminal industrial investigation in the Harwood manufacturing company by Coch and French (Coch, 1948). The focus of their study was to determine what the causes of resistance were, and what strategies could be used to overcome the phenomenon. Lewins' concept of forces of change is drawn on throughout the paper with respect to productivity levels. The experiment used the research vehicle of measuring productivity levels after changing a group from one operation task to another. A control group was used along with three experimental groups and results elicited from the study were to form the basis of much subsequent research in resistance. In the experiment, the control group, which was neither involved in discussions nor provided with reasoning, performed poorly on an equivalent task in comparison with the experimental groups who did participate in the change.

Lawrences' (Lawrence, 1954) commentary on resistance intimated that people did not resist 'change' per se but resisted 'social change' – the change in their relationships that generally accompanies technical change. His retrospective view on the article fifteen years later was still in line with this but he was less optimistic about how effective participation could be. It must be kept in mind that the results obtained from the initial Harwood study would have been conducted by the same 'change team' across the four experimental groups. The effectiveness of this 'implementation team' was not commented on or measured against any standard. As a consequence the notion of 'participation' could have been taken as simply a checkbox exercise and applied without rigour or depth. A second salient point made was that in his original paper he had viewed resistance as a phenomenon only experienced at the worker level. The fact that managers also find their own resistance level running high was noted in the retrospective as a point of consideration.

3.5.2 CURRENT CONSIDERATIONS ON CHANGE RESEARCH.

More recently Armenakis (Armenakis, 1999) discusses the state of the art with respect to organisational change theory and research conducted in the 1990's. He classifies change in the organisation into four distinct areas;

a) Content issues which focus on the substance of contemporary organisational changes.

b) Contextual issues focusing on the environment in which the organisation operates.

c) Process issues which address actions taken.

d) Criterion issues which deal with outcomes assessed in change efforts.

What was of note in comparing the analysis to original papers on organisational change was the breadth and depth of directions of research that have since been undertaken. The strands of research include assessment of the effect of organisational culture to outcomes of change given individual attributes. Approaches at each point in the continuum are supported by an array of theoretical models and strategies. Given the aforementioned breadth and depth of research, a number of decisions had to be made with respect to the direction of the research.

The strands of research deemed most relevant were as classified in the introduction and were chosen for their respective ability to bring the concept into sharp relief for the purposes of change as it related to implementation of an MIS project. What was looked for were categorisations of resistance to change that would bring the concept of resistance back from a generic organisational 'concept' to something measurable at the level of the individual contributors to the system and allow the addressing of the concept of human risk factors at this level. Strategies proposed for overcoming resistance and change management are reviewed and compared to the categorisations of resistance, and subsequent fit assessed.

3.5.3 PRESCRIPTIVE LINEAR METHODOLOGIES AND ADAPTIVE ROUTINES

Methodologies encountered in the domains researched thus far offer methodologies for system implementation that are linear in that there is a step by step sequence that rarely incorporates any typology of a Plan Do Check Act (PDCA) cycle. The recommended methods are prescriptive in that they tend to follow the same procedure regardless of where, when or with whom they are being implemented. It is posited that there is a significant area of research required in order to understand how to incorporate levels of both individual and environmental sensitivity such as was necessitated in the case studies. The key deliverable at this juncture is to identify research that will refine the

implementation framework from a stepwise stage progression through implementation stages to one that is sensitive and adaptive to individuals and their working environment.

3.5.4 ARTEFACTS OF RESISTANCE.

Since publishing of Coch and French's paper, the attitude towards resistance has been that it is an artefact to be 'overcome'. While this remains true for current interpretation of successful implementations, the use of the term 'overcoming' has implied that resistance in itself is an unequivocally negative concept and that there is no utility to be gained from it (Waddell, 1998). Interpretation of the meaning and consequences of resistance have significant impact as to how an implementation will proceed if indeed resistance to change is encountered. If resistance is viewed from a negative standpoint, then initial reaction to encountering resistance is, as the paper entitled 'overcoming' indicates, the chosen means to deal with it. Temptation for the implementer is to take a number of paths, none of which may be inherently constructive. The implementer may decide to ignore or disregard resistance and carry on according to plan as in retrospect was the case in PWAI. Resistance may be dealt with by head on confrontation, which more often tends to drive resistance underground as opposed to resolving it.

With the assignation of a negative quality to resistance, a number of assumptions have become implicitly associated with the term including the presupposition that all change is 'good' (Dent, 1999), that it is only workers that exhibit the characteristic (Lawrence. and 1969) and ignoring the possibility that there is a wide range of levels and types of resistance including ambivalence and antipathy. In recent literature however there is a questioning of the traditional associations to the term resistance (Piderit, 2000).

3.5.5 REINTERPRETATION OF THE TERM

Waddell (1999) takes the notion of resistance and puts forth the possibility that resistance, if handled in the correct manner may in fact be a vital source of innovation and agrees with Lawrence in stating that the resistance encountered can be for perfectly valid reasons.

Adversarial connotations however can instil a degree of panic in implementers when encountered during late implementation stages and the tendency is to deal with it in absolute fashions. If however resistance is viewed from a positive perspective, resistance can prompt a closer analysis of the issue at hand and in turn, create space for generation of improved alternatives to what is being proposed. It is on this basis that most democratic and governmental agencies in theory operate (Nierenberg, 1981). In fact, a lack of resistance can oftentimes indicate a deeper malaise, that of apathy or ambivalence towards a change project. The contention that asking a simple question as to what is the source of the resistance prompts a reasoned, productive and opportune method of 'working with' as opposed to 'overcoming' resistance. Dent & Goldberg (1999) go as far as to propose 'resistance to change' is a bankrupt mental model and argue that most programs of change fail because they are guided by a theory of change which is fundamentally flawed (Beer, 1990).

Continuing the theme of reinterpretation to resistance to change, Piderit (Piderit, 2000) advocated a multidimensional view of resistance building on work proposed by Ajzen's (Ajzen, 1991) tripartite view of attitudes. Adopting this stance made allowance for more complexity of response to change and proposes looking at the phenomenon from an 'emotional, cognitive and intentional' standpoint. This in turn allows for development of sophistication in understanding and selection of response. Also noted is the possibility of reactions along more than one conative aspect, it is possible to hold more than one attitude towards change and indeed, conflicting emotions towards one object may be held simultaneously. Reasoning as to the nature of causes of ambivalence has led to continued support for the proposition of tripartite views. Markus (1983) corroborates the view by stating 'Resistance is not a problem to be solved so that a system can be installed as intended: It is a useful clue to what went wrong and how the situation can be righted'. By following scripted programmatic change, companies with a standard view of overcoming resistance can inhibit the change and promote 'cynicism and scepticism' and in the long run inoculate organisations against the real thing.' (Beer et al 1990) A more correct assumption may be that we don't resist change itself, but its perceived consequences which may include loss of status, loss of pay or perceived loss of comfort (Dent, 1999).

This type of interpretation to the artefact of resistance is crucial if an evolution in methods of MIS implementation in organisations is to occur. There was merit to the research on 'overcoming resistance' as it fitted what was experienced in PWAI and partly in Dell and provided a framework around which to further refine and develop an augmented implementation framework. Certainly there was a clearer understanding of what was encountered and reasons why, but the term was still being discussed as an organisational phenomenon. Dent & Goldberg however made the first foray into looking at resistance on an individual basis.

A conceptualisation of resistance as an entity that can be positive as well as negative and moving the authors perception of the theory as something encountered with individuals as opposed to simply a cultural artefact provided a more solid basis for investigation. As discussed, resistance is not 'good' or 'bad' in itself but must be assessed in relation to its source and reasoning. An improved understanding of resistance can provide for more effective, reasoned and embedded changes such as required by an MIS implementation in the firm in the long term, and if managed with this in mind, may foster organisational effectiveness, communication and ideally, at the other end of the continuum, engagement.

3.4.6 Classifications of sources.

Within the classification of sources of resistance to change, it became apparent that a further subdivision of resistance was required. Although none of the sources to resistance listed facilitated change per se, the end effect of some of the sources differed considerably. The division to be drawn is a continuum between an apathetic or 'no response' to a vigorous response with associated measurable effects. Moderating variables from the research include the size of the transformation being undertaken (Markus 1983), whether the change is evolutionary or strategic and the second moderating variable measured to contribute to relative strength of resistance is the existence of deep rooted values. (Del Val, 2003, Rumelt, 1995). An apathetic response may also be labelled as 'inertia' (Keen, 1981) and specifically in relation to implementation of information systems, causes of inertia are categorised;

- Information is only a small part of the decision making process.
- Human information processing is experiential and relies on simplification.
- Organisations are complex and change is incremental and evolutionary.
- Data is not merely an intellectual commodity but a political resource.

Bagranoff (Bagranoff, 2002) cited six causes of resistance including;

- Leaving the comfort zone,
- Loss of position
- New responsibilities
- Higher expectations
- Loss of power and influence
- Past experience.

The language encountered in the review was approximating more closely the case study experiences. Certainly in PWAI factors such as leaving the comfort zone, new responsibilities and higher expectations were a factor in the system demise. To this end, empirical studies have also been conducted and identify the effect individual attributes and attitude components may have While Trader Leigh (2001), O'Toole (1995) and Wargin (2001) adopt a technicist view to

introduction of information systems and attributes, responsibility for resistance as a function of the end users attitude and have a three way split for causes according to this classification, namely that people resist change because;

- They lack the skills to use and gain benefits from the system.
- There is resistance because people working in organisations do not understand the big picture and new technology changes the way business is executed.
- New technologies and their translation into new business models change the organisation and its power bases.

Davidson (Davidson, 2002) also defines resistance as function of end users attitude and cites;

- Embracing change takes time and effort that end users may not want to commit.
- Taking on something new largely means giving up something that is familiar, comfortable and predictable.
- Annoyance or fear of disruption may stop people from taking first steps even when they know the net result will benefit them.
- If change is imposed externally, not derived internally, resistance may be ego related.

While the above classifications are of some assistance, and increasingly closer to describing the case studies, there was a significant issue in that they did not codify or categorise resistance in a way that was functionally applicable or particularly useful in its power of predictability.

There is an array of sources of resistance to change of which the above have classified but a few. If two of Piderits' (2000) dimensions of resistance to change are used, namely the cognitive, and emotional dimensions (use of third dimension, intentionality, would render a framework overly complex for application) in conjunction with the relative strength of source of resistance for separating out into apathetic and energetic resistance according to Rumelt (1995), the possibility of a more nuanced classification arises. Understanding the source of the resistance is key, both in predicting resistance and, once encountered, tracing back to its source and cause can provide a solid basis for progression. Using Piderits (1995) and Del Val and Fuentes (2003) concepts as a heuristic, sources of resistance are classified. A key assumption of the model however is that there is an acceptable level of comprehension of the implications of the change. Conflicting objectives, misunderstanding and constrained resources (Stiles, 2000) or structurally embedded resistance where conflicting objectives are part of the culture (Fenton O'Creevy, 2000) may give a very different resistance behaviour typology but if the generic implementation framework outlined is adhered to, it should not be necessary to take these factors into consideration. Applying individual measures of resistance to change will not yield any benefit to the organisation or to the individual if prerequisite factors such as adequate training and provision of resources have not been met. Having considered sources of resistance to change, the challenge is to combine or provide some means of representation of sources of change with the effects of resistance to change, both tacit and explicit to the individual.

3.5.6 CLASSIFICATIONS OF EFFECTS

The classifications of effects of resistance to change again tend to be generic and not classed in terms of their strength from either an emotive or cognitive basis. The relationship between neglecting to meet user expectations on behaviours of 'Neglect, Exit, Voice and Loyalty' is a useful framework (Farrell, 1983, Turnley, 1999).

'Exit' can be defined as any behaviour that involves a separation from the role or the task and is at the extreme end of the continuum of response and indicates that the individual does not perceive that the situation will change in any way that is beneficial to them.

'Voice' is primarily politically orientated and is defined by (Hirschman, 1970) as 'any attempt at all to change rather than to escape from an objectionable state of affairs'. The employee continuing to work in spite of change and upheaval until the end effect of situations become clearer typifies 'Loyalty'.

'Neglect' behaviour can range from the small or inconsequential behaviour such as being late on occasion to mindful neglect of key tasks and roles which the employee is aware will negatively impact business functioning in one form or another. The behaviours as experienced in PWAI and Dell in part fitted snugly into these categorisations.

Agocs (Agocs, 1997) provided a counterpoint of opinion in the respect that the paper proffered the viewpoint of the employee encountering resistance to change from senior management that would not amend practices of discrimination. Management's resistance was classified into 'denial, inaction and repression'. Inaction and denial fall into the category of neglect as originally defined by Hirschman (1970) but repression involves 'energy' and as such falls within the category of "voice". It is interesting to note that this seems to be the only distinction in the resistance of change 'toolkit' between management and employees.

In an effort to differentiate between management level attitudes and effect of involvement in the change process, further results can be drawn (Harley, 2006), negative reactions such as increase in workload, having to 'do more with less' and reduced flexibility were noted at all levels in the organisation. The variation measured was between levels of management and participation level and responses were either negative or positive. The final task, given these reviews is to take a typical listing of negative or apathetic responses and construct a model within which a rough correlation to sources may be derived. It is not presumed that all responses will fall within the heuristic, it is proposed as only an indicator. but should still provide a stepping stone to improved understanding of source, relative strength and effect of resistance.

The final possibility to be noted is that of opportunistic resistance (Elangovan, 1998), whereby although a response may be apathetic, should the opportunity to cause damage to the implementation without harm to the reputation of the instigator, that this opportunity would be availed of. Further along the scale and comparable to the 'Exit' stage of response a second option is system sabotage by various subtle approaches which may include anything from diverting resources to deflecting goals and dissipating energies (Bardach, 1977). A heuristic that incorporates these in conjunction with cause and valences is presented in Figure 4 along with estimated point of perceived resistance encountered in each of the case studies. With other variables remaining equal from the literature as reviewed. Proposed is that there is a transition from purely cognitive assessments of change, to emotionally assessed assessments.

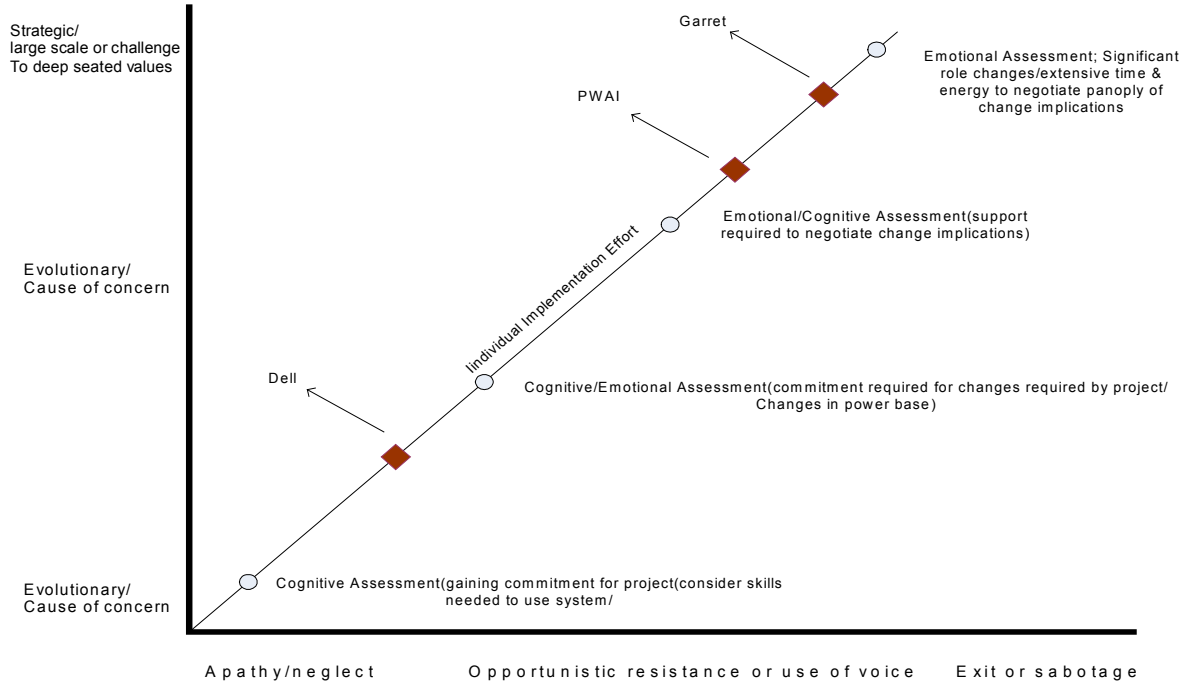


Figure 4 Resistance Heuristic

3.5.7 STRATEGIES FOR COPING WITH RESISTANCE.

The literature for strategies dealing with 'overcoming resistance to change' again is of volume and sources are from varying areas of research. The review of this section is confined to models for practical application within the business domain. This has been a source of interest for business leaders, middle managers and supervisors since the turn of the century. Its popularity is simply down to the perceptions that 'change', ergo, strategies for overcoming resistance to change apply to institutions of all sizes, structures and denominations. How effective an institution is at implementing focused change efforts can be the determining factor in long term success. There are a number of models that have come to prominence and have been used to varying levels of success in industry.

In terms of prescriptive frameworks perhaps the most widely known model is Kotter's (Kotter, 1979) model of choosing strategies for change. The methodology was developed as a result of a survey on a number of successful and unsuccessful change initiatives. Also proposed were types of situations in which the change methodology applied and respective advantages and drawbacks. The model proposed and escalation type of implementation which changed in accordance with the situation ranging from 'education and communication' where 'there is a lack of information or inaccurate information and analysis', to 'Explicit and implicit' coercion being recommended where 'speed is essential and the change initiators possess considerable power' Also suggested in the paper were specific situational factors that needed to be taken into consideration prior to selecting the strategy. These included:

- Given the type of change being considered the amount of resistance that is expected.
- The authority of the change instigator.
- The amount of information and support required by the implementer.
- The consequences of relative failure or success of the implementation.

In contrast to this method, however closely it may reflect methods still used in industry, Armenakis and Mossholder (1993) Lewin and Schein (Schein, 1996) suggest a method whereby a 'readiness' for change is created in the firm, borrowing on Lewin's theory of unfreezing or creating sufficient justification for the change Schein suggests that readiness is the cognitive precursor to the behaviours of either resistance or acceptance. They posit that the 'energy, information and support necessary to create change must come from within the organisation'. Put forward for consideration are a) contextual factors, b) how the message of change is communicated and its relevant discrepancy, c) effectiveness, d) the attributes of the change agent, e) influence strategies utilised and f) interpersonal and social dynamics. The theory progresses Kotter and Schlesingers' in that it takes into consideration not just the end goal and its relative importance, but it also considers communication methods and 'style' the individual responsible for the change has. The model has a more rounded and holistic approach to its construction.

While Lewin and Schein's model of change entailed changes implemented going through phases of 'freezing , unfreezing, and refreezing' it wasn't prescriptive in its outlook and was sufficiently open that individual and sociological factors affecting change readily fitted into the framework. This factor was exploited by Zands (Zand, 1975) investigation into the effective use of theories of change. By identifying key recurrent issues in MIS implementation, Ginzberg (Ginzberg, 1981) simply suggested three key factors as critical;

- Gaining commitment for the project,
- Gaining commitment for any changes required by the new system and
- Assuring the project is well defined and plans are clearly specified.

Beer and Eisenstat (1990) propose six steps to effective change, these include:

- Mobilise commitment to change through joint diagnosis of business problems.
- Develop a shared vision of how to organise and manage for competitiveness
- Foster consensus for the new vision, competence to enact it and cohesiveness.

- Spread revitalisation to all departments without pushing it from the top.
- Institutionalise revitalisation through formal policies, systems and structures.
- Monitor and adjust strategies in response to problems in the revitalisation process.

While the method is again prescriptive, it does include a loop by virtue of the last statement. This is acknowledgement that even given a perfect execution of the previous five steps, monitoring and adjustment is a constant for accuracy of response to changes of subject, context, timing and environment of change. Even yet, the first five terms are completely subject to interpretation. For example in step one, measures used for whether commitment to change has been mobilised are in principle a measure that is esoteric and will be peculiar to individual organisations. The model is sufficiently generic however to be applied in most instances without breaking any of the reviewed principles in respect to successful IS system implementation. With respect to the PWAI case study, the factors of mobilising commitment through joint diagnosis of issues, developing a shared vision of how to organise and manage for effectiveness and fostering consensus had not been followed and offered a definitive starting point for addressing human factor risk within the implementation framework as described in figure 9. It must be kept in mind however that the model prescribed is supposed to simply guide change programs and does not take into account resistance. This prescription then, by proxy implies following of the method will result in a resistance free implementation. Sensitivity to apathy in response to change is also omitted.

In comparison's to Beer and Eisenstat's generic and open ended six step program, Jiang et al's (jiang., 2000) model of implementation is a comprehensive twenty step list of recommendations for promoting acceptance of systems. It was constructed by testing for relative strength of effect of system type (transaction processing or decision support) of recommendations from established research and suggestions range from 'involving employees in development of new systems to encourage a feeling of ownership' to providing 'job counselling' and 'group therapy'. Results from this indicated that not only do end users respond differently depending on the type of system being implemented, but that they have a preference for different promotion strategies dependant on the system type. The effect of this study was significant in that it sparked a shift of

focus to factors as they affect the end user of the system with respect to the implementation method chosen. Although environmental factors per se are not taken into account, the study yielded important results as what was deemed effective from the end users perspective as opposed to that of the implementer. This is a departure as the focus of most change management literature by its nature was focused on the organisation or the change manager and bolstering their respective techniques for overcoming resistance.

Jiang's study swung the focus from overcoming resistance to promotion of acceptance, a subtle but very important distinction. The implication being that responsibility for adoption of change transfers from the change agent simply exerting power to overcome resistance, to having to give back power of decision of whether to accept the system back into the hands of the end change target. According to this theory, to be truly effective, the end user would have to retain the option to question, negotiate with the organisation and/or the system implementer without fear of censure or recrimination. A significantly more difficult challenge, but if effected it is posited that it is a significantly more powerful, long lasting and beneficial change methodology.

Thus the question arises as to what the determinants of commitment to information system are and whether there was any corroboration of the factors as espoused by the study conducted by Jiang et al. What criteria contributed to system uptake or a successful implantation as judged by the end user?

Implementation strategies may be subdivided into three characteristic types dependant upon the school of thought being adhered to. In extrinsically based models, the dominant belief is that resistance to adoption of an IS based system is due to factors that are inherent in the system such as design of the user interface (Fischer, 2001, Branscomb, 1984, Davis, 1989). Research in relation to this has indicated that while perceived ease of use had a small but significant effect, perceived usefulness of the overall system had a far greater impact on individuals' intentions to use a system (Davis et al 1989).

The second characteristic type are Intrinsic models, for example the steps recommended by Jiang are based on the theory that resistance to change is due to factors internal to the group or the individual. Factors or attributes that have been tested in relation to adoption may be for example related to the individual traits such as whether they have a tendency to innovate or to adapt (Mullany., 2001) their respective need for achievement or 'nAch' (McClelland., 1966) or their respective need for cognition or understanding (Haugtvedt, 1992). Traditional studies in the area have tended to measure one or two attribute strengths in relation to a specific action or event and while useful, fail to account for situational variables such as environment or strength of other moderating variables which are not being measured in the specific instance of the study.

The third category of strategies for overcoming resistance to change may be defined as an interaction between the previous two theories or 'interaction' theories. These theories imply that resistance to change is as a result of how something such as a sociological construct interacts with the way a system is defined (Markus 1983). For example, implementing a manufacturing information and transaction system that decentralised decision making into an environment where decision making was traditionally centralised. This understandably would alter the power structure within an organisation and thus resistance arises from 'the interaction of the technical design features of the system and the social context in which the systems are used (Keen 1981; Ginzberg 1981). It should be noted that Sociotechnical theories also fit into this category (Van Der Zwaan and DeVries 2000), as do technological diffusion approaches which are a variant of Lewin and Schein's freezing, unfreezing and refreezing model (Cooper, 1990, Kwon, 1987). Stages include initiation, adoption, adaptation, acceptance, routinisation and infusion and are used to describe how the use of new technology 'diffuses' through the organisation. A third approach to implementation strategy that falls within the definition of interaction theories is the Technology Acceptance Model (TAM)

3.5.8 TECHNOLOGY ACCEPTANCE MODEL (TAM)

The original TAM model (Davis, 1989) is based on Fishbein and Ajzens (Fishbein, 1975) Theory of Reasoned Action (TRA). According to this, the immediate determinant of a persons behaviour is their intention to perform the behaviour. The individuals intention to perform the behaviour is in turn said to be influenced by his/her attitude concerning the behaviour (whether he/she thinks that performing the behaviour is a good/bad idea) and his/her subjective norms concerning the behaviour (whether they believe that other individuals want them to perform this behaviour) (Hartwick, 1994). The components of the original TAM were assembled as per Figure 5 below;

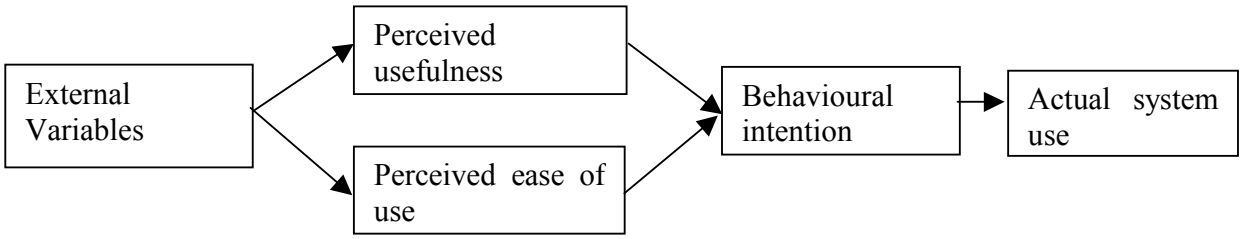


Figure 5 Technology Acceptance Model (Davis 1985)

TAM was developed by Davis in an attempt to predict the likelihood of software use by focusing on mainly two variables, those of perceived usefulness and perceived ease of use of the system by the end user. A Meta analysis of the model (King, 2006) indicated that the model correlations were valid and robust. A second iteration of TAM known as TAM 2 (Venkatesh, 2000) was developed and extended to further account for human factors influencing Technology Acceptance (Figure 6)

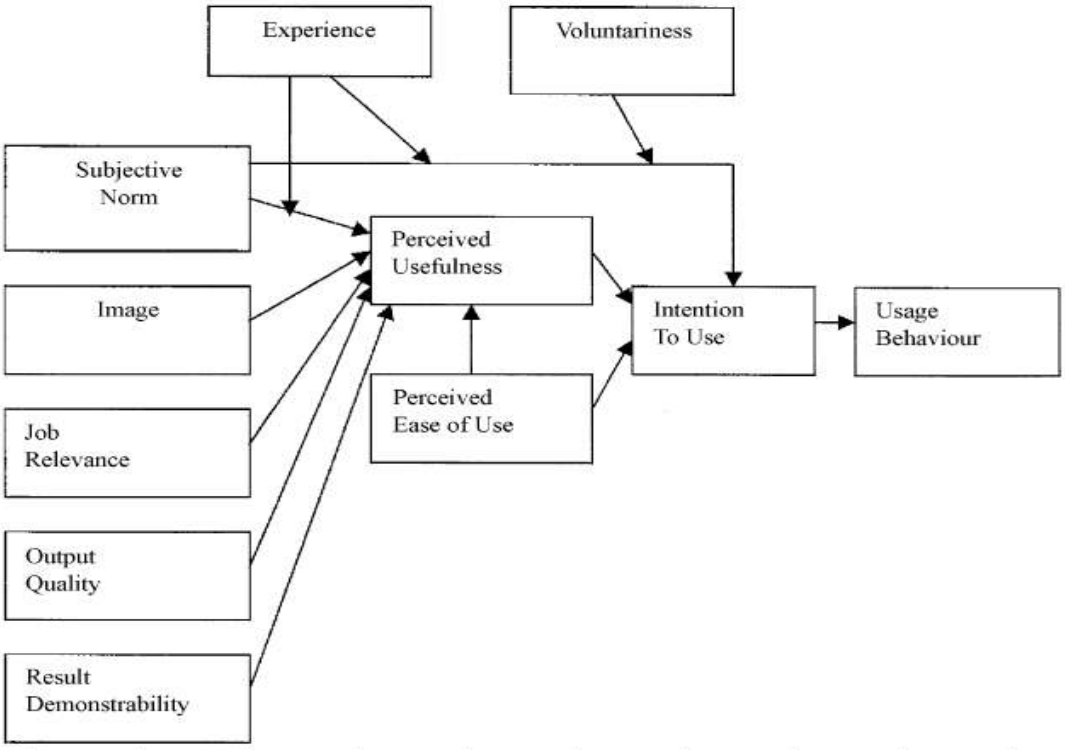


Figure 6 Technology Acceptance Model 2 (Venkatesh 2000)

The theory now posited that both social influences such as subjective norms, voluntariness and image and cognitive instrumental processes such as job process, job output quality, demonstrativeness and perceived ease of use significantly influence user acceptance. In theory, up to forty percent of variance in intention to adopt can be explained using this model (Venkatash, 2000, Legris, 2003). The theory however still fails to explain failure of systems where there has been good alignment between the design of the system and the environment into which it is being installed. It can partially explain resistance but fails to provide a meaningful method of overcoming or indeed preventing the artefact of resistance, nor is it practitioner oriented. A means to operationalise the constructs of TAM is not provided nor will it flex to explain the scenario where poorly designed or aligned systems have been successful. A final issue with TAM from a

practitioners perspective is that there is no indication as to the type or level of interaction needed to enact a felt level of behavioural intention to use a system (Blake, 1984) and indications are that these may vary considerably from individual to individual (Chau, 2001). The theory however pointed towards understanding the criticality of the effect of user involvement on perceptions of self efficacy through communication and training (Amoaka-Gyampah, 2004, Riedel, 2006).

3.6 RESISTANCE AND CSF REVIEW

Methods for implementation of IS based systems have been wide and varied in their techniques and applications but there is yet much variance in results of their use. Results of the literature review in comparison to the case study experience suggest that a departure from current methods of implementations is timely. Immediately apparent as a result of the prescriptiveness and ubiquitous level of the models suggested is the lack of feedback or, if discussed, is presented in the form of monitoring of progress. A feedback loop that is sensitive to changes required in implementation strategy is key. 'One size fits all' or prescriptive and linear programs as described earlier have repeatedly failed as a consequence of this lack of reassessment of meeting of goals.

Brushstroke steps such as 'overcoming resistance by participation' while not untrue can vary hugely in interpretation from practitioner to practitioner. Although all models of change are subject to interpretation, it appears to be particularly the case with respect to IT implementations. The scope for misinterpretation is wide but it is acknowledgement that describing in detail a model to cater for all eventualities would render any model unwieldy and impractical for use in the field.

The concept of linking performance orientation has not been expanded past ensuring the system is congruent with the organisations overall long term strategy. This must be an explicit part of the stated intention of the system. That participation in design (Riedel, 2006) and perceived 'usefulness' of the system has been proven to be a key factor in intentions to adopt (Venkatesh and Davis 2000) is not in question, but means to incorporate key performance metrics for the system at the outset is key for both end user and implementer in understanding and supporting both

perception of usefulness and system design participation. Performance expectations from both organisation and individuals must be attended to from the outset and for the duration of the project.

None of the models prescribed across the critical success factor, systems design and Sociotechnical applications are 'untrue' and they have all significantly contributed to the domain of implementation research, however space exists yet to contribute to the domain in the concept of developing a methodology that can adapt to suit not only the environment in which they are being deployed but that they suit the people for whom they are intended in a logical, sequential and practitioner oriented manner. It is difficult to expect practitioners and business strategy analysts to move seamlessly from the initial concept of a system design through to ensuring a cohesive and enthusiastic adoption of the system by end users. Implementation specialists have aptitudes at various points along the implementation continuum. Although integration of systems with the needs of end users has long been the battle cry of Sociotechnicists and the interaction theorists as described, thus far there is no cohesive operationalisation of the methodology.

The granularity or level at which the research has been deployed has been from very finite measurement of individual traits on the adoption of systems to all encompassing change management strategies. Proposed is a method to match implementation to each individual user whose uptake and commitment to use the system effectively is critical to the success of the system. Critical success factors, Enterprise architecture, software design and the Sociotechnical methods listed are simply the pre- requisites to a system implementation. It is posited that these will still only account for forty to fifty percent of the causes of implementation success. The remaining factors depend on how the system is presented and deployed at the individual and personal level. To this end, models suggested across the literature types do not discuss any type of specific or operationalised methodology for obtaining a genuine depth of engagement with end users, not only to adopt, but to use a system to the full extent of its capabilities and remain committed to a system implementation despite the associated changes and problems often associated with them.

The focus for the review was on CSF's deemed organisational in nature. Figure 7 indicates the organisational behaviour and communication-oriented factors from the CSF review.

As can be seen from the graph, the shape is an inverted 'T' with majority of the "soft" or interactional components focused at the latter stages of the system implementation.

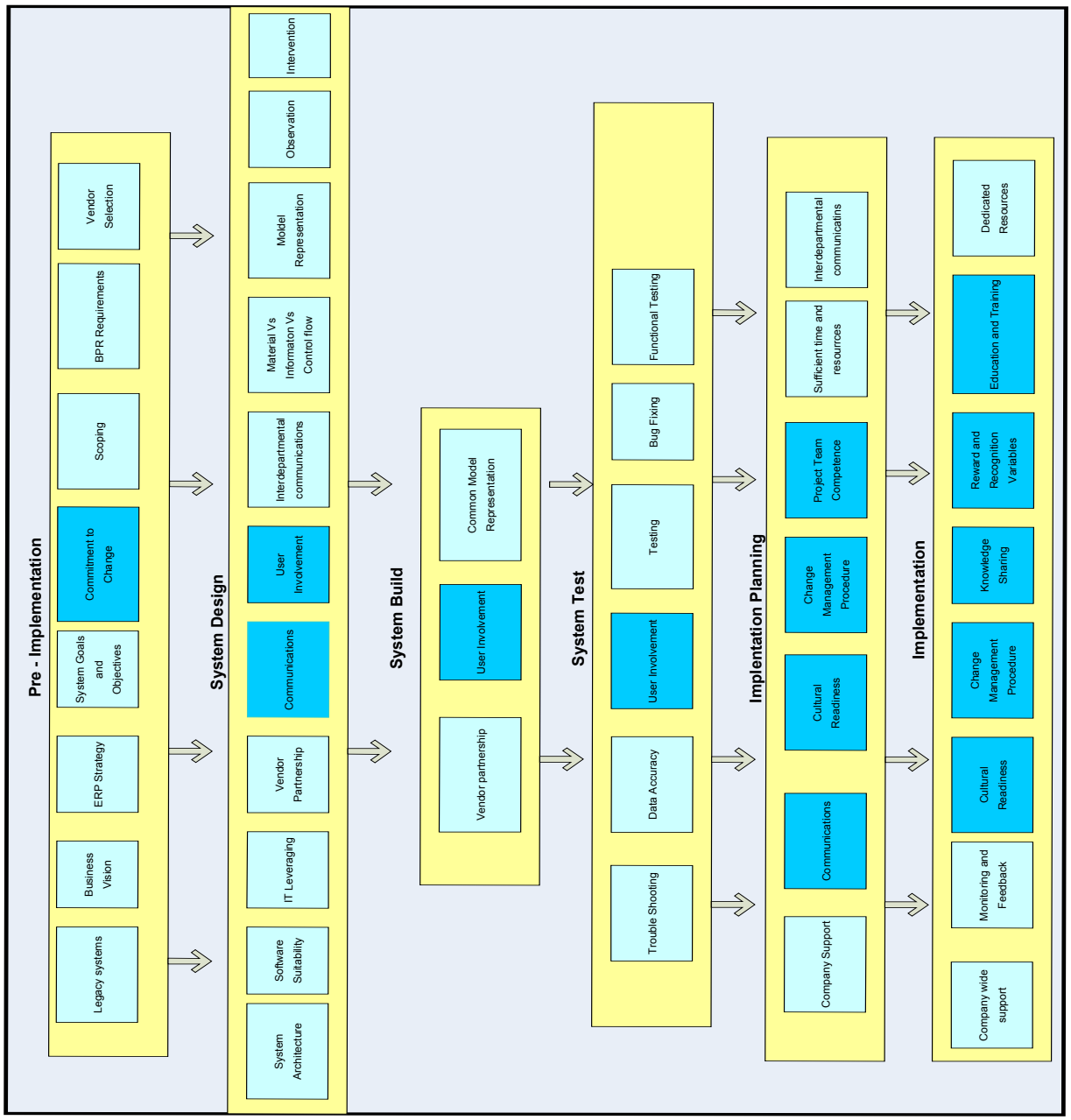


Figure 7 Technical Vs Soft Factors in Implementation

3.7 INTEGRATING RESISTANCE INTO THE FRAMEWORK

The challenge now lay in integrating the knowledge for both resistance to change and successive implementation stages. The subsequent step was segregating the technical factors from the human to further develop the framework (Figure 8)

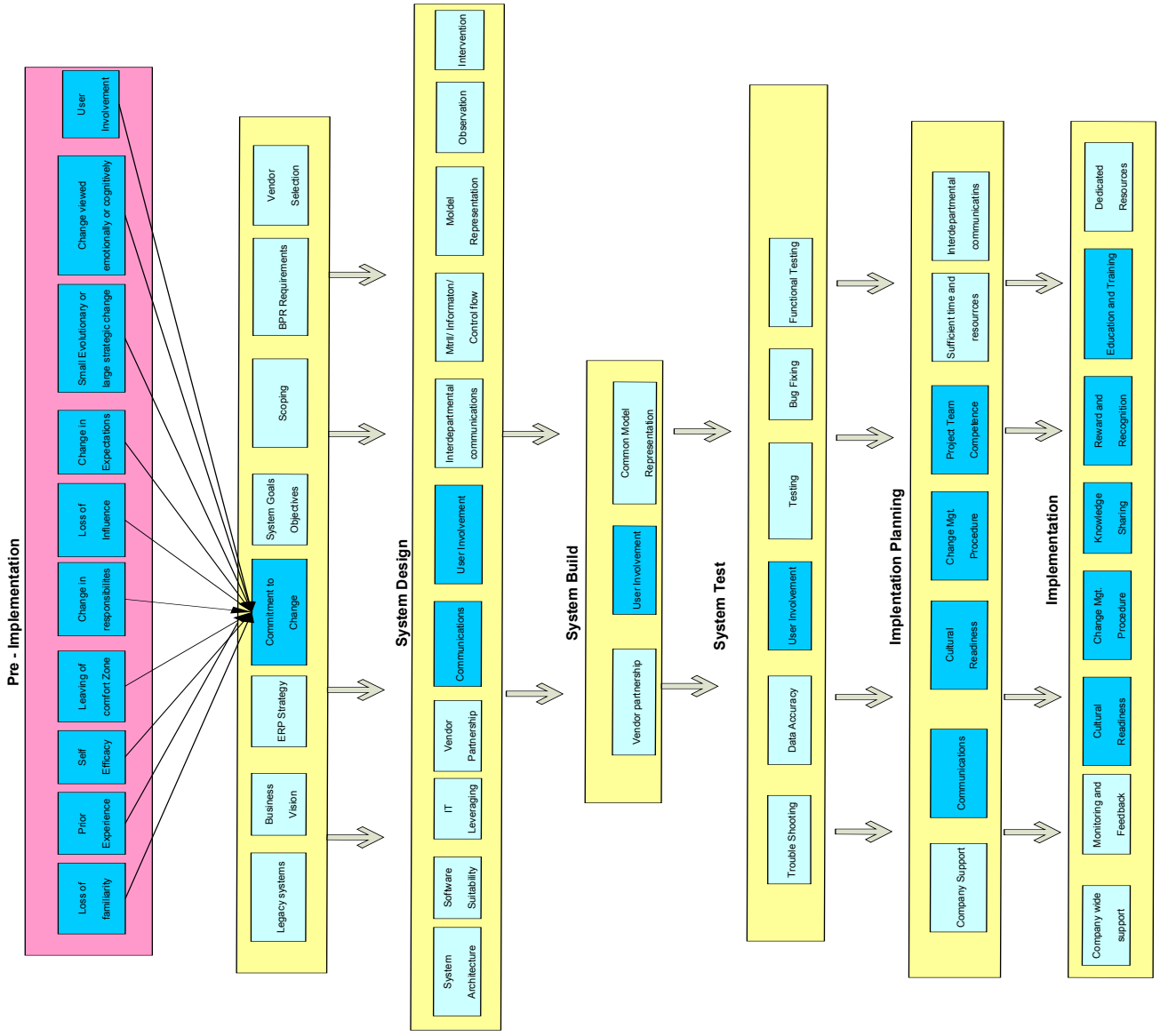


Figure 8 Implementation Framework With Resistance Factors

The analysis of empirically assessed critical success factors contributed most to the development of a framework for implementation across all stages of an MIS project and provided a useful outline for structuring the narrative of each the case studies. The review of business literature was in accordance with factors gleaned from the empirical review with one exception of the mention of being aware of integration points across different functional systems (Worthen., 2005). Analysis of the architecture and system design literature provided means for assembling system architectures and understanding the issues involved in representing an enterprise in its entirety. Again focus was predominantly on the capturing and design of enterprise operations. Reference was made however to the requirement of implementation plans (Wu., 2001, Lee., 2003).

Sociotechnical systems and more pointedly, resistance to change literature incorporating models from change management literature and Technology Acceptance contributed most towards moving towards development of a means of risk mitigation in MIS implementation. It became possible to compare the case study experiences with respect to sources and effects of resistance encountered and place these on a continuum. The technology acceptance models introduced Fishbein and Ajzen's (1975) theory of reasoned action which indicated a future path to research in order to determine how best to work with individual characteristics and components of motivation with respect to risk reduction for MIS implementation. Prompted by theory of reasoned action, the literature domain of motivation was identified as the most likely source of information to contribute to development of risk mitigation of human factors in MIS.

3.8 IMPLEMENTATION AT THE LEVEL OF THE INDIVIDUAL

To mitigate the human factor risk by determining what elicits individual commitment and engagement in using a MIS as identified and given that resistance to change and Sociotechnical literature still did not provide a mechanism of understanding to adequately develop a framework for implementation that could have supported the case study implementations described in Chapter 2. The following cognitive and behavioural areas of research were chosen in order to bridge the

gap still evidenced but also to facilitate a means of implementation that would also be meaningfully engaged with by the end users at every level of the organisation. As described in the Dell case study, significant variation in the level of engagement from end users had been encountered, on reflection this was not due simply to the amount of time it was possible to spend with each individual, but on the balance, fairness and "meaningfulness" of the negotiation of the implications of the system with the end user.

3.9 INTRINSIC THEORIES OF MOTIVATION.

For the purpose of developing a framework within which to find theories that would explain the progression of implementation techniques in the case studies and allow an individual implementation plan to be developed, the topic of motivation necessitated enquiry. The research of motivation has tended to investigation within a scale dealing with 'not motivated' to 'motivated' and resistance has been studied in the scale range of 'no resistance' to 'resistant'. Interestingly, it is exceedingly rare that a journal paper or investigation will cover the continuum. Resistance to change has been employed as the modus research when encountering system implementation issues but has yet to suggest a methodology for deployment at the level of the individual end user that isn't framed in terms of resistance only. No single study has explicitly looked at framing a study with respect to 'motivation to adopt' or engagement. Although the effect of participation and attitudes has been investigated, they have yet to be placed within a framework that is operational for the practitioner. The resistance to change literature does not offer robust models or constructs upon which to test a model of change for the end user. The field of motivation research however is wide and varied and proffers a number of theories of causal explanation for choice of actions. Thus, it is work motivation literature that provides the impetus for framework construction as opposed to resistance to change literature, although there is much similarity as both can be classified under 'intrinsic' and 'extrinsic' causal reasoning. Extension of many of these theories would cross the threshold dividing the two thus indicating they are indeed perhaps opposite ends of the one dimension.

The purpose of the subsequent section of the literature review is to cover in brief the main theories of motivation and discuss each in terms of an elucidation of:

- The main points of the theory.
- Robustness in the context of an industrial setting based on prior case studies.
- Sensitivity with respect to providing causal reasoning for adoption or rejection as these are the key criteria for determining the concepts usefulness.
- With respect to an analysis of the assembled methodology, suggested criteria for assessment of the theory include its parsimony, validity and coherence (Furnham., 1997).

The transition from the generic implementation models to an individual implementation is a large one. More research is required in making this transition by means that are logical and orderly in their progression. In an extract taken from the implementation of educational policy analysis, the principle is phrased "policy directed change ultimately is a problem of the smallest unit, these lessons frame the conceptual and instrumental challenge for a third generation of implementation analysts – integrating the macro world of policy makers with the micro world of individual implementer" (McLaughlin, 1987). This evaluates the point clearly. A grasp of both sides of an MIS implementation is key for long term success.

3.9.1 NEEDS AND PRESSES

Perhaps the best well known of theories of motivation is Maslows' (Maslow, 1968) hierarchy of needs in which he splits needs into higher and lower level needs. Maslow suggests that needs are hierarchical in that we must first satisfy physiological needs such as food, water and shelter before progressing on to safety needs for a secure, non threatening, predictable and inhabitable environment. On meeting of physiological and safety needs, social needs such as the

need for affiliation within a group, family, community etc. Grouped together, physiological, safety and affiliative needs are known as the deficiency needs. The next two higher order needs are classified as 'growth' needs and include the need for esteem in that there is a need to be recognised by others and finally, assuming all other needs are met this in theory places individuals in the position of being able to self actualise or engagement in the process of meeting our individual potential. Maslow conceived of the dynamic forces of behaviour as deprivation and gratification. Maslow's key points are:

- The deficit principle: If the need is not satisfied, it generates tension.
- The pre-potency principle: The needs are arranged in hierarchy and some are more important that others and must be met before other needs can serve as motivators.
- The progression principle: Physiological needs must be met before safety needs and safety must be met before social or self-actualisation needs.
- The need structure is open ended in that as we grow and develop as humans our concept of what our individual potential is also changes and that is something that is always strived towards but will keep moving out of reach.

The attractiveness and proliferation of this theory lie in the fact that it is a neatly structured, all encompassing explanation of motivation as a logical sequence of sating of progressively more involved needs.

Also falling under this classification of needs and presses theories is Alderfer's (Alderfer, 1969) 'Existence, Relatedness and Growth' theory (ERG). Existence relates to all needs for physical survival, warmth, shelter, food etc, relatedness describes social and interrelationship requirements. Parallels may be drawn between Maslows' actualisation and 'Growth' in terms of an innate desire to learn and become more. Although the theory is very similar to Maslows it does not specify the sequence in which the needs must be met and does not preclude the possibility or more than one need being achieved at the same time. The removal of this constraint again makes the theory more generally applicable. A third theory within the classification of needs and presses are Murray's (Murray, 1938) list of twenty separate biological and mental needs. Needs are

neither categorised nor structured in a hierarchy. Inherent in the appeal of this model is the ability of researchers to test individuals for separate or groups of traits. The fourth and final theory to be discussed under this heading is Herzberg's (Herzberg, 1959) two factor theory. After researching the literature he discovered that there was no correlation between job satisfaction and work performance but maintained there was a relationship between their attitudes and their behaviour. Herzberg maintained that there was a difference between factors causing dissatisfaction and factors causing satisfaction although it was possible to think of the two extremes on a single continuum. Factors that without which there was dissatisfaction but that in themselves did not predict dissatisfaction included environmental condition such as physical working conditions and salary. Factors that were motivators, but that the absence of which did not predict dissatisfaction included such factors as achievement, recognition and the work itself (Buchanan, 1997).

To assess these models in terms of their sensitivity and robustness for industrial application presents a number of issues. Although the models are intuitively appealing, the assessment of people's motivation to adopt a system according to Maslow or Alderfer (assuming they are clothed and fed) is to attempt to assess what the model provides to them in terms of social needs or self actualisation. Unless an MIS system can be seen to contribute in either of these domains, it is posited that there will not be motivation to adopt a system. This statement is not untrue, in fact it may be quite accurate and is robust in that it could be used across a number of scenarios. Peoples' motives for adopting a system can all be classified under headings of perceived physiological, social or growth needs. But the sensitivity of these models for use in application of an MIS system are closed loop and the principles have proven immensely difficult to prove in empirical research let alone operationalise. There is no natural order in moving from the general theory to a specific application of the construct. It is unlikely however that any model or theory of motivation falls outside of any of the classifications of these 'need' theories unified. There is validity in the construct and this may go some distance in explaining the popularity of these models even yet.

For the purposes of an individual performance orientated implementation though, a more structured and organisationally focused model would facilitate a more refined and sound

approach. The validity of these models as mentioned is not the point of contention, simply that the models would have to be significantly developed to cater for needs of operability and sensitivity in the context of the firm. Need theories may serve as a generic framework into which other theories can fit. As an introduction to possible causes and sources of motivation however, need theories work very well. Within them theories of social learning, equity theory, goal theory, value theory and social learning can be slotted in and understood within a broader context.

3.9.2 VALUE THEORY.

Value theory as originally proposed by Locke suggests that people search for jobs or positions that fulfil or allow them to express their values. In a study focused on explanations of unemployment (Feather, 1985) indicates that these values are constructed as a result of contributing factors including but not limited to religion, culture, choice of profession, political affiliations, gender etc. These values become organised into coherent value systems over time, which serve as frames of reference that guide beliefs and behaviour in many situations such as work. Locke's (Locke, 2002) development of Needs theory was to propose that job satisfaction may be more closely linked to how closely a job provides people with what they want, desire or value. This moves the theory firmly forward to take into account not only wants but also to consider desires or values as moderating variables. The implication of this is that a number of other factors need to be taken into account if the level of motivation of an individual towards an MIS system is to be determined. Values and desires that may be a construct of backgrounds and experiences unique to each individual must be accounted for.

The implications of this with respect to robustness and sensitivity are similar to the analysis provided in Maslows and Alderfers theories in that the generality of the model renders it applicable to most scenarios. It is provided as a means of understanding as opposed to a usable tool. Its relative sensitivity is greater than those of needs theory because regardless of their source or whether they are implicit or explicit, values have been taken into account and is an important addition. Studies have indicated that they have a significant effect on decision making in a work

context (McGuire, 2004). Noted also is valence of the values. Although a group may share a number of values, the relative strength and importance of these values, mechanisms of how these may be superseded, eliminated, developed or reinforced are acknowledged and vary from individual to individual. Locke's theory begins to acknowledge the attendant complexity in possible analysis of motivation at an individual level. The model is not prescriptive, perhaps in acknowledgement of the individuality of the phenomenon in organisational behaviour research. As for how this affects an MIS application, while understanding of the area is enhanced, the range of potential reasons a system may or may not be implemented successfully at an end user level is too broad for a system implementer to consider with no classification as to what their individual constructs may be. The theory was significantly moved on by the addition and values research, as proposed by Locke, Rokeach and Braithwaite continue to be researched.

3.9.3 TRAIT/PERSONALITY THEORIES.

The central tenet of trait theory is that choice of human action is governed by traits that are intrinsic to each individual. These traits are perceived to be relatively enduring and broad and seen to be relatively stable from one context to next. Even within the definition as used by trait theorists, there is considerable debate as to whether traits should be used as a means describing behaviour as opposed to a means of *a*scribing. There are a number of approaches that may be classified under trait theory also known as attribute theory. Examples of the use of measure of individual traits to attempt to predict behaviour include McClelland's(McClelland., 1966) work on the need to achieve or 'NAch' measures. Caccioppo's (Cacioppo, 1982) measures of levels of need for cognition, further developed by Haugtvedt (Haugtvedt, 1992) to include determination of whether the need for cognition moderated the persistence and resistance of attitude changes which if proved would be a factor to have to be considered in the model construct.

The study involved looking at the decay rate of a newly formed attitude as a result of having looked at an advertisement. The following experiment measured the resistance subjects had to change as a result of being given conflicting information with respect to a product. Under

the controlled circumstances, there was a relatively significant correlation between the individuals with high needs for cognition. They were found to have a slower decay rate of attitude when measured two days after the experiment compared against subjects who had a lower need for cognition. It was also found that individuals with a high need for cognition were less prone to attitude change when presented with conflicting information. Evidence, suggesting that for this particular trait at least, the desire to understand has a measurable effect on the behaviour of the individual.

A trait of significance in research in adoption and use of information systems is that of control. Kidwell et al (2004) describe two types of control; Internal control is where a behaviour may be internally controllable when an individual perceives that he/she possesses control over internal resources such as skills, confidence, ability to perform the behaviour similar to Bandura's self efficacy. A behaviour may be perceived as externally controllable when it is relatively free of external or intrinsic influences that can act as a barrier to performing the task. Findings from this study indicated that internal and external control are distinct constructs of perceived behavioural control within the theory of planned behaviour and are key in understanding an approach to individual engagement. The argument for an individuals need for control is strengthened by the findings of physiological and behavioural detriments when personal control is absent (Mineka, 1985, Cannon, 1999, Maier, 1985) including changes in stressor controllability, immune function and endogenous opiates. In both animals and humans, the perception of control over a stressor has been shown to inhibit autonomic arousal, stress hormone release, immune system suppression and maladaptive behaviours observed when stressors are uncontrollable (Leotti, 2010).

A significant moderator in this effect of control is the opportunity to exercise choice in the environment in which individuals operate. "These choices include complex and emotionally salient decisions. Although much of our behaviour is elicited by environmental cues, and may be below the state of explicit awareness, all voluntary behaviour involves choice nonetheless. Thus, to choose is to express a preference, and to assert the self. Each choice –no matter how small – reinforces the perception of control and efficacy."(Leotti, 2010) This is especially relevant with respect to MIS implementation where there are, depending on the required level of use by the

eventual end user, a large number of decisions which can be made either with or without the end user. The evidence suggests ensuring not just involvement but genuine participation will positively affect the end users perception with respect to self efficacy in use of the planned MIS. This finding was corroborated in a study by Kleingeld (2004) it was shown that a participatively designed performance management system led to a significantly improved performance increase in comparison to a non participatively designed system. Participation with respect to an MIS system implies by definition that workers enter in to decision making with respect to aspects of the system and thus end users are given the opportunity to exercise legitimate control with respect to the MIS (Riedel, 2006).

Other examples classifiable under the heading of trait theory or cognitive style is a categorisation of individuals with respect to whether they have a preference for innovating or adapting (Mullany., 2001) for use as a predictor in measuring resistance in use of information systems. It was found that the higher the score pertaining to innovation type characteristics, the more increased the likelihood of system adoption. A note of caution is introduced however with respect to long term success of a system in that it is recommended there is a minimum ratio of innovators to adaptors is required for long term system success. A second result of note from this study was that there was significance in the relationship between user satisfaction and system accuracy and reliability. This corroborates evidence from Davis and Riedel (Davis, 1989, Riedel, 2006) with respect to system usability and intention to adopt.

In a variation of this study, Wanberg (Wanberg, 2000) conducted a study to determine the correlation between personal resilience and levels of change acceptance. Results indicated that the composites of personal resilience, namely self esteem, optimism and perceived control were predictive of higher levels of employees' openness to change. Correlation was also found between lower levels of change acceptance and job satisfaction, work irritation and stronger intentions to quit. In short, there are a number of studies linking measures of traits to intentions. The logical progression in research was combination of traits to determine how robust an indicator combining traits may be. Research in this was parallel at this stage to theories of personality, as they have tended towards combinations of traits.

With respect to research in personality, two theories still hold much sway in conducting empirical research using these traits as the building blocks of personality. The first to be considered is Eysenck's (Eysenck, 1975, Barret, 1998) 'big three' of Psychoticism(P), Extraversion(E) and Neuroticism(N) extended to include 'social desirability' as elicited by the Eysenck personality questionnaire. The theory is predicated upon a biologically based theory of personality, from which a deductive prediction of universality can be made. These behaviours are not just arbitrary combinations of traits but are based upon theories that seek causal explanation at the level of brain physiology and biochemistry. It is proposed that behaviours can be explained by the combination of and strength to which these three main factors are exhibited in any individual. This theory was extended by Costa and McCrae (McCrae, 1987) to be known a the big five, and included the factors of 'agreeableness, conscientiousness and intelligence. The attractiveness of these particular theories, apart from their root in physiological explanations, is the validity dimensions these models have obtained as a result of repeated testing across instruments and observers. It is repeatedly recoverable from questionnaires as well as from adjectives and from observer ratings as well as from self reports.

Zuckerman (Zuckerman, 1993) compares Eysenck's and Costa and McCrae's models and an alternative compilation of traits including 1) impulse sensation seeking, 2) anxiety 3) aggressiveness/hostility 4) need for activity and 5) sociability. The alternative five emerged from factor analytic studies of personality and temperament scales, most of which had already been used in psychobiological studies. What can be noted from the basis of attributes and the biological basis for choosing them is research in the area has not linked the relative strength of these constructs specifically to linkage in use of information technologies. Martinko (Martinko., 1996) acknowledges the lack of accepted theory or paradigm encompassing the full range of variables associated with resistance of IT at the individual level that incorporates attributional perspective. Proposed is the 'majority of variables and dynamics associated with rejection of IT can be conceptualised and grounded within an attributional perspective of achievement motivation

and proceeds to suggest a model that incorporates a)factors influencing attributions, b) outcomes, c)reactions, d)causal attributions for success or failure and e) efficacy and outcome.

Oreg (Oreg, 2003) used a resistance to change scale to measure an individuals' dispositional inclination to resist changes. The four factors used were routine seeking, emotional reaction to imposed change, cognitive rigidity and short-term focus. Three studies using these measures demonstrated the concurrent and predictive validities of the resistance to change scale in three distinct contexts. Thus, the scale can be used to account for the individual difference component of resistance to change and to predict reactions to specific change. From an operations research perspective, very few models would suggest that consideration of personal factors, attitudes or decision style would have a bearing on the success of an implementation but the topic was broached by Lucas (Lucas, 1978), in this study, attitude was simply named a function of the quality of a system or model and there was no clear distinction drawn between perception and attitude. Robey (Robey, 1979) also named attitudes and perceptions as factors in the implementation success but focused on objective measures of system use to attitudes and found that there was a significant relationship between use of the system and the users perception of its impact on his/her performance, moving somewhat out of the realm of measurement of attributes.

From the brief synopsis of some of the main theories in trait and personality theory, it may be seen that there is a range of attributes or traits to be chosen from when looking to assemble a bank of traits from which the likelihood of exhibiting a certain type of behaviour may be predicted. With trait theorists, a main point of contention is as to whether theories are nomothetic or idiographic. It is contended that they are nomothetic and specific to that set of instances being measured given the environment within which they are being measured. There are a myriad of circumstances that measurement of a single or group of traits does not take into account, not least the situational or environmental factors. It must also be noted that while actions are observable, intentions are not and while there may be correlations, even strong correlations between attitudes and intentions to act, situational factors may arise that cause individuals to act in ways that would not have been predicted by sole adherence to trait theory.

This observation is elegantly observed in relation to IT implementations by Levine and Rossmore (Levine, 1993) whose research found significant discrepancies between an individuals 'Espoused Theory' what they will publicly proclaim to adhere to, and their 'Theory in Use' which is what they actually base their decisions upon, and in fact often, the individual was unaware of incongruence between the two. This does not preclude use of measurement of traits as an indicator of peoples intentions or likelihood to adopt information technology. Its performance as a tool however could be significantly enhanced by using it in conjunction with another theory that does take into account alternative conceptualisations such as motives or goals and suggest a form that combines these theories with needs for affiliation, achievement or cognition, resilience or perceived levels of self efficacy. There is also yet disagreement in studies over what constitutes a correlation that is significant (Pervin, 1994).

3.9.4 EXPECTANCY MODELS.

Expectancy models state that the force acting on an individual to work at a specific level of effort is a function of the algebraic sum of the products of a) the desirability of the outcomes/valences, b) the subjective probabilities (expectancies) that those outcomes will follow from working at that level (Behlin, 1973). The theory is also known as the Valence – Instrumentality – Expectation model by its originator (Vroom, 1964) and incorporated into goal theory by Locke (Locke, 2002). Expectancy theory assumes that motivation is not equivalent to job performance but is only one of several determinants. It also recognises the role of opportunity in that even the most motivated employee cannot perform if there is not opportunity to do so (Furnham., 1997). With respect to how this theory could become operationalised, a number of considerations must be taken into account. The theory is again innately appealing but there are some constructs and research results with respect to how people make decisions that must be considered. By its nature, expectancy theory does take into account situational constraints in that the individuals' judgement of the likelihood of obtaining desired results given performing an action in that specific context. There are some points with respect to an IS implementation worth noting.

If the individual perceives that the contributive effort in learning to use and apply technology will have a negative effect with respect to loss of position the expectancy model cannot account for reactions given a composite negative result. Peoples ability to rationally deduce the most favourable outcome given a fixed set of circumstance has yielded information that individuals, given a complex set of interactions will often settle for satisficing with respect to perceived outcomes as opposed to attempting to optimises the results (This may possibly be an effect of being able to process a relatively limited amount of information at any one time). The effect of ambivalence or conflicts, which will often be the case with MIS implementations, is not catered for with respect to how the individual attributes weighting to each perceived outcome. The prospect of comparing intrinsic outcomes with extrinsic has also yielded difficulties in operationalisation of the theory. The construct has however significantly contributed to management theory in that it posits that explicit understanding of outcomes and the prospect of enabling employees to select outcomes, as they are deemed important to the individual is key.

The concept has undoubtedly contributed to the understanding that goals and outcomes should be explicit and work to most impact when used in unison with individually selected reward schemes. This model again needs to be constructed in unison with a support construct that makes allowance for value reactions or perceived comparison or assessment of rewards to external measures for valence. The theory stands as a process as opposed to content description of motives. Thus there is little importance ascribed to reasoning for selections of not only the goals/intended outcomes but the means of attributing importance to outcomes is yet to be fully understood. In an empirical study conducted by Van Erde (Van Erde, 1996), the criterion variables that are more strongly related to the expectancy models appear to be attitudinal (intention and preference) rather than behavioural (performance, effort and choice).

3.9.5 COGNITIVE DISSONANCE.

The theory of cognitive dissonance as means of motivation according to Festinger (Festinger, 1957) can be defined in a straightforward manner. Stated is that a sense of dissonance

arises when a person holds two cognitions that are psychologically inconsistent, dissonance is a negative drive state and because the experience is unpleasant, the person will strive to reduce it, usually by struggling to find a way to change one or both cognitions to make them more consonant with each other (Aronson, 1997). This effect of dissonance with respect to implementation was measured in a study performed by Sjazna (Sjazna, 1993) building on an initial experiment by Ginzberg (Ginzberg, 1981), where the accuracy/realism of a users expectations had a significant impact on user attitudes and usage of the information system. The corollary of this for testing would be that unrealistic expectations could lead to users exhibiting symptoms of system failure such as low satisfaction and usage. User expectations in relation to an IT implementation were manipulated in one group to be artificially high, in a second group to be consonant and the third group to be artificially low. Results showed that users with unrealistic expectations had perceptions of the information system that were significantly different from those with realistic expectations. Specifically, subjects with relatively low expectations had user satisfaction scores lower than those with moderate or high expectations and subjects with relatively high expectations had satisfaction scores higher than those with moderate expectations. The paper submits in conclusion however that at the risk of inducing dissonance as a result of over or underselling a system that it is within the organisations best interests to present as accurate a picture of system as possible to end users as this strategy is most likely to promote cognitive consonance.

The impact of dissonance theory with respect to any implementation is in fact in its sensitivity, far more so than Value, Need or Trait theory. Cognitive dissonance can arise as a result of many situations for the individual. Festingers theory does not discriminate on the grounds of source for dissonance whether it is as a result of behaviour arising from a situation assessed in terms of whether there was lack of congruence between our actions and our self concept could be either from a goal orientation perspective or a value based perspective. The source is not the key determinant of the motivation to act, but the perceived level of dissonance. The issue with using the theory of dissonance if used to explain adoption or rejection behaviour solely is that it is possible that an end users refusal to adopt or use an IS system will not be the source of any

dissonance as rejection of the system may be entirely congruent with their belief system. A method of coping with this scenario is not suggested and instrumentalising dissonance as tool for motivation would be exceedingly difficult. Again a significant portion of the power of this theory is again in its efficacy in assisting comprehension of behaviour when our ought, ideal or normative self concepts are violated (Wood, 2000) Its efficacy is severely diminished in any attempt for use in prediction.

3.9.6 Regulatory focus of the Hedonic Principle.

The hedonic principle in its simplest form states that behaviour/actions are driven by the extent to which we attempt to approach outcomes that we perceive beneficial- promotion, and try to avoid outcomes or measures that we perceive are detrimental to our goals or well being – prevention. The theory of regulatory focus is concerned with how people approach pleasure and avoid pain in different ways. The genesis of the theory may be traced to the writings of Jeremy Bentham (1748 – 1832) the English Jurist, philosopher and legal and social reformer. The theory of self regulatory focus of the hedonic principle should operate differently when serving fundamentally different needs, such as the distinct survival needs of nurturance (e.g. nourishment) and security (e.g. protection).

Regulatory focus also proposes that nurturance related regulation and security related regulation differ in regulatory focus. Nurturance related regulation involves a promotion focus, where as security related regulation involves a prevention/risk adverse focus. Regulatory focus also posits that self-regulation in relation to strong 'deals' versus strong 'oughts' differs in that ideal self regulation involves a promotion focus whereas 'should' self regulation involves a prevention focus. An inclination to approach matches to desired end states is the natural strategy for promotion self regulation. In contrast to this, because a prevention focus involves a sensitivity to negative outcomes, an inclination to avoid mismatches to desired end states is the natural strategy for prevention self regulation (Higgins, 1997). The principles of the concept are portrayed in Figure 9 on the subsequent page.

