UNIVERSITY OF KWAZULU-NATAL

STATUS OF IMPLEMENTATION OF ERP WITHIN THE

SMME CONSULTING ENGINEERING SECTOR

By Deon Govender
(210531019)

A dissertation submitted in partial fulfilment of the requirements for the degree of
Master of Business Administration

Graduate School of Business and Leadership
College of Law and Management Studies

Supervisor: Dr. Brett van Niekerk

2014

i

DECLARATION

I, Deon Govender declare that:

a) The research reported in this dissertation, except where otherwise indicated is my original research.

b) This dissertation has not been submitted for any degree or examination at any other university.

c) This dissertation does not contain other persons' data, pictures, graphs or other information, unless specifically acknowledged as being sourced from other persons.

d) This dissertation does not contain other persons' writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then:

      i) Their words have been re-written but the general information attributed to them has been referenced:

      ii) Where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

e) This dissertation does not contain text, graphics or tables copied and pasted from the Internet, unless specifically acknowledged, and the source being detailed in the dissertation/thesis and in the References sections.

Signature:

Deon Govender (Student Number: 210531019)

ACKNOWLEDGEMENTS

I would like to give praise and glory to my heavenly father for the wisdom, knowledge, understanding and patience over the last 4 years of MBA. It has been the most challenging task for me to date and I am glad to have reached the end.

Many thanks to my supervisor Dr. Brett van Niekerk who has patiently guided me through this MBA research submission. Your professional guidance and quick response time has made this research possible.

My heartfelt gratitude goes to all the lecturing and admin staff in the GSB who contributed towards this milestone in my career. A special thank you to Wendy Clarke, you will sadly be missed at the GSB.

My sincerest gratitude goes to my family, especially my lovely wife, Nevilene, for her continuous prayers, immense patience and many sacrifices during this course; my sons, Jaden and Reuel for their many sacrifices and encouragement in making this study possible, as well as, my extended family for their support, encouragement and prayers.

My most profound gratitude to my MBA study group, it was a pleasure working with the team over the last few years. This degree would not have been possible without the combined effort from everyone taking the lead whenever they could to assist in the areas we struggled with. Your friendship is greatly appreciated.

Thanks to BVi Management and staff for the funding and assistance during the MBA programme. Your support made this achievement possible.

Last, but not least, to my dear friends and editors Rishen and Sibongile, thank you for all your invaluable assistance and your great ideas. Your contribution to this study is greatly appreciated. May you both be continually blessed in your future.

ABSTRACT

Most companies have identified the need to incorporate Information technology (IT) in their companies in order to stay competitive in the current corporate world. The introduction of the Enterprise Resource Planning (ERP) systems as a technological tool to enable competitiveness for enterprises provided many businesses with growth opportunities. For several micro, small and medium enterprises (SMMEs) it has, however, become almost impossible to implement ERP systems due to perceived high cost, lengthy timelines and high failures rates. Moreover, even though research has been conducted regarding these systems, literature on implementation methods are not extensive, thus making it complicated for enterprises to properly assess their decisions before considering installing the system. This study intended to study the status quo of ERP systems amongst SMMEs in the consulting engineering sector with an aim of also investigating possible challenges leading to non-implementation and benefits regarding the systems for those enterprises that have implemented the systems. The study incorporated a quantitative approach to study and was conducted amongst the consultants in the engineering sector involving 37 companies to which questionnaires were electronically distributed. The findings in this study indicated that there are still many companies within the engineering sector that have not yet implemented ERP systems. The perceived broad challenges with regards to ERP systems non-implementation included high costs, the complex nature of the systems, lack of training for end users and lack of involvement from top management. The recommendation was that there should be more involvement of experts in providing the industry with updated research about that value of having ERP systems installed in their companies.

CONTENTS PAGE

Description	Page

LIST OF FIGURES   PAGE

LIST OF TABLES
<div style="text-align: right">

PAGE
</div>

CHAPTER ONE

OVERVIEW OF STUDY

1.1 Introduction

Small Medium and Micro Enterprises (SMMEs) have identified the need to remain competitive in the current economic environment and this has necessitated the need for incorporating Information Technology (IT) into their business processes (Beig, Pourhasomi & Ghorbanzad, 2012).

