

Factors Affecting the Implementation of  
Enterprise Systems  
within Government Organisations in New Zealand

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## **ABSTRACT**

The 1990's saw a rapid growth in the use of Enterprise Systems by organisations to undertake quick and strategic decisions. Significant to the use of Enterprise systems, is their implementation in the organisation. The increased use of paper documents in government organisations and the augmented implementation rate of Electronic Document Management Systems within government organisations in New Zealand, is what triggered this research and subsequently the framing of the research objectives and thereby the research question. This research encompasses the factors which affect the implementation process of an Enterprise Document Management System and thereby render it a success or a failure.

The study used an ethnographic approach in order to introduce rigour in the research. The data was collected by conducting eight semi-structured interviews at the client organisation. The interviews were transcribed and later coded using an open – coding methodology. A thematic analysis based schema was developed to later analyse the coded data.

The research found that, factors such as change management, behaviour management / emotions, communication, implementation process approach and system functionality had profound effects on the implementation success of the Electronic Document Management System in the research organisation. The thesis has been mostly written in the first person to represent the author's interpretation of the implementation process and its related factors.

## **Acknowledgement**

This research has been one of the biggest academic tasks I have undertaken in my life till date. Completing the research successfully would not have been possible all by myself and hereby I would like to acknowledge the help I received from some people during this process.

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## Abbreviations

AUT	Auckland University of Technology
AUTEC	Auckland University of Technology Ethics Committee
BPR	Business Process Reengineering
CFF	Critical Failure Factor
CRM	Customer Relationship Management
CSF	Critical Success Factor
E2RP	Extended Enterprise Resource Planning
EDMS	Electronic Document Management Systems
ERP	Enterprise Resource Planning
ES	Enterprise Systems
HR	Human Resources
IM	Information Management
INIT	Integrating Information Technology and the Enterprise
IS	Information Systems
IT	Information Technology
KPIs	Key Performance Indicators
LAN	Local Area Network
MRP	Material Resource Planning
MS	Microsoft
NAA	National Archives of Australia
NZ	New Zealand
PC	Personal Computer
PCMH	PITT County Memorial Hospital
RFP	Request for Proposal
SCM	Supply Chain Management
TOR	Terms of Reference

# **1. Introduction**

## **1.1 Introduction**

This chapter gives an overview of the entire report. The chapter begins by providing some background information about me as a researcher and the research organisation. It then proceeds onto a brief overview of the research topic, formation of the research objectives, and subsequently the research question. It then briefly outlines the research method used for the study, and the limitation of the scope of the research. It finally concludes by giving an outline for the rest of the report.

## **1.2 The Researcher**

Coming from a background where research has never been at the forefront, the study presented in this report, was a great challenge for me. Beginning the Masters in Computer and Information Sciences course itself presented the greatest challenge of embedding myself in a research perspective.

My educational background had involved getting a diploma in computer technology and a degree in information technology, back in India. Both the courses were more inclined towards the programming base than towards the research or the management side. Having always been interested in the management side of things than the technical when I started my 'Masters of Computer and Information Sciences' course at Auckland University of Technology (AUT) I undertook a management-based elective paper in 'Integrating Information Technology and the Enterprise (INIT)'. In that elective, doing a paper on 'factors affecting implementation of Enterprise Resource Planning (ERP) systems' was my first step towards getting exposed to the interpretivist paradigm. The paper allowed me to

probe more towards the ethnographic, case study, and grounded theory approaches that were used by some of the authors in the papers reviewed by me.

Alongside, INIT, I was also undertaking a 'research methods 1' paper, wherein I did a research report on 'factors affecting the implementation of Customer Relationship Management (CRM) systems'. This report allowed me to use a hybrid approach of literature review and case study, comprising some previous research heavily involving interpretivist research methods. By the time I was into the second semester of my master's course, I had become a lot more inclined towards the interpretivist paradigm and had started enlightening myself on the ethnographic research method. This concluded with me submitting a research proposal report on factors affecting implementation of ERP systems in the research methods 2 elective paper. The proposal went on to form the crux of my research proposal for the thesis, thereby started my process of discovery of qualitative research and analysis methods.

### **1.3 The Client Organisation**

The client organisation is a large government organisation in New Zealand, consisting of around 2000 users. It has a number of divisions dealing with everything, from transport and water services, to environmental and leisure facilities for the tax payers.

The search for a client organisation began in March 2007 when the ethics application had been sent and provisionally approved. When the study began at the organisation, it was at the end of a seven year cycle of having started the implementation of an Enterprise Document Management System (EDMS) and was on the threshold of implementing an upgrade to the EDMS solution. The need of the organisation was for someone to analyse the factors which affected the system implementation the last time so that it could improve upon those during the current upgrade process.

The research objectives and the research question which I had formed by then, found a direct relevance to the kind of outcome they wanted. This resulted in me sending a research proposal document to the organisation, giving them a brief introduction about the type of research I wanted to perform, what the research was regarding and the time requirements from the organisation.

Once the organisation had approved the proposal, a meeting was arranged with the management. At the meeting the management staff present reported a brief overview of the lifecycle of the implementation process for the EDMS, which the organisation had followed over the past couple of years since the emergence of the idea of having an EDMS in the organisation, till date. The meeting was followed by soliciting a list of potential participants for the interviews, and sending meeting invites and following those up with the interview sessions.

The positive about the organisation's approach towards the research had been that the management had informed the users that research was occurring and that if they were enlisted, they could participate and cooperate in the research and speak out their own personal opinions on the entire process without prejudice. This allowed for the rich data collection from each of the interviews.

## **1.4 Research Topic**

This section describes the conceptualisation of the research topic and the nature of outcomes which had been perceived at the start of the thesis.

### ***1.4.1 Enterprise System (ES)***

Enterprise Systems, interchangeably also referred to as ERP systems, have been used extensively across organisations since the 1990's, amalgamating their resources and processes into one central location. Evolving from the traditional Information Technology (IT) / Legacy Systems in the 1960s to the Extended ERP (E<sup>2</sup>RP)

Systems in the 2000s, they have provided enterprise integration of all the activities of the organisation, across the entire supply chain . The advantage of ES over other legacy systems is that they provide an integrated solution for the organisation by supporting all the business processes and allowing the businesses to undertake strategic decisions based on the simulations of the real processes provided by the ES. This advantage of ES is encompassed within EDMS. EDMS extended the advantages of ES to document management, which is discussed next.

#### ***1.4.2 Enterprise Document Management Systems (EDMS)***

EDMS use an ES approach in the management of documents related to an organisation's processes across its entire lifecycle. This is made possible by the EDMS which stores not only the document, but also the related metadata / attributes . EDMS, in addition to document storage and retrieval, offer other value added features such as auditing, workflow facilities, searching, publishing, etc .

The inference drawn here is that EDMS cannot automatically manage documents but need to be invoked by the user and rely upon the underlying business processes. This implies the importance of the user perspective of the system, which becomes essential for the success of the system; a view reiterated by Downing (2006) on user importance in EDMS success. This draws us to the significance of the implementation process of the EDMS.

#### ***1.4.3 ES / EDMS Implementation***

ES implementation is a complex issue, since it involves not only the technical but also the organisational aspect. This in turn implies the organisational, operational and technical impact; an ES implementation process has on the organisation. Also the ES covers the entire supply chain of the organisation, hence even the organisation's business partners involved in the supply chain assume significance in the implementation process .

The involvement of users across the organisation in the implementation of the system makes the process a complex one. The implementation process stretches across from the selection of the system till the training of the users and the post-implementation support. This leads us to the question that ‘has enough research been undertaken in the ES implementation process segment to unearth the organisational factors affecting the implementation process?’

#### ***1.4.4 Research Approaches***

Most of the research undertaken has come out with findings affecting the technical and organisational aspect of implementation process. However, greater importance has been given to the technical factors than to the organisational factors. This might seem useful for enterprise systems where most of the processes are automated and need little human interaction, as compared to the working of EDMS systems, where the functioning depends heavily on user input to the system. This led me to select an ethnographic approach for the research, in order to unearth and place greater relevance on the social and organisational aspect of the implementation process than on the technical aspects. The ethnographic research method helped me to conduct the research without having any presuppositions prior to beginning the research as well as adding rigour to the research process.

#### ***1.4.5 Research Trigger***

The research proposal formed prior to beginning the research, centred around implementation factors affecting ES. The search for a research organisation ended with this particular government organisation which had earlier implemented an EDMS. EDMS can easily be construed as a subset of ES. I then subsequently researched literature on EDMS. The literature on ES implementation and EDMS implementation, together, formed the trigger for the formation of the research objectives.



A plethora of paper documents exist in government organisations. Recently a number of government organisations in NZ have adopted EDMS. From a government organisation's point of view the supply chain would consist of the governmental organisation, its partner organisations at one end and the rate payers or the public at the other end. This implies that the implementation process, if carried out unsuccessfully, would not only impact the users, i.e. the employees of the organisation, but would also have an indirect impact on the partner organisations and the rate payers i.e. the public as a whole. This signifies the importance of researching the factors affecting the implementation of ES within government organisations. The next section denotes the formation of the research objectives for the study.

### **1.5 Research Objectives**

The selection of the research organisation led to a literature review being undertaken for EDMS. As outlined earlier, the existing theories gave more importance to technical factors and were more inclined towards the implementation of ES or ERP systems as a whole. The need for finding the organisational factors led to the natural emergence, from the initial data analysis, of using a three dimensional approach. The approach consisted of looking at factors affecting the organisation-wide implementation of the ES from the people-view, process-view and system-view. This approach formed the basis of the research objectives.

#### **Research Objective 1: People Factors affecting the implementation of ES in government organisations**

The most dominant dimension in the three dimensional approach specified in the previous section, is the people, since as explained earlier, EDMS are heavily dependent upon the users of the system for its success. Thus finding the people factors' affecting the implementation was formed as the first objective.

**Research Objective 2: Process Factors affecting the implementation of ES in government organisations**

Processes are the second dimension of any organisational activity. The actual implementation process of the ES was thought by me as one of the key activities and thus the formation of the second objective was connected with finding the actual process factors affecting the implementation.

**Research Objective 3: System Factors affecting the implementation of ES in government organisations**

People implement processes in order to use a system in an organisation. Thus the system factors which would affect the implementation were considered to be the third dimension.

The three research objectives together characterise the research question which is defined next.

**1.6 Research Question**

The research question emerging from the literature review, research objectives and the chosen research organisation, is expressed as:

“What are the factors affecting the implementation of Enterprise Document Management Systems (EDMS) in government organisations in New Zealand (NZ)?”

The research proposal at the start had outlined the intent to study factors affecting ES implementation. The search for a research client ended with a government organisation which had implemented an EDMS a few years ago. EDMS is a subset of the larger ES. After the research client had been found, literature on EDMS was reviewed and from the historical perspective of the system implementation at the client organisation, the research objectives evolved. Thus, although there was some

natural movement from the original topic for research, the study has been successful at satisfying the research objectives outlined earlier. The need to move from the original topic can also be attributed to the time constraint for searching an organisation, conducting the research and writing the study within a span of one year.

### **1.7 Data Collection Method**

For collecting the data for the study, I used a semi-structured interview approach while conducting eight interviews at the client / research organisation. Such an approach allowed the interviewees to lead the interview discussion as well as allowed me to maintain control over the direction as to where the interviews lead to. In addition to this semi-structured interview approach, I also recorded audio diaries of my thoughts prior to beginning the interview process and maintained a diary of my views and opinions after conducting each of the eight interviews. This rich collection of data was later transcribed using an open coding approach in order for the data to lead the analysis process, than let the literature / theory drive the analysis.

### **1.8 Limitations of the Scope**

The major limitation of the research lay in the time constraint for doing the study and the geographical limitation. The research was towards satisfying the academic qualification of getting a masters degree as well as generating and supporting existing knowledge in the Information Systems (IS) field. The research spanned a short time of a year, within which the data was collected, analysed and results discovered. Also the interviews had been conducted at a single organisation.

### **1.9 Outline of the Report**

The document presents a manifestation of the research done, from the inception of the idea, till the time the results were obtained and reported. This document, which is the research report, summarises all of these.

The trigger and establishment of the research objectives and subsequently the research question have been explained in this chapter, which is the *Introduction*. Following this, is the chapter on *Literature Review*, which gives an in-depth view of the research / literature which has been investigated for the research and its inadequateness for the research objectives. Following it is a chapter on *Research Methods*, which gives a detailed view of the research methodology and the research methods used in the study. Following it is a chapter on *Analysis*, giving an in-depth view of the analysis procedure used in the study, followed by a chapter on *Results*. The next chapter is on *discussion and future research* followed by the last chapter which is *Conclusion*.

### **1.10 Chapter Summary**

This chapter gave an overview of the background of the research as well as the trigger for the research and the main objectives which need to be satisfied by the research. It also gives an overview of the research methodology and the data collection and analysis technique. Finally it concludes by giving an outline of the entire research report.

## **2. Literature Review**

### **2.1 Introduction**

The preceding chapter had given an overview of the report as well as of the literature upon which the study has been based. This chapter explains the literature in depth. The chapter begins by giving a brief overview of Enterprise Systems. It then continues by briefly explaining the implementation characteristics of ES, EDMS and ERP systems in general. It then explains the implementation factors uncovered by relevant literature, reviewed for the study, and the underlying research methods and their limitations, with respect to this study.

### **2.2 Enterprise Systems**

#### ***2.2.1 What are Enterprise Systems?***

ES have been utilised by organisations across the world for integrating all their various processes and resources into one central location . At times, also interchangeably known as ERP systems, they have been acknowledged as one of the finest pioneering developments of the 1990's by organisations across the world . The purpose of ES is to support the business and functional processes of organisations in order to enable them to undertake strategic decisions. ES allow organisations to undertake quicker and better strategic decisions for the progress of the organisation by containing the data in one central repository as opposed to collecting data from many different systems .

### 2.2.2 Evolution of Enterprise Systems

ES have evolved from the need of the manufacturing systems in the 1960's in Europe, for having stable control over the organisations inventory. In the 1960's, IT / Legacy systems only offered support for inventory control and worked only in one section of the supply chain . The need to integrate the resource planning with the production schedule saw the evolution of Material Resource Planning (MRP) systems . The shortcomings of the MRP systems in being unable to optimize the production processes led to the development of MRP II systems which encompassed the entire manufacturing / production environment of the organisation .

The MRP II technology evolved over time with the creation of the just-in-time methodology which allowed organisations to automate some of the tasks. However, the inability of MRP II systems to cover the entire supply chain, led to the evolution of ERP systems. ERP systems cover the entire supply chain for the manufacturing industries, covering not only the manufacturing / production environment but also the suppliers and the customers of the organisation. The key differentiating factor between MRP II systems and ERP systems is the ability of ERP systems to not only plan and schedule the organisation's resources but also those of its suppliers . Today's Extended ERP (E<sup>2</sup>RP) systems provide complete enterprise integration for the organisation by integrating the ERP, Supply Chain Management (SCM) and E-business functionalities of the organisation . Figure 1 shows the evolution of ES systems from the early MRP systems in 1960s to E<sup>2</sup>RP in the 2000s.

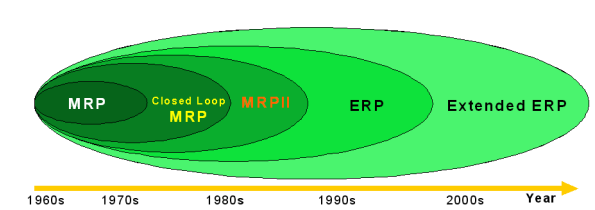


Figure 1: Evolution of ERP systems

### 2.2.3 ES Characteristics and Uses

ES inherit a number of characteristics which qualify them as a true integration solution for the business processes of an organisation. These systems are purported to be flexible; encompass open system architecture and are modular in nature; provide a comprehensive coverage of all the business processes and functions of the organisation; supports business processes undertaken with external organisations; provide a simulation of the real processes for strategic decision making; need multiple operating system environments for implementation and operation and can access organisation wide information in real time for strategic decision making .

ERP systems comprise of various modules, such as material and quality management, human resource (HR), project management, accounting and finance, and sales . Though the modules which the ERP systems embody will vary from system to system and organisation to organisation, these are the typical modules embedded in any ERP system, as shown in Figure 2.