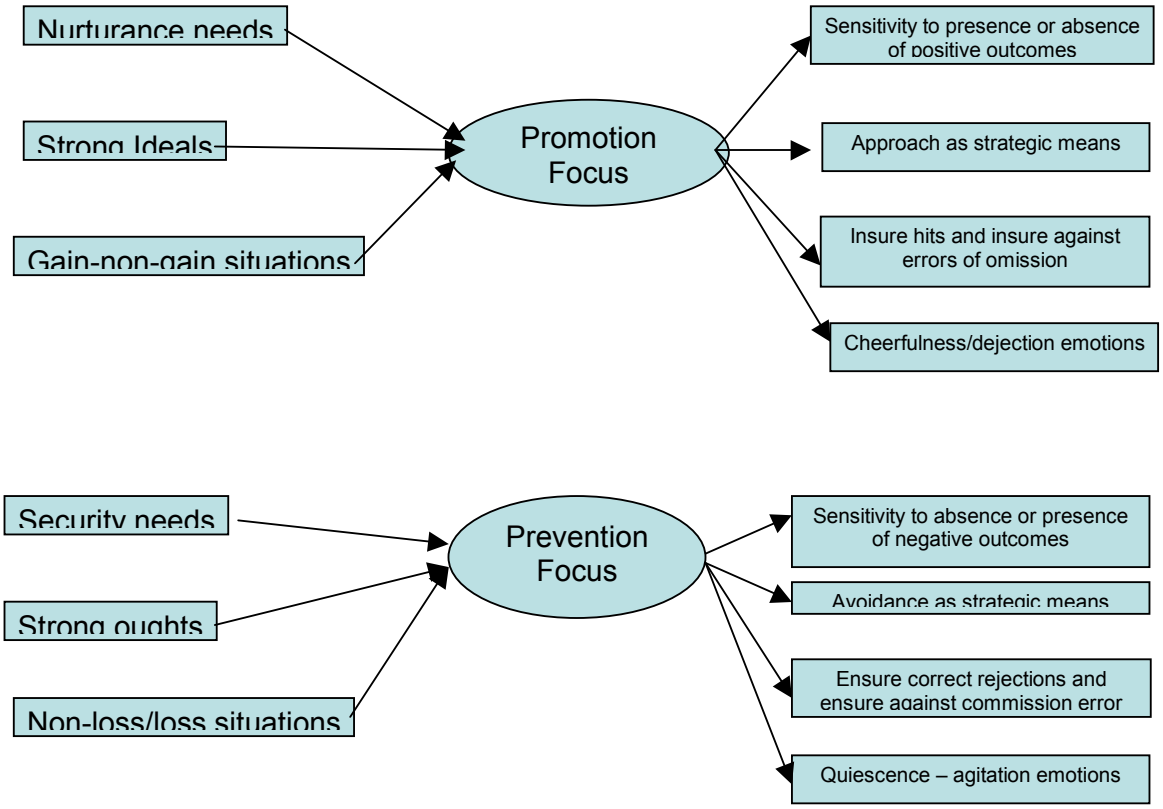


Figure 9 Promotion and Prevention focus Variables (Higgins 1997).

Studies suggest that strategic compatibility between incentives and peoples goals increases motivation and performance, results also suggest that motivation and performance are enhanced when the strategic nature of the means for attaining the goal is compatible with performers' regulatory focus while working on the task (Shah, 1998). From this viewpoint, much of human behaviour consists of attempts to create and maintain conformity to desired goal values, similar to Festingers theory of endeavouring to reduce any perceived dissonance. There are however two modes of approach to reduction of dissonance or gaining congruence. The first of these is discrepancy reducing feedback processes. This action occurs when actions and their

attendant effect in moving the individual closer to a goal is assessed and modified based on the feedback, this applies in approach behaviours. There is also the effect of 'discrepancy enlarging loops' which occur when an individual is looking to create increasing distance from comparison values which might be thought of as "anti goals", values the system tries not to embody which applies in avoidance behaviours (Carver, 2000). The final concept to be put forward is the differentiation between the ideal and ought self. Ideals are qualities the person desires to embody – aspirations, hopes, positive wishes for the self. Oughts in contrast are defined by a sense of responsibility or obligation. An ought self is one that feels 'compelled to be' rather than intrinsically 'desires to be' (Markus, 1986).

With respect to experimentation that has been carried out to measure the effect regulatory focus has on motivation and behavioural intentions, some interesting findings have emerged. It has been demonstrated that appeals presented in gain frames are more persuasive when the message is promotion focused, whereas loss-framed appeals are more persuasive in a prevention focus. In a precursor to much of the research, Elliott (Elliot, 1996) partitioned achievement goals orientation into approach and avoidance motivational orientations. Results from two experiments supported this framework with an interesting corollary of eliciting that when performance goals are grounded in the avoidance of failure, intrinsic motivation is undermined. When the appeal is prevention focused (Lee, 2004a). Shah (1988) demonstrated that as promotion related ideal strength increases, performance on an anagram task is greater for a monetary task incentive framed in terms of gains and non gains (promotion focus) than one framed in terms of losses and non losses [prevention focus]. A further study demonstrated that ideal strength increases motivation for promotion task framed attainment means and individuals 'ought' strength increases motivation for prevention related means.

Discrimination on the basis of approach and avoidance behaviours exhibited by individuals based on strategies for friendship were found to correlate (Higgins, 1994). Furthering the concept Crowe (Crowe, 1997) hypothesised that with a promotion focus, the inclination is to ensure hits and ensure against errors of omission whereas the prevention focus inclination is to ensure correct rejections and ensure against errors of commission. The predictions were

supported by results of the study. In conclusion of the review of literature pertaining to the effect of regulatory focus, it was found that adolescents demonstrate lower benefits to smoking when the fit between the regulatory goal and the anti-smoking message frame is congruent. 'Therefore an anti-smoking message for adolescents with a promotion focus should emphasize promotion related merits of non smoking whereas antismoking messages for adolescents with a prevention focus should emphasize merits of abstaining from smoking' (Kim, 2006). Thus studies prove the link between regulatory focus, message framing and behaviours across a variety of domains of research.

Robustness of the approach with respect to using an MIS implementation would require eliciting what an individual's regulatory focus is. The impact of understanding this may provide the implementer with the key as to how best present the system to end users and also what aspects of the system are most salient to each persons focus. This was found to in part explain some of the PWAI, Dell and Garrett case studies, where instances of both behaviours were encountered. The proposition is that this theory has more facility for operational deployment and there were more similarities than differences found in the language used to describe the theory and what was experienced in the case studies. It is suggested that it would hold true for different types of MIS systems and for organisations regardless of their size, culture or environment.

Sensitivity is innate in the proposed methodology, as by its nature, the focus of each individual must be taken into account for the correct framing and content for their respective regulatory focus to be catered for. Industrial application would require implementers to understand how best to present and negotiate an MIS for approach or avoidance criterion. This was a significant departure from any other literature recommendations with respect to IT implementation of any kind. While the theory certainly fitted the authors experience with respect to understanding how individuals perceived systems, on its own however was not sufficient for a proposed deployment methodology. A means by which the individuals sense of justice and what their expectations are with respect to an MIS are required to complement their regulatory focus. It is suggested that if the MIS system achieves acceptance at the individual level, then

organisational acceptance and facilitation towards ingrained and motivated use is certainly more assured than without.

Although not complete as an implementation tool, Regulatory focus represents a significant part of the construct and facilitates an industrial application, more so than needs and presses, values, traits or expectancy/goal constructs reviewed. With respect to finding a theory that can be used in accordance with regulatory focus that also accounts for extrinsic motivational factors, regulatory focus of the hedonic principle emerged as the most suitable theory given the evaluation method employed.

3.9 EXTRINSIC THEORIES OF MOTIVATION

3.9.1 MIS IMPLEMENTATION THEMES; CONTROL, PARTICIPATION AND TRUST.

User participation and trust are two commonly discussed themes with respect to MIS implementation. User participation and user involvement represent two key but distinct constructs with participation leading to involvement and involvement mediating the relationship between participation and system use (Hartwick, 1994). Research findings indicate that user participation can be very effective, particularly when users perceive a noticeable degree of instrumental control over the decision outcomes (Hunton, 1997). User participation is the term used when referring to referring to the behaviours and activities that users or representatives perform in the development process. User involvement refers to the psychological state of the individual and defined as personal importance and relevance of the system to the user (Hartwick, 1994). The role of user participation will change depending on whether system use is voluntary or mandatory. In a study by Kleingeld (Kleingeld, 2004) where the same performance management system was implemented using a) a participative implementation where end users had choice over the system outcomes and b) a "Tell and Sell" type implementation where end users did not have any choice over system outcomes, the participative implementation yielded significantly higher return on

investment for the system. Similar results were evidenced by studies by Hunton (1997) and Bartolke (1982).

Several psychological processes can explain the process of user participation on user involvement. Users who participate will likely influence system attributes in accordance with their personal needs and desires (Robey, 1982) resulting in a system they perceive as important, personally relevant and good, thus in information System Design, it is proposed that users who participate (behaviour) will align their beliefs and attitudes resulting in higher levels of involvement and more positive attitudes towards the system (Hartwick, 1994). A note must also be made that cognitive engagement, a form of intrinsic motivation and organisational support, a form of extrinsic motivation were statistically significant factors in self efficacy determinants (Scott, 2009). These are significant findings that corroborate the assertion that an individual approach to implementation must be formed but still yet do not provide the mechanism upon which a sense or perception of control may be developed for the end user. Despite the contribution of the concept of control, it still does not provide a means to understand the level of control or input in the decision making with respect to the MIS may be reached and neither is it mentioned that the level at which participation leading to involvement and engagement for each individual may be achieved.

Trust is increasingly becoming a factor for consideration in the design and use of IT based systems, particularly with the advent of e-commerce. Trust however also plays a role in the implementation and use of Manufacturing Information Based Systems. Just as trust mediates the relationship between people, it also mediates the trust between people and technology (Sheridan, 1984). Trust itself may be defined as "Willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action of importance to the trustor, irrespective of the ability to monitor or control that party" (Mayor, 1995). A number of points developed to design for trust in an IS system have been suggested by Lee et al (Lee, 2004b) and include; show the process and algorithms of the system by revealing interim results; Simplify the automation as far as possible to make it understandable; Show the purpose of the automation, its design basis and range of application in a way that relates to the user; and; Train

operators regarding its expected reliability". Simply put, ensuring that end users understand the "why's, where's and how's" of the system and ensuring the system performance and functioning matches expectations of the end user will lay a suitably strong foundation for development of trust in the software itself. Trust in the software is a pre-requisite to engagement and commitment in use of any IT based System.

3.9.2 Organisational Behaviour Modification.

Organisational Behaviour Modification (OBM)is based on reinforcement theory with its historic roots based in Skinner's (1938) operant conditioning and Thorndykes' (1913) law of effect . The main premise of Organisational behaviour modification is that employee behaviour is a function of contingent consequences (Pfeffer, 1995). Applying this theory indicates that firstly, the activity or task where a specific set of behaviours from the employeed are identified, secondly, the specific response or behaviour required of the employee are delineated and thirdly, the behavioural consequences required to reinforce the behaviour are then developed. This behavioural management literature interprets this sequence of actions as "Antecedent-Behaviour-Consequence" or simply ABC (Luthans, 1975). The behavioural approach to work motivation assumes that the causal agents of human action are found in the functional relationship between environmental variables (reinforcers) and the behaviour they effect (Komaki, 1996). The consequences of this for successful implementation of an MIS are many and varied and questions as to how what behaviours represent engagement with the MIS and how these may be supported and reinforced according to the theory of Organisational behaviour Modification.

Stajkovic and Luthens (2003) propose a model (Figure 10) within which Behavioural Modification may implemented;

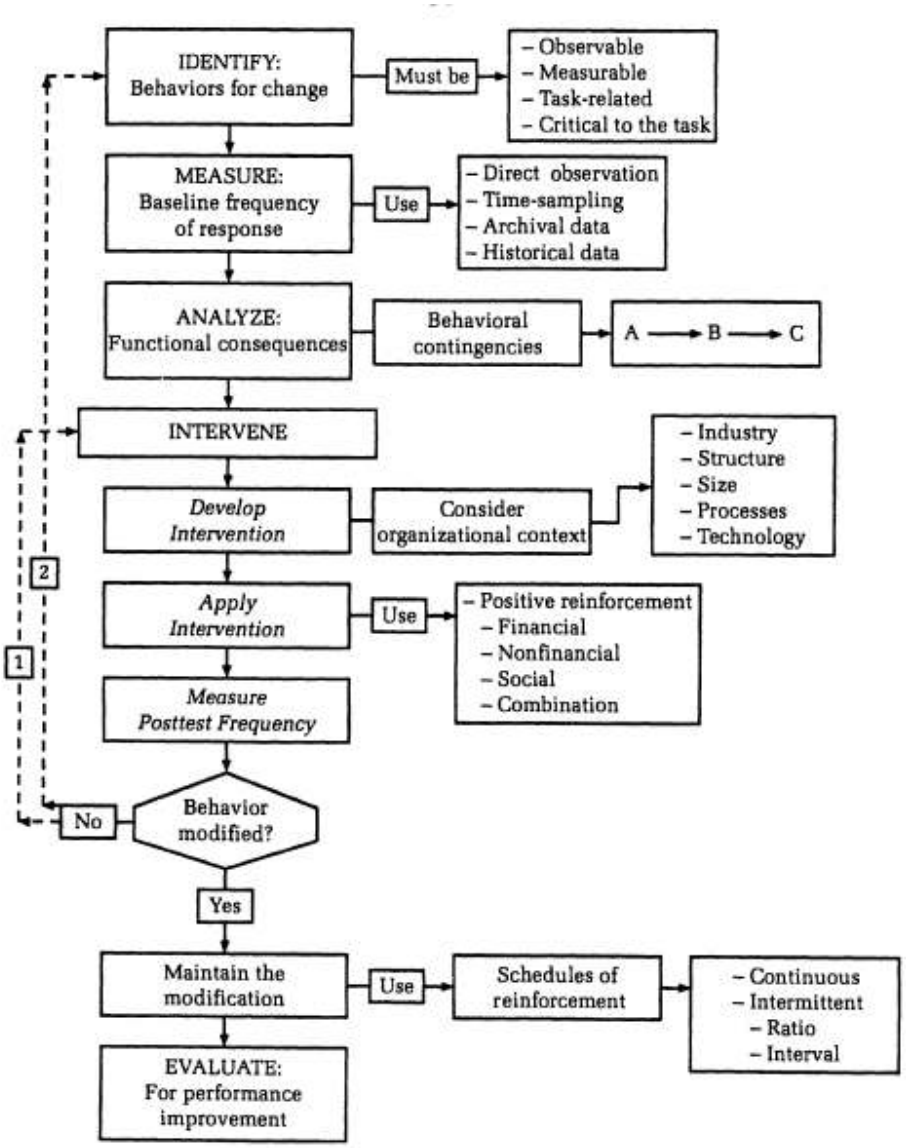


Figure 10 OB Modification (Stajkovic, Luthens 2004)

If this sequence was to be applied to MIS Implementation then the consequences would have to incorporate; a) The desired behaviours with respect to the implementation and use of the system, b) implementing a method for measurement for both impact and frequency of the behaviour, c) analysis of the consequences of this behaviour on the use of the system and the associated long term performance characteristics associated with the system implementation d) developing a set of interventions for both when the desired behaviour is and is not being exhibited

e) scheduling of these interventions and f) evaluating and maintaining the effect of these interventions for performance improvement.

While this may seem a straightforward sequence of actions, the reality of implementing behavioural modification is very different. Reasons why behavioural management has rarely been effectively used are described by Daniels (1999) and include; The perception error – what works as a reinforcer for one individual may not work for another; The Contingency error; If you can get a reinforcer without engaging in a prerequisite behaviour then the behaviour is not contingent; The Delay error; If there is too long a delay between the desired behaviour and the reinforcer no link is made between the behaviour and the reinforcer; The Frequency error; The reinforcer is insufficiently regularly linked to the behaviour.

The implications of behavioural modification with respect to MIS implementation are a somewhat unique set of circumstances in that the desired behaviour of end users, particularly in the design and implementation are necessarily of a "once off" variety in that involvement of the user in the design of the system is a difficult task to describe the desired behaviours for tasks which more than likely do not require repeating. Certainly behavioural modification has a place in the actions and sequence of intervention required by the end user once the system is implemented, and discussion at the time of implementation with the end users as to what represents system engagement from their perspective is recommended. Organisational Behaviour Modification however provides the first structure with how to work with end users in a way that can succinctly identify what represents meaningful engagement and the mechanism by which this engagement may be acknowledged.

3.9.3 EQUITY THEORY.

Equity theory was originally developed by Economists. It views motivation from the perspective of the comparisons people make among themselves. In essence it states that people are

motivated to maintain fair or equitable relationships among themselves and to change those relationships that are unfair or inequitable. Thus, the theory is largely concerned with peoples motivation to escape negative feelings brought on as a result of feeling or perceiving they are negatively or unfairly treated in their jobs once they have engaged in the process of social comparison (Furnham., 1997). This comparison may be exhibited as:

a) 'Self inside': An employee's comparison to the experiences of others in a different position inside his or her current organisation.
b) 'Self outside': An employee's comparison to the experiences of others in a situation or position outside his or her current organisation.

Stated also is that people compare their outcomes and inputs to those of others in the form of a ratio. In terms of either benefit, benefits in kind or treatment specifically the ratio of their own outcomes and inputs to the ratio of other peoples outcomes and inputs is compared to establish a baseline for the comparison and this can result in one of three states, overpayment inequity, underpayment inequity and equitable payment. Reaction to this inequity can be either behavioural or psychological and manifest emotions of guilt, anger or in psychological attitude adjustment. Folger and Skarlicki (Folger, 1999, Skarlicki, 1997) proposed that organisational fairness is a psychological mechanism that can mediate employee resistance to change.

In a variation of equity theory, referent cognition is used to explain why organisational change not only increases employee's sensitivity to change but also why change is frequently perceived as a loss. The meaning of equitable treatment is extended to include the concept of justice in distributive, procedural or interactional forms is assessed and noted that all three forms should ideally be assessed for each employee. How people are treated and how the change is implemented can have considerable influence on employee's resistance to change, to the extent that when employees see themselves as being treated fairly, they develop attitudes and behaviours required for successful change, even under conditions of adversity and loss (Cobb, 1995). Conversely, when employees deem they have been treated unfairly the employee experiences feelings of anger (Bies,

1996, Greenberg, 1996) and the desire for restoring the balance/equity and re-asserting their perceived position in the relationship by partaking in activities to prevent the change from occurring. Perceptions of inequity are similar to sensations of dissonance and employees may act to reduce the sensation intrinsically by changing their attitude or expectation or extrinsically by adopting behaviours designed to prevent successful implementation of the system. Their choice of actions is dependant upon a number of variables. Joshi (Joshi., 1991) presented an 'Equity implementation model based on the observation that employees were not resistant to all changes in an organisation, in fact, if they were perceived as being beneficial they were welcomed.

The Equity implementation model describes the processes employed by users in assessing the change associated with the implementation of an information system or technology in an organisation. Implied is that the process of 'sense making' or of turning circumstances into a situation that is comprehended explicitly in words (Weick, 2005), is a three stage process of a) assessing the change in terms of the gain or loss in his or her equity status, b) the relative outcomes are compared with that of the organisation and c) the relative outcomes as compared with that of other users in the reference group. Given the definition of Equity theory and provided with a construct of how it may be applied with respect to an IS implementation, it becomes possible to discuss its comparative merit.

The driving force behind equity theory is justice in all its forms as it impacts the employee within an organisation. If it is true that an employees primary response to changes is a cognitive evaluation of the ramifications in terms of Equity, then an implementation response would necessitate assembling the implementation plan to assess the impact on each individual from a, distributive (workload, responsibility, information access etc), to procedural (whether the employee was involved in the decision making at not only deployment but at developmental level) and an interactional level (the manner in which people are treated interpersonally during implementation (Mikula, 1990). This means that the impact on the how 'fair' the system is on each employee must be assessed. This would require an analysis on not just the implementer's behalf, but also that the employees perception of fairness with respect to their own sets of referent cognitions based on past rewards and experiences are also taken in account.

This type of model for implementation is sensitive, at least to finding out what is important in terms of fairness as long as Folgers extension to referent cognition as used. The model is useful in prediction and possible negation of resistance to change but weakens considerably when assessed as to its strength for use as a tool for motivation. While equity theory would state the organisational citizenship behaviour may increase as a result of overcompensation, use of this as a strategy by an organisation is questionable and doubtful in terms of its long term impact. The best that can be hoped for with this style of implementation is that the employee does not perceive themselves as 'less well off' in comparison to a) others and b) to their own situation prior to the implementation.

When equity theory is used as a tool to explain organisational resistance behaviours and non-adoption, the theory is far more useful, but when moving into the realm of trying to determine an intention to adopt or engagement, the efficacy of the theory is considerably weaker. Further research with respect to which types of justice are applicable to types of situations and whether one type of justice is more salient in a particular situation is also required.

Equity theory has a significant role and place in implementations of information technology, but it is suggested that its role is one of estimating whether the proposed changes do not adversely affect the employee in terms of workloads, loss of responsibility, decision making capability and position, not as a tool for encouraging adoption. The methodology proposed by Joshi is robust in that it applies regardless of size, type or duration of project or the domain within which it is being implemented.

3.9.4 Social Cognitive Theory.

'Social Cognitive Theory (SCT) suggests that people are neither driven by internal forces nor automatically shaped or controlled by external stimuli. Rather, human functioning is explained in terms of a model of triadic reciprocality in which behaviour, cognitive and other interpersonal factors and environment all operate as interacting determinants of each other'(Bandura, 1986). Based on this theory, by far the most popular model to incorporate and classify the respective

components and relationship elements of Social Cognitive Theory is Theory of Planned Behaviour (TPB) or 'Reasoned Action (TRA) (Fishbein, 1975) upon which Davis (1985) developed his Technology Acceptance Model. TPB, which comprises of what are known as belief-attitude-intention chains. This assumes behaviour is directly caused by behaviour intentions, which are caused by attitudes, which in turn reflect beliefs about the consequences of behaviour weighted by the subjective evaluation of the consequences (Liska, 1984).

Much research has been carried out with respect to the ability of social cognitive theory to predict behaviour. According to Bandura, the explanatory power of a psychological theory is gauged by: a) their predictive power, b) whether they can effect significant changes in human effect, thought and action and this must be gaugeable and finally, c) the theories must identify the determinants of human behaviour and the intervening mechanisms by which they produce their effect. Due to its popularity, many studies have used social cognitive theory as a basis for both prediction and explanation of results obtained. A key component of SCT is perceived self efficacy of individuals. Studies have shown that individuals with a high self efficacy perception consistently outperform those with a low self efficacy rating with respect to ICT (Compeau, 1999, Shih., 2006). Self efficacy is not concerned with the actual skills people possess, but with peoples own estimation of what they are able to achieve given their assessment of their skill set.

There is similarity of SCT to goal directed or expectancy theory in that the relative strength of the intention to behave is directly linked to perceived benefits arising from estimated outcomes but differs in including the judgement of self efficacy. Under social cognitive theory it would follow that personal efficacy judgements with respect to use of an MIS would be a significant moderating variable in the end success of an implementation. A second assertion that may be made and with respect to industrial applications may be more suitable that as long as people see themselves as both capable of using the technology and that deploying the technology is worth time and effort as it is congruent with their goals, then this would be a strong predictor for system uptake and eventual full utilisation of a system.

Social Cognitive Theory is more refined than previous theories considered in that along with listing the components of motivation to act as interaction between of behavioural, cognitive,

interpersonal and environmental factors but that the relationship between these factors as being bi-directional is also significant. The consequences are that what the individual believes influences intentions, in turn influencing behaviour. The results of the behaviour are in turn taken into consideration as their environmental impact was cognitively assessed. This environmental assessment in turn influences our belief by providing or withdrawing support for the belief or premise. This cycle in theory would continue until all cognate goals had been achieved. The sensitivity of this model in theory should be high as cognitive, intentional, behavioural and environmental factors are taken into account. With respect to robustness of the theory there is no reason why this theory couldn't be applied across a number of organisational types and circumstances. As nuanced as the theory may be however, there is much difficulty in its operationalisation.

Thus far the concept of self efficacy has been tested and validated as a meaningful trait with respect to MIS's. Individuals own concept of the environment they are operating within, and the type of behaviour and cognition peculiar to them alone are difficult to account for however. Conducting an individual analysis of individual's preferences, needs and goals and then determining their interaction to attempt to predict adoption behaviour with respect to an MIS is fraught. The main contribution of social cognitive theory is as a well constructed reference against which other theories for behaviour and motivation may be compared. Should the theory violate the main hypotheses of SCT it is worth thorough investigation as to reasons why. It has proved a solid basis from which to construct other theories which have included the social information processing which caters for information provided by the social context about which behaviours are appropriate (Salancik, 1978). The theory was also the basis for development of social accounts in explaining actions or situations (Sitkin, 1993). This is not to say that SCT is without its difficulties.

Intention is neither a necessary nor a sufficient cause of behaviour. Individuals may not do what they intended to do maybe because of a constraint such as lack of time or resources or the goal with which the behaviour was associated may become subjugate to different goal necessitating different behaviour. A second observation is with respect to the causal structure of TPB. Research shows that intentions do not completely mediate the effect of attitudes on behaviour and research

also does not show that attitudes do not completely mediate the effect of cognition on intention. This may be due to the cognitive process being too complex to translate directly into action, or peoples cognitive processing ability is simply not capable of the task. (Liska 2006).

3.9.5 THE PSYCHOLOGICAL CONTRACT

The concept of psychological contracts as first introduced by Argyris (Argyris, 1960) to describe the relationship he found between employees and foremen in one of two factories analysed. He described the situation as 'the employee will maintain the high production, low grievances etc if the foremen can guarantee and respect the norms of the employee informal culture, make certain they have adequate wages and have secure jobs' Thus introducing the concept of inherent reciprocality in the relationship. The concept was taken and further developed by Levinson (Levinson, 1965, Levinson, 1962) who defined the concept as 'the sum of mutual expectations between the organisation and the employee. It highlights the implicit and unspoken expectations which antedate the relationship between the employer and the employee. Some expectations are more obvious than others such as the expectation with respect to salary but others are more unconscious and are only revealed indirectly, for example longer term promotion prospects.

More recently, Rousseau (Rousseau, 1998) has developed a number of constructs in relation to what criteria define the contract, the types of contract and possible contents contracts in this instance are defined as 'beliefs, based upon promises expressed or implied, regarding an exchange agreement between an individual and, in organisations, the employing firm and its agents'(Rousseau, 2004). In situations of organisational change such as that brought about by a MIS implementation consequences for the existing pattern of expectations and it is clear for managers that the psychological contract is an important issue (Anderson, 1998, Hiltrop, 1996, Rousseau, 1999). The proposed features of a psychological contract are (Hiltrop, 1996);

1) Voluntary choice; the firm and the individual have to have both participated freely in the negotiation.

2) Belief in mutual agreement; individuals will act on their subjective understanding of the contract as though the same perception of the contract is shared between them and the organisation
3) Incompleteness; initial contracts tend to have few constructs and they are refined, added to and subtracted over time.
4) Multiple contract makers; the individual's contract is not formed by interaction and expectations of just one person – there are multiple sources of information for construction and validation of what is expected from both parties in the relationship. Contributors may include co-workers and human resource managers, though the most significant organizational relationship is normally between the employee and their direct supervisor.
5) Managing losses when contracts fail; if the psychological contract is breached or broken, i.e. there is a sensation of loss experienced directly as a result of part of the contract not being met, this in turn generates negative reactions including anger, outrage, termination or withdrawal of support. Both employer and employee must place effort in ensuring they fulfil their respective contracts. If not, reparation should be seen to be made if the sensation of contract breach is to be avoided.
6) The contract as a model of employment relationship; the employee will use their psychological contract to guide their contributions in respect to their work agreement and assist them informing realistic expectations in what to expect.

3.9.5.1 Psychological Contract; Assumptions and Constructs

According to Rousseau (2004) there are two types of psychological contracts, a relational contract which is built up over time, is more involved and invariably involves higher expectations than the second proposed type of transactional which is usually short term with relatively explicit expectation such as exhibited by a short term factory working contract. These contracts are said to differ along six dimensions (Sels, 2004, Rousseau, 1993):

- Tangibility; the extent to which the employee perceives the contract as having clearly defined boundaries, explicitly defined and observable to third parties.
- Scope; the extent to which the boundary between one's employment relationship and other aspects of ones life is seen as permeable.
- Stability; this dimension refers to the relative flexibility of the contract, whether it is static, emerging or flexible.
- Time frame; refers to perceived duration of the employment relationship, this category has been divided into transactional (short term) or relational (long term).
- Exchange symmetry; relates to the extent to which employees perceive the unequal contract as acceptable.
- Contract level; this dimension describes the level to which the employees contract is regulated, collectively or individually.

Measurement of the individual's contract can be conducted in three ways, with a content orientation which measures terms and interrelations amongst these terms. Terms may include fairness, discretion, flexibility etc. (Herriot, 1997) feature orientation, which compares the contract to some attribute or dimension, such as exchange symmetry over time (Robinson, 1994). The third and final means is evaluation orientated, which assesses degrees of fulfilment, change or violation of the contract experienced (Rousseau, 1999, Conway, 2002).

3.9.5.2 Psychological Contract; Issues.

Issues for negotiation in how the contract is put together are described by Morrison (Morrison, 1994) and include;

a) Predictability; most people exhibit a strong need for predictability and it is key to the development of stable long term relationships. The psychological contract facilitates this, however

due to the nature of the contract it is difficult for most people to verbalise what their expectations are as they are often unaware of them until they have been broken.

b) Interdependence; dependency on others is integral to working effectively on teams and in organisations at many levels of interaction, however as much as the need to be independent is a reality, it is often avoided, degraded or disguised. There is an inherent risk in being seen as being dependant.

c) Psychological distance; if people are to work within groups, the challenge of reducing the psychological distance required to allow direct expression of dissent may be a non trivial task if individuals are used to working at a psychologically impersonal and distant level. This is particularly apt at all stages of an MIS development and deployment.

d) Change; according to Morrison (1994) the psychological contract relates to change in three ways, namely that it is dynamic, which means it changes depending on the needs of the parties, secondly, that change will alter the contract, and thirdly, that there are unspoken expectations about the change. Key to effectively managing change is to make explicit these unspoken expectations, then the process of changing them in a way that is mutually beneficial can begin. This is not to say that people continue to look for evidence to support the old psychological contract. Shared attitudes about change tend to fall between perceiving it as something potentially beneficial or something potentially harmful. It is at this point that the critical success factor of 'management support' becomes particularly salient. If employees, looking to direct supervision for a comparative attitude to the change can see them not get involved in the change process, getting too many people involved, or becoming defensive about their role with respect to the change, then this inevitably leads to the employee deducing the change may be in some way detrimental.

e) Danger; there are a number of variations as to how perceived danger is addressed, whether it is verbalised, whether the organisation expects people to face perceived difficulties/change individually or as a group etc. How danger is managed will very much determine what the psychological contract becomes afterwards (Cavanaugh, 1999). Avoidance of dealing with people at a personal support level suggests to employees that change is troublesome, further supporting the perception that there is inherent danger in the proposed changes.

Assumptions implicit in psychological contracts include namely that both parties have equal bargaining power, in that it is acknowledged both parties have opportunity to either place sanction on, or provide some type of goods or service that is of value to the other. The second outline assumption with psychological contracts research to date is that it is between the employer and worker (Sels, 2004). The notion of contracts between peers or associates, or what impact different agencies within the organisation was discussed by Herriot (Herriot, 1997)who argued that each individual holds a number of contracts. The concept of which was extended by Marks (Marks, 2001) to incorporate a concept of there being one contract between the individual and the organisation, but that there was multiple foci to the contract. A final means of approaching the concept of the psychological contract is to conceptualise it in terms of a mental model or schema. Dependent on contract antecedents such as prior experience, post hire socialisation. How intricate this mental model is may have implications as to how difficult it is to change an individuals' perception of change (Rousseau, 2001).

3.9.5.3 Psychological Contract; Management and violation.

The overall implication from research on contracts to date is that workers with different types of psychological contracts respond differently to violation and to planned organisational change (Rousseau, 2001). Research has indicated that use of the psychological contract shows a better fit than other models in measurement of the relationship between communication, support, participation and change management (Schalk, 1998). However, by their nature, psychological contracts are normally voluntary, subjective, dynamic and informal which makes management of

the entity a time consuming and difficult task, however, research indicates that there are significant moderating variables to employee commitment, ergo a function of their psychological contract. These include role clarity, two way communication, decentralisation and direct participation in decision making (Adman, 2000, Morris, 1980). Aligning human resource policies with social changes and with respect to employees letting them know about what is happening in the organisation, facilitating understanding of decisions made, being able to contribute own ideas and participating in the decision making process while having autonomy and meaningful work experiences, all go a significant distance towards managing the psychological contract (Hiltrop, 1996). It has been found that this commitment wanes in proportion to the size of the gap between what inducements were offered to employees and what they actually received (Porter, 1998) thus, with respect to promise making, organisations need to exercise diligence in following up in full on commitments made to the individual.

The question of consequences of breach and/or violation of the psychological contract and its consequences has attracted much interest from a research perspective as the framework of psychological contract breach has face validity in explaining behaviours not seen to be in accord with stated organisation goals and objectives. As to a causal explanation to reasons of MIS implementation failure, the concept of breach or violation of psychological contract offers a solid causal reference upon which to build reasons for behaviours ranging from neglect of duties with respect to implementation, to actual exit from an organisation (Turnley, 1999). Contextual factors such as job availability or a sense of pride in the job, however, can moderate behaviours related to contract breach or violation (Pate, 2003). Perceived breach represents a cognitive assessment of contract assessment that is based on an employee's perception of what each party has promised and provided to each other. The term 'violation' is reserved for the emotional and affective state, that may, under certain conditions, follow from the belief that one's organisation has failed to adequately maintain the psychological contract (Morrison, 1997). Two factors may give rise to violation; reneging on promises and incongruence between words and deeds or lack of behavioural integrity of management and supervisors (Simons, 2002). Although again social accounts (Sitkin, 1993) and motivated reasoning can have a moderating effect on the breach

(Rousseau and Tijoriwala 1999). Reneging is when agents of the organisation realise than an obligation exists but they knowingly fail to follow through on the obligation. This may be due to inability or unwillingness on the behalf of the employer. Lack of behavioural integrity is more difficult to define, the concept may vary from individual to individual depending on perception, poor communication and complexity and ambiguity of obligations can lead to poorly perceived organisational actions.

3.10 IMPLEMENTATION THEORY PROPOSAL

Keeping with the proposition that human functioning is explained in terms of a model of triadic reciprocality in which 'behaviour, cognitive and other interpersonal factors and environment all operate as interacting determinants of each other' (Bandura 1999), a model that allows for a framework of understanding of intrinsic and extrinsic theory of behaviour motivation/resistance is suggested. However, social cognitive theory and planned behaviour theory are relatively complex constructs for operationalisation outside of a controlled setting. Given the review of theories of resistance and motivation, a framework for implementation of a full or part MIS system that is based on sound psychological and sociological theory, that is applicable in an industrial setting is suggested.

Completion of the review of research into resistance to change and motivation, combined with experience of successful and unsuccessful implementations by the author, two theories from the preceding review have been combined to provide a method incorporating a degree of sensitivity and facility for feedback response, which it is posited will positively affect implementation success rate. Suggested is the combining of psychological contract theory with that of regulatory focus for augmentation of a method of MIS implementation. The implications of the union of these two theories are discussed below.

These separate theories have been selected, as while both offer an excellent framework for understanding of behaviour, neither was capable of individually catering for facilitating response to

the range of behaviours and attitudes normally exhibited in reaction to an MIS implementation as experienced across the three case studies. The joining of these two theories has many ramifications for how an implementation is conducted in an industrial setting. Although human factors are often discussed in implementations, it is normally described in business and implementation methodologies in such terms as 'ensure participation' or 'communication' (Wheatley., 2000, Verville., 2005). How such artefacts may manifest at a group or individual level is generally not described in a way that allows for deployment of a system. A second reason for combination of the theories is for the possibilities of feedback that use of such a method would allow. It is envisaged that the provision of a structured facility for feedback, constructed within a regulatory focus of the psychological contract is a significant addition to the process of an MIS implementation. The third and perhaps most salient reason for research into the theories of motivation is that they allow for feedback with sensitivity to both user and organisation needs but also provides a means for understanding these requirements not encountered in existing project or change management frameworks.

The proposition is, that by approaching an implementation through use of the combination of the most relevant theories, *in conjunction* with the generic MIS implementation framework suggested from the CSF and resistance to change review, will contribute to reducing the human risk factors in MIS implementation. Used in retrospect, it may also facilitate explanation of previous failures of implementations in terms of breach or violation of the psychological contract and lack of presentation and training of the system that pays attention to perception of equity as supported by the psychological contract and preferred regulatory focus.

3.11 REGULATORY FOCUS AND THE PSYCHOLOGICAL CONTRACT; ANALYSIS

Regulatory focus of the hedonic principle states; 'An inclination to approach matches to desired end states is the natural strategy for promotion self regulation. In contrast to this, because a prevention focus involves a sensitivity to negative outcomes, an inclination to avoid mismatches to desired end states in the natural strategy for prevention self regulation (Higgins, 1994). The

definition of psychological contracts states that 'beliefs, based upon promises expressed or implied, regarding an exchange agreement between an individual and, in organisations, the employing firm and its agents' (Rousseau 2004). How should the combination of these two theories exhibit?

If the attendant tenets and principles of both theories are taken into account, then the central implication is that whether people are promotion or security biased in their self regulatory control and behaviours is a significant moderating variable in how their psychological contract are assembled, thus will affect effort and behaviours exhibited in adoption of an MIS.

Regulatory focus provides a continuum upon which the type of psychological contract an individual has may be placed with respect to a MIS, from completely security focused, to completely promotion orientated. Thus according to this theory, if the organisation negotiates a psychological contract for implementation with the employee that is in accordance with their regulatory focus, it is proposed that there will be an increased probability of system engagement. For example, negotiating a contract with individuals who have a 'security' orientation in their regulatory focus would imply that presenting components of the system that are in accord with their habitual preference, such as whether the system will facilitate them in fulfilling their respective duties, obligations and facilities of their role. The proposition being these facets would not only facilitate attitude and intention to adopt, but if well conducted, would ensure the implementer is working with the individuals 'theory in use' as opposed to 'espoused theory' (Levine, 1993). Negotiating the psychological contract with an individual with a promotional self regulatory focus would imply that the aspects of the system that are aligned with this individuals focus are aspects of the system that emphasize aspirational content such as providing accelerated means for accomplishment or providing an opportunity to exhibit initiative or resourcefulness. The theory also provides a framework for investigation of the impact of regulatory focus on the dimensions, issues and breach behaviours with respect to an MIS. A representation of the model is illustrated in Figure 11.

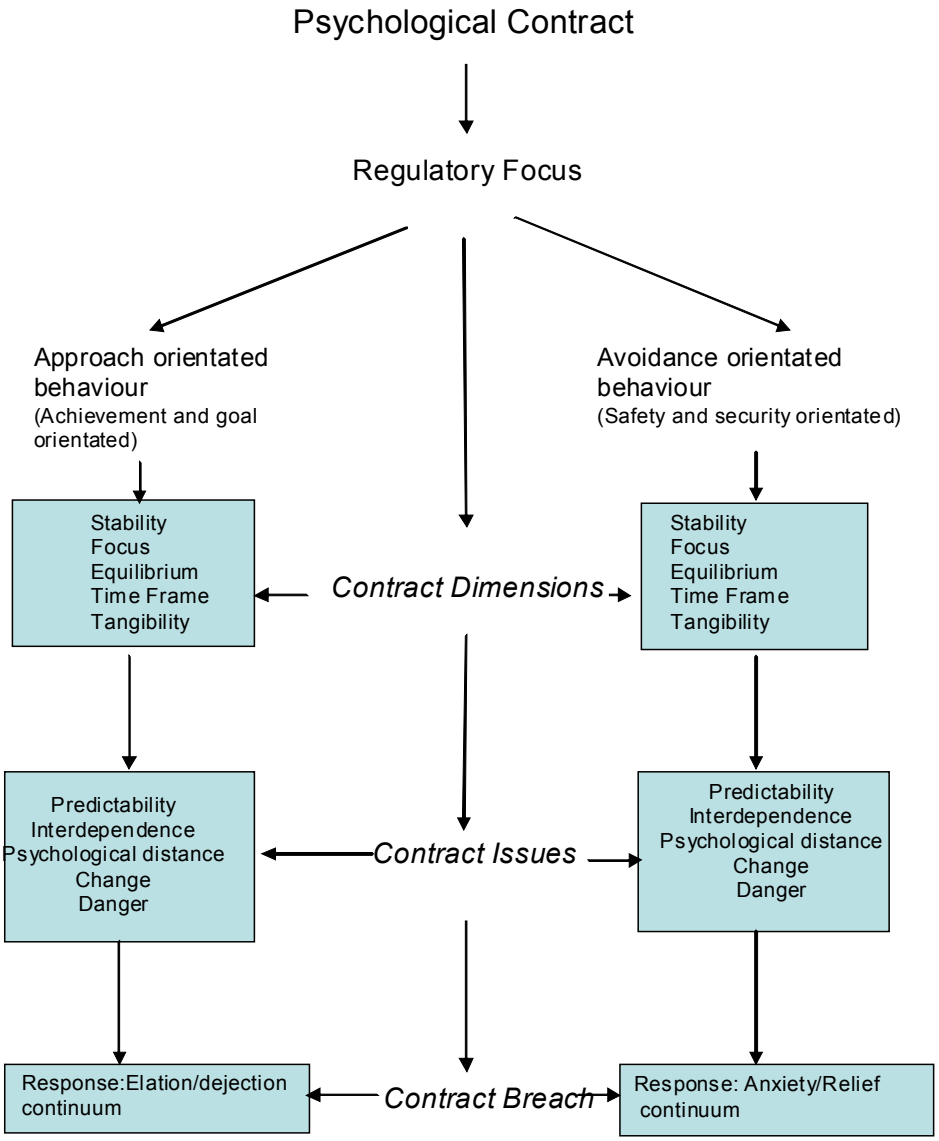


Figure 11 Regulatory focus of the psychological contract

3.12 COMPARISON OF THEORY TO TENETS OF MOTIVATION.

The theories assessed in the literature review, both intrinsic and extrinsic, exhibit all of these characteristics to a greater or lesser extent and have all significantly contributed to mainstream motivation research. It is of concern and of use as an initial validity check that the concept of Regulatory Focus of Psychological Contracts does not transgress any of the tenets of the preceding theories.

With respect to needs and presses the main assumption that fundamental needs are being met by the work contract in terms of providing salary, safe environment in which to work etc. The extent to which needs are met is dependant on how well the employee is able to verbalise these needs and negotiate for their inclusion into the psychological contract. In fact if deployed well, the psychological contract is a succinct and objective means of building eliciting needs and presses for both the employee and the organisation where needs and wants are stated in a meaningful way. Negotiation skills on behalf of both the implementer and the end user here are key.

Equity theory posits that we continually assess and reassess whether we perceive we are being fairly treated in comparison to a) previous experiences b) in comparison to others in a similar situation and c) in comparison to others in a similar company. Inherent is the concept is that we conduct constant comparison checks to ensure for equality of perceived outcome for ourselves given the effort expended. The notion of psychological contracts very much allows the employee to construct a negotiation where their concepts of fairness are made explicit. It is incumbent on the organisation to ensure that they are both versed in explicitly stating their requirements and are perceived to be fair and open in terms of rewards for effort and that comparatively, rewards meted out exhibit consistency. This is not to say that reward structures have to be the same, in fact if they are structured to suit the individual employee, they will be different and suited to what is of value to the employee but will stand up to comparison to other employees in terms of rewards for effort input. Value theory sits well at this juncture in that rewards from an equity standpoint can be a

direct derivative of what is of value to the employee. As expressed, the Psychological Contract is a very natural means of expressing what is perceived to be of value, fair and equitable, not only by the employee, but also by the organisation who may also have a very different contract with individuals dependant upon their level and responsibilities in the organisation.

Dissonance theory posits that we will expend considerable effort to reduce or eliminate perceived dissonance. To recap, a sense of dissonance arises when a person holds two cognitions that are psychologically inconsistent. Dissonance is a negative drive state and because the experience is unpleasant, the person will strive to reduce it, usually by struggling to find a way to change one or both cognitions to make them more consonant with each other (Aronson, 1997). A very obvious source of dissonance is when there is a significant gap between expectations and experienced reality. Deft use of psychological contract is an expedient means of normalising expectations, especially with respect to an MIS system, thus reducing possible instances of dissonance within the individual. Dissonance is very closely related to equity theory and ensuring of equitable treatment as discussed in the previous paragraph, by default can reduce the possibility of experiencing dissonance.

Expectancy theory or 'belief -attitude-intention' chains do not in any way contravene what is suggested by the regulatory focus of the psychological contract. Use of the contract again provides a framework which in fact facilitates and supports expectancy theory and the triadic reciprocality suggested by social cognitive theory, as long as contract negotiations are fairly and consistently conducted, then, by stating their contract terms, beliefs with respect to what is fair and equitable, intention to act in an agreed way given the existing environment should the terms of the freely negotiated contract be met and attendant attitude are explained under the theory. The relative ability of the theory to predict behaviour is what is required for proof/testing. Pairing of Regulatory Focus with the Psychological Contract allows for a clearer understanding and perception of the effect of focus on the contract and how each constituent of the contract is in fact affected by this focus as for operationalisation of contract theory a second means of focusing the diffuse theory of contracts was required. Indeed, regulatory focus provided a direction with which each individual's contract could be examined under.

The initial implementation framework as illustrated at the start of this chapter is now presented in conjunction with regulatory focus of the Psychological Contract. It is suggested that the model is used in a similar style split in what was suggested by Herzberg's (1959) version of job satisfaction theory in that the generic model of implementation must be seen as the 'hygiene factors' or those factors that must be in place before there is any merit or benefit to be had from implementing MIS using the regulatory focus of psychological contracts. The generic factors for implementation must be met before the augmented implementation at the level of the group and or individual can be attempted.

Further developing the augmented model in the context of the already defined critical factors in an implementation. The issues of predictability, interdependence, psychological distance, change and danger have close relation to the pre implementation factors resulting from the resistance to change review but can now be focused in a more tangible and applied manner (Figure 12).

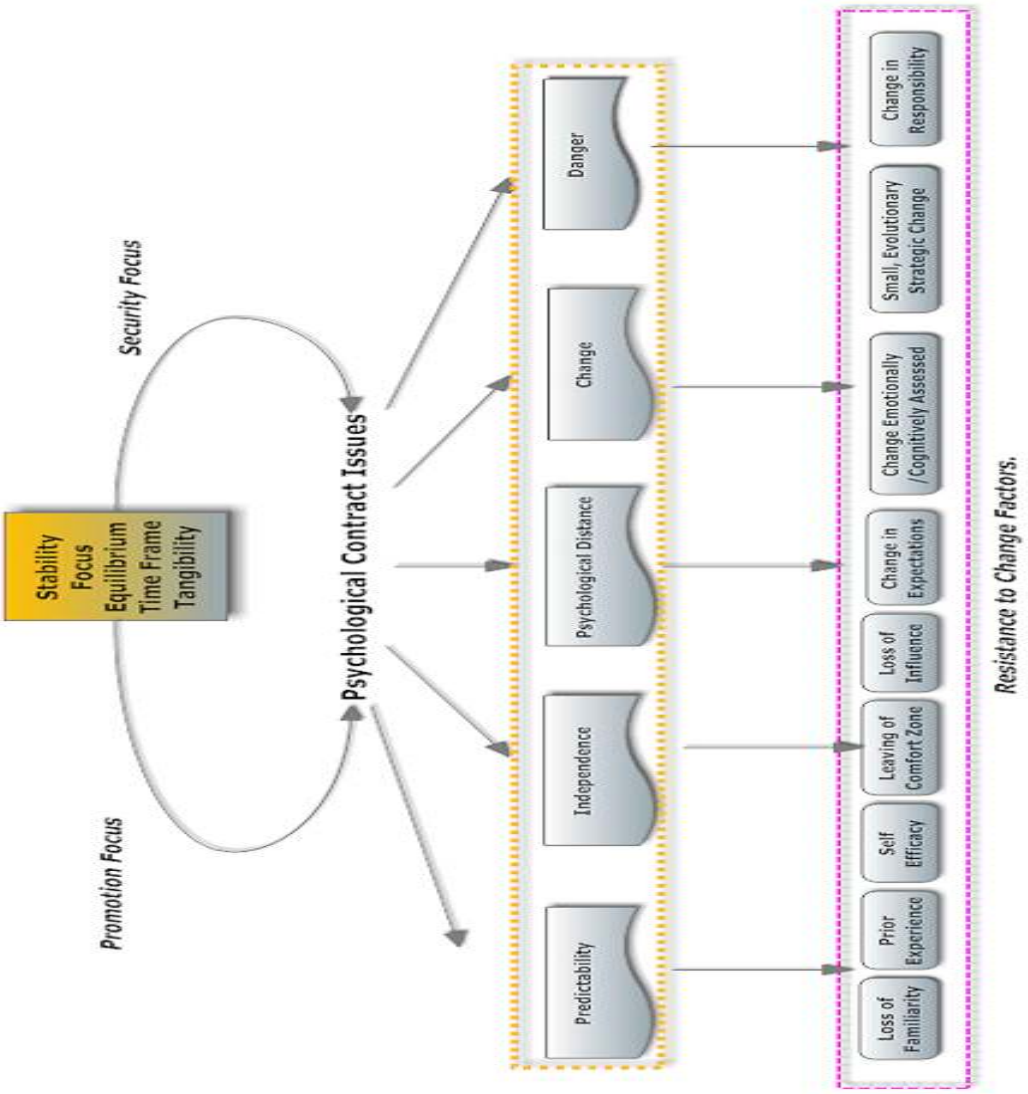


Figure 12 Psychological Contract Focus and Resistance Factors

3.13 APPLICATION OF THEORY TO CASE STUDIES.

The final test of the possible efficacy of the proposed theories for implementation is a retrospective comparison to the three case studies described in chapter two and estimation as to

what effect using these theories to augment the implementation would have affected the end results of the system.

PWA International

With respect to the psychological contract, the author had not endeavoured in any way to segregate out the respective needs and concerns of the end user except from a technically oriented focus on system outputs. While the functional needs had been detailed, the concerns and reasons underlying these had not in any way been negotiated. With respect to regulatory focus, the needs of the operations manager were promotionally orientated in terms of the focus of the outputs of the system, increasing efficiency and improved detailing of the maintenance function activities. The needs of the maintenance department were considerably more security focused, although the author had failed to elicit many of the unspoken concerns with respect to the system. The objective of the maintenance department was security focused, in that they did not have issue with the existing reporting methods and were, in the author's perspective, concerned, and understandably so, in retaining autonomy of operations they conducted. Retaining this autonomy would have been made considerably more difficult with a detailing of daily activities that would have been provided had the system been used according to its design. Understanding this at the time of implementation would have prompted a considerably altered approach.

The application of the concept of the psychological contract in understanding a means to elicit these concerns by means of constructs as recommended by Sels and Rousseau and issues as discussed by Morrison, if deftly conducted and honestly participated in, would have saved considerable time and effort on behalf of all three parties to the implementation. This is not to say that these were issues that it would have been possible for the implementer to resolve, but that the open and honest discussion as to what real concerns were with respect to the system would have been identified and resolved prior to the system design stage.

Dell Computers Incorporated.

The regulatory focus of the individual user groups here were less obvious than in the PWAI case study, but there was still distinct perspectives encountered from user groups. The operations and functional managers relying on the information were promotionally focused in that the efficacy of the system in supporting them with information that if addressed, provided the means to improve both individual results and the performance of their respective department. There was willingness on the behalf of line managers, but this was from a security focused orientation, as the system detailed the technical, material and other causes of production targets not being achieved, and in effect, correctly shared responsibility for poor production rates. In regulatory focus terms this meant that line managers were focused on avoiding 'errors of omission'. The fact that the information was already being recorded and reported to some extent also reduced the concern. There was no perceived loss of autonomy in terms of how the line managers performed their role.

With respect to the psychological contract, the equity and perceived fairness of the interactions were a definitive factor in the varying levels of engagement encountered between the three implementations. The eliciting of genuine concerns and conceptions needed to ensure a shared world of discourse is one that requires time and shared interaction to develop from system design through to system test and implementation. The implementation timeline restrictions for EMF01 and EMF02 did not allow the requisite time to develop this, and the effects emerged in the eventual comparison of the engagement results. An implementation with regulatory focus of the psychological contract would have, in retrospect, again, considerably improved the approach of the author in system implementation and would have allowed sufficient time to develop the sense of equity and understanding as developed in EMF01.

Garrett Engine Boosting Systems

Both the implementation environment and complexity of the system being installed in Garrett were an order of magnitude greater than either of the prior two implementations

conducted. The learning outcomes from the prior two case studies however provided a platform upon which to plan the implementation. From the perspective of regulatory focus it became immediately apparent that there were two very distinct groups of users, in management and the operators. Based on these two groups the author adapted the approach taken in that far more time and resources were required to work with those in what can now be understood from the literature to have a very strong security oriented psychological contract. The authors discussion focus with management end users was very much promotion oriented and on how the functions of the system would provide them with real time, accurate information as to the status of production, facilitating better decision making. The focus of discussions with operators was very much security oriented, focusing on how introduction of the system would *not* affect current work expectations and routines.

With respect to the psychological contract, the perception that requisite time and effort was taken to ensure that end users considerations were both negotiated, and taken into account, were critical to the eventual success of the system. The perceived level of equity in the discussion was paramount, as the constant underlying issue in labour negotiations at the time was one of felt inequity in working conditions. In review of the implementation, had a similar approach to either PWAI or Dell been adopted, the system would not have been engaged with. The learning from the shortcomings of both implementations prior to Garrett were critical and although the author was not aware of either of these theories during the case studies, the language of the combination of these theories was felt to address each of the exigencies encountered in the implementations, thus validating the theory combination as worthy of further investigation.

3.14 IMPLEMENTATION FRAMEWORK

Given the analysis, the review of how the theory applied to the case studies and that no motivational theory tenets were contravened, the final step was to develop the principles of regulatory focus of the psychological contract into the overall implementation framework. The remainder of the organisational or ‘soft’ factors at each successive stage were listed in sequence.

Each of the organisational factors identified could be integrated in the psychological contract issues. Figure 13 shows the combination Psychological Contract and Resistance factors of the model with the 'soft' factors identified within the review of critical failure and success factors.

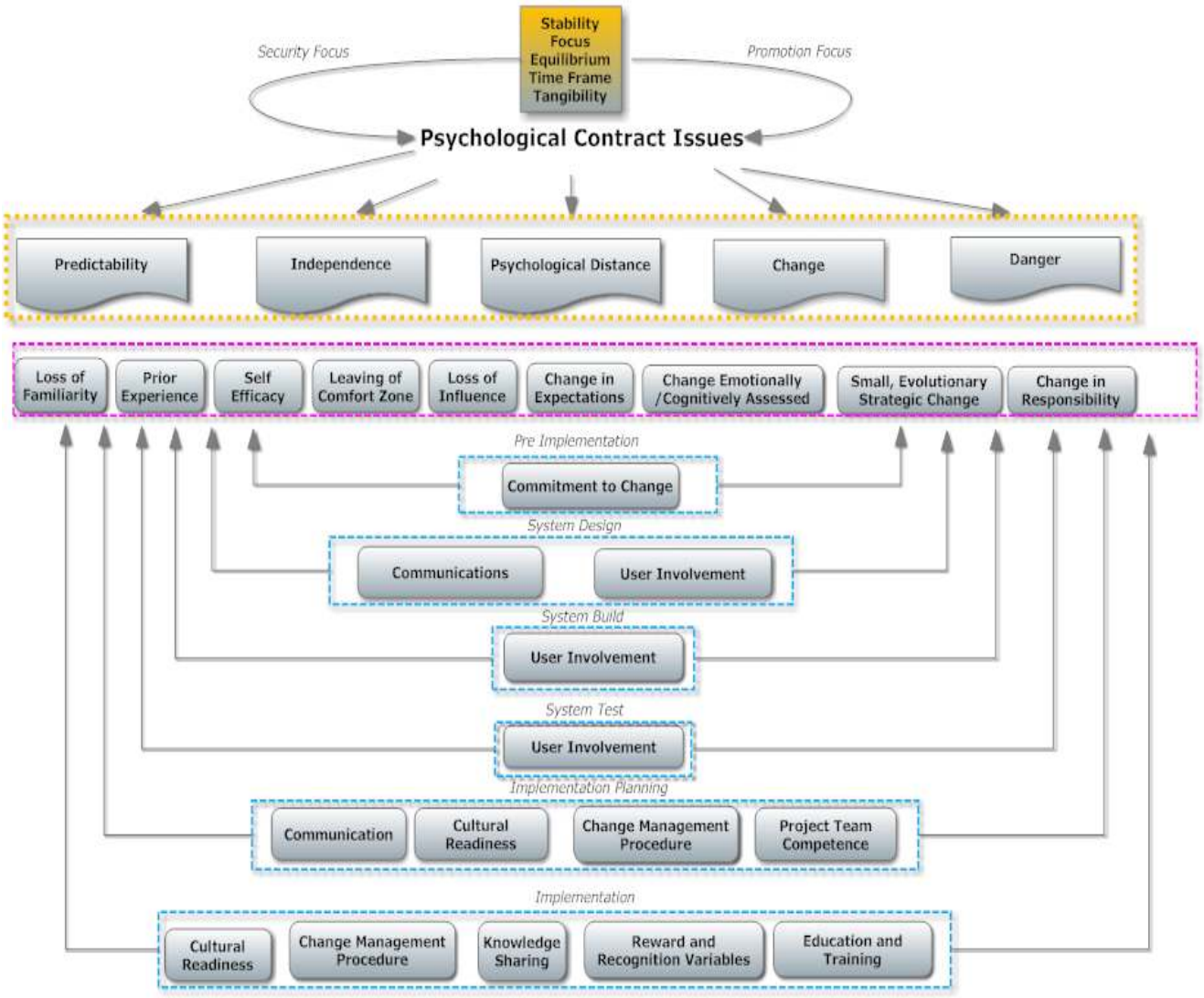


Figure 13 Integration of 'Soft' CSF's with Psychological Contract

The remainder of the factors in the successive stages were then re-integrated back into the framework to portray the first steps in an augmented implementation methodology. (Figure 14). As can be seen, the psychological contract provides a means to address each of the soft factors identified from the critical success factor and resistance literature.

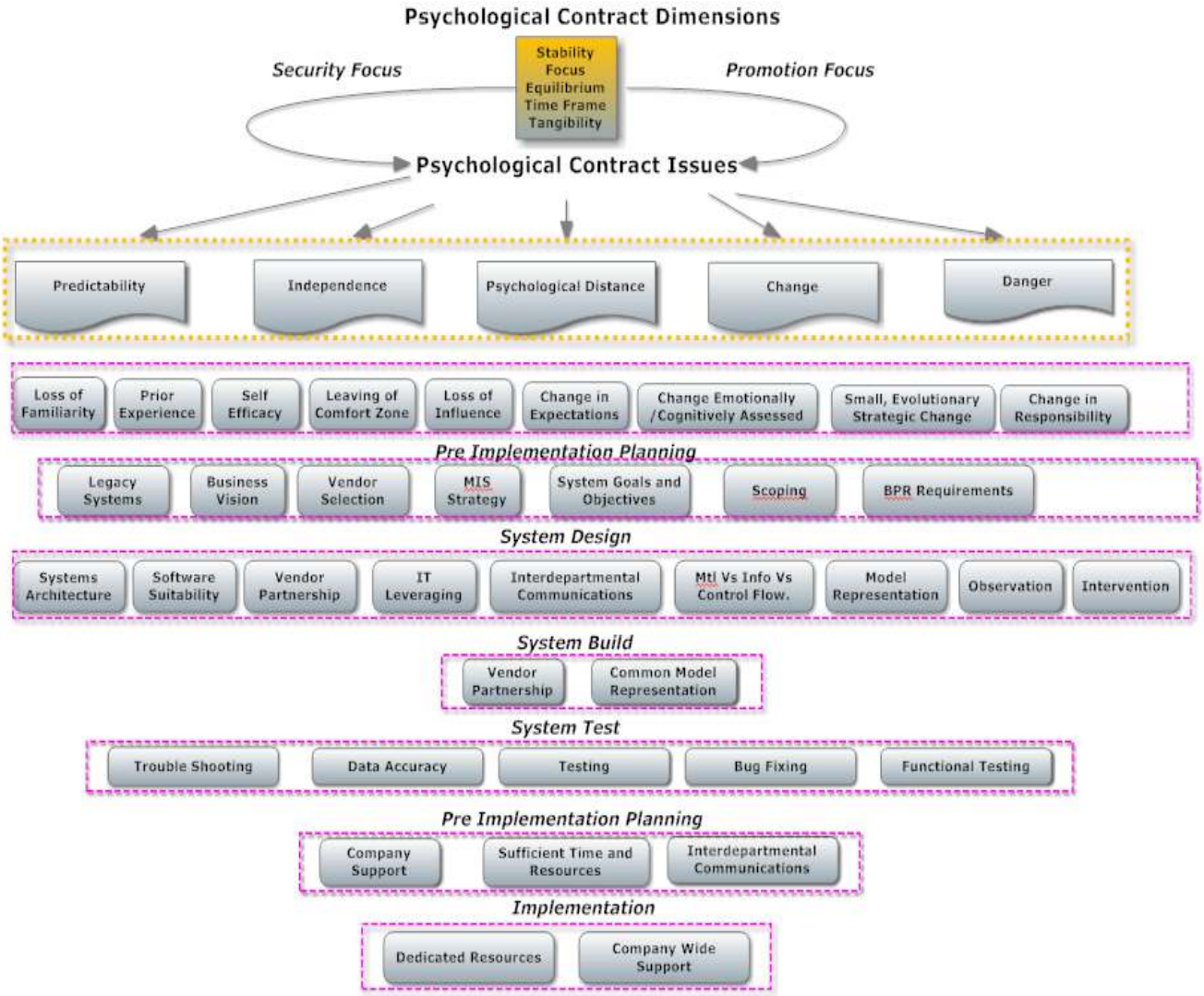


Figure 14 Integrated Implementation & Technical factors

3.15 LINKING REGULATORY FOCUS OF THE PSYCHOLOGICAL CONTRACT TO MIS AUGMENTATION.

While critical success factors, resistance to change and linear change models facilitated understanding of failures of systems, it was not until significantly more nuanced theories, with respect to human behaviour were reviewed in conjunction with the case study experience, that the breadth of gap between the requirements for a successful implementation and available literature became evident. Both significant experience and literature research were required to frame an understanding of what was missing in respect to working at an individual level to ensure a successful implementation. The granularity of working with individuals to implement systems was simply not addressed. While motivational theory put forward a possible means to address this gap, evidence of where either of these theories had been used was not available in the research. It is posited that understanding each individuals expectations as catered for by the psychological contract and the focus of these expectations, as addressed by regulatory focus, provides a mechanism to explore the use of these combined theories to augment an MIS implementation.

Technical factors have traditionally been comprehensively addressed in the literature and provide the platform for stages through which an implementation will move. What is missing in the sequence are factors critical to an individuals ability to understand and adopt a new MIS. The key interactions an individual will have with respect to any MIS implementation framework are firstly, how they are trained in the use of a new system, and secondly, a common point of concern with respect to adopting new work practices, is linked to whether there is recognition for engagement with the system.

To operationalise regulatory focus of the psychological contract means testing the theory upon these two principles of interaction and expectation setting, which are ubiquitous in MIS implementation. It is upon these two common variables that investigation as to whether there is efficacy in regulatory focus of the psychological contract will be explored. Expectations identified from end users with respect to how they are trained on a system and how they expect to be acknowledged form the expectation set that will constitute the psychological contract. Whether

users have a security or promotion focus is sintered out by first identifying, through a series of questions, what their focus is, and by then linking these to choices made, provide the means for identifying whether this focus has an impact on what their particular set of expectations are with respect to an MIS. The third and final variable, that of contract breach/violation behaviour is also explored as this defines how a lack of system engagement manifests, and also what the possible lack of engagement behaviours are depending on the focus of the contract.

At this stage of development of the augmented methodology, human factors as identified by the literature and displayed in the implementation framework in Figures 19 and 20 include; commitment to change, user involvement, cultural readiness, knowledge sharing, change management procedure, project team competence and commitment to change. Should the tenets of regulatory focus of the psychological contract be valid, each of these factors, by the very nature of applying the principles of the theory, would be a consequence of negotiating the psychological contract with an understanding of the consequences of its focus for an MIS implementation.

The subsequent task is to then explore the use of the theory in augmenting an implementation methodology, with respect to how a particular focus, promotion or security, in implementation and recognition variables may be integrated into a framework, with established implementation requirements as derived from the CSF and resistance to change literature. The subsequent chapter focuses on how these proposed variables of implementation, recognition and breach with respect to an MIS are established.

CHAPTER 4 REGULATORY FOCUS OF THE PSYCHOLOGICAL CONTRACT; THEORY TESTING

4.1 INTRODUCTION.

The function of this chapter is to describe the means adopted to test the validity of using pairing of regulatory focus of the psychological contract to augment MIS implementation as set out in the previous chapter. The purpose of the instrument will be to investigate whether there is applicability of regulatory focus of the psychological contract outside of the contextual experiences of the author. To this end, a method of operationalising the theory is required. Given that neither of these theories had previously been applied in the context of an MIS implementation, a method for testing the possible relevance of the theories for MIS implementation had to be developed a priori. Both the means for eliciting individual respondents regulatory focus and what constituted their psychological contract in the context of an MIS. This chapter will describe the reasoning and process used to assemble the instrument to test the proposed combination of theories as they may be used to augment an MIS implementation.

4.2 CHAPTER LAYOUT.

The following chapter describes the procedure used for selection of the methodology to test the pairing of Regulatory Focus of the Psychological Contract.