Most of the studies concerning ERP systems implementation have been conducted within large ERP installations with individual investment costs of over R100 million (Muscatello, Small & Chen, 2003; Moohebat, Asemi & Jazi, 2010; Al-Mashari; Zairi and Al-Mudimigh, 2010). Over the past few years, the ERP systems developers, systems integrators and consultant's attention has been drawn to smaller enterprises (Fleishaker, 1999; Parker, 1999). Smaller enterprises need to upgrade their information technology with the systems that can readily communicate with their larger supply chain partners or corporate partners (Chalmers, 1999).

With the introduction of IT and Information Systems (IS), production and service has substantially improved, while the quality of products and competition between companies has increased as well (Moohebat, Asemi & Jazi, 2010). It has thus become imperative that companies seek innovative methods to improve efficiency by reducing operating costs within their supply chain framework. This allows them to provide better quality, offer a diverse range of products or services, and markedly reducing inventory and improving reliability in terms of delivery dates. Implementation of an ERP system offers a company a vehicle for overcoming these problems (Moohebat et al., 2010).

In essence, ERP systems provide a dynamic yet and fruitful method of harmonizing inherent processes within a company more closely as well as assimilating these processes to a degree which places an emphasis on sound management of resources and the provision of exceptional customer service across functional areas in an organization" (Moohebat et al., 2010: 99).

1

While ERP installations can greatly assist micro, small and medium enterprises in improving their strategic and competitive capabilities, several micro, small and medium enterprises, however, do not rush into ERP installations because of perceived expenses and failures (Muscatello, Small & Chen, 2003).

1.2 Problem Statement

Many companies seem to be radically changing and adopting technological strategies such as Enterprise Resource Planning in order to maintain a competitive advantage, respond to market changes, as well deliver better service at lower cost by purchasing off-the-shelf integrated ERP software instead of developing IT specific systems that match their needs (Al-Mashari Zairi & Al-Mudimigh, 2010).

Even though it has become so imperatively important for companies to utilise these systems, ERP is a relatively new phenomenon, and research relating to it and its implementation methodologies are not extensive (Al-Mashari et al., 2010). Questions regarding ERP systems are being raised faster than they can be answered (Al-Mashari et al., 2010). Dantes and Hasibuan (2011) highlighted two ERP vendor perspective implementation methodologies that can be utilised for a successful implementation of an ERP system, namely, which are represented by Accelerated SAP (Systems Application and Products) and Multi-factor Enterprise System methodology. Even though these new methodologies appear to be a recipe for successful ERP implementation, they have not been widely used with the professional. While ERP installations can assist small and medium enterprises in improving their strategic and competitive capabilities, several small and medium enterprises do not rush into ERP installations because of perceived expenses and failures.

Literature regarding implementation processes has indicated that most companies, either, have installed ERP systems but are not familiar with them, or have partially implemented while others have dismally abandoned implementing these systems (Gargeya & Brady, 2005; Dantes & Hasibuan, 2011). Examples of companies that have discarded the systems include Dell, which abandoned the system two years after implementation and having spent about $200 million, Waste Management which aborted the system after having spent $45 million of $250 million of their 2008

2

budget, Nike, whose inventory problems led to $100 million in the third quarter of year 2000, Cambridge University, which considered suing Oracle and KPMG Consulting for a faulty computer system which was worth $13 million of implementation costs, Dorsey County whose system became slower by an hour instead of the original 1 minute, as well as Phakama whose 65 000 account holders were negatively affected after having spent R600 million on the new SAP-based billing system (Du Plessis, 2011).

Most of the research that has been conducted on ERP systems deals with the question of how to implement it successfully in an adopting organization (Brehm & Markus, 2000). Research on the status of its implementation within the SMME Consulting Engineering sector is relatively scarce.

1.3 Purpose of the research

Since the introduction of the ERP systems it has been assumed that most companies have adopted and implemented these systems in order to stay competitive in the face of the current turbulent economic situation. Most research has been concerned with implementation of the systems in organisations and less studies assessing, investigating and measuring the status of ERP implementation within the SMME Consulting Engineering Sectors. This apparent gap was the focus of this study with the aim of looking into the status of ERP systems implementation in Durban, South Africa. The purpose, therefore, was to add to the few current studies on ERP implementation status, and bring to the attention of professional bodies in which these companies are registered as well as to top management, the real challenges that hinder many organisations to implement ERP systems. The study was conducted with the hope that something could be done to assist organisations that are currently struggling with implementations so that they, too, will be on the same par as other successful organisations that have benefited through ERP systems installations.