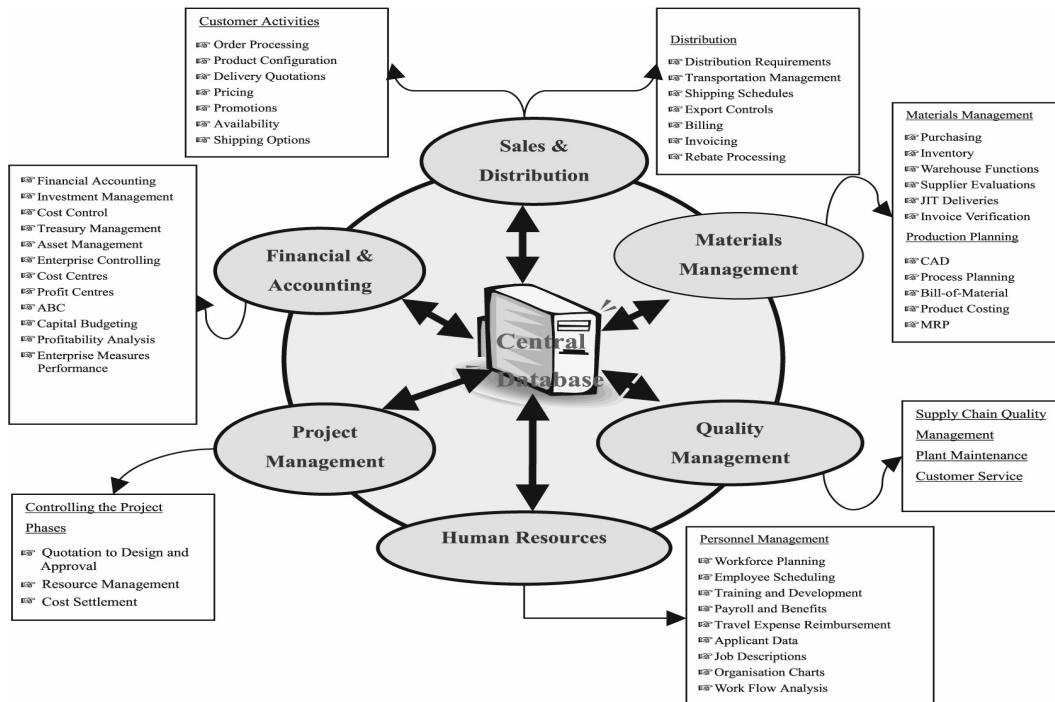


Figure 2: Typical ERP System Modules

Traditionally used in manufacturing industries, ERP systems are now used in a wide variety of industries, such as education, environment, health, power generation and telecommunication .

## 2.3 Electronic / Enterprise Document Management Systems (EDMS)

### 2.3.1 What are EDMS?

The National Archives of Australia (NAA) identifies EDMS as automated systems that improve an organisation's workflow by supporting the creation, use, maintenance and storage of electronic documents . Richard et. al. (1999) defines an EDMS as a computer system which stores not only the electronic document but the attributes / metadata as well. EDMS allow its users to not only search and retrieve the related documents from the system, but also to query on the metadata available in the system. The metadata in an EDMS is stored in a database which is the major element of the EDMS. Richard et al's (1999) definition of EDMS is supported by Kohn (2002) who states that EDMS store 'documents' and not 'data' The documents could be of any type, i.e. formatted or unformatted, analog or digital and can be viewed in visual, audible or readable manner. Forbes-Pitt (2006) identifies a document as an artefact which when automated gets broken down into three levels, namely the type of the document, the metadata contained within the document, and content of the document. This is as shown in figure 3.

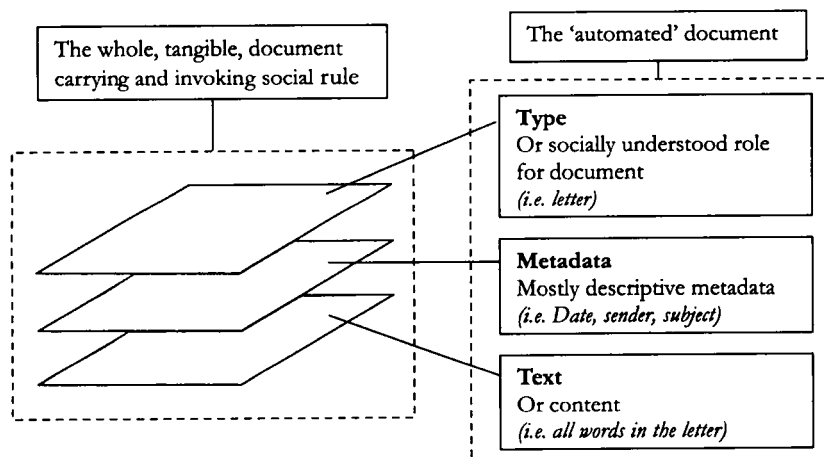




Figure 3: The whole document and its subsequent levels

However, in its entirety, the document itself is assumed to contain a meaning which is conveyed when viewed and implemented . EDMS involves not only a software system for managing the documents and a database for managing the metadata of the documents; but it also includes other technologies such as document imaging, document retrieval, reporting, character recognition, document management, workflow, form processing, content management, digital signature management, and storing and archival technologies .

### ***2.3.2 Features / Characteristics of EDMS***

EDMS offer not only the mundane document storage and retrieval facilities but also offer many additional value-added services. These include mechanisms to check in and check out documents for modification purposes, version controlling and auditing facilities, document reviewing functionalities, security facilities for accessing documents based on role permissions given to the users, document organising facilities, searching facilities, recoding of document's metadata, workflow facilities, ability for adding scanned documents and publishing facilities. These functionalities are value added functionalities embedded in many EDMS and only specify what the system is capable of doing and what the user can do by their usage. However, these functionalities will not be able to automatically manage documents and the user will have to invoke them for efficient functioning of the system .

### ***2.3.3 Use of EDMS***

Hajjar and AbouRizk (2000) quote Turk et al.(1994) as estimating that a single building structure involves around 10,000 documents. This increases the value and usage of EDMS in the construction industry, since as the number of building structures increase it gets increasingly difficult to manage all the connecting

documents using a manual system. Hence the usage of EDMS, in the construction industry, has increased manifold.

Painter (2002) highlights the advantage of implementing EDMS in a public insurance company which results in faster response to client queries, faster document retrieval and limited time delays between document requisition and receipt by the user.

Foster (2002) identifies the use of EDMS by PITT County Memorial Hospital (PCMH), which pioneered the usage of EDMS technology by converting from a paper based system to a document management system . The implementation of the EDMS resulted in better access to patient records, improved security of patient's medical records, faster turnaround times and improved patient's medical record's confidentiality.

The only flip side of EDMS is the use of validation rules which are defined on a field level or at times at document level, which makes the business rules static and difficult to manage when the organisation evolves over time . Many commercial EDMS don't allow the use of complex data types. For example, in the construction industry the listing of material, which is a complex data type, may prove to be a hindrance to the implementation and usage of EDMS . Also EDMS rely more on the underlying business processes and the people / users who are going to use the system . Thus it can be implied that the success of the EDMS depends on the functions and features offered by the system as well as the users using the system.

## **2.4 Implementation of Enterprise Systems**

The implementation of Enterprise Systems is a dynamic and complex process. It involves not only the technological aspect but also the people / organisational aspect during the implementation process. Viehland and Shakir (2005) propose involving user representatives from across the entire organisation in the implementation

process, as well as making decisions and revising them from time to time as the implementation progresses. Since the system is going to stretch across the entire supply chain of the organisation's processes, hence even the organisation's partners need to be involved in the implementation process, making the implementation process a complex one. Allen (2005) supports the view of involving partner organisations since the implementation process is one of social cooperation between the various functional areas of an organisation rather than a technical process of implementing a software system. Hence, the ES does not only have a technological but also a strategic, organisational and operational impact on the organisation .

The implementation of ES requires extensive knowledge about the technical and social aspect of the organisation. This includes knowledge about the business processes, technical framework, ES to be implemented, knowledge about the organisation where the ES is to be implemented and knowledge about project management strategies . The selection and subsequent implementation of ES also depends upon the IT platform currently available in the organisation, the one selected by the vendor, the cost for acquisition, and the hardware / software configuration policies of the organisation . This signifies the technological impact that Grant (2003) states ES implementation has on the organisation. The relation between the IT platform and ES is as shown in Figure 4.

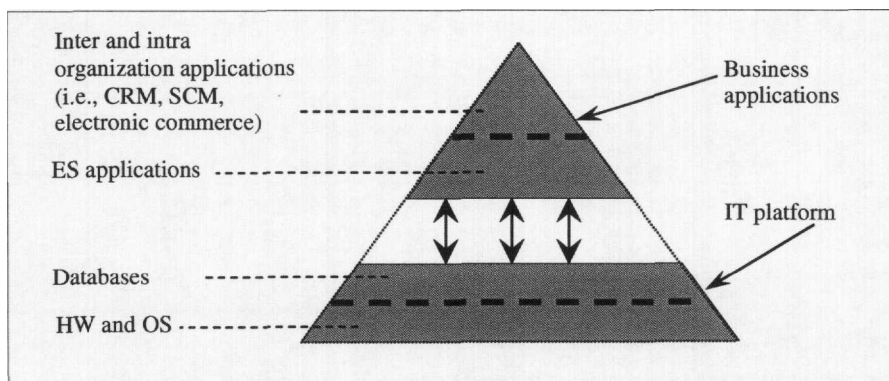


Figure 4: Relationship between IT Infrastructure and business applications

In one research project the reason for implementing ES, according to managers, was to obtain real-time information, get robust support for strategic decision making and integrating the various applications existing in the organisation . Rikhardsson and Kraemmergaard (2006) further state that the organisation can transform its functioning only if all the activities across the entire supply chain are integrated with one another after the ES implementation.

Prior to beginning the implementation process Al-Mashari (2002), in a study, advocates making a checklist of the capability of the organisation against certain factors. The factors include ensuring presence of appropriate infrastructure, local area network (LAN), deployment of servers across the LAN, availability of Personal Computers (PC's) supporting the requirement of the ES, adequate training facilities for the user, availability of human resources for deployment, commitment to the implementation process, strategic decision making and top management support to the implementation process . The availability of these factors is important, prior to beginning the implementation process, to confirm its consequential success.

In addition to the availability of these factors, Sutton and Lemay (1999) advocate the importance of the existence of a Terms of Reference (TOR) document to the success of an EDMS implementation. EDMS implementation is an extensive activity and a TOR document will help the project team members to effectively understand the pathway of the implementation process, as well as keep it on track. The TOR document identifies not only the purpose of the implementation but also its objectives. Thus the creation and follow-up of a TOR document through out the life cycle of an EDMS implementation becomes extremely important .

In addition to having a TOR document Kerkoulas (2002) identifies having a project scope and vision outlined, as well as the use and future expansion of the system, prior to implementation. This enables the organisation to test the solution successfully in a predefined pilot area, thus minimizing the chances for failure of the system . Downing (2006), in addition to Sutton and Lemay's (1999) and Kerkoulas's

(2002) comments, states that greater emphasis must be placed on the people using the EDMS and the business processes to be supported by the EDMS. This leads to the proposition that for a successful EDMS implementation, the process must be made transparent across the organisation and a strategy for managing user's expectations must be in place. Greater focus must be placed on the users of the system and their training as well as on the business process changes. Changes in the communication structure of the organisation must be well understood by all users, as the new EDMS gets implemented.

## **2.5 Factors Affecting Implementation of Enterprise Systems**

Al-Mashari, Al-Mudimigh, and Zairi (2003) have identified that the success of IT projects is related to a match between the IT systems and positive user's attitudes, user's expectations, project objectives and cost and time of completion. Since ES implementation is a huge investment on part of the organisation, hence a number of factors play a crucial role in it's success / failure .

These factors, similar to those identified by Al-Mashari et. al. (2003) identifying success of IT projects, can be broadly defined into two categories, namely organisational and environmental . Figure 5 shows a framework of ten factors which together comprise internal and external / environmental factors affecting ERP implementation.

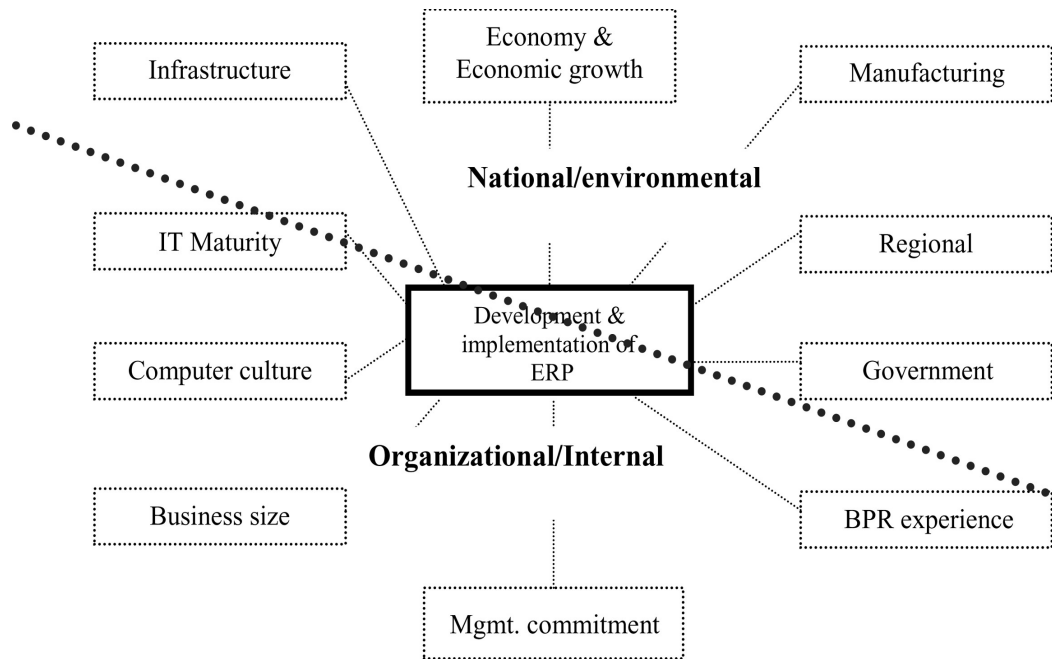


Figure 5: Framework for ERP Implementation

As can be seen in figure 5, the organisational factors relate back to Raynes (2002) implication of the success of EDMS relying more on the users using it than the technical factors underlying the enterprise system. This is further supported by King and Burgess (2006) who state Sauer's (1993) model for IS innovation, which stresses the significance of the organisation structure and user expectations to the success of the ES implementation process. Sauer's (1993) model as shown in figure 6, highlights the importance of organisational factors as opposed to environmental / external factors throughout the implementation process .

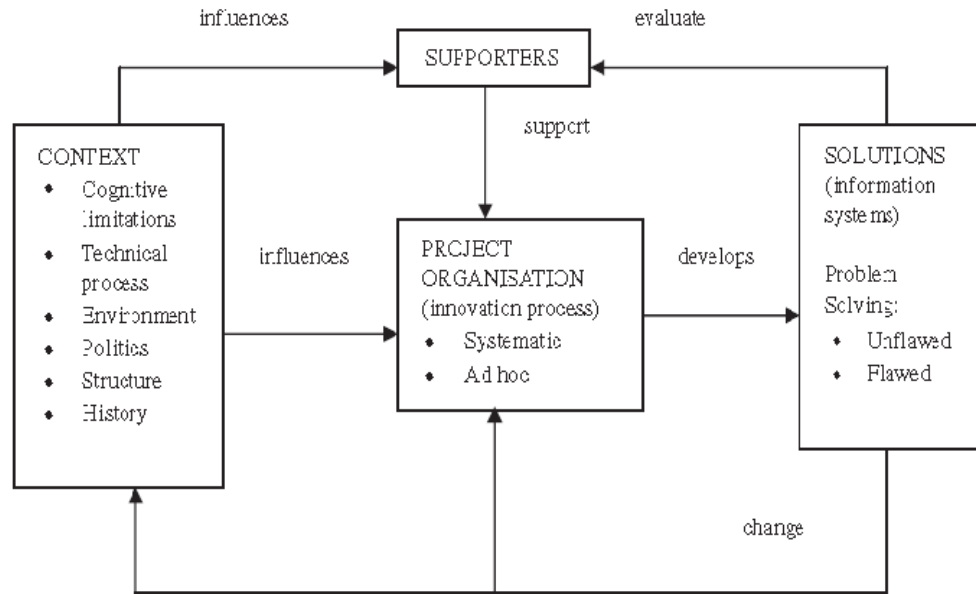


Figure 6: The IS innovation process, Sauer Model

Drawing on these models, the factors affecting the implementation of ES can be broadly classified into the following three types.

### **2.5.1 Key Performance Indicators (KPIs)**

Pairat and Jungthirapanich (2005) have identified some KPIs for measuring ERP implementation success. In their review of literature regarding KPI and ERP implementation they have identified factors relating to user satisfaction, business operation performance, business performance, system performance, quality of service and security of the processes as some of the key performance indicators for the successful implementation of ERP systems.

### **2.5.2 Critical Success Factors (CSF)**

Trimmer et. al. (2002) define CSF as certain areas of the implementation process, which if deemed successful will in turn ensure the success of the entire implementation process. Trimmer et. al. (2002) cite Rockart (1979), mentioning that the sources of the key areas revolve mainly around the structure of the organisation, the temporal factors, environmental factors, geographic location of the organisation

and business strategy of the organisation. Since ERP implementation is a complex process, the factors affecting both design and implementation of the system must be considered .

In the majority of the literature reviewed, the chief CSF reviewed were either related to the management of the organisation implementing the system, the actual implementation process, factors / properties of the ES which was being implemented, users of the organisation using the system and training users for using the system. Since ES implementation is a major activity for any organisation, top management support for the implementation assumes greater importance for its success. Thus top management support and commitment, committed leadership, presence of a business plan and vision, presence of a project manager, linkage of the implementation process with business strategy, top management awareness and participation and streamlined decision making are factors which are critical to the success of the implementation of an ES from the top management support point of view .