Section 4.3 addresses the selection of factors chosen to investigate whether the regulatory focus of the Psychological Contract and breaching of this contract is an identifiable phenomenon. The chosen variables of implementation preferences, reward and recognition variables and contract breach and violation are discussed and the section concludes with the propositions chosen to explore whether the theory is a valid construct.

Section 4.4, 4.5 and 4.6 briefly investigates the domains of research on training, reward and recognition and psychological contract breach in order to develop the questionnaire with respect to how these factors may be applied with respect to an MIS.

Dependent, independent and external variables including selection of factors deemed to moderate the results are discussed in section 4.7 and Sections 4.8 to 4.11 of the chapter focuses on the design of the experimental techniques chosen, specifically in relation to the research approach, interview methods and methods of questionnaire design including the phraseology, focus, sequencing and layout of the questions. Also discussed are methods employed for ensuring the validity and reliability of the survey and in conclusion ethical considerations are discussed.

4.3 REGULATORY FOCUS OF THE PSYCHOLOGICAL CONTRACT: PROPOSITION LISTING.

The theories identified that most succinctly closed the gap between the case study experience and the literature review was the possibility of an individual's psychological contract having a particular focus or orientation. The combination of theories discussed lent the best possible avenue to resolve the individual implementation issues for a MIS as it provided both a means of understanding individual concerns in a way that was actionable for an implementation. Since this is the first exploration into the pairing of the psychological contract and regulatory focus, and the fact that neither of these theories have been used in prior literature with respect to an MIS, nor before combined. The term 'proposition' as opposed to hypothesis was chosen as the term more accurately reflects the early nature of investigation into the validity of the concept.

For the research in hand, the areas of implementation preferences and reward and recognition preferences were selected as the means of testing whether there was merit to determining the focus of the employees contract as these were the only factors which were reliably part of an MIS implementation regardless of the organisation or individual. Many other possible

facets were explored but these three yielded a shared representation and understanding to both employees and organisations to in turn allow measurement and comparison. Breach and violation behaviours were also included in the questionnaire to elicit if there was a difference in behaviour to contract breach as this could have long term consequences for the firm installing the system. The testing criteria, supported by the combining of the regulatory focus of the psychological contract are detailed below in Figure 15.

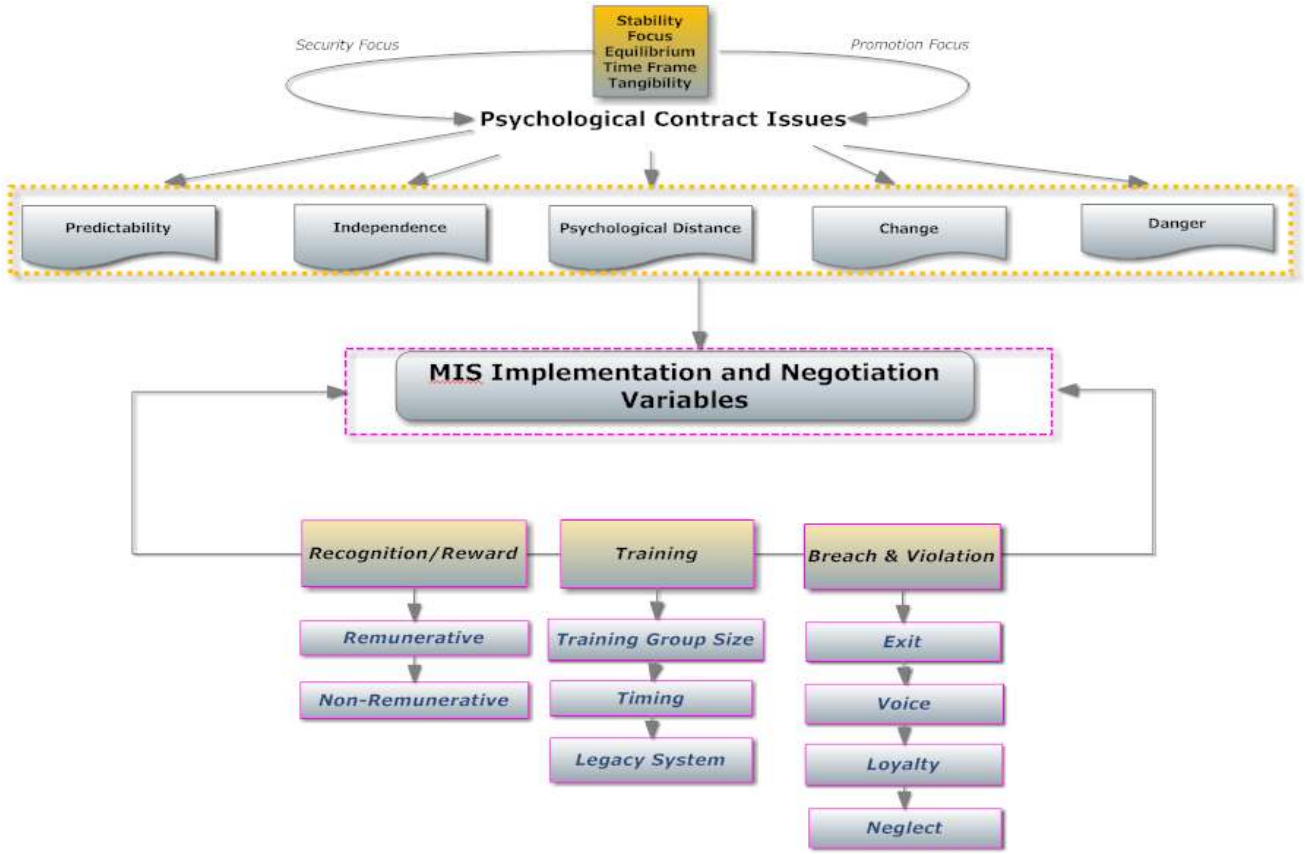


Figure 15 Theory Test Parameters

A survey to test the theory has to serve a number of functions. The first of these is to establish whether the concept of psychological contract is applicable with respect to an MIS,

whether the concept of regulatory focus is applicable to an MIS, and whether recognition and implementation can be used to discover whether there is a distinction in expectations and contract breach between promotion and prevention focus. The propositions chosen for investigating regulatory focus of the psychological contract include;

- P1: That training and recognition are the key components of the psychological contract with respect to an MIS implementation.

- P2: That regulatory focus affects individual psychological contract preferences.

- P3: That promotion focus contract tends towards group based training.

- P4: That promotion focus contract tends to increased role freedom for incentives along with opportunity for educational progression in keeping with a gains focused orientation.

- P5: That promotion focus contract tends towards 'Exit' type behaviours if contract is breached or violated.

- P6: That prevention focus contract tends to individualised training and running existing system in tandem with an MIS module in keeping with risk aversion.

- P7: That prevention focus contract tends towards selection of role health and pension options and written acknowledgement with respect to preferred incentives.

- P8: That prevention focus contract tends towards use of voice and initiation of methods designed to stall or prevent implementation in breach/violation mode.

- P9: That management of the psychological contract positively affects felt commitment to an MIS implementation.

- P10: That not taking into account the psychological contract negatively affects felt commitment to an MIS implementation.

4.3.1 Role of propositions in supporting Implementation Augmentation

The propositions are developed first to explore whether the Psychological contract with respect to an MIS is made up of expectations in regard to how the system is implemented and users are acknowledged. Preferences for variables in terms of training, and options for recognition of system adoption are used to explore whether there is variation in selection of responses linked to regulatory focus. This exploration forms the basis of best determining what factors merit consideration from end users forming the basis of understanding how to augment an implementation founded on factors are deemed key by system end users. The concept of the opportunity to negotiate and select implementation and recognition preferences are also explored as negotiation forms part of establishing well founded mutual expectations and felt responsibility with respect to an MIS. Once Contract constituents and the implications of the regulatory focus are established, it is then possible to augment the standard stages of MIS implementation as derived from the literature with the human factors that support individual engagement with the end system.

Based on the propositions the research was looking to investigate, a qualitative research instrument is used in conjunction with the quantitative instrument in order to investigate constructs of regulatory focus of the psychological contract that may not have been elicited from either the case studies or the literature review.

4.3.2 SURVEY INSTRUMENT .

A graphical representation of the proposed variable layout for testing is outlined below in Figure 16

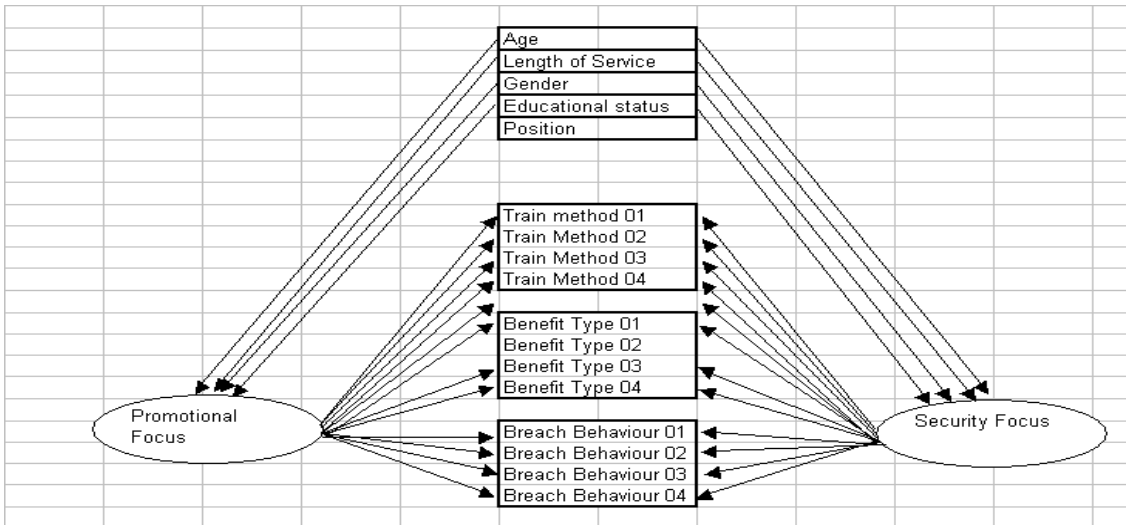


Figure 16 Survey Instrument

The reasoning underpinning the choice of factors selected for testing is that dependant upon focus of the contract there will be a variation in preferences for;

a) Preferred implementation style.
b) Preferred Reward and Benefits.
c) Breach/violation behaviour selection.

The research instrument was also designed to establish whether it was possible to determine;

a) What the individuals contract focus was in respect to an MIS and;
b) Whether a sense of reciprocity with respect to the psychological contract being met was experienced to varying degrees by employees (reported engagement)

In order to effectively develop an instrument to test the propositions on Implementation preferences and reward and recognition techniques, factors identified as pertinent to MIS's within both of these domains had first to be addressed. The following section on Implementation techniques and Reward and recognition (Sections 4.4 and section 4.5) describes the reasoning behind selection of questions for both these sections of the quantitative research instrument.

4.4 IMPLEMENTATION TECHNIQUES.

From the review performed on business press in the literature, it became evident that the prevailing attitude of organisations after failed implementation was to attribute responsibility to software issues. However it was also noted that the precise nature of the software problems encountered were not clearly reported. Software may not have functioned correctly or the software may not have functioned in a way that was expected by end users. There is a significant difference. Training methodology does need addressing with respect to MIS implementation and is key to its success. Despite this, training for systems tends to represent a small fraction of the total budget allocation for training although focus on implementation is repeatedly cited as a critical success factor in an MIS implementation (Umble., 2003, Ehie., 2005) and conversely as a factor in past implementation failures (Barker., 2003, Muscatello., 2003, Kim, 2009). From an estimated investment of 100 Billion Dollars spent by American industries on training, only about ten percent of those expenditures result in transfer of newly learned skills and knowledge to the job (Baldwin, 1988). The view that only a fraction of training is transferable back to the job is a contention well supported (Broad, 1992, Burke, 1999), thus further research in training techniques is warranted.

Training may be defined as "A planned learning experience designed to bring about permanent change in an individual's knowledge, attitude or skills (Campbell, 1970) A suitable definition of trainability of an individual however may be derived from Porter and Lawler's assertion (1968) that managerial performance was a function of abilities, traits, efforts and role perceptions (Noe, 1986). Paralleled from this concept to assert that trainability was a function of ability, motivation and the individual's perceptions of the work environment. That motivation of the individual to adopt an MIS is a factor in their desire to learn or facilitate their training is a key tenet

of this research. Even with realisation of this, the best planned implementations can go awry as can be seen from initiatives deployed by the National Health Service in the UK and that an implementation can be confounded by the response of employees faced with an uncertain future. (Hyman, 2002). Further research is merited, as research has indicated that trainees who learn more in training go on to perform better in the job (Rouiller, 1993). Investigation in the area is difficult however given the multitude of possible external variables. It is extremely difficult to prove causal relationships in a training environment and this is responsible in part for the dearth of research in the area (Kontoghiorghes, 2001). Also cited is the lack of theoretical frameworks (Baldwin, 1988). Use of regulatory focus of the psychological contract for MIS implementation will provide an initial theoretical framework for this instance.

4.4.1 TRAINING TECHNIQUES.

As a general rule, standard training techniques for MIS implementation do not take individual training needs into account. Traditionally a combination of techniques is used. The MIS set-up and design is introduced as a 'done deal' at a company communications meeting or general information session. Having asserted reasons for implementation and proposed benefits of the installation, the floor is then opened for questions. Updates may or may not be given at a regular basis until a 'Go live' date approaches. It is usually at this juncture that consideration for how to train employees in use of the system is entertained. The size of the implementation plays a significant role in training considerations. If one module of an MIS or ERP package is being installed, then it is more than likely training requirements will be confined to one department with a high degree of overlap between functions. As a consequence training is deployed to the group, not to the individual employee. A typical selection of training techniques available to the organisation may consist of;

A) Action learning: a continuous process of learning and reflection supported by work colleagues to find solutions to real problems and facilitate organisational and personal development.

B) Mentor process: a mentor guides, advises, supports, coaches, counsels and facilitates the development of a mentee.
C) Coaching: a process whereby a coach guides another to improve their work performance by turning work situations into learning opportunities in a planned, purposeful and systematic way.
D) Use of a corporate university: use of a business unit set up within a company solely dedicated to education of the employees
E) Use of a learning centre: dedicated room with a set of resources where hands on computer based training is delivered by a tutor. The tutor may be internal or external to the corporation.
F) Games: use of competition, involves scoring or rating which produces a winner, consists of rules and participants who are players.
G) Simulations: attempts to approximate reality and have employee's adopting roles in an in depth way so that they become really involved in the process.
H) Exercises: do not have roles, maintain objectivity, may be individual or group, are often about roles that are described as opposed to experienced.
I) Case Study: attempts to simulate decision making scenarios.
J) Role Play: is an enactment of a scenario in which each participant is given a part to act out.
K) Behaviour modelling: uses the natural tendency for people to observe others to learn how to do something new. Most frequently used in combination with another technique such as on the job training.

(Malone, 2005, Truelove, 1992)

Given the selection of training techniques the question remains not only how to select the most apt training technique, but also how to frame it or present it in such a way that is most meaningful for the recipient. To reiterate, trainees that learn more in training perform better on the

job (Rouiller & Goldstein 1993). The purpose of the first section of the questionnaire is to provide a means of determining if there is a relationship between preferred training type and regulatory focus given the assumption that sufficient training is a fundamental construct of the Psychological Contract for reciprocating MIS engagement. The following considerations as recommended for training also need to be acknowledged;

- Identify the types of individual learning strengths and problems and build training around these needs.(Awareness of instrumentality, scepticism, resistance to change, attention spans, expectation levels, dominant needs, absorption level and topical interest).
- That learning objectives are aligned to organisational goals.
- Clearly defined program goals and objectives at training outset.
- That active engagement of the employee is a requirement for learning.
- A systematic, logically connected, sequencing of learning activities so that trainees have mastered lower levels of training before moving on to higher levels.
- Use of a variety of training techniques.
- Use of realistic training material that is relevant to employees work or life experience.
- Facilitation of opportunities for trainees to work together to share experiences.
- Provision of constant feedback.
- On identification of performance discrepancy, analyse training, reward/punishment incongruence, employee feedback mechanisms and system obstacles.

[Adapted From (Blanchard, 1999, Michalak, 1979, Gordon, 1995)]

4.4.2 THE CONTEXT OF REGULATORY FIT IN IMPLEMENTATION

The theory of regulatory focus distinguishes between two distinct regulatory orientations and the strategic means that best fit each. A promotion focus represents goal pursuit in terms of

hopes and aspirations (‘ideals’) and a prevention focus represents goal pursuit in terms of duties and obligations (‘oughts’) and entails an orientation towards security and a sensitivity to the presence and absence of nonloss/loss outcomes. Regulatory focus is a state that can be investigated either as a chronic tendency or situational inducement focus (Cesario, 2004). Regulatory ‘’fit’’ is when the manner of goal pursuit sustains a regulatory orientation. (Higgins, 2000). Research has acknowledged that the general problem with IT training is that it is often focused on skills and procedures rather than a complete strategy involving the individual (Coulson, 2003). Field experiments have been carried out that compares the relative effect of cognitive style and training method and proved personal characteristics and situation factors are joint determinants of behaviour (Chou, 2001). This section of the survey instrument is based on a questionnaire developed by E. Hardin (Hardin, 2002) who developed the tool from the original selves questionnaire (Higgins, 1994, Higgins, 1985) and a variation on the selves questionnaire to allow for ease of marking (Tangney, 1998) (Appendix D)

The subject of regulatory focus with respect to coaching has been addressed by Smither (Smither, 2001) noting that in respect to coaching at least, that the role of regulatory focus may be critical “to the extent that coaches can make a promotion focus more accessible (perhaps by the way they frame goals and feedback – moving toward success rather than away from failure), they can help shape the behaviour of the employees they coach in subtle but powerful ways.” Dispositional goal orientation was related to the content of goals that individuals adopted for a training program. Abstract goal orientations such as a tendency to approach positive stimuli or avoid negative stimuli are mapped onto distinct response styles that serve as directional orientations. These response styles do not offer the ability to make behavioural predictions, but give an indication to the types of goals that individuals set (Brett, 1999). The regulatory focus content of the goal has also been proven to be a factor in motivational strength during goal pursuit. It has been shown alignment of goals to regulatory fit of the individual enhances motivational strength (Spiegel, 2004). Given that;

- Training perceived as adequate by the employee is a significant part of the psychological contract and a prerequisite to the employee reciprocating commitment.

- The findings of the effect of regulatory focus on goal pursuit.

The research question at hand is to determine if there is a relationship between the Regulatory Focus of the employee and preference for type of training or indeed the framing of the training proffered. The remaining task is to develop a questionnaire set for MIS implementation that will allow for selection of this preferred training method for MIS. Thus the following set of questions are organised by;

- Questions pertaining to training preference or combination of training types preference.
- Questions pertaining to regulatory framing of training selection , thus concluding the first section of the questionnaire.

The questions selected as a consequence of the research in training methods in MIS implementation are detailed in Figure 17. The purpose of this section of the questionnaire was not to elicit any behavioural preferences or characteristics, simply to elicit in the context of an MIS implementation, what the preferred methods of training were.

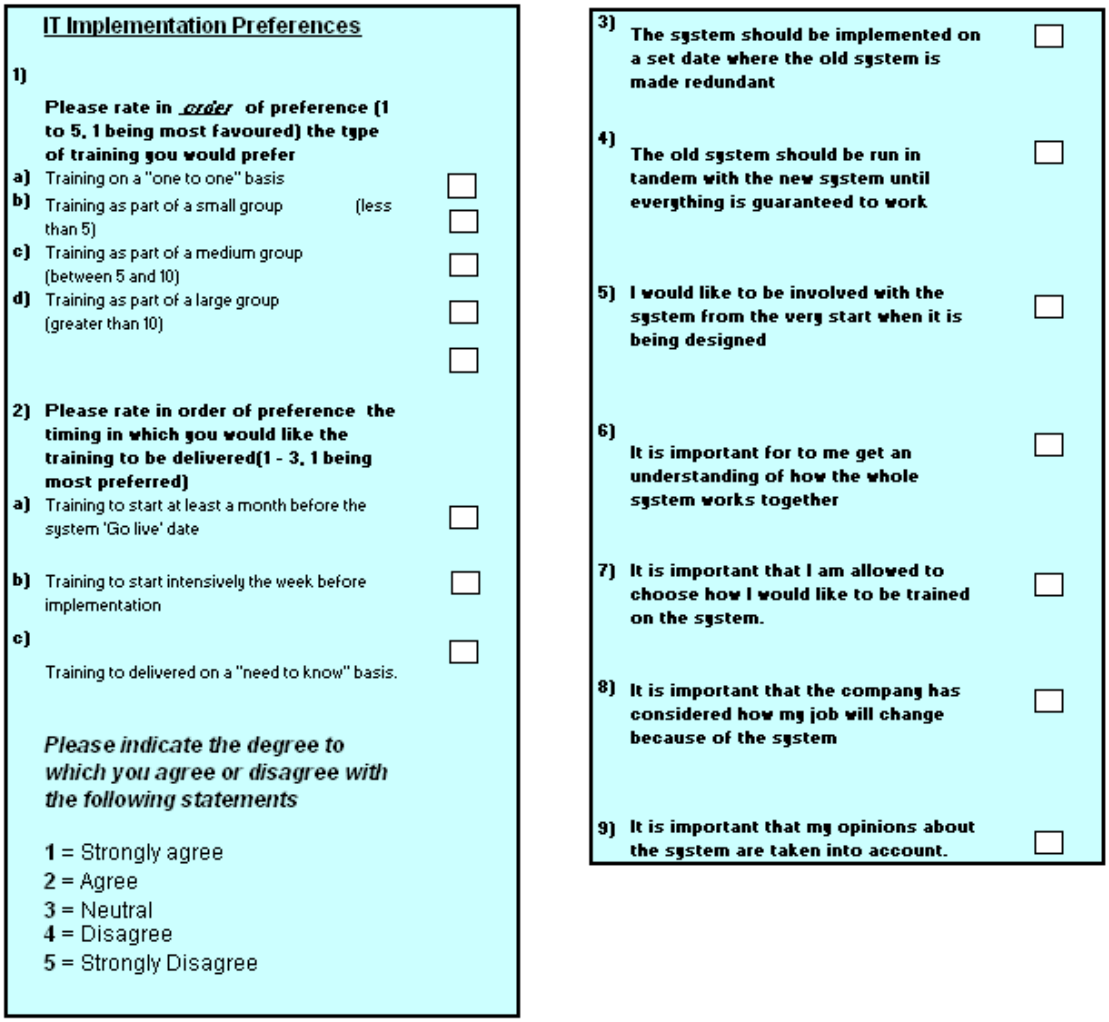


Figure 17 Implementation Preferences

4.5 REWARD AND BENEFIT AND REGULATORY FOCUS OF THE PSYCHOLOGICAL CONTRACT

Reward and benefit expectations are the second proposed construct of the Psychological Contract in relation to an MIS implementation. The next step is to determine what effect Regulatory Focus has on reward and benefit expectations and reciprocated levels of commitment. Regulatory

focus as discussed by Higgins (2000) may be dispositional or situational. The purpose of researching methods of rewarding employees is to determine not only if there is preferred types of remuneration dependant on focus, but also to find out how to frame the questions in a way that can be classified as either promotion or prevention oriented. "Reward management is concerned with the formulation and implementation of strategies and policies the purpose of which is to reward people fairly, equitably and consistently in accordance with their value to the organisation, and to help the organisation achieve its strategic goals. It deals with the design, implementation and maintenance of reward systems which aim to meet the needs of both the organisation and its stakeholders" (Armstrong, 2005)

An alternative view to this approach is to consider that incentive compensation is a means of 'exerting control', which may be deployed by either controlling employees inputs with a high degree of supervision or it may be exerted by placing control on employee outputs (Banker, 1996). Compensation can be construed to support either approach. The end effect is that employers using selective incentives such as would be required for reward for implementation and use of an MIS system rely on monitoring and output control in order to establish who would be rewarded and why (Szulkin, 1999). It has been well argued however that adroit use of reward and recognition can significantly enhance the chances of adoption of organisational change (Pettigrew., 1997).

4.5.1 REWARD AND RECOGNITION; VARIABLES.

In the implementation of reward and benefits for adoption of MIS systems, the initial assumption made was that rewards could not fail to have a blanket positive impact on the adoption of an MIS. With further research however a number of strong arguments about merit based incentive complexities with respect to both the means of distributing the rewards and determining what could be construed as a fair reward for the adoption of the system were encountered. Research has indicated that merit based pay can not only *not* be strongly positively linked to overall performance but can serve to inhibit or vitiate long term effectiveness. Merit based pay systems can also undermine team working relationships, promote a short term focus and can lead to employees

believing that pay is not related to performance at all but to having the 'right relationships' and being ingratiating (Pfeffer, 1998). Even if external factors affecting reward such as the labour market, inflation, wage rates for similar jobs in other companies and minimum wage requirements are taken into account (Freedman, 1980), the design and implementation of employee pay and compensation systems has attracted much attention due to a belief in the strong ability of monetary based or extrinsic compensation systems to reward the employee (Pfeffer 1998). Regardless of the validity of this assumption, there are a number of internal considerations that must be taken into account:

- There must be a comprehensive measure of performance; depending on what outcomes are some variables are extremely difficult to measure such as provision of customer care.
- Communication; because pay levels for individuals are kept secret employees must take it on faith that their remuneration level is based on performance as they have no means of comparison.
- Delivery systems; the typical merit based pay system is poor at relating pay to performance as pay reviews generally only occur annually and are a small percentage of overall pay.
- Managerial behaviour; failure on behalf of the manager to recommend widely different pay increases when widely different performances exist. (Lawler, 1987).

4.5.2 MERIT BASED REWARD AND COMPENSATION SYSTEMS.

The misconception that reward based systems can enhance performance can be observed still with the regularity with which organisations overhaul their pay and benefit systems. The assumption is that there is a linear relationship between pay and performance. Egan (Egan, 1995) contends that it is not poor design or application of benefit systems which is at fault, but that the conception is simply a misnomer. The failure of any given incentive program is due much less to any glitch in that program than to 'the inadequacy of the psychological assumptions that ground all

such plans' (Kohn, 1993). That people overemphasize the effect of extrinsic incentives on others has been shown (Heath, 1999), but to the extent that incentive schemes can go as far as to disincentivise is rarely considered. The mechanism by which merit or reward based systems fail to work is due to these systems building in disincentives for the management of uncertainty, interdependence and complexity and so discourage the kind of co-operative actions that lead the organisational form to be more efficient (Pearce, 1987) and that 'measuring peoples performance is vitiated by the obsession with control of the employees performance' (Hendry, 2000). The point is enumerated by Baker at al (Baker, 1988) who stated the reasons merit schemes are counter productive are that they encourage 'a narrow focus and a reduction in risk taking, That extrinsic rewards can erode intrinsic motivation and finally, corroborating the point that people come to see themselves as being controlled by the reward'.

Given these issues with subjective merit based systems companies have tended to move towards group based incentive systems that are objectively assessed on the basis of performance of the business unit or division as companies have realised that it is not in their long term interest to encourage short term single transaction expectations amongst employees. There is yet an issue with group based reward systems as share ownership or profit sharing as these do not necessarily impact positively on employee attitudes, behaviour or performance, nor on organisational performance overall. Thus it is posited that financial reward is not of use in providing any type of commitment to adopt an MIS system and if used, could in fact be detrimental to adoption and continued use of the system. The proposition is still worth testing, however the questions remains then what can be provided to employees to incentivise use of an MIS system.

4.5.3 REWARD FRAMEWORK.

Reward does not have to be meted out solely on the basis of financially based reward systems. There are a number of means of reward at the disposal of management. This must be begun to be seen in terms of the impact this has on the psychological contract. Currently reward

systems are seen to be a combination of transactional and relational based reward categories (Armstrong, 2005).

Transaction Rewards;

- Basic pay (weekly or monthly salary)
- Contingent pay (Performance bonus, overtime, commission etc.)

Relational Rewards:

- Learning and development
- The work experience
- Achievement & Recognition
- Responsibility, autonomy and growth.

Key is realising that the misuse of reward systems as a control device is still prevalent but eliminating this has left a vacuum for a means of reward and benefit of employee without the manipulation of possible outcomes by the employer. It is proposed that use of the psychological contract and development of the contract in such a way that caters for the dispositional regulatory focus of the employees in a transparent, equitable and fair means of implementing a reward and benefit system that is not manipulative. The employee not only has choice of the efforts to be expended in achieving desired outcomes but they will have negotiated the rewards for their efforts as a fair and equal party in a negotiation process that has led to desired outcomes for both parties. Research indicates that subjects work harder when they have control over performance outcome contingencies and type of reward (Brigham, 1979).

4.5.4 Regulatory focus of reward outcomes.

As the promotion focus represents goal pursuit in terms of hopes and aspirations, and a prevention focus represents goal pursuit in terms of duties and obligations. The implication is that

dependant on the individual, there is sensitivity to loss or gain outcomes. There is substantial evidence that matching the topic of a persuasive message to some aspects of the recipients cognitive, emotional or mental system can influence persuasion (Spiegel, 2004, Shah, 1998, Kim, 2006, Kim, 2009). Further research has shown that regulatory fit (when the manner of goal pursuit matches regulatory orientation) influences motivational intensity during goal pursuit, prospective feelings about a future choice, retrospective evaluations of past decisions and values assigned to chosen object (Higgins 2000). Thus when a message recipient 'feels' right from regulatory fit this subjective experience transfers to the persuasion context and serves as information for relevant evaluations including perceived message persuasiveness and opinions of the topic (Cesario et al 2004). Research has also found in an experiment on classification performance, that performance was closest to optimal when regulatory focus matched the structure of the payoffs for clients. Thus, 'promotion focus subjects performed best when the payoffs were structured in terns of gains and security focus subjects performed best when the payoff was structured as a 'non loss' (Markman, 2005).

In a model integrating models of commitment and motivation by use of regulatory focus Meyer (Meyer, 2004) included the proposition; "Employees who see themselves as more intrinsically driven see themselves working a promotion focus or for the accomplishment of ideals. Employee's who see themselves as being extrinsically motivated see themselves as working in a prevention focus." Research has indicated regulatory focus affects how the reward is approached and the effect of its framing.

The purpose of the questionnaire is to determine if regulatory focus has an effect on the type of reward selected. The implementation questions chosen as a consequence of the research are detailed in Figure 18. This section of the questionnaire again does not seek to elicit any behavioural traits or preferences, simply a ranking of preferred type of recognition – remunerative or non-remunerative.

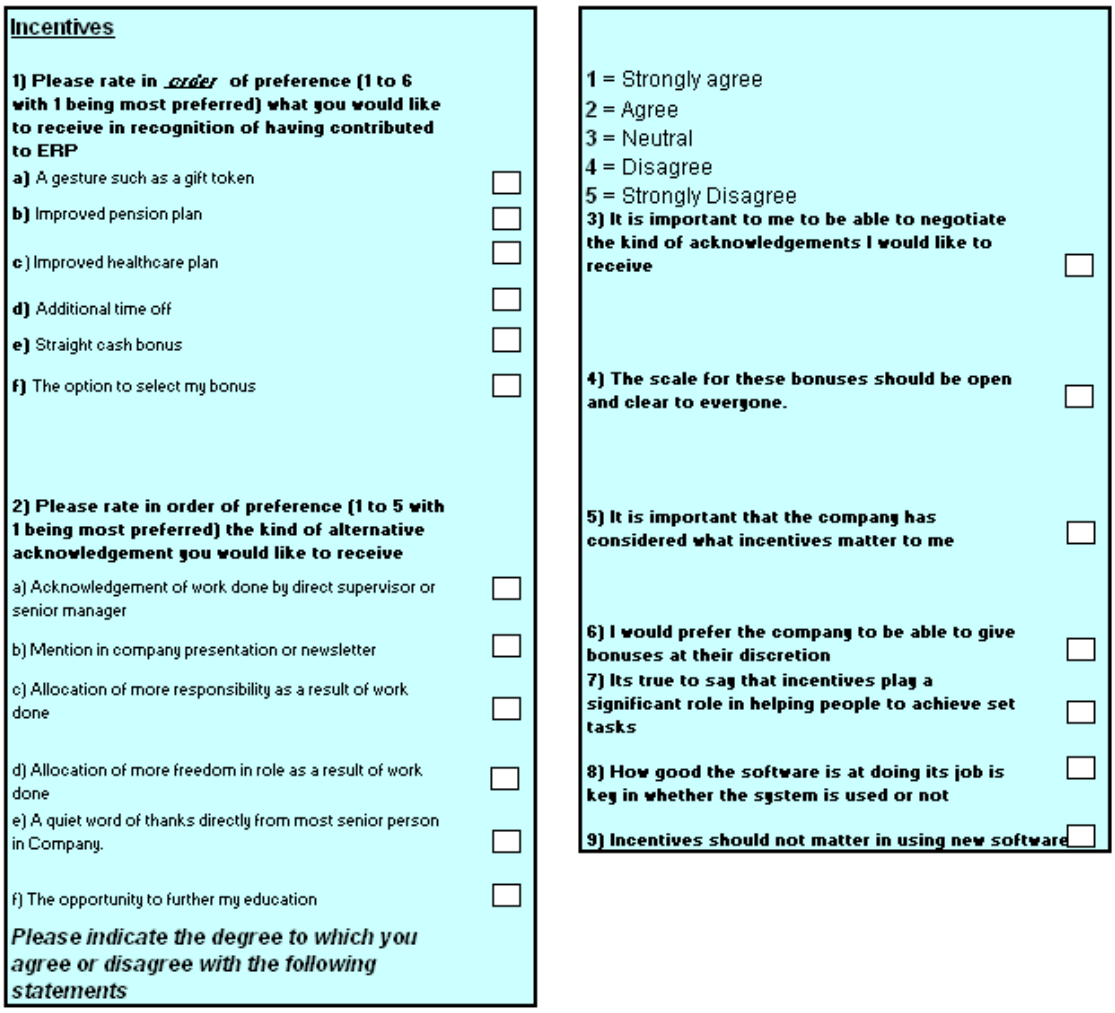


Figure 18 Reward and Benefit/Incentive

4.6 CONTRACT BREACH, VIOLATION BEHAVIOURS AND CONTRACT FOCUS.

As discussed in the literature review, it is posited that behaviours as a result of a breach of the psychological contract by the organisation will be affected by the extent to which the employee is in a promotion or a security focus. The concept of reactions to breach of contract depending on focus has been discussed with (Argyris, 1971) noting that reaction can vary along two different sets

of scales. Elation/Dejection if in a promotion type focus and Relief/anxiety continuum if in a prevention focus. While this serves to describe the emotional content of the reaction, this research proposes to determine if there is any difference to behaviours if the contract is breached and the employee's contract is security based or prevention based. Hirschman's (Hirschman, 1970) categorisation of behaviours into exit, voice, loyalty or neglect is proposed to be used to classify behaviour types. This classification has already been used as a framework to effectively measure responses to contract breach in the literature (Turnley, 1999, Lemire, 2005). However although a link to psychological contract and organisational commitment has been found (Flood, 2001), how a) regulatory focus b) attitude to a fixed component such an MIS affects this has not yet been investigated.

The questionnaire developed and built from this section will seek to determine if it is possible to classify behaviours according to regulatory focus using Hirschman's classifications. Previous researchers have concluded that there are two basic causes of psychological contract violations: Reneging and incongruence (Morrison, 1997). Reneging is when a promise or obligation is knowingly retracted or broken, incongruence is when there is there are different understandings of what obligations were in the first instance. This section of the questionnaire will be split into questions that will establish what employees perceived reactions to reneging behaviour by the organisation as a measure of incongruence will also initially be perceived as reneging by the employee.

Breach behaviour, while not a part of the psychological contract, it is posited is a consequence of how the contract is focused. Results obtained from analysing the questionnaire will be linked back to the case studies and literature on change resistance to determine if any parallels or deeper understanding of the mechanism of resistance in individuals can be drawn.

In Lawrence's (1954) review of Coch and French's (1948) study, reference was made to the reaction of an operator to the interventions of two industrial engineers. The first worked with the operator on a regular basis and interacted co-operatively to assess possible changes to be made to the device being assembled. The operator assisted the engineer fully in assessing the change. The

second instance of interaction was with a second industrial engineer who had no prior relationship with the operator but coerced cooperation by virtue of position. The operator handled the prototype in a rough manner and in effect ensured the amendment to the device would not assemble. This covert type of resistance it is suggested is very typical in organisations, but very difficult to capture the range and effect they may have. It Is not possible within the scope of a questionnaire to capture all possible types of resistance behaviour thus a semi structured set of questions at the end of the section it is hoped will elicit a broader range of resistance behaviours to MIS for completeness and whether there is a regulatory association to them. While Lawrence attributes the actions of the operator to the person in question disliking the brusque manner in which the second engineer treated them, it is posited that it was due in most part to the operator having built a psychological contract in relation to how they are treated for testing of changes. The second engineer broke this contract, thus the employee exhibited a behaviour (According to Hirschman's framework of neglect).

The research aims to determine if the reaction would differ if the regulatory focus was different. The above scenario is an illustration of Nierenberg's (Nierenberg, 1981) assertion that all parties to a negotiation should come out with some needs 'satisfied' Not only was there no needs satisfied on the operators behalf, no negotiation had taken place. Thus the resulting behaviour was an attempt at equalisation or the reclaiming of some control by the employee (Faranda, 2001). Non-cooperation re-established the balance of control in the employee's perception. The research aims to find out if this type of scenario is re-enacted on a regular basis in industrial settings with the application of an MIS. The question set developed for this section of the survey were adapted from Rusbelt's (Rusbult, 1988) study on the impact of exchange variables on exit, voice, loyalty and neglect on declining job satisfaction and adapted for the instance of an MIS implementation. The questionnaire set for contract breach/violation is detailed in Figure 19.

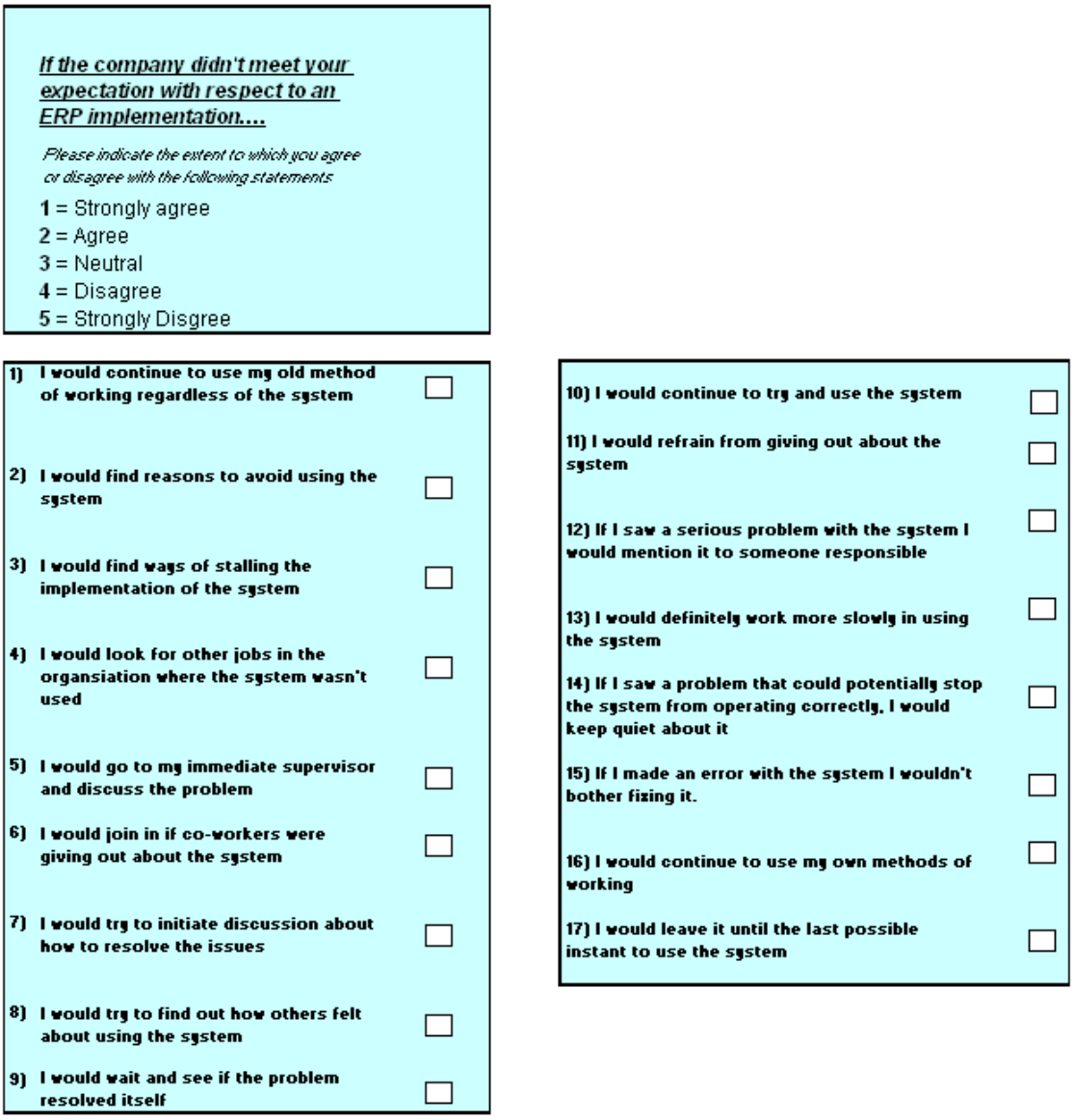


Figure 19 Contract Breach Preferences

4.7 RESEARCH INSTRUMENT VARIABLES.

Variables may be defined as a "set of mutually exclusive set of characteristics such as age, sex, employment status and so forth, A variable by definition must possess variation" (Babbie,

1973). The purpose of the research is to determine if there exists any relationship between attitudes to preferred implementation style, incentives and MIS adoption or contract breach behaviours as indicated by regulatory focus of the psychological contract. As the purpose of the research is to determine whether there is an ex ante relationship, no variables are dependant on or will be manipulated by the experimentation method. The variables to be measured have been selected as a result of the literature conducted in chapters three and four. It is important to note that this study is an investigation as to whether any relationship exists between the factors noted. Questions of causality are beyond the scope of the current research. The model for operationalisation of the research are below in figure 20.

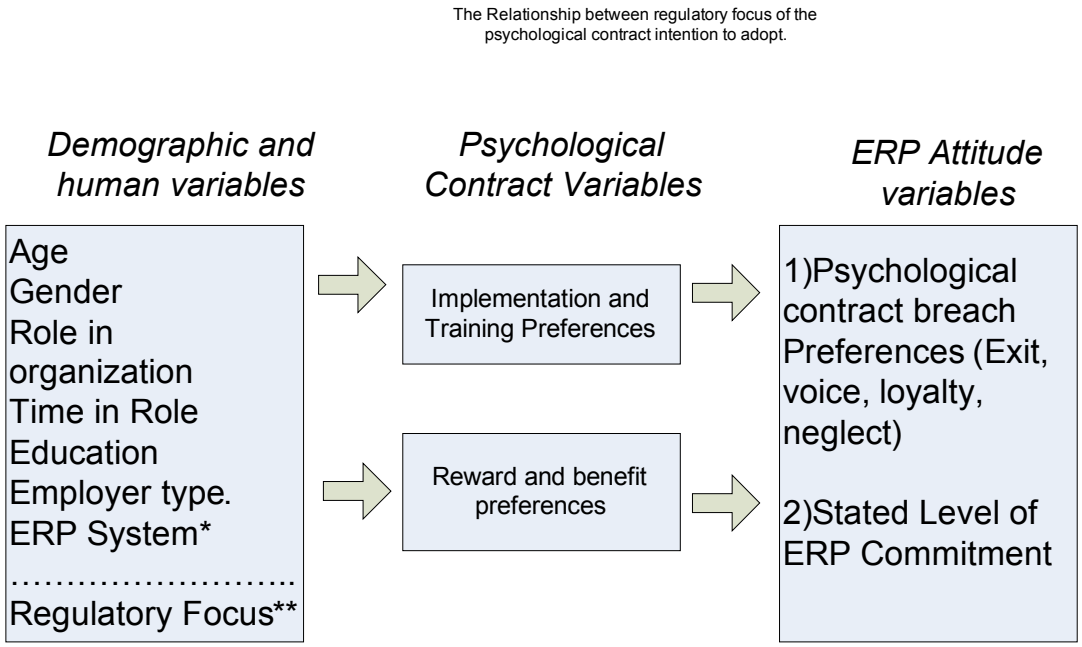


Figure 20 Model Operationalisation

4.7.1 DEMOGRAPHIC VARIABLES.

The demographic variables listed for inclusion in the research are those that need to be accounted as factors which could affect a relationship between regulatory focus and attitudes towards implementation, incentives, commitment to adopt and contract breach. The

measurement of these variables will allow them to be incorporated in the end analysis of results to determine what moderating effect, if any, they have on the remainder of the variables under analysis. The variables to be measured will include age, gender, length of time in company, role in organisation, education and regulatory focus.

4.7.2 PSYCHOLOGICAL CONTRACT VARIABLES.

These variables are broken into categories of implementation and training preferences in which it is proposed to use a twenty eight question listing based in the research conducted on training, reward and recognition and contract breach and violation as adapted from Rusbult (1988) in order to elicit training and implementation preferences and planned behaviour from the end user.

4.7.3 MIS ENGAGEMENT.

At one side of the continuum there is perceived response to breach of contract by the organisation and attitudes separated into exit, voice, neglect and loyalty concerns (Turnley & Feldman 1999) to the opposing end of the spectrum and measuring an espoused level of engagement by the employee responding. To date, question sets have shown a bias to measurement using one scale or the other. The proposed scale will allow for a wider range of response measurement. The data set for this section of the questionnaire was adapted for opposing measures to Rusbults (Rusbult, 1988) questionnaire on Exit, Voice, Loyalty and neglect and is reproduced in Figure 21

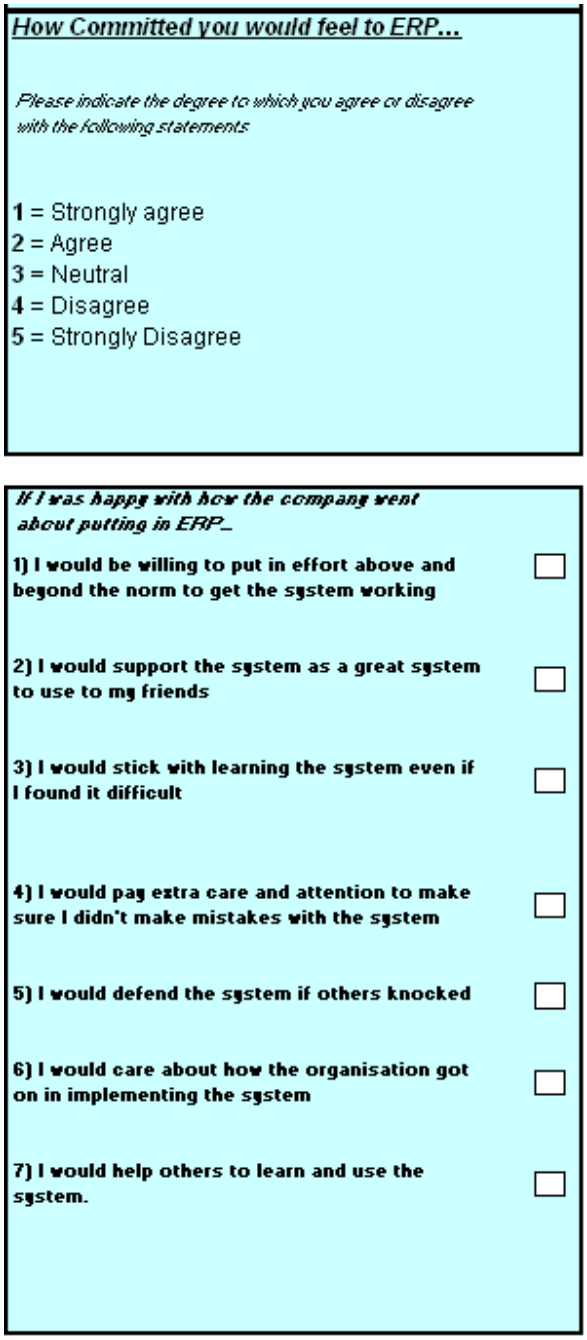


Figure 21 Engagement

4.7.4 MODERATING FACTORS; SELF EFFICACY AND JOB SATISFACTION.

Two factors were chosen for their possible effect on measurement of regulatory focus of the psychological contract from the research. Measures for self efficacy were adapted from Compeau and Higgins (Compeau, 1995) and had an established reliability co efficient of .87. The second factor to be explored was that of Job satisfaction. Brayfield and Rothe's (1951) from (Fields, 2002) was adapted for the instance of an MIS Implementation(Reliability co-efficient .83 - .90). Figure 22 details the questions pertinent to Self efficacy and Job satisfaction;

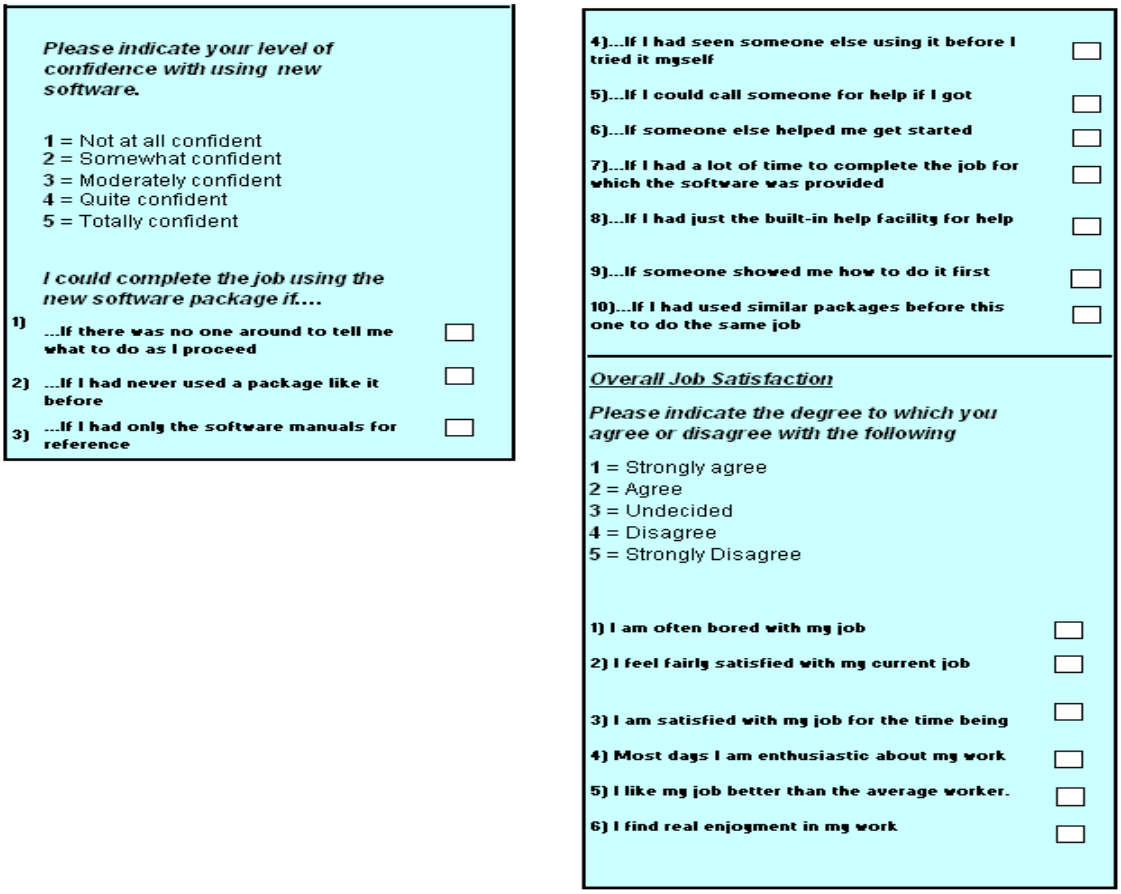


Figure 22 Self Efficacy and Job Satisfaction

4.8 RELIABILITY MEASURES IN SURVEY DESIGN.

Reliability in a questionnaire refers to the consistency of the tool. “The measurement instrument should behave in a manner which is consistent with itself: that a very high proportion of the score on every occasion is due to the underlying scale variable with a minimum of error” (Oppenheim, 1972). Otherwise stated, reliability is a degree of confidence that if the same instrument is used to measure two different scenarios, that differences obtained are due to variations in the subject being measured, not in inconsistencies in the tool. A scale or test is reliable to the extent that repeat measurements made by it under constant conditions will give the same result assuming no change in the basic characteristic being measured (Moser, 1972).

The methods of measuring reliability was the internal consistency method whereby questions are placed in the survey that ask the same question in a slightly different manner This was the chosen method for this research and generally accepted as providing an acceptable level of reliability and used in majority of social research instruments.

4.9 VALIDITY TESTING

“By validity is meant the success of the scale in measuring what it sets out to measure so the differences between individual’s scores can be taken as representing true differences in the characteristic under study” (Moser & Kalton 1972). Assessing the validity of survey instruments is notoriously difficult, the reliability and validity of any scale will always be specific to the time, purpose, place and population on which the instrument was used (Oppenheim 1972).

There are a number of measures of validity, amongst which the following are the most commonly used; Construct validity; the extent to which it relates in practice to other variables to which the theory predicts it should relate, Criterion validity: the extent to which it is related in practice to other indicators of the same concept. Predictive validity: the strength of its relationship to relevant later events or behaviour, content validity which is the extent to which the items cover the full breadth of the concept and finally, Face validity: the extent to which items appear to ‘tap’ the concept being explored. For the purpose of this research the goal is to establish at this stage

whether sufficient face validity of the concept exists, as explored through the propositions listed in to determine whether further research in the topic is merited.

To ascertain content validity for the survey instrument for implementation and incentives, five individuals were requested to review whether the test was a fair and balanced representation of the listing of propositions. The same question was also delivered on completion of the pilot study on each individual. The final consideration was construct validity which indicated how well the test links up with the theoretical assumptions of regulatory focus and the psychological contract. The construct validity was assessed by use of open response from the pilot study respondents and also from academic researchers. Results of the analysis on content and construct validity and changes made to the instruments as a result of feedback are discussed in the results chapter (Pilot study).

The chief difficulty in assessing the validity of questionnaires is the lack of criteria, ideally groups of people with known attitudes are. What distinguishes the social researcher from another writer is his/her capacity to produce accounts of social phenomena which are not merely good stories, but are valid and reliable (Pole, 2002). At this stage it must be remembered that behaviour cannot necessarily be predicted from attitude, nor are attitudes readily inferred from behaviour with any validity. The links between attitudes and behaviours are complex and group membership may or may not be a valid criterion of a particular attitude. It must also be noted that a reliable scale is not necessarily valid, for it could be measuring something other than what it was planned to measure. Measures of validity and reliability are key to the strength of the research instrument. To this end, in tandem with developing the survey from questionnaires with established validity, a factor analysis was conducted on the results obtained from deployment of the research instrument.

4.10 QUESTIONNAIRE DESIGN AND CONSIDERATIONS.

"Questionnaires are not designed to yield subtle insights in individual cases and should not be used as a clinical instrument. Their chief function is to divide people roughly into a broad number of groups with respect to an attitude, and allow us to study the ways in which attitude relates to other variables in our survey" (Oppenheim 1972). Questionnaires do not measure

absolutes; it is a technique for placing people on a continuum relative to one another. The use of scaling in a questionnaire allows unambiguous ordinality of the response measures thus allowing an effective means of comparison between groups. The Likert scale is based on the overall assumption that the overall score on responses to the many items seeming to reflect the variable under consideration provides a reasonably good measure of the variable under examination. Averaging of responses also reduces the effects of idiosyncrasies of particular respondents in respect of particular aspects of the attitude. Scaling issues include ensuring that the items accurately span the dimension which is being measured but also that the decision of what number of points to include on the scale. If the scale is divided too finely then respondents will be unable to place themselves, too coarsely means the scale will not adequately differentiate between strengths of attitudes being measured (Moser & Kalton 1972). There are four tendencies which must be taken into consideration in construction of a questionnaire. Tendencies of individuals to;

- The avoidance of extremes by individuals, this is labelled the error of central tendency.
- Leniency: Individuals may dislike being critical and as a consequence may not accurately record their attitude.
- Halo effect: Where respondents classify the object on each scale according to their general impression rather than according to the scales meaning.
- Social desirability bias: Respondents answer in a way they think will show them in a positive light as opposed to their genuine attitude to the item being rated. (Moser & Kalton 1972; Babbie 1973).

These effects must be discussed and determined as far as possible whether they are a factor that must be taken into account during regression analysis. Each questionnaire response will be assessed prior to inclusion in the result for whether there are any very obvious scoring tendencies on behalf of an individual response and will be discussed accordingly in the discussion of survey instrument results.

4.10.1 QUESTIONNAIRE LAYOUT AND QUESTION SEQUENCING.

The first survey instrument is based on a questionnaire developed by E. Hardin (Hardin, 2002) who developed the tool from the original selves questionnaire (Higgins, 1994, Higgins, 1985) and a variation on the selves questionnaire to allow for ease of marking (Tangney, 1998). The survey distinguishes between the 'ideal' and 'ought' selves. The respondent provide qualities they think they 'ought' to have and qualities they think another individual of close standing thinks they ought to have (Representing a security focus to the psychological contract) in relation to their work environment. This process is repeated for 'ideal' qualities (representing a promotionally oriented psychological contract) and then averaged. Those with a higher 'ought' discrepancy have a promotion focus and a tendency to dejection based emotions if a large discrepancy is perceived. Those with a higher 'ideal' discrepancy have a security focus and a tendency to agitation or fear based emotions of a large discrepancy between the ideal and ought self is perceived. The questionnaire developed a set of sixteen questions focusing on ideal and ought based phraseology in order to establish a security – promotion continuum.

The decision was made to place factual and impersonal questions at the start of the questionnaire by means of introduction of the respondent to this section of the survey instrument. Questions requiring personal information such as age, educational level etc. were left until the very end of the survey instrument by which stage it was hoped an element of familiarity with the questionnaire had been established. The survey instrument necessitated development from first principles as there were no available research instruments for measurement of peoples' attitude with respect to psychological contract for new software. The method used to build the questionnaire was a compilation of questions based on implementation and incentive preferences to determine elements to individuals' contracts. The completed question set was then assessed by five members not involved with the research being undertaken and questions amended, rephrased and re-sequenced as suggested. The questions were sequenced in the following manner;

- Demographic variables including age, gender, length of time in organisation.

- Control for external variables incorporating established questionnaires for self efficacy and job satisfaction.
- Ideal Vs Ought orientation questions.
- Implementation preference preferences.
- Reward and recognition preferences.
- Attitudes in respect to breach of the psychological contract (Exit, voice, loyalty and neglect)
- Open ended questions to elicit preferences and behaviours that may not have been specified in the earlier sections of the questionnaire.

The inclusion of open ended questions in the questionnaire was for the freedom it allowed the respondent in selecting responses outside of those provided in the instrument. The confidentiality clause requesting what planned behaviour in respect to contract breach was key to the research in that the question was much less personal but it was hope would still allow for a directness and loquacity in response which may have been more difficult to obtain if phrased in the first person.

4.10.2 INTERVIEWS – TRIANGULATION BY USE OF QUALITATIVE DATA

A qualitative approach in the format of interviews using a series of open ended questions in order to allow for triangulation of responses received by comparison to results from Quantitative interview results. With respect to the qualitative research, The interviewer was looking for the individuals to describe what they felt was key in software implementations, what their preferred training and recognition were and in conclusion, what constituted a breach of their psychological contract with respect to an MIS. Responses from this section of the questionnaire were analysed to elicit recurring themes from the interviews. The multimethod approach (Gill, 2002) of using both deductive and inductive methods were adopted to allow a means of triangulation to prove the concept. The questions were purposefully kept open in order to allow for as open and unbiased a response as possible from the interviewees and included;

- Our research findings indicate there is a link between how well people's expectations about how new software are met and how committed they feel to a system– would you agree with this statement?

- Is there a way you would have liked the organisation to have acknowledged the effort you had put into learning and using the system?

- Do you think your reaction to the system was based on how well your expectations about training and incentives had been met?

- What is the best thing the organisation could have done to have ensured the software was successful?

- Were there things that the organisation could have done better in your estimation? Things that would have made you happier about using the system?

- Was there something that the organisation could have done to have better ensured the operational success of the system?

- Did you feel your relationship with the implementer was important when the new software was implemented?

- Did you feel your relationship with the organisation was important in how committed you felt in using the software?

4.11 ETHICAL CONSIDERATIONS IN CONDUCTING THE STUDY.

Although ethical concerns do not form part of the scientific method, nevertheless they comprise a set of norms that scientists in most disciplines are obliged to follow (Babbie 1973) Ethical points of consideration are;

a) Voluntary participation; in the study conducted, the decision of respondents to participate is entirely voluntary. No sanctions or benefits of any kind were made as a result of participation or non participation in the study.

b) No harm to respondents; due to the fact that that research instrument was a survey and care was taken to develop questions in such a way that data recorded, either verbal or written, would not cause discomfiture. Also all datasets recorded from respondents were confidential and response sets could not be traced back by means of any references recorded in the study.

c) Anonymity and confidentiality; all responses in all their formats were both anonymous and confidential. This was a prerequisite from an ethical perspective but was also deemed necessary to ensure respondents were confident that there could be no censure of their responses.

d) Analysis and Reporting; all assumptions made and any shortcomings with respect to the statistical analysis that arose during both the pilot study and the main study were made known and discussed along with any other factors that may have affected the study and analysis of the results.

Both survey instruments were also submitted for approval under the guidelines of the University's Ethics Committee, thus conformed to all guidelines for ethical research under institutional guidelines.

CHAPTER 5: RESULTS

5.1 INTRODUCTION

This study seeks to explore whether there is any relationship between regulatory focus of the psychological contract with respect to MIS implementations and thus determine its application in reducing human risk factors by augmenting the implementation methodology at the level of the individual. This chapter presents the results and findings of the research conducted from the survey instrument, eight interviews conducted at participating organisations and separate set of six interviews conducted in one organisation post a publicised problematic IS system implementation. The interviews and survey were conducted over a six month period with the six interviews at the state run organisation at the end of the six month period.

5.2 CHAPTER LAYOUT

Section 5.3 of the chapter provides an introduction to and the results of the qualitative research instrument conducted in four organisations. Two respondents were chosen in each organisation and the section compiles the results and concludes with a review of the feedback obtained.

Section 5.4 Introduces the results from the interviews conducted in a state run institution providing a public service where there had been an acknowledged problematic IT implementation. Six end users of the software in question were interviewed. The results are detailed and reviewed.

Section 5.5 and 5.6 of the chapter discusses the survey design and deployment and response rate obtained from the study. This discussion is then followed by the results of the pilot study conducted and changes made to the questionnaire as a consequence of feedback retrieved.

Section 5.7 performs an exploratory data analysis on the results received from the research instrument deployment. This includes an overview on the Gender, age, educational level

attainment, role in organisation and number of prior organisations in order to obtain a representation of participant population.

Sections 5.8 and 5.9 explore the results for the Ideal Vs Ought set of questions and discusses the relative spread of values related to these variables.

Section 5.10 addresses the MIS expectations with respect to what the relative importance of the variables chosen with respect to the constituents of the psychological contract.

Section 5.11 explores the survey results with respect to training, reward and recognition preferences, and in conclusion, contract breach/violation actions.

The chapter concludes with the results of the interviews from the qualitative instrument and from an investigation into one organisation with reported post implementation issues.

5.3 QUALITATIVE ANALYSIS: INTERVIEW RESULTS

Interview results from respondents were transcribed during the interview process, due to the relatively concise nature of the questions and the number of interview results it was possible to manually compare and contrast responses to tabulate and present the results. There were six open ended questions included in the questionnaire and condensed responses of respondents are detailed below;

Q1; If your expectations about training weren't met, would this affect your commitment to the system?

> *"Probably not – would teach myself how to use the system if I need it for my job"*
>
> *"My expectations about the system wouldn't matter, I would learn how to use the system''*
>
> *"Yes. You can gauge how important the system is to a company by how much resources are put into training people in on a system"*

"It would affect how well I could use the system but I would fiddle with it until I got it working"

"I would feel reluctant to use the software if I didn't feel I was competent in using it"

"If training wasn't sufficient I would tell project manager to amend the training being given"

"It depends on a number of things, namely how critical it is in performing my job"

"It would definitely affect my commitment, I would put as little effort as possible into using the system''

Q2; How would you like the company to acknowledge the effort you put into using the system?

"Use of the system should be included on performance review evaluations"

"If it is required for job acknowledgement shouldn't be a pre-requisite''

"incentives not expected, a 'thank you' from manager is enough"

"Should be part of set goals and incentives in performance review"

"Should be reimbursed if its not part of job, acknowledgement from manager, night out"

"Doesn't merit reward as such, as long as workload is distributed evenly"

"wouldn't expect the company to acknowledge – part of business"

"Wouldn't really expect anything back from employer, should be part of job unless very specialist"

Q3; How do you think you would react if you were really unhappy with the system?

"Probably avoid using it or use it for the bare minimum required"

"Would give feedback if there were bugs with the system, would make it known to programmers, manager etc"

"would feel very frustrated"

"Would get back to IT directly, implementer and vendor – whom is responsible"

"Would put up barriers to using the system, even subconsciously I guess to avoid using it"

"Would raise awareness that system is not working to full potential, otherwise make do"

"Try and avoid using the system but depends how well I got on with manager"

"Would apply as little effort as possible in using the system"

Q4; What is the best thing the company could do to make sure the software was successful?