1.4 The need for study

Although the ERP system appears to be an immediate solution to the current business challenges, many organisations find it impracticable to install and

implement the systems. The reason for this is, firstly, the lack of research with regards to implementation methodologies, and, secondly, lack of training of end-users to utilise these systems (Gargeya & Brady, 2005). Since most research only deals with implementation techniques (Dantes & Hasibuan, 2011), and these are not extensive, a research on the status quo of ERP systems implementation would provide a picture of how companies are doing with regards to ERP systems implementation. This would give a picture of which companies are in need of assistance with regards to ERP systems implementation.

1.5 Objectives of Study

As this study intended investigating the current status of ERP within the SMME Consulting Engineering sector within Durban, its objectives therefore, are:

(a) To establish the usage of IT in the consulting engineering sector;

(b) To establish the awareness of ERP;

(c) To establish the reasons why ERP has not been implemented;

(d) To establish the current levels of implementation of ERP;

(e) To assess the perceived benefits of implementation;

(f) To assess the perceived challenges of implementation and the factors hindering implementation and maintenance.

1.6 Questions to be answered in the research

(a) To what extent is IT used in SMME Consulting Engineering Sector?

(b) Awareness of ERP systems and to what extent is it being implemented?

(c) To establish the reasons why ERP systems has not been implemented within the industry?

(d) To what level is the system being utilised within the industry?

(e) What are the perceived benefits of utilising ERP?

(f) What is the success associated with implementation?

1.7 Research Design/Methodology

The quantitative research method was selected for the proposed study. The rationale behind this selection was based on the following points:

SMMEs are busy companies with a strong focus on profit generation in order to remain operational and create opportunities for growth in their businesses.

They are also very target oriented and are largely owner managed. This, therefore, brings in the element of a speedy research methodology which can be easily accommodated for by a quantitative assessment. The research was conducted through the utilisation of a questionnaire which incorporated questions which are closed-ended. Questionnaire design followed the chronological sequence of the research objectives.

The questionnaire was used to assess the status of implementation of ERP within the SMME Consulting Engineering sector.

1.8 Population/Sample Size

The population chosen was based on the registered companies that form part of Consulting Engineers South Africa (CESA). The targeted sample size for this study was 84 companies, however, only 37 responded. The minimum number of respondents makes it impossible to generalise the results. Cronbach's alpha provides an effective tool to verify the reliability of a set of tests/questions taken. The Alpha coefficient ranges in value from 0 to 1 and can be used to describe the reliability of multi-point formatted questionnaires or scales (rating scale: 1 = poor, 5 = excellent). It is generally accepted that an alpha value of above 0.7 indicates an acceptable level of reliability. Cronbach's alpha is therefore a measure of internal consistency, i.e. how closely related a set of questions are as a group. A high alpha value (> 0.7) may therefore be used to form part of other substantive arguments and statistical measures as evidence that the specific set of questions measure a primary hypothesis. It must also be noted that Cronbach's alpha is technically not a statistical test, but rather a coefficient of reliability or consistency in a set of questions.

k	$\sum$ var	var	Cronb α
35	15.57	102.6951	0.873317

Table 1.1 – Cronbach Alpha

Based on the above it is noted that a 0.87 value is recorded for this study which then confirms the research exceeds the accepted minimum norm of 0.7 significance value

5

(Sekaran & Bougie, 2009). Questionnaires were distributed to 84 companies electronically, and only 37 responded.

1.9 Location of Study

The study was conducted amongst the Consulting Engineering sector within the Durban area, KwaZulu-Natal.

1.10   Structure of the Study

Chapter 1 in this study introduces the research topic, background to the problem, purpose of study, objectives of study, the need for study, research design, limitations and structure of this study.

Chapter 2 discusses the literature which informs this study. It discusses ERP systems implementations, implementation methodologies, benefits of ERP systems, as well as challenges facing companies with regards to implementation.

Chapter 3 informs the reader of the research method, namely, quantitative approach, and data collection methods, such as questionnaires, utilised in this study.

Chapter 4 then presents data obtained from the electronically distributed questionnaires using table and bar graphs.

Chapter 5 provides the analysis according to objectives of this study of data presented in Chapter 4 of this study.

Chapter 6 is the final chapter that brings in conclusions from the research findings and makes recommendations for further studies.