Since the implemented system is going to be chiefly used by the employees of the organisation, their involvement also determines the success of the implementation. User factors instrumental for the success of the implementation, include understanding employee perspective of the implementation process, employee training and undertaking employee feedback on the implementation process .

ES implementation is a huge effort on the part of the organisation. Factors related to the implementation process on the part of the organisation are also instrumental in its success. The factors include reengineering, integration, implementation consultation, implementation cost, excellent communication strategy, efficient project management, implementation strategy, selection of the ERP package, ERP team work and team composition, change management processes, minimizing customization of the ERP system, excellent implementation team, data accuracy, presence of project champion, presence of appropriate IT legacy systems,



implementation team composition and involvement, implementation goals, presence of a detailed implementation schedule, presence of an implementation budget, reliability of the system, pre implementation hardware assessment, modular implementation, patience with the implementation process and presence of a cross functional implementation team .

Implementation of an ES does not stop at the end of implementing the ES across the organisation, but continues even after that with post implementation review and support. These activities too play a pivotal role in underlying the success of the system. These factors include monitoring and evaluating the performance of the system, software development, testing and troubleshooting and cross functional support .

### ***2.5.3 Critical Failure Factors (CFF)***

CFF not only determine if a system implementation fails but also why it fails. A successful implementation process must note the CFF and devise strategies to avoid them. Pairat and Jungthirapanich (2005) in their review of literature concerning ERP implementation have identified CFF as lack of change management, inadequate training, poor reporting procedures, inadequate Business Process Reengineering (BPR), lack of staff for managing operation of the system, inadequate support, poor software, lack of software functionality, underperforming project team, lack of monitoring and performance evaluation, unprepared IT functions, lack of understanding of the system by the business and inadequate system testing. These findings have been ably supported by Al-Mashari and Al-Mudimigh (2003), who in their study have identified CFF as lack of ownership of the ERP implementation project, absence of knowledge transfer from the consultant to the business, absence or lack of change management, lack of communication within the business, lack or absence of performance measurement and lack of alignment between it strategy and business strategy.

In addition to the success and failure factors, ES implementation is a mammoth effort spanning across an entire organisation and it involves a high amount of risk. Scott and Vessey (2002) have proposed a model for accessing the risk factors associated with ERP implementation. Figure 7 shows their risk assessment model. The model signifies strategic changes occurring within the organisation on account of the ES implementation project, as well as tactical changes occurring within the context of the organisation. The relationship between power of change and occurrence is an indirect proportional one.

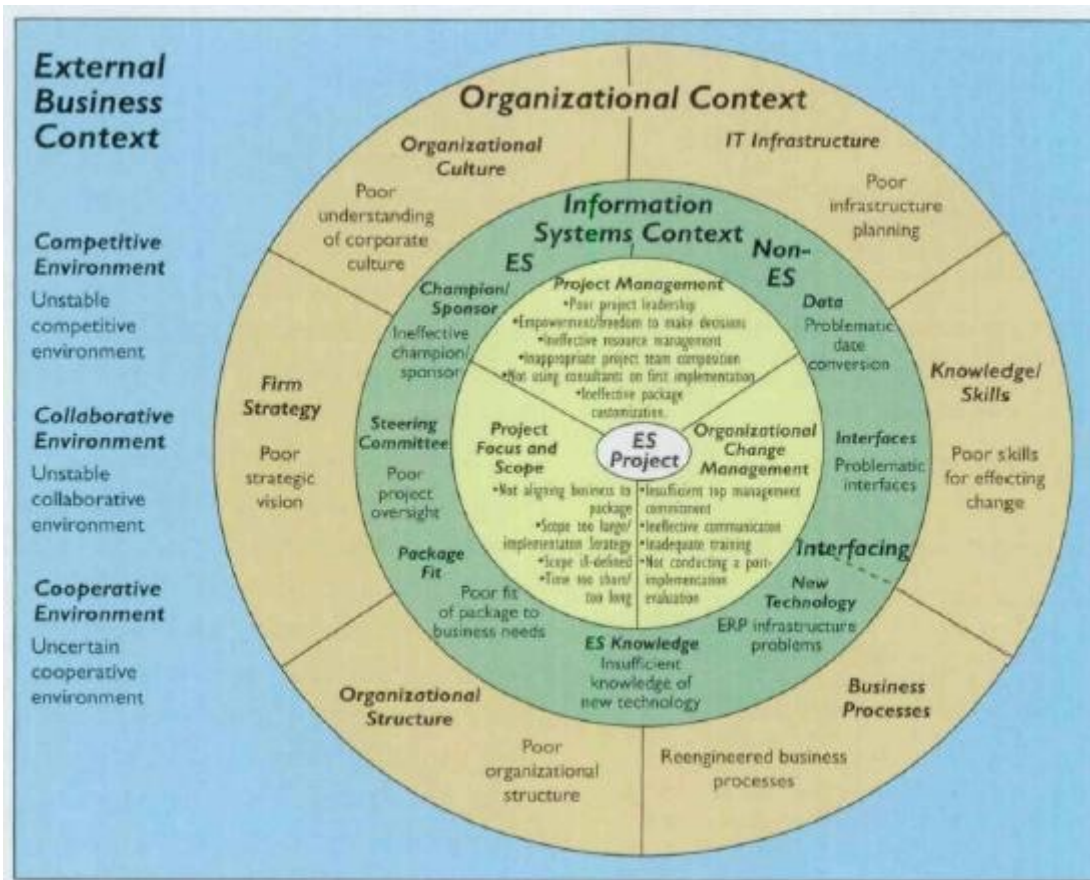


Figure 7: Model depicting risk factors associated with ES implementation

## 2.6 Research Methods used for studying ES Implementation

Of all the literature reviewed, the majority of the papers used either a case study approach, survey approach or a literature review approach.

The case study method has been one of the most commonly used approaches for studying ES implementation as well as the impact of ES implementation on an organisation, probably because it allows for studying a phenomenon in a particular context .

Survey methodology has been reported extensively in the literature reviewed on ES implementation . The reason for the extensive usage of surveys in Information Systems literature is on account of surveys being easy to manage, help in quantification of results, results can be easily generalised and are reusable .

A few other papers have reviewed existing literature on ES / ERP implementation to draw conclusions about factors affecting the implementation process

Other than the three most prominent methods outlined above, some other methods used in studying ES implementation include generating models for improving the implementation approach , using an ethnographic approach for finding the effects of strategy conflicts on ERP implementation in organisations , using a mixed approach of case study along with grounded theory methodology for discovering the effects an ES has on an organisation and using a mixed approach of case study and action research to study a certain phenomenon in a single organisation .

## **2.7 Research Methods used in Prior Work**

The case study methodology seen in the literature reviewed has been used by the authors to investigate a phenomenon occurring in a particular case / incident. The case study method requires the researcher to develop some propositions and have a theory developed around the case to be investigated prior to data collection (Yin, 2003, p. 28). Also the case study method requires the researcher to indentify the boundaries of the research (Collis & Hussey, 2003, p. 70). In this study, the theory development was considered to be an outcome from the analysis process of the data

collected. Also in IS research, the organisation, people and systems interact with one another and don't exist in a vacuum. To delineate boundaries and context of the research to a specific phenomenon becomes hard in IS research. Hence, use of case study method was found to be limited for this study.

The result of a survey research consists of the interpretations of participants, which may vary from one another. The variation between the interpretations of the survey questionnaire by the participants is not captured by the survey analysis. Users also tend to answer certain questions on account of their personal comfort with answering in a certain pattern, thus making the findings of the survey flawed .

A number of papers also proposed various model developments for investigating CSF relationships , understanding the balance of requirements for a project incorporating ES , impact of consultant and client relationship on ES implementation and best approach for implementing ERP systems . However the models reviewed were investigating individual factors, such as CSF relationships, but not as a whole from a particular perspective, affecting the implementation of ES. Also model development does not allow the researcher to study the historical perspective of the implementation process, which other research methods such as ethnography do.

Literature Review papers are limited with respect to the terms / criteria used for selecting the papers for review. Papers using literature review methodology were rather tied to using particular databases , using particular search keywords for articles and using a particular timeframe for searching related articles .

Volkoff et al. (2005) have used a hybrid methodological approach of grounded theory and case study. The advantage of using such an approach is it increases the rigour associated with the research. However, the usage of such hybrid approaches increases the time required for conducting the research. Since time was a limiting factor for this study, with an upper limit of a year only for the entire process to

submission, usage of a hybrid approach was not considered for the research. Stefanou and Revanoglou (2005) have also used a hybrid methodological approach of case study and action research and were similarly not considered.

Lee and Myers (2004) have used an ethnographic approach for studying the effects of strategy conflicts on the success of ERP implementation. In their research, they have used the political school of thought and have carried out the research in a single firm which was undertaking an ERP implementation with the aim of achieving IT-enabled enterprise integration. The usage of critical ethnography has enabled the researchers to focus on the strategic context of the research process. The methodology has also enabled the researchers to discover the effect factors such as power and politics have on strategy formation. The usage of ethnography for the research, allowed the researchers to use varied data collection methods such as interviews, observations, organisation's documents, informal chats and meetings to get a deep insight of the implementation process. The methodology also allowed the researchers to conduct the research without delimiting it.

## **2.8 Chapter Summary**

The chapter gave a brief overview of ES and explained implementation procedure and factors affecting ES, EDMS and ERP systems in general. It then explained in depth the underlying research methods used in the literature reviewed for the study, the overwhelming importance given to case study, survey and literature review approaches. The drawbacks of these three and other research methods reviewed in the literature forms the backbone of the next chapter which pertains to the selection of the research methodology, data collection and analysing methods for the study.

### **3. Research Methods**

#### **3.1 Introduction**

The base of a good study is the selection of a correct research method and a sturdy data collection method. This chapter continues from the limitations of the research methods, outlined in the literature reviewed, which led to the selection of a few research methods as potential research methods and finally the selection of ethnography as the chosen research method. The chapter then proceeds to give an overview of the procedure which was undertaken for collecting the data for the study as well as the conceptual procedure which I would use for analysing the collected data.

#### **3.2 Justification and Details of the Research Methodology**

This study deals with the social aspects of an enterprise implementation of an Information system. Since the research would deal more with people and their behaviour and attitudes, the positivistic epistemology was avoided and a phenomenological approach was chosen for conducting the research. This is also supported by the literature review section wherein, some of the research methodologies lay in the phenomenological paradigm, such as Lee and Myers's (2004) use of ethnography.

Research which deals more with the way people perceive systems, rather than assuming that all people have similar understanding about systems, is intended to be undertaken better in an interpretivist paradigm, than in a positivist paradigm . As

compared to positivist research which comes out with generalised findings, interpretivist research tends to come out with findings relating to how people feel and react under specific circumstances within a certain context . This lead to outlining action research, case study and ethnography as the three potential methods for conducting the study.

Action research method is more suitable when there is already some evidence present from previous research and further research needs to be done to either refine it or add something more to it . Action research also encompasses a collaborative effort between the researcher and the participants, with both having mutual control over the research process (Collis & Hussey, 2003). In the type of study which was undertaken there was no planned collaborative intervention, that forms the core of Action Research, as the natural events were the focus of the research, and in part because the time required would have been prohibitive. Thus on account of this, action research was not considered as the chosen methodology for the research.

The case study methodology has been identified as researching a system which is bound by factors such as time and place, which form the context within which the research is to be conducted . This argument is supported by Hartley (2004) and Collis and Hussey (2003) who imply that case study research is an extensive study of a particular phenomenon in a set context. The limitation of the case study approach for this research was concerned around the area of lack of the formation of a theoretical proposition (Yin, 2003, p. 28) and the absence of boundaries delimiting the research (Collis & Hussey, 2003, p. 70). In this study, there had been limited preliminarily constructed theory. Also limiting the context of the research to a particular phenomenon, in this study the implementation of the ES, was problematic. This led to the removal of the case study approach as the potential research method.

The third research method identified was ethnography. An ethnographic approach allows the researcher to understand the context of the research from the people's

point of view and identify the differences between the viewpoints of the various participants. The different viewpoints are then combined into one, in order to produce a rich description of the people and their associated beliefs and cultures . The process requires the researcher to establish long-term trustworthy relationships with the participants and to learn from the participants, while getting completely immersed in the social context being studied in order to produce an account of research which is far more concrete and rich in context . The notion of building trustworthy relationships with the participants leads to them revealing greater information than would have been captured using other methodologies.

Investigating the social context, collecting unstructured data, detailed examination of a case and analysing the unstructured data to understand the relationship of the concepts analysed to the whole context to gain a holistic understanding of the problem, have been identified as the four prime characteristics for conducting ethnographic research . This also implies the researcher needs to accept multiple realities and have a non-judgemental orientation of the research .

The advantage which ethnography offered my study was the flexibility of using any method for data collection, collecting any type of data rather than focussing on a certain part of the phenomenon under investigation and concentrating more on participation in the research, data analysis and writing and presenting the research, rather than on data collection methods . Also, as Jones (2006) indicates, the advantage of ethnography over other methods is that the researcher can write out their own observations as field notes which can then be used in the research as data. Nevertheless ethnography allows for empirical data collection, is holistic in nature, provides for better understanding of the phenomena under observation and allows for direct observations, rather than relying on indirectly obtained or second-hand information as compared to other methods . The triangulation of research methods used in ethnography is also one of it's strength, since ethnographic research uses a number of research methods which are not isolated from one another .



Harvey and Myers (2002) state that ethnography is suited for research in IS because ethnography deals with real world issues and situations and allows for relevant real world problems to be investigated and relevant frameworks to be developed which can then be used by researchers, as well as real world practitioners. They also state Orlikowski's ethnographic research on the impact of newly implemented information technology on the power controls within an organisation. Also ethnographic research for real world issues allows for studying the organisation as a combination of the political, social and cultural systems that it encompasses within itself. Harvey and Myers (2002) and Hunter (2004) further imply that on account of its ability to explore real world issues, ethnography is the chosen methodology for researching enterprise systems. Hence an ethnographic approach has been undertaken, as it helps the researcher to engage deeply with the client organisation and extract rich data which would unearth the factors affecting the implementation process in the research organisation. Such findings may not be completely revealed if positivist methods were to be utilised. Hence Ethnography is chosen as the research method for the study.

### **3.3 Justification and Details of Data Collection Methods chosen**

Since ethnography had been selected as the chosen research methodology for undertaking the research, data collection methods which allow the researcher to collect first hand information had been reviewed. Out of the methods reviewed, the three data collection methods namely observations, focus groups and interviews had been shortlisted on account of their affinity to the ethnographic methodology.

The following sections evaluate the three methods for data collection and then give the justification for the chosen research method of these three.

#### ***3.3.1 Focus Groups***

Focus groups have been identified as being helpful at the start of the research to help identify the issue as a whole or as a precursor to formulating the research question /

objectives, or supplementing other research methods . Some of the known problems with conducting this method are the difficulty for allocating a view to a participant at the time of transcribing the focus group recording , summing up the views of the group based on those said by individual members of the group and the problem of shy participants who are unwilling to share information even when probed and some participants being more vocal in the group and thus ending in dominating the discussion as compared to the others . The argument of group view is also supported by Collis and Hussey (2003) and Krueger and Casey (2000) who argue that it is a method for gathering data related to a group opinion and not individual opinions.

However, in the study to be conducted, the need is for a method which provides first hand information, and captures individual unbiased view, not one which is stimulated by the views of other individuals. As can be seen from the arguments of various researchers above, focus group method does not fit into this study. Hence it was not used as the data collection method in this study.

### ***3.3.2 Observations***

Observations allow the researcher to collect data without involving the participants of the research. This is possible by observing the activities, movements and expressions of the participants of the research . Observations have the distinct advantage of avoiding respondent bias, acquire information from hard to obtain group of participants, observe the effects of environmental factors on outcomes and inability of being deceived by participant response on account of being able to observe them from close quadrants .

On the other hand, observations have disadvantages such as the need for the researcher to be physically present for long periods of time at the research site for collecting data, being a slow and expensive and time consuming process, recorded data being biased on account of observer fatigue, inability to capture cognitive behaviour of participants, temporal behavioural change displayed by participants,

sensitivity of observer to field notes, training required for observer, gaining access to organisation, selecting situation in which to conduct observation, inability to capture unseen characteristics, non-replication of the research process and observer bias in data collection . Adler and Adler (1998) draw on the limitations of observation as a technique over it's reliability and validity, since the data obtained at times lacks participant's quotes and statistical analysis to support researcher's analysis.

Brewer (2000) makes a strong statement that a participant observer's view, at times are good to include in a research as a view, however on account of the various disadvantages that it has, it can never stand alone as the primary research method for any research. Considering the short time period offered by the study to be conducted as well as the issue that the system had already been implemented and the negligible impact that observation of people's usage of the EDMS today would have on the study, led to observations being phased out as a preferred data collection method.