"Management commitment is key, ensuring enough time and resources are allocated"

"Ensuring the software is relevant and actually does what its supposed to"

"Get input from the staff who would be using it, chance to use in test environment"

"Proper strategy for rolling out the system and ensuring sufficient training, doing a post hoc review"

"To have researched the requirements really well and ensure proper training, tell people importance and get them on 'board'"

"Software has to match what the user is looking for, software has to match what we do"

"Test the system on a smaller scale and install in stages, training very important"

"User participation in development, detailed requirements gathering"

Q5; What is the biggest mistake the company could make in implementing an Erp system?

"Poor initial training, not letting people understand reason for system, insufficient time"

"listening to 'bumph' from salespeople, not properly researching package, not understanding how the system will or won't benefit the company, knowing its not a panacea"

"Not having induction/good training"

"Poor communication to users and not telling people what its for"

"Poor strategy, lack of implementation planning, if replacing an old system overlap or run in tandem, ease people into new system gently"

"Not consulting people and not testing the system properly before roll out"

"Not taking into account needs of end user, insufficient training"

"Management not committing to the system, wrong software selection"

Q6: What is the most important thing that the company could do to make sure you are happy to use the system?

"Giving sufficient training and making sure it was timely"

"Ensuring the software actually assists me in completing my job"

"Opinions from end users extremely important, software should be effective"

"If you feel like you are good at something you are much happier to use it, so good training is essential, communicating and keeping people in the loop"

"To know there was really good back up and support available, a helpline"

"That the software reflects the work I do, not vice versa, its plain wrong to change the company profile"

"That the software is installed quickly with the minimum of fuss and meets my needs"

"Nice design on system and intuitive, not crowded with too much info and easy to navigate"

The prime observations that can be drawn from the interviews conducted is how the variation in responses spanned a wide continuum. This supported the contention that there are individual concerns and expectations with what constitute problems with implementations, and what factors individuals perceive merits support of an implementation. A surprising revelation was the extent to which majority of respondents estimated that adoption or use of a system did not merit Incentivisation. The effectiveness of the software in performing its functions was universally supported. The respondents supporting the findings from the critical success factors review put commitment, consultation and communication forward as critical. The variation in espoused reaction if the system was not implemented according to expectations supported the contention that this is also particular to end users and highlights the criticality of managing breach of psychological contract.

5.4 CASE STUDY INTERVIEW RESULTS FROM PUBLIC SECTOR IMPLEMENTATION

In support of qualitative investigation and to ensure that all possible detail regarding an end users expectations with respect to a software implementation were elicited, a case study

within a single institution with a representative cross section of the users was carried out. The institution in question was a public body and is not named as anonymity was requested. The enterprise in question had implemented a software system ten years previously but upgrades were installed on average on a six monthly basis and all members of the enterprise were required to be proficient users of the system to facilitate their role. The same question set as used for the organisational interviews were deployed. Audio recording of the interview was not permitted thus the key statements from respondents, 'a', 'b', 'c' and 'd' were recorded and are as follows;

1) Our research findings indicate there is a link between how well people's expectations about how new software are met and how committed they feel to a system - would you agree with this statement?

   a) *'I would agree, yes'*

   b) *'Yes, the system was presented as an all singing all dancing ,system was foisted on end users, it was a design from the Ivory towers'.*

   c) *''I would agree, especially in here'.*

2) Is there a way you would like the organisation to have acknowledged the effort you had put into learning and using the system?

   a) 'No, the learning is of benefit to myself, so no expectations'

   b) I learned/taught myself how to put in a complex query that resulted in a significant payoff for the organisation but I was not acknowledged in any way'

   c) 'No'

   d) 'Learning the system was part of the initial training so it was a part of my job from the start'

   e) 'No, I don't have expectations, it's a part of how the job has to be done,

3) Do you think your reaction to the system was based on how well your expectations about training and incentives had been met?

   a) *'The system wasn't really user friendly and this affected how happy I was but I didn't really have expectations about the system. Faults were identified at the beginning but nothing was done about them, that was frustrating'.*

   b) *'Train the trainer programs were run so people were pretty positive towards the system regardless of the timing of the implementation. Initial good reaction to the system was lost because the system was so slow to respond. The hardware for the project had been skimped on and it really affected its speed.'*

   c) *'The training was framed very positively, it looked much more advanced than the old system, had all the whistles, was brand new and attractive to use'*

   d) *'Mandatory for use – absent at the system implementation'*

   e) *'Part of introductory training'*

4) What is the best thing the organisation could have done to have ensured the system was successful?

   a) *'Sought input from end users in advance, at the design stage, more servers, faster speed, training was adequate and there was a help desk number'*

   b) *'Bypass management and ask the workers, the people who actually had to use the system, ask locally what is needed and what is important'*

   c) *'There was an initial pay increase to accept the system, this should have been phased as there was no incentive afterwards to learn the new additions to the system unless people are self motivated, there was no refresher training'*

d) *'To make the training interesting, ,match it to real life examples, match the skill level to the training . Ensuring the system was fit for the job, it used to crash a lot and you would lose all the data that you had just input'*

e) *'That the training is sufficient, that the system is user friendly, that the system doesn't crash.'*

5) Was there things the organisation could have done better in your estimation – things that would have made you happier about using the system?

a) *'More servers, more user friendly, they could have afforded to go much more high tech, they should have gone for the paperless office entirely when they had the opportunity, now there is more paper than ever' although there is a helpdesk number it is a bottleneck'*

b) *'Insufficient resources were dedicated to getting it up and running. More resources should have been allocated'*

c) *'Definitely there could be an improvement in training, we get training every time new legislation comes out but we don't get training when there are changes or additions to the IS system It is much easier to put in data now, but there is less reason to use the system since its being done for us.'*

d) *'The system was so slow, it really needed to move faster. Having people to input the data has freed up a lot of resources'*

e) *'There could have been more emphasis on training at the start'*

6) Was there something the organisation could have done to have better ensure the organisational success of the system?

a) *'Faster server speeds, it was always going to be used, there was no choice but to use the system as this is the public sector'*

b) *"Comprehensive user manuals, the actual number of terminals was a real issue, you had to queue up at the end of shift to enter data' sometimes people gave up or did not put in the data at the end of shift because of this. They should have spent money on it as there was always going to be a need for It"*

c) *"The number of access points to the system, also the logon to the system was drawn out and complicated"*

d) *"Training should have catered for different levels of competency and speed, everyone was put in the same training but there would have been people who had never used a pc and those who would have used them every day in the same training session"*

e) *"Reduce the existing workload to allow time to put in the data – fixed since"*

7) Did you feel your relationship with the implementer was important when the new software was implemented?

a) *"No, it didn't have an impact, there was fifteen of us in the training class"*

b) *'Training numbers were too high, there young, middle aged and old, we should have been separated or there should have been different levels of training"*

c) *"The initial training was good, each had our own PC and the training was classroom based and one to one was available if required"*

d) *"Yes, in the way that it was taught some trainers were able to use their own experiences when training in"*

e) *"Not really, there was a couple of different lecturers"*

8) Did you feel your relationship with the organisation was important in how committed you felt in using the software.

a) *"No, you have no choice but to use it, you're obliged"*

b) *'It depends how committed you are, there is no negotiation, use of the system is mandatory – no discussions, this isn't the private sector"*

c) *"Yes, absolutely, if you have a chip on your shoulder you'll try to avoid having to use it, you'll find things wrong and disregard the good stuff"*

d) *"Not applicable – have just started with the organisation"*

Results from these interviews were fascinating with respect to what they highlighted and may be summed up perhaps by the term 'resigned to having to use the system'. The four interviewees ranged from recent members to the organisation to one individual with ten years experience in the organisation. Again the variation in response in just four out of thousands of users of the system highlight the range of perceptions and beliefs and the criticality of effectively managing these with respect to resulting system engagement. Insufficient time was allowed to the author to further investigate facets of regulatory focus, but the interview results from both this particular organisation and from interviewees in the other four organisations indicate the need to communicate and negotiate expectations with respect to introduction of software.

5.5 SAMPLE SURVEY AND INSTRUMENT DESIGN

The following section discusses the criteria for selection of the sample population and the survey deployment methodology and concludes with the response rates received from the instrument.

5.5.1 SAMPLE POPULATION

The selection of the target sample population on which the survey was conducted based upon;

a) Prior experience at having used software or having participated in a software implementation.

b) Reciprocation of the psychological contract could be said to apply. (Not self-employed).

c) Target population was chosen to incorporate a range of size of firms from large multinational organisations to firms employing less than ten people.

d) A range of industries were chosen including banking, insurance, biomedical, customer support centres to heavy metal processing plants ensuring the continuum of industry and response types could be catered for.

A listing of companies with industry type and contact details was obtained from Shannon development for organisations based in both the Limerick and Cork Region and firms contacted. Selection of the individuals within the firm was at the behest of the Human resource manager but requested to represent a cross section of users from the organisation.

5.5.2 SURVEY DESIGN

General principles of questionnaire design (Oppenheim 1972, Babbie 1973) were adhered to with respect to the structure of the questionnaire (Appendix D). Principles such as keeping the questionnaire short but concise and clear as possible, sequencing of 'easy to answer' questions early on in the survey, clear delineation of sections, ensuring no emotional or leading bias in the form in which questions were asked. Ensuring that response per question was looked for. It was deemed that both for an affirmative response from firms to agree to allow employees to participate in the survey but also to ensure that completing the survey did not become an exercise in ticking boxes was to ensure that time required to complete the survey did not average at over fifteen minutes.

5.5.3 SURVEY PROCEDURE

For the survey section of the research the Human Resources manager in each firm was contacted and a set description of the reasoning for the research and principles underpinning the

research as a result of the study were described. The second part of the contact entailed describing what was requested from the organisation in terms of the amount of time required to complete the response and number of responses looked for. In order to get as large a number of firms as possible to participate, a small number of respondents (between five and ten) was looked for from each firm.

Each firm was guaranteed the confidentiality and anonymity of respondents. This was ensured by supplying each questionnaire with cover note (Appendix D) in its own sealable envelope, which respondents were requested to seal on completion of the questionnaire. In each instance the firm was given the option of letting a researcher distribute the questionnaire's or distributing the questionnaire themselves. If the firm agreed, an explanatory email detailing the purpose of the research and what was required was forwarded on to the Human Resource Manager/Company contact who then forwarded this email on to individuals who they expected might participate in the study. The second stage in the survey procedure was a telephone call one to two days after the questionnaires had been delivered to confirm if it was possible to return the following day to collect the completed surveys.

For the interview section of the research, a random sample of the firms participating were requested if it was also possible to conduct an interview with two employees in addition to conducting the survey. This section of the research necessitated interviewing an employee at the firm and asking open-ended questions as listed in Chapter four to ensure that all aspects of the psychological contract had been accounted for in the main body of the research. Eight interviews were conducted of duration between ten and fifteen minutes each.

5.5.4 Response rate and participating companies

Out of 45 companies contacted, 38 agreed to participate, five companies declined for varying reasons including that as an organisation they did not participate in surveys or had processes or information that were proprietary. In the instance of the remaining four companies contacted there was no response to the contact made by the researcher. From 420 surveys which were delivered to 38 participating companies, 298 usable responses were obtained. 24 unusable (insufficient data or blank) were obtained and 86 questionnaires were not received back giving a

response rate of 73.8%. Participating companies sizes ranged from five employees to in excess of one thousand. The range of industries surveyed included ore processing, aeronautical engineering publishing, distribution, pharmaceuticals, software development, automotive, banking, insurance, telecommunications, medical devices and customer support service centres.

5.6 SURVEY INSTRUMENT PILOT STUDY

5.6.1 PRELIMINARY INTERNAL PILOT OF QUESTIONNAIRE.

For the purpose of proof reading and ensuring established questionnaire criteria of brevity, single item measure per question, choice of scaling, clarity, wording and length of time to complete were within acceptable limits. The questionnaire was distributed to five doctoral research students. The following changes were made;

a) Wording and re phrasing of four of the questions.

b) Reducing the physical number of questions which had to be answered as time required to complete the questionnaire was in excess of twenty minutes including the biographical detail section.

c) While there had been initially a section on preferred negotiation style this was removed as being outside the main focus of the research area and making the questionnaire unnecessarily long.

d) The number of item measures for measuring exit, voice, loyalty and neglect were reduced from a thirty two item measure to a sixteen item measure which necessitated recalculation of the reliability of the measure but reduced the average time for completion of the questionnaire to fifteen minutes. This length of survey was deemed the limit at above which confidence in the accuracy of responses received was reduced.

e) The physical layout was also significantly changed to facilitate reading and answering of the attitude scales on the questionnaire. Rating Scales on the demographic section of

the questionnaire were amended to ensure there was no category overlap and a significant number of questions were simplified.

5.6.2 INDUSTRIAL PILOT

The industrial pilot of the survey was carried out in Tyco Electronics, a multinational firm specialising in the manufacture if industrial connectors. The same methodology decided on for the main study was deployed for the pilot. Ten people were requested to fill in the questionnaire but on completion of the questionnaire they were interviewed separately or if unable to meet the researcher due to time constraints they were requested to write any thoughts or feelings they had with respect to any aspect the questionnaire or whether there were any items with which they were unclear. The selection of individuals to complete the survey was left to the discretion of the company; the only stipulation being that respondent's role must necessitate use of software on a daily basis. Interviews with respondents were completed on the same day as the survey deployment. The length of time for survey completion was confirmed at averaging at fifteen minutes.

5.6.3 CHANGES MADE AS A RESULT OF PILOT FEEDBACK.

a) Size of tickboxes increased.

b) Question 4 preference for redundancy of prior system for MIS amended was made clearer by rephrasing.

c) Elimination of questions regarding preferred negotiation style. This was the largest single individual change made to the study as it considerably reduced the length of time required for completion.

d) Request to repeat the scale description at the start of each header section on the questionnaire. Initially this had been placed at the start of each of the three pages.

e) Further explanation of MIS required on cover letter attached to the survey. Although the functions covered in the pilot study would have had experience in using some aspects of Enterprise resource planning it was felt that on a full scale

deployment either a fuller explanation of MIS or replacing of the term MIS with a generic ‘new software’ term would be clearer for respondents.

On completion of both the internal and industrial trial runs of the questionnaire and attendant changes completed. The organisations identified for participation in the study were contacted and questionnaires deployed over a time period of two months from contact of the first company to contact of the last company. The following section details the analysis carried out on the data.

5.7 EXPLORATORY DATA ANALYSIS

5.7.1 INTRODUCTION

The purpose of exploratory data analysis on the data obtained was to get an initial result for the mean, range and shape of the distribution of the demographic data on the sample population tested, thus ensuring that the data obtained fitted a normal range, mean and distribution shape. Conducting an exploratory analysis also allowed identification of any unexpected outliers or asymmetrical results which would need to be taken into account for consideration of the accuracy of later tests. A subsection of conducting the analysis was to ensure data entered did not deviate from set parameters for data entry.

5.7.2 GENDER AND AGE.

The preliminary data analysis indicates that the data for female respondents is centrally located in the 25 to 35 year old age group. For the distribution of male responses to the questionnaire majority of responses were spread evenly across the age groups 25 to 35 and 35 and over. For both male and female respondents there was a significantly smaller proportion of respondents in the under 25 age category as may be seen from figure 23.

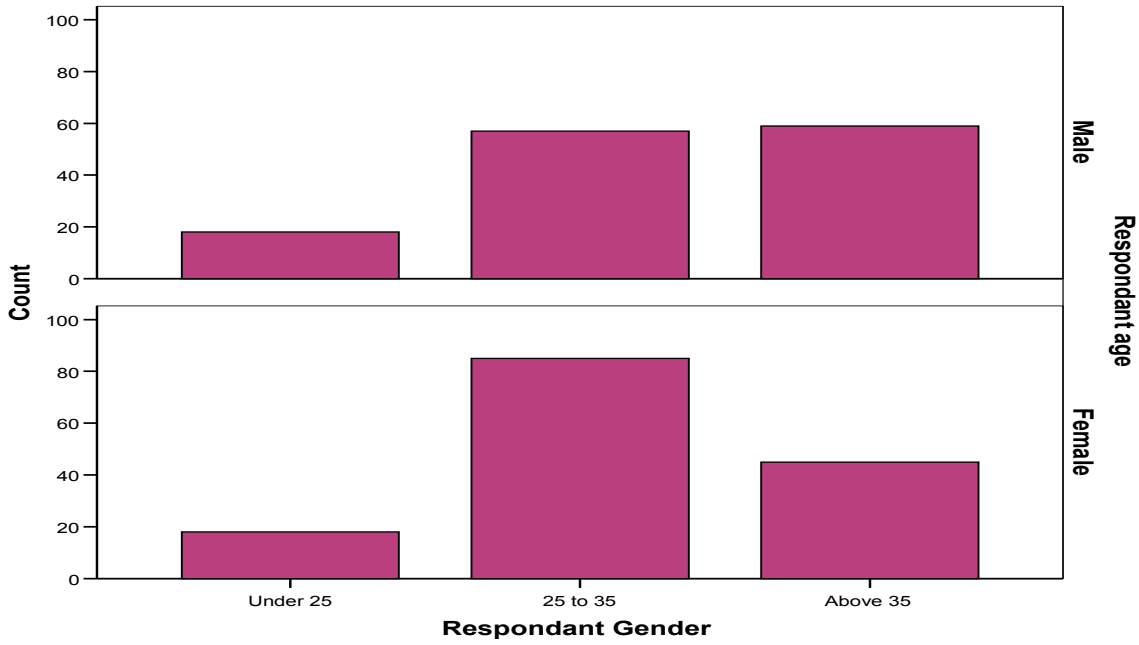


Figure 23 Exploratory Data Analysis; Gender

5.7.3 EDUCATION

Education level of the group was split relatively evenly across the three categorisations with 6 responses used not recording educational level, 68 respondents qualified up to degree level, 111 respondents qualified to degree level and 98 qualified to as far as a postgraduate qualification, indicating a high level of base education in respondents chosen

5.7.4 EMPLOYEE STATUS AND TIME SPENT IN FIRM.

The proportion split for the employment status of employees was significantly skewed. 236 of the respondents employed in a full time capacity, 32 employed on a fixed contract term basis and a remaining fifteen employed on a part time capacity. With respect to length of time spent in the firm, results were again more evenly distributed with 96 respondents having spent less than two years in the present company, 71 having spent between two and five years and the remaining 113

respondents having worked for the firm for a time greater than five years. Of the total number of respondents 200 respondents had prior experience in using Enterprise resource planning systems.

5.7.5 ROLE IN AND PRIOE ORGANISATIONS.

Results for organisational role were skewed towards a function based role as expected with 36 working in a production assistant category, 147 working in the function based role, 54 in management and the remaining 47 classifying themselves as 'other'. Although the company contact in each organisation was requested to ensure as even a cross representation of respondents as possible, the results were significantly skewed with professionally qualified employees representing 88% of respondents. The most fundamental divergence in regulatory focus found during the case studies were between the grouping of professionally/administrative/management. Distribution with respect to number of prior organisations is presented in Figure 24.

5.7.6 PRIOR ORGANISATIONS

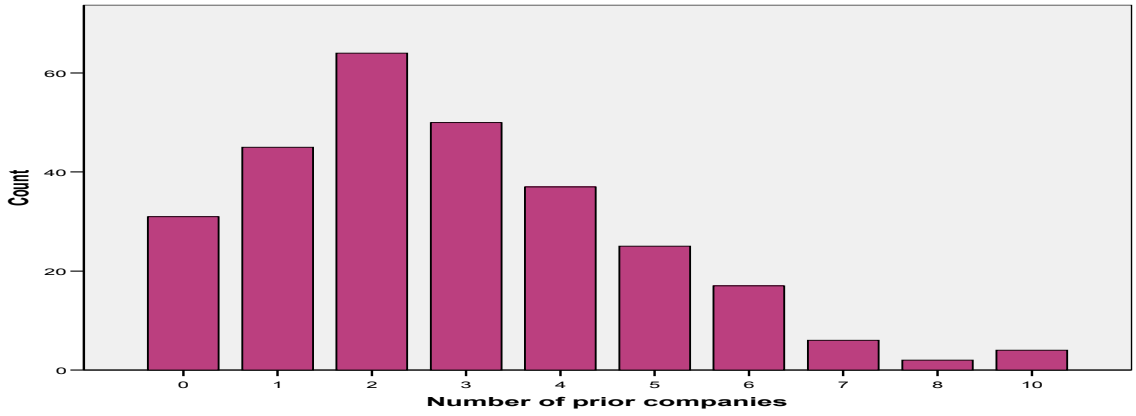


Figure 24 Exploratory Data Analysis; Prior Companies

5.8 REGULATORY FOCUS: "IDEAL" PREFERENCE STRENGTH.

Respondents were requested to fill in a five point likert rating for how strongly they felt the statement matched their attitude. The questions had an Ideal or Promotion based focus and were

worded specifically to elicit attitudes that displayed a self regulatory system with desired end state functioning as the value. The response for each question type is set below

5.8.1 PREFERENCE STRENGTH RATING METHOD AND QUESTIONS

Each question used was rated with 1 being most positive (strongly agree) and 5 being most negative (strongly disagree) the score for each individual response was then summated to give a value of between 8 and 40 which would indicate the relative strength of their "ideal" regulatory focus. This figure was also used for comparison to the relative strength of prevention/security focus. The response for each question type for promotion focus is portrayed in Figure 25 below;

5.8.2 RELATIVE SPREAD OF PROMOTION FOCUS ACROSS SAMPLE POPULATION

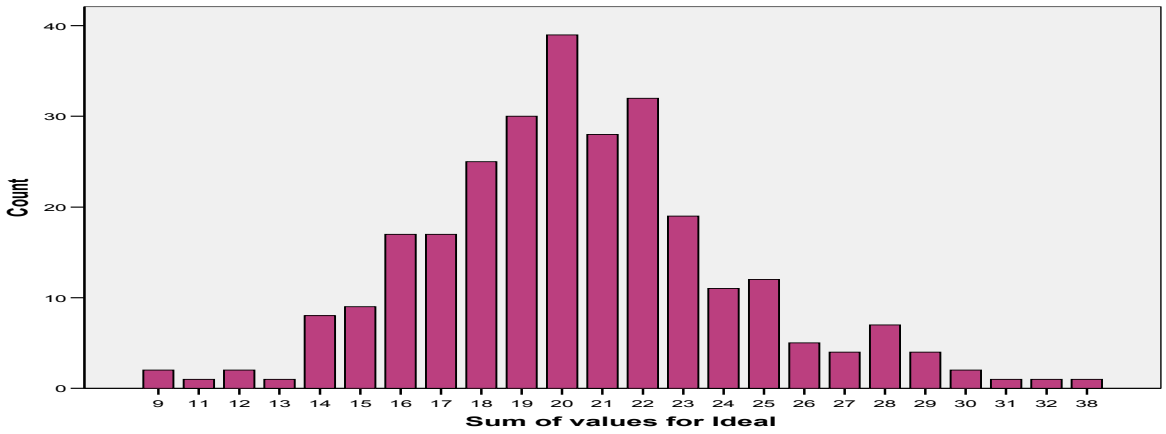


Figure 25 Relative Spread of Promotion Focus

5.9 REGULATORY FOCUS RESULTS – 'OUGHT' PREFERENCE STRENGTH.

Respondents were requested to fill in a five point likert rating for how strongly they felt the statement matched their attitude. The questions had an 'Ought' or security based focus and were worded specifically to elicit attitudes that displayed a self regulatory system with undesired end state functioning as the value. The response for each question type is set below in Figure 26;

5.9.1 RELATIVE SPREAD OF SECURITY FOCUS ACROSS SAMPLE POPULATION

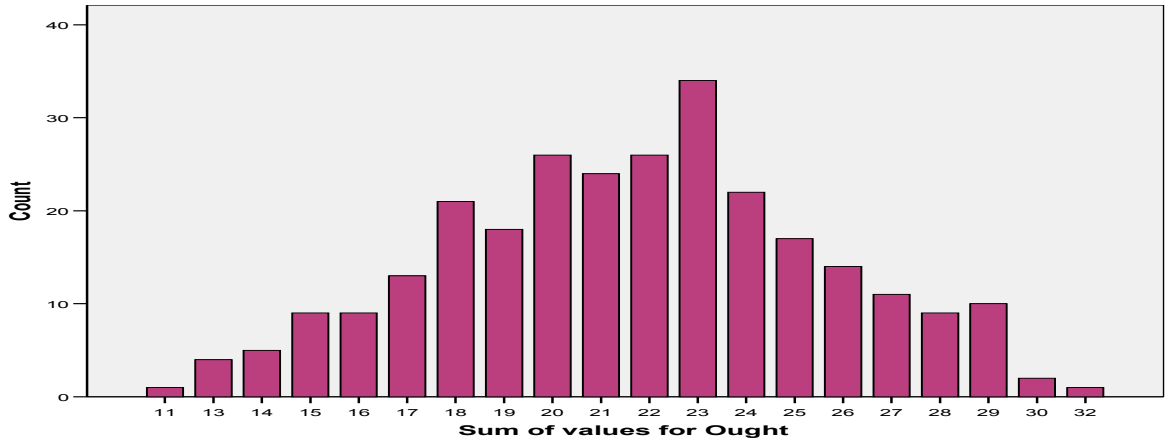


Figure 26 Relative Spread of Security Focus

5.10 PSYCHOLOGICAL CONTRACT CONTENTS;

This section of the survey was conducted by interviewing respondents. An open ended questionnaire format was used to as an informal guide to the interview. The purpose of the questions, which were purposely similar to what was already on the survey was to engage individuals in discussing informally what their expectations were in the instance of an MIS implementation. Reasoning for this was to ensure that there were no omissions on the main survey for what the content of the psychological contract was. The duration of the interview was for between ten and fifteen minutes and again the only prerequisite was that the end user was working in an organisation and was au fait with computer applications. Questions looking at exit, voice, loyalty and neglect behaviours were also included on the questionnaire, again to ensure that there were no response types falling outside of the classification and to ensure there were no special cases of planned behaviour for breach or break of psychological contract for MIS. To try and elicit a full range of responses questions were constructed so that personal responses to a 'good/bad' implementation were asked for, but also an impersonal response to what they thought other's reactions to an implementation may be.

5.10.1 IMPLEMENTATION EXPECTATIONS; CONTRACT 'MAKERS'

Q1; How would you like the company to acknowledge the effort you put in to using the system?

Q2; What is the best thing the company could do to make sure ERP was successful?

Q3; What is the most important thing the company could do to make sure you are happy using ERP?

5.10.2 IMPLEMENTATION EXPECTATIONS; CONTRACT 'BREAKERS'

Q1; What is the biggest mistake the company could make in implementing ERP?

Q2; If you're expectations about training weren't met would this affect you're commitment to the system?

5.11 SECURITY/PROMOTION FOCUSED PSYCHOLOGICAL CONTRACT.

These findings present results from individuals ranked for strength of either security or promotion focus. For presentation of results relative strengths of regulatory focus are subdivided into three categories, low, medium and strong focus as results for both distributions were normally distributed. Delineation between these categories was calculated by plotting the range of responses obtained after the factor analysis had been completed and subdividing the ranges into three types, Low, Medium and high promotion or security focus (Figure 27)

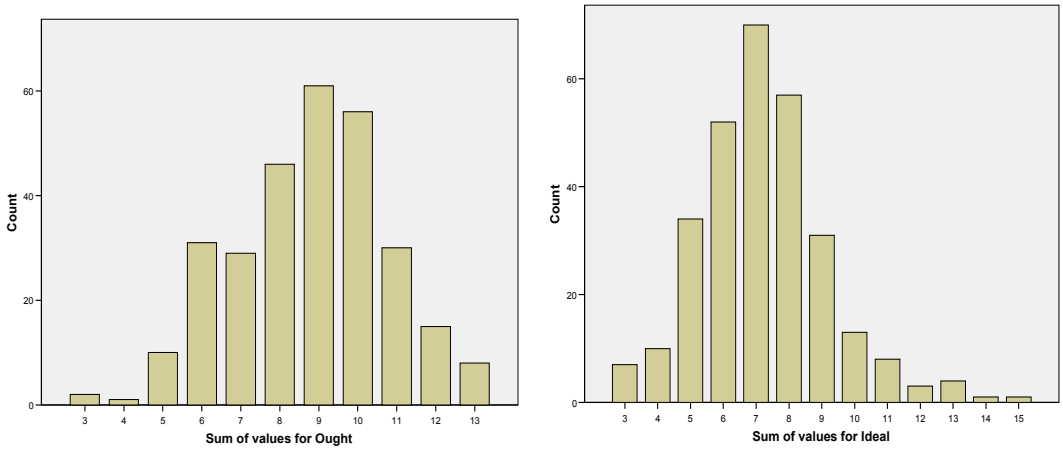


Figure 27 Security Vs Promotion Distribution

5.11.1 OUGHT/IDEAL FOCUS RESEARCH INSTRUMENT; FACTOR ANALYSIS;

The original measure for ideal and ought focus was developed by ET Higgins and a further measure for application known as the selves questionnaire was developed by Hardin (Hardin, 2002) The selves test was a psychological test measure and results were analysed by measuring how closely individuals felt that they approached their Ideal or their Ought self. Because the test was psychological in nature this proved an issue in that is was not possible to deploy the selves questionnaire in the manner in a reliable way in that ideally a researcher's presence is required to explain the instrument and also to assist in its deployment. As this was not possible and organisations were self deploying the questionnaire, the tenets and principles of the selves questionnaire were used to develop a likert based response scale which did not require the intervention of a researcher on site.

With respect to the validity of the chosen questions, a Principal Component Analysis (PCA) was performed. PCA seeks a linear combination of variables such that maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. PCA analyses total variance from the result set and this was chosen as the statistical method to explore validity.

Rotated Component Matrix(a)

	Component	
	1	2
1) Not to make mistakes is most important thing in my job	.767	.205
2) Spend most of my time ensuring mistakes aren't made	.702	.121
3) Spend most of my focus on task that showing responsibility	.292	.385
4) Security most important thing when considering a new job	.394	.435
5) I have most traits that I think I ought to have	-.103	.751
6) Meeting responsibilities most important	.082	.635
7) Taking the wrong strategy is worst mistake	.525	.009
8) Ensuring things I don't want to happen, don't happen.	.640	.035

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 3 iterations.

Table 3.4 Factor Analysis; Security Focus Questions

Total Variance Explained

Compon	Initial Eigenvalues			action Sums of Squared Load			ation Sums of Squared Loadi		
	Total	of Varian	umulative %	Total	of Varian	umulative %	Total	of Varian	umulative %
1	2.317	28.960	28.960	2.317	28.960	28.960	2.024	25.305	25.305
2	1.070	13.378	42.339	1.070	13.378	42.339	1.363	17.034	42.339
3	.986	12.320	54.658						
4	.906	11.324	65.982						
5	.863	10.791	76.774						
6	.779	9.734	86.508						
7	.659	8.239	94.747						
8	.420	5.253	100.000						

Extraction Method: Principal Component Analysis.

Table 4.4 Variance Analysis; Security Focus

The results loaded on to two separate factors, namely three questions focusing on mistake avoidance (1,2,8) and the second set of questions loading on the ought and meeting of responsibilities (question 5 and 6) with no significant loading either way for 'security being the most important factor to consider when taking on a new position'. The results for the mistake avoidance questions were summated to give an overall score for strength of ought focus based on the three most highly loaded mistake avoidance questions as the closest approximation available to a reliable estimate for security focus:

a) Factor Analysis results; Promotion Focus.

Rotated Component Matrix(a)

	Component	
	1	2
1) I Have a set of traits I regard as ideal **	.681	-.027
2) Always Try to learn new skills to improve promotion **	.766	.005
3) Most of my time making sure what has to happen, happens	.375	.460
4) Spend most of my time focusing on tasks that can do well	.120	.504
5) Spend time looking for opportunities to do well **	.711	.264
6) Finding ways to learn and progress is the most important	.146	.619
7) opportunity for advancement most important consideration	.522	.353
8) worst possible mistake is to miss the best way of doing things	-.120	.740

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 3 iterations.

Table 4.5 Factor Analysis; Security Focus

Total Variance Explained

Compone	Initial Eigenvalues			traction Sums of Squared Loadin			otation Sums of Squared Loading		
	Total	% of Varianc	Cumulative %	Total	% of Varianc	Cumulative %	Total	% of Varianc	Cumulative %
1	2.435	30.437	30.437	2.435	30.437	30.437	2.019	25.234	25.234
2	1.175	14.686	45.122	1.175	14.686	45.122	1.591	19.888	45.122
3	.992	12.397	57.519						
4	.809	10.117	67.636						
5	.756	9.445	77.081						
6	.701	8.769	85.850						
7	.600	7.497	93.347						
8	.532	6.653	100.000						

Extraction Method: Principal Component Analysis.

Table 4.6 Variance Analysis; Security Focus

The analysis on the promotion based contract questions indicated there was loading on two factors. Loading most highly was ‘I have a set of traits I regard as ideal’ accompanied by ‘I spend time in work looking for ways to do well’ and ‘Always trying to learn new skills to improve chances of promotion’. The second factor loading centred on questions 6 and 8 which was the strategy question which may have yielded a separate factor loading while although it was a promotionally focused question, it was framed negatively. Included in this grouping was that finding ways to learn and progress was important. It was a surprising result that this question did not load on to the same factor as the first factor group. Questions omitted as they did not load significantly into either question set was ‘I spend most of my time in work focusing on tasks I think I can do well’ and that ‘Opportunity for advancement was the most important factor when considering a new position.

Promotion Vs Security Contract Distribution.

The results for both contract types based on the most pertinent questions as indicated by the factor analysis were then recoded and yielded the distribution in figure 28 after calculation. The ought

based contract was slightly skewed to a strong regulatory focus where as the Ideal based contract results were slightly skewed to a weaker focus strength;

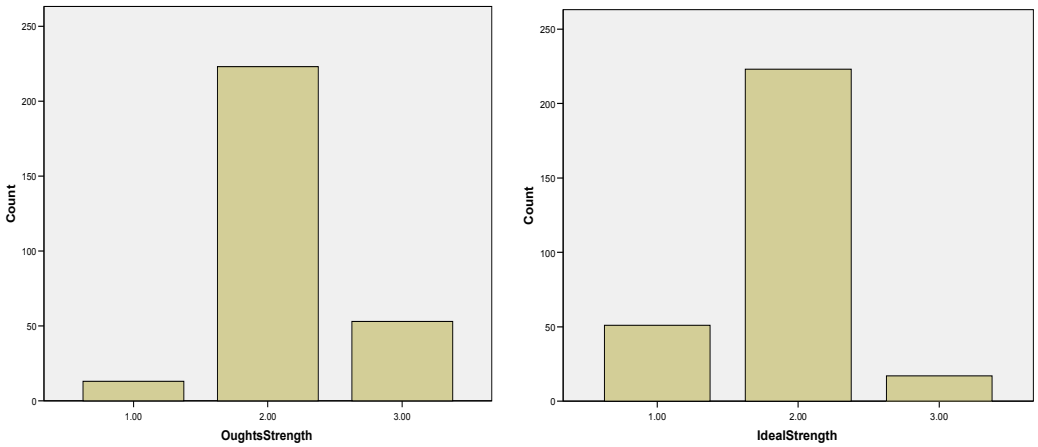


Figure 28 Post Component Analysis Focus Comparison

It was against these relative strengths of Low, Medium and high of ideal and ought focus that preferences for training, incentives, commitment, exit, voice, loyalty and neglect behaviours were measured and compared. On completion of the comparison, relative strengths and focus types were compared, a similar analysis was then performed for the 'ideal' regulatory focus questions and relative preferences across both ideal and ought measures compared. In the following section the method chosen for data display is by use of the cluster bar chart function in SPSS to compare actual and expected values for a given distribution and thus estimate from the variance between values if there is a relationship meriting further analysis. If a relationship is indicated then the data is analysed for a correlation.

5.11.2 TRAINING AND IMPLEMENTATION PREFERENCES;

This proposition stated that given a choice between a number of training alternatives, those with a strong security focus will tend towards training that allows interaction on a 'one to one' basis and show least preference for being trained in groups of five or ten or more people. The remainder of

training preferences in terms of timing of training, whether these individuals would prefer to be included from system inception, whether understanding how the whole system works is important are also explored.

1) *"Rating in order of preference the type of training preferred ranging from 'one to one' to group based training*"

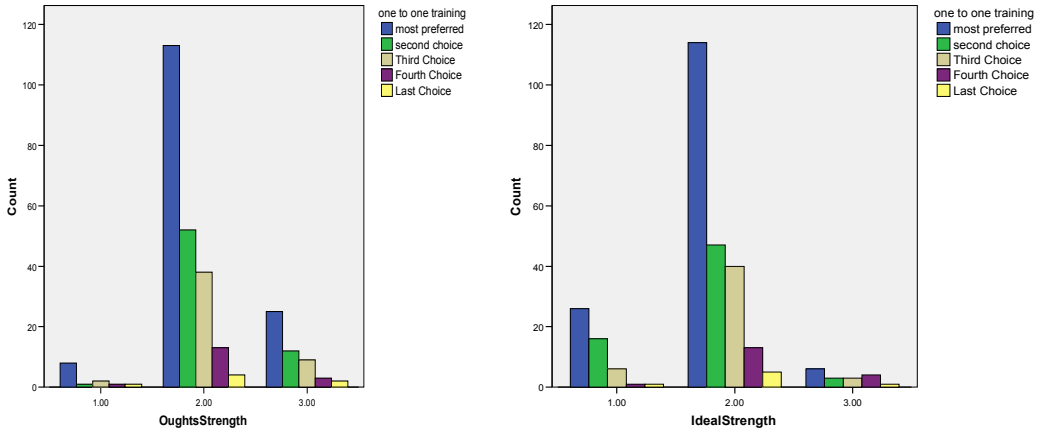


Figure 29 Training Preference comparison

Individually based training is indicated as the preferred option across all levels of focus strength whether ideal or ought. The distribution type changes once in strong ideal focus however in comparison to the other strengths of regulatory focus, there is a very slight preference for individually based training but an even spread of responses for the remainder preference rankings. Thus indicating that those in strong ideal focus are perhaps more ambivalent with regard to the training environment.

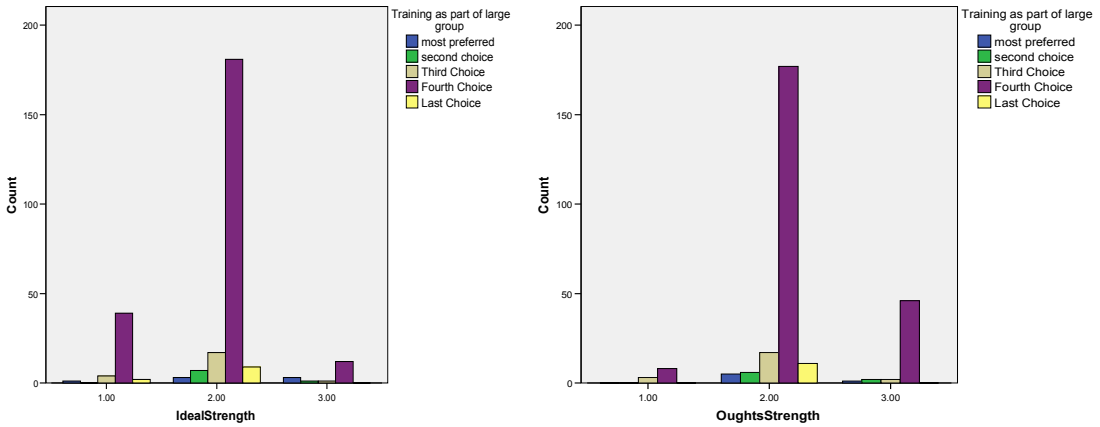


Figure 30 Training Preference Large Group Comparison

The converse of this option was for training in a large group (>10) again there was differentiation between those in strong ought versus ideal in that those in ought were more strongly opposed to this training option.

2) *"Ranking in order of preference for timing of delivery of training*"

The second comparison for training preferences and strength of ought/ideal focus is for that of timing of training, three options were presented to respondents and they had to choose between being trained a month prior to implementation, a week prior to implementation and finally being trained in on a 'need to know basis' again a bar chart was most suited for comparison of ought strengths.

'Ought' Training timing.

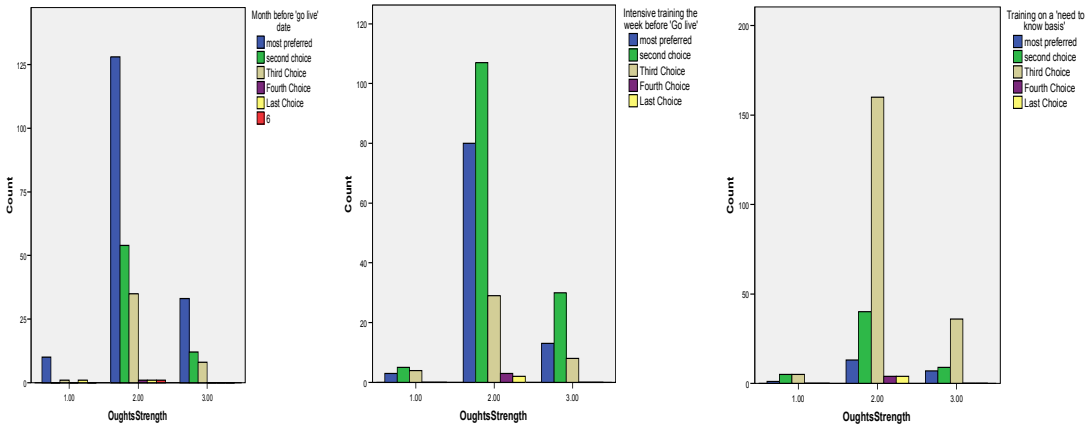


Figure 31 Training Timing Delivery: Security Focus

Ideal Training Timing focus.

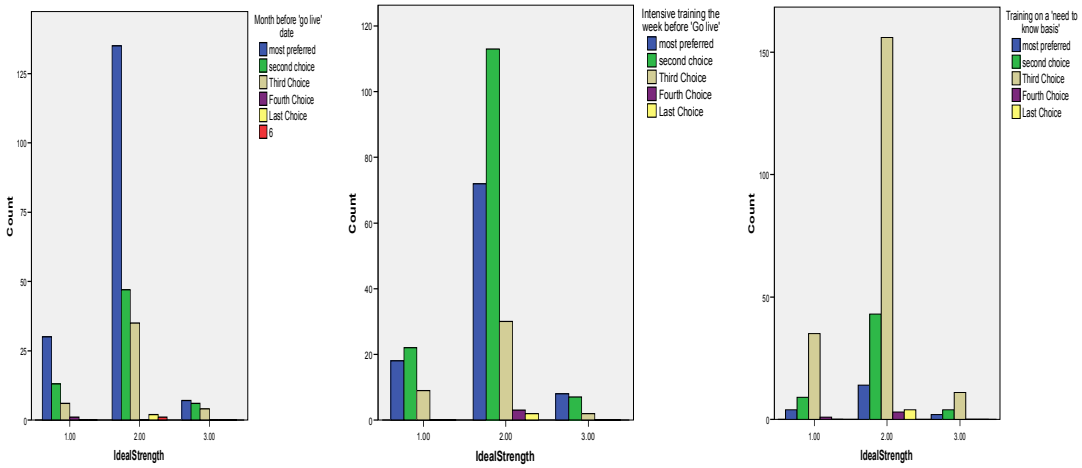


Figure 32 Training Timing Delivery: Promotion Focus

Consistently borne out across the range of both ideal and ought strengths was a significant preference for training to be delivered a month prior to system 'Go live' date, a stated second preference for training to be delivered the week prior to inception and 'Training on a need to know basis' was again consistently chosen as a last option across both ideal and ought strengths.

5.11.3 IMPLEMENTATION PREFERENCES LIKERT GROUPINGS;

The following set of questions were compiled as possible implementation options that could be proffered to individuals either at or during an MIS implementation.

Q3; "*The system should be implemented on a set date where the old system is made redundant*"

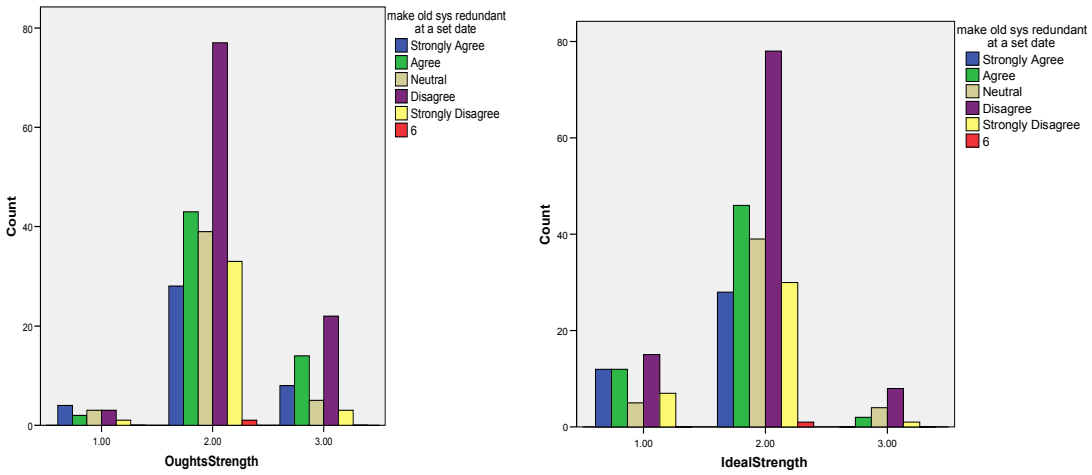


Figure 33 System Redundancy Preferences

This trend displays strong similarity in preference in low and medium strengths towards making a legacy system redundant but responses with a high regulatory focus separate out more strongly and a strong ought focus show a peak for disagree strongly to legacy system redundancy in keeping with proposition expectations for those in security focus.

Q4; *"The old system should be run in tandem with the new system until everything is guaranteed to work*" This question is a rephrasing of question three to elicit is there is a variance in response to the question when posed in a positive fashion. The response was significantly positively skewed

towards ‘strongly agree’ and ‘Agree’ again for respondents in a low to medium and medium to high ought focus. Those with a strong ideal or ought focus skewed either side of the neutral attitude, both more strongly towards agree though more strongly for Ought focus in keeping with question three.

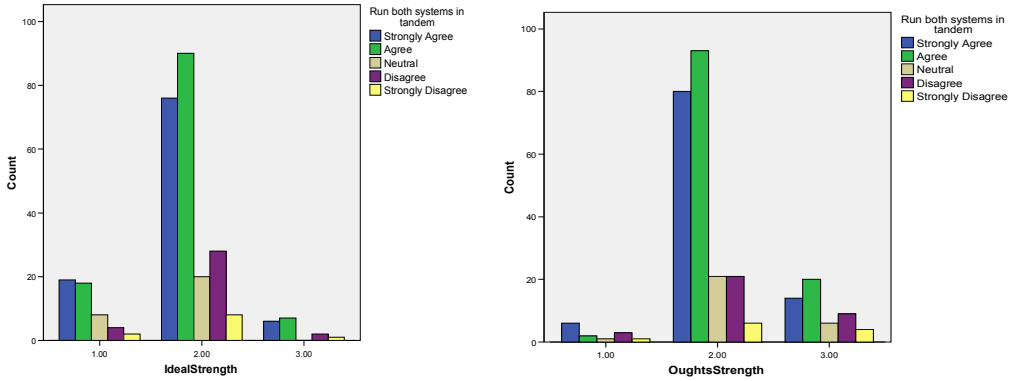


Figure 34; Running MIS concurrently Preferences

Q5 *“I would like to be involved with the system from the very start when it is being designed*” Those in ought focus were predicted to be strongly affirmative as involvement in system design would allow for participation decisions which ultimately affecting role responsibility and risk exposure.

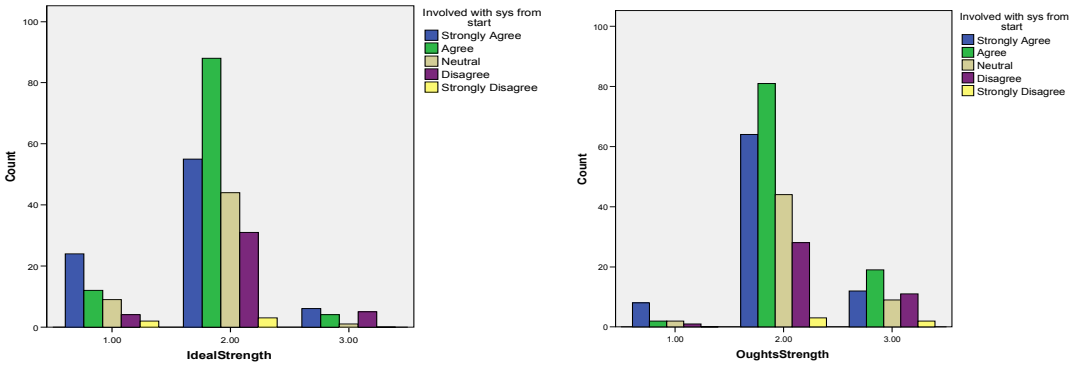


Figure 35 Involvement Timing Preference

The results obtained were less distinct than expected in that there was still a significant proportion that were neutral or in disagreement with being involved from inception of a system for both focus types. Majority of responses are in the Strongly agree or agree and significantly fewer in the disagree or strongly disagree mode.

Q6; "*It is important for me to get an understanding of how the whole system works*"

There was no proposed response set to this question the results indicated that regardless of ought strength, the ratios of those who strongly agreed, agreed and were neutral were very similar across all strengths of regulatory focus. The predominant selection was in agreement or strong agreement with the stated attitude.

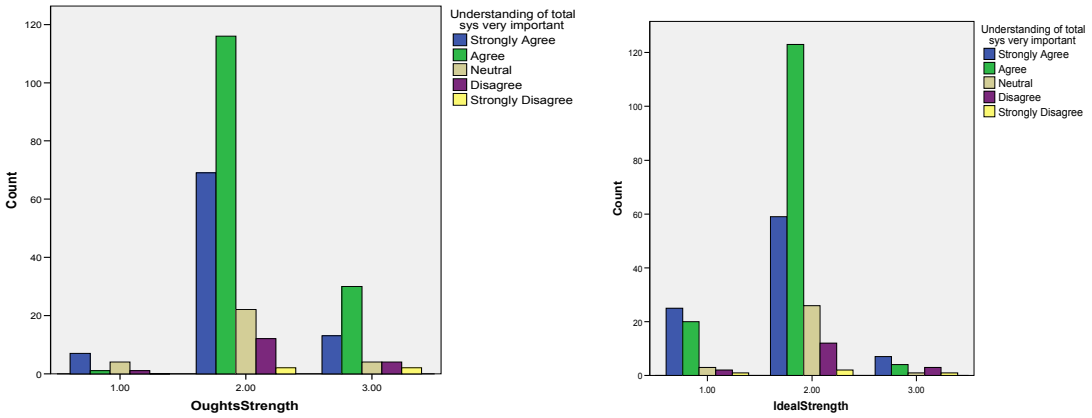


Figure 36 Total System Comprehension Preferences

Q7; *"It is important that I am allowed choose how I would like to be trained on the system"* This is a seminal question in the research as part of the consequences of using the psychological contract in MIS implementations would necessitate allowing employees and implementer latitude in determining how they would like to be trained in using a system. It was proposed that majority of respondents would react in the affirmative regardless of regulatory focus or strength. This was found again regardless of strength or focus with a small proportion in medium strength focus in disagreement.

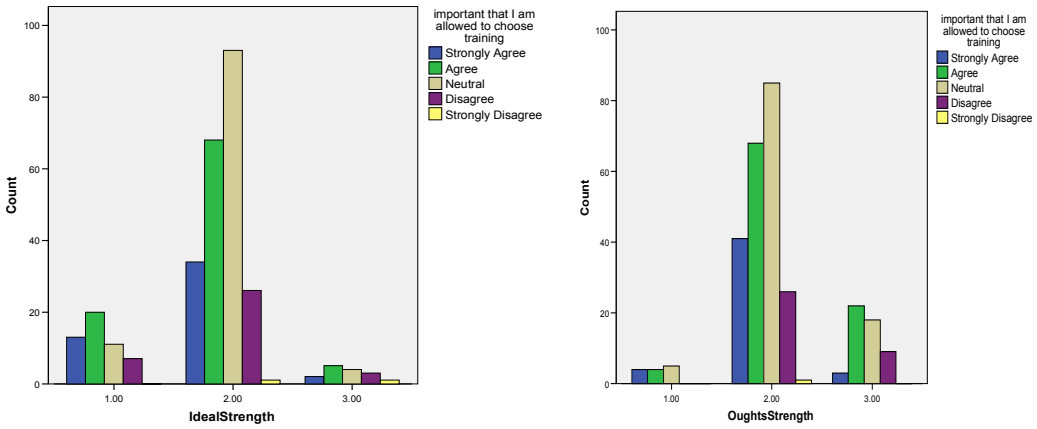


Figure 37 Training Selection Preferences

This was not the case. Majority of respondents regardless of ought preference strength were relatively ambivalent about being able to negotiate their preferences with respect to how they were trained in on the system and were neutral to the option of being able to select preferred training.

Q8; "*It is important that the company has considered how my job will change because of the system*" It was proposed that this was a key distinction for those in strong ought focus and responses centred significantly on strongly agree and agree in comparison to a neutrally stated or disagree preference.

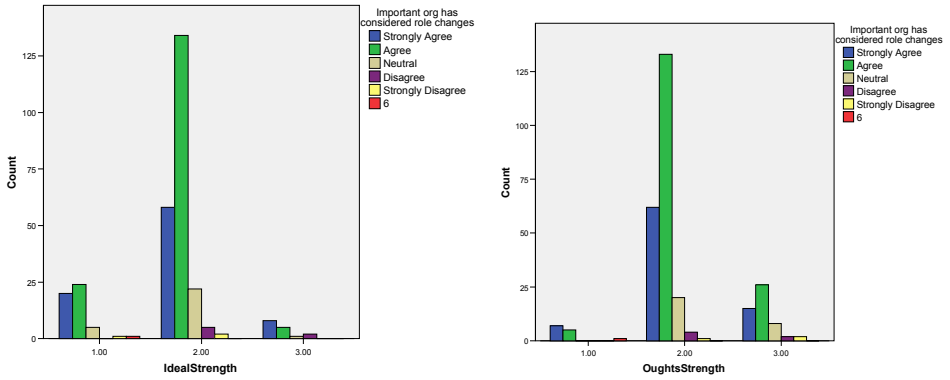


Figure 38 Role Impact Consideration Preferences

Q9; “It is important that my opinions about the system are taken into account”

There was no proposed difference between strength of ought focus and associated importance placed on consideration by the organisation of the opinion of the individual;

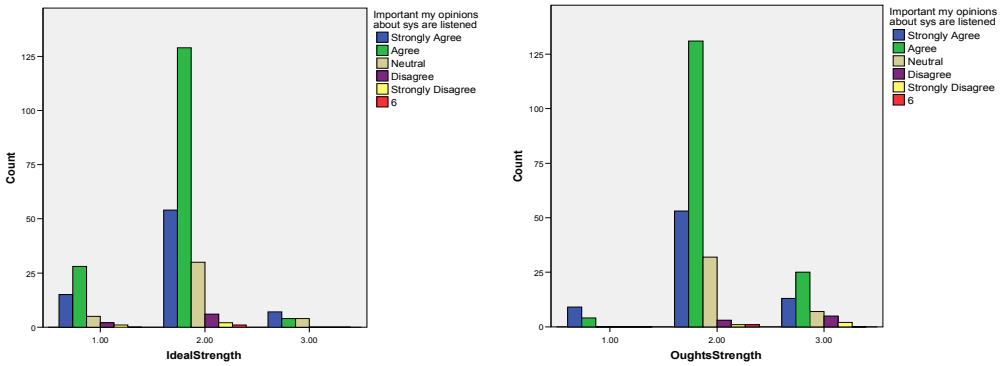


Figure 39 End User Perspective Consideration

It can be observed from the chart that the responses strongly tended towards agree and strongly agree corroborating the Sociotechnical approach to system design regardless of strength of ought focus.

In summary in support of proposition six, respondents in ought focus selected training individually regardless of the strength of their individual preferences. Running the system in parallel with the legacy system was also a strongly preferred option for those in low to medium or medium to strong ought focus however for those with a strong ought focus tended to ambivalence with respect to this option which was not a forecasted result. Possible explanation may be that those with a strong ought focus may not see retention of the legacy system as being connected in securing their current position or tasks. A comparison with those in an ideal focus is also required for a fuller understanding as to whether focus influences the choices made for implementation training. A scale delineated into four was initially run on the results but the numbers resulting in each of the scale were insufficient to be statistically significant and the scale was re-categorised in three and coded

into low medium or strong regulatory focus which better illustrated the differentiation between preferences.

5.11.4 REWARD AND REMUNERATION PREFERENCES

Proposed was those in an ought focused contract would select more traditional security based benefits such as improved healthcare and pension options. For the second ranking scale on the questionnaire respondents were requested to rank their preferred based on non benefit or benefit in kind rewards.

Q1; Please select your preferred type of incentive for use in conjunction with an MIS system.

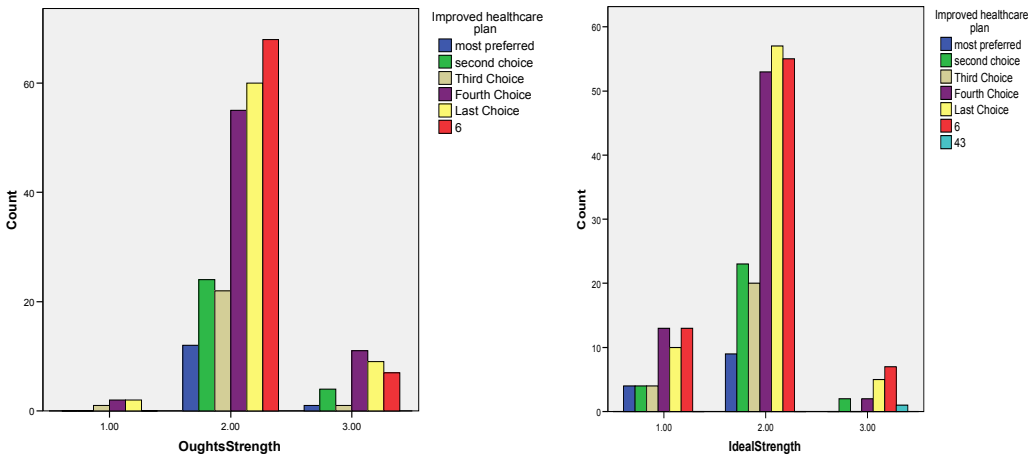


Figure 40 Incentive Preferences Comparison

The coding of '6' that can be seen in the graphs was due to miscoding on behalf of the respondents however given the regularity with which it occurred it was retained as a code for comparison with the remainder of the responses. For those in ought focus, the option improved pension chosen as a least preferred option followed by options. Followed by improved healthcare. Across the range of options listed, most preferred was the option to be able to select the preferred benefit followed by a direct cash bonus. The proposition that those in strong ought focus showed a stronger preference for health and pension options was not borne out. These preferences were mirrored by those in ideal focus for both most and least preferred options although those in strong

Ideal focus showed more differentiation in 'option to select bonus' than Ought. Strong ought was also more strongly skewed in the negative for selection of improved healthcare plan. A similar analysis was conducted for non-monetary rewards.

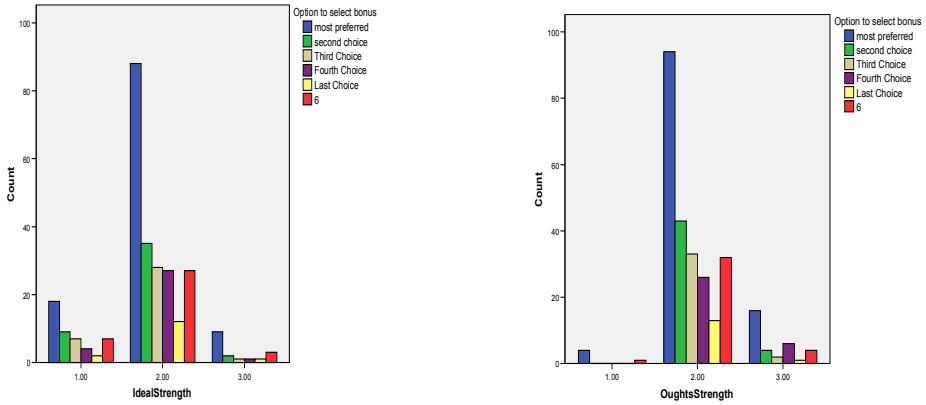


Figure 41 Monetary Recognition Preferences

Q2; "Please rate in order of preference the kind of alternative acknowledgement you would like to receive from your employer in recognition of having contributed to the new software"

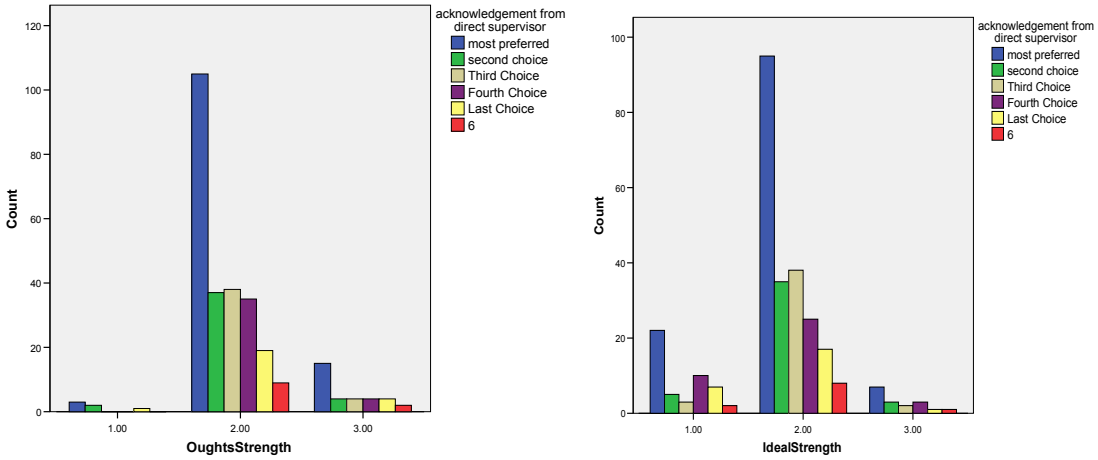


Figure 42 Non Monetary Recognition Preferences – Security Focus

‘Acknowledgement from direct supervisor’ is first choice across the spectrum of respondents again regardless of strength of focus. There was a step difference between this acknowledgement as a first choice and relatively equal distribution across the remainder of options. ‘Mention in company newsletter’ was responded to strongly in the negative again across all ought strengths For those in strong ought focus the option of allocation of more freedom in their role was more positively skewed towards first and second choice.

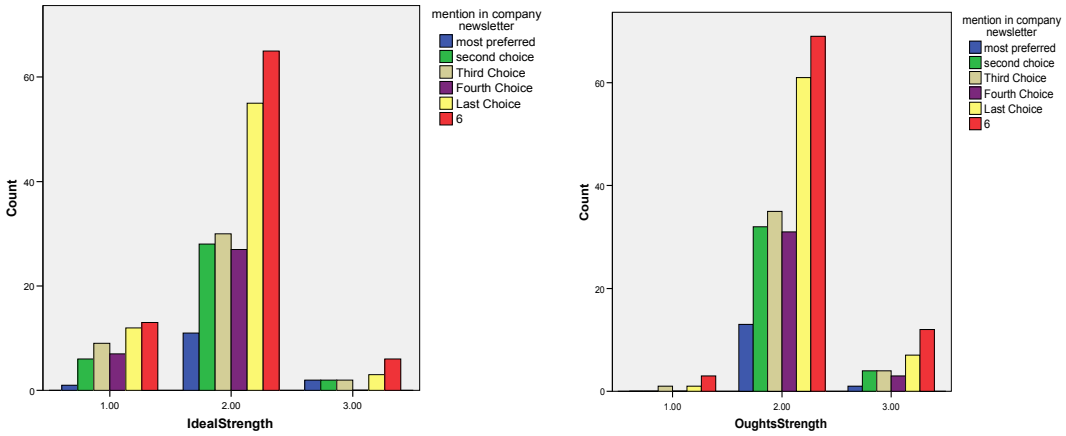


Figure 43 Non Monetary Recognition Preferences – Promotion Focus

Q3; “It is important to be able to negotiate incentives”

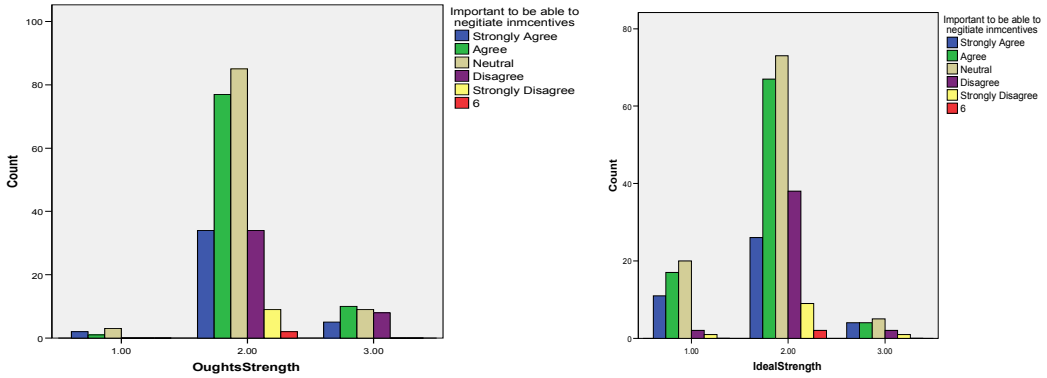


Figure 44 Incentive Negotiation Preference Comparison

Responses in medium ought strength indicate that majority of respondents bordering between neutral and agree with this statement. Very few(<5) stated that they strongly disagreed. Those in strong focus again appeared more ambivalent in their attitude with an even distribution of responses across positive and negative attitude strengths.