1.11   Summary

This chapter introduced the research topic, background to the problem, purpose of study, objectives of study, the need for study, research design, limitations and structure of this study. The next chapter discusses the literature upon which this study is built.

CHAPTER TWO

REVIEW OF LITERATURE

2.1 Introduction

The current chapter introduces ERP as a business strategy to obtain competitiveness in the currently expanding global market. Enterprise Architecture is introduced as an umbrella for ERP system implementation. SMME have identified the need to stay competitive in the current economic environment and this has necessitated the need for incorporating IT into their business processes (Beig, Pourhasomi & Ghorbanzad, 2012).

Most of the studies concerning ERP systems implementation have been conducted within industries with individual investment costs of over R100 million where large ERP installations have been made (Muscatello, Small & Chen, 2003). However, in the previous few years, the concentration of ERP systems' developers, systems integrators and consultants' has been drawn to smaller enterprises as well (Fleishaker, 1999; Parker, 1999).

With the introduction of IT and Information Systems, production and service has grown substantially, while the quality of products and competition between companies has increased as well (Moohebat, Asemi & Jazi, 2010). In this way, companies have been compelled to seek ways through which quality can be improved while keeping costs within their supply chains down, decreasing inventories, expanding products and services, and providing more consistent delivery dates in an improved method when equated to their competitors (Moohebat et al., 2010). The introduction of ERP systems provided these enterprises a technique of overcoming these complications (Moohebat et al., 2010). ERP systems presented companies with a flexible and productive approach that assists them to coordinate and integrate their business processes in order so that the focus would be on effective management of resources and customer service (Moohebat et al., 2010). "ERP systems integrate information and information-based processes within and across functional areas in an organization" (Moohebat et al., 2010: 99).

7

While ERP installations can greatly assist small and medium enterprises in improving their strategic and competitive capabilities, several small and medium enterprises, however, don't rush into ERP installations because of perceived expenses and failures.

2.2 Definitions of Enterprise Resource Planning (ERP)

Wallace and Kremzar (2001) defined ERP as a system comprising of management tools which possess the ability to balance demand and supply between suppliers and customers, and provides a high degree of decision-making techniques as well as cross-functional integration of sales, marketing, manufacturing, operations, logistics, purchasing, finance, development of new products and human resources. It has the ability to lower costs and inventories through effective e-commerce. O' Brien (2002) defined ERP as a type of business technology solution which is driven by software modules that support the internal business processes of an organization.

The American Production and Inventory Control Society (APICS) dictionary further stipulates that ERP serves as a model utilised to organise, define and standardise business processes that are necessary to plan and control an enterprise such that it can utilise the knowledge it possesses to obtain external advantage. According to the Business Dictionary ERP is Accounting aligned, relational database based, multi-module, however, cohesive software system used to classify and plan the resource requirements of an organisation.

The ERP system, therefore involves those techniques and concepts that assist in the management of the whole enterprise from the viewpoint management resources should be used to improve the efficiency of enterprise management (Hilman, Setiadi, Sarika, Budiasto & Alfian, 2012). An ERP system provides the whole organisation with one user-interface that assists in the planning of products, materials and in the purchasing of parts, in controlling inventory, distribution and logistics, scheduling of production, capacity utilization, tracking of orders, as well as in planning for finance and human resources (BusinessDictionary.com).

2.3 The Evolution and Introduction of ERP Systems

Previous studies on ERP systems introduction indicate that the origins of the system date back to the introduction of Material Requirement Planning (MRP) which was implemented as a universal manufacturing equation (Wallace & Kremzar, 2001). MRP tools were then developed, namely, Sales and Operations Planning, Master Scheduling, Demand Management and Rough cut capacity Planning (Wallace and Kremzar, 2001). ERP is said to be quite similar to MRP, however differs in the sense it has a broader scope with supply chain tools which are more robust, and much more effective with regards to multiple business processes and financial integration (Swaminathan, 2011). The ERP system prides itself in its core business which is a single database which has the ability to collect data and feed it into modular applications which support all the activities within the business across all functions, business units and across the universe (Swaminathan, 2001). As it becomes difficult to maintain many different computer systems due to exorbitant costs, the ERP systems address this problem of fragmentation of information in organisations (Muscatello et al., 2003).