### ***3.3.3 Interviews***

Interview has been defined as a method allowing the researcher to directly enquire with the respondent and get a response. Interviews are useful when the research question is complex or it is regarding a sensitive issue and also allows the researcher to obtain feedback at the end of it . My reason for selecting the interview methodology is aptly supported by Schostak (2006) who argues that since ethnographies deal with collecting information from various sources, which might be visibly different from one another and then combining all those differences into one, interview is the most appropriate method for collecting data at the time of conducting ethnographies. Interviews allow the researcher to obtain 'insider' information which identifies the difference in the views of the interviewees .

The biggest support for conducting interviews as opposed to conducting observations or focus groups, comes via a statement which Taylor and Bogdan

(1998) position professing using in-depth interviews when the intent of the research is well defined, the phenomenon has occurred in the past and the people connected to it are not easily accessible and the setting cannot be recreated, there is a time constraint for doing the research and the researcher is concerned with understanding the various people connected with the phenomenon or the settings when the phenomenon occurred.

The option for conducting interviews opened to me a vast avenue of various types of interviews. I had a choice of conducting structured, semi-structured or unstructured interviews. Structured interviews follow a set sequence of questions and do not differ from the sequence. Unstructured interviews do not follow a particular sequence and comprise of an open discussion about a particular issue. Semi-structured interviews in comparison to the above, allow the researcher the freedom to alter the sequence of questions. The structured part is having an interview guide, whose flow can be altered depending on the interviewee's response and the researcher's initiative. The semi-structured approach is useful since it does on the whole, have a structure and direction. The researcher can also exercise the freedom to include unexpected questions which can bring in unknown and insightful information.

### **3.4 Appropriateness of Interviews for the Study**

My choice for conducting semi-structured interviews is supported by Flick (2006) who states that if the output of the research is aimed at supporting a particular issue, then using semi-structured interviews is more economical. The approach helped me to make a note of all the topic areas which I had to cover at each of the interviews. If I got to know some more related areas; which I did, then it was a bonus. My choice for selecting semi-structured interview approach is also supported by numerous authors, who state that such an approach is best suited for research areas where little previous information is known. Another reason for selecting this approach was the limited time availability for collecting the data. The semi structured interview

approach allowed me to collect detailed and historical information in the limited time available for conducting the research.

From the perspective of my research, prior to beginning, I conducted a one-on-one interview with the only management personal who was still there in the organisation from the conception of the idea of bringing in the EDMS till date, when a major upgrade is being undertaken. The interviewee gave me a thorough idea as to what had happened earlier at the time of implementing the system. I got sufficient background information from the interview to develop an interview protocol for conducting the subsequent interviews. I refined the interview protocol later on, as I built up my knowledge base about the implementation process. The interview protocol used for the interviews has been included in Appendix B. As at the start I did not know much about the process as a whole and I learnt as I went through each of the interviews, I chose to stick with the semi-structured approach.

### **3.5 Utilisation of Interviews in the Study**

In using the interview technique, I received great help from the management who invited the staff to participate in the research when approached for an interview. This allowed me to enlist the participants for the research. Since the interviewees had been using the EDMS, they knew what the system did. From the research perspective I provided them with a participant information sheet, as attached in Appendix C, which outlined what was the purpose of the research and how it will be conducted. I also took their signed consent for recording and transcribing the interviews. Thus I obtained consent from the interviewee for the study, which is one of the key factors for an interview-oriented research .

I never rigorously followed the order of questions, enlisted in the interview protocol, through each of my interviews. I modified the order according to the response received from the interviewee. At times, a new topic came up in the discussion; not something completely unrelated, but something which I had never heard of earlier

and allowed me to widen my knowledge base about the implementation even further. The way I conducted the interviews, was similar as to how Babbie (2007) describes an ideal interview to be undertaken; listen, paraphrase, confirm and understand.

The interview approach, had given me the freedom to alter the flow of questions. I was never bound by a fixed interview protocol. The alteration of the order of the questions did not suppress the emotions displayed by the interviewees and allowed them to divulge more information. As Collis and Hussey (2003) and Jones (2004) state, emotions such as facial and bodily expressions and their gestures, voice pitch tones, postures, allowed me to add richness to the data and infer hidden meanings from them.

I framed the questions using simple and lucid language which can be easily understood by the interviewee's, coming from different departments . I avoided using any kind of technical jargon or ambiguity in my questions, so as to keep the conversation as simple as possible, so that the interviewee felt relaxed and comfortable to talk about issues, since they can understand as to what is asked in the first instance . I also tried to keep the questions as open-ended as possible in order to ease out the pressure of coding the transcripts. Since most of the questions were open-ended, the responses I received were quite wide; they were not directed towards a particular or a single topic only and covered a multitude of facets. This approach allows me to code and find the relevant themes easily when I analysed the data .

The interviews which I conducted were characteristically different from each other. However, one thing in common between all interviews was that at one stage I did use a lot of mining questions as opposed to mapping questions as proposed by Legard, Keegan and Ward (2003). This allowed me to explore particular topics of relevance in depth in each of the interviews. Also as opposed to what Brewerton and Millward (2001) state about the various biases creeping into the interviews, I tried to

keep the interviewer bias as much as possible to the minimum. As opposed to conventional intelligence, time and location did not limit the interviews I conducted. This was because of the reason that I and the client organisation were both at the same geographical location and not separate ones. This eased out some of the interviewing difficulties that most interviewers face .

In order for ensuring the success of the interviews, I encompassed Dillard and Reilly's (1988) view of the seven important components that facilitate an interview. I accomplished those by establishing rapport with the interviewee, clarifying my role as well as the interviewee's role prior to the start of the interview, asking open-ended and close-ended questions, probing the interviewee at times to obtain further information, paraphrasing and clarifying answers obtained, identifying concerning areas and establishing ways to mitigate them and analysing the interviews to uncover the themes from them. How I cover the last component will be discussed, later on, in the section on analysis. Fontana and Frey (1998) support this argument of Dillard and Reilly (1988) as well.

As opposed to Dillard and Reilly's (1988) statement for dividing the interview into four sections, I never had any four specific sections into which I had divided the interview protocol. I had a few questions at the beginning to establish rapport and make the interviewee comfortable. The middle section of the interview protocol dealt with the actual implementation process. The ending questions dealt more with what the interviewees thought about the entire process.

Finally, in order to ensure the correctness and the richness of the data collected, I advocate using King's (2004) proposal of using reflexivity in qualitative research. This is done by maintaining a small diary in which I have penned down my thoughts after every interview, as well as recording audio diaries prior to the commencement of major milestone in the research, such as getting ethics approval, forming the interview guide, conducting the interviews and beginning with the analysis of the interviews. It has added to the load of the research process, but it has enhanced the

data collected and has equally helped to reduce the research bias which may have crept into the research, unknowingly.

### **3.6 Analysis Method Selection**

At the start, before conducting the interviews, I had given deep thought as to how I would conduct the analysis for the interviews. I had enlisted some techniques by which I could analyse the interviews. Of relevance seemed content analysis, discourse analysis and thematic analysis.

Looking at content analysis, it comes out more of a technique which seems to bridge the gap between qualitative and quantitative research methods. Content analysis is an analysis technique which is oriented towards quantification of the results obtained from a qualitative research. It quantifies the findings but does not capture the context of the findings. As Grbich (2007) iterates, content analysis is used mainly for analysing large amounts of text to identify the structure, relationship, pattern and discourses between words.

Grbich (2007) identifies research questions like ‘how something happened’ or ‘what are the other means of doing something’, to encompass the use of discourse analysis in them. This is because the purpose of such research is to find the discourses, or the objects, from the time they have originated to their present state. The descriptions of content and discourse analysis are in complete contrast to this study since the purpose of analysis in this study is to find the common meanings, encompassed within the interviews, which have been conducted.

On the other hand, thematic analysis deals with identifying the various concepts and themes in the research, which are discovered as the research is conducted. It implies, finding out concepts first and then grouping these concepts into categories. Explicit relationships between these categories are then formed to form what Glaser and Strauss (1968) identify as “formal theory”. Thematic analysis in many ways is



similar to grounded theory analysis, except that grounded theory analysis encompasses theoretical sampling, which is not there in thematic analysis .

Lansisasalmi, Peiro and Kivimaki (2004) support the use of thematic analysis over discourse analysis since it allows the uncovering of phenomena as compared to discourse analysis which focuses more into analysing events or discourses. However the major advantage offered by thematic analysis over other techniques of analysing is, while other techniques start with an initial set of codes, thematic analysis starts without any fixed coding pattern and develops the codes as the research moves on .

The absence of predefined codes in thematic analysis, led to the selection of thematic analysis as the chosen technique for analysing the transcripts. In this study, the pool of data which I had collected comprised of eight interviews conducted with people with varied roles in the erstwhile system. In addition to the interviews, I had also recorded four audio diaries, which comprised of my thoughts prior to a significant milestone in the research process. I also had a diary note, which consisted of my thoughts after conducting every interview. The interviews and the audio diary notes were later transcribed. At the start of the analysing process, I did not have any pre-conceptualised codes or coding template. As I started coding the transcripts, the codes were formulated from the data.

For analysing this pool of data, I used ‘NVivo 7’ to help with the coding process. The coding method used was ‘open coding’. The conceptual way in which I had thought of coding this data, was to review and revisit the transcript and attach a code to every significant idea that I found in the transcript. The same process was repeated for each of the transcripts. Once I had identified the main ideas in each of the transcripts, I intended to find a common relationship between each of these codes to see if I could combine those which had similar meanings into one category.

Once I had categorised the different codes into various categories, I would repeat the cycle of finding relationships between the various categories, and if found the two

categories would be combined into one. This process would be an iterative process and would be repeated till such time that the identified categories are distinct from one another. The categories identified after the final cycle would represent the main themes, which would be the outcome of the research. The sub categories would represent the sub themes of the main themes. The conceptual process mentioned herewith was later compared with the actual analysis process and many similarities were observed between the two.

### **3.7 Chapter Summary**

The chapter gave a detailed description and justification for the decision to choose ethnography as the research method for the study. It also detailed the selection of interview as the chosen method for data collection as well as thematic analysis as the chosen method for analysing the collected data. The chapter concluded by giving a brief overview of the conceptualisation of the analysis procedure, which will be explained in depth in the next chapter.

## **4. Data Analysis**

"Every researcher is concerned about how to ask 'good' questions, ones that will take the research to a productive conclusion".

### **4.1 Introduction**

The previous chapter discussed the research methodology as well as the research methods used for this study. This chapter explores the use of the selected research methods in the data collection and analysis. The chapter begins a journey from the beginning of data collection, which was briefly explained in the research methods chapter, continues with the analysis procedure used and concludes with the analysis of the collected data.

### **4.2 Initial Preparation**

The research and the subsequent analysis performed by me in this research represented the first time I had performed a thorough empirical research project. Though I did have an understanding of empirical research methods through the literature that I had read in my academic studies, I never had the opportunity to undertake any such research in practice.

The preparation for the analysis had started even before I conducted the interviews. In order to give me a fair idea about how to conduct the analysis, I had undertaken a test interview with a volunteer participant from the university. The topic was different and the intention of the interview was to give an idea about how to

conduct, transcribe and analyse an interview. The interview topic was fixed as “comparison of study pressure between the New Zealand and Singaporean education systems.” This was on account that the interviewee was a friend of mine, coming from Singapore, who was now studying here in New Zealand. The interviewee had volunteered for the interview and hence I had chosen such a topic about which the interviewee would have a fair idea.

The interview was a brief one, lasting only about ten minutes. I had prepared an interview protocol for myself for reference. I also made the provision to change the order of the questions as well as incorporate new ones, depending upon the response received from the interviewee. Thus I followed a semi-structured interview format. After the interview was over I transcribed it the next day and then tried to analyse it using the trial version of N6, which is a previous version of NVivo7.

In the analysis I used open coding methodology; since I wanted to discover some initial categories from the interview, as had been made prominent by Glaser (1992) and then analysed the interview for common themes that occurred throughout the transcript. For me the intent of this interview was to expose myself to the open-coding paradigm, which I achieved satisfactorily to a certain extent.

Thus for example in the transcript, which followed the interview, the line

*“Actually I did perform quite well when I was under that sort of pressure, and because it was for the entire class that was being emphasized and so it was like that we got together in groups and we used to study together. So that kind of reduced the pressure quite a bit.” – Lillian*

was coded under three codes. One was ‘superior performance’, the second was ‘group study’ and the third was ‘pressure’. The code ‘pressure’ occurred repeatedly throughout the interview transcript and thus allowed me to obtain intersections between nodes in the reporting stage of the analysis process.

The reporting on the interview was not done immediately by me. After I received the licensed copy of NVivo7, I then undertook the reporting on the interview and generated some test reports. Most of the reporting revolved around node intersections including the 'pressure' nodes with other nodes such as 'education standard', 'grading system', 'superior performance', 'group study', etc. This attempt at interviewing and conducting thematic analysis on the transcript, gave me some practical experience as well as an idea of what to expect in the days to come.

### **4.3 Analysis Procedure**

This section outlines the entire analysis process followed for this study.

#### ***4.3.1 Early Days***

The data for analysis consisted of eight interviews which were conducted with the employees of the client organisation from late May 2007 till the end of June 2007. In addition to that the data also consisted of three audio diaries which I had recorded prior to beginning the interviewing process. I also had one more audio diary which I had recorded after I had completed the interviewing process. In addition to all these I also maintained a diary note of my own in which I wrote my views after recording each interview.

I transcribed all this data over the period of mid June 2007 to mid July 2007. Simultaneously I also started writing the research methods section of this report. This, coupled with my earlier literature research on analysis methods, widened my horizon of the analysis procedure I was going to use. Also my earlier attempt at using a software-based approach for analysing the transcripts, namely N6 and later NVivo7, helped me in getting hands-on practice with the actual coding process.

#### ***4.3.2 Iteration One***

Iteration one began by going through each of the thirteen transcripts and coding every theme / idea which occurred in them. Prior to beginning the coding, I made a thorough comparison between theory-driven coding methodology and the open coding methodology.

Theory-driven coding compels the researcher to code the data based on the theory behind the research. The code is based more on the viewpoint and assumptions of the researcher, thus introducing researcher's cultural bias into the coding process . This implies that the codes obtained from the coding process will not be related to the context of the research. This is in complete contrast to what the research question of this study implied. The study needed the use of an approach which could ground the coding procedure within the context of the research. Thus the need to use open coding scheme for coding the data obtained from the transcripts was raised .

Prior to beginning the coding I established a set of coding rules, on the basis of which the entire coding procedure would be conducted. These rules, which were iterative, would lead me through all the iterations of the coding process. The coding rules are shown in Table 1.

<b>CODING RULES</b>	
<b>STEP NUMBER</b>	<b>DESCRIPTION</b>
1.	Any primary idea, which is central to the research theme, needs to be coded as a free node.
2.	The newly created free nodes are to be gone over and seen if the names can be truncated to 1-2 words or as precise and generic as possible.
3.	The nodes are then tested for uniqueness. The context of the repeated nodes is to be combined and then the repeated nodes are to be deleted.
4.	The nodes are to be seen for their meaning. If a node spans more than two meanings, then it is to be broken up into two.
5.	Steps 2 to 4 are to be repeated till such time that no further changes can be done.
6.	The nodes are then to be grouped together into tree nodes based on some similarity between them. Meanings to the themes are to be attached and a priority level is to be given to each.
7.	Repeat step 6 till such time that no free nodes are left.
8.	Repeat step 7 till such time that no further groups or sub groups can be formed.

Table 1: Rules for the coding process

During the first iteration, I started by coding each of the eight interview transcripts first and then I coded the audio diary transcripts and my interview thoughts diary. I began the coding process in NVivo7. This included creating a research project, loading it with all the transcripts and then going through each of the transcript in NVivo7 and coding the paragraph whenever I encountered a novel idea / theme. For example, when I encounter a paragraph in the transcript where the interviewee said:

*"Because, they say that, division's management also had a part to play in the blame, I think, because when we moved buildings we had a whole complete restructure. And a lot of the administration staff were actually, (umm) made redundant or were shifted to different roles and their roles did not include typing letters or filling in their tracking or their timesheet entries or anything like that. So all of a sudden they had to do all this extra administration work for themselves, they had to track on the computers themselves, they had to do their own documents in System A and I don't think that went down very well either." – Sandra*

This paragraph in the transcript was coded on two nodes, since it intercepted two ideas; fault on part of the management while implementing the system as well the emotional behaviour problem faced by the employees of a division in the organisation. As the coding process carried on, new ideas were discovered and new free nodes were created for each of them. At the end of the first iteration, I was left with 272 new free nodes.

#### **4.3.3 Iteration Two**

Iteration two consisted of going through step 2 - 4 of the coding rules, outlined in Table 1, for the first time. I revisited each of the free nodes which I had created in iteration one and checked them for the length of their names. Every node name which was more than three words was attempted to be compressed into three or less. For example, there was a free node called "high handedness of management". The name of the node was outside the parameter of rule 2 of the coding rules. Thus the node was renamed as "bureaucracy".



The second step of iteration two involved visiting each node and evaluating its importance to the research question / context of the research. If a node was found to be not important, then it was removed from the coding scheme. The third and the final step of iteration two involved going through each of the nodes and seeing if any of the nodes were similar in meaning to one another. For example, nodes called "frustration" and "disappointment" were similar in meaning to one another. Thus the text coded by them was combined under one node called "frustration". At the end of iteration two, I ended up with 201 free nodes.