Q4: “The scale for these bonuses should be open and clear”

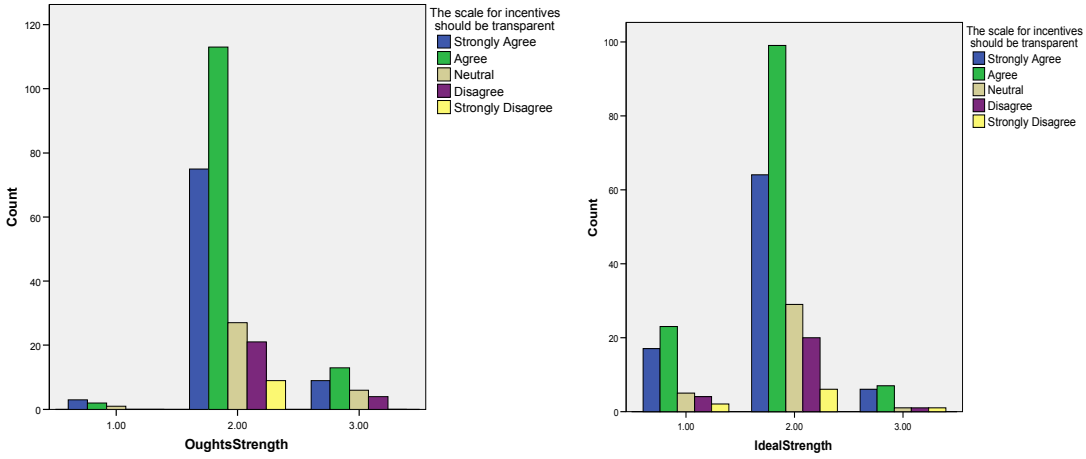


Figure 45: Clarity of Bonus Scale Preference Comparison

Q5; “It is important that the company has considered what incentives matter to me personally.

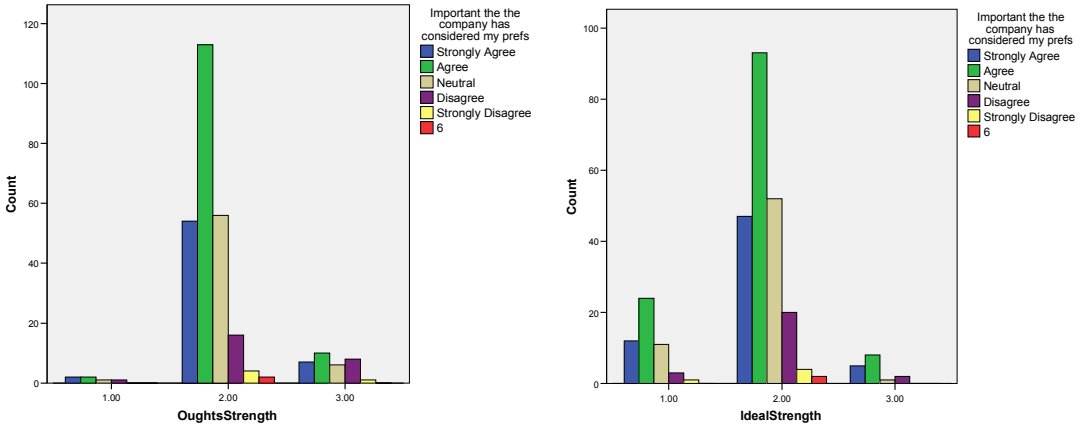


Figure 46 Personal Incentivisation Consideration Preference

Responses centred on agreeing to this statement for those in medium strength but for those in strong ought focus again there was much less variation across the range of responses again indicating a level of ambivalence not being encountered in lower strengths of regulatory focus.

Q6: “I would prefer the company to be able to give bonuses at their discretion.”

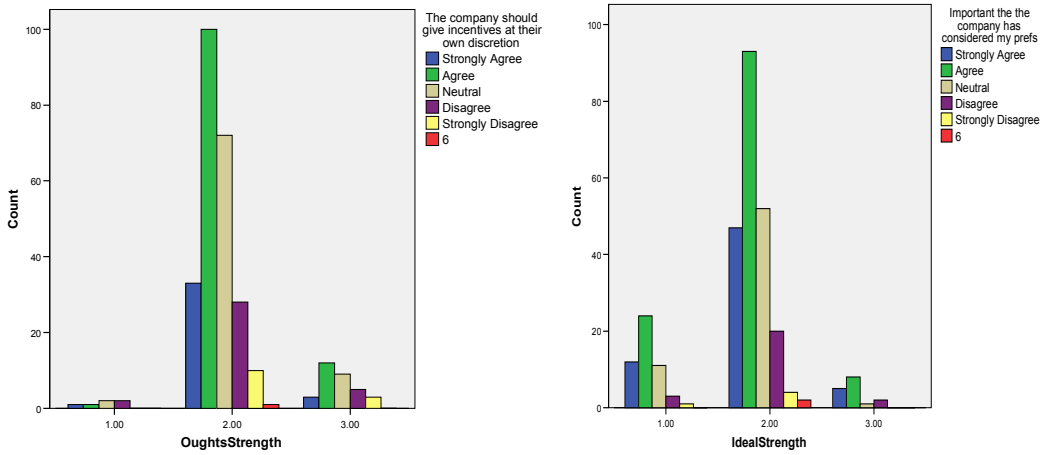


Figure 47 Discretionary Bonus Giving Preference Comparison

Preferences for whether the company should give bonuses at their own discretion was replicated across focus strengths and no discernable differences were apparent.

Q7; “Its true to say that incentives play a significant role in helping to motivate

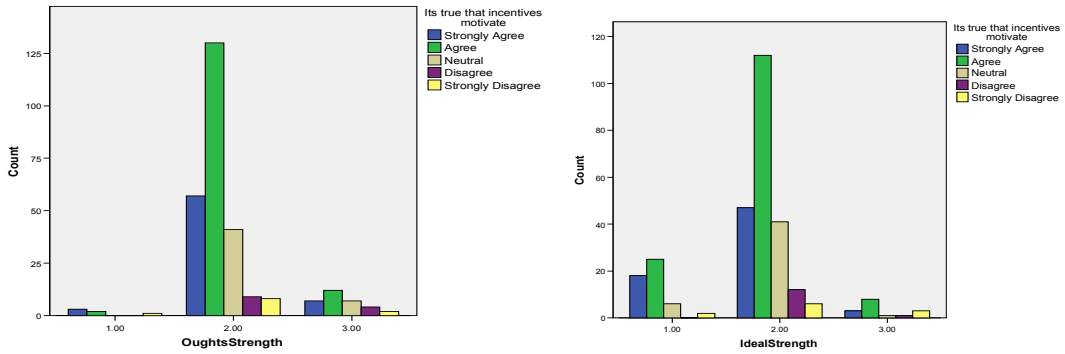


Figure 48 Perceived Role of Incentivisation Comparison

Those with a medium focus strength responses centred predominantly on agreeing to this statement and again an ambivalence in attitude was apparent from those in strong regulatory focus. This may be because incentives have not been traditionally structured in a way that has appealed to those with a security/ought focus.

Q8: “How the good the software is at doing its job is key in whether the system is used”

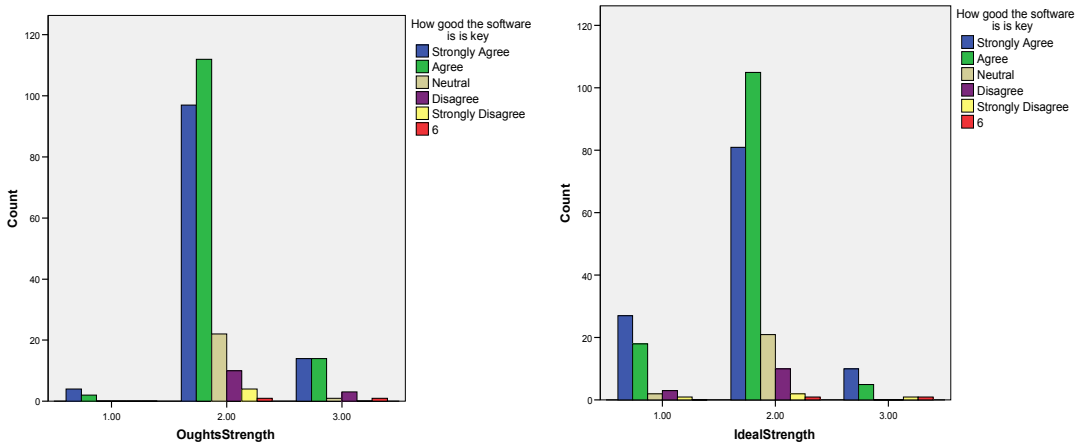


Figure 49 Role of Software Efficacy Comparison

There was consensus in reaction to this attitude statement in that regardless of ought strength the majority of responses were split evenly indicating aptness of software was a key factor

Q9; “Incentives should not matter in using new software”

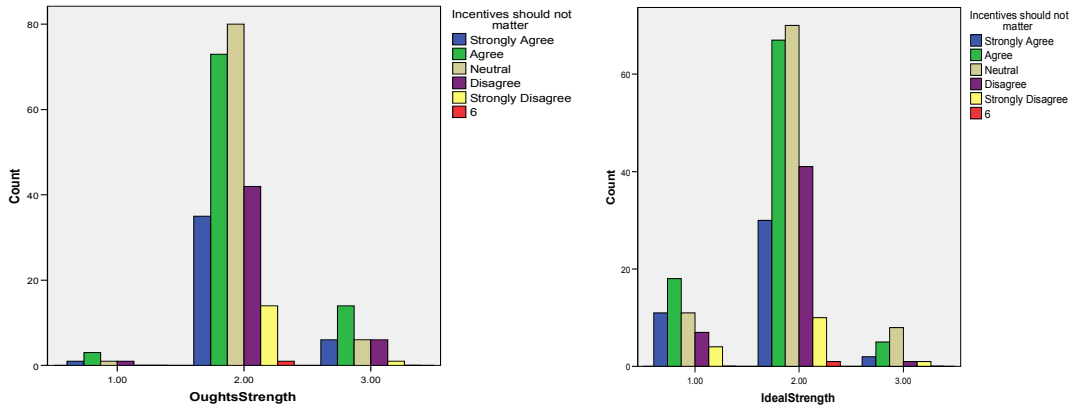


Figure 50 Role of MIS Incentivisation Comparison (Prior Page)

There was a more distinctive response in the positive to this statement from those in strong focus in comparison to those with a medium focus whose responses centred on agree and neutral and normally distributed response towards this question.

5.11.5 CONTRACT BREACH AND VIOLATION

A four item measure for each characteristic of Exit, Voice, Loyalty and Neglect were adapted from an questionnaire developed by Rusbult (Rusbult, 1988) . On completion of the survey a factor analysis on the measures was conducted. The scale was adapted to allow for the range of responses when using new software in an industrial or work based environment and a face validity check conducted prior to the survey deployment. Reactions to software if people were unhappy with aspects of the software was also incorporated as a question in the preliminary interview section of the survey although phrased in such an impersonal manner in order to mitigate as far as possible the effect of social desirability bias. It was also proposed that measured responses to a new software development could be cleanly categorised under these four distinctions. A separate scale was used for commitment to the system however as it was felt that 'loyalty' was insufficient to measure positively orientated reactions to a system whereby all expectations for training and incentives had been met. Again a five item likert measure was adapted to cater for reactions based in introduction of new software items.

Component Matrix[a] Exit

	Component
	1
Find reasons not to use	.834
Find ways to stall the system	.749
look for other jobs in org	.677
continue to use old method	.685

Extraction Method: Principal Component Analys

a. 1 components extracted.

Component Matrix[a] Voice

	Component
	1
Discuss with supervisor	.756
Join in workmates discussion if giving out	.398
Initiate discussion in how to resolve issues	.850
Find out how others felt about using sys	.849

Extraction Method: Principal Component Analysi

a. 1 components extracted.

Rotated Component Matrix[a] Loyalty

	Component	
	1	2
Wait and see if issues resolved themselves	-.028	.795
Continue to try and use system	.787	.165
Refrain from giving out	-.006	.630
Would flag serious issues with sys	.740	-.210

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Component Matrix [a] Neglect

	Component
	1
Would work more slowly using the sys	.244
Would keep quiet about a serious problem.	.807
Would continue to use own mwthods of wrk	.479
Would not bother fixing error if it was found	.849

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Table 4.7 Contract Breach Behaviour Factor Analysis

The factor analysis indicated that questions for exit, voice and neglect loaded on to one factor while results for loyalty indicated there was loading on to two factors. These were separated out into 'patience' ('would wait and see if issues resolved themselves' and 'Would refrain from giving out') and conscientiousness (Continue to try and use the system and 'would flag serious issues with system) Having a two item measure is less than ideal for measurement of these characteristics but it was decided to continue and use the given delineation to attempt and extract differences between recorded preferences on ought strength even though reliability of the measure was less than the other three facets of contract breach/violation behaviour.

Q1; Exit 01; I would continue to use my old method of working regardless of the system.

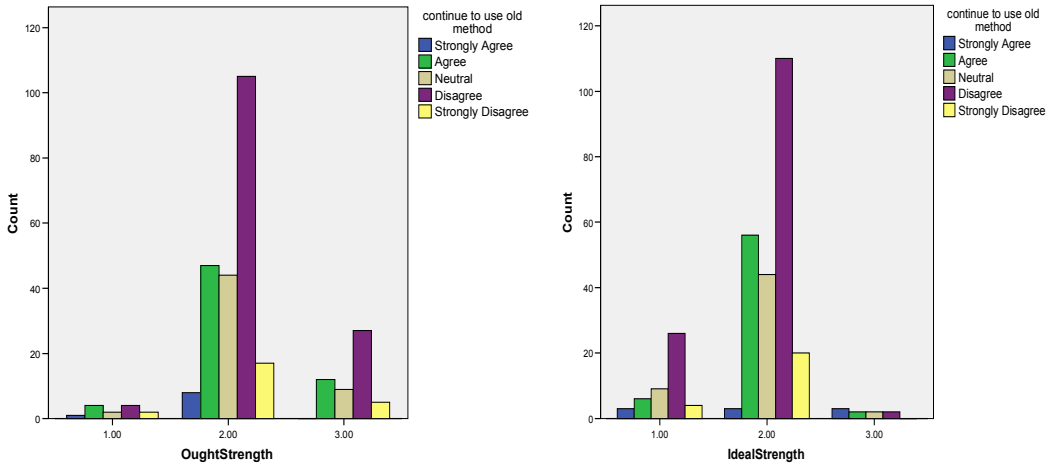


Figure 51 Exit Behaviour 1 Comparison

Q2: Exit 02; 'I would find reasons to avoid using the system.'

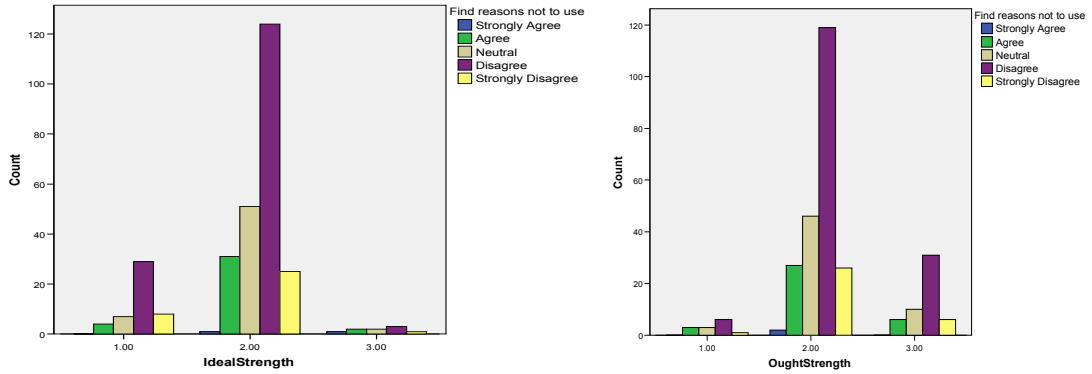


Figure 52 Exit Behaviour 2 Comparison

Q3 Exit 03; 'I would find ways of stalling the implementation of the system'

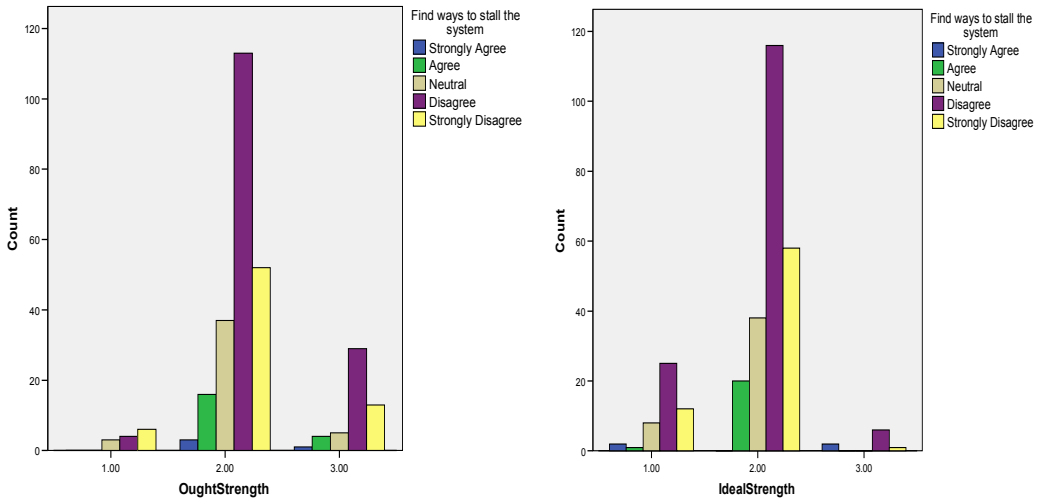


Figure 53 Exit Behaviour 3 Comparison

Q 4; Exit; 'I would look for other jobs in the organisation where the system wasn't used'

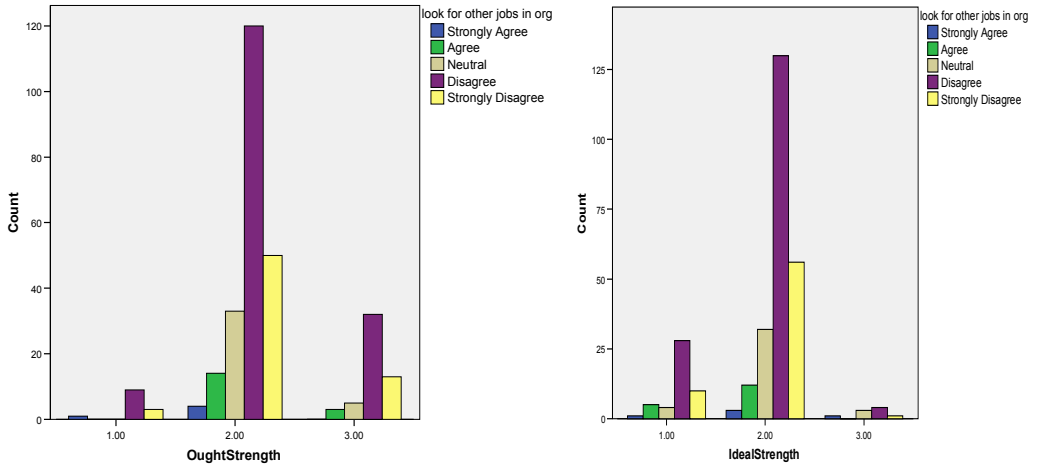


Figure 54 Exit Behaviour 4 Comparison

Q5: Voice; ‘I would go to my immediate supervisor and discuss the problem’

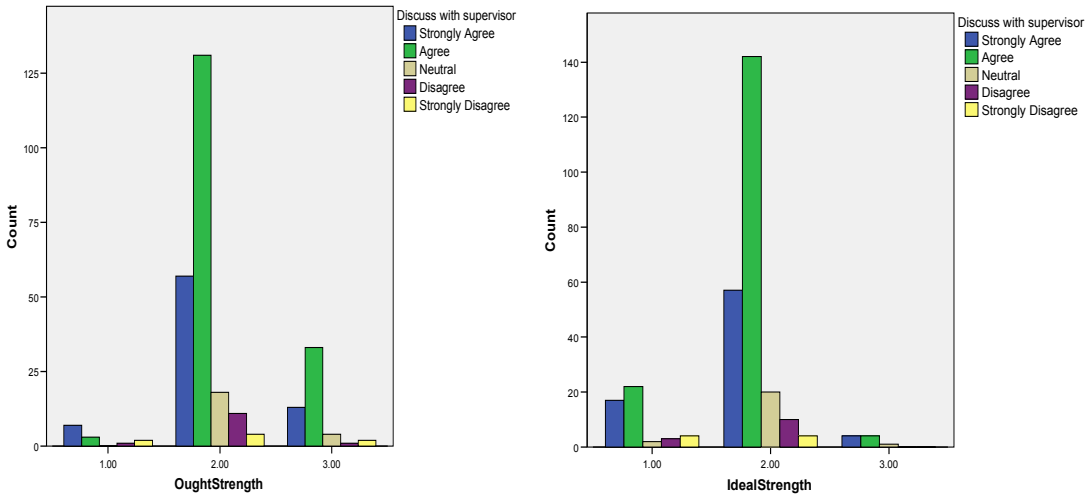


Figure 55 Voice Behaviour 1 Comparison

Q6: Voice; ‘I would join in if co workers were giving out about the system’

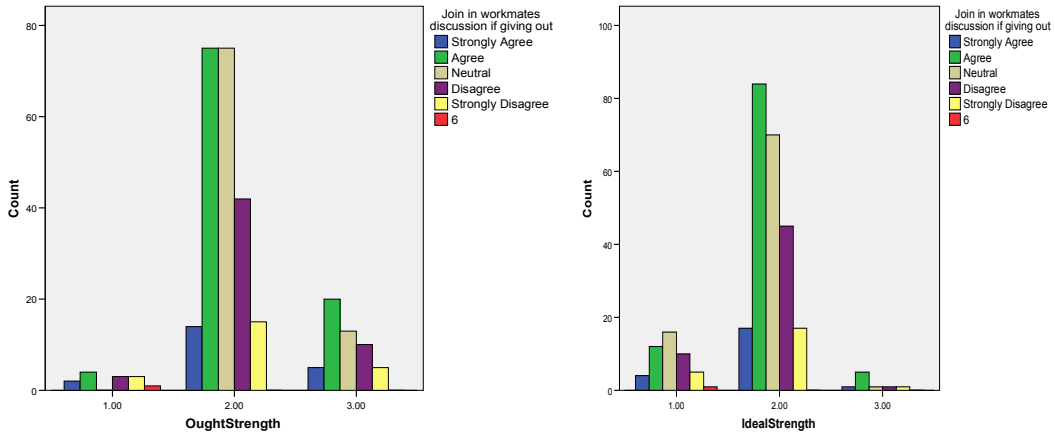


Figure 56 Voice Behaviour 2 Comparison

Q7: Voice; ‘I would try to initate discussion about how to resolve issues’

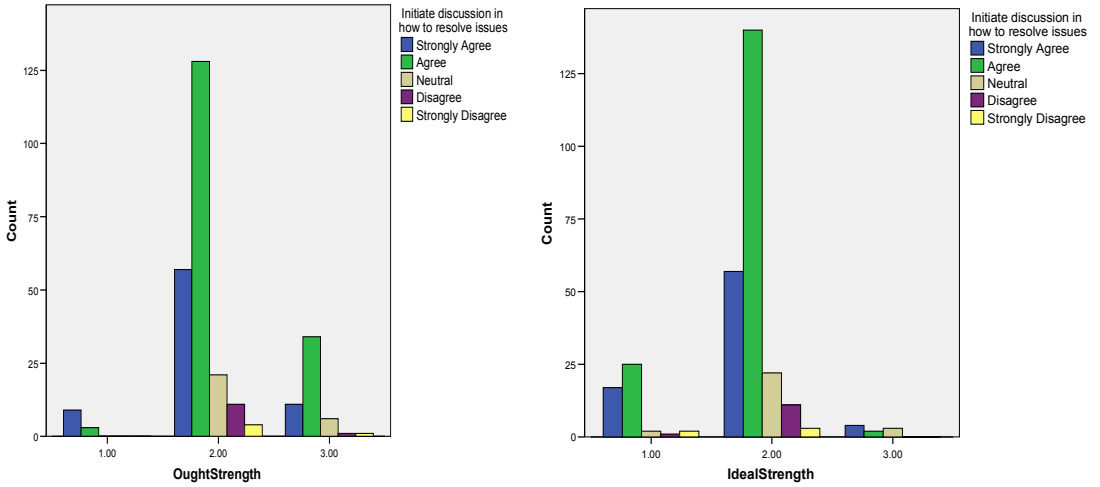


Figure 57 Voice Behaviour 3 Comparison

Q8: Voice; ‘I would try to find out how others felt about using the system’

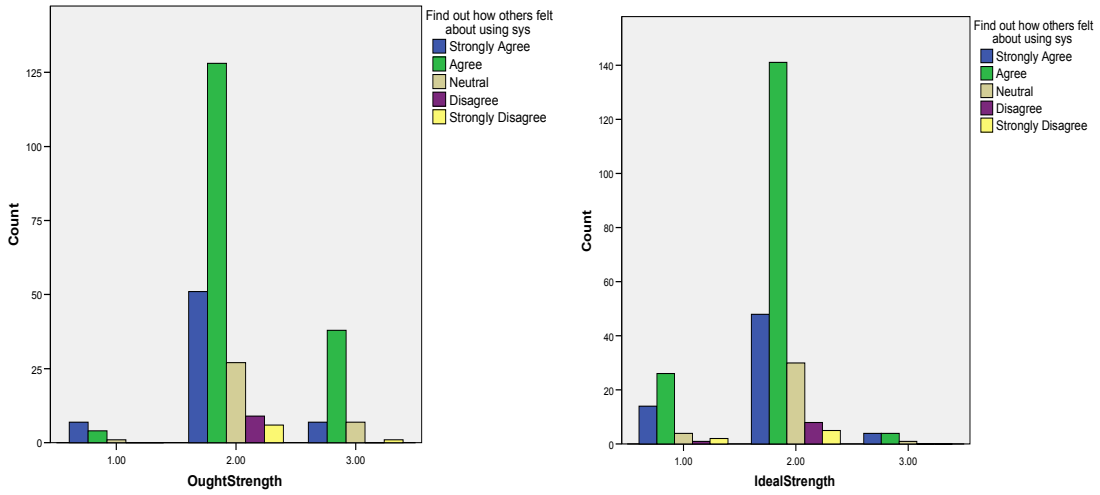


Figure 58 Voice Behaviour 4 Comparison

Q9: Loyalty: ‘I would wait and see if issues resolved themselves’

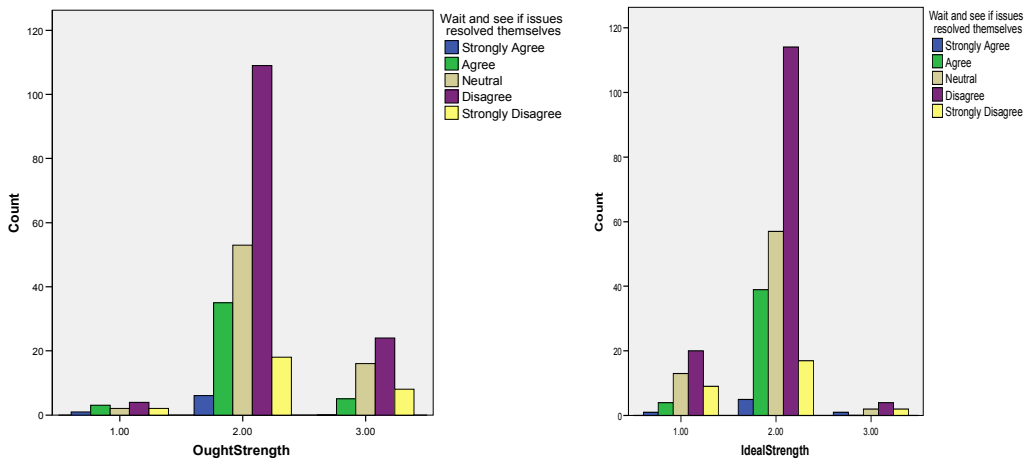


Figure 59 Loyalty Behaviour 1 Comparison

Q10: Loyalty; ‘I would continue to try and use the system’

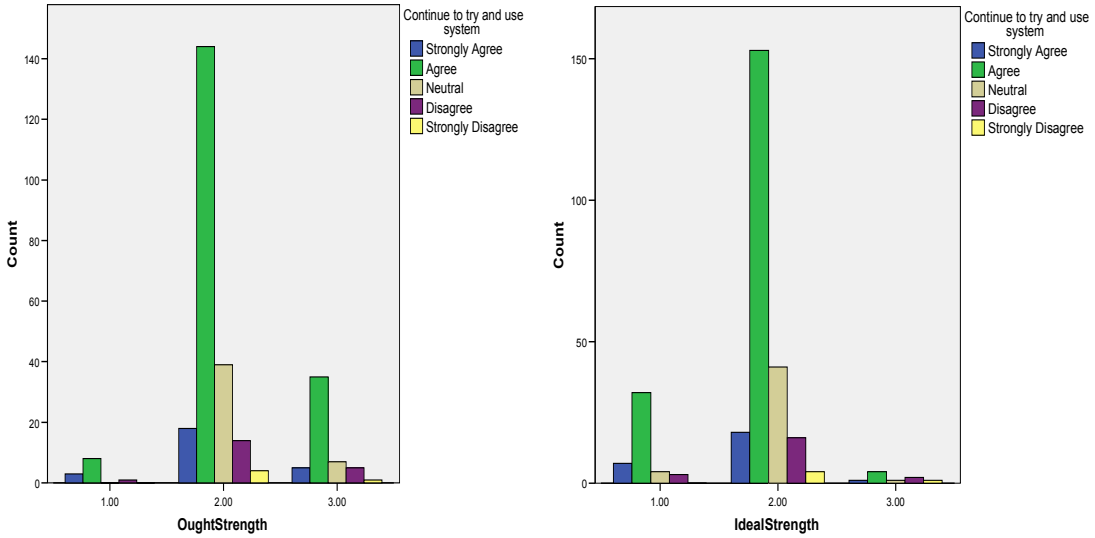


Figure 60 Loyalty Behaviour 2 Comparison

Q11: Loyalty: ‘I would refrain from giving out about the system’

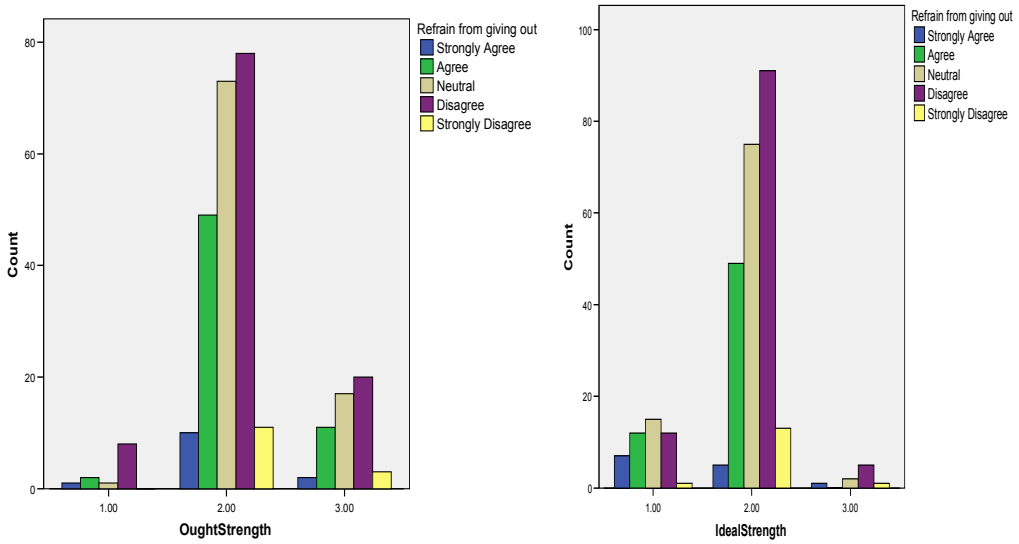


Figure 61 Loyalty Behaviour 3 Comparison

Q12: Loyalty; 'If I saw a serious problem with the system I would mention it to someone responsible'

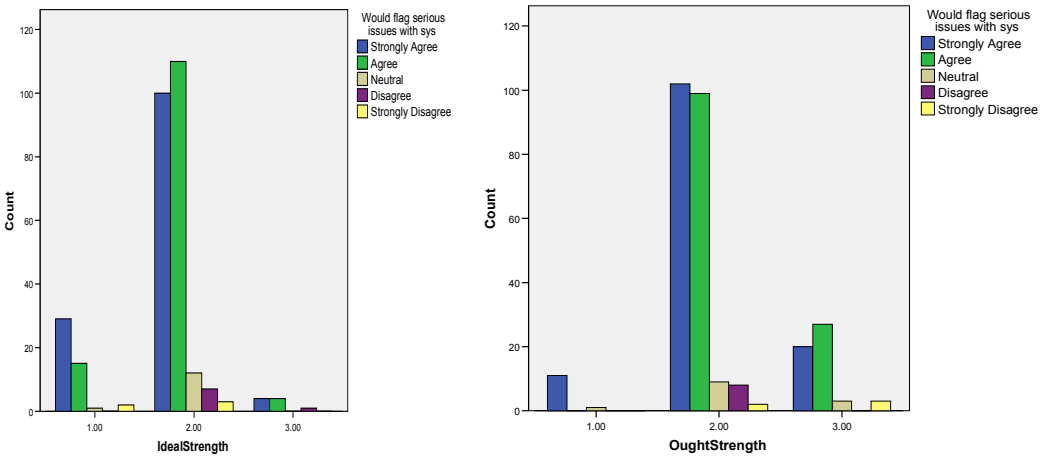


Figure 62 Loyalty Behaviour 4 Comparison

Q13: Neglect; ‘I would definitely work more slowly in using the system’

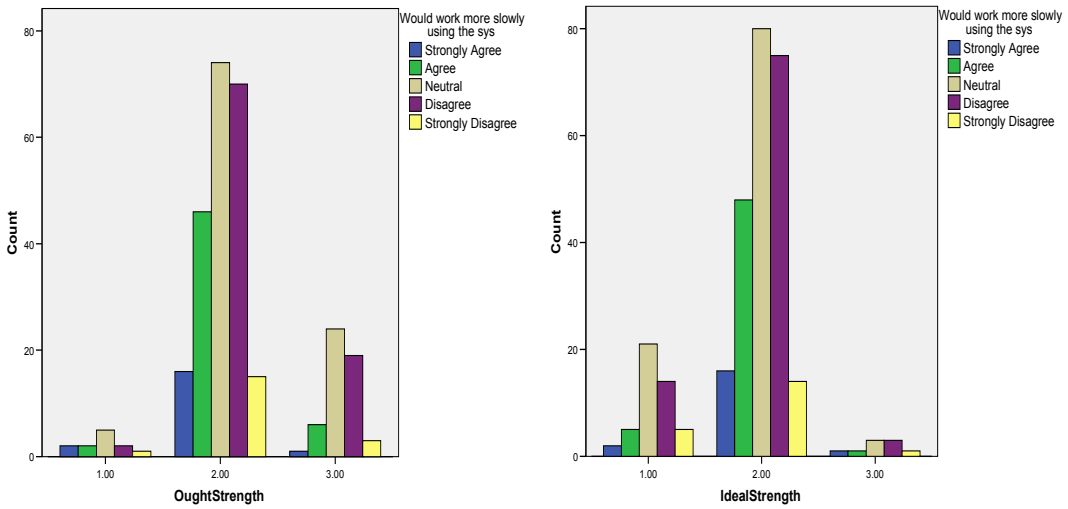


Figure 63 Neglect Behaviour 1 Comparison

Q14: Neglect; ‘If I saw a problem that could potentially stop the system from operating correctly I would keep quiet about it’

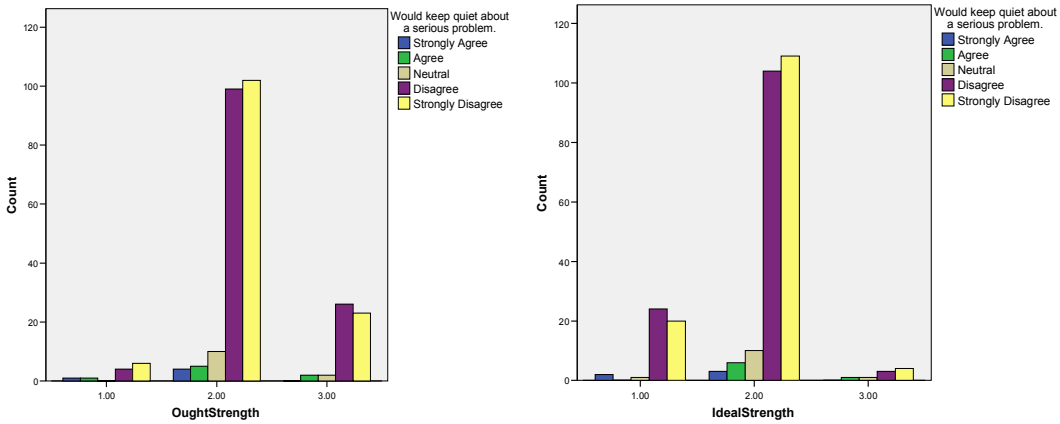


Figure 64 Neglect Behaviour 2 Comparison

Q15: ‘If I made an error with the system, I wouldn’t bother fixing it.’

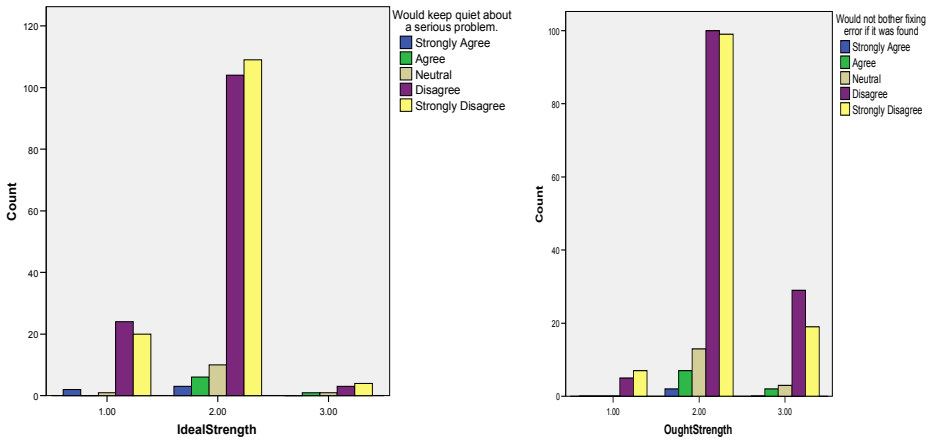


Figure 65 Neglect Behaviour 3 Comparison

Q16: ‘I would continue to use my own methods of working’.

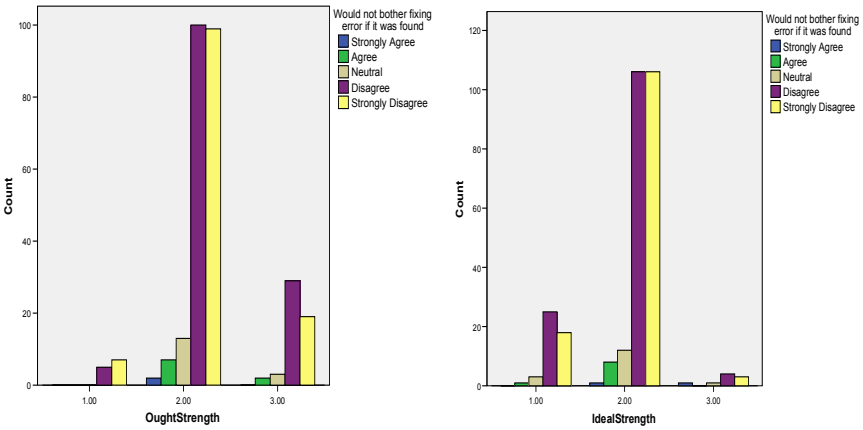


Figure 66 Neglect Behaviour 4 Comparison

Q17:Neglect; ‘I would leave it until the last possible instant to use the system.’

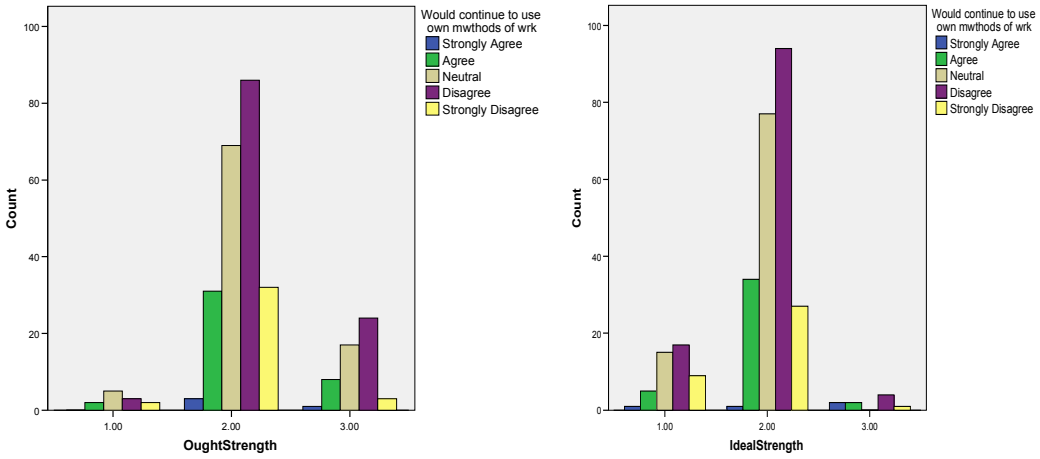


Figure 67 Neglect Behaviour 5 Comparison

CHAPTER 6 AUGMENTED MIS IMPLEMENTATION METHOD.

6.1 INTRODUCTION.

This chapter details the closing methodology for mitigation of MIS risk at the level of the individual. The methodology was assembled using the case studies, the results of the literature review undertaken on critical success factors, resistance to change and motivation theory on one hand and the results of the interviews, questionnaire/survey and case studies on the other. It is not proposed that the model will cover all eventualities, it is proposed however, that use of such a model will, with genuine participation in the process from both parties will significantly facilitate making explicit the expectations of both the organisation and the individual when it comes to an implementation project. From the point where both parties are fully aware of respective desired outcomes, a sound basis for negotiation is established. It is also envisaged that this process will facilitate discovery of respective reservations along with desired outcomes. Thus dealing with points of concern early in the process when the possibility of resolving then is usually more amenable to both parties is made eminently more possible.

6.1.1 STRUCTURE OF THE CHAPTER.

The implementation methodology is comprised of four stages. The source and reasoning of each stage of the framework is provided and in turn, components of each stage are discussed and set forward. The chapter concludes with a representation of each stage of the process and a full representation of the model is discussed including a synthesis of the previous sections. This graphical model for implementation at an individual level is then incorporated into the overall generic implementation presented in the literature review chapter. It then became possible to move through successive levels of an overall implementation plan whilst augmenting the methodology for effectively working with the individuals involved in the process at each step. Trigger points for contract renegotiation are discussed, as methodology is iterative.

6.2 PSYCHOLOGICAL CONTRACT AND SYSTEM INTRODUCTION.

The first proposed stage in the implementation model is in the first meeting with the key end users of the system. This principle is also espoused both in the Critical success factor literature (Holland., 1999, Cooper, 1990) and from SocioTechnical literature with respect to information sharing and communication (Shani, 1992, Loughman, 2000). From the very outset, if the tenets of the psychological contract are to be adhered to, this meeting must cover a number of critical points. The first of which to be introduced is an outline description of the proposed tool for facilitating implementation, the psychological contract. It is proposed to introduce the contract in such a manner that the concept is immediately comprehensible. As aforementioned the psychological contract has high face validity, and in the interviews conducted, reaction of the participants to the concept was without exception positive and respondents indicated not only understanding but also strong agreement. After a brief initial discussion of the topic and provision of examples of the contract and how it might apply in different instances, the tenets of how the psychological contract applies in this particular instance is described using principles outlined by Sels, Levinson and Morrison (Sels, 2004, Morrison, 1994, Levinson, 1965).

1) Stability; The extent to which the contract is seen as stable/flexible or emerging. The extent to which the contract can be made stable significantly affects the extent to which the employee can feel secure working with the confines or expectations of the contract plan. A detailed provisional implementation plan with outline tasks and time requirements that can be discussed is the first step. Contract stability can be further enhanced by discussing events that may disrupt any element of the project plan, from either the individual implementer or organisation perspective. During this phase, the concept of the psychological contract is being introduced so it is in a stage where it is emerging. The ideal scenario is to move the contract from an emerging state to relative stability within a set time frame. Negotiated briefly at the outset from this point are also key trigger points for renegotiation of the contract.

2) Tangibility; the extent to which employees see the contract as unambiguously defined. This is the ability to make as explicit as possible, as early as possible, what the enterprise's side of the contract is. This necessitates having a clear understanding of how the organisation will perceive the individual's role and tasks changing as a result of the new system. This is still not to present

the project as a fait accompli. However the organisation must make clear where the opportunities for negotiation and discussion of the psychological contract are. The mechanics of the how the psychological contract works for both the employee and organisation must be clearly understood by both the implementer representing the organisation and the employee. Teaching aids such as diagrams or simulations are useful at this juncture to assist in making the psychological contract as concrete a phenomenon as possible.

3) Scope; The extent to which the boundary between one's employment and other areas of the individuals life; For the purposes of a software implementation this is less critical as an MIS is a clearly defined entity within the work scenario which should not impede on any aspect of the employees life outside of the work situation and may not necessarily affect all areas of the individuals work. As aforementioned, MIS is a single definable entity that should necessarily span a relatively narrow set of job functions/roles and therefore present a set construct within which contract can be efficiently scoped.

4) Time span; whether the contract is relational or transactional (Rousseau 1998). The time span of the contract with respect to MIS necessarily falls out of this narrow definition of contract type. The contract duration is specific to the amount of time required to successfully embed a new system in the organisation in a sustainable way. However it is proposed that the length of time the employee has spent with the company and how secure they feel in their position will have an effect on how they may approach a new system

5) Contract level; Refers to the degree to which the contract is individually versus collectively negotiated. An MIS implementation will have a varying breadth and depth of impact on how each individual carries out their work roles, thus making a collective negotiation impossible. The psychological contract must be individually negotiated with a fixed scope for agreement with each employee.

6) Exchange symmetry; Refers to the degree to which the employee perceives the unequal employment relationship as acceptable (MacNeil, 1985). For the purposes of an MIS, implementation exchange symmetry or equity between the employer and the employee is measured in terms of whether the employee perceives the expectations of the organisation to be

fair, given what the organisation is providing to them. This perception of equity is individually based and context specific so will necessarily change or be experienced differently by employees. The explicit question of whether the contract feels as though it is fair both in content and in how it is negotiated must be explicitly asked at regular intervals and that a sufficiently accepting environment for a response in the negative is provided is also critical to how well an implementation is executed with an individual and their felt level of reciprocating commitment.

6.2.1 Linking the MIS to Employee Role Tasks and Responsibilities.

A key factor in supporting the meaningful development of the psychological contract with respect to supporting the tenets of the psychological contract as discussed above in 6.2 is being as explicit as possible in understanding the interaction between

a) The employee's current role and responsibilities

b) How a new system will affect the way these responsibilities are undertaken.

c) How to manage the transition from old methods to new methods of conducting transactions.

To this end the concept of "Task technology fit" as described by Tung et al (Tung, 2008), and (Yucong, 2011) goes far in supporting the development of the psychological contract. Perceived Task technology Fit argues that the use of a technology may result in different outcomes depending on its configuration and the task for which it is designed. Perceived Task-technology fit itself depends on the agreement between the perceived capabilities of the technology, the needs of the task and the competence of the end user (Marcolin, 2000). The competence of the end user has been discussed as significantly affected by self efficacy as evidenced in both the literature review and the results of the questionnaire, but functional requirements of the task and the ability of the software to efficiently execute this is critical to the eventual success of the system and will necessitate the following sequence of steps to effectively ensure the software can reliably perform to match the end user requirements thus ensuring confluence between the task, technology and the individual in accordance with task technology fit literature whilst supporting psychological contract tenets of stability, tangibility and scope;

a) Identification of the key critical end users of the proposed system – those whose roles will change significantly as a result of the software and those end users upon whom the effective deployment of the system is critical.

b) A thorough understanding, developed with the potential end user of how current role and task responsibilities of the end user are executed but also *why* they are executed in this way. This step is essential in both establishing trust and in ensuring both the implementer and end user understand the problems and potential opportunities in how the current tasks are undertaken. Questions such as;

    - Is the data required for the end user to execute the function presented fully, clearly and in the correct sequence

    - Does the end user have sufficient visibility and autonomy over the transactions required to execute the function in the proposed system

    - Can the end user navigate between functions and is it possible for the end user to see the effect of their actions both up and downstream, are actions reversible.

c) Determining with the end user how their role affects processes and tasks in the wider context of the organisation and how this fits in with the organisational objectives defined for the new system.

d) With each key critical end user, understand how the proposed system would affect the way these functions are executed and how end users would have to adapt the way in which they perform these functions. Once this shared understanding has been established, of both the existing methods and the proposed methods would affect them, it becomes possible to identify the potential problems and opportunities with the new MIS and identify the sequence of tasks and actions required to transition from the existing methods to the new system.

This sequence of tasks, negotiated between the end user and the implementer will support establishing the tenets of stability, tangibility and scope but as part of the process ensure a confluence of fit between the task, the technology and the individual. With respect to Job enrichment theory (Hackman, 1975), working through the methodology with key end users also sets a platform for involvement (Hartwick, 1994) further allowing for development of personal responsibility, Knowledge of results and if well executed toward meaningful work. This sequence also sets in place as a natural consequence of working through steps A to D above the mechanism through which psychological contract considerations of predictability, interdependence, psychological distance and expectations from the past.

6.2.2 CONTRACT CONSIDERATIONS

1) Predictability; psychological contracts provide predictability for the relationship between the MIS, the organisation and the individual which is essential if trust is to be engendered going forward with the system. Thus it is key that trigger points for renegotiating the contract are agreed at the outset so the structure is understood by all participants.

2) Interdependence; acknowledgement at the outset that both parties require each others effort and input for the project implementation to be successful. To understand the significance of full commitment to the project from the employee, the enterprise must be able to communicate the performance difference between having acquiescence and engagement from the end users, and vice versa, the employee must understand and be able to negotiate the reciprocation side of the contract given the set of outcomes that they can negotiate for. The reciprocation of the contract will work both ways however in that the enterprise is also aware of the dependence of the employee on the firm for work/survival on a more immediate level. Because there is not equal distribution of power in the relationship - the organisation is the dominant player, hence it is critical that the negotiating relationship is equalised by setting the negotiation boundaries for the new software.

3) Psychological distance. the extent to which the implementation will change the individuals working role and conditions will necessarily dictate their level of involvement thus how much

support is required and this in turn determines how required interaction level between the implementer and the end user. If the end user was dependant on a means of completing functions that will be replaced by the new software, they may find themselves in a position where they have lost autonomy or means to control the way in which they carried out their tasks. If this is identified as the case between the implementer and the employee, it must be made clear that it is appropriate for the employee to seek significant assistance in using the system and that the implementer makes known that they are in a position to support the level of interaction and support required by the employee. It is critical that the employee feels they are in a position where they ask for support without incumbent censure or judgement and that the resulting assistance is timely.

4) Expectations from the past; should the employee have had prior experience of either an IT implementation or of an MIS system, their experience with this system will be a significant determining factor of how their expectations are construed. Understanding how these prior experiences have shaped the employees expectations is critical in establishing what the psychological contract for the new software is. These expectations as a result of prior experiences would ideally be elicited with the use of open ended questions looking at how well the employee considered the implementation had been carried out and conversely, what aspects of the implementation they perceived were worth keeping. Thus, an understanding of the employees approach to adopting the system can be understood or what their respective barriers to committing to using new software.

6.2.3 OUTLINING OF THE ENTERPRISE MIS OBJECTIVES

That the enterprise is clear and succinct in what its reasoning for implementing the new software is discussed in the generic framework for implementation derived from critical success and failure factors in the literature, the logic and reasoning for the implementation must also be reiterated and again made explicit at employee level to provide the logic case for the implementation. The organisations capacity to clearly explain the reasoning for the implementation is crucial for defining the organisation contract side. This document which will, initially, describe the organisations expectations of the employee with respect to the implementation. At the outset of the negotiations this need only be an outline and not a detailed description of what the organisation is looking for the company to achieve as a result of having implemented the MIS. It should be sufficient however for

the employee to understand company motives and have an outline perception as to how this will impact them personally and how they complete their tasks. It is proposed that ideal vehicle for this is assessment of the key performance indicators that the enterprise feel will be positively impacted by use of the system. An individual listing of each of the factors, and what the main contributors to achieving each of the KPI's are described. For example if the key performance indicator of On time delivery in full is chosen, the below are a sample listing of factors which may affect the enterprises ability to meet the customer order;

- On Time Delivery in Full
- Customer credit clearance check
- Availability of raw materials
- Sufficient labour and machine resources
- Intact incoming and outgoing supply chains

Each of these sub headings can be further sub divided a number of times but as aforementioned at the outset an employee should have sufficient data to perform their own initial assessment of the interactions between the system and the key performance input variables that they personally impact. It may be the employee's role or tasks that they perform will affect a number of variables across the range of Key performance indicators. Thus for a stable, scoped and well defined psychological contract it is key that the enterprise is exceptionally clear on what it is that they hope the system will achieve. Also as the organisation is the lead negotiator in the process the opportunity to set example in being clear and open with respect to objectives sets precedent for;

- Eliciting the employees expectations
- Setting the contract discussion boundaries.

6.2.4 SETTING OF CONTRACT TIMELINES AND CONTRACT BOUNDARIES

Development of the psychological contract between the organisation and the employee may be envisaged as a project in itself that is run in tandem with the implementation. As such, it needs to be set so that tasks are progressively achieved. This is also made explicit with the employee and the stages of the contract negotiation are discussed with the logic underpinning each of the stages and desired outcomes, both from each stage and from the overall process, clarity of objective and commitment for both the individual and the organisation. The end timeline and again, justification for the selection of the dates is discussed with the employee including how the end results of the system are to be published. Ideally majority of the contract timeline will be finalised in the initial discussion and majority of the psychological contract dimensions made explicit prior to proceeding with MIS implementation.

Boundaries for building of the psychological contract are critical. As the process is involved and requires significant time and skill to establish robustly with each employee it is essential for the efficient building of the numbers of contracts that are required to establish with the new system that the process is both equitable and efficient. Contract boundaries allow for this in that limits are set both for what is expected in terms of commitment from the employee and in terms of remuneration or time, training and support from the organisation. Boundaries are also set in that it is the psychological contract solely in relation to the MIS implementation that the enterprise is looking to establish. The psychological contract established for an MIS is solely in relation to the new software and is negotiated independently of other task functions and relationships external to the boundaries of what is affected by the software implementation. Being clear about this at the project outset will facilitate making the process efficient. Ensuring the same contract limits are applied across the board and again ensuring that the enterprise is explicit about this achieves equity. Employees understand that the contract is subject to reasonable limits and that other employees are also working within these boundaries when they are negotiating their individual contract limits. These boundaries will be specific to each organisation and to each instance of a software implementation at the organisation

6.2.5 TRIGGER POINTS FOR RENEGOTIATION OF THE PSYCHOLOGICAL CONTRACT.

A key differentiating factor in the psychological contract is that although the contract as negotiated will end with the completion of the project, there are a number of trigger points that may necessitate renegotiating the contract between the organisation and the end user of the MIS. It is critical that these trigger points for negotiation are made explicit after the above steps have been completed so that both parties understand that the contract is mutable but that it is mutable within confines as set and agreed by both parties. The set of trigger points will differ and a possible set are listed;

Employee side contract renegotiation points;

1) Change of project scope; if the scope of the project scope changes significantly after the contract has been negotiated, irrespective of whether it is enlarged or reduced.

2) Change of project timelines; if the original planned time frame has to change by more than a number of days. Changing of milestones dates within the project will also act as renegotiation triggers if the employee is affected by the change.

3) Change of key project personnel or support; if there is any change of personnel involved with the project either from the implementation. Management support or end user side then the new or additional people must be made aware of the contract and be prepared for renegotiation if required.

4) Change in the role or responsibilities of the end user; if the end user is allocated new tasks or responsibilities then the terms under which they had originally negotiated have changed which may also prompt renegotiation.

5) Significant organisational, management, business or cultural change; in essence anything that can affect the terms or ‘landscape’ under which both parties had originally entered into the agreement.

6) Personal situation of Employee; allowance for any significant changes in the personal life of the employee must also allow for a renegotiation of the psychological contract.

From the above, it may be seen that triggers for renegotiation of the psychological contract are event driven and will usually be as a result of unforeseen changes. Setting in place a process for renegotiation will facilitate responsiveness and appropriate responses from both contract sides to change. The second benefit to using the psychological contract is that there is security for both parties to the negotiation in having a set and known process within which change is discussed and agreed upon. When a known method for introducing, handling and negotiating change is agreed many of the factors that influence negative attitudes to change are negated if the end user can retain a sense of control which comes as a result of and event triggered contract renegotiation process.

The benefits to the organisation of setting trigger points with the end user is that the process for renegotiation re-equilibrates the power balance in the relationship and it is posited will facilitate concomitant reciprocation in terms of commitment. If the process is applied sufficiently well, fast response changes will flag and resolve issues in advance of them becoming embedded organisational issues or causes of passive resistance.

6.2.6 EMPLOYEE FEEDBACK.

If implementation of the software project is the first instance of an implementation then, ideally, a survey will be done which will discuss with end users of the system whether the process of negotiating the psychological contract can be amended in a way that works better for them. Aspects of both the overall instantiation process and of factors about the individual negotiation need to be discussed and may be adapted to suit the situation in which the organisation or the individual are in. Procedures and approaches that operate well in multinational environment may not flex to suit a small or indigenous manufacturing organisation. The process being outlined is of a form that the particular details may be built to suit the culture and environment for that particular implementation. Employee and organisational feedback is essential to maintain the process, not only during the negotiation phase of the psychological contract but both before and after the process and about the process itself.

6.2.7 METHODOLOGY FORMALISATION; WRITING THE CONTRACT

The second point of debate is whether the psychological contract should be recorded as it is being discussed and whether a final draft should be drawn up on conclusion of the discussion. Whether or not the contract is recorded is dependent on the existing level of trust between the organisation and the individual. The act of writing down the components of the psychological contract will reduce ambiguity in the long term but may also have the effect of over formalising the process, possibly inhibiting a full elicitation of the contract. Whether the contract is formally recorded is a point for agreement and a part of the contract in itself. It is possible that within the one enterprise that some contracts may be recorded and others may not. A second point for consideration is whether other end users contracts are available for others to review. It is key that contracts with the organisation are open to review by other participants in the implementation process. At this juncture and with all points from the first phase taken into consideration it is possible to begin negotiating the psychological contract for MIS.

6.3 EMPLOYEE CONTRACT SIDE

6.3.1 INTRODUCTION

The employee side of the psychological contract for a software implementation was formed by the research undertaken as described in results. Employee side contract was formed by;

a) Grounded research from three previous MIS implementations

b) Sampling of 298 employees from thirty eight separate enterprises.

c) A case study based investigation where five individuals were interviewed at length with respect to their individual expectations for a software implementation.

d) Ten standard interviews with open ended questions from five separate enterprises again detailing what the individual expectations with respect to incentives and preferred training.

The steps for consideration have been listed in chronological sequence, as they would need to be negotiated with the employee. The steps for consideration are identified and agreed upon prior to embarking on eliciting the employee contract side. The prime outcome from the process is that as complete a view as possible of the employee's psychological contract has been made explicit, and all unspoken expectations voiced. The results of the analysis were broken down into a number of subsections for negotiating through between implementer and end user.

6.3.2 Questionnaire survey result implications; Training preferences

Based on the results obtained from analysis of the survey, the following were the constituents of the employee side contract with respect to training on use of the new software:

- Style of training delivery; The majority of respondents indicated a strong preference for training to be delivered on a one to one basis. Regardless of whether a strong ideal or ought focus was stated more than one third of respondents cited training on a 'one to one basis' as their most preferred choice with more than twice the number of respondents stating this as a preference above any other type of training. The second highest preference stated was for training in a small group of less than five participants.

- Timing of training delivery; More than twice the number of respondents stated a preference for training delivered a minimum of a month in advance of a system launch date. This preference was stated over intensive training a fortnight prior to system launch or training delivered in a 'need to know' format.

- Approach to redundancy of existing system; majority of respondents indicated that they strongly disagreed with the proposition that there should be a "big bang" type implementation where the old system is made redundant at a fixed time and date and there is full reliance on the new software. When the question was posed in an alternative format and gave the option of both systems should be run in tandem while the new system is proved, responses were significantly positively skewed towards strongly agree and agree response types.

- Timing of involvement in system development. This question requested respondents to respond with their strength of preference to the question "I would like to be involved with the system from the very start" Irrespective of regulatory focus The results obtained were less distinct than expected in that there was still a significant proportion that were neutral or in disagreement with being involved from inception of a system. 15% disagreed or strongly disagreed and 18.5% were neutral.

- Level of understanding required about the system in its entirety; Responses across gender, age and regulatory focus indicated majority of respondents preference strength for this was strongly agree and agree (in excess of 80%)

- Significance of ability to choose type of training; responses to this question were more polarised in that majority of responses for this option were 'neutral' (33%), indicating that there was a degree of ambivalence about the relative importance of being able to choose training although the remainder of results were skewed towards agree and strongly agree, neutral was still the mean response. A comparatively small percentage responded in the negative (14%)

- That the company has considered how roles will change as a result of the new software; Results to this were decisive irrespective of age, gender position or focus over 80% of respondents fell into the strongly agree/agree categories and 10% in neutral indicating that this belief was strongly held across the board. A result this strong indicated that this may be taken as one of the first areas for negotiation within the remit of the contract by means of assessing with the employee how their role and expectations about means to achieve those goals are met.

- Employee's attached significance to feeling their opinions with respect to the system have been listened to; Responses again indicated that this was a significant factor in relation to how an employee felt with respect to a system, although less strongly skewed than the company ensuring how the employee's role would change, 78% agreed or strongly agreed that this statement was significant to them. This implies a process of at a minimum being 'listened to' is key and more strongly so than the opportunity to negotiate. The response

to both this and the previous question prove that a foundation for negotiation is critical in employees expectations.

6.3.3 QUESTIONNAIRE SURVEY RESULTS; ACKNOWLEGEMENT PREFERENCES.

Based on the results obtained from analysis of the survey the following were the constituents of the employee side contract with respect to training on use of the new software package.;

- Preference rating for tacit benefit accrued as a result of role played in system implementation; This question listed a number of benefit options and requested respondents to fill in descending order of preference their chosen means of remuneration. Majority of respondent chosen preference was between a) the option to select type of tacit acknowledgment b) A straight monetary bonus and C) additional days off. Less preferred options in most instances included health plan benefits, pension plan benefits or token type remuneration. However the option to select a combination of preferences was not offered as a response option. Of note is the high instance of responses in the affirmative for the option to select and or negotiate own bonus. However when asked at a latter stage of the questionnaire whether they felt the company should remunerate employees for use of a new software system the prevailing response was 'no'.

- Preference rating for implicit/non remunerative acknowledgement accrued as a result of role undertaken in system implementation; This investigates what an employee's preferences were when proffered non fiduciary acknowledgement of effort input. Results indicated that acknowledgement of work done from an immediate supervisor was the favoured response type, significantly outweighing options such as allocation of more freedom or "thanks" from a senior company representative. Allocation of more responsibility was slightly negatively skewed and "mention in a company newsletter" would in fact rate as a disincentive.

- Option to negotiate type of acknowledgement; Respondents were then asked how important it was for them to be able to negotiate their preferred incentive type; Pareto analysis again indicated that similar to their response to for opportunity to negotiate

preferred type of training that the option to choose was skewed but with a neutral response being the mean. This response was in keeping with a general response from open-ended interviews that indicated discomfiture with the concept of selection of benefits or acknowledgements.

- Visibility/transparency of bonus structure; The mean of this response was on the 'agree' response and positively skewed to 'strongly agree.' Visibility of each individuals contract is thus important. Individual must feel in a position where there is opportunity to compare and review contracts.

- "I feel it is important that the company has considered my preferences" the mean of response was in 'agree' but with an equal distribution either side of the tail. The majority of remainder of the responses was split evenly between 'Strongly agree' and 'neutral'. This type of distribution is linked to the outcome that receipt of benefits or incentives for implementation of the system was not felt to be justified by many as it would have perceived use and deployment of a new system as part of their original contract of employment.

- "That the company should give incentives at their own discretion" responses predominantly centred around 'agree' however the smallest proportion of strongly agree' was recorded for any of the questions, the remainder of the data was skewed to neutral to disagree to strongly disagree. Thus indicating a possible undercurrent of rejection of arbitrary assignment of benefits. It may also be an acknowledgement of lack of perceived influence on meting of rewards irrespective of performance or position in the company.

- When asked if "its true that incentives motivate" the majority of responses congregated on 'agree' thus indicating majority of respondents felt that incentives did indeed motivate it was interesting to compare the response of this to the response of the subsequent question;

- "Incentives should not matter in use of the system" to which again majority of responses centred on agree, granted there was a significant skew towards neutral and disagree but

the mean was still ‘agree’. This yields an unusual and unexpected dichotomy. Although majority of respondents agree that incentives do motivate people they also think that they should not matter in use of the system. This is a phenomenon which will be revisited in the discussion.

- “How good the software is would be key in whether the system is used” Over 90% of respondents were in agreement with this statement. This would indicate that perceived efficacy of the software as proposed by the TAM model is critical in whether there is belief in the system. It is posited that this is a prerequisite to commitment to using and adopting a system. Lack of this feature however does not necessarily preclude adoption and use of the software.