#### ***4.3.4 Iteration Three***

I went through steps 2 – 4 of the Coding Rules with all the 201 nodes which I had obtained at the end of iteration two. Some more nodes were combined; some nodes on the basis of their negligible importance to the research were removed. The difference of this iteration as compared to iteration two was that none of the nodes were renamed. This symbolized a degree of uniqueness which was being achieved. At the end of iteration three, 159 free nodes remained.

#### ***4.3.5 Iteration Four***

With the uniqueness being reached at the node level, the next step was to group the nodes based on their similarity. I started this process by combining nodes based on their allegiance to systems, processes or people. This saw me ending up with all the nodes arranged into three lots. There were two possible approaches for coding from iteration four onwards. One was a top down approach for coding, which meant dividing the codes into three lots depending on their affiliation to systems, people and processes, or cluster them into groups based on the similarity of their meanings and then combine those groups into systems, people and processes. However, I felt it was better to use the top down approach from here on, since it would give better clarity to the coding process.

For example, nodes 'failed implementation attempt', 'incomplete implementation of System B', etc., seemed more inclined towards 'systems' than towards 'people' and thus were included in the 'systems' group. Iteration four saw me ending up with the 159 nodes arranged into three groups; people consisting of 70 nodes, systems consisting of 59 nodes, and processes consisting of 30 nodes.

#### ***4.3.6 Iteration Five***

The last and the final iteration saw the nodes in each of the groups being clustered together into sub-groups. This was done on the basis of a common meaning being shared by each of the nodes. For example, nodes 'perfect system security', 'relationship between documents', 'taxonomy linkage' were grouped together under the sub-group 'system implementation positives'. Similarly other groups too were formed under each of the three groups. The iteration ended with seven sub-groups under the people's group, six sub-groups under the system's group and five sub-groups under the 'processes' group.

### **4.4 Research Rigour**

Complementing the software process of coding the transcript, I was also running a parallel manual process from the end of iteration two. The manual process consisted of having 'post-it notes' for each of the nodes and having those pasted on a white board. As the coding process progressed in NVivo7, I compared the same with the post-it notes in the manual process. This helped to verify the codes being formed within NVivo7 as well as the linkages which occurred during Iteration 4 and Iteration 5. Figures 8,9,10 and 11 signify the manual process followed.

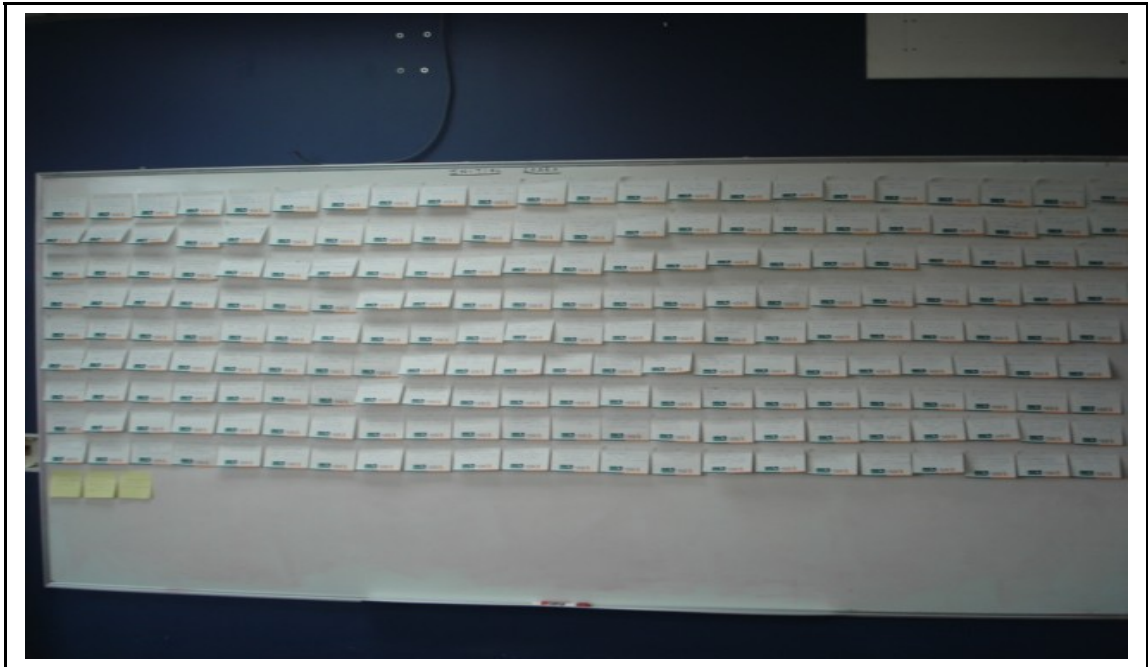


Figure 8: Manual process, outlining free nodes at the end of Iteration 2

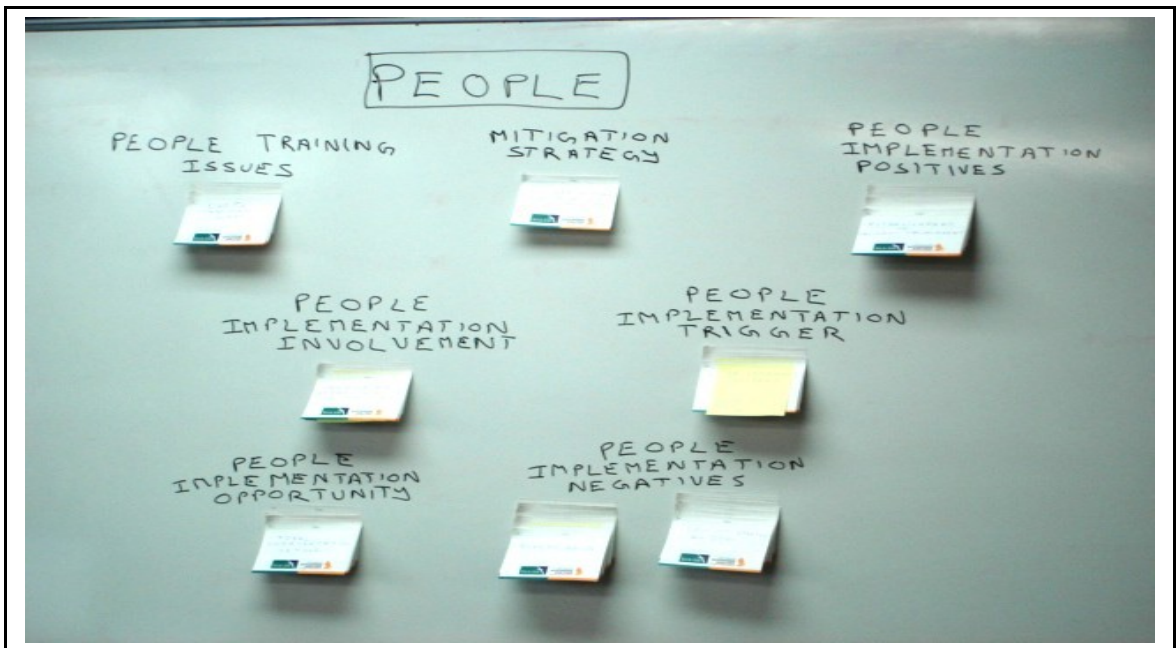


Figure 9: Manual Process, outlining nodes from the 'people' group at the end of iteration 5

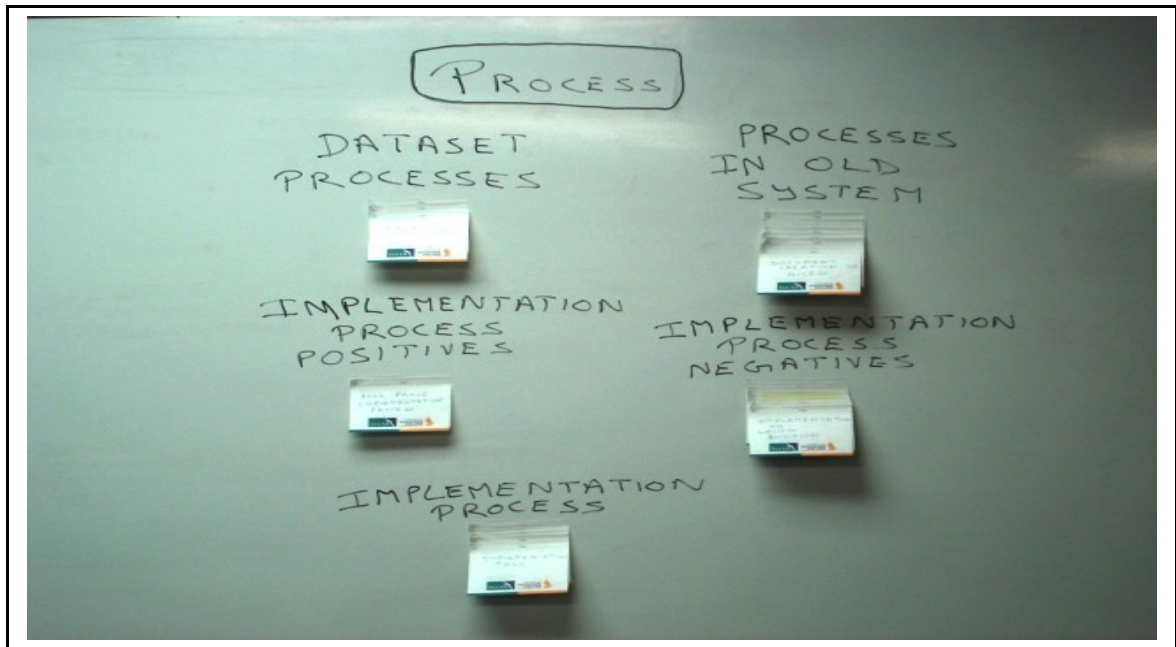


Figure 10: Manual Process, outlining nodes from the ‘process’ group at the end of iteration 5

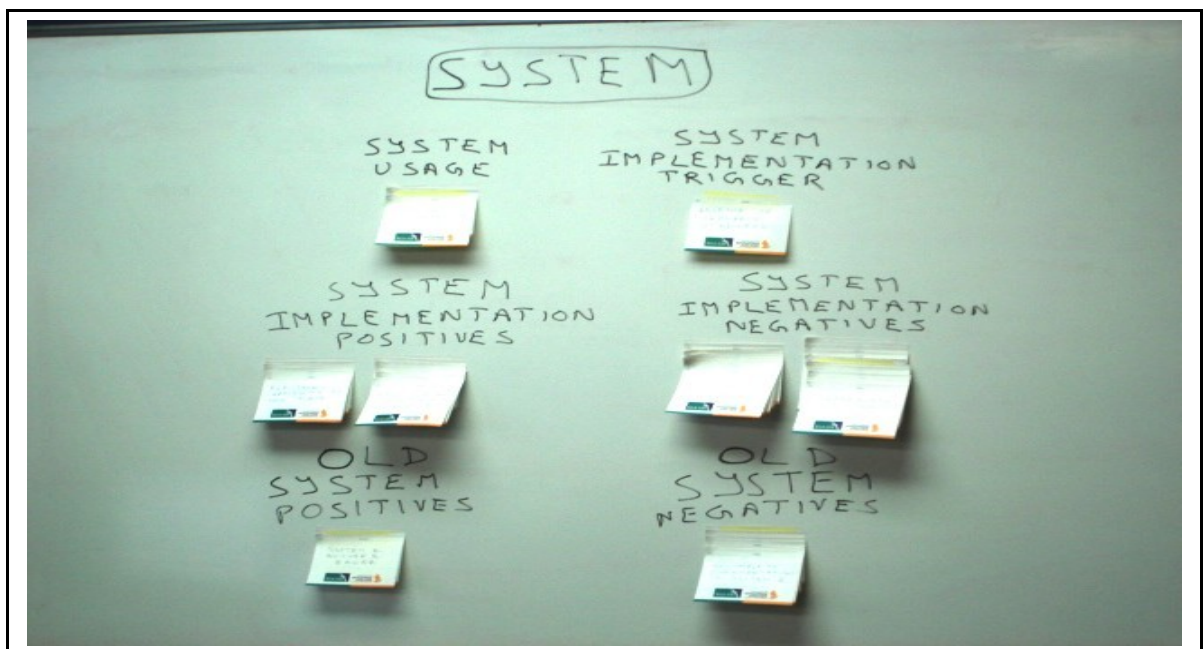


Figure 11: Manual Process, outlining nodes from the ‘system’ group at the end of iteration 5

#### **4.5 Chapter Summary**

This chapter continued from the research methodology and research methods which had been outlined in the previous chapter. The chapter divulged briefly on the data collection for the study and then gave a detailed description about the coding process of the collected data. The chapter then discussed the analysis process used in order to obtain results, relevant to the research objectives outlined at the start of the study.

## 5. Results

*“No project management, no programme management, (umm) there was no idea what the business benefits would be, there was no idea what the business impacts are gonna be.” – Jack*

### 5.1 Introduction

The codes which had been developed using the coding schema in the previous chapter and the subsequent groups and sub groups which had been formed are now analysed using the analysis guideline presented below. The results obtained from this analysis have been presented in this chapter, broken up into the three sections based on the research objectives identified in the first chapter. These results will form the basis for the subsequent discussion chapter.

### 5.2 Results Schema

At the time of coding the transcripts, I had used a schema as mentioned in the previous chapter. The final step in the analysis preceding the results, was undertaken with the intention of identifying themes which had been of greater significance to the research question than the others. In order to achieve these 'significant' themes and articulate a piece of text as significant, a guideline had been derived by reviewing relevant literature . The ordering of the guidelines identifies the level of importance attached to finding the significance of a particular theme occurring in the transcripts.

1. Is the theme connected to or has direct relevance to the research question?
2. How many times has the theme occurred across the various interviews / transcripts?
3. Does the theme have historical relevance attached to it?
4. How many times has the theme occurred across the various interviews / transcripts in conjunction with another theme?

### **5.3 Study Results**

The results comprise of analysis conducted on 54,392 words of transcribed text. The factors found from the analysis relating to the research objectives have been divided into each of the three main objectives, as outlined at the start of the study, as follows:

#### ***5.3.1 People related factors***

Factors relating to people have been found to be the most dominant in the coding process, covering all the coded transcripts and having 133 references in the entire coding process. The dominant themes occurring in the analysis, involving people related factors affecting the implementation are:

##### **A. Communication:**

Communication has been identified as one of the most dominant factors affecting the implementation process by the interviewees. The interviewees spoke about the lack of or absence of communication within the organisation with regards to the pre-implementation processes and during the implementation cycle itself.

*'Well I don't think all the representatives on RADAR went back and shared their information.....They probably knew what it was but they didn't know what it was going to do. All I knew that it was gonna make all our records electronic, and it was going to make their job easier and that was it. There wasn't a lot of communication about that.'* – **Thomas**

*'I don't think that would have been done very well. I know that Drew and Jack attended meetings, where the opportunity was given to do it.....I do believe they had opportunities to feedback. They had meetings, but you know, Jack would have taken all details but the problem is, and Jack will probably say to this, you know, you, umm, where, we can deal with a problem, we cannot deal with emotion.'* – **Diana**

Communication is a critical factor in the implementation of enterprise systems, since the implementation effort spans across the entire organisation. In order for a successful user participation in the implementation effort, user involvement needs to be solicited. This would require an established communication strategy at the start of the implementation process, as has been iterated in literature on ES implementation.

In this implementation, one interviewee implied the lack of communication regarding the implementation process which led to a negative reception of the EDMS by the users. This was further implied by the lack of feedback acceptance by the interviewee, who went on to state,

*'Going and talking about it at work group, at division level, at management level, communicating about it in the 9'O clock news regularly. Am trying to give you the whole picture, creating an advisory group or user group within the organisation, what we have just done with the taxonomy. Giving an opportunity for 360 degree feedback. An opportunity for us to tell the organisation what we're doing and an opportunity for the organisation to tell us what they like, what they don't like, what they change, so that nobody at the end of the day should say honestly, I didn't know.'* – **Thomas**

The comment further implies absence of communication and absence of user feedback on the implementation process by the implementation project group.

## **B. Management Support:**



Management plays an important role in the implementation of ES since it's a costly and time consuming activity. However, in this study, the interviewees seemed to support the view of absence of a management initiative, lack of vision and strategy and organisation wide buy-in for the implementation.

*'We're not; we're not calling the steering committee. I am trying to use the words we would use today. I think it was fair to say there was an 'ad hoc' group of managers who from time to time would get together to talk about issues..... The other issue that they had which would be raised by the project team because the advice given from the project team was not to do it this way and that was overruled.'* – **Jack**

*'I would want the directorates there to be able to provide us with a list of their business function. You cant, you cannot, you cannot implement a document's management system, umm, without understanding what is the purpose of the business.'* – **Diana**

*'Disadvantages are probably the fact that the buy in from the rest of the organisation hasn't been as great as Environmental Services. So it's a lot harder to convince people in the other areas.....'* – **Danielle**

From the above comments it can be summed up that the users felt the absence of a project management plan and support from the management. However the positive coming from it was what one of the interviewees described as the creation of a project management department.