6.3.4 State body organisation interviews (Case Study)

This research was conducted by the author in a state run organisation. Questions as sequenced below were used to structure the interviews. Key comments and phrases were recorded manually as recording devices were not permitted and the organisation has also requested full anonymity and confidentiality. Responses as they relate to the psychological contract dimensions for the employee are listed.

In response to ‘Is there a way you would like the organisation to acknowledge the effort you had put into learning and using the system?’ the response across the board was most notably in the negative. The respondents felt that learning and using a new system was part of their original expectation set of the job and thus did not merit any additional remuneration. Unless the respondent had shown particular effort with respect to using a system in such a way that provided a result outside of the original remit of the system. With respect to negotiation of individual contracts however, uniformity of response is critical, particularly in the area of remuneration or reward. If the predominant feeling is that extra remuneration is not merited, this needs to be stated explicitly by the organisation at the outset that remuneration is not a point for negotiation.

The psychological contract is not simply made up of a dimension of positive expectations. The possibility that end users may find it easier to state expectations negatively was catered for by

asking the question “Is there something you feel the organisation could have done to better ensure the organisational success of the system” This yielded replies including comments;

- How ‘user friendly’ the system was.
- Expectations about how fast the system could respond.
- That sufficient capital on hardware had to be spent.
- Emphasis on ‘aptness’ levels for training.
- Help or reference manuals.
- Reduction of existing workload to allow time for data entry.

The question ‘Did you feel your relationship with the implementer was important when the new software was implemented”; This question was deemed not entirely relevant by respondents as responses included ‘not really, there was fifteen of us in the class’ or ‘not really, our lecturers kept changing’ although in this instance training had been conducted in large groups it negated the relevance of the question in this instance, it must be kept in mind that the relationship with the implementer may have a significant bearing in a one to one training scenario and is a point for future research.

The remainder of questions looked at asking respondents directly how having their expectations missed met affected their felt level of commitment to using the system.

6.3.5 Employee Contract side; interviews; short format

In five of the corporations who participated in the survey, two employees were requested in addition to participate in short (between five and fifteen minute) interview. Participants from Halifax, Shannon Aerospace, University of Limerick, Analog and Technomen Solutions were interviewed and sessions were structured using open questions.

“How would you like the company to acknowledge the effort you put into learning and using the system”. Responses from these companies were similar to responses from the state run body

in that majority of respondents felt that monetary or benefit in kind incentives were not a part of the employee expectation set when it came to new software implementations. Typical responses included "Doesn't merit reward as such as long as workload is distributed evenly" and "wouldn't expect the company to acknowledge – part of business". Thus verifying that merit, incentives and rewards are not a part of the employee's psychological contract for software.

Responses to "What is the best thing the company could do to ensure an MIS system was successful" (Contract makers) were particularly apt and elicited the following range;

"Management commitment is key, ensuring enough time and resources are allocated"

"Ensuring the software is relevant and actually does what its supposed to"

"Get input from the staff who would be using it, chance to use in test environment"

"Proper strategy for rolling out the system and ensuring sufficient training, doing a post hoc review"

"To have researched the requirements really well and ensure proper training, tell people importance and get them on board"

"Software has to match what the user is looking for, software has to match what we do"

"Test the system on a smaller scale and install in stages, training very important"

"User participation in development, detailed requirements gathering"

The challenge for the system implementer using the psychological contract is to ensure means to capture the range and meaningfulness of the responses for that individual.

Responses to this question phrased in the negative " What is the biggest mistake the company could make in implementing an MIS"(contract breakers) system yielded;

"Poor initial training, not letting people understand reason for system, insufficient time"

"listening to 'bumph' from salespeople, not properly researching package, not understanding how the system will or won't benefit the company, knowing its not a panacea"

"Not having induction/good training"

"Poor communication to users and not telling people what Its for"

"Poor strategy, lack of implementation planning, if replacing an old system overlap or run in tandem, ease people into new system gently"

"Not consulting people and not testing the system properly before roll out"

"Not taking into account needs of end user, insufficient training"

"Management not committing to the system, wrong software selection"

Again, variation in responses and language used to elucidate strength of emotive feel to the suggestion indicate how critical it is for a sufficiently flexible framework that is comprehensive enough to capture the positive and negative expectation list from each individual employee.

6.3.6 RESULT SYNOPSIS AND METHODOLOGY REVIEW.

The remaining task to construct a technique for eliciting the end users side of the psychological contract is to derive the above results into a tool that can be used by any individual in MIS implementation. The below is the composite framework

"That the company has considered how my role will change" This is listed as the first step in the sequence of steps to eliciting the end users contract as it yielded the most strongly positive response. A proposed methodology to understand how the employee's role will change would include in addition to the task technology fit characteristics described in 6.2.1;

Discussing with the end user their existing body of work and tasks that require completion during the working day/week/month.

List the functions that currently require them to interact with software.

List current benefits and drawbacks to existing methods of achieving set goals using current methods.

Under the assumption that the system has been developed and is at pre-implementation stage the net effect that the implementation will have for the employee is assessed. Provisional headings such as change in nature, timing, sequence, communication requirements and span of tasks can be assessed.

Allocation of sufficient resources for both time to negotiate the contract, for training and finally for increased or changed workload.

The second overall heading was "I felt it was important that my opinion had been listened to" If the first step is adhered to and a full analysis of current task roles and requirements is completed this would contribute significantly to achieving the objective that the end user felt that they had a meaningful contribution with respect to how system was going to interact with their specific requirements. In practice this could be achieved by a) Implementer training in "listening skills" and training in recording of user requirements and expectations and b) Use of open-ended questions to guide process and to refer back to when reiterating and confirming final list of expectations.

The third subheading of "Understanding of what is expected of me" The responses which fell into this classification included statements such as "excellent communication", that "sufficient training" was provided and suited to the end user. Methods of addressing this requirement include;

a) Meaningful regular communication to end users about purpose and progress of system design and implementation.

b) Ensuring that there is a source of access for the end user should any concerns arise with any aspect of the implementation.

c) Completion of rigorous analysis of how the end users job content will change as a consequence of the software.

The fourth and final subheading may be entitled as perceived or felt equity. Included under this were stated expectations such as desiring the option of being able to select from a set list of training and incentives, transparency of bonus structure and facility to negotiate. This may be facilitated by;

a) Providing options for type of training, so that the individual can choose what kind of support and teaching they feel is most beneficial for them.

b) Ensuring that if an incentive or bonus scheme is made available that the benefits are divided in such a way that is equitable.

c) That the terms open for the negotiation of each part of the contract are open and accessible to all system end users.

These four criteria headings are the results of the research and capture the main aspects for negotiation of the end users psychological contract.

6.4 ORGANISATION CONTRACT SIDE

6.4.1 PERFORMANCE MEASUREMENT

In order for a contract to be negotiated the organisation must be cognisant of the fact that it also has a contract in terms of what is expected from the employee. For any instance of a software implementation, it is unlikely that expected levels of commitment from the end user for an MIS implementation is explicitly stated in any employment contract but the employer will still have, at a minimum, a loosely defined set of expectations. Having determined a method for eliciting the employee's psychological contract, the task remains to attempt to understand what the process of eliciting the organisations' side of the contract may be and who/what represents this in negotiations with the employee. Research to date has predominantly focused on employee views and has neglected the organisational perspective and the management of the psychological contract (Guest, 2002). By consequence, there is also a dearth of research on any means by which this can be achieved for the organisation. (Ashforth, 1989, Dutton, 1994), all state that 'Effective top down communication and use of multiple channels of communication are likely to increase organisational identification with positive consequences for organisational commitment and cooperative behaviour' and that by

implication ‘the process of communicating the contract was as important as the contract itself’. Thus the organisation must attempt care in communication of the contract, this point is corroborated by evidence that sophisticated HR practices that appear in the high performance literature such as contingent pay and reward schemes, performance management and appraisal are in fact different from those HR practices valued by employees, which include communication and facility for work-life balance (Conway, 2008). Yet there is no generally accepted model for communication type or indeed contract contents for either employee or organisation.

It is posited that a possible means for the organisation to comprehensively draw out what its own contract is, is to match the expected contribution that the system will make to the organisations key performance indicators to what their contract with each individual employee is. Stiles (Stiles, 1997) states that ‘to ensure that the performance of employees is aligned with the needs of the business, individuals objectives should be derived from the organisations strategy and, where appropriate, the departmental strategy.’ That performance measures must be linked by some means to the organisations strategy is a point well reinforced by the literature (Kaplan, 1992, Hudson, 2001, Neely, 1999, Mills, 2000, Wilson, 2006). Performance measurement may be defined as ‘the use of performance measurement information to effect positive change in organisational culture, systems and processes, be helping to set agreed upon performance goals, allocating and prioritising resources, informing managers to either confirm or change current policy or programme directions to meet these goals and sharing results of performance in pursuing these goals’ (Amaratunga, 2002). Thus the basis of using the organisational goals to link back in some way to what the expectations of the end users interaction with the system is.

The use of performance measures has become topical of late for a number of reasons. Reasons for this increased focus on performance as defined by Neely (1999) which may be applicable to a firm implementing an IS system may be due to the changing nature of work, increasing competition, changing external demands, the power of IT and changing organisational roles and that many organisations seek to differentiate themselves based on either their quality of service, flexibility, customisation, innovation and rapid response’. Further reasoning for the topicality of performance measurement is provided by Neely (Neely, 2002) indicating that;

1) It is no longer acceptable for organisations to focus solely on the needs of one or two their stakeholders if they wish to survive.

2) An organisations strategies, processes and capabilities need to be aligned and integrated with one another if the organisation is to be best positioned to deliver real value to its customers.

3) Organisations and their stakeholders have to recognise that their relationships are reciprocal, stakeholders have to contribute as well as expect.

Thus use of the organisations strategy in tandem with any other pre-defined outcomes that the organisation hope to achieve from the implementation are the foundation of the enterprises psychological contract. Key performance indicators are the means by which the success of the chosen strategy may be managed. For this method of constructing the organisations psychological contract, it is critical that there is alignment between the key performance indicators as chosen by the firm and the reasoning behind development and installation of an MIS. Thus characteristics of a performance measurement system must be understood and incorporated into any MIS implementation.

6.4.2 THE FINALISED ORGANISATION CONTRACT SIDE.

Given the prior discussion on why the organisations psychological contract be derived from its key performance indicators, ergo its performance measurement system, the characteristics and elements of a performance measurement system and issue and impediments to consider prior to an implementation. The below framework describes a proposed process for the organisation to follow to ensure that their psychological contract is comprehensively defined.

a) Definition of what the key performance metrics as derived from the firms stated strategic goals. The suite of performance measures chosen are based on the selection of the key performance indicators, the following are a sample of key strategic goals and possible associated measures that are topical under this particular strategic heading.

- On time delivery of full sales order; New order production planning, overdue orders material availability, Order velocity, machine breakdown, capacity.

- Superior quality product; Rework levels, customer returns, Cost of quality, number of, Customer satisfaction, Vendor quality, yield. Supplier quality. Field returns.

- Profit; Cost of sales month to date, net revenue percentage weekly, wage cost and overtime, gross margins, gross margins per product, material costs.

b) Once the firm has determined their key performance metrics for that particular period of time, the requirement is then to list the factors that are deemed to impact the overall metric, regardless of whether this impact is positive or negative. This list is then used as the basis for the organisations psychological contract.

c) The next step in the sequence for the organisation is as a result of agreed negotiation with the employee, to set goals associated with the subset of metrics. If the functions or tasks that are completed by the employee are not linked to the key performance indicators in a way they feel that they can influence by their work contribution, then this may indicate that more functional alignment between strategy and operational tasks is required in the organisation. Measures must be found which assist the organisation in positively managing goal attainment, measures that employees feel that they can directly impact. Otherwise, the contract is not based on an equal footing, as both parties require 'coming to the table' with both needs and contributions.

d) Once the set of performance measures is defined, how the end user can affect these measures by their interaction with the new system is explored and goals which are "Specific, Meaningful/Measurable, Attainable, Realistic and Time bound/Trackable" (Rubin, 2002, Locke, 1990) are discussed. This stage of the process segues into the negotiation of how the end users overall work experience is affected by the implementation of the software so the goals that are in context. The organisation understands the impact the system will have on the end user but also that the end user is fully aware of what the organisations expectations from implementing the system are. By this systematic means of ensuring both contracts are as fully developed as possible, Common expectations and goals can be immediately identified and set the basis for discussion where there is misalignment in desired outcomes.

e) Ancillary benefits accrued as a result of system implementation. Any other benefits as a result of the organisation replacing the old system or simply installing a completely new system that are not necessarily measurable or linked to key performance metrics. This may be improved ease of use, a faster learning curve, increased transparency of results, improved communication etc. While it is important that these are stated and made explicit, they must not pre-empt the importance of linking the installation of the software with medium to long term strategic goals to ensure long term success of the system.

f) Post Implementation Review on completion of MIS install. This is a critical step in the Organisational contract process. A key distinction of successful performance measurement is that not only clear but realistic goals. To allow setting of agreed goals that are achievable, it is critical that the organisation has an accurate measure of the current organisational performance at the point in time the goals are being set. To measure progress against the set measures requires regular review and addressing of variances to determine what adaptations are needed.

6.5 NEGOTIATION TO OUTCOMES

Recommendations for negotiation styles and methods are necessarily outside of the remit of the research, however the proposed method of eliciting both sides of the psychological contract and expectations which are common but potentially more critical to the success of any implementation, identification of areas where there are discrepancies between expectation sets. These points for negotiation can then be listed as key discussion areas to negotiate and agree upon prior to project implementation. These discussion points must also be listed in order of priority for each party and each point discussed to ensure balance and equality of position in the negotiation process. With respect to selection of training and remuneration as explored by the research instrument and interviews, an organisation may not be in a position to individually amend either of these factors to tailor individual needs but if this is not possible, the organisation must be explicit about what can be changed and negotiated with respect to balancing discussions concerning implementation.

6.5.1 NEGOTIATION: THE END USERS PSYCHOLOGICAL CONTRACT;

It is incumbent on employers to ensure that the end user not only is facilitated in making their psychological contract as explicit as is reasonable and comfortable for the end user but also that the end user is aware that this defining of their own contract is in fact the first stage in a two stage process. The second stage for the end user is the understanding that they are in a position where they are encouraged to negotiate with the organisation for the outcomes that they would find ideal and engaging with the organisation to find a shared ideal outcome. It is critical that the employee understands the reasoning for the implementation and use of psychological contract to avoid simple acquiescence or superficiality in commitment. The process of defining the contract and negotiating to its outcomes are not designed to be prescriptive but it is proposed that the proposed outline can be amended to suit a range of industrial settings.

- Define existing body of work and tasks.
- List the functions that currently require them to interact with software.
- List the functions that they can complete independently of the software.
- List current benefits and drawbacks to using existing methods.
- The total effect that the implementation will have upon the employee is assessed. Provisional headings such as change in nature, timing, sequence, communication requirements and span of tasks can be assessed.
- Resources for both time to negotiate the contract, for training and finally for increased or changed workload.

6.5.2 NEGOTIATION: THE ORGANISATIONS PSYCHOLOGICAL CONTRACT.

As it is the organisation seeking to bring about the change in the employment relations, they are the party requesting the negotiation. A consequence of this is that they are in the position of first presenting their side of the contract after training in the contract process has been undertaken and completed. The organisations contract will change depending on the situation they are placed in by

business requirements but the fundamental framework of ensuring the firms goals are clearly and comprehensively identified remains the same. To summarise, the firms means of constructing a contract;

- Clear Definition of the firms' key strategic objectives.
- Deriving of key performance metric from strategic goals
- Means by which the end user affects the metric by virtue of system interaction.
- Set goals associated with each performance measure that feed the overall metric.
- Any other benefits the firm expects to realise as a result of the system.

6.5.3 GAP ANALSYSIS

The final stage in the process of using the psychological contract to implement new software is to identify by a process of iteration where:

- There are discrepancies between the organisations contract/expectations and the employees assessment of what is fair and reasonable to expect. These are then listed in order of priority by the organisation.
- There are discrepancies between the employees contract/expectations and the organisations assessment of what is deemed fair and reasonable. The employee then lists these discrepancies in order of importance.
- As the organisation is the party requesting the change the employees concerns are dealt with first and resolution agreed. At this stage the organisation addresses their issues.
- At a very minimum an outline plan of both the employees and the organisations contract are kept by both parties if a formal approach of implementation of the

contract is adopted. If there are variances or points that require negotiation then a brief record of what point was and resolution reached.

- The contracts are kept by both parties and reviewed on a regular basis throughout the implementation to ensure agreements are being adhered to in a way that both parties find acceptable.

- The contracts are kept and the same process revisited should any of the trigger points for negotiation arise.

- A full post implementation review is conducted including organisation, implementer and end user to review the process and identify where improvements to the process could be incorporated.

6.5.4 MODEL FOR MERGING OF CONTRACTS

Having defined the process by which both sets of contracts are arrived at, it remains to place both procedures in a framework that can be referenced by both parties. Each party will still need to understand the process by which the others contract is arrived at. This is a preliminary model and is represented in Figure 68. Included at the beginning is training in the process of psychological contract development for both employee and organisation. The diagram is also represented as coming together at the start of the process, diverging during the contract development and converging again for the negotiation of variances in expectations. Also incorporated is the process for reviewing of the respective contracts based on both time and triggers for renegotiation as outlined in section 6_2_4. The events for triggering renegotiation of the contract are also agreed upon at the contract development stage. The final process is to merge the respective contracts into one document and for both parties to retain copies.

6.5.5 MODEL FOR PYSCHOLOGCAL CONTRACT BASED IMPLEMENTATION.

The model represented in Figure 68 is the model for merging of the employee and organisational side psychological contract.

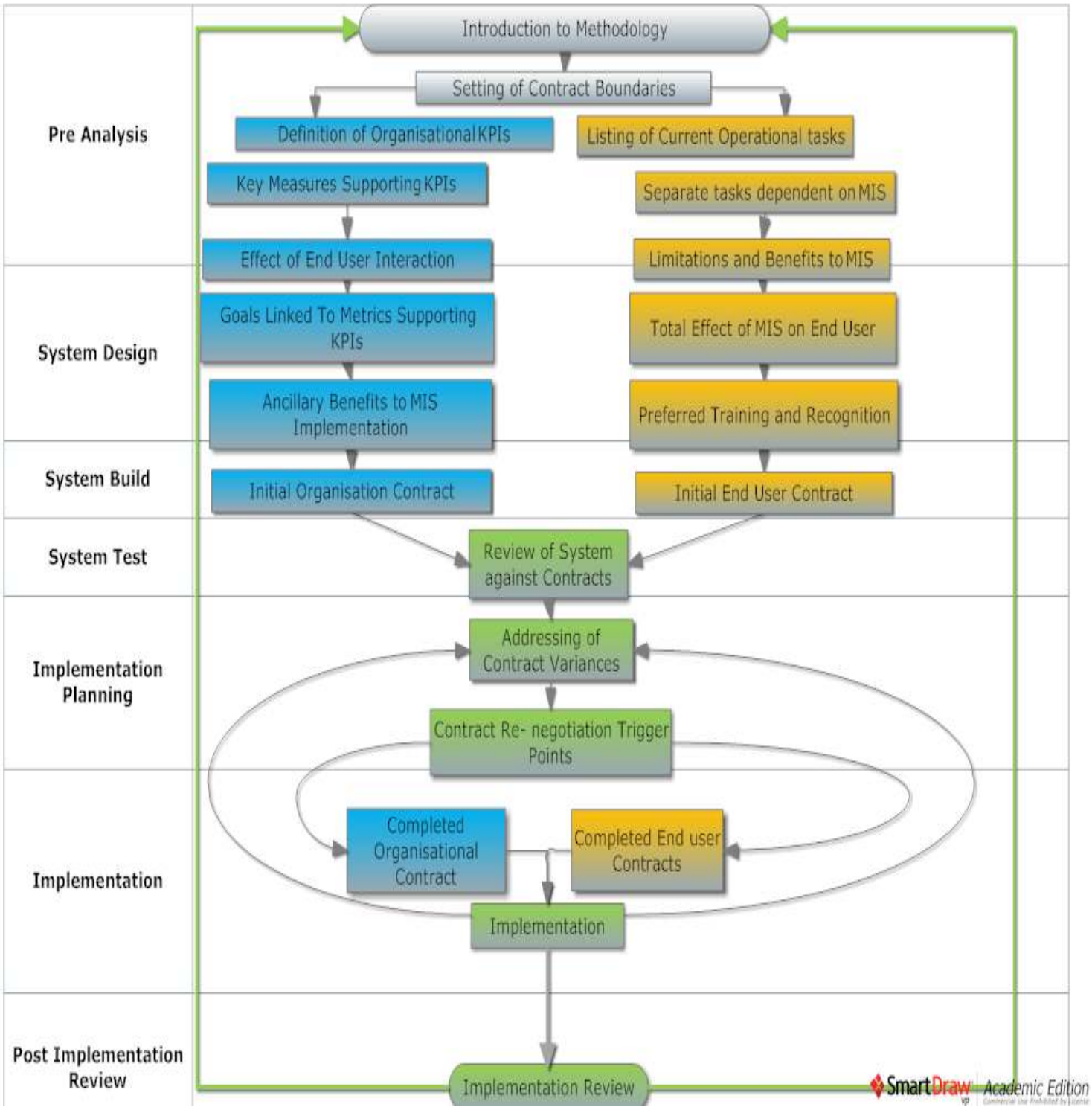


Figure 68 CSF and Psychological Contract Combined

6.6 IMPLEMENTATION AUGMENTATION: CSF'S AND CONTRACT FACTORS.

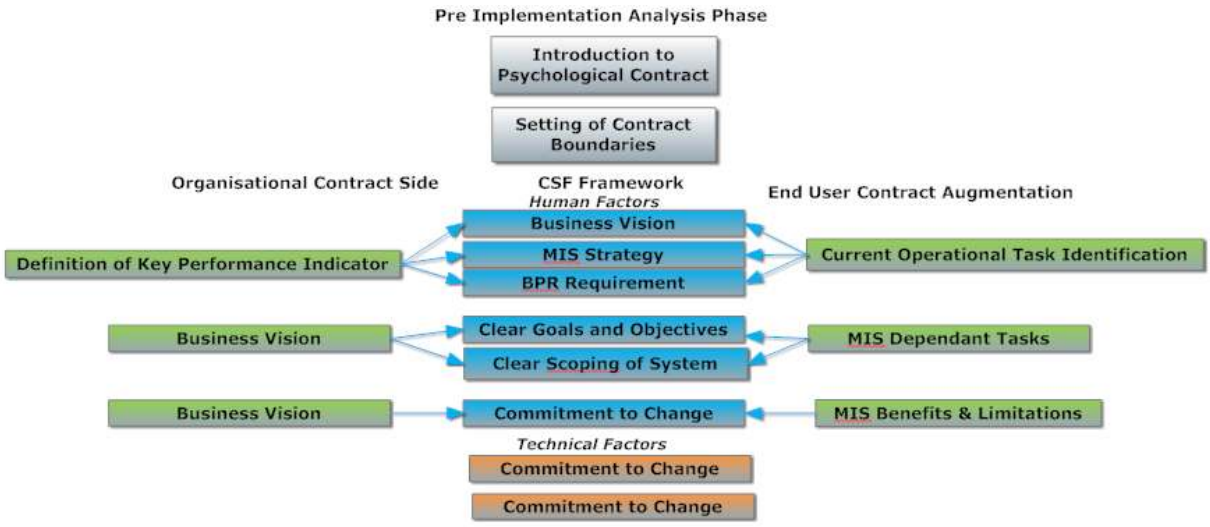


Figure 69 Implementation Pre-Analysis Phase

Assuming the organisation has conducting the initial training on developing a psychological contract with respect to its planned MIS, the first phase of augmentation of the standard implementation process as derived from Critical Success Factors involves both the End user and the organisation clearly defining at the very start of the implementation process and in as much detail as possible what organisational performance variable(s) as defined by the Business vision, MIS Strategy and/or BPR requirement are. Once the organisation is clear with respect to the KPI's they are looking to enhance and what organisational input directly and indirectly affects each of these KPI's. The subsequent task is to begin the process of understanding, documenting and prioritising the end user and individual actions that affect KPI variables. It is at this juncture that close interaction with the end users is established and that a shared understanding and agreement of what the factors influencing these variables are.

The responsibility of the end users at this stage is to clearly define what their full set of role responsibilities and then isolate those directly affected by the planned MIS. This will be a process requiring significant resources and time but one that can be conducted prior to any outlay of hardware

or development cost. One of the key differences between using simply a standard implementation process as opposed to one augmented by use of the psychological contract is a shift on the emphasis of human factors from just prior to implementation, to a solid integration of human factors at Pre analysis stage. Technical factors are included at each stage and agreement as to the level of Organisation/End user interaction required may also, if necessary, be addressed within the initial contract discussions (Figure 69)

The function of establishing the psychological contract discussions at the pre analysis phase are to allow clear and agreed understanding and mapping of the purpose of the MIS against a first hand realistic assessment of the organisations operations as viewed from both parties to the MIS discussion. If well conducted, the vast majority of issues and opportunities in relation to the system will become clear prior to progressing to the next implementation stage of System design.

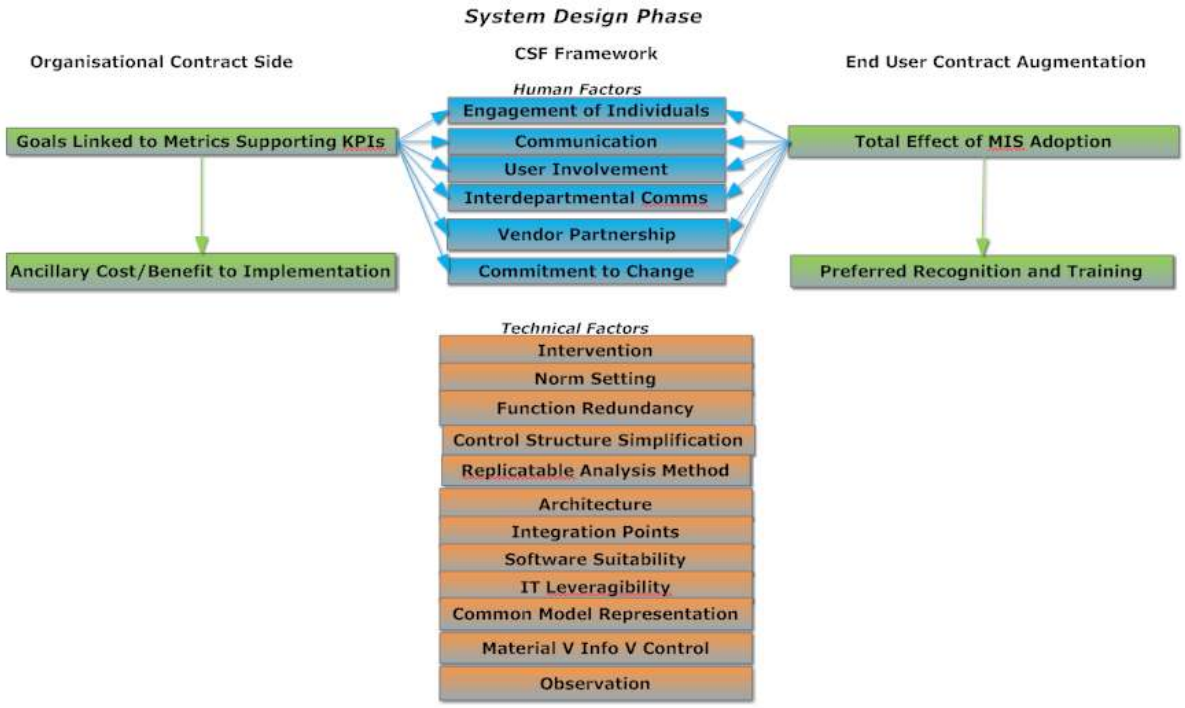


Figure 70 System Design Phase

On completion of the pre-analysis stage and when both organisation and end user are clear as to the objectives, scope and impact of the proposed MIS, The design of the system may be initiated. There are no solid contracts drawn at either pre analysis or design phase, as how the software will carry out meeting these objectives may differ considerably from end users perceptions and it is immensely difficult for end users to reasonably assess the full impact of the software until the common model representation and system mock ups are used. It is only until both organisation and end user get a shared feel for the how the MIS will operate that they can begin to sense-make with respect to understanding what their concerns and expectations are as evidenced in the Garrett case study. An MIS is usually a necessarily complex piece of software and it will take skill on behalf of the implementer to provide an amenable structure to elicit and negotiate the set of end users personal and genuine perceptions with regard to the MIS. The psychological contract provides a foundation process upon which to build the Human orientated CSF's of engagement, communication, involvement, interdepartmental communication and how the vendor partnership is established and conducted.

The technical factors involved at the design stage of the MIS are yet critical, It is at this stage that system architectures, software selection, material, information and control flows, integration points and software leveragability etc. are established. The role of the implementer is to separate out the technical facets of an implementation that will not affect the end users from those that will but maintaining openness with respect to all facets of the system as it is designed and planned to operate. The cycle of negotiating with both end users and the Organisation is an iterative one and will include the estimation of all benefits and costs to using the system as again, this will usually only become fully apparent with a solid MIS model representation. On completion and agreement of the design phase of the model, all participants to the process will be fully familiar with the system as it is planned and will have had opportunity for structured input at a number of junctures and they will have considered and chosen their preferred training and if agreed, means of recognition for additional workload required by the system. The next sequence in the implementation process is the physical build of the MIS.

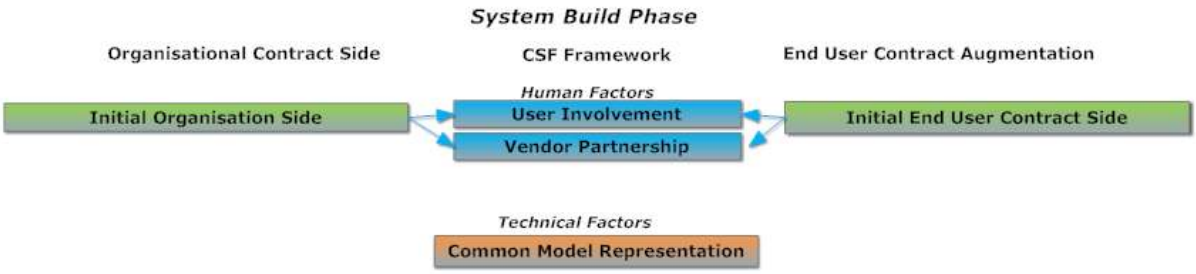


Figure 71 System Build Phase

By this juncture of the system build phase, the most significant portions of negotiating the system with end users should be completed but there must yet be an iterative process to ensure that the graphical user interfaces and background software executes its functions according to the shared understanding and objectives that should now exist between the organisation and the end users. As system functions are outlined and presented, a sufficiently real representation of the system now exists to develop the initial organisational and end user contracts. From the technical perspective the common model representation is continuously updated to reflect the changes made to the system and is openly accessible. Again, the psychological contract provides the foundation for user involvement and vendor partnership.

Use of the psychological contract by now will have provided the organisation and end user with explicit and first hand knowledge with respect to the system objectives, its operations, how it will actually run, what tasks and functions it affects and shared knowledge and agreement of set of system concerns and expectations, thereby significantly reducing the risk of a failure at system implementation due to any of these factors not having being addressed.

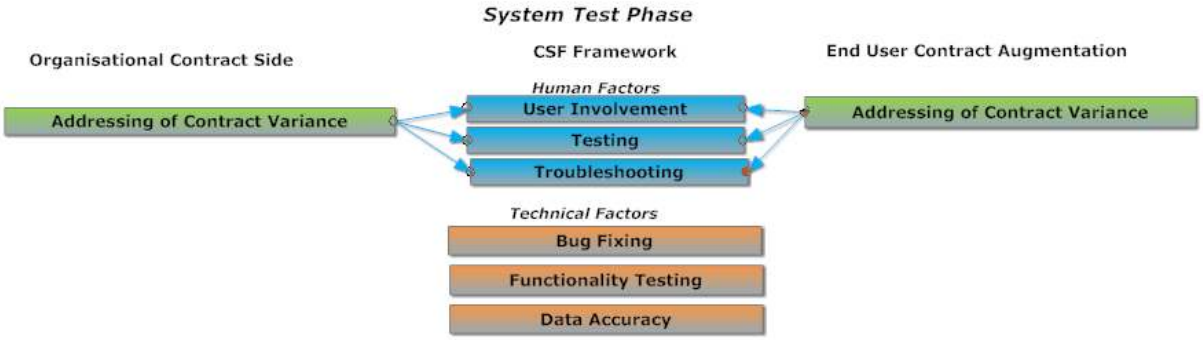


Figure 72 System Test Phase

By the test phase of the implementation, both end user and the organisation should be very familiar with much of the system. The test phase will focus on detailing the remaining variances that are left between both organisational and end user contract and the system operations. The full implementation plan is agreed as part of the contract as would have been provisionally set at the contract boundaries stage. The contract boundaries in terms of the timelines for the implementation are reviewed and agreed with the psychological contract again providing the substrate for user involvement, testing and troubleshooting. For the recommended Technical CSF's at this stage, user involvement is critical to ensuring system integrity and accuracy of output.

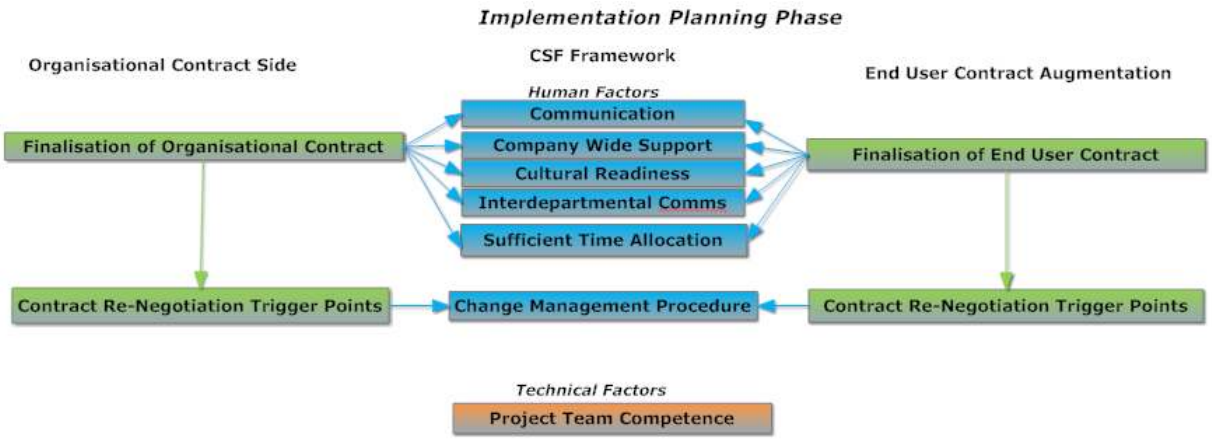


Figure 73 Implementation Planning Phase

By the implementation planning phase, all parties should be in a position to have established and iteratively reviewed their respective contracts. The critical success factors of communication, company wide support, cultural readiness, interdepartmental communication and sufficient time allocation will already be well established and secured if both organisation and end users were facilitated and supported in establishing their system expectations and concerns through the previous stages. With respect to change management, it is ideal at this stage that both parties to the MIS implementation consider what would justifiably trigger a contract re-negotiation. This is apt at this stage as opposed to earlier stages as it is only at this stage that the contract effectively becomes finalised (Figure 73)

Re-negotiation triggers may be from either end user or organisation and may be precipitated by a change in scope, organisational KPI's or imperatives of the system or changes to key personnel involved in the implementation due to a change in business requirements or functional responsibilities. Project team competence is delineated as a technical factor at this juncture as the human factors associated with the implementation will have been addressed by the contracting process and project team competence is oriented to system based issues.

Figure 74 Implementation Phase

In the standard CSF model of implementation, it is only now that the focus switches from the technical imperatives of the system to human factors by which stage, human factor risks are

considerably more difficult to address (Figure 74) The human factors recommended by CSF's of monitoring and feed to education and training will have been addressed and agreed much earlier in the augmented implementation process. What remains is simply to implement the MIS to mutually agreed times, training and KPI's.

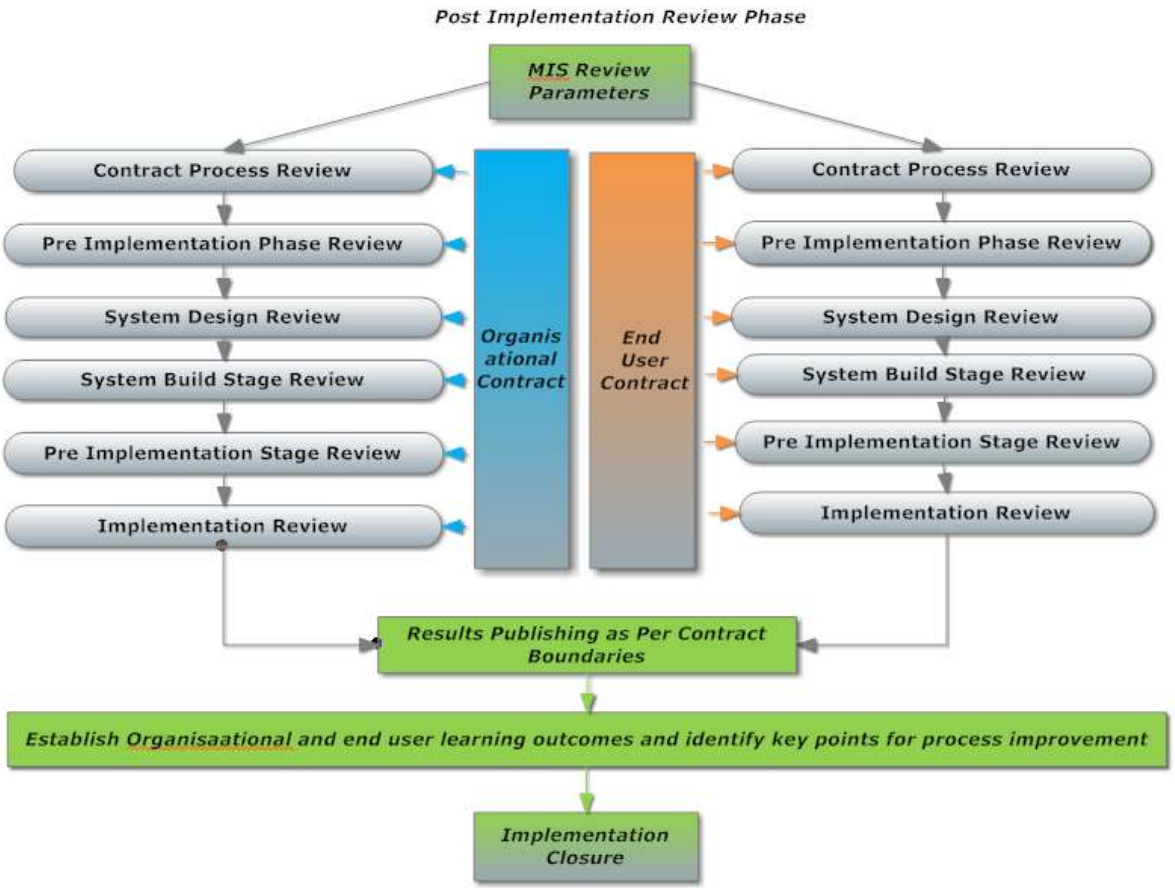


Figure 75 Post Implementation Review Phase

The Post Implementation Review (Figure 75) is the final but usually neglected aspect to the MIS implementation process. Industry reports have presented Post Implementation Reviews (PIR) as an important process in the life cycle of a systems development (Nicolau, 2004, Holland, 2001, Ross, 2000, Benchmarking, 1998). This is the final iteration of the implementation process and performs the role of reviewing the entire implementation process and determination of whether the system achieved its objectives as stated in the Pre-analysis phase. Concurrent to this review of agreed system

outputs, the psychological contract process for MIS implementation for both contract holders is reviewed.

The process of reviewing the psychological contract for the implementation is conducted in stepwise fashion beginning with reviewing of the introduction to the process of using the psychological contract itself, determining whether the contract boundaries set were well aligned to the MIS and continuing successively through each implementation stage. The questions asked for the overall MIS review are similar in nature to those of the implementation review: What mistakes were made, where improvements could be deployed, and what steps or iterations need to be added, amended or removed entirely are explored. Reviewing the implementation via the augmented psychological contract process for this allows for a meta analysis of the implementation and secondly: provides a human factor oriented platform for review not otherwise available in implementation reviews.

As each implementation is context specific, this final process step is critical to allow the organisation adapt the contract issues, boundaries and constituents so as to ensure equity for the end user and the organisation and further improve future IT or change management initiatives. The publishing of implementation results as per the contract boundaries is the final key stage in encouraging contract adherence for both parties. Conducting a PIR is key in providing a platform for organisational learning (Argyris, 1981). The explicit and shared review of performance of the implementation in comparison to the organisation and end user contracts is the closing step in ensuring completeness to engagement in MIS implantation.

6.7 MODEL VALIDATION

In order to explore the face validity of the proposed augmented model of implementation developed from the case studies, interviews and survey instrument, implementation experts from Six design and implementation organisations were interviewed (Appendix E). The participating organisations included: Sapphire Systems PLC, In2grate Software Solutions, Epicor Software Corporation, Sirius Consulting UK Ltd., Openda Limited, Integrity Software and Access UK Limited. From a research perspective, two possible interview approaches were available. The first of these was

to present the model and obtain feedback as to the relevance of the psychological contract as it applied to the distinct phases of implementation. The second approach available was to question the experts on their perspective of management of human risk factors in implementation without first presenting the augmented model. The latter approach was chosen as;

- The unbiased feedback could be subsequently compared to the model to assess whether the aspects put forward by industry practitioners were addressed.
- An open ended question based interview without presenting the model allowed for any aspects which may not have been addressed by the augmented model to emerge.
- The first hand expert perspective of human factor risks were not in any way influenced or biased by prior research or the interviewer.

The key salient observations from each interview were transcribed, first by Organisation and then by whether the points discussed fell under the category of Organisational Contract, End User Contract or Contract negotiation. The following sections investigating the organisational and end user sides of the augmented model present the condensed results of the interviews.

6.7.1 Organisational Contract supporting Statements

Each of the statements and actions summarised on the left hand side of the augmented implementation model were linked to the specific organisational issues identified by the implementation experts from the six ERP implementation firms in order to identify whether the proposed model catered for the exigencies described by the consultants. The headline sequence and tasks (with the fully described functions described in section 6.6) are linked to the interview results in section 6.7.4 – discussion of the results.

Management understand KPI's very well and the measures feeding into them but do not understand the actual processes or the 'hows' of the way these are achieved – the processes. (Openda)

The companies concerns are often solely focused on the system output but good change management is what will guarantee the system outputs can be achieved. If the change is not well managed, what

often happens is an initial successful launch of the system but in six months time, there are serious problems as people gradually find system workarounds. (In2grate)

The system champion and implementation team must be very carefully chosen, no matter how well the system is functioning and designed to meet the contract requirements, it needs people internal to the company who are dedicated and responsible for ensuring the project is a success. (Epicor)

Return on Investment is our Key performance indicator. (Epicor)

The project must be planned in a very detailed way and agreed at the outset. We encourage the organisation to ensure end users are represented at each step in the design and development process. (Epicor)

Majority of problems we've encountered in implementations can be attributed to poor planning, made up in most part by poor communication. (Saphire)

Organisations need to pick the top two or three key critical outcomes they want from the system, otherwise scope creep and complexity simply explodes and the both design and implementation becomes very difficult. (Saphire)

Too much specification early on in the project can also make it very difficult, Organisations have to be clear about what they are looking to achieve but need to allow room for negotiation as to how this is achieved. (Saphire)

The ability of the implementer/implementation team is critical, their ability to communicate and sustain the necessary relationships in order to sustain the implementation the whole way through. (Sirius)

We rely on train the trainer sessions – the organisation has to take responsibility for getting end user commitment to engage the system from very early on. (Sirius)

System functionality is not the issue. The technology and software is such that its not a barrier. (Sirius)

Communication is critical- the main problems with implementation arise from poor communication of requirements. (Integrity)

Setting of contract and project management boundaries at the very start of system inception is incredibly important – the organisation themselves need to be crystal clear about what they want the system to achieve. (Access)

Define with the company at the start how they wish to manage the system implementation. We use workshops with end users pre-system design to fully understand to map the existing processes and understand how the processes actually function. (Access)

The system has to be bespoke, trying to change the way an organisation conducts its business in order to match software is a recipe for disaster. (Access)

We conduct a post implementation review with the organisation two months post launch of the system and sign off happens only at this stage. (Access)

6.7.2 End User Contract Supporting Statements

This set of questions explored how the MIS Implementation expert viewed the mechanism by which employee engagement was supported. The end user contract statements are linked to the right hand side of the augmented implementation model in terms of the logic and

sequence of tasks necessary for individual engagement of the employee. The full description of these tasks and in how they link to supporting a platform for the end user to meaningfully engage with the system is described in Section 6.6 and how the resulting comments were congruent with the proposed model are discussed in section 6.7.4

Critical that the system flexes to mirror the way the end user conduct their role tasks. (In2grate)

Eliminating the fears and concerns of the end user has to be managed the length of the process – this requires repeated going back through system design and testing and implementation. (In2grate)

Using a windows based application very useful as users already know the fundamental workings and menus of windows packages – the system 'how to's'. (In2grate)

The ability for end users to be able to personalise the interface that they use makes a big difference later in the system – the background workings are the same but the end user can choose how they want the system to look. (In2grate)

System adoption is definitely easier when end users feel they have influence on system design and operation decisions – eliminates a lot of reasons of resistance to the system. (In2grate)

The eventual end users must be the ones to validate the system and its outputs. (Epicor)

There is a significantly better rate of adoption if introductory end user training happens prior to system design in fact – we communicate what the software functions are and how it operates and explain how the process of tailoring this to meet end user and organisational requirements is conducted. (Saphire)

The most end user interaction happens at the system build stage. (Saphire)

The vast majority of interaction with end users needs to be at the start of the process, if you are trying to involve system users pre launch, Its just too late. (Saphire)

The journey from using excel spreadsheets to using an ERP based system to conduct functions is a very long one, not from a system perspective but from an end user perspective. (Sirius)

For something like user resistance it is impossible for the implementing partner to resolve as they do not have the necessary position or organisational knowledge to fix these issues. The organisation has to take responsibility for ensuring end user commitment. (Integrity)

Have to tailor how the system and data is presented in order to ensure people are only dealing with the information that they need to know ,otherwise they get scared. (Access)

Next significant interaction with the end user is at system test stage, on verification that the system is sound, we then conduct end user training workshops and train the trainer sessions dependent on the size of the implementation. (Access)

6.7.3 CONTRACT NEGOTIATION SUPPORTING STATEMENTS

This section of the interviews focused on eliciting whether the MIS implementation experts supported the process of negotiation of the psychological between the organisaiton and the end user and to what extent they felt this supported engagement in the system. The augmented model proposes that iterative interaction between the organisation and the end user is critical. Open ended questions were again used to explore in an unbiased manner the externt to which the consultants viewed this as a substantial element in the eventual success of the system. The below are the condensed responses from each of the implementation experts;

Need to spend a lot of time with end users – this takes a lot of going back and forth. (Openda)

A lot of handholding is required during the process. (Openda)

A different set of understandings have to be negotiated for the end user and for the organisation – successful implementation requires careful management of both from first engagement with the implementing partner through to the post implementation review. (Openda)

Critical that you get into the 'shoes' of the organisation and understand the existing current operations and culture of the organisation <u>and</u> of the end user. (In2grate)

Immensely difficult to scope at the start of the process how long it actually takes to well understand the organisation but if this is not well accomplished problems will continuously arise during the implementation. (In2grate)

Huge problems arise when the contract setting team is not the implementation team – a whole new set of relationships have to be rebuilt to ensure system progression and shared understanding. (In2grate)

It's an iterative process and takes a lot of going back and forth between what was agreed and how it gets done. (Epicor)

Critical that there are representatives from all key end user groups who are in a position to well represent the functions they are standing in for. If the implementation is large, it is not possible to cater to every end user requirement, the system can't be all things to all people but people still need to know that fundamental operational concerns have been addressed. (Saphire)

Information management in terms of not overwhelming with data is also critical, you need to be careful to tailor and present information that is pertinent to the end user at the time – there are a lot of levels of abstraction that have to be negotiated. (Saphire)

Relationship building has to happen from the very start. (Saphire)

Human factors in an implementation are the most difficult aspect to get right. (Sirius)

Sirius have an acknowledged superb front end for scheduling which we have been successful at implementing in every manufacturing company we've been to, but in over 300 implementations only a handful of organisations use this front end. The instances where it has been used it has been very

successful but companies underestimate how much work with end users is required to accomplish this. (Sirius)

If not well managed (underanding between organisation and end user) you can guarantee that people will wait until just pre launch to start objecting to the system and try to derail the system. (Sirius)

Key distinguishing characteristic for Sirius in winning contracts is track record in the implementation and change management surrounding the system which is agreed at the system contracting stage. (Sirius)

An able communicator who is knowledgeable about the company operations and has the ability to work well with both management and the end users is fundamental - no amount of train the trainer sessions or support from the implementing partners can substitute for this. (Integrity)

Constant revisiting of contract with the organisation is necessary. (Access)

There is an iterative process between us and the end users to ensure all the detail concerning transaction processing and reporting is correctly documented. (Access)

Once the system templates from the current transactions are developed we return to the end users to validate the structure and functionality of the design. We revisit the contract set out with the organisation at this stage to ensure there is still alignment between the system requirements as set out by the organisation and the design provided by us. (Access)

The negotiation process between the reasons the organisation has chosen to put the system in place and how these get put in place operationally has to be carefully planned and executed. (Openda)

6.7.4 VALIDATION REVIEW.

Aspects of the organisational side of the model which were reinforced and supported through the interviews were the criticality of clear objectives, early, consistent and quality communication, planning and change management. The only aspect of the augmented model not explicitly supported was identification of the ancillary benefits step as part of the system design phase.

With respect to the end user contract statements, the steps supported were criticality of inclusion of the end user from the very first steps of the process, the importance of users participating and being able to influence how they interact with the system and that the software and implementer have sufficient flex to address the needed changes.

The iterative negotiation aspects of an implementation were universally supported and reinforced through each of the interviews conducted with each expert. The creation of a shared conception and understanding of both end user and organisational needs from the pre implementation phase to the post implementation was undisputed. The augmented model was validated as each point identified as being critical by the implementation experts was supported by the model in a way that is logical explicit, and equitable.

CHAPTER 7 DISCUSSION

7.1 INTRODUCTION

This chapter discusses the contribution of each of the research methods and domains of enquiry addressed during the course of the research. The results of the validation of the human factors identified are reviewed in the context of the final proposed methodology along with their contribution to the objectives outlined. In conclusion, unexpected results, limits to the study conducted and recommendations for future research are presented.

7.2 RETROSPECTIVE NARRATIVE CONTRIBUTION

Further avenues of exploration from the perspective of a technicist were initially limited. The use of the quality function deployment technique of 'voice of the customer' was the only individual orientated method of gleaning requirements that intuitively seemed appropriate and thus was applied in the second MIS implementation in Dell. The definition of QFD is "The ability to meet the stated and unstated needs of the customer" In this definition lay a part of the key to understanding of the failure of the first implementation. There was a set of understandings or requirements that the author had failed to be cognisant of.

This method was deployed and while the implementation was ostensibly a success, there emerged a further set of mitigating factors. After the initial pilot of the system when operations management realised that for the first time there was an opportunity to accurately record and manage the impact of production issues the author was no longer in the minority for support of the system. The project to that point could have been likened to a freight train which all of a sudden 'took off' and the author was in a position having to exert considerable resources to keep up with implementation demand. This support from management was a significant contributing factor in

ensuring the system was both used and sustained. However, a problem emerged. On comparison of use of the system on the pilot line to; a) the remainder of the lines and b) the second and third factories. There was a significant difference in the level and quality of data recorded. There was not resistance per se, but the phenomenon of rationed contribution or 'token' support. The question had moved from the first case study of "why did the system fail?" to "why the variation in exhibited levels of engagement?" The question was especially pertinent, because culture, production set-up, performance management, human resource practices, the implementer and the system were the same. The only variable in the equation was not the implementer or the end users, but the level, type and quality of engagement between the implementer and the end user. In retrospect, the realisation emerged that there had been a direct correlation to the type of relationship established and the level of system engagement.

For the third and final MIS implementation conducted by the author, the entire set of variables had again changed. A different manufacturing company, culture, systems, organisational structure, complexity of proposed system and people. This time, the implementation approach was heavily biased towards working with individual end users from system inception. However, the first learning was that a substantial amount of reasoning and understanding with the system had to be established in order to provide something for the end users to negotiate with and understand the implications from their own perspective. The first discussion round which was completely open was met with little or no useful feedback but was important nonetheless in signalling intent and establishing grounds for conversation. It was only with representation of the system in an A1 paper format that end users could begin the process of Sense making (Weick, 2005) which was the precursor for them to understand in what ways the proposed system would affect them. Feedback came much more fluidly on provision of the initial system representation. The second differentiating factor that emerged, which on reflection had also been present in the prior implementations was the adaptation required by the author dependant upon the end user.

In Garrett, Industrial relations were at particularly low ebb and introducing a new system at the same time as introduction of annualised hours was experienced as a challenge. Introducing and negotiating with end users who were union members was an order of magnitude more difficult

than working with end users who were in a supervisory or production support role. Significantly more time was required to establish meaningful dialogue and the reasons for putting the system in place in the first instance had to be absolutely congruent. Dialogue in groups was swiftly abandoned as once there was more than the implementer and the end user in dialogue, culture nearly immediately became an additional factor, one that was of little use to either party in the discussion. In the end, after a period of months of negotiating and iteratively discussing the system, the pilot was run and the system became successfully embedded in the machine cell business unit. Although the focus on establishment of quality and fairness of relationship had resulted in a successful implementation, the final piece of the conundrum was although adapting approach dependant on end user had worked, there was difficulty in comprehending the characteristic of the end user that instructed the approach adopted. On analysis, the determining factor in the approach adopted was the level of felt fear/distrust on behalf of the union members and level of felt system implications on behalf of the non union members. The subsequent challenge lay in attempting to codify the phenomenon.

7.3 CRITICAL SUCCESS FACTORS AND SOCIOTECHNICAL CONTRIBUTION

The literature review in chapter three was informed in most part by the three case studies. There was an interesting phenomenon in that the premise of the first system design was based nearly entirely on the efficacy of the system and driven by the simple imperative that designing a system that met user needs was sufficient. The premise was not dissimilar to factors identified in the outline framework developed from the critical factors. The research was not in vain from the standpoint of system integrity and constituted a key part of what was to become a pre implementation framework. But what were the remainder of factors required for competent delivery of an MIS? The domain of literature for MIS implementations was delineated into multiple perspectives, business and academic reviews of critical failure and success factors including case studies from the Sociotechnical literature. This review enabled the development of the implementation framework but yet, when compared to the experience of the case studies while necessary, did not yet provide a meaningful way to implement a system. Nowhere in the reviewed

literature was a means to understand how to work with end users. The subsequent literature details the research covered in order to find a theory that suitably explained the case study experiences, one that could be codified into a methodology to implement the systems at an individual level was identified as the missing part of the literature in addressing the human risks in MIS implementation.

7.4 RESISTANCE TO CHANGE CONTRIBUTION

Resistance to change literature signalled the start of the search for a means to understand the reflected end users level of system engagement. On first foray into the literature, the sheer volume of material necessitated a structured means of navigating the domain with respect to what was applicable for an MIS. The classifications chosen were an investigation into the origins of the term, a review on the current state of the art by assessing current considerations in change research, culminating in a treatise on sources and effects of resistance to change and strategies for overcoming resistance. While a number of sources in the review made reference to obtaining engagement (Ginzberg 1981, Beer & Eisenstat 1990, Kotter & Schlesinger 1979), it was Davis (1979) and Jiang et al (2000) who looked at changing the emphasis from 'resistance to change' to 'Promotion of acceptance'. The concept of motivation and intrinsic, extrinsic and interactional means of MIS implementation were addressed in the literature, but again, not to a sufficient depth to allow understanding of how to formally deploy any of the recommended approaches. But understanding and development of the theme became clear. A significant contribution of the resistance literature was the introduction of behaviours associated with resistance under Rusbelts' (Rusbult, 1988) classification of exit, voice, loyalty and neglect. This heralded the first resonance with the experience as felt from the case study implementations and proffered a means to begin to understand the mechanism by which the phenomenon of resistance exhibited itself, or perhaps more accurately as referenced in Coch and French's study, the means to 'equilibrate the relationship' as perceived by the end user.

The chapter concludes by developing a means to equate the individual's estimation of change and associate valence of response corresponding to Rustbelt's categories. This a significant

component in understanding responses when the end users commitment had not been established, but still yet did not yield itself to understanding the other end of the continuum, how to support engagement. The side of the continuum being dealt with was not resistance, but engagement. The most promising avenues revealed through the research conducted in resistance was that of intrinsic, extrinsic and interaction theories, but these had been broached at a relatively superficial level. The subsequent literature review was devoted to exploring the domain of theories of motivation to the depth required to develop a theory from which a realistic implementation methodology could be created.

7.5 MOTIVATION THEORY CONTRIBUTION

The realm of research on Organisational behaviour and motivation theories is vast. During the course of the research it became apparent that understanding the application of these theories and developing means by which they may be developed for the context of MIS implementation is fraught. Though a means to understand the individuals has been established as critical to the success of a system, no one theory, or even combination of theories can yet account for the exigencies by unique individuals in unique circumstances. Thus, the task became to develop theory which could be adapted as far as possible for the needs of both the organisation and the end user. Theories reviewed included needs and presses, value theories, trait, personality, expectancy models, dissonance theory, organisational behaviour modification and Regulatory focus of the hedonic principle. The final theory of Regulatory focus of the hedonic principle provided the most coherent explanation for case study experience. This it was felt more than any other theory lent itself to understanding the variation in attitude and approach experienced at different levels in each of the three organisations. Given alignment of approach with positively and negatively framed outcomes, this had a high face validity when it became evident that end users at different levels of the organisation had sets of pre-existing perceptions with regard to a system and these could be segregated into a continuum ranging from positive to negative (promotion to security). This theory contributed most in explaining the adaptation in approach required by case study three.

When perceived that a negative set of precepts were in place, thus ascribed as a security focus, negotiating and discussing the system with an understanding that first there was a set of apprehensions with respect to how the system would affect them, a focus was placed on how much of existing sets of work practice would remain unaltered were key in providing a stable negotiating ground. For the end users in the organisation at a function support level, greater emphasis on how the system could facilitate, support or improve existing work practices provided the most apt discussion ground. While this theory lent a deal of insight into why adapting approaches in implementation worked, it still did not provide enough explanatory power to the full range of adaptation required to successfully negotiate the system for each individual. Why was this a process that with some individuals required a number of negotiations and with others a relatively short discussion? There was more nuance than simply promotion or security foci.

The subsequent set of theories explored to use in conjunction with regulatory focus of the psychological contract included theories under the heading of equity and those of Bandura's (1999) social cognitive theory. The main challenge with these particular theories was with their applicability for use in an industrial context. The final theory reviewed was Rousseau's psychological contract. This theory immediately and succinctly provided the means to understand at a number of levels the difference in felt levels of engagement and commitment experienced in the case studies. This theory provided an insight in to the tenets underpinning the quality and fairness of relationships established with respect to the MIS system and resultant engagement. This criterion and constructs lent insight to importance of make implicit assumptions explicit. The assumptions and expectations with respect to the system and resultant negotiation directly affected the end users engagement and were developed into the model for implementation for the third case study.

There were now two theories of motivation where grounded research evidence from the case studies indicated direct applicability for use in providing an explanatory framework. The next question to arise was if both were applicable, in what way could they be combined? What became of the psychological contract if the concept of approach and avoidance oriented end users was taken into account and how might the psychological contract of a security orientated end user differ from that of a promotion orientated end user? Before progressing further with the theory, there were two

means of validation to be conducted. The combined theory was reviewed under Furnham's (1997) criterion of parsimony, validity and coherence. The theory was finally assessed by comparison to theories reviewed under the literature and it was found that no existing motivation theory tenets were contravened by the proposed merging. Thus, the concept could proceed to a further stage of analysis whereby an instrument to test this pairing might be developed.

Prior to testing the theory a decision had to be made in respect to what external variables could affect the test result. The variables chosen were self efficacy as indicated from the resistance to change research (also TAM) and job satisfaction from established research instruments (Fields, 2002) The level of prior experience in use of software had been identified as a factor from the case studies and was also incorporated. Following this, the question as to how to test for regulatory focus of the psychological contract with respect to an MIS was approached. To select a means or variables upon which to test the theory the two traditional means by which an organisation or implementer can influence uptake of an MIS were chosen, namely training methods and reward and remuneration variables, The literature was again returned to develop a means to test for preferences in a way which regulatory focus could be elicited. The final section of the questionnaire was motivated by experiences from the case study in the means chosen to disengage from a system implementation and it was posited that this was also a function of the focus of the psychological contract for which Rusbelts classification of exit, voice, loyalty and neglect were identified as a preliminary research tool.

While there were established measures for self efficacy and job satisfaction, there were no tested measures for pairing of the regulatory focus and psychological contract in relation to an MIS this Higgins (1995) identification of the "ideal" and "ought" self measure was adapted to allow for framing of the end users focus or choice of actions in a MIS adoption context towards ideal/promotion based activities Vs ought/security focused actions. The same approach for contract violation/breach behaviour was taken and Rusbelt's (1988) questionnaire adapted for the context of MIS implementation. The research instrument was first tested locally in an Academic setting and a test deployment was carried out in Tyco Electronics, Ireland, where a number of amendments to the questionnaire were carried out based on feedback received. The instrument was amended and

deployed across thirty individual organisations. Eight interviews and a case study with an open-ended structure were also conducted in order to triangulate the results from the survey.

7.6 SURVEY REVIEW IN THE CONTEXT OF THE PROPOSED METHODOLOGY.

The demographic variables chosen for inclusion in the survey were age, gender, role, employment status, level of education, length of time in organisation and number of companies previously worked for. A preliminary data analysis revealed a normal distribution across these factors excepting education and role, out of the two hundred and eighty three respondents, one hundred and eleven were qualified to degree level and ninety eight were qualified to postgraduate level. With respect to role in the organisation, only thirty-six were in what was classified as a "production assistant" role with the remainder in a management or function support role. This was more skewed than would have been originally desired as it was felt that in an ideal situation there would have been a more even distribution across educational levels and roles and in the case studies the most significant differences experienced had been between function support/management and production assistant. Although the author had requested that an even distribution of questionnaires between these categories, to whom the survey was delivered was at the behest of the personnel function and it was not possible to gauge the spread of participants until collation of the results.

Two hundred and thirty six of the respondents were in full time employment with the remainder working under contract. Of the total number of respondents, two hundred had prior experience in having to use new software. With the preliminary analysis completed it was possible to move forward and begin analysis of the data set. As the survey instrument had been adapted from previous instruments, it was necessary to conduct a factor analysis on the questions chosen. Two questions from the promotion focus question set were omitted as they did not load sufficiently to indicate congruence of question asked to response elicited. With the factor analysis completed, it became possible to analyse the remainder of the question set for psychological contract contents, relationships between regulatory focus and training, remuneration and psychological contract breach preferences.

A number of the variables chosen revealed a similarity of response irrespective of regulatory focus or strength of focus. This indicated that there were psychological contract tenets for system implementation that stood, regardless of the focus of the end user. These variables included;

Individual/one on one system training.

Training a minimum of one month in advance of system implementation as opposed to a shorter timeframe or training on a need to know basis.

“It is important that the company consider how my role will change” uniformly strong response in the affirmative across both foci and strength of foci.

“It is important that my opinions about the system be taken into account” again a uniformly strong response in the affirmative.

Questions that yielded a less positive result or showed more variance included;

“It is important that I am included at the start of system design” and “It is important that I can negotiate the type of training I receive” This result was a surprise in that the proposition had been that both of these factors would have been a key contract constituent, but the mean of the response centred around “agree” with a significant skew towards “ neutral across both foci. This did not indicate that it was necessarily a component of the contract but was at a lesser level than the factors indicated above. It must also be kept in mind that it is extremely unusual for end users to be provided with a choice with respect to what type of training they receive and not a factor they may have previously considered prior to responding to the survey.

For reward and recognition variables, the literature indicated that these factors be split into remunerative and non-remunerative decision variables. The question of whether it was again important to be in a position to negotiate reward types was introduced and again, this did not yield expected results in that response spread was across agree with tails in both foci across agree to neutral. However when asked whether the reward meted out be “open and transparent” there was

significant strong agreement across both foci corroborating tenets of equity theory. For the purpose of eliciting a link between regulatory focus and recognition variables there was not sufficient discernible difference between choice of acknowledgement and focus to establish a relationship, however congruence of response across foci did serve to elicit that direct acknowledgement from direct supervisor along with the option to select type of bonus were definitive contract constituents.

Selection of other benefits such as pension and healthcare option yielded a relatively ambivalent response across the foci where as "mention in company newsletter" was uniformly strongly disagreed with as a means of recognition. Interestingly, from responses from the interviews and the results from the State body when asked "Do incentives play a role in motivating people to adopt and use a system" respondents uniformly responded in the positive but when asked individually they indicated that this was not necessarily a strong personal influence in whether a system was committed to. This was corroborated by the response to the question "Should incentives matter" with end users responses giving a mean distribution peaking at "neutral" with tails either side. This upheld Heaths (1999) assertion that people maintained that individuals over emphasize the effects of extrinsic motivation.