*'One benefit is we came out with programme management. We got programme management, out of it. It was so, such a horror, we actually realised that we actually couldn't keep managing like that.'* – **Jack**

Also as one of the interviewees summed up, the management did investigate the needs of the user's but not at the micro level, only at the macro level. This in other terms implied the lack of communication in order for that information to flow from the macro level to the micro level.

### **C. Emotion:**

From the interviewees, it could be derived that the implementation of the system led to a paradigm change in the working environment of the users. The implementation meant shifting from a manual processing environment to an electronic environment; or in some instances from an environment which involved little input from the user to a do-it-all-yourself approach. This led to a lot of emotion being attached to the implementation and use of the system. This was summed up by the interviewees in the following comments:

*'But I had to go and learn all. If it was an email you did this way and if it was this, you did it this way, a lot of that they developed out of the product. But at that time that was a real frustration for us, to make it easy for a particular user or a particular organisation. (Frustration)' – Jack*

*'It's not supposed to be, that you do a daily task and you expect 'nay' or somebody else to do it. It, you know, that's what records keeping is about. You deal with it at the front end and that's been a huge thing for people, who have been in the organisation, long time. (Emotional change)' – Diana*

*'And there was a lot of hostility, there was a lot of resentment at the time of implementation. (Hostility)' – Thomas*

*'Some of them completely had a break down and then came right, and, and they were using the system with not a problem. Others refused to use the system for years and found ways around it. Ya, there was no common reaction. But yeah, it definitely was stressful to the staff. (Stress)' – Danielle*

The users, who had a system shift or a paradigm shift, had a lot of emotion attached to the implementation process and a majority of them conveyed it in a negative manner. This led to a negative image formation about the Information Management (IM) division by the users of the division where it was implemented first.

*'The surveys that IM did with the staff were absolutely very negative about IM as a division. IM as a division was the enemy and they imposed System T or System A on us and you know we had no choice, that wasn't done correctly; there was a lot of resentment. (Dislike)' – Sandra*

The only positive from the user end was the positive usage of the system as depicted by the new staff coming onboard the organisation.

**D. Implementation Trigger:**

Implementation of an Enterprise System in an organisation has a number of rationales attached to it. One could be improving the process operations, another could be better decision making.

The interviewees were of the opinion that the reason for implementing the EDMS was driven by the need to make the processes electronic as well as gain a substantial technological advantage over rival organisations. However, the main reasons for selecting the system and its subsequent implementation were given by one of the management staff in one of the interviews. The interviewee said,

*‘The first one was the centralization of all of our development control people into one office..... Then when they started doing it, they thought hey, it would be a great idea to convert these files into digital images because they realised at a future date, you know things like processing and that would be done electronically and ..... So they thought, well, ok, now is the time to look at electronic document management. They knew that that was the toolkit that they wanted. So I read, I guessed that the real driver was a realisation that they couldn’t carry on using paper as, as a media for a lot of the information that was moving around the organisation. So that was really the catalyst deciding to go into the market and look for a electronic document management solution.’ – Alan*

Contrary to this another interviewee thought it was more of a leadership approach that the organisation wanted to employ as compared to other organisations and had brought the system on board without much thought. The interviewee went on to say that,

*‘I think, you know, from my own perspective, there seems to be a drive that Organisation A wants to be a leader in this area and it was brought on, potentially without the training, or the support,*

*that should have been put in place to make the implementation a lot more...*’ – **Sandra**

Another factor which was purported as a trigger for the implementation seemed the decommissioning of the company that provided the earlier legacy system used for operation by the processes. Since the company had removed the products from active support and the need existed to make the processes electronic, the organisation was compelled to undertake the implementation.

Also the success of the selected EDMS in organisations in one of the neighbouring countries was perceived as a positive for the selection of the EDMS by the organisation. The only negative felt by one of the interviewees was the organisation seemed to implement ready-made systems than design custom systems to fit their own requirements. The interviewee summed it up saying,

*‘So all I am saying that, Organisation C is a prime example. They needed a system, instead of looking to other countries; see what they could adapt to, to suit their needs, they designed one that met their needs. They created their own. And I think that’s the thing that seems to be repeated time and time again. We are taking things that done necessarily; they might meet some needs of some particular part of the organisation, but not all. And we have to then adapt to their.....’* – **Sandra**

#### **E. Vendor Support:**

ES implementation needs a deep and a thorough technical understanding of the infrastructure of the organisation where the system is being implemented. The interviewees felt the vendor had not provided the correct advice to the organisation during the implementation of the system.

*‘The system was setup and then would have been six months or a year later, we rolled out reporting, which would be something, umm, that would be the only thing I would suggest, that we did not get good advice from vendor of System A.’* – **Diana**

*'Vendor of System A were providing advice from other implementation they had done. Some of their ideas were quite good and some of their ideas were quite bad.'* – **Jack**

However, as can be implied from one of the interviewees, another drawback of the vendor support during implementation was the success of the company. As the company succeeded and became bigger, it did not have enough resources to either provide adequate support to the system or develop the EDMS further.

*'But the problem is I think that initially the vendor of System A, who own the company, went too big too quickly; and they were the same, they didn't have enough staff, to do all the things that all the users wanted it to do.'* – **Emma**

The inability of the vendor to satisfy the needs of the user regarding the development of additional functionality in the EDMS also led to a negative reception from the users.

#### **F. Staff Support:**

This requires that the end users of the system must have adequate support available to use the EDMS successfully. From the interviewees, it was implied that the staff support and the training support was not adequate within the organisation. Greater support and more comprehensive training methods were needed in order to enable the user to be competent enough to use the system to the best of its abilities.

*'I think there still needs to be a big support out there because there is a lot of new staff coming on, the staff change is quite big, or you know, quite, quite regular.'* – **Sarah**

*'That's why they say, ohh I can't find my information, well yes you actually can. But if you had used your response function, if you had done a whole lot of specialty thing, then you would have no problems with it. So we have training issues..... I think, I think that is a major. Because I think that, that, you know, we do standard training, but what I think is actually needed is, is similar to add on courses, that, I mean cause there's a lot to learn. .... Yeah, one person can't do it. It comes down to actually resource.'*

*One person can't service 600 users and so, umm, I, I mean, you know.'* – **Diana**

*'Well, environmental services staff were trained and then dumped in the deep end. Okay and they actually had like a month or so between being trained and when they actually started using it..... They should have had a testing or a training environment they could play until such time as that was implemented..... There was a considerable delay between when the training was to actually when they could physically use.'* – **Sandra**

Not only the staff support, but also the administrative support was not enough for the system, which was implied by one of the interviewees saying,

*'I don't believe system administration goes far enough. What I mean by that is, umm, one of the problems is that, we have a potential for three system administrators.'* – **Diana**

Even though the EDMS may have been competent enough to satisfy the needs of the organisation, the support delivered to the users to use the EDMS wasn't adequate.

### **G. Change Management:**

In this study, change management has been related to the changing of processes on account of the implementation of the new system and has been differentiated from the emotional behaviour displayed by users, which has been recognised earlier as a factor called emotion.

The EDMS implemented in the organisation saw a shift in the way the processes were undertaken, from a manual form to an electronic form. This was a big change for users of the system who had never used any electronic resources for the completion of any of their processes. Thus a dedicated change management person was needed by the organisation to mitigate this cultural change. This has been voiced by some of the interviewees.

*'Umm, what happened for the taxonomy deployment is that we actually, had Vanessa who was actually employed to specifically drive it. Now, what gives you the advantage is, you actually work as a change management agent, as well as somebody who's deploying....., and I think that if we have had people dedicated to change management, they didn't do anything else right from the day that System A was deployed, it would have been a lot, it would have been, there would have been more acceptance of it.'* – **Diana**

*'All our internal processes had to be changed. We had no files anymore. We used to photocopy a piece of paper on a file. So now, now we were doing everything different.'* – **Emma**

The change in the processes caused a negative system image being formed in the minds of the users of the system. The absence of a dedicated change management person to mitigate the emotional / cultural change meant that the system was not being used to its full potential.

### **5.3.2 Process Related Factors**

Process related factors were also found to be critical to the system implementation, with the implementation process and the legacy systems factors being the most prominent ones in this group.

#### **A. Implementation Process:**

This would imply undertaking an in-depth scrutiny of the various implementation approaches available to the organisation prior to implementing the ES. The research organisation used a big bang implementation approach which was not received well by the users. The interviewees implied their displeasure over the implementation approach through some of the following statements.

*'I would say, you know, it was just an overload of , you know, it wasn't only one corporate system that was going live, it was two corporate systems going live and process changes and team changes, whole division restructure.'* – **Sandra**

*'Relocate to a new building, with a bunch of new people that they don't know, and expect them to change their habits from using typists and female staff to having to learn how to do it themselves. So all these issues, all by themselves, could be major issues and roadblocks that any project and we got all of them head on.'* –

**Thomas**

*'All the teams were reorganised, new managers were appointed, all this happened on the same day and they moved into another building. So you can imagine... This is the big bang. This is, this is big bang beyond the big bang.'* – **Jack**

One of the interviewees was supportive of using the big bang approach by saying that the approach may suit certain organisations in implementing Enterprise Systems but not the current organisation. The factors to be taken into account include the size and nature of the organisation. The users also became quite averse to using the system and this led towards developing resentment within the user group and hostility towards using the new EDMS solution.

*'There was a lot of resistance and I think the staff, that there wasn't, they didn't get listened to enough in terms of implementing it that way.'* – **Danielle**

There had been a failed implementation attempt at the start, prior to the actual implementation, which had been due to the loss of integrity of data, which prompted the management to run a data cleansing project for nine months in order to bring the data up to an acceptable standard by the EDMS solution. Thus, rather than encouraging the users and enabling a smooth transformation from the earlier processes to the new EDMS enabled ones, the implementation process complicated matters further and gave rise to user hostility towards the system and a negative image of the IM division implementing it.

## **B. Legacy Systems:**

Two legacy systems existed in the organisation prior to the implementation of the EDMS. In addition to the legacy systems, an MS-Access database was also used for processing purposes. The drawbacks of these legacy systems were



partly instrumental in the selection and the resultant implementation of the EDMS in the organisation. The drawback of the MS-Access database as iterated by one of the interviewees was the lack of storage space needed to store all the relevant data related to the processes of the organisation. Also the MS-Access database was not used by the processing staff but only by the administrative staff.

*'Well all the tracking was done by me. Like none of the staff actually used it, it was only used by the administration staff. So none of the processing staff actually used it.'* – **Danielle**

The old records process, as explained by one interviewee, was a manual process,

*'There was no electronic system; I understand they used to write it down in some books, in some cases. But all they did was basically copy, ohh sometimes they copied it and put it on the file, in other cases they didn't even bother to copy it, it just went to the person, and once the person had done what they needed to do, then it went in the filing.'* – **Jack**

Another process, prior to the EDMS system being implemented, used partly a manual process and partly an MS-Access database.

*'We processed in hard copy, we had plans, we had applications lodged, we had an Access database that recorded the tracking of the consents.'* – **Sandra**

Since the number of records stored in the MS-Access database was huge, it needed to be repaired each day.

*'The database wouldn't work until you repaired it. Basically it was not designed to hold that many records.'* – **Danielle**

The inefficiency of the Access database for processing basis led to the implementation of another corporate system, System T. There also existed a System G, which was in operation for some period of time, before it was

deemed unstable for operation and removed. The vendor of System T promised integration with System A and thus the reason System A got chosen, instead of some other EDMS solution.

*'System G wasn't stable so then they have gone on to the one that we have got now, System T.'* – **Sandra**

Thus, some of the drawbacks of the legacy systems prompted the search for an EDMS and later the selection of System A, as the preferred EDMS solution for the organisation.

### **5.3.3 Systems Related Factors**

System related factors, as compared to the other two groups of factors, were also quite prominent in the implementation process. Factors most prominent in this group were those related to system functionality, integration, standards and security.

#### **A. Functionality:**

According to the interviewees, the new EDMS had a lot more features and functionality over the old system which was well received by majority of the staff. Users across the entire organisation could do their processing from one system, electronically; create relationships between documents and easily find any file which they required.

*'I could see the benefits straight away, specially, being able to accept everything electronically in one place..... As a user, it's easier to find information. You don't have to wait for the property file to be found. So yeah, you can look things up, quickly. Two people can look at the same document, at the same time without having to print copies.'* – **Danielle**

*'Well you don't have to go to records and say get me this file, you can look at it all there. Time is cut down..... I actually found System A better cause you actually had the documents there on the screen. Actually it was easier cause it was more like a, like a explorer type.'* – **Sarah**

*'To me the benefits are you can find all the information. Umm, you can actually use the functionality in System A to create relationships between documents..... you can register your incoming and outgoing emails, and you could bind it to the very start of that document. And now nobody is doing it, but if you did it and I do it on my information request, I can track the whole thing.'* – **Diana**

*'I think that probably, I think the system is capable of all the things we, we wish it could do. I, I think it has the power to do most of what we want.'* – **Emma**

From the interviewee's perspective, the system did most of what was desired by the users and was easier to use and better than the old system which was there in operation in the organisation earlier. However, the existence of network drives within the organisation where most of the users stored their documents instead of the EDMS became a deterrent for the system's functionality. Also some users found the EDMS to be a lot more labour intensive than the old legacy system. Another drawback of the EDMS was multiple ways of doing the same process, iterated by some of the interviewees, which lead to them being frustrated, since some of the users who doubled up as trainers had to learn all the various ways in order to train other users in the organisation.

*'16 different ways to register a document. I had to go and learn all. If it was an email you did this way and if it was this, you did it this way, a lot of that they developed out of the product. But at that time that was a real frustration for us.'* – **Jack**

The EDMS also accepted scanned copies of hard copy files arriving in the mail. These documents were scanned and entered into the system. The scanning was outsourced to an external agency, which created problems at the time of scanning since the documents had to be referenced with the corporate taxonomy, consisting of more than 1000 entries. The scanning process created a problem for the system, which one of the interviewees described as

*'Certainly from the system point of view, they will do everything perfectly right for months on end, and then they will start mugging*

*my system up. I have had to, the integrity that I have had to build into the specification, and they would still be able to mug it up..... So I have been unimpressed, with Organisation P from the start. However umm, you know the taxonomy subject, to expect an agency to be able to apply, something correctly to 1400 without specialised knowledge, it's impossible.'* – **Diana**

**B. Integration:**

The implication is that while all the related user-groups are involved in the decision making regarding the implementation, all the systems through which the entire supply chain goes through, also need to be integrated with the ES.

The interviewees came across with the view that within the organisation, the EDMS was currently integrated with only one of the other corporate systems through an interface created by a user from within the organisation. The lack of integration of the EDMS with the other corporate systems, as viewed by some of the interviewees, was a drawback when compared to the old system which was supposed to be a suite of operational modules which were totally linked throughout the organisation. However, the view of the old system being completely integrated was also supported by one of the interviewees.

*'It was more integrated with the entire, we had records, was a integrated module of the whole of System B.....The reason for that was they were actually developed by the one software being dealt, which at the time was 'Organisation D'. So they had what they called as the local government suit of software and they did everything from community system to property, you know, to applications, name and address. Records was a component of that.'* – **Diana**

The acceptance of a total integration within the old system was contradicted by another interviewee.

*'I suppose the negative would be that it wasn't fully implemented. There were parts of it that we didn't utilise .System B had separate modules, but we were just using the records management system.'*  
– **Sarah**

The EDMS was not integrated with the other corporate systems within the organisation which led to a number of problems such as incomplete data existing in some corporate systems as well as in the EDMS, since some processes incorporated the use of both the systems. Such an incomplete process flow resulted in incomplete data being provided to the customer. This was aptly reiterated by one of the interviewees as:

*'Most documents that are created now, in from Environmental Services, are created in, if its application related, its created in System T and they are not registered in System A. Most incoming correspondence goes into System A. It has created a problem because we at Environmental Services thought that when the discs that were being burnt for the customers that they were getting information from both areas. Well, we understood and we were told that there is a search function in System C where you can see both System A and System T documents as long as they are not draft or confidential. Okay, so they would only use that search to burn the disc. But now we find out, a year down the track that, that is not the case. There were documents missing, from those burnt discs. Okay, so that, we still scan a lot of the important documents that actually get generated from System T and signed into System A at the end of the process. So the customers are still viewing that stuff. It's not complete, yeah. And they, and at the moment the customers coming to the front of the house don't get the information from System T either. So yeah, yeah that's a major issue.'* – **Danielle**

Also the management had been promised by the vendor of the EDMS system about a possible integration with the other corporate system, which never happened.

*'My understanding was that System A was chosen because at that time Organisation D who were producing System T, had said that System A was the records and document management module of choice. They didn't have a document management choice for System T and they were going to use System A. They went into a agreement with vendor of System A, and they were going to use the product to provide them with a document management module. Since then they have of course developed their own document*

*management system, that integration has never happened with System A, it was only just done and talked about it again.*’ – **Jack**

This lack of integration between the core processing systems of the organisation, led to the creation of *bucket documents*, i.e. having a set of documents which existed in the EDMS and another set of documents which only existed in the other corporate systems. The organisation still awaits the integration of the EDMS with other corporate problems for a solution. The reason that the management had not given enough forethought to the integration process and relied on the word of the vendor of the EDMS is aptly reiterated. This implies a lack of strategy and vision on part of the management.

### **C. Standards:**

The success of an EDMS, to some extent depends on the standards and policies of the system. Since, an EDMS is going to store documents in it, which will be readable and have a value attached to them via a set of metadata attached to the document, hence the need for a standard for the EDMS becomes all the more visible. Prior to the implementation of the EDMS, there had been negligible or no corporate standards for documents within the organisation. This was summed up by some of the interviewees as:

*‘Well, when you think about it you had stuff that was coming in to this office, which was going into a filing system. Then there was a filing system at each of the area offices. Then there was a filing system at development services. So basically there was no corporate filing system as such. There were many different record stores and, and they all had different standards applied.’ – Jack*  
*‘And we had a lot of people replicating datasets into their access databases, who should have been using the system and those are the people that have been quite hard to convince to actually use the corporate systems because, its nothing nicer than having your own little system, that has no corporate standard sitting behind it, which is the real problem now why people don’t like now certain things behind corporate systems, because they had to do things in a certain way.’ – Diana*

The lack of corporate standards showed up during the implementation of the EDMS, which also brought along with it, auditing process for the system. This led to the establishment of corporate document standards for the organisation.

*'Yeah, also, also one of the other things I would say is , you also need to, when I say document management, I mean all document management, including email, and G drives and all that sort of stuff, you come up with a standard, and that would be the standard that we would then audit throughout the organisation.'* – **Jack**

However the absence of standards, at the time of implementation of the EDMS solution, led to the establishment of document management standards throughout the organisation. This was one of the positives of the EDMS implementation process.

#### **D. Security:**

The security of an ES is critical to the success of the organisation implementing and using it. Moreover when the ES is an EDMS, storing nearly every electronic and scanned document related to the processing of the organisation, the security of the system becomes even more important. The interviewees gave a positive viewpoint about the security of the EDMS. One interviewee defined the security of the EDMS being extremely tight, by saying

*'We actually found that, umm, we had tailored the security a bit too tightly, so nobody could do anything great, because my system, so we, so we learnt from that. That was the only real problem area as actually getting the balance right of security.'* – **Diana**

The interviewee's comment led to the belief that the security of the system was one of the strongest points of the implementation process. This was further strengthened by some comments made by the interviewee.

*'Emma does auditing everyday. We audit, because the quality of data what people put on it, will not help them find it. So Emma actually looks after that. So I, my expectation, would be that, not*

*only would one audit, for data accuracy in document management system, but they should be doing that on every system. So we don't set it off, umm, document management, as begin unusual, in the event that we apply auditing to it.....I tend to judge System A now by the new users who come in and they think it's fantastic. I've had users go down from here to team's Organisation E, they have looked at their setup and said jeez you shouldn't be able to do that and noted that their security is not right. So I am very proud of the fact that, I think we got, I think from system administration point of view, we got the security exactly right.....there are something's that you should be able to do and there are something's you shouldn't be able to do that. And when we get audited, we want to be able to say well G, yes we can release that. We don't want to be able to say, no anybody can do that.'* – **Diana**

The comments imply the correct security measures undertaken in the EDMS which was implemented within the organisation.

#### **5.4 Chapter Summary**

At the conclusion it can be said that following the analysis schema outlined at the start of the chapter, dominant factors in each of the three groups were found. These factors were then supported with findings from the literature and comments from the interview transcripts. The most significant amongst these factors, in each of the three groups, will be discussed next in the discussion chapter.



## **6. Discussion**

### **6.1 Introduction**

The 1990s have seen a continual rise in the use of ES by organisations. The vast amount of paper documents, which government organisations normally make use of and the current rise in the use of EDMS by government organisations is what, triggered this study. The lack of literature surrounding the implementation of EDMS in government organisations provided the ideal platform. The study has found out factors, from the people, process and system perspective, which together constitute an organisational view, affecting the EDMS implementation. This section now discusses some of the major findings, from all the three dimensions, obtained in the results section.

### **6.2 People Related Factors**

EDMS cannot automate the functionalities encompassed within them. They need an external user to invoke these functionalities. Since the success of an EDMS depends on the usage of the system by the users, users assume greater significance as compared to the system itself. The overwhelming importance of users was exemplified in the results section when the majority of the themes as well as nodes from the analysis of the interviews were found to be aligned with the 'people' group. However, the most prominent amongst these were communication, management support, change management and emotion. These themes are discussed next.

### ***6.2.1 Communication***

The importance of communication in the implementation of an ES assumes significance since the ES stretches across the entire supply chain of the organisation. This implies involving all the users whose processing will be affected by the implementation of the ES, in the implementation process .

In the study communication seemed to have a greater bearing on the implementation process. This explains its extensive linkage to the other factors within the people dimension as well as the process and system dimension, which has been described later on in the report in table 2. In the case of an EDMS, the affected users will be all the employees of the organisation where the EDMS is being implemented, since it will change all the manual document processes into electronic ones. This would imply that for a successful implementation, the users will need to be informed about the change in processes. In the study, the need to inform users was found wanting.

The communication about the functionality of the system to the users would have been an instrumental factor for the success of the system. The absence of communication of the system's functionalities to the end users of the system would also have an impact on the business process. This impact was because the functioning of the EDMS also depends upon the underlying business processes .

The implementation of feedback provided by the end-users during the EDMS implementation was lacking in this organisation. One of the interviewees compared the importance of feedback to another implementation project occurring within the organisation wherein the organisation seemed to have encouraged user feedback, leading to overwhelming success of the project. The importance of user feedback to implementation success is dwelled upon deeper in the recommendations provided in Appendix A.

### ***6.2.2 Management Support***

Management plays an important role in the implementation of ES since it's a costly and time consuming activity. This is comparable to several previous studies conducted in the implementation of enterprise systems, denoting the importance of the management in the implementation process. Management support, during the implementation of an ES, affects not only the user processes but also causes the redesigning of the business processes. The impact of management support on the implementation process can be tied back to the literature, where greater relevance has been placed on factors such as top management support and project champions. In this study, management support was found to be a crucial factor relevant to the success of the system. The management had taken the appropriate step, analogous to the literature reviewed, by preparing a request for proposal (RFP) document and observing the system at other sites which had implemented the same EDMS solution and had it operational. However, the drawback of this, as summed up by one of the interviewees, was the lack of a steering committee or a project management group for managing the entire implementation process.

Coupling the absence of project management, was the lack of vision regarding the future post-implementation processes, which as Kerkoulas (2002) identifies, is crucial for the success of an EDMS implementation. In addition to this, the terms of reference document was also absent during the implementation process. Implementation of an ES is a lengthy and an extensive process. It takes years for an organisation to implement an ES. In the case of this study, it took the organisation seven years to implement the EDMS. There existed confusion between the interviewees as to whether all the users had been trained to use the system or were there some left who still needed to be trained, indirectly implying the absence of a training plan.

The implementation activity was enterprise wide and affected the processes of all the divisions within the organisation, implying continued support and cooperation between all the divisions for a successful system implementation. However, the intra

divisional support and cooperation was found to be missing. There was a contradiction between the interviewees upon the investigation of the user needs for the EDMS, with some users signifying the high handedness of the management in the selection process. Contrary to this another interviewee appeared satisfied with the review process undertaken by the management.

The only positive coming out of the implementation process was, as one of the interviewee described, the establishment of a formal programme management department to oversee the implementation of any system / projects in the future. The establishment of a programme management department can be seen as major positive of the implementation process, seen it came upon as a realisation on the organisation that huge implementation projects cannot be carried on in an adhoc manner.

### ***6.2.3 Change Management***

The lack of change management has been identified as one of the Critical failure factors in ES implementation projects . Traditional ES implementation literature attributes change management as an important factor . In this study, change management found considerable mention, although most of it was negative. Even though literature mentions change management as being crucial to successful ES implementation, its presence was negligible during the EDMS implementation. The organisation failed to handle the change management aspect carefully, provoking the interviewees to shed some poor light on it. One of the interviewee commented on the lack of change management and emphasized the need for it for future implementation processes.

The organisation did have a person working in one of the divisions, changing processes in order to take advantage of the functionality offered by the new system, however it was limited to process changes of that division only. Instead the organisation needed to have an organisation-wide, implementation process-wide,

dedicated change management person. The implementation saw process changes occurring, in order to fit the functionality of the new system, than being vice versa.

#### ***6.2.4 Emotion***

The theme of emotion has been independently formed and has been purposefully separated from the theme of change management. In this study emotional display of users in the usage of the system has been prominent and has been instrumental in determining if the system was a success or a failure. Although the importance of people for the success of EDMS implementation has been highlighted in literature, it has never been linked, either directly or indirectly to the emotions of the people during the implementation process.

The emotions displayed by the users at the time of implementation and consequent usage of the EDMS can be partly attributed to the implementation approach used, communication problem within the organisation with regards to the implementation, as well as the lack of change management and the system's functionalities itself. The implementation represented a massive change from the current manual processes or the legacy system process to the EDMS. EDMS entail the user to not only input a document but to also profile it and attach metadata to the document, prior to storing it in the system. This functional specification of the EDMS was unknown to the users of the system. The added responsibility of profiling and adding metadata to the documents, in addition to their routine duties, caused a lot of resentment and resistance from the users of the division in which the EDMS was first implemented.

The staff developed a negative approach towards the IM division which was the one responsible for implementing the system. Hence, the negative approach of the users towards the system was a major roadblock towards the success of the system. However, the impact of emotional behaviour on the implementation and usage of the EDMS leaves a possibility for future research in the field of Information Systems, which is discussed, in the future research section in the next chapter.

### **6.3 Process Related Factors**

Process related factors assumed as much significance as the people and system related factors. The sole major process related factor was the implementation approach used. This factor is next discussed in detail.

#### ***6.3.1 Implementation Process Approach***

Implementation of an ES in an organisation does not only have a technological impact on the organisation, but it also has a strategic, organisational and operational impact. Modular implementation approach has always been specified as a critical success factor for ES implementation. The modular implementation approach is on account of the reason that ES implementation is a time consuming, lengthy and a complex process involving not just the organisation where it is implemented but also affects the partner organisations with which the processes of the organisation have been linked. Contrary to this approach, in this study, the research organisation implemented the EDMS using a big bang implementation approach. However, this approach did not go down well with the users, with most of them developing an aversion to the system. Compounding the implementation of the EDMS was the implementation of another corporate system, a move to a new location for the division's staff where the EDMS was first implemented, along with the change of business and operational processes. This was not received well by the users. Some of the interviewees described this approach as an overload on the users. The negative outlook generated within the users by the implementation approach carried on to the usage of the system.

However, one of the interviewees defended the implementation approach by saying that the approach was not wrong but it also depended upon the size and type of the organisation. Such an argument would stand true, if the organisation is small and a homogenous one, structured in one single location consisting of few employees. However, in this study the organisation had more than one division, each consisting

of more than one department. In addition to this, as described, more than one system was implemented, users were being moved to a new location, and process changes were occurring, all these changes in themselves were major ones. In such a scenario, use of modular approach for implementation would have been a better option, allowing the users to slowly get used to the functioning of the new system as well as settle down in their new work environment.

#### **6.4 System Related Factors**

System related factors assumed second most significance in the implementation process. However one of the major factors here dealt with the functionality offered by the EDMS and its impact on the implementation and usage of the system by the users.

##### ***6.4.1 Functionality***

The success of an EDMS depends as much on the functionality offered by it, as it depends on the implementation process and the expertise of the users using the system. Across all the interviews it was implied that the system selection was more of a management-only initiative than a management-user initiative and there was limited user involvement in the system selection process. The view was consistent across all the interviews except the management interview where the concept of complete user involvement in the selection of the system found prominence.

The majority of the interviewees voiced the opinion of being unhappy with the functionality of the current system, with some of them considering the selection of another EDMS solution in comparison to the existing solution being a better one. The opinion could be attributed to the system lacking integration with other core corporate systems of the organisation. The integration with other systems probably should have been a prerequisite for the EDMS selection since the EDMS was concerned with making electronic all the documents related to all the business process of the organisation. The integration was lacking in the chosen EDMS solution, causing people to start disliking the system.

An example was the lack of functionality possessed by the system in order to enable the users of the organisation to be able to do their processing electronically. On account of this lack of functionality some of the processes were still kept manual. Coupled with this inadequate functionality ability of the system some of the interviewees came up with arguments such as the system was not intuitive enough, not user friendly and having a *bolt-on* system design. The lack of adequate functionality possessed by the system is in contrast to Raynes's (2002) argument of an EDMS having adequate system functionality.

However one key argument in support of the decision to select and implement the system was that the vendor of one of the other corporate systems at the organisation had promised integration with only this particular EDMS solution and had later turned their back on the promised integration between the systems. The part blame for the failed integration of the EDMS with other corporate systems also lay with the vendor of the system as it lay with the management for overdependence on the vendor's promise.

### **6.5 Relations between the Three Dimensions of the Implementation**

Reflecting back on the previous sections, on more than one count, relations can be seen within any of the dimensions and between the dimensions as well. For example, within the people group the factors, management support and change management have a direct relation between them. The absence of change management could have been prevented by having a proper strategy and vision of the implementation process as well as of the future growth of the system. The implementation process missed the presence of a project champion to take it forward through difficult phases of implementation. The absence of functionality within the system has a direct relation with the absence of integration of the system with the other corporate systems in the organisation.



Relations also seem to exist between the factors across different groups. The big bang implementation approach was the result of a lack of planning of the management which resulted in a negative reaction displayed by the users towards the system. The absence of system functionality for online processing caused the users to despise usage of the system. The users had not been informed about the functionality of the new system by the management, till the time that the system was implemented in the organisation and the user training was conducted. The relationship amongst the factors within and between the three groups can be summarised as shown in Table 2.

		Commu- -nication	Emoti- -on	Manage- -ment Support	Change Management	Implem- -entation Process Approach	Func-ti- -onality
People Factors	Communication		✓	✓	✓	✓	✓
	Emotion	✓		✓	✓	✓	✓
	Management	✓	✓		✓	✓	✓
	ChangeSupport	✓	✓	✓		X	X

System Factors	Functionality	✓	✓	✓	✗		✗
		✓	✓	✓	✓	✗	
Process Factors	Process Approach						

Table 2: Relation between significant factors within a group and across the groups

From the table it can be seen that factors such as communication, emotion, management support have a considerably greater impact than some of the other factors such as system functionality. The study establishes that the impact the factors have is in combination with one another. None of the themes have a significant singular impact on the implementation process.

The most interesting result of the study was that inter-relationships existed not only between themes within a group / dimension, like people or systems, but relationships existed between themes across dimensions as well. This establishes the fact that implementation of an ES depends upon the relationships existing between the three dimensions. Better the relationship between the dimensions, greater the success of the ES implementation.

## **6.6 Future Research**

At the start of the research, it had been established that the research was a year long process, in fulfilment of a master's degree. The method used in the study follows an ethnographic approach. Ethnography requires the researcher to have immersion in the research organisation for extensive periods of time. However, on account of the limited time available, I tried to be as immersed as possible in the organisation in order to understand the working of the system and user reaction to imply the implementation process within the background of the organisation. The findings which I came out with have opened up the possibility for further research in the arena of EDMS implementation in government organisations within New Zealand and else where in the world.

The findings from the study have been interesting for a typical governmental organisation which had already completed the implementation cycle. Future research could consider organisations, where the implementation process is under way as well as research consisting of a mix of Action Research and Ethnographic approaches under those circumstances. The Ethnographic approach could come out with findings affecting the implementation process at the current stage and the

factors could then be implemented in the next stage of the implementation process to improve it.

The factor of emotion, which was one of the prominent findings of the research process, could also be individually researched upon in relation to the impact of the implementation of EDMS on users of the organisation. As opposed to other ES, EDMS are a lot more user dependent. Hence, the effect of user's usage of the system could have a direct impact on the organisation and provides a viable direction for future research. The research has not only found some significant factors, satisfying the research objectives mentioned at the start but also linked back to the literature which had been reviewed for the study and provided a direction for future research in the same arena to further the knowledge base in this field.

## 6.7 Chapter Summary

In conclusion, it can be said, as exemplified in the introduction chapter, the implementation of an EDMS is an organisation-wide process. The success of the implementation process and thereby the system, as identified in this study, depends upon the three parameters i.e. people, systems and processes, around which the research objectives had emerged. The results demonstrated factors which were prominent and central to the study in each of these three dimensions. The analysis also showed the inter-relationship between the prominent factors within each of the groups and across the groups as well. The relationship amongst and between the three groups / research objectives can be summarised as **'The success of an EDMS implementation depends not only on the system implemented, but also on the process used for implementation as well as the people implementing and using the system.'** The research has also been successful in providing direction for future research in the field of EDMS implementation.

## **7. Conclusion**

### **7.1 Introduction**

This chapter gives a summary of the research which has been performed, as well as the suitability of the findings to the research objectives and the research question, which had been identified in the *Introduction chapter, at the start of the research*. The chapter begins by giving a brief summary of the background and the consequential literature review done, which simulated the research objectives and subsequently the research question. The research objectives and later the research question initiated the search for an organisation where the research could be undertaken. Research was undertaken in the organisation that was found and results discovered. The results were then discussed with respect to the research objectives. The chapter discusses the overall findings in the context of the literature and the research methodology and its linkage to future research in similar arena.