"How good the software is is key in using the system" yielded a strongly affirmative response across all foci indicating again that this was a key contract constituent. In essence for factors of training methods and implementation did not yield as much variance across the foci as originally proposed. It did serve however to indicate the tenets of the end users psychological contract for an MIS. The set of questions dealing with the contract breach behaviours of exit, voice, loyalty and neglect however did serve to elicit a variance between an "ideal" and "ought" focus but also served to indicate limits to contract breach behaviour across both foci. On reflection it is possible that value theory according to Rokeach and Bandura's social Cognitive theory may in fact moderate the effects of contract breach behaviour. Forming effective limits to behaviour responses that were uniformly strongly opposed include;

"I would find ways of stalling the implementation" and "I would look for another job in the organisation which not necessitate use of the system" in exit behaviour mode. In "Voice" mode

behaviours of “I would discuss with my supervisor”, “initiate discussion about how to resolve issues” and “I would try to find out how others felt about using the system” were uniformly positively responded to along with “ I would join in if others were complaining about the system. Voice behaviours were definitively the response of choice with respect to implementation issues.

With respect to loyalty behaviours there was distinction between foci, questions including “I would try to see if issues resolved themselves” the mean was on “disagree” with a stronger emphasis on “disagree” elicited from those with a high Ought focus. “I would continue to try and use the system” centred strongly on agree in both foci but with emphasis on strongly agree and agree for respondents with a high ought and low ideal focus. “I would refrain from complaining about the system” converged on “disagree” to “neutral” response categories across the range of foci and “If I saw a problem with the system I would mention it to someone responsible” yielded a strongly agree across the range of focus strengths.

For neglect behaviours, the majority of responses for those in a high ideal focus yielded more ambivalence about the planned behaviour if the psychological contract had been breached. All four questions such as ”If I saw a problem that could affect the system I would keep quiet about it”, “If I made an error, I wouldn’t bother fixing it”, “I would leave until the last possible instance to use a system” and “I would continue to use my own method of working” revealed a “disagree to neutral spread of responses until a high ideal focus strength where there was more ambivalence about these types of response to contract breach. As aforementioned, factors of social desirability bias in response to these types of questions must be taken into account, but also the sample population used was skewed towards third level educated functional support roles. While the results accrued did not yield strong noted preference for training and remuneration activities dependant on regulatory focus, they did elicit fundamental tenets of the role of user expectations in response to an MIS implementation which were corroborated by the results of the interviews and public body case study. It was interesting to note however that there was a small but notable variance from those exhibiting a high ideal focus for contract breach behaviours.

7.7 BUILDING THE METHODOLOGY

The function of this chapter was to synthesize the research carried out into a meaningful contract for end users and the organisation. Contract considerations as enumerated by Sels, Rousseau and McClean Parks (1993) and reviewed how the end users contract for an MIS met considerations in terms of stability, tangibility, scope, time span, contract level and exchange symmetry. Also discussed were Morrison's (1994) considerations of predictability, interdependence, psychological distance and expectations from the past. There was one critical aspect to the psychological contract, which had not been discovered within the literature, and from the case study experience this was maintenance of the psychological contract. An essential part of the process was identifying contract "re-negotiation triggers". This was any change to any aspect of the system or the implementation that could affect the end user. This is represented in the final model.

A comprehensive depiction of the requirements of the end user had been discovered, there are however at least two sides to every contract. The organisation's had yet to be explored and discussed, the literature was returned to a final time in order to develop a means to build the organisation side contract for an MIS development and implementation. Mentioned time and again in the review of critical failure and success factors was the ability of the organisation's to clearly state the outcomes looked for from an MIS implementation and that it was aligned with their strategy (Lee 2002, Reel 1999, Allen at al 2002). Following this, literature with respect to how organisations derive Key Performance Indicators from strategy was reviewed. The goal of this review was to ensure the organisation had clear and achievable strategy driven aims linked directly to outputs from the MIS. These outputs in turn were linked to the roles and responsibilities of the end user. Thus establishing two of the critical success factors; a) That outputs expected of the MIS were closely aligned with the organisations strategic orientation and b) By default the organisation had to closely consider the impact of the systems on its prospective end users. The remainder of the chapter focused on assembling the sequence of tasks required by both the organisation and the end user to successfully navigate a psychological contract for an MIS.

7.8 UNEXPECTED RESEARCH OUTCOMES

The most significant unexpected result from the research was that the effect of regulatory focus was less than what was expected from experience. This did not emerge as a factor for the constituents of the psychological contract, but did eventually emerge in contract breach behaviours. It must be remembered that direct manufacturing associates comprised a relatively small subset of the population sampled and from the case studies conducted, the greatest adaptation required in implementation approach in the three case studies was experienced between this user group and manufacturing support based roles. Regardless of role in the organisation however, the variation in perspectives that could be seen from the research interviews conducted in the organisations and the semi state body revealed the variation in perspectives, beliefs and attitudes within groups that are normally part of the key end user group.

The extent to which reward and remuneration did not form a part of the contract was also a revelation, it had been hypothesized, that despite some of the literature findings, the ability to negotiate and choose remunerative and non-remunerative rewards would have played a much more significant role in the psychological contract. Employees do in fact see adopting the use of new software and systems as part of their prescribed role in an organisation, and do not necessarily expect recompense or reward as part of organisations obligation. There is what seems to be in essence a bank of "goodwill" on behalf of employees with respect to new systems. This is a critical resource for the system implementer to be aware of and an excellent basis for the start of any system implementation. If simple tenets of the psychological contract are adhered to then this in combination with this "bank of goodwill" can provide the foundation for engaged and sustained use of a system.

The third unexpected result from the case study was the manifestation of system engagement and commitment. In the Dell case study, although there had been vocal support and acquiescence, there was by no means a direct relationship between espoused commitment and resultant engagement. In the Garrett implementation although there was much vocal dissent and a low level of espoused commitment there was in fact in high resultant engagement. The

differentiating factor between the implementations was the quality of relationship established and time spent in the early stages of system implementation. The revelation was in the unreliability of the relationship between espoused commitment and engagement. The research formally sought to develop a means to support development of an equitable means of achieving engagement as opposed to "commitment".

A fourth unexpected result from the research was the extremely high face validity of the psychological contract. It had originally been a concern that the' eureka' moment experienced by the author had been by virtue of the case study experiences but when the principle was explained during the deployment of the research instrument it was, without exception, met with high enthusiasm and invariably further information was sought as to how this manifested, how it could be used and what the remaining principles of the theory were. Intuitively and regardless of organisation or role, people very quickly understood the concept of unspoken expectations and what the effects of meeting or not meeting these expectations were. Thus, the requisite of being explicit that the process of engaging with end users psychological contract is made clear at the start of the psychological contract.

The final revelation from the research was the need for the organisation as the change instigator to establish much of the ground for negotiating the psychological contract. Before end users can meaningfully engage with the concept of a new system and understanding what their own expectation set is, they need to first engage in sense making. For this to be effective, sufficient detail about the system, its objectives, how it aligns with strategy and what the role of the end user will be needs to be clearly established. It is not of particular use to begin investigating the psychological contract without a blueprint or "map" for end users to assess the proposed system and its meaning for them. This was quickly established in Garrett when the author returned to first principles and requested feedback for what end users thought should be incorporated into an MIS. There was little or no meaningful discussion until it had been clearly established what the system was for and an outline representation of the system could be provided. In real terms, this means that not every detail of the system needs to be up for discussion. Based on case study experience, for end users to feel comfortable, a significant number of decisions will have to be made

unilaterally about the system. Understanding that there will be input desired and needed is critical but not for the system in its entirety as this can lead to overwhelm. Identifying the set of system parameters that speak to the psychological contract which are up for discussion, input and negotiation is key.

7.9 LIMITS TO THE RESEARCH.

There were two fundamental limits to the research, both by virtue of the means chosen to investigate the topic. The first of these was the use of case study narrative. The perspective of the author was the sole means through which the experience of the case studies was experienced, translated, interpreted and reflected on. A sole reporting of experience will be, by its very nature, idiosyncratic and subject to the influence of a number of factors both internal and external to the author. These were accounted for as far as possible by accounting for the environment in which each of the case studies was implemented, by maintaining the same criteria for case study analysis, stating the assumptions under which the implementations were conducted and by critically evaluating the approach taken at each step of the process. In the event of the opportunity arising for further research, the multiple perspectives obtainable from an implementation would be of significant value in both theory building and corroborating research findings.

The second limitation to the study was the use of a survey instrument which are subject to by now well known influences including social desirability bias (Oppenheim 1996) particularly apt perhaps with respect to the investigation of contract breach and violation behaviours, the phenomenon of “Consistency Motif” which is the desire to maintain a consistent line in a series of answers. Finally, the skew towards professional support roles in the survey was a factor in that the body of direct manufacturing associates represented twelve percent of respondents. Although a broad cross section of industries, both manufacturing and service, public and private bodies were polled, the fact remains that the study was restricted to a nationally conducted study. A future study would ideally incorporate a multinational perspective.

The third and final practical limitation to the research lies in a full validation of the proposed methodology. Opportunity to accomplish this would require an extremely rare set of circumstances, namely;

1) To find an organisation at the planning stage of an MIS implementation, this information in terms of company strategy is normally confidential.

2) For the company to be willing to participate in a research study of this nature.

3) For the company in question to be able to segregate two similar user groups where the proposed method could be deployed at the same time as an alternative method in order to account for as many experimental variables as possible such as time of implementation, organisational culture, complexity of the system, size of the change required to successfully implement the system etc. There is also an ethical consideration in that one control group is using what is purported to be a sub optimal implementation method.

4) In order to account for the specific skillset of the implementer and ensure there is no variation in this particular variable, the implementer would have to conduct both implementations, the labour requirement of this level of involvement may simply not be tenable for either the organisation or the implementer.

CHAPTER 8 CONCLUSION

8.1 INTRODUCTION

The concluding chapter of this thesis will address the contribution of the research from five perspectives; the domain of MIS implementation research; The methodology augmentation; practitioners of MIS implementation; the organisation deploying the system and the end user tasked with using the software. The chapter concludes with reflections on the research and recommendations for future exploration in the domain.

8.2 RESEARCH DOMAIN

The domain of MIS implementation has become a platform for many modes of inquiry. Although much of the research contribution in the domain certainly lent insight and room for consideration of many aspects of an MIS, the task of sintering out what is practicable in the area with respect to human factors is a challenging task, even for academics with relevant practical experience. The task of developing the methodology would not have been possible without the experiential evidence against which to assess the applicability of concepts from the literature domain and the case studies outcomes could not have been further explored without the support of prior research from domains not traditionally referenced for an MIS implementation. The following are the novel contributions to the research domain of MIS implementation:

- An implementation framework from pre-implementation planning to deployment that segregates the technical from the human risk factors.

- Incorporation of contributions from both business and academic sources and multiple perspectives within both domains.
- A combined experiential and empirical method of theory development for MIS implementation.
- Corroboration of existing methods of MIS architecture and software design to accurately and effectively describe and capture organisations' operations.
- Provision of a resistance to change heuristic incorporating factors of magnitude of change required and resulting resistance typology.
- Elucidation of the inability of current Sociotechnical and resistance to change literature to appropriately address human factor variables in implementations.
- Identification of theories of regulatory focus of the hedonic principle and the Psychological Contract as the most nascent method to fully elicit and negotiate the MIS expectation set.
- Combining and development of the two previously un-applied theories for MIS Implementation and review of these against alternative theories of work motivation for parsimony, validity and coherence.
- An A priori research instrument to test the tenets of regulatory focus of the psychological contract including training and remuneration preferences and contract breach behaviours as applied to an MIS implementation.
- Validation of the importance of the individual but also the organisational psychological contract in the context of an MIS project.
- Combining of experiential evidence, literature, and research instrument results to create a practitioner oriented methodology for mitigation of human risk factors in the implementation of a Manufacturing Information System.

8.3 AUGMENTED MIS IMPLEMENTATION

Within industry and academia, a number of models of implementation exist and include factors that have been well proven to contribute to the success of an implementation along with much received wisdom. It is the authors contention however, that had the first two case studies been conducted, even with the most detailed of these models and received wisdom, there still would have been little difference in the eventual outcome of these implementations. The problem is one of interpretation. Each individuals understanding of terms such as 'User Involvement', 'Knowledge Sharing or 'Cultural readiness' are so varied and individual as to be close to meaningless for a practical implementation and the science of semantics is a nebulous one relative to that of systems design. What this research has sought to accomplish is augmenting of the implementation process by more closely describing the import, sequence and negotiation of the human factors contributing to system engagement. The augmented methodology provides the basis for iteratively developing each of the phases of an implementation in such a way as to reduce the variation in this interpretation of terms between the organisation and end user. The contributions of the Augmented methodology are:

- Pre-Implementation Analysis Phase; the initiation of an organisational and end user contract process that explores the explicit and implicit objectives and considerations with respect to the planned system.

- System Design Phase; negotiation to preferred training and recognition on behalf of the end users and explicit linking of metrics supporting KPI's incorporating early user involvement in system design establishing a common universe of discourse.

- System Build Phase; continuation of user involvement and platform for vendor relationship management through development of the outline organisation and end user contracts and building of the initial contracts having provided both organisation and end user sufficient information upon which derive key considerations and expectations with respect to the MIS.

- System Test Phase; refinement of the organisation and end user contracts via addressing of contract variances from system testing and troubleshooting and incorporation of this as part of the organisations change management.

- Implementation Planning Phase; with contract deviations addressed from the system test phase, this phase of the implementation augmentation focuses on finalisation of the contracts and identification of events such as change of timelines, goals or responsibilities that will justifiably trigger contract re-negotiation from either end user or organisation and final details of the system launch are documented.

- Implementation Phase; it is at this juncture that traditional methods of IS implementation will focus on the end user, with the proposed methodology augmentation however the level of interaction by now focuses on ensuring the mutually agreed contracts are simply abided to and carried out as agreed.

- Post Implementation Review Phase; in conjunction with the post implementation review of how the MIS was planned developed and deployed, a review to how the Psychological contract negotiation process was conducted is performed. How the contract was introduced, how boundaries were established and how well each of the contracts performed in elucidating and negotiating the implicit and explicit system expectations at each stage of the implementation is reviewed in order to further both individual and organisational learning.

8.4 MIS IMPLEMENTORS

This research was conducted with practitioners to the fore. The challenges facing the person(s) responsible for an MIS implementation are many fold and diverse. Significant technical competence and deep understanding of both the organisations operations and imperatives are critical, but this is yet insufficient to mitigate the human risks of implementation failure. The role of human factors are, as evidenced by the research, an equally significant part of the requirements of a

successful implementation and the outcomes of the thesis from a practitioner perspective are outlined below:

- Identification of the criticality of human as well as the technical factors from the outset of an MIS project and delineation of the technical and human risks.
- A framework of factors to address at each stage of an MIS development and implementation project.
- Provision of a methodology to establish, negotiate and review the Psychological contract of both the individual and the organisation as it applies to an MIS through each stage from the decision point to implement an MIS to the post implementation review.
- A methodology of establishing the psychological contract that is sensitive to both the individual and the organisational requirements.
- Identification of factors to which will trigger psychological contract re-negotiation as pertinent for the introduction of an MIS.
- An augmented implementation methodology that merges the key critical requirements of the organisation and the end user.

8.5 ORGANISATION

At many points in both the literature review and in the results of both the surveys and interviews conducted was the finding that end users must have a clear understanding of what the function and purpose of the proposed MIS are. This is only possible if the organisation themselves have no ambiguity as to what their own expectations of the software are. This emerged repeatedly as a critical failure factor from the review conducted in chapter 3. An organisation is a deeply complex and multifaceted combination of objectives and needs but an MIS, if correctly used may in

fact be used to make explicit, quantify and prioritise the business requirements as they pertain to the MIS. The outcomes of the research from the organisations perspective are:

- Significantly more comprehensive and earlier understanding of the resource requirements, both technical and human required accommodating a successful MIS implementation.
- By virtue of the organisational contract, the firm will be precisely clear as to what their value judgement of system success is, and that these success criteria are aligned with corporate strategy.
- Direct linking of the organisational psychological contract to key performance indicators and that these are categorised and prioritised in order of importance and are explicit.
- Addressing of impact of system on organisation outside of KPI's identified.
- Means to iteratively review and manage the implementation in such a way that it maintains congruence of intention and outcome between organisation, implementer and end user.
- A methodology that mitigates the overall risk of an MIS implementation failure and its associated financial and organisational ramifications.
- Provision of an iteratively supported means of organisation/employee engagement and a timely departure from assessing MIS projects in terms of avoiding resistance to change.

8.6 MIS END USER

Use of the psychological contract for the MIS end user is perhaps the most significant contribution of the research. Enforced and/or ill planned or reasoned MIS implementations have left a legacy of mistrust and apprehension of employees in organisations the world over. This erosion of goodwill and perceived reason and fairness have often crippled an organisations ability to develop alacrity and creativity in response to market opportunities. Fair and meaningful opportunity for participation and negotiation in aspects of MIS systems as they are relevant to end users contributes more to the organisation and has effects lasting beyond that of the implementation for the organisation. For the end user, the specific outcomes of use of the psychological contract are:

- A methodology with proven high face validity with respect to ensuring an equitable platform for introduction of the MIS.
- Clear and unambiguous understanding of the reasons for implementation of the MIS at the outset of the project by virtue of the contract making the expectation set of the organisation fully explicit.
- Comprehension of the effects of the implementation on their role, function and responsibilities.
- The opportunity to negotiate to the aspects of the system affecting how they conduct their functional responsibilities.
- Establishment of security by clear delineation of what the organisations responsibilities are and explicit stating of what the end user needs to accomplish to meet these, but secure in the knowledge that their perspectives and contribution are key to the process being effective.
- Provision of a fair and equitable basis for negotiation.

8.7 RESEARCH REFLECTIONS.

Although it did not transpire that regulatory focus of the hedonic principle formed part of the implementation framework, the fact remains that it still provided the closest causal reasoning with which to understand the case study experiences and the way in which it was necessary to adopt implementation approach with end users. The theory is not defunct, but needs to be explored in a different context. Given further time and resources, it may be possible to develop a more sophisticated and sensitive means of exploring the role of this theory in implementations.

While use of the psychological contract is a powerful tool for negotiating implementation at the level of the organisation and the individual, it was found that when this method of attempting to elicit a psychological contract in a group format was significantly more difficult if nigh on impossible. Many more factors as may be explained perhaps by social accounts theory came into play. Eliciting the factors that influence individuals in a peer group setting is not a simple task. While individuals can usually verbalise what their fears and hopes are with respect to a system on a one to one basis, this is not something that can be effectively established in a group setting, particularly in an organisation with a strong culture with clearly established norms of behaviour, attitude and social interaction. This is not to say that there is not a means to establish a group psychological contract, one that may in fact be even more robust than establishing individual psychological contracts. The area of taking into account cultural imperatives when establishing if it is possible to effectively negotiate a group psychological contract for system implementations is an area ripe for significant further research.

The process of revisiting existing theories of motivation after pairing of regulatory focus with the psychological contract at the end of chapter four was a fascinating process. A theory that was not reviewed at the end of this chapter because it was couched in resistance to change literature, was Lewins theory of change, both the concept of “freezing, unfreezing and refreezing” and the concept of quasi stationary equilibria. When the concept of the psychological contract is applied to Lewins theory it provides a deeper insight in to the possible mechanism as to the working through of the psychological contract. If successfully elicited, at least in relation to an MIS,

negotiating the stages of the contract will mirror Lewins stages as described. The contract serves to identify both the current expectation set of the end user – establishing the current set of expectations (identifying the "set" aspects of the contract – "freezing") identifying the aspects of the system which can be discussed reviewed and amended (unfreezing) and through interaction and negotiation establishing a shared expectation set for the new system (refreezing). These "quasi stationary equilibria can be equated to the constituents of the contract between the organisation and individual.

There is much scope for applicability of the concept of implementation at the level of the individual beyond the realm of MIS implementation. The application of principles of regulatory focus and framing objectives in accordance with the focus have long been used as a coaching tool in elite sports training and the concept of the psychological contract is now beginning to be used as a tool in exploring employee performance as a consequence of adept negotiation of implicit and explicit expectations. The applicability of the concepts however extends far beyond those of MIS implementation. Introduction of change in any organisation whether it is a government, education service, hospital or care provision or non governmental organisations, whether procedural, personal or organisation wide, can benefit from the very least of understanding the principles of negotiating the change at the level of the individual. Use of such methods however will require an able and experienced practitioner and are time consuming but will, it is proposed, significantly reduce the risk of failure as a consequence of lack of engagement. The method may be particularly suited to situations where adoption and engagement of the individual have critical consequences such as in training of emergency services personnel, introduction of new medical procedures or in operation of safety critical equipment. In particular, where the eventual success or profitability of an organisation are dependent upon the full engagement of employees in the planned initiative or change.

A final reflection is the contribution of action research to this particular domain of research. The thesis would not have been possible without the opportunity at all points of the literature, to reflect and compare the theories as discovered in the research to the realm of what had been practically experienced during the case studies. The challenge was to reflect on the individual application of the theory, and to seek to find a means to sinter out the experience of the unique to a

methodology that was applicable to experience of the many. The author was uniquely privileged to be in a position to have the opportunity to reflect on three successive instances of MIS implementations. The basis on upon which all good negotiations and indeed, institutions are based, from parliamentary structures to courts of law is where there are two informed and intellectually armed parties to a discussion. The practical experience and the literature researched performed this role of the intellectually armed party to the discussion opposing for this thesis. The successive questioning and review of both theory and experience contributed significantly to the enrichment of both author perspectives and the thesis outcomes.

The study of the individual implementation of systems is not so much an act of theory, model or framework building as a process of finding means to reduce blind spots or scotosis with respect to the meaning that end users attribute, derive or foresee from the implementation of the system. Prescriptive or 'one size fits all' implementation methods by their nature will never flex to meet individual interpretations of an MIS. At this point in time, given the research and experience, there is a fine line between structuring specific, measurable, attainable and realistic goals for the organisation and negotiating these through the individual world of discourse and meaning for each end user but it is here that the fundamental key to successful implementations rest.

8.8 RECOMMENDATIONS FOR FUTURE RESEARCH

There are a number of related domains of research within the human factor side of implementation that are worthy of significant research effort. Good MIS implementers are invariably those with experience of both failure and success in implementation in more than one domain. This is a very costly and time-consuming learning curve however. Means to accelerate this novice to expert trajectory with respect to MIS is a research domain as yet unexplored.

The second recommendation is to empirically test the methodology in a full MIS development and implementation. The presentation of a case such as Dell computers where there were three separate manufacturing plants located in close proximity, with the same organisational culture, business imperatives and size requiring a the same MIS would be the ideal. Exigencies

external to the project, including project implementer would remain the same, but the means of implementation could be compared for the case where the augmented methodology was employed Vs a standard implementation. Two factors however militate against this: firstly, the rarity of such an instance; Secondly, in action research, the best concerns of the business must be to the core, it would be unethical to use a methodology which did not reduce the human risk factors for the business.

The final recommendation for future research is to explore the applicability of the methodology in alternative domains. As a means of implementation of change programs in general, augmentation of implementation methods by use of the psychological contract has much to offer. Exploration of grounds such as deployment of policy in local or national government, Introduction of educational programs, service contract negotiations all provide ripe ground for further exploration into factors that constitute and affect the shape and outcomes of the psychological contract.

SQL Programming View

C:\MSOFFICE\ACCESS\DBASE.MDB 14 April 1998
Query: BREAKDOWN BY CELL Page: 4

Properties

Date Created:	01/12/97 15:05:32	Def. Updatable:	Yes
Last Updated:	19/02/98 12:14:43	ODBC Timeout:	60
Record Locks:	No Locks	Returns Records:	Yes
Type:	Select		

SQL

```
SELECT DISTINCTROW RFM_DATA.PLANT, RFM_DATA.[DATE REPORTED], RFM_DATA.FAULT,
RFM_DATA.DOWNTIME, RFM_DATA.[TYPE OF FAULT], RFM_DATA.CELL, RFM_DATA.[MACHINE RISK
ASSESSMEN~], RFM_DATA.[OPERATOR RISK LEVEL]
FROM RFM_DATA
WHERE ((RFM_DATA.[DATE REPORTED] Between [ENTER IN START DATE ] And [ENTER IN FINISH
DATE]) AND (RFM_DATA.CELL=[ENTER IN CELL]));
```

Query Parameters

Name	Type
[ENTER IN START DATE]	Text
[ENTER IN FINISH DATE]	Text
[ENTER IN CELL]	Text

Columns

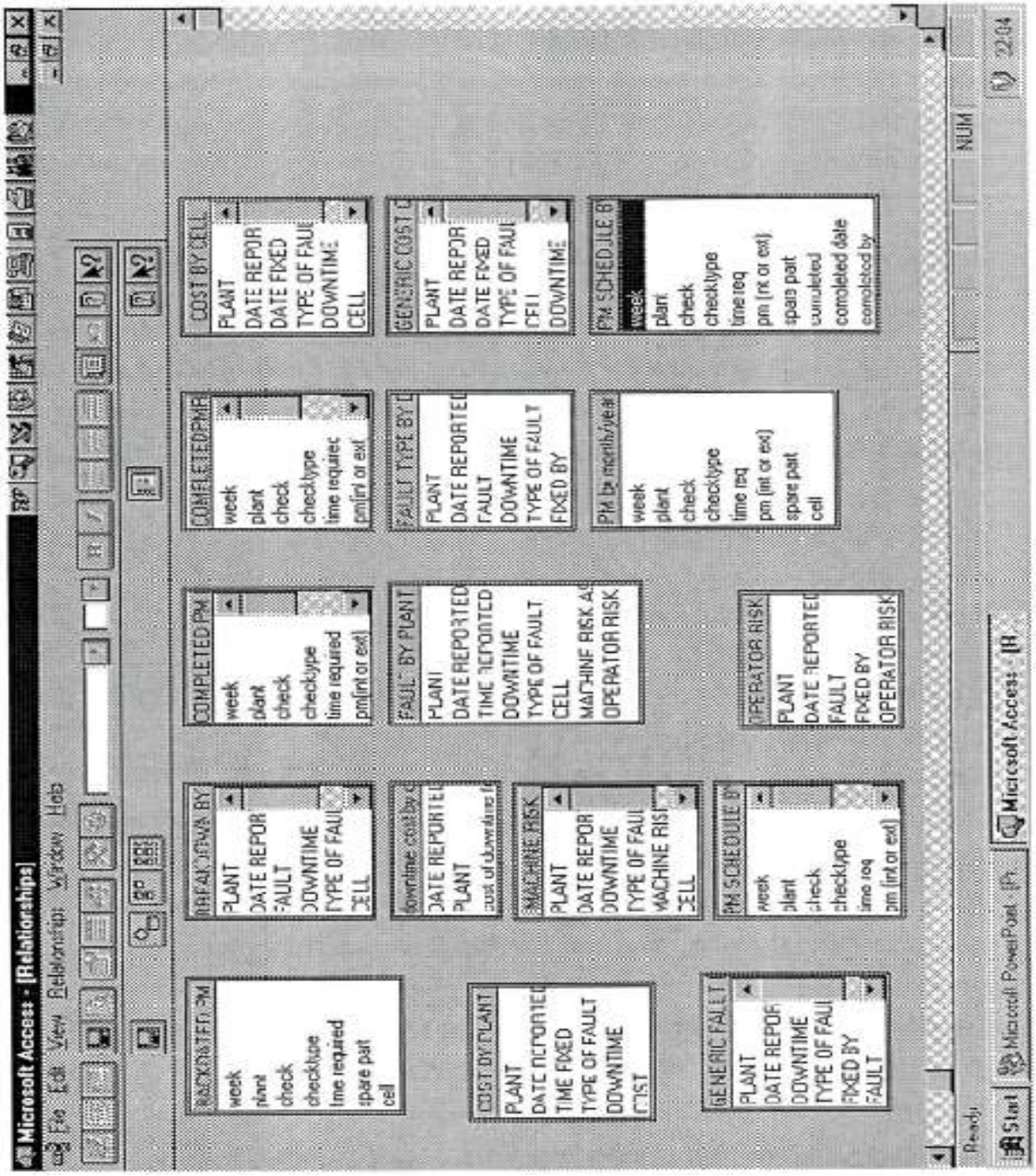
Name	Type	Size
PLANT	Text	255

Allow Zero Length:	No
Attributes:	Variable Length, Updatable
Collating Order:	General
Column Hidden:	No
Column Order:	Default
Column Width:	Default
Data Updatable:	Yes
Ordinal Position:	0
Required:	No
Source Field:	PLANT
Source Table:	RFM_DATA
Validate On Set:	No

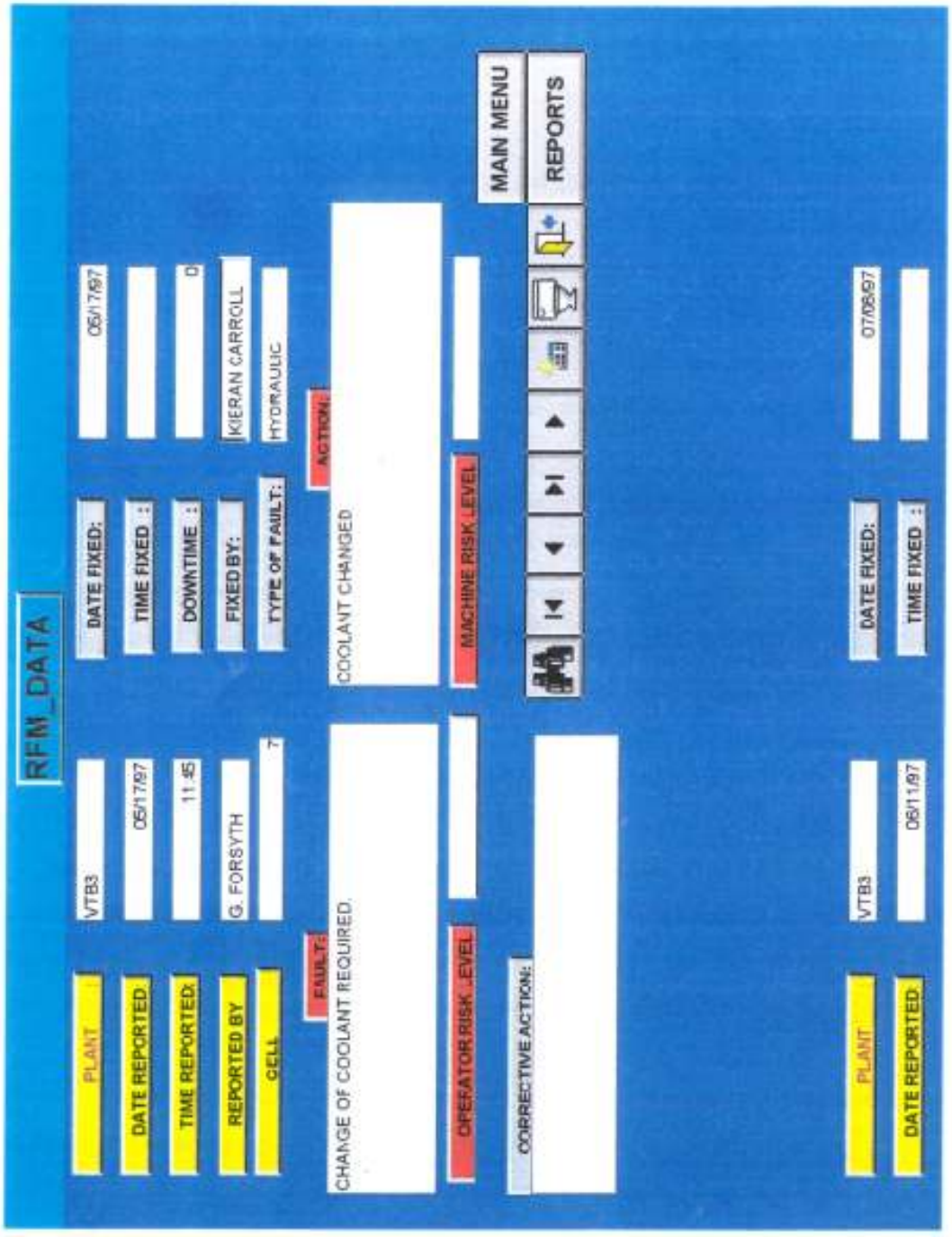
DATE REPORTED — Date/Time

Allow Zero Length:	No
Attributes:	Fixed Size, Updatable
Collating Order:	General
Column Hidden:	No
Column Order:	Default
Column Width:	Default
Data Updatable:	Yes
Format:	mm/dd/yy
Ordinal Position:	1
Required:	No
Source Field:	DATE REPORTED
Source Table:	RFM_DATA
Validate On Set:	No

Database Tables



Request For Maintenance Form



Downtime Breakdown by Plant Location

BREAKDOWN BY CELL

09-Apr-98

PLANT	DATE REPORTED	FAULT	DOWNTIM	TYPE OF FAULT	CELL
VTB3	06/11/97	BOLD IN CYCLE START BUTTON NOT WORKIN	8.2	ELECTRICAL	1
VTB3	10/20/97	HYDRAULIC OIL LEAKING FROM PIPE AT COPY	1.33	MECHANICAL	1
VTB3	09/16/97	COPIER NOT WORKING PROPERLY	0	MECHANICAL	1
VTB3	08/12/97	PROGRAM ERROR-CABLE DAMAGED	2.5	ELECTRICAL	1
VTB3	06/26/97	SHEAR PIN GONE-NO FEED ON MACHINE	0	MECHANICAL	1
VTB3	06/25/97	SHEAR PIN GONE	0.16	MECHANICAL	1
VT33	06/21/97	SHEAR PIN GONE-NO FEED ON MACHINE	1	MECHANICAL	1
ENVETER	06/15/97	CABLE TOO SHORT	0	ELECTRICAL	1
BRIDGEPCR	04/17/97	SPINDLE WILL NOT START	2	ELEC	1
PEDESTAL G	04/25/97	ELEC ON PEDESTAL GRINDER WILL NOT STAY	0	ELEC	1
PILLAR DRI	05/16/97	WIRE PLEASE ALL DRILL TO THREE PHASE SUPP	0	ELEC	1
LATHE	05/09/97	LATHE NOT OPERATIONAL	0	ELEC	1

Preventive Maintenance Schedule

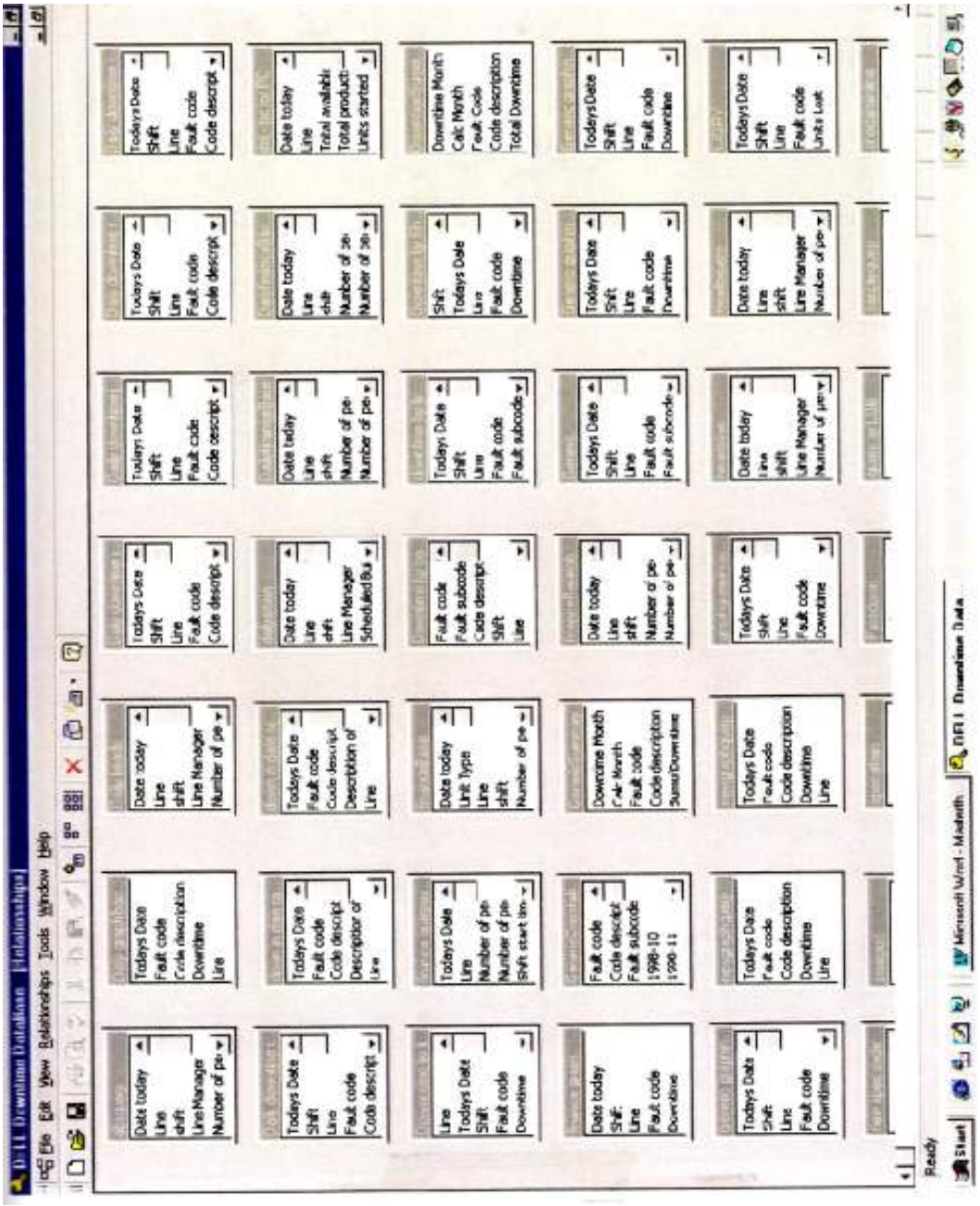
PM BY MONTH/YEAR

09-Apr-98

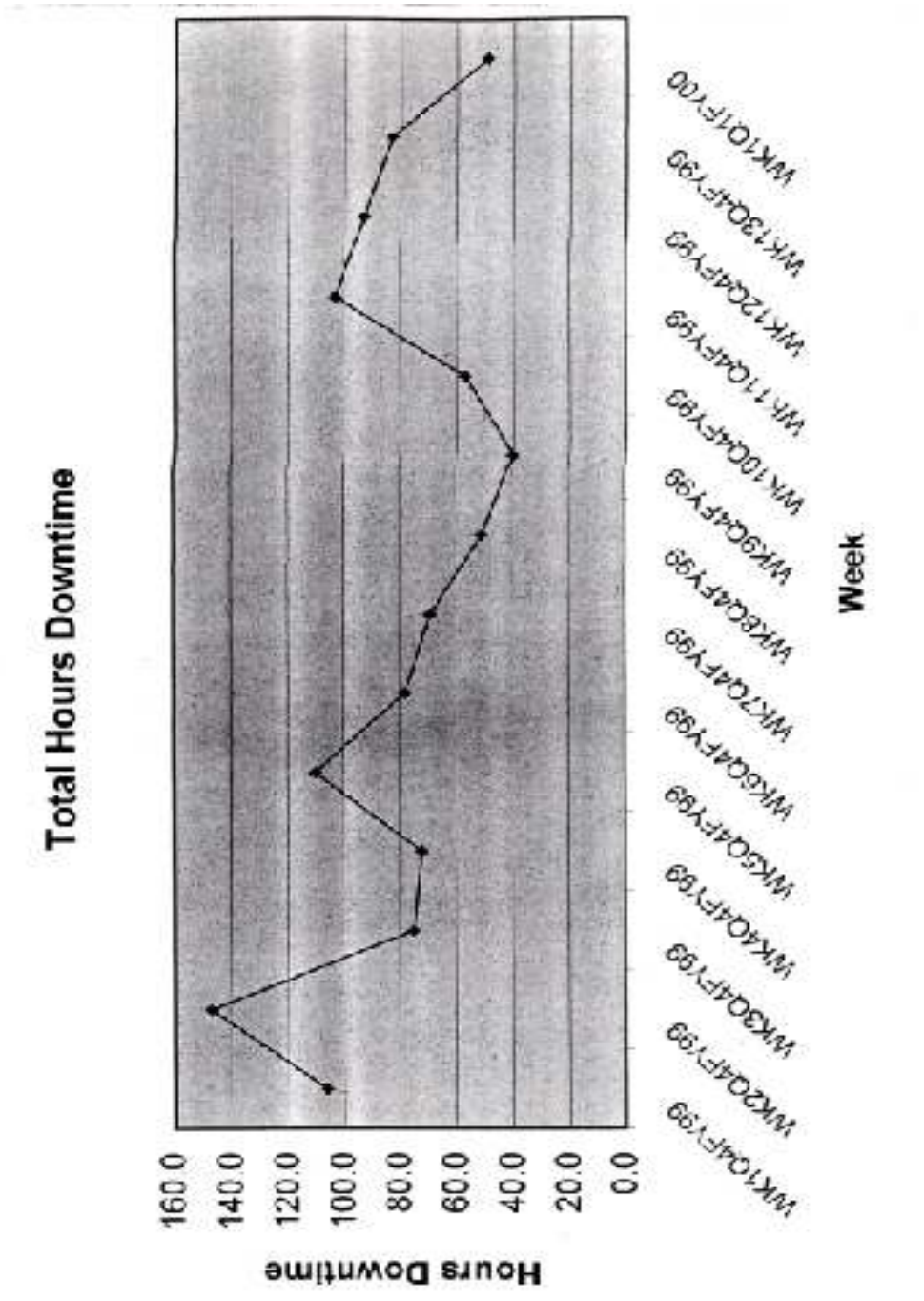
week	plant	check	checktype	time req	pm (int or ext)	spare part	completed
2	vtl1	VTL1 - yearly check	yearly				
3	uf4	UF4 - yearly check	yearly				
5	uf5	UF5 - yearly check	yearly		SHW		
6	uf6	UF6 - yearly check	yearly		SHW		
17	pensotti1	pensotti 1 - yearly check	yearly				
18	vtb2	VTL2 - yearly check	yearly				
19	vtb3	VTL3 - 3 yearly+C647 check	yearly				
21	uf41	UF4 - yearly check	yearly				
22	pensotti2	pensotti 2 - yearly check	yearly				
23	htf	high temp furnace - yearly check	yearly				
24		CMM - yearly check	yearly		DEA		
25	vtb4	VTL4 - yearly check	yearly				
26	pensotti3	pensotti 3 - yearly check	yearly				

APPENDIX B: DELL MIS

Database Table Set

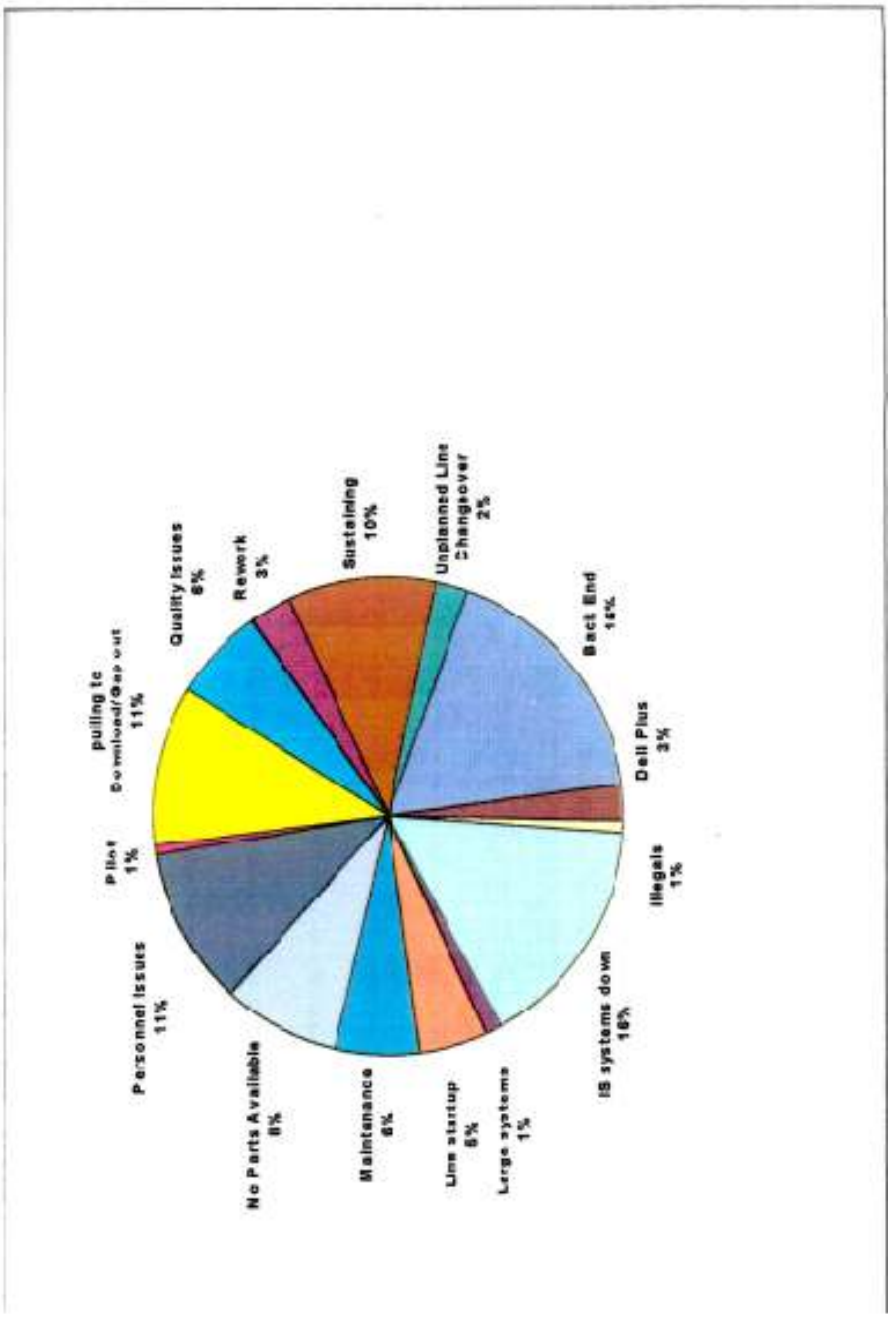


Downtime Trend – 1st Quarter



e

Downtime Pie Chart – 1st Quarter 2000



Trend Graph 1st Quarter 2000

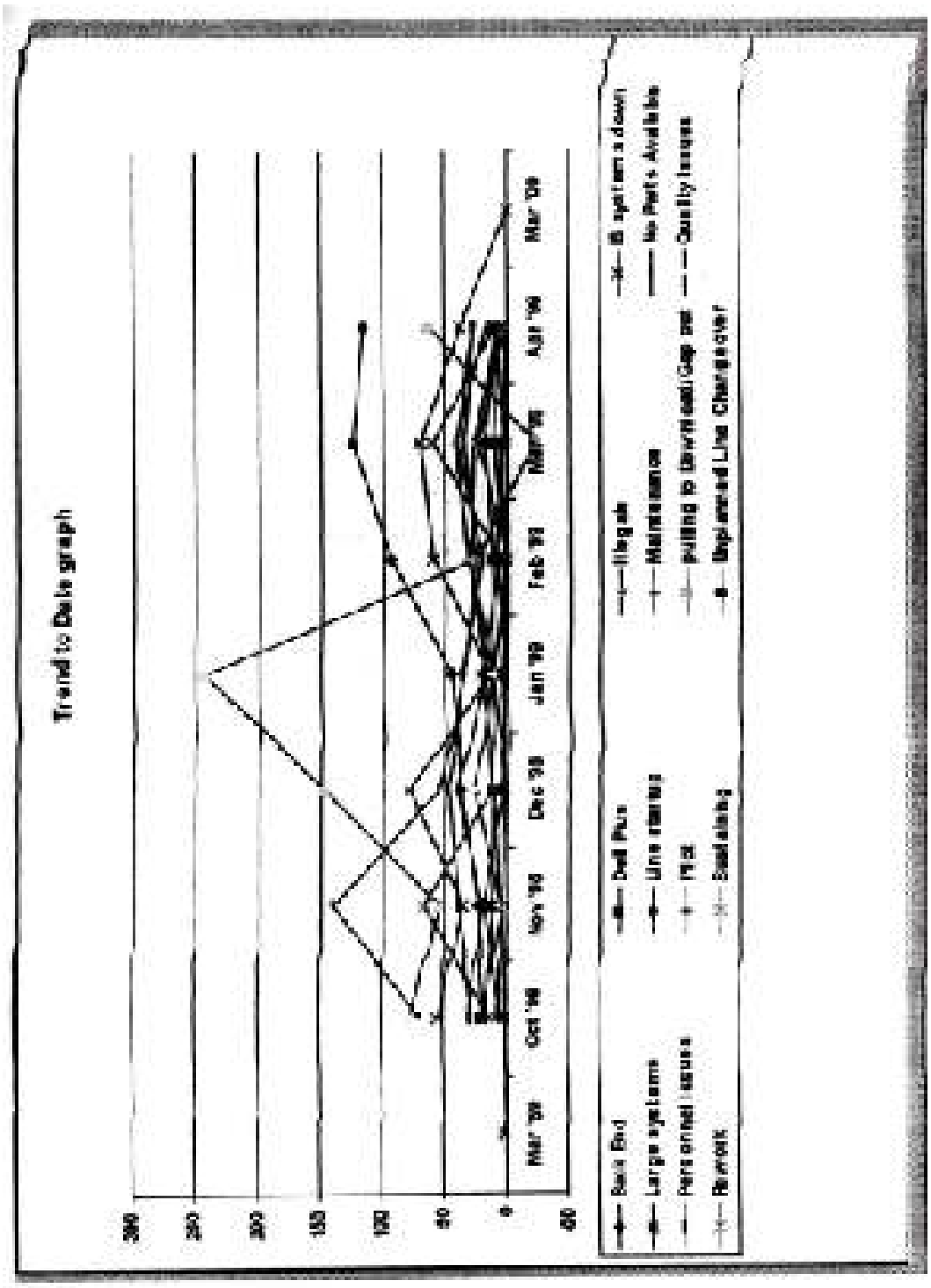


Diagram 5 1st Quarter 2000

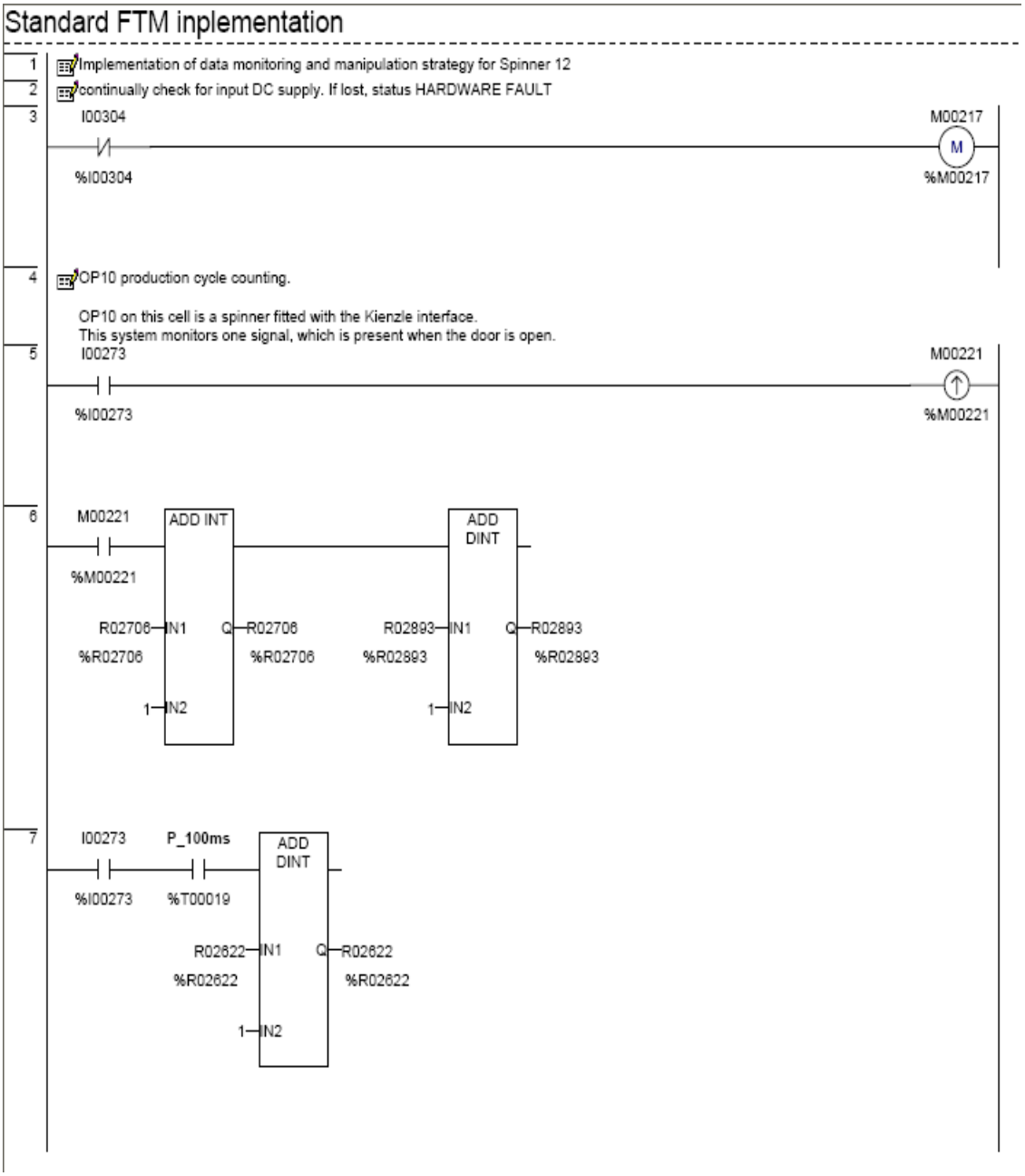
Daily downtime report

Wednesday, March 15 2000 04:16 PM

Today's Date	Night Filter	Awaiting parts	Downtime	Description of downtime	Department	Person responsible for downtime	Down Count
15/03/00	A	01	0.5	Outside bearing backlogged	Manufacturing	Gilad Manager of area	60
15/03/00	A	01	0.5	Television stoppers: Operator machine	cutting	oiled cutting	55
15/03/00	A	01	0.5	pocket spraying blocked into tunny claws	Engineering	oiled mechanical engineering	45
15/03/00	A	02	0.25	boards machine down	Maintenance		30
15/03/00	A	02	0.167	solenoid box full ...			25
15/03/00	A	02	1	Pull units back on line			80
15/03/00	A	02	0.333	Snip parts			40
15/03/00	A	04	0.5	SHORT PEOPLE AT START OF SHIFT	HELEN FINN	PEOPLE TRAIN HIGH DO HAVING BEEN CLOSED DOWN	44
15/03/00	A	04	0.5	DE OPERATORS HAD TO BE SENT BACK TO DO AFTER UNIT WAS CLEARED.	Manufacturing	DE OPERATORS SENT BACK GRADUALLY AS DOWNS WERE CLEARED	88
15/03/00	A	04	0.5	ALL OF CHAIR TO BE MOVED TO DE TO CLEAR THE LINE	Manufacturing	DE SHUT DOWN UNTIL DO WAS CLEARED	55
15/03/00	A	05	0.333	waiting on spare parts from unit 2			18
15/03/00	A	05	0.333	waiting on cable from store		ko wait to get them out of a job	17

APPENDIX C: GARRETT MIS

PLC Ladder Code



PLC Data Register

Cell orientated PLC data design for QuickPanel / Cimplicity
Version 6.1.4 1 August 2007

%R	description	%R	description	CIM point name
+ 433	Tentative Downtime start - Year	+ 547	used in calc. Performance	
+ 434	Tentative Downtime start - Month	+ 548	used in calc. Performance	
+ 435	Tentative Downtime start - Day	+ 549	used in calc. Performance	
+ 436	Tentative Downtime start - Hour	+ 550	used in calc. Performance	
+ 437	Tentative Downtime start - Minute	+ 551	used in calc. Performance	
+ 438	Tentative Downtime start - Second	+ 552	used in calc. Performance	
+ 439	timer for Tentative downtime detection	+ 553	used in calc. Performance	
+ 440	timer for Tentative downtime detection	+ 554	used in calc. Performance	
+ 441	timer for Tentative downtime detection	+ 555	used in calc. Performance - result	
+ 442	Downtime Filter time used	+ 556	used in calc. Performance "	
+ 443	Downtime Preload time used	+ 557	changeover due soon	
+ 444	Downtime Tentative time used	+ 558	changeover due soon	
+ 445	Duration in seconds of Tentative	+ 559	timer for New Batch Started message	
+ 446	Downtime Filter - (factor)(nom cycle)	+ 560	timer for New Batch Started message	
+ 447	Downtime Assumtion Time	+ 561	timer for New Batch Started message	
+ 448	tot dt in minutes DINT	+ 562	Timer for No Operator Message	
+ 449		+ 563	Timer for No Operator Message	
+ 450	minutes since last SPC check	+ 564	Timer for No Operator Message	
+ 451	difference interval - minutes since last SPC	+ 565	Timer for No Response/Cell idle message	
+ 452	used in calculating Downtime filter	+ 566	Timer for No Response/Cell idle message	
+ 453	used in calculating Downtime filter	+ 567	Timer for No Response/Cell idle message	
+ 454	used in calculating Downtime Totals	+ 568	Timer for operator response in changeover	
+ 455	used in calculating Downtime Totals	+ 569	Timer for operator response in changeover	
+ 456	used for keypad	+ 570	Timer for operator response in changeover	
+ 457	used for keypad	+ 571	timer for SPC Complete message	
+ 458	used for keypad	+ 572	timer for SPC Complete message	
+ 459	used for keypad	+ 573	timer for SPC Complete message	
+ 460	used in calculation of Batch quantities	+ 574	Timer for CIM that downtime event ended	

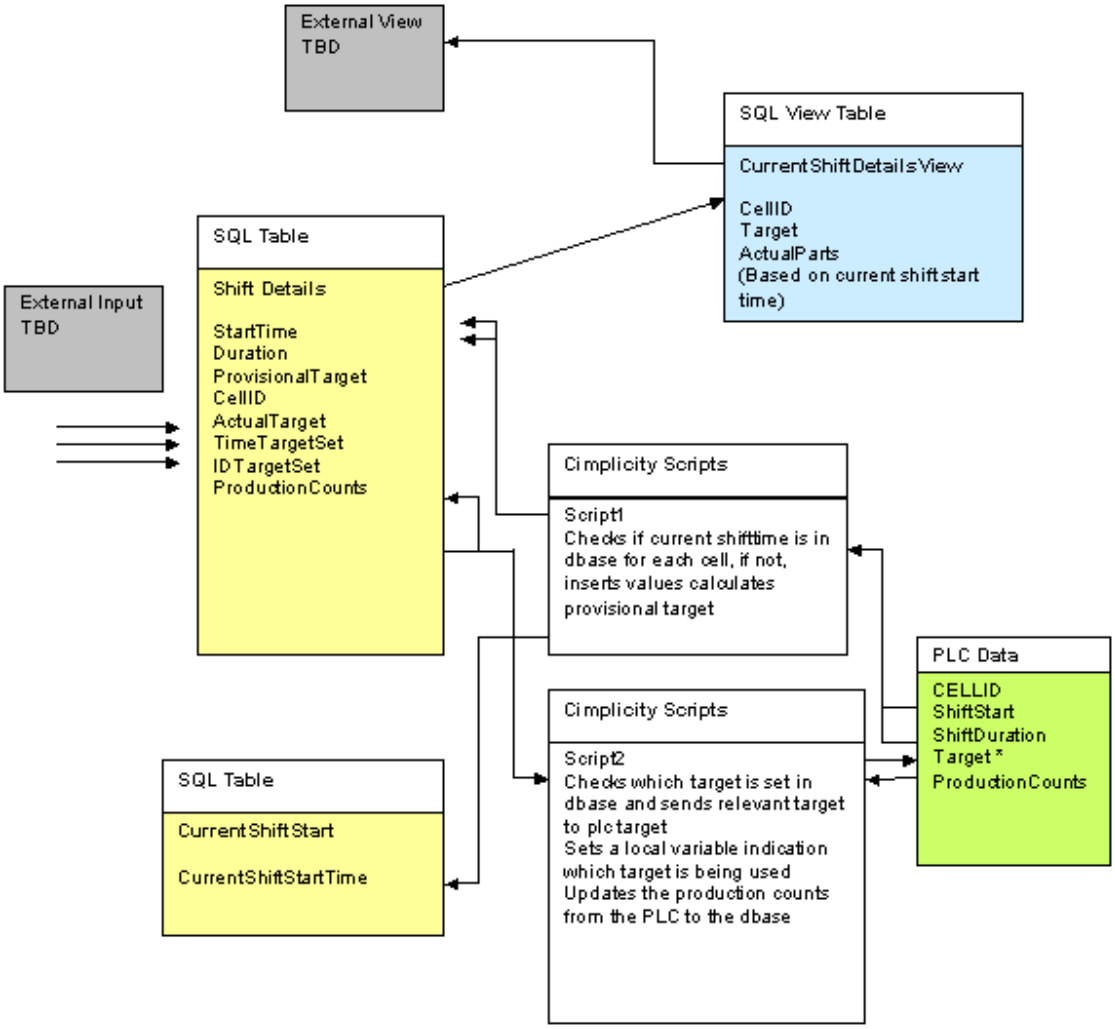
Machine Cell Downtime Report

CWM RTY - Shift Report End of review period:- 14/04/05 06:00

Start of Shift	6:00	14:00	22:00	6:00
End of Shift	14:00	22:00	6:00	6:00

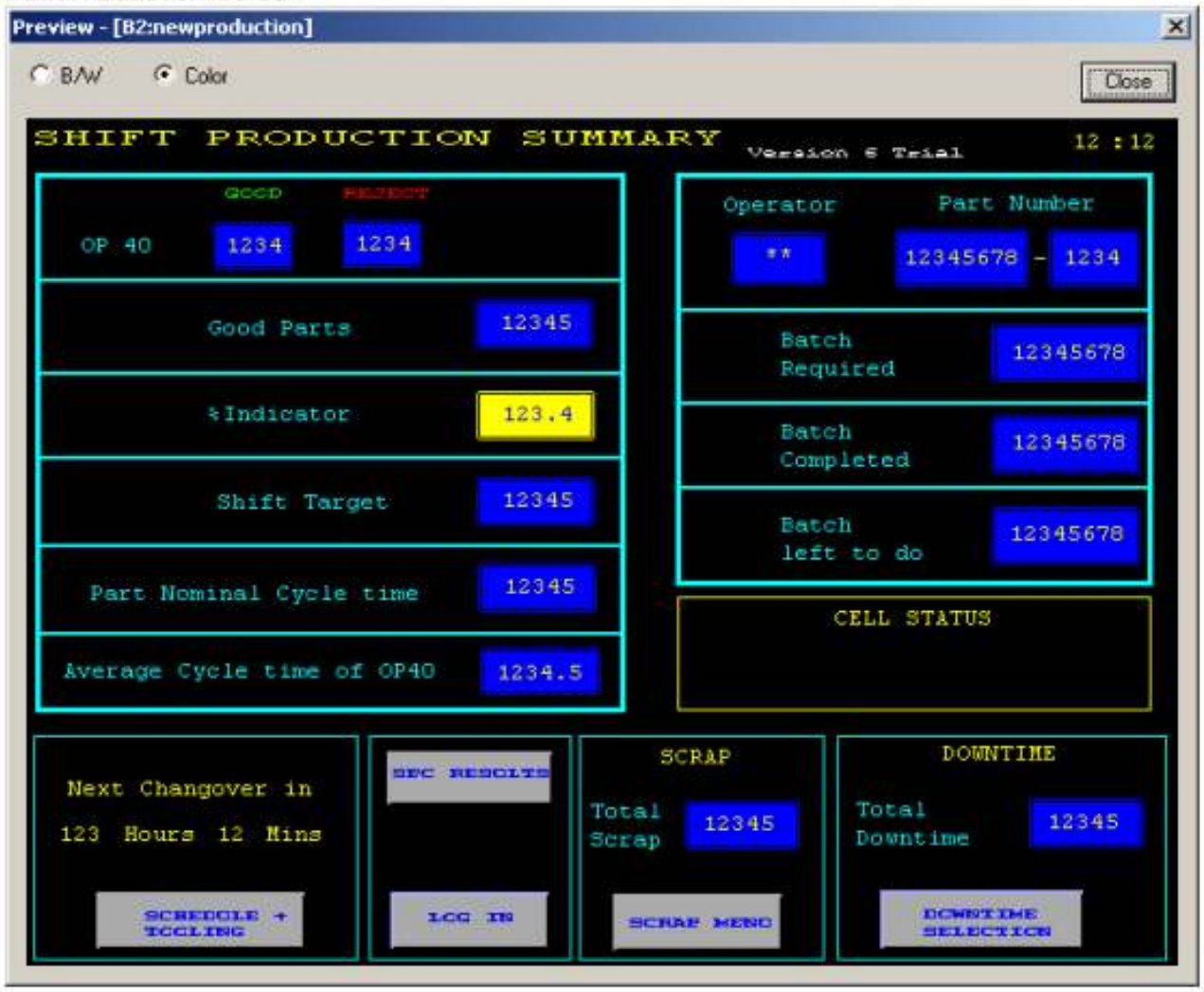
Machine	Op 40 Count	Op 40 Reject	% RTY	Op 40 Count	Op 40 Reject	% RTY	Op 40 Count	Op 40 Reject	% RTY	Op 40 Count	Op 40 Reject	% RTY
Spinner 1	501	73	87.3%	559	29	95.1%	491	7	98.6%	1551	109	93.4%
Spinner 2	526	36	93.6%	489	27	94.8%	464	30	93.9%	1479	93	94.1%
Spinner 3	671	11	98.4%	625	2	99.7%	708	11	98.5%	2004	24	98.8%
Spinner 4	388	2	99.5%	410	1	99.8%	429	2	99.5%	1227	5	99.6%
Spinner 5	392	18	95.6%	314	29	91.5%	355	48	88.1%	1061	95	91.8%
Spinner 6	413	29	93.4%	495	30	94.3%	471	70	87.1%	1379	129	91.4%
Spinner 7	606	13	97.9%	431	14	96.9%	591	16	97.4%	1628	43	97.4%
Spinner 8	394	40	90.8%	403	26	93.9%	343	21	94.2%	1140	87	92.9%
Spinner 9	580	64	90.1%	484	65	88.2%	402	72	84.8%	1466	201	87.9%
Spinner 10	225	11	95.3%	279	47	85.6%	229	6	97.4%	733	64	92.0%
Spinner 11	514	23	95.7%	436	4	99.1%	573	3	99.5%	1523	30	98.1%
Spinner 12	451	34	93.0%	460	53	89.7%	504	56	90.0%	1415	143	90.8%
Spinner 13	439	37	92.2%	474	111	81.0%	381	81	82.5%	1294	229	85.0%
Spinner 14	388	31	92.6%	471	38	92.5%	523	34	93.9%	1382	103	93.1%
Spinner 15	501	8	98.4%	489	3	99.4%	404	73	84.7%	1394	84	94.3%
Spinner 16	509	18	96.6%	452	50	90.0%	520	22	95.9%	1481	90	94.3%
Spinner 17	276	23	92.3%	285	39	88.0%	187	26	87.8%	748	88	89.5%
Spinner 21	307	56	84.6%	312	40	88.6%	334	134	71.4%	953	230	80.6%
Rika 1	398	42	90.5%	59	1	98.3%	535	17	96.9%	992	60	94.3%
Rika 3	424	23	94.9%	411	2	99.5%	440	43	91.1%	1275	68	94.9%
Rika 4	365	32	91.9%	474	53	89.9%	466	80	85.3%	1305	165	88.8%
Total	**9268**	**624**	**93.7%**	**8812**	**664**	**93.0%**	**9350**	**852**	**91.6%**	**27430**	**2140**	**92.8%**

Garrett MIS Layout



Touch Panel Production Summary Screen

Main Production Screen



APPENDIX D: SURVEY INSTRUMENT

Preferences For Training and Incentives in Software Adoption

University of Limerick

The University of Limerick is currently conducting research into factors that affect;

a) The users' decision to deploy new Manufacturing or Enterprise Resource Planning (ERP) software. ERP software may include SAP, JDEdwards, PROMIS or any other software used to assist in planning and reporting of the manufacturing process.

b) Peoples' preferences for training and incentives in software use. and what they feel is important with respect to its implementation.