### **7.2 Research Summary**

The study began with a literature review of research which had been undertaken around the context of ES implementation. The crux of the literature review performed prior to beginning the research, mainly dealt with the ES implementation undertaken and the research methods used for studying the implementation process. Upon successful search for a research organisation, the focus shifted to EDMS implementation, the use of which had increased in recent times, considering the amount of paper documents which circulate within organisations. Further work dealt with looking at the lack of literature surrounding the implementation of EDMS within New Zealand, and particularly the government sector. EDMS, as Forbes-Pitt (2006) propose, manage documents, which are nothing more than a wrapping

around the “social rules” and regulations that are invoked when the document is utilized. The implication then is that the implementation of EDMS goes beyond the technical factors and has greater bearing on the organisational / human factors affecting the implementation process.

The research objectives revolved around finding the organisational factors which affect EDMS implementation. Consequently the research question developed around the application of the research objectives to government organisations within New Zealand. The research organisation chosen was a government organisation, within New Zealand, which had implemented an EDMS and was now implementing an update to the EDMS. Since the research dealt with discovering the organisational aspects affecting the implementation of EDMS, a research method within the interpretivist paradigm was chosen in order to portray how people understood a process rather than discovering an abstract conceptualisation of the impact on the process. For justifying the individual’s understanding, of the EDMS implementation process, a semi-structured interview approach was chosen. Such an approach would allow the interviewee to express his / her views freely. The approach would also allow the interviewer to change the order within the interview protocol, based on the response received, while covering all the necessary areas which needed to be covered. Thus, both the interviewee and the interviewer retained part control of the interview process.

### **7.3 Results Summary**

The research discovered that factors relating to people were more dominant in the implementation of an EDMS in this particular government organisation within NZ. This is in conformity with Raynes (2002) who implies that since EDMS rely more on the business processes and the people using the system, thus the success of an EDMS implementation and its usage depends more on the users of the system than the system itself.

The study discovered management support, change management, communication, and system functionality and implementation process approach as some of the key factors affecting the system implementation. The study also came up with the finding of the importance of user emotion to the success of system implementation. Extensive literature exists about change management and management support for ES implementation. However limited research has been done in the area of the impact of system implementation on human emotion. The study was successful in providing future direction in researching relationship of user's emotional behaviour with ES implementation.

The study also established inter-relationships between factors such as emotions, change management within one group and between factors of different groups. The study established the importance of people, systems and processes as three dimensions suitable for studying factors affecting ES implementation. The people dimension not only was the dominant dimension but also contributed significantly greater numbers of factors than either of the other two dimensions. However the study opened up a possibility for future research into the relationships between each of the three dimensions. The factors discovered in the three dimensions successfully satisfied the three research objectives of this study.

The ethnographic approach allowed for richer data collection and deeper understandings of people's perspective of the process than finding the technical system implementation approach. The appropriateness of the research approach to the study is explained in the next section.

#### **7.4 Research Approach used**

The ethnographic approach helped to understand the views of the interviewees in a set context. The semi-structured interview approach, used for conducting interviews, unearthed information which was previously unknown. Prior to beginning the research process, an interview was conducted with a management staff member. The



data regarding the implementation process obtained from the interview, helped to build up the interview protocol. The protocol was refined with each interview, since something new got discovered in each of the interviews. The interview protocol used in conducting the interviews is attached in Appendix B.

I kept a check on the interviewer bias, which at times is known to creep into such type of research. The bias was negotiated by following the semi-structured interview approach. The interview approach allowed me to explore the context of the research and enabled rich data collection, at the same keeping me aware of the research topics to be covered. The interview approach also allowed the interviewee to lead the discussion while allowing me to maintain control over the direction of the interview.

## **7.5 Research Objectives met**

At the start of the research I had identified three research objectives. I will now discuss the appropriateness of the results to each of the research objectives.

### ***7.5.1 Objective 1 – People factors affecting the implementation of ES in government organisations***

The study discovered and supported ES implementation factors such as communication, management support, change management, as well as came up with the user's display of emotional behaviour as one of the most dominant factors affecting the implementation process. The study also provided direction for future research based on the impact of ES implementation on user behaviour, by exploring the linkage between 'emotion' and other factors within the 'people' group and the 'process' and 'systems' group.

### ***7.5.2 Objective 2 – Process Factors affecting the implementation of ES in government organisations***

The most dominant process related factor, 'implementation approach' has always been classified as a significant factor in ES implementation literature. The study established the impact of implementation approach on the implementation process. Contrary to literature, the study ascertained that the big bang implementation approach which the organisation had undertaken for implementing the EDMS was not received well by the users of the system. The research discovered the considerable impact the implementation approach had on the emotional behaviour of the users using the EDMS.

### ***7.5.3 Objective 3 – System Factors affecting the implementation of ES in government organisations***

The study discovered the impact the functionality offered by an ES had on the usage of the system by the users. The study ascertained the effect system functionality had on the emotional behaviour displayed by the users, and its linkage with the management support and communications theme. The study establishes system functionality as one of the critical success factors in ES implementation.

## **7.6 Research Question met**

The research found a viable answer to the research question “What are the factors affecting the implementation of EDMS in government organisations in NZ?”

The factors forming the people, systems and process clusters, together found an ideal answer to the research question. The research approach used was an ethnographic one, concerning the views of the users regarding the implementation of a particular EDMS solution in a specific context in a particular organisation. Hence the findings are more suited to the research organisation and the specified context in which the research has been undertaken.

The study highlighted the inter-relationship between the three dimensions of the organisational implementation process and the interlinking between the various factors within each of the dimensions. The importance of communication and its relationship with top management support and change management has been prominently identified in the study. The impact of this relationship on the system selection and the consequential implementation process and the emotional behaviour displayed by the users towards the system has been highlighted in the discussion section.

### **7.7 Chapter Summary**

The chapter presents the background of the literature and the research process and the results and identified their inter-relationships. As can be seen, the study has been successful in satisfying the research objectives and thereby, the research question. The research came up with the people's theme of emotional behaviour and its relationship to the EDMS implementation process being one of the most prominent ones. The study also identified this relationship as providing direction for future research in the arena of ES implementations within government organisations.

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## Appendix A – Recommendations

Based on the data collected from the eight interviews and their subsequent transcription, coding and analysis, the most prominent findings have been discussed in the research report. The purpose of this section is to provide recommendations to the research organisation, based on the data collected from the interviews. The recommendations cover all the findings, including those which were found to be negligible and not discussed in the research report earlier. The numbering of the recommendations is not related to their importance to the implementation process.

1. **Presence of Strategy and Vision:** One of the views that came across in the interviews was that the implementation process lacked the profound visibility of a strategy and vision document. There was no visibility of a strategy formulated as to where the EDMS implementation was leading to. There was a lack of forecast of the growth of the organisation with respect to the EDMS implementation, which was felt by most of the interviewees. A strategy and vision document could be in place prior to even selecting the EDMS and could to be communicated to all the members of the organisation. A TOR document also could be in place, enlisting the activities to be undertaken, resources needed for the respective activities and a course of action for each activity.
2. **Management Support and Organisation-wide Buy-in:** The management support for the implementation process, across the organisation, was not sufficient. Some divisions were felt as being supportive of the implementation process whereas some other divisions seemed to be not

cooperative and supportive of the implementation process. For the success of an EDMS, it is imperative for an organisation-wide support to the system.

3. **Design System rather than adapt system:** The interviewees felt the system selected did not provide enough functionality to be supportive of their operating processes. The appropriateness of the system's functionality to the business processes had not been seen. The business processes were then revisited and changed to fit the system. The system selected could be one, which satisfies all or most of the business processes of the organisation and revolves around the business processes and not vice versa.
4. **Investigation of user needs and opportunity given to users to provide feedback:** Most of the interviewees felt users were not given enough opportunities to voice their opinions. A forum or a user group could be formed, and it could comprise of members from every division and department in the organisation. Members of the forum / user group could go and report back to their respective divisions. Later, at every forum meeting, the feedback obtained by each member from the respective divisions could be discussed and thoughts on the same could be communicated back to the user providing the feedback.
5. **Establish an implementation committee:** Most of the interviewees felt there was an 'ad hoc' committee established to oversee the implementation. EDMS implementation is a time consuming and a costly activity and a committee could be selected in place to oversee the implementation. Any EDMS implementation could be preceded by the formulation and establishment of an implementation committee to oversee the process.
6. **Avoiding over-reliance on the word of vendors and integration of system with other systems:** If the system to be implemented, involves processing data stored in other systems, integration of the systems could be looked into

prior to implementing the system. Word of the vendor might not be taken for granted and vendor support could be solicited for integrating the system with other related systems within the organisation, prior to implementing the system.

7. **Ensuring availability of sufficient resources for deploying a system:** Prior to beginning with the implementation of an EDMS, the organisation might ensure sufficient resources exist within to complete the implementation process successfully. Resources include hardware and software as well as human personnel for installing and supporting the system once it is operational.
8. **Greater support provided for system administration:** System administration covers not only administering the use of the system by users but also involves looking after activities such as providing support at times, installing upgrades to the system; which are time consuming activities. Hence it's better to have more than one system administrator looking after a system, when the system is overlooking the use by more than 500 users.
9. **Increasing user involvement in system selection and implementation and sharing information between managers and users:** Most of the interviewees had come up with the view that the user involvement in the system selection and implementation process had been kept to a minimal. The managers also failed to share the discussions from the meetings regarding the system selection and the implementation process with the users, which they needed to do. Thus for the success of an ES implementation, users could be involved from the initiation of the process till the post-implementation processes. The information discussed between the user groups of an implementation project team could be communicated back by the members of the team to the other users in their respective departments.

10. **Dedicated change management person:** Most of the interviewees were of the opinion that the organisation missed the services of a dedicated change management person. Implementation of an ES impacts the business processes as well as the behavioural patterns of users. Hence a dedicated change management personnel could be employed at the time of implementing the ES to handle the process changes occurring within the organisation. The change management personnel could also convey these process changes to the users and assure them of the negligible impact the process changes may have on their work patterns and the benefits the users would derive from these changes.
11. **Modular approach for implementation:** Extensive literature regarding ES implementation has always stressed on the need of a modular approach for implementing an ES. Following a modular approach in implementation would not only ease the burden of extensive resources required during the implementation stage but would also ease the pressure on the trainers for training the users for using all the modules of the new system and the users from using all the modules of the new system from day one.
12. **Greater staff support during and post implementation:** The interviewees felt that the staff support, once the system had been implemented, was lacking. Implementation of an ES means a change in the business process, impacting and subsequently changing the way user tasks are performed. In order to mitigate this change, greater support could be made available to the users
13. **System implemented and used across the entire organisation within a year and not later:** The system could be implemented across all the divisions within the organisation. Once the system has been implemented, then the user training could proceed. Within a year of implementing the

system, all the divisions connected with processing activities using the system, could be using the system to conduct their business processes.

**14. Shorter training schedule and users trained within a year of implementing the system:** The training imparted to the users was spread across various modules and involved more than one training session and was spread across long periods of time. In order to train the users and entice them to use the system, the training could be spread over shorter periods of time. The time difference between training the users on different modules should possibly not be more than fifteen days to one month. Once the users have been trained, they could be encouraged to use the system. This process of training all the users and making sure they have started using the system could possibly be completed within a year of implementing the system.

**15. More trainers required for training the users:** Currently the organisation has a single trainer handling the training of users for all the various modules across the entire organisation. It becomes difficult and tiresome for the trainer to track every new user coming into the organisation, sending invitees, and keeping a track of the modules trained, for each user. Hence more trainers could possibly be employed when an ES is implemented. This is on account of the fact that the system is implemented across the entire organisation and is used by all the divisions.

**16. Have advanced training and refresher training modules:** Currently training is provided in the organisation only for the basic modules of the EDMS. In order to be able to use the advanced features and functions, users need to contact the super user of the system or take tips from the administrator. For an efficient functioning and use of the system, training could be split into two sections. One is the basic training module which could be compulsory for all users. The second module is the advanced training. The second module would be optional for users who wish to know

more about the system and use its extra functionalities and features to ease the processing load. Also refresher training sessions could be conducted for users who have been trained but have not used a particular functionality of the system for a long time and need someone to refresh what has been taught to them.

The recommendations outlined here, are an outcome from the research undertaken and can be interpreted as the learning's of the author / researcher as part of the research process. Incorporating these recommendations at the time of implementation of an ES at the organisation, most of the drawbacks of the implementation process outlined in the study above can be avoided.



## Appendix B – Interview Protocol

1. What was your role in the system, which was in operation, prior to the implementation of System A?
2. What were the positives that you saw in that earlier system?
3. What were the negatives that you saw in that earlier system?
4. What was your role / involvement in the selection of the new EDMS system?
5. What was your involvement in the implementation process? Who were the other people involved in the selection and implementation of the EDMS solution?
6. How often do you use the EDMS in your day-to-day work, now? What do you use it mainly for? Was it easy to get accustomed to it from the old system?
7. Were you happy and satisfied with the functionality offered by the new EDMS solution? In what way?
8. What is your current role in the EDMS?
9. What do you feel are the perceived benefits of using this system as a *mention the role of the interviewee here?*

10. What do you feel are the drawbacks of the system?
11. What do you feel were the positives of the implementation process i.e. the way the EDMS solution was implemented in the organisation?
12. What do you feel were the drawbacks of the implementation process?
13. If you had to make a choice between the old system and the new EDMS, which would you choose and why?
14. If the system were to be implemented again, would you like it to be implemented the way it was or make some changes to the implementation process? Why?

## **Appendix C – Participant Information Sheet**

# **Participant Information Sheet**



### **Date Information Sheet Produced:**

29<sup>th</sup> November 2006

### **Project Title**

Factors affecting implementation of enterprise-wide application integration systems in organisations that deploy web services

### **An Invitation**

This is an invitation to participate in research that aims at discovering the interpersonal factors that affect the implementation of enterprise wide integration systems. All the information collected from participants will be kept secure and only available to the researcher and the project supervisor. Participation is entirely voluntary and the participants can withdraw at any time before the completion of data collection.

### **What is the purpose of this research?**

The output of the research is aimed towards fulfilling the requirements of a 120 points masters thesis as well as contributing towards academic literature.

Enterprise integration systems apply a modular approach and provide an integrative view of the processes embedded in the organisation. With the growth of the Web, there has understandably been a marked increase in the use of Web services by organisations, which have been defined as an ‘application enabler’. However, to date, limited research has been undertaken for finding the impact of factors, on the implementation of enterprise application integration systems in organisations deploying web services. Thus this research aims to do so and create some new knowledge.

### **How was I chosen for this invitation?**

You have been chosen for the research based on two factors:

- 1.) You have just completed, are nearing the end of, implementing an enterprise-wide application integration.
- 2.) You are deploying web services.

### **What will happen in this research?**

The project will investigate the human / personal factors that contribute to the success of implementing these integration systems through meetings and one-on-one interviews. It is envisaged that the core of the personnel involved in the implementation of the system will meet to plan the investigation. Members of this meeting will later be interviewed, along with any other personnel identified in the planning meeting. All of these meetings will be audio taped and transcribed. Once this round of interviews is complete the researcher will analyse the transcriptions and run a review meeting where participants will have an opportunity to review and amend the findings.

### **What are the discomforts and risks?**

The only discomfort would be for you to talk openly about the drawbacks / failure of the implementation process.

**How will these discomforts and risks be alleviated?**

The discomfort / risk highlighted above will be alleviated by keeping your name confidential in the recorded information. Also you can choose not to answer a particular question which you feel might put yourself at a discomfort.

**What are the benefits?**

The potential benefit of participating in the research will be for you to gain an understanding of all of the employees views on what contributed to the success of the implementation, and hopefully gain insight into how future projects could be improved.

**How will my privacy be protected?**

As stated earlier, any suggestions made by you in any of the meetings will be kept confidential, thus protecting your privacy.

**What are the costs of participating in this research?**

The only cost involved would be the time that would go in attending the meetings and interview. The time would not be more than 7-8 hours during the entire project.

**What opportunity do I have to consider this invitation?**

You have a time period of two weeks, before the research begins, to consider whether to participate in it or not.

**How do I agree to participate in this research?**

If you wish to participate in this research please sign the attached consent form and return it to the researcher.

**Will I receive feedback on the results of this research?**

Once the research has been completed, you will be given a copy of the results / findings of the research.

**What do I do if I have concerns about this research?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Dr. Robert Wellington, Email Address: [Robert.wellington@aut.ac.nz](mailto:Robert.wellington@aut.ac.nz) , Work phone Number: 9219999 extension 5432.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEK, Madeline Banda, [madeline.banda@aut.ac.nz](mailto:madeline.banda@aut.ac.nz) , 921 9999 ext 8044.

**Whom do I contact for further information about this research?**

***Researcher Contact Details:***

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***Project Supervisor Contact Details:***

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**Approved by the Auckland University of Technology Ethics Committee on 17<sup>th</sup>  
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