Our aim, with the assistance of results from the questionnaires is to give a clear indication of training and implementation preferences based on end user expectations. A preferred consequence of the research is that in the future organisations may use these findings as a framework for negotiating with individuals to take software preferences into account.

Your participation is very much appreciated

Maeve Fitzpatrick
Enterprise Research Centre
Engineering Research Building
University of Limerick,
Plassey
Limerick.

Personal Details: Please tick the following.

1) Gender

Female ☐
Male ☐

2) Age

Under 25 years ☐
25 to 35 years ☐
Over 35 years ☐

3) Educational Level

Below Third level ☐
Undergraduate ☐
Postgraduate ☐

4) Employment Status

Full time ☐
Fixed Term Contract ☐
Part time ☐

5) How long have you been working for your present employer?

Less than 2 years ☐
2 to 5 years ☐
More than 5 years ☐

6) How many companies have you worked for before now?_____

7) Have you used ERP Software before?

Yes ☐
No ☐

8) If you answered yes to Q7, how would you rate the software?

Extremely poor ☐
Poor ☐
Average ☐
Good ☐
Excellent ☐

9) If relevant, please indicate the main reason for the software rating in Q8

4)...If I had seen someone else using it before I tried it myself ☐

5)...If I could call someone for help if I got ☐

6)...If someone else helped me get started ☐

7)...If I had a lot of time to complete the job for which the software was provided ☐

8)...If I had just the built-in help facility for help ☐

9)...If someone showed me how to do it first ☐

10)...If I had used similar packages before this one to do the same job ☐

Overall Job Satisfaction

Please indicate the degree to which you agree or disagree with the following

1 = Strongly agree
2 = Agree
3 = Undecided
4 = Disagree
5 = Strongly Disagree

1) I am often bored with my job ☐

2) I feel fairly satisfied with my current job ☐

3) I am satisfied with my job for the time being ☐

4) Most days I am enthusiastic about my work ☐

5) I like my job better than the average worker. ☐

6) I find real enjoyment in my work ☐

10) How would you describe your role in the organisation;(Please tick)

- Production assistant ☐
- Function/Desk based Role ☐
- Management ☐
- Other ☐

Please indicate your level of confidence with using new software.

1 = Not at all confident
2 = Somewhat confident
3 = Moderately confident
4 = Quite confident
5 = Totally confident

I could complete the job using the new software package if....

1) ...If there was no one around to tell me what to do as I proceed ☐

2) ...If I had never used a package like it before ☐

3) ...If I had only the software manuals for reference ☐

Please indicate the degree to which you agree with the following statements using the 1 -5 scale below;

1 = Strongly agree
2 = Agree
3 = Neutral
4 = Disagree
5 = Strongly Disagree

1) I possess a set of personality traits I would regard as ideal ☐

2) I try to continuously learn new skills to improve my chances of promotion ☐

3) The most important thing in my job is not to make any mistakes ☐

4) I put most of my time in work into trying to make sure the things I want to happen, happen. ☐

5) I spend most of my time in work meeting focusing on tasks I think can do well ☐

4) In work I tend to naturally focus on activities that will demonstrate my responsibility in completing tasks. ☐

7) I spend a lot of my time in work ensuring I don't make mistakes ☐

8) I spend a lot of my time in work looking for opportunities to succeed. ☐

9) I possess a set of personality traits I would regard as adequate. ☐

10) I consider security the most important thing when considering whether to take on a new job. ☐

11) I invest most of my time at work ensuring things I don't want to happen, don't happen. ☐

12) The most important thing in a job is finding ways to learn and progress to do the job faster ☐

13) The most important thing in a job is meeting my responsibilities ☐

14) I regard the opportunity for advancement the most important thing in considering a job. ☐

15) The worst mistake that could be made would be to take the wrong strategy ☐

16) The worst possible mistake I could make in my job would be to miss the best way of doing things ☐

If the company didn't meet your expectation with respect to an ERP implementation....

Please indicate the extent to which you agree or disagree with the following statements

1 = Strongly agree
2 = Agree
3 = Neutral
4 = Disagree
5 = Strongly Disgree

10) I would continue to try and use the system ☐

11) I would refrain from giving out about the system ☐

12) If I saw a serious problem with the system I would mention it to someone responsible ☐

13) I would definitely work more slowly in using the system ☐

14) If I saw a problem that could potentially stop the system from operating correctly, I would keep quiet about it ☐

15) If I made an error with the system I wouldn't bother fixing it. ☐

16) I would continue to use my own methods of working ☐

17) I would leave it until the last possible instant to use the system ☐

How Committed you would feel to ERP...

Please indicate the degree to which you agree or disagree with the following statements

1 = Strongly agree
2 = Agree
3 = Neutral
4 = Disagree
5 = Strongly Disagree

1) I would continue to use my old method of working regardless of the system	☐
2) I would find reasons to avoid using the system	☐
3) I would find ways of stalling the implementation of the system	☐
4) I would look for other jobs in the organsiation where the system wasn't used	☐
5) I would go to my immediate supervisor and discuss the problem	☐
6) I would join in if co-workers were giving out about the system	☐
7) I would try to initiate discussion about how to resolve the issues	☐
8) I would try to find out how others felt about using the system	☐
9) I would wait and see if the problem resolved itself	☐

*If I was happy with how the company went about putting in ERP_*

1) I would be willing to put in effort above and beyond the norm to get the system working	☐
2) I would support the system as a great system to use to my friends	☐
3) I would stick with learning the system even if I found it difficult	☐
4) I would pay extra care and attention to make sure I didn't make mistakes with the system	☐
5) I would defend the system if others knocked	☐
6) I would care about how the organisation got on in implementing the system	☐
7) I would help others to learn and use the system.	☐

IT Implementation Preferences

1)

Please rate in *order* of preference (1 to 5, 1 being most favoured) the type of training you would prefer

a) Training on a "one to one" basis ☐

b) Training as part of a small group (less than 5) ☐

c) Training as part of a medium group (between 5 and 10) ☐

d) Training as part of a large group (greater than 10) ☐

☐

2) Please rate in order of preference the timing in which you would like the training to be delivered(1 - 3, 1 being most preferred)

a) Training to start at least a month before the system 'Go live' date ☐

b) Training to start intensively the week before implementation ☐

c) ☐

Training to delivered on a "need to know" basis.

Please indicate the degree to which you agree or disagree with the following statements

1 = Strongly agree
2 = Agree
3 = Neutral
4 = Disagree
5 = Strongly Disagree

Incentives

1) Please rate in *order* of preference (1 to 6 with 1 being most preferred) what you would like to receive in recognition of having contributed to ERP

a) A gesture such as a gift token ☐

b) Improved pension plan ☐

c) Improved healthcare plan ☐

d) Additional time off ☐

e) Straight cash bonus ☐

f) The option to select my bonus ☐

2) Please rate in order of preference (1 to 5 with 1 being most preferred) the kind of alternative acknowledgement you would like to receive

a) Acknowledgement of work done by direct supervisor or senior manager ☐

b) Mention in company presentation or newsletter ☐

c) Allocation of more responsibility as a result of work done ☐

d) Allocation of more freedom in role as a result of work done ☐

e) A quiet word of thanks directly from most senior person in Company. ☐

f) The opportunity to further my education ☐

Please indicate the degree to which you agree or disagree with the following statements

3) The system should be implemented on a set date where the old system is made redundant ☐

4) The old system should be run in tandem with the new system until everything is guaranteed to work ☐

5) I would like to be involved with the system from the very start when it is being designed ☐

6) It is important for to me get an understanding of how the whole system works together ☐

7) It is important that I am allowed to choose how I would like to be trained on the system. ☐

8) It is important that the company has considered how my job will change because of the system ☐

9) It is important that my opinions about the system are taken into account. ☐

1 = Strongly agree
2 = Agree
3 = Neutral
4 = Disagree
5 = Strongly Disagree

3) It is important to me to be able to negotiate the kind of acknowledgements I would like to receive ☐

4) The scale for these bonuses should be open and clear to everyone. ☐

5) It is important that the company has considered what incentives matter to me ☐

6) I would prefer the company to be able to give bonuses at their discretion ☐

7) Its true to say that incentives play a significant role in helping people to achieve set tasks ☐

8) How good the software is at doing its job is key in whether the system is used or not ☐

9) Incentives should not matter in using new software ☐

The following section looks at your preferred style of negotiating. Please indicate your preference by marking the boxes as follows

1 = *Strongly agree*
2 = *Agree*
3 = *Neutral*
4 = Disagree
5 = Strongly Disagree

1) **I try to integrate ideas with those of my peers to try and come up with a decision jointly.** ☐

2) **I attempt to avoid being put on the spot and try to keep my conflict with my peers to myself.** ☐

3) **I use my influence to get my ideas accepted** ☐

4) **I usually accommodate the wishes of my peers** ☐

5) **I try to find a middle course to resolve an impasse** ☐

6) **I try to bring all our concerns out into the open so that the issues can be resolved in the best possible way** ☐

7) **I try to stay away from disagreement with my peers** ☐

8) **I argue my case with my peers to show the merits of my position** ☐

9) **I usually allow concessions to my** ☐

10) **I try to play down differences to reach a compromise** ☐

11) **I collaborate with my peers to come up with decisions acceptable to us.** ☐

12) **I try to avoid unpleasant exchanges with my peers** ☐

13) **I am generally firm in pursuing my side of the issue** ☐

14) **I try to satisfy the expectations of my peers** ☐

15) **I negotiate with my peers so a compromise can be reached** ☐

APPENDIX E VALIDATION INTERVIEWS

IT Showcase Registration

Maeve.Fitzpatrick

From: iTSHOWCASE ONLINE [registrations@frameworkmedia.co.uk] **Sent:** Tue 05/04/2011 16:26
To: Maeve.Fitzpatrick
Cc:
Subject: Quick Registration Confirmation for iTSHOWCASELive
Attachments:

We are pleased to confirm your registration on iTSHOWCASELive.

The form below includes the details you submitted with your registration. Please notify us of any changes by email to registrations@frameworkmedia.co.uk

Charges

Entry to iTSHOWCASE is **FREE** for managers, directors and business owners attending for the purpose of the selection, specification or implementation of software software systems.for their business.

*** For representatives of suppliers to the IT sector there will be a registration fee of £495 plus VAT (click here for further information or contact Gary Jones on 01425 477565 ***

Further details will be sent to you by email shortly before the event. In the meantime, feel free to visit our web site where you can download directions, maps and exhibitor information for your chosen event.

Kind Regards,

The iTSHOWCASE Team

Form Details	
Please choose and event	London (7 Apr 2011)
Seminars	
First Name	Maeve
Last Name	Fitzpatrick
Company	University of Limerick
Job Title	Systems Researcher
Email	maeve.fitzpatrick@ul.ie
Post Code	CR8 5LR
Charges	
Street Address	
Telephone	
Town	
County	
Main Business Activity	

Augmented Model Validation Interview Respondents

Steve Bayley; Director of Sales; In2grate; www.in2grate.com;

Martin Woolger; Director; Integrity: www.integrity-software.net;

Nathan Bell; Managing Director ; Openda; www.openda.com

Clive Mattson: Managing Director; Sirius Consulting; www.siriusconsultinguk.com

Mike Bernhard; The Access Group ; www.theaccessgroup.com .

Sapphire; www.sapphiresystems.com Sholto Hesketh: Business Development Manager

Epicor; www.epicor.com ;

Interview Questions; Augmented Model Validation

1) *What are the human factors that you deem critical to an implementation?*

2) *How do you manage the human risk factors in your implementations?*

3) *How do you work with the organisation in setting the initial contract?*

4) *How do you work with end users to ensure they engage and adopt the system ?*

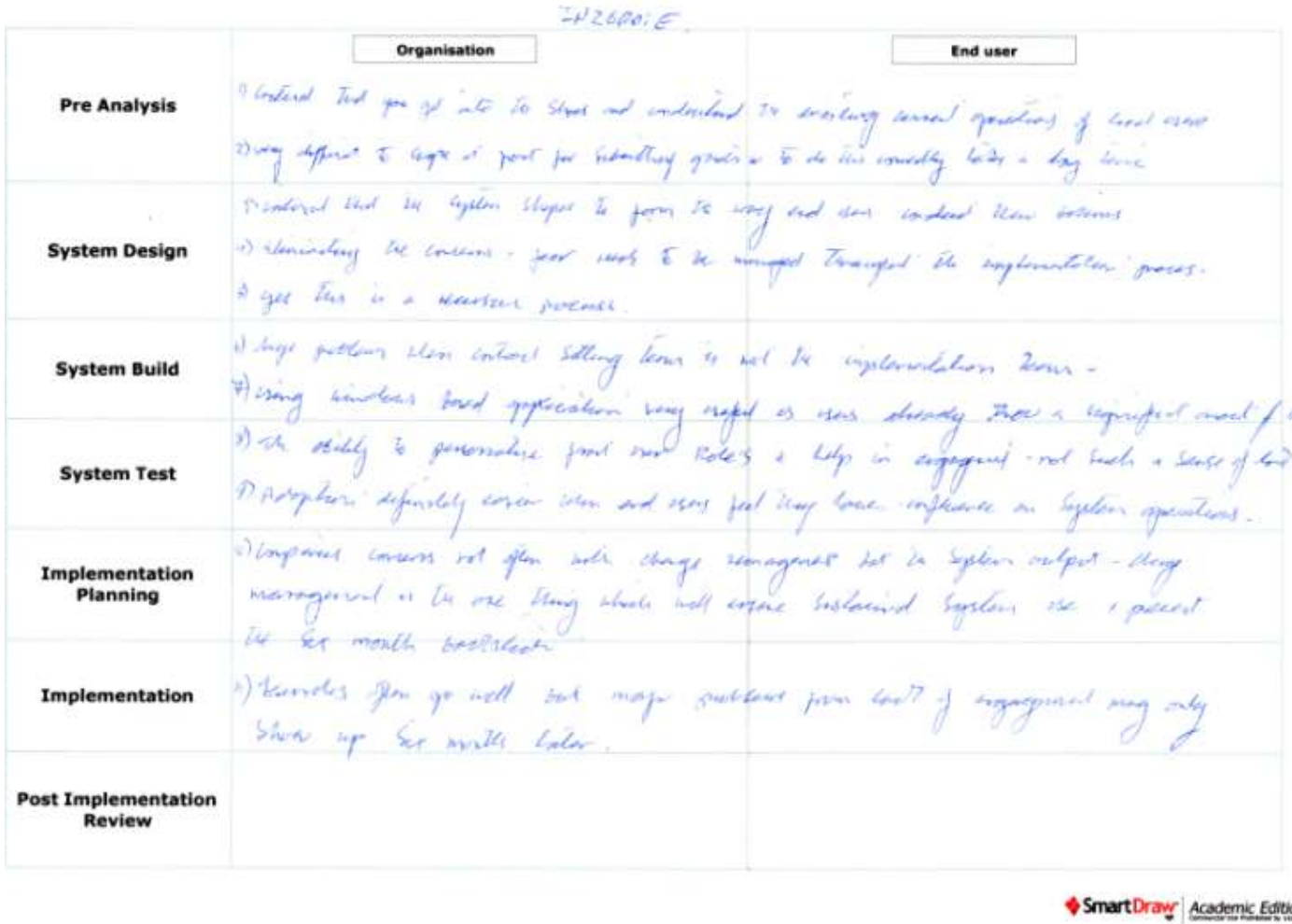
5) *How do you manage the implementation between organisational goals and individual end user needs?*

6) *Where are most problems in implementations usually encountered?*

7) *What is the most common problem you encounter in implementations?*

8) *Where does most of the end -user interaction occur in your implementation?*

The Access Group



	Organisation	End user
Pre Analysis	1) Critical that you get info to steer and understand the evolving current operations of local areas 2) Very different to cope of point for submitting grants & to do this smoothly takes a long time	
System Design	1) Critical that the system shapes to form the way end user wanted them actions 2) eliminating the concerns - poor work & be managed Through the implementation process. 3 get this in a Heuristic process.	
System Build	1) Huge problem when critical Selling teams to not the implementation team - 2) using windows based application very rapid as users already have a significant amount of learning	
System Test	1) the ability to personalise front end Roles & help in engagement - not both a sense of test use 2) Adoption definitely easier when end users feel they have confidence in System operations.	
Implementation Planning	1) Important concerns not often with change management set to System output - change management is the one thing which will ensure sustained System use & prevent the 6x month backsliding	
Implementation	1) Knowledge often go well but major problems from lack of engagement may only show up 6x months later.	
Post Implementation Review		

INTEGRITY. SURVAITE.

	Organisation	End user
Pre Analysis	communication is critical - main problems arise with poor communication of requirements	
System Design	From the Tesco - project champion - someone/group with a stay - ideally terminal critical dependency on ensuring the software is well implemented. For handling both user directions, different for vendor partner & manage is problems can be kept neutral and/or moderated with other factors	
System Build	Organisation (integrity) will not take responsibility for ensuring attendance - they must select implementation team in case with ability & take decisions necessary to overcome personal issues	
System Test	- integrity will support all learning - Team the trainer but don't take responsibility for engagement of people.	
Implementation Planning	Use of phases project management	
Implementation		
Post Implementation Review		

	Organisation	End user
Pre Analysis	negotiation process between - to define KPI's and how these get operationalised. Need to spend time with Org and users - both going bottom up + top down.	
System Design	Management understand KPI's + Org process domain very well but do not understand the actual processes + the how's of how these are achieved. A lot of backlooking is required throughout the process	
System Build	Different lvl of Org understanding need to be negotiated for the end user and for the organisation. -> Successful implementation requires management of both. - Many iterations needed. ongoing	
System Test	through to system launch + Review	
Implementation Planning		
Implementation		
Post Implementation Review		

Sapphire

	Organisation	End user
Pre Analysis	Majority of issues of problems in implementation in planning + communication. Ignorance much better results if Dep and users allowed training prior to design.	
System Design	Large level of interaction in system build stage. Representation - engaged representation from all groups is critical.	
System Build	Information management in terms of not overloading people with data critical. Don't be expected new KPI's ⇒ Too much complication at too early a stage problematic.	
System Test	Majority of testing work needs to completed to prior to implementation stage. Relationship building is work critical.	
Implementation Planning		
Implementation		
Post Implementation Review		

Sirius

	Organisation	End user
Pre Analysis	10 Step Model organisations view is to Rat. - frustration just not but less than to great in use	combonds human factor is most difficult aspect.
System Design	Policy on Team is Training Sessions Mapping of information flow need to be	
System Build	Iterative Testing is Key Key distinguishing factor is ability implementer / implement team champions	
System Test	Always generated that there will be advocacy for prior to implementation "the system is crap"	
Implementation Planning	system functionality is not the issue	
Implementation	Key point in for weighting for helpful company pitch is ignorance - implementation. Comms from senior boardroom to system to be the same as huge hype	
Post Implementation Review		

PUBLICATIONS

Fitzpatrick, M., Sheahan,, C.(2005) **"**Software design architecture review of Enterprise Resource Planning Systems," International Manufacturing Conference Proceedings**,** Waterford.

Fitzpatrick,M.., Sheahan, (2007) Development of a staged ERP Implementation Model International Manufacturing Conference Proceedings, Cork.

Fitzpatrick,M.., Sheahan, C. (2008) **"**Application of the Psychological Contract in Manufacturing System Implementation" FAIM Conference Proceedings, Skovde (unable to attend)

Fitzpatrick, M., Murphy, E. (2008); **"**Equipping the future expert practitioner given current barriers and future manufacturing and e-learning developments" QMOD Conference Proceedings, Linkoping.

Fitzpatrick,M., Coughlan, D.(2009) **"**Learning Cultures in SMEs and Their Role in Supporting the Learning Region" PENR3L Conference Proceedings, Limerick 2009

Sturdy, G., Fitzpatrick, M. (2010) "Results of research on a pre change diagnostic assembled from research on key critical success and failure factors" QMOD

Fitzpatrick, M., Murphy, E (2010); Problem Based Learning Approach to Support The Application of Lean tools in Healthcare" ICQSS Conference.

Fitzpatrick, M., Sheahan,, C (2011) Implications of resistance to change research TQM Journal; (Under review).

Fitzpatrick, M. (2009) Lean Thinking/Lean Tools. Atlantic University Alliance.

ABBREVIATIONS

BPR	Business Process Re-Engineering
CEO	Chief Executive Officer
CFF	Critical Failure Factor
CIO	Chief Information Officer
CMMS	Computerised Maintenance Management Software
CNC	Computer Numerical Control
COTS	Commercial Off The Shelf Software
CRM	Customer Relationship Management
CSF	Critical Success Factor
EMF	European Manufacturing Facility
EMEA	Europe Middle East and Asia
ERG	Existence Relatedness Growth
ERP	Enterprise Resource Planning
FPI	Fluorescent Penetrant Inspection
HRM	Human Resource Management
KPI	Key Performance Indicator
OMS	Order Management System

PAR	Participatory Action Research
PIR	Post Implementation Review
SCM	Supply Chain Management
SCT	Social Cognitive Theory
SOP	Sales Order Processing
SQL	Structured Query Language
TAM	Technology Acceptance Model
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
TPM	Total Preventive Maintenance
VIE	Valence Instrumentality Expectation
VOC	Voice Of the Customer
WCM	World Class Manufacturing
WIP	Work In Progress
WMS	Warehouse Management System
WTCS	Wip Tracking and Control Sytem

BIBLIOGRAPHY

ADMAN, P., WARREN, L. (2000) 'Participatory sociotechnical design of organizations and technical systems - An adaptation of ETHICS methodology. *Journal of Information Technology***,** 39-51.

AGOCS, C. (1997) Institutionalised resistance to organisational change: Denial, Inaction and repression. *Journal of Business Ethics,* 16**,** 917-931.

AJZEN, I. (1991) The Theory of Planned Behaviour. *Organisational behaviour and human decision processes.,* 50**,** 179-211.

ALDERFER, C. (1969) An empirical test of a new theory of human needs
Organisational behaviour and Human Performance, 4.

ALLEN., D., KERN.,T., HAVENHAND.,M. (2002) ERP Critical Success factors: an exploration of the contextual factors in public sector institutions. *Annual Hawaii International conference on System Sciences.*

AMARATUNGA, D. B., A. (2002) Moving from performance measurement to performance management. *Facilities,* 5**,** 217-223.

AMOAKA-GYAMPAH, K., SALAM, AF. (2004) An Extension of the Technology Acceptance Model in ERP Implementation Environement. *Information and management,* 41**,** 731 - 745.

ANDERSON, N. S., R. (1998) The psychological contract in retrospect and prospect. *Journal of organizational behaviour,* 19**,** 637-647.

ARGYRIS, C. (1960) *Understanding organisational behaviour,* London, Tavistock publications.

ARGYRIS, C. (1971) Management information systems: The challenge to rationlity and emotionality. *Management Science,* 17.

ARGYRIS, C., SCHON, DA (1981) *The Handbook of Organisational Learning,* Reading, Massachusetts, Addison Wesley.

ARMENAKIS, A. (1999) Organisational change: A review of theory and research in the 1990s. *Journal of management,* 25**,** 293-315.

ARMSTRONG, M. S., T. (2005) *Employee Reward Management and practice,* London, Kogan Page Ltd.

ARONSON, E. (1997) Back to the future: Retrospective review of Leon Festinger's "A theory of cognitive dissonance". *The American journal of Psychology.,* 110**,** 127-137.

ASHFORTH, B. M., F. (1989) Social Identity And The Organization'. *Academy of Management Journal,* 14**,** 20-39.

AVISON, D., LAU., F., MYERS, M., NIELSEN., P. (1999) Action Research. *Communications of the ACM,* 42**,** 94 - 97.

BABBIE, E. (1973) *Survey Research Methods,* Belmont., Wadsworth Publishing Company Inc.

BAGRANOFF, N. E., J. KAHL, H. (2002) Who moved my ledger. *The CPA journal,* 72**,** 22-26.
BAILEY, J. (1999) Trash Haulers are taking fancy software to the dump. *Wall Street Journal, June 09th.* New York.
BAKER, G. J., M. MURPHY, K. (1988) compensation and incentives: Practice Vs Theory. *The Journal of Finance,* 43**,** 593-616.
BALDWIN, T. F., J. (1988) 'Tansfer of training: A review and future directions for future research'. *Personnel Psychology,* 41**,** 63-105.
BALLANTINE, J. B., M., LEVY, M., MARTIN, A., MUNRO, I., POWELL, PL. (1996) The 3-D Model of Inormation Systems Success: The Search For The Dependent Variable Continues
Information Reseouce Management Journal, 9**,** 5-14.
BANDURA, A. (1986) *Social foundations of thought and action,* New Jersey, Prentice Hall.
BANKER, R. L., S. POTTER, G. SRINIVISAN, D. (1996) A contextual analysis of performance impacts of outcome based incentive compensation. *Academy of Management Journal,* 39**,** 920-948.
BARDACH, E. (1977) *The implementation game: What happens after a bill becomes law.,* Cambridge Mass., MIT Press.
BARKER., T. F., M. (2003) ERP implementation Failure; A case study. *Information Systems Management,* Fall**,** 43-49.
BARRET, P. P., K.V. EYSENCK, S. EYSENCK, H. (1998) The Eysenck questionnnaire:An examination of the factorial similarity of P, E, N and L across 34 countries. *Personality and indivisual differences.,* 95**,** 805-819.
BEER, M. E., A. (1990) Why change programs don't produce change. *Harvard Business Review.* Nov/Dec ed.
BEHLIN, N. S., F. (1973) The postulates of expectancy theory. *The Academy of Management Journal,* 16**,** 373-388.
BENCHMARKING, P. (1998) Second Wave: Maximising the value of ERP enabled processes. Deloitte Consulting Study.
BENDOLY, E. (2002) Theory and Support For Process Frameworks For Knowledge Discovery (KD) and Data Mining From ERP Systems. *Information and management,* 40.
BERGER, A. (1992) Towards a framework for aligning implementation change strategies to a situation-specific context. *International Journal of Operations and Production Management.,* 12**,** 32-44.
BIES, R., TRIPP., TM. (Ed.) (1996) *Beyond distrust: "Getting Even" and the need for revenge ",* California, Thousand Oaks: Sage.
BLACKSTONE JR., J. H., COX III, J.F., (2004) *APICS Dictionary,* Alexandria, VA.
BLAKE, I., OLSEN, M. (1984) User Involvement and MIS Success: A Critical Review. *Management Science,* 30**,** 586 - 603.
BLANCHARD, P. T., J. (1999) *Effective Training,* New Jersey, Prentice Hall.

BRANSCOMB, L. T., J. (1984) Ease of use: a design system challenge. *IBM Systems Journal,* 23**,** 224-235.
BRETT, J. V. W., D. (1999) Goal orientation and goal content as predictors of performance in a training program. *Journal of Applied Psychology,* 84**,** 863-873.
BRIGHAM, T. (1979) *Some effects of choice on academic performance,* New Jersey.
BROAD, M., NEWSTROM., JW. (1992) *Transfer of Training: Action Packed Strategies to Ensure High Payoff,* Reading, Addison Wesley.
BROADBENT, M., WEILL., P., CLAIR., D. (1999) The Implications of Information Technology Infrastructure for Business Process Re Design. *MIS Quarterly,* 23**,** 159-182.
BUCHANAN, D. H., A (1997) *Organisational behaviour: An introductory text.,* London, Prentice Hall.
BUONANNO., G. F., P. PIGNI., F. RAVARINI. A. SCIUTO., D. TAGLIAVINI., M. (2005) Factors affecting ERP adoption. *Journal of Enterprise Infomation Management,* 18**,** 384-426.
BURKE, L. B., T. (1999) Workforce training transfer: A study of the effect of relapse prevention training and transfer climate. *Human Resource Management,* 38**,** 227-241.
CACIOPPO, J. P., R. (1982) The need for cognition. *Journal of personality and social psychology,* 42**,** 116-131.
CALISIR, F., CALISIR F. (2004) The relation of interface usability characteristics, perceived usefulness and Perceived Ease of Use to End User Satisfaction with Enterprise Resource Planning Systems. *Computers in Human Behaviour,* 20**,** 505-515.
CAMPBELL, D., STANLEY, JC. (1963) *Experimental and Quasi-Experimental Designs For Research,* Boston, Houghton Mifflin Company.
CAMPBELL, J. D., M. LAWLER, E. WEICK, K. (1970) *Managerial behaviour, performance and effectiveness,* New York, McGraw Hill.
CARVER, C. S. S., M.F. (2000) Action, Emotion and Personality: Emerging conceptual integration. *Personality and social psychology bulletin,* 26**,** 741-751.
CAVANAUGH, M. N., R. (1999) Antecedents and consequences of relational components of the new psychological contract. *Journal of organisational behaviour,* 20**,** 323-340.
CESARIO, J. G., H. HIGGINS, E. (2004) Regulatory Fit and Persuasion: Transfer from "Feeling right". *Journal of personality and social psychology,* 86**,** 388-404.
CHAPMAN, S. (2007) Forrester: ERP project disasters, a retrospective.
CHAU, P., HU, PJ (2001) Information Technology Acceptance By Individual Professionals; A Model Comparison Approach. *Decision Sciences,* 32**,** 699 - 719.
CHERNS (1987) Principles of sociotechnical design revisited. *Human Relations,* 40**,** 153-162.
CHOU, H. (2001) Influences of cognitive style and training method on training effectiveness. *Computers and Education,* 37**,** 11-25.

CLEGG, C. (2000) Socio Technical Principles For System Design. *Applied Ergonomics,* 31.
COBB, A. W., K. FOLGER, R (1995) The role justice plays in organisational change. *Public Administration Quarterly*, 135-151.
COCH, L. F., J. (1948) Overcoming resistance to change. *Human Relations,* 1, 512-532.
COLLET., S. (1999) SAP: Whirlpool's rush to go live led to shipping snafus. *Computerworld.* Nov 04 1999 ed.
COMPEAU, D. H., C. (1995) Computer Self Efficacy; Development of Measure and Initial Test. *MIS Quarterly,* 19, 189 - 211.
COMPEAU, D. H., C. HUFF, S. (1999) Social Cognitive Theory and Individual Reactions to computing technology: A longitudinal study. *MIS Quarterly,* 23, 145-158.
CONWAY, E., MONK, K. (2008) HR Practices And Commitment To Change: An Employee Level Analysis. *Human Resource Management Journal,* 18, 72-89.
CONWAY, N. B., R. (2002) A daily diary study of affective responses to psychological contract breach. *Journal of organisational behaviour,* 23, 287-302.
COOPER, R. Z., R. (1990) Information technology implementation research: A Technological Diffusion Approach. *Management Science,* 36, 123-139.
COULSON, T. O., L. SHAYO, C. ROHM, C. (2003) ERP Training strategies: Conceptual training and the formation of accurate mental models. *SIGMIS Conference.* Philadelphia.
CROWE, E. H., E.T. (1997) Regulatory focus and strategic inclinations: Promotion and prevention in decision making. *Organisational behavior and human decision processes,* 69, 117-132.
DAVIDSON, J. (2002) Overcoming resistance to change. *Public mamangement,* 84, 20-23.
DAVIS, F. B., R. WARSHAW, P. (1989) User acceptance of information technology: A comparison of two theoretical models. *Management Science,* 35, 982-1003.
DEL VAL, M. P., FUENTES, C.M. (2003) Resistance to change: A literature review and empirical study. *Management Decision.,* 41, 148-155.
DENT, E., GOLDBERG, SG. (1999) Challenging "reistance to change". *Journal of applied behavioural science,* 35, 25-41.
DOLMETSCH, R., HUBER, T., FLEISCH, E., ÖSTERLE, H. (1998) *R/3 implementation in small and midsize companies*.
DRUKER, J. W., G (2000) *Coda,* London, Routledge.
DUTTON, J. E., J.M. DUKERICH., HARQUAIL, CV. (1994) Organizational Image and Member Identification. *Administrative science quarterly,* 39, 239-263.
ECKARTZ, S., DANEVA., M. WIERINGA., R. (2009) Cross-Organisational ERP Management: How to Create A Successful Business Case. *Proceedings of the 2009 ACM Symposium on Applied Computing, New York, USA.* New York.
EGAN, G. (1995) A clear path to peak performance. *People Management*, 34-37.
EHIE., I. M., M. (2005) Identifying critical issues in enterprise resource planning (ERP) implementation. *Computers in Industry,* 56, 545-557.

ELANGOVAN, A. R. S., D. (1998) Betrayal of trust in organisations. *Academy of management review,* 23**,** 547-566.
ELLIOT, A. J. H., J.M. (1996) Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of personality and social psychology.,* 70**,** 461-475.
EYSENCK, H., EYSENCK, SB. (1975) *Manual of the Eysenck Personality Questionnaire,* London:, Hodder and Stoughton.
FARANDA, W. (2001) A Scale to Measure the cognitive Control Form of Perceived Control: Construction and Preliminary Assessment. *Psychology & Marketing* 18**,** 1259 - 1281.
FARRELL, D. (1983) Exit, voice, Loyalty and neglect as responses to job dissatisfaction: A multidimensional scaling study. *The Academy of Management Journal,* 26**,** 596-607.
FEATHER, N. (1985) Attitudes, values and attributions: Explanations of unemployment. *Journal of personality and social psychology,* 48**,** 876-889.
FENTON O'CREEVY, M. (2000) *Managing Strategy Implementation,* Oxford, Blackwell.
FERGUSON, I. (2004) 'NAB takes Au$200 million writedown on failed ERP project'. *zdnet Australia+-3*

FESTINGER, L. (1957) *A theory of cognitive dissonance,* Evanston, IL., Peterson.
FIELDS, D. (2002) *Taking The Measure of Work; A Guide to Validated Scales for Organizational Research and Diagnosis,* California, Sage.
FISCHER, G. (2001) User modelling in Human-Computer Interaction. *User modeling and user-adapted Interaction,* 11**,** 65-86.
FISHBEIN, M., & AJZEN, I. (1975) *Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research,* Reading, MA:, Addison-Wesley.
FLOOD, P. T., T. RAMAMOORTHY, N. PEARSON, J. (2001) Causes and consequences of psychological contracts among knowledge workers in the high technology and financial services industry. *International journal of Human Resource Management,* 12**,** 1152-1165.
FOLGER, R., SKARLICKI, D.P. (1999) Unfairness and resistance to change: Hardship as mistreatment. *Journal of organisational change management,* 12**,** 35-50.
FREEDMAN, S. M., J. (1980) An integrative model of managerial reward allocation. *Academy of Management Review,* 5**,** 381-390.
FURNHAM., A. (1997) *The Psychology of behaviour at work; The individual in the organisation,* London, Taylor & Francis.
GILL, J. J., P. (2002) *Research methods for managers,* London, Sage
GINZBERG, M. J. (1981) Early diagnosis of MIS implementation failure: Promising results and unanswered questions. *Management Science,* 27**,** 459-478.
GORDON, E., MORGON, R.R., PONTICELLI, J.A. (1995) *FutureWork: The Revolution Reshaping American Business*
Westport, Quorom.

GOUL, M., CAROUL, K. (2007) Enterprise Model Managment and Next Generation Decision Support. *Decision Support Systems* 43**,** 915-932.
GREENBERG, J., COPRANZANO, R. (1996) *Advances in Organisational Justice,* Boston, Stanford University Press.
GUEST, D. E., CONWAY, N., (2002) Communicating the Psychological contract: An Employer Perspective. *Human Resource Management,* 12**,** 22-38.
GYAMPAH., K. A. (2004) ERP implementation factors: A comparison of managerial and end user perspectives. *Business Process Management Journal,* 10**,** 171-183.
HACKMAN, J. R., OLDHAM, R.J., PURDY, K (1975) A New Stratgy For Job Enrichment. *California Management Review,* 17.
HARDIN, E. (2002) Depression And Social Anxiety Among Asian and European Americans: The Roles of Self Discrepancy, Optimism, and Pessimism. *Psychology.* Ohio, Ohio State University.
HARLEY, B. W., C. HALL, R. DERY, K. (2006) Management reactions to technological change: The example of enterprise resource planning. *The journal of Applied behavioural science,* 42**,** 58-75.
HARTWICK, J. B., H. (1994) Explaining the Role of User Participation in information System Use. *Management Science,* 40**,** 440 - 465.
HAUGTVEDT, C. P., RICHARD, E. (1992) Personality and persuasion: Need for cognition moderates the persistence and resistance of attitude changes. *Journal of personality and social psychology,* 63**,** 308 - 319.
HEATH, C. (1999) On the social psychology of agency relationships: Lay theories of motivation overemphasize extrinsic incentives. *Organisational behaviour and human decision processes.,* 78**,** 25-62.
HENDRY, C. W., S. BRADLEY, P. PERKINS, S. (2000) Performance and rewards: cleaning out the stables. *Human Resource Management Journal,* 10**,** 46-62.
HERRIOT, P. M., W. KIDD, J.M. (1997) The content of the psychological contract. *British Journal of Management,* 8**,** 151-162.
HERZBERG, F., MAUSNER, B. & SNYDERMAN, B.B. (1959) *The Motivation To Work,* New Yor, John Wiley.
HIGGINS, E. (1997) Beyond Pleasure and Pain. *American Psychologist,* 52**,** 1280-1300.
HIGGINS, E. (2000) Making a good decision: Value from fit. *American Psychologist***,** 1217-1230.
HIGGINS, E. K., R. STRAUMAN, T. (1985) Self-concept discrepancy theory: A psychological model for distinguishing among different aspects of depression and anxiety. *Social Cognition,* 1**,** 51-76.
HIGGINS, E. T. R., C. CROWE, E. HYMES, C. (1994) Ideal Versus ought predictions for approach and avoidance: Distinct self-regulatory systems. . *Journal of personality and social psychology.,* 66**,** 276-286.
HILTROP, J. (1996) Managing the changing psychological contract. *Employee Relations,* 18**,** 36-49.
HIRSCHMAN, A. (1970) *Exit, Voice and Loyalty: Responses to declines in firms, organisations and states.,* Cambridge, Harvard University Press.

HOLLAND, C., LIGHT, B. (2001) A Stage Maturity Model for ERP System Use. *Database of Advanced Information Systems,* 32**,** 34-45.
HOLLAND., C. P. L., B. (1999) 'A critical success factors model for ERP implementation'. *IEEE, Software,* 16**,** 30-36.
HONG., K. K. K., Y.G. (2001) The critical success factors for ERP implementation: An organisational fit perspective. 40**,** 25-40.
HUDSON, M., SMART, A., BOURNE, M. (2001) Theory and practive in SME performance measurement systems. *International journal of Operations and Production Management,* 21**,** 1096-1115.
HUNTON, J. E. (2002) The Reaction of Financial Analysts to Enterprise Resource Planning (ERP) Implementation plans. *Journal of Information Systems,* 16**,** 31 - 40.
HUNTON, J. E. B., JD (1997) Effect of User Participation in Systems Development. *MIS Quarterly,* 21**,** 259-388.
HYMAN, J. W., S. MUNRO, P. (2002) In Difficult times: influences of attitudes and expectations on training and redeployment opportunities in a hospital contraction program. *International journal of training and development,* 6**,** 183-197.
JACOBS, R. (2007) Enterprise Reseource Planning (ERP), A Brief History. *Journal of Operations Management,* 25.
JIANG., J. J., WALEED., A.., KLEIN, GARY. (2000) User Resistance and strategies for promoting acceptance across system types. *Information & Management,* 37**,** 25-36.
JOSHI., K. (1991) A model of users' perspective on change; The case of informations systems technology implementation. *MIS Quarterly,* 15**,** 229-242.
KAPLAN, R. S., NORTON, D.P (1992) The Balanced Scorecard. *Harvard Business Review,* Jan-Feb**,** 71-79.
KEEN, P. G. (1981) Information systems and organisational change. IN KLING, R. (Ed.) *Communications of the ACM.*
KIM, H., KANKANHALLI, A. (2009) Investigating User Resistance To Information Systems Implementation: A Status Quo Perspective. *MIS Quarterly,* 33**,** 567 - 582.
KIM, Y. (2006) The role of regulatory focus in message framing in anti smoking advertisments for adolescents. *Journal of Adverstising,* 35**,** 143-151.
KING, W., HE, J. (2006) A Meta Analysis of The Technology Acceptance Model. *Information and management,* 43**,** 740 - 755.
KLEINGELD, A., VAN TUIJL, H. ALGERA, J. (2004) Participation in the Design of Performance Management Systems: A quasi experimental field study. *Journal of organisational behaviour,* 25**,** 831-851.
KOCH, C. (2002) Supply Chain: Hersheys' Bittersweet Lesson. *www.cio.com.*
KOHN, A. (1993) Why incentive plans cannot work. *Harvard Business Review.*
KOMAKI, J., COOMBS, T., SCHEPMAN S. (Ed.) (1996) *Motivation Implications of Reinforcement Theory,* New York, McGraw Hill.

KONTOGHIORGHES, C. (2001) Factors affecting training effectiveness in the context of the introduction of new technology - a US case study. *International journal of training and development,* 5.
KOTTER, J. P., SCHLESINGER, L. (1979) Choosing strategies for change. *Harvard business reviews.*
KUMAR., K. B. A., N. (2000) ERP experiences and evolution. *Communications of the ACM,* 43**,** 23-26.
KUMAR., V. M., B., KUMAR., U (2003) An investigation of critical management issues in ERP implementation: empirical evidence from Canadian organisations. *Technovation,* 23**,** 793-807.
KWON, T. Z., R. (Ed.) (1987) *Unifying the fragmented models of information systems implementation,* New York, Wiley.
LAWLER, E. (1987) *Paying for performance: Future directions,* New Jersey, Prentice Hall.
LAWRENCE, P. (1954) How to deal with resistance to change. *Harvard Business Review.* January/February ed.
LAWRENCE., P., LORSCH, JR & (1969) *Developing Organisations: Diagnosis and Action,* Reading Massachusetts, Addison-Wesley.
LEE, A. A., J. (2004a) Bringing the frame into focus: the influence of regulatory fit on processing fluency. *Journal of personality and social psychology,* 86**,** 205-218.
LEE, J., SEE, K. (2004b) Trust in Automation; Designing for Appropriate Reliance. *Human Factors,* 46**,** 50-80.
LEE., C. Y. (2003) Total Manufacturing Information System; A conceptual model of a strtegic tool for competitive advantage. *Integrated Manufacturing Systems,* 14.
LEGRIS, P., INGRAM, J., COLLERETTE, P. (2003) Why do people use Information Technology? A critical review of the technology acceptance model. *Information and management,* 40**,** 191 - 204.
LEMIRE, L. R., C. (2005) An empirical exploration of psychological contract violation and individual behaviour. *Journal of Managerial Psychology,* 20**,** 150-163.
LEOTTI, L., IYENGAR, S., OCHSNER, KN. (2010) Born To Choose: The origins and value of the need for control. *Trends in Cognitive Science,* 14**,** 457-463.
LEVINE, H., ROSSMORE, D. (1993) Diagnosing The Human Threats To Information Technology Implementation. *Jounal of Information Management Systems,* 10**,** 55 - 73.
LEVINSON, H. P. C. M. C. M., H. SOLLEY, C.M. (1962) *Men, management and mental health,* Cambridge, Harvard University Press.
LEVINSON, H. P. C. M. C. M., H. SOLLEY, C.M. (1965) Reciprocation: The Relationship between Man and Organization *Administrative science quarterly,* 9**,** 370 - 390.
LEWIN, K. (1948) *Resolving Social Conflicts and Field Theory in Social Science*, Harper.
LEWIN, K. (1963) *Field Theory in Social Science: Selected theoretical papers,* London, Tavistock Publications Ltd.

LISKA, A. (1984) A critical examination of the causal structure of the Fishbein/Ajzen Attitude-Behaviour model. *Social psychology quarterly,* 47**,** 61-74.
LOCKE, E., LATHAM, G. (1990) *A theory of Goal Setting and Task Performance,* New Jersey, Prentice Hall.
LOCKE, E., LATHAM, G. (2002) Building a practically useful theory of goal setting and task motivation. *American Psychologist,* 57**,** 705-717.
LOUGHMAN, T., FLECK JR R.A., SNIPES, R. (2000) 'A cross disciplinary model for improved information systems analysis'. *Industrial management and data systems,* 8**,** 359-369.
LUCAS, H. (1978) Empirical evidence for a descriptive model of implementation. *MIS Quarterly,* 2**,** 27-42.
LUTHANS, F., KREITNER, R. (1975) *Organisational Behaviour Modification,* Illinois, Scott.
MACNEIL, I. (1985) Relational Contracts, What we do and do not know. *Wisconsin Law Review***,** 483 - 525.
MALONE, S. (2005) *A practical guide to learning in the workplace,* Dublin, The Liffey Press.
MARCOLIN, B., COMPEAU, DR, MUNRO, MC. (2000) Assessing User Competence: Conceptualisation and Measurement. *Information Systems Management,* 11**,** 37-60.
MARCUS., M. L. (1983) Power, Politics, and MIS Implementation. *Communications of the ACM,* 26**,** 430-444.
MARKMAN, A. B., G. MADDOX, W. (2005) The interaction of payoff structure and regulatory focus in classification. *American Psycchological society,* 16**,** 852-855.
MARKS, A. (2001) Developing a multiple foci conceptualisation of the psychological contract. *Employee Relations,* 23**,** 454-467.
MARKUS, H. N., P. (1986) Possible selves. *American Psychologist,* 41**,** 954-969.
MARKUS, L. (1983) Power, Politics and MIS Implementation. *Communications of the ACM,* 26.
MARKUS, L. A. T., C. (2000a) *The Enterprise System Experience, From Adoption To Success,* New York, Pinnaflex Educational Resources.
MARKUS, M., AXLINE, S., PETRIE, D., TANIS, C (2000b) Learning from adopters experiences with ERP: Problems Encountered and Success Achieved. *Journal of Information Technology,* 15**,** 245 - 265.
MARTIN., M. H. (Feb 1998) An ERP Strategy. *Fortune.*
MARTINKO., M. J. H., J.W. ZMUD., RW (1996) An attributional explanation of individual resistanceto the introduction of information technologies in the workplace. *Behaviour and information technology,* 15**,** 313-330.
MASLOW, A. (1968) *Towards a Psychology of Being,* Canada, Wiley & Sons.
MAYOR, R., DAVIS, JH., SCHOORMAN, FD. (1995) An Integrative Model of Organisational Trust. *Academy of Management Review,* 20**,** 709-734.
MCAFEE, A. (1999) The impact of Enterprise Reseource Planning Systems on Company Performance. Boston, Wharton Electronic Supply Chain Conference.

MCCLELLAND., D. (1966) That urge to achieve. *Think Magazine.*
MCCRAE, R. C., P. (1987) Validation of the five factor model of personality across instruments and observers. *Journal of personality and social psychology,* 52**,** 81-90.
MCGEEVER., C. (1999) 'Faulty install' spurs lawsuit. *Computerworld.*
MCGUIRE, D. (2004) The relationship between individual and managerial values and human resource decision making: A comparitive study. *Kemmy Business School.* Limerick, University of Limerick.
MCLAUGHLIN, M. (1987) Learning from experience: lessons from policy implementation. *Educational Evaluation and policy analysis,* 9**,** 171-178.
MEYER, J. B., T. VANDENBERGHE, C. (2004) Employee commitment and motivation: A conceptual analysis and integrative model. *Journal of Applied Psychology,* 89**,** 991-1007.
MICHALAK, D., YAGER, EG. (1979) *Making The Training Process Work,* New York, Harper & Row.
MIKULA, G. B., P. TANZER, M. (1990) What people regard as unjust: Types and structures of everyday experiences of injustice. *European Journal of Social Psychology,* 20**,** 133-149.
MILLS, J., WILCOX, M., NEELY, A., PLATTS, K. (2000) Designing, implementing and updating performance measurement systems. *International journal of Operations and Production Management,* 20**,** 754-771.
MORRIS, J. S., R. (1980) Structural influences on organisational commitment. *Journal of Vocational Behaviour,* 17**,** 50-57.
MORRISON, D. (1994) Psychological contracts and change. *Human Resource Management,* 33**,** 72-84.
MORRISON, E. R., S. (1997) When employees feelbetrayed: A model of how psychological contract violation develops. *Academy of management review,* 22**,** 226-256.
MOSER, C. K., G. (1972) *Survey methods in social investigation,* London, Heinemann educational books ltd.
MOTWANI., J., MIRCHANDANI., D., MADAN., M., GUNASKERAN., A. (2002) Successful implementation of ERP projects, Evidence of two case studies'. *International Journal of Production Economis,* 75**,** 83-96.
MULLANY., M. J. (2001) Using cognitive style to measures to forecast user resistance. *Proceedings of the NACCQ.* New Zealand.
MUMFORD, E. (1995) *Effective requirements analysis and systems design: The Ethics Method.,* London, McMillan.
MURRAY, H. A. (1938) *Explorations in personality,* New York, Oxford University Press.
MUSCATELLO., J. R., SMALL., M.H. INJAZZ., J.C. (2003) Implementing enterprise resource planning (ERP) systems in small to midsize manufacturing firms. *International Journal of Operations and Production Management.,* 23**,** 850-871.

NAH, F. Z., K. LAU, J. (2003) ERP Implementation: Chief informations officers' perceptions of critical success factors. *International journal of Human computer interaction,* 16**,** 5-22.
NASH, K. S. (2002) Russ Berrie Tells vendors; "Let's Define a Deal". *BaseLine.*
NEELY, A. (1999) The performance measurement revolution; Why now and what next. *International journal of Operations and Production Management,* 19**,** 205-228.
NEELY, A. A., C., KENNERLY, M. (2002) *The Performance Prism,* Harrow, Prentice Hall.
NICOLAU, A. (2004) Quality of Post Implementation Review for Enterprise Reseource Planning Systems. *International Journal of Accounting and Information Systems,* 5**,** 25-49.
NIERENBERG, G. (1981) *The Art of Negotiating,* New York, Random House.
NOE, R. (1986) Trainee's attributes and attitudes: Neglected influences on training effectiveness. *Academy of Managment Review,* 11**,** 736-749.
O'LEARY, D. E. (2004) Enterprise Resource Planning (ERP) Systems: An empirical analysis of benefits. *Journal of Emerging Technologies in Accounting,* 1**,** 63-74.
OESTERLE, H., FLEISCH, E., ALT, R. (2000) *Business Networking:Shaping Enterrpise Relationships on the Internet*, Springer Verlag.
OPPENHEIM, A. (1972) *Questionnaire design and attitude measurement,* London, Heinemann.
OREG, S. (2003) Resistance to change: Developing an individual difference measure. *Journal of Applied Psychology,* 88**,** 680-693.
PARR., A. S., G. (2000) A model of ERP project implementation. *Journal of Information Technology.,* 15**,** 289-303.
PATE, J. M., G. MCGOLDRICK, J. (2003) The impact of psychological contract violation on employee attitudes and behaviour. *Employee Relations,* 25**,** 557-573.
PEARCE, J. (1987) *Why Merit based pay doesn't work: Implications from organisational theory,* New Jersey, Prentice-Hall.
PERVIN, L. (1994) A critical analysis of current trait theory. *Psychological inquiry,* 5**,** 103-113.
PETTIGREW., A. M. (1997) 'Success and failure in corporate transformation initiatives.' Published in dutch under title 'Sladen en falen bij transformatie van ondernemingen'. *Nijenrode Management Review,* 49**,** 272-289.
PFEFFER, J. (1995) *Competitve Advantage Through People; Unleashing the Power of The Workforce,* Boston Massachusetts, Harvard Business Press.
PFEFFER, J. (1998) Six dangerous myths about pay. *Harvard Business Review,* May-june**,** 109-119.
PIDERIT, S. (2000) Rethinking resistance and recognising ambivalence: A multidimensional view of attitudes toward an organisational change. *The Academy of Management review,* 25**,** 783-794.
POLE, C. L., R. (2002) *Practical Social Investigation,* Essex, Pearson.

PORTER, L. P., J. TRIPOLI, A. LEWIS, K. (1998) Differential perceptions of employer's inducements: Implications for psychological contracts. *Journal of organizational behaviour,* 19**,** 769-782.
REEL., J. S. (1999) Critical success factors in software projects. *IEEE, Software,* 16**,** 18-23.
RETTIG, C. (2007) The Trouble With Enterprise Software. *MIT Sloan Managment Review,* 49**,** 20 - 27.
RIEDEL, R. F., J., V.C.S. WIERS. (2006) Modeling Dynamics in Decision Support Systems IN R.N. PIEKAAR, E. A. P. K., AND P.J.M. SETTELS (Ed.) *Proceedings IEA 2006 Congress (CD-ROM).* Maastrich, Elsevier.
ROBEY, D. (1979) User attitudes and management information use. *Academy of Managment Journal,* 22**,** 527-538.
ROBEY, D. (1982) An Investigation of User Led System Design: Rational and Political Perspectives. *Communications of the ACM,* 27**,** 1202-1210.
ROBINSON, S., KRAATZ, M. ROUSSEAU, D. (1994) Changing obligations and the psychological contract: A longitudinal study. *Academy of management journal,* 37**,** 137-152.
ROSS, J., VITALE., MR (2000) The ERP Revolutiuon: Surviving Vs Thriving. *Information Systems Front,* 2**,** 233-241.
ROTHERBURGER, M., WRITE, M. (2009) An investigation into customisation in Enterprise Resource Planning System Implementations. *IEEE Transactions on Engineering Management,* 56.
ROUILLER, J. G., L. (1993) The relationship between organsiational transfer climate and positive transfer of training. *Human Resource Development Quarterly,* 4**,** 377-390.
ROUSSEAU, D. M. (2001) Schema, promise and mutuality: The building blocks of the psychological contract. *Journal of Occupational and Organisational Psychology,* 74**,** 511-541.
ROUSSEAU, D. M. (2004) Psychological contracts in the workplace: Understanding the ties that motivate. *Academy of Managment Executive,* 18**,** 120-127.
ROUSSEAU, D. M., & MCLEAN PARKS, J. (Ed.) (1993) *The contracts of individuals and organizations,* Greenwich, JAI Press.
ROUSSEAU, D. T., S. (1998) Assessing psychological contracts: Issues, alternatives and measures. *Journal of organisational behaviour,* 19**,** 679-695.
ROUSSEAU, D. T., S. (1999) What's a good reason to change? Motivated Reasoning and social accounts in promoting organisational change. *Journal of applied psychology,* 84**,** 514-528.
RUBIN, R. (2002) Will The Real SMART Goals Please Stand Up. *The Industrial-Organisational Psychologist,* 39.
RUMELT, R. P. (1995) *Inertia and Transformation,* Massachusetts, Kluwer.
RUSBULT, C. F., D. ROGERS, G. MAINOUS, A. (1988) Impact of exchange variables on Exit, Voice, Loyalty and Neglect: An integrative model of responses to declining job satisfaction. *Academy of Management Journal,* 31**,** 599-627.

SALANCIK, G. R. P., J. (1978) A social information processing approach to job attitudes and task design. *Administrative science quarterly,* 23**,** 224-253.
SAWYER, S. S., R. (2002) Temporal issues in information and communication technology-enabled organisational change: Evidence from an Enterprise systems implementation. *The Information Society* 18**,** 263-280.
SCHALK, R. C., J. FREESE, C. (1998) Change and employee behaviour. *Leadership and organsiation development journal,* 19**,** 157-163.
SCHALLA, K., FRANSOO, JC., DE KOK, TG., (2004) Modeling The Planning Processes in Advanced Planning Systems. *Information and management,* 42.
SCHEIN, E. H. (1996) Kurt Lewin's Change theory in the field and in the classroom: Notes toward a model of managed learning. *Systems Practice,* 9**,** 27-47.
SCOTT, J. (1999) The Foxmeyer Drugs' Bankruptcy: Was it a Failure of ERP? *AMCIS Proceedings.*
SCOTT, J., WALCZAK, S., (2009) Cognitive Engagement with a Multimedia ERP Tool. *Computers and Information,* 46**,** 221-232.
SELS, L. J., M VAN DEN BRANDE, I. (2004) Assessing the nature of psychological contracts: A validation of six dimnsions. *Journal of organisational behaviour,* 25**,** 461-488.
SHAH, J. H., E. FRIEDMAN, R. (1998) Performance incentives and means: How regulatory focus influences goal attainment. *Journal of personality and social psychology,* 74**,** 285-293.
SHANG, S. A. S., PB (2002) Assessing and Managing the Benfits of ERP Systems: The Business Managers Perspective. *Information Systems Journal,* 12**,** 271 - 299.
SHANI, A. B. G., R.M. KRISHNAN., R. THOMPSON., E. (1992) Advanced manufacturing systems and organisational choice; SocioTechnical system approach. *California Management Review,* 34**,** 101-115.
SHERIDAN, T., HENNESSY, RT. (1984) *Research and Modeling of Supervisory Behaviour,* Washington DC, National Academy.
SHIH., H. P. (2006) Using a cognition-motivation-control view to assess the adoption intention for web based learning. *Computers and education*.
SIMONS, T. (2002) Behavioral integrity: The perceived alignment between managers' words and deeds as a research focus. *Organisation science,* 13**,** 18-35.
SITKIN, S. B., R.J. (1993) Social accounts in conflict situations: Using explanations to manage conflict. *Human Relations,* 46**,** 349-370.
SJAZNA, B. S., R. (1993) The effects of information system user expectations on their performance and expectations. *MIS Quarterly,* 17**,** 493-516.
SKARLICKI, D. F., R. (1997) Retaliation in the workplace: The roles of distributive, procedural and interactional justice. *Jounal of Applied Psychology,* 82**,** 434-443.
SLEVIN. D.P. PINTER, J. K. (1987) Balancing strategy and tactics in project implementation. *Sloan Management Review,* Fall**,** 33-44.
SMITHER, J. R., S. (2001) Coaching in organizations: A social psychological perspective. *How people evaluate others in organizations: Person, Perception*

and and interpersonal judgement in I/O Psychology. Mahwah, NJ, Lawrence Erlbaum.
SOJA., P. (2006) Success factors in ERP systems implementations; Lessons from practice. *Journal of Enterprise Infomation Management,* 19**,** 418-433.
SOMERS, T. M., NELSON.,KLARA (2001) The Impact of Critical success factors across the stages of enterprise resource planning'. *34th Hawaii International conference on system sciences - 2001.*
SONGINI, M. (2004) University hits peoplesoft with $520 million lawsuit. *CIO.* March 2004 ed.
SONGINI, M. (2005) GAO: Navy sinks $1B into failed ERP Pilot project. *CIO.*
SPIEGEL, S. G. P., H. HIGGINS, E. (2004) How reulatory fit enhances motivational strength during goal pursuit. *European Journal of Social Psychology,* 34**,** 39-54.
STAKE, J. (Ed.) (1998) *Qualitative Inquiry and Research Design: Choosing Amongst Five Traditions.,* London, Sage Publications.
STEDMAN., C. (1999) Failed ERP gamble haunts Hershey. *Computerworld.*
STILES, P. (2000) Constraints on strategy implementation: The 'problem' of the middle manager. IN FLOOD, P. D. T. C., S.J. GORMAN, L. (Ed.) *Managing strategy implementation.* Oxford, Blackwell.
STILES, P., GRATTON, L., TRUSS, C. (1997) Performance Management and the Psychological Contract. *Human Resource Management,* 12**,** 57-65.
SZULKIN, R. (1999) Making people work: Control and incentives in Swedish Organisations. *Acta Sociologica,* 42.
TANGNEY, J. N., P. COVERT M. BARLOW, D. (1998) Are shame and guilt related to disctinct self discrepancies? A test of Higgins (1997) Hypothesis. *Journal of personality and social psychology,* 1**,** 256-268.
TRUELOVE, S. (1992) *Handbook of Training and development.,* Massachusetts, Blackwell.
TUNG, C., CJIEN, CH (2008) Understanding Knowledge Managment Usage Antecedents; An Integration of Social Cognitive Theory and Task Technology Fit. *Information and management,* 45**,** 210-217.
TURNLEY, W. F., D. (1999) The impact of psychological contract violations on Exit, Voice, Loyalty, and neglect. *Human Relations,* 52**,** 895-922.
UMBLE., E. J. H., R.R. UMBLE., M.M. (2003) Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research.,* 146 241-257.
VAN DER ZWAAN, A. H. (1975) The sociotechnical systems approach: A critical evaluation. *International Journal of Production Research.,* 13**,** 149-163.
VAN ERDE, W. T., H. (1996) Vroom's Expectancy Models and Work-Related Criteria: A Meta Analysis. *Journal of Applied Psychology,* 81**,** 575-586.
VENKATASH, V. D., F. (2000) A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science,* 46**,** 186-204.

VENKATESH, V. (2000) Determinants of Perceived Ease of Use: INtegrating Control, Intrinsic Motivation and Emotion into the Technology Acceptance Model. *Information Systems Research,* 11**,** 342 - 365.
VERNADAT., F. (2002) UEML; Towards a unified enterprise modelling language. *International Journal of Production Research.,* 40**,** 4309-4321.
VERVILLE., J. B., C. (2005) So you're thinking of buying an ERP? Ten Critical Success factors for successful acquisitions. *Journal of Enterprise Infomation Management,* 18**,** 665 - 677.
VOGT, C. (2002) 'Intractable ERP; A Comprehensive analysis of failed enterprise resource plannning projects". *ACM Aigsoft Software Engineering Notes,* 27**,** 62-68.
VROOM, V. (1964) *Work and Motivation,* New York, Wiley.
WADDELL, D. S., A.S. (1998) Resistance: A constructive tool for change management. *Management Decision.,* 36**,** 543-548.
WANBERG, C. B., J. (2000) Predictors and outcomes of openness to changes in a reorganising workplace. *Journal of applied psychology,* 85**,** 132-142.
WEICK, K. S., K.M. OBSTFELD, D. (2005) Organising and the process of sensemaking. *Organisation science,* 16**,** 409-421.
WHEATLEY., M. (2000) ERP Training Stinks. *CIO Magazine.*
WHITE, J., CLARK, D. ASCARELLI S. (1997) This German Software is Complex, Expensive and Wildly Popular. *Wall Street Journal.* New York.
WHYTE, W. (Ed.) (1991) *Participatory Action Research And Action Science; Argyris & Schon,* California, Sage Focus Edition.
WILSON, C., SHEAHAN, C. (2006) State of Performance Measurement Management in SME's. *Performance Measurement Management: Public and Private.* Cranfield School of Management, UK.
WINTER, R. (1989) *Learning from experience; Principles and Practice in Action research.*
, London, The Falmer press.
WOOD, T., CALDAS, M. (2002) Reductionism and complex thinking during ERP implementations. *Business Process Management,* 7**,** 387 - 393.
WOOD, W. (2000) Attitude change: Persuasion and social influence. *Annu. Rev. Psychol.,* 51**,** 539-570.
WORTHEN., B. (2005) Nestle's ERP Odyssey. *CIO Magazine.* CIO Magazine.
WU., B. (2001) A unified framework of systems design. *Industrial management and data systems,* 101**,** 446-469.
XU, H., HORN NORD, J., BROWN, N., NORD, G. (2002) Data Quality Issues In Implementing ERP. *Industrial Management and Data Systems,* 100.
YUCONG, L., YOUNGWHA, L., CHEN, A. (2011) Evaluating the effect of Task-Individual-Technology Fit in a DSS. *Information and management,* 51**,** 688-700.
ZAND, D. S., R. (1975) Theory of change and effective use of management science. *Administrative science quarterly,* 20**,** 532-545.

ZHIANG., L. L., M., ZHANG., Z., BANERJEE., PROBIR (2003) 'Critical Success Factors of enterprise resource planning systems implementation success in china'. *Proceedings of the 36th Hawaii international conference on system sciences.*

ZUCKERMAN, M. K., D.. JOIREMAN, J. TETA, P KRAFT, M. (1993) A comparison of three structural models for personality: The big three, the big five and the alternative five. 65**,** 757-768.