Although ERP systems are a new phenomenon and research relating to it is often limited, and hence fails to include quite a number of implementation methodologies, it has become imperative for companies to implement it as part of a business re-engineering model designed for the achievement of a competitive advantage.

From as early as the 1990s, the introduction of IT brought significant need for businesses operating at the time to start revamping and improving their business processes (Yu, 2007). Enterprise Architecture was then seen as advancement in Information technology. Since then, technological advancement and the utilization thereof by most businesses has forced businesses to keep afloat in spite of the current deteriorating economic conditions. To obtain a competitive advantage in the growing global advancements in the business sector, it has become empirical for most, if not all, businesses to encapsulate a more integrated and enterprise-wide Management Information Systems (MIS) that has the ability to cross the boundaries of traditional form of business with regards to designing of products, warehousing of information, material planning, capacity planning, systems of communication, human resource systems, finance and project management (Yu, 2007).

9

According to Van Oyen (2012) ERP systems assist in automating basic business processes and in the provision of a joint real-time interpretation of nominated company resources and obligations through databank(s). An example of how ERP systems work is where an enterprise owner wants to order a particular product. The computer will be fed with the order, which is then noted by the purchasing/procurement unit. The manufacturing department will receive the information in both aggregate forecasts together with the detailed bill of materials (Van Oyen, 2012). It then utilises this information in generating a workable Master Production Schedule (MPS) (Van Oyen, 2012).

Enterprise Architecture has contributed a lot to organizational transformation and success (Matthee, Tobin & van der Merwe, 2007). It was later extended and renamed 'A Framework for Enterprise Architecture (Sowa & Zachman, 1992; Bernus, Nemes & Schmidt, 2003).

Cross-functional MIS is perceived as the most effective tool in sharing information resources and in improving the effectiveness and efficiency of business processes as a whole (Yu, 2007). The integrated cross-functional enterprise MIS are commonly known as Enterprise Resource Planning (ERP) systems. Within the Enterprise Architecture are the following issues: 'Business IT alignment, Transformation road map, Application renewal, Mergers/acquisitions, Business Change, ERP/System Implementation, Knowledge Legacy management, and Infrastructure Renewal' (Matthee et al, 2007: 16). The ERP systems form only a smaller part of Enterprise Architecture.

Vendors such as SAP, Peoplesoft, JDEdwards, Oracle, and Baan have developed an ERP system which represents major business processes in the world (Hilman, Setiadi, Sarika, Budiasto & Alfian, 2012), and these offer their services to businesses who require ERP systems installations. Businesses often opt for an external ERP development instead of an in-house application due to time deliverable and supporting service after the ERP system's implementation was activated (Hilman et al., 2012). The adoption methodology used in the implementation of ERP systems determines the success of those systems (Hilman et al., 2012).

2.4 Implementation of the ERP Systems

2.4.1 ERP Systems and Implementation Approach/Methodology

Dantes and Hasibuan (2011) maintained that an ERP system's success greatly depends on its implementation methodology. This simply implies that organisations will experience success only if they also adopt correct and relevant methodologies of adopting the system. Different implementation methodologies have been proposed to have different effects on an organization (Hilman et al., 2012). However, in order for these methodologies to be successfully implemented, organisational diversity should be considered as organisations possess different and unique needs. These need to be carefully scrutinised before any installations should be done. Implementation methodologies can be purchased from vendors, while generic methodologies can be obtained from non-vendor perspectives (Hilman et al., 2012). Typical ERP Methodologies include SAP's Accelerated SAP (ASAP); Oracle Unified Method (UOM), previously AIM; Peoplesoft's Compass; JD Edwards' OneMethodology; SureStep Methodology used by Microsoft for their Dynamics ERP; SSA Global's One Point and Infor's FastStart (du Plessis, 2011). Most companies have been found to prefer vendor consultancy for ERP implementation, compared to those that are done by the hardware vendors.

The implementation of an ERP software package incorporates a mix of business process change and software configuration that aligns the software with the business processes (Davenport, 2000). Even though the implementation methodology greatly depends on the software's life cycle or framework on developing software, the critical issue with ERP system is the organization's ability to link and match the organisational and the ERP systems business process (Hilman et al., 2012:2). Due to the complex nature of ERP systems most companies end up discarding implementation altogether. Most organisations also find it expensive to implement the system.

Master planning is incorporated at the centre of ERP systems and incorporates the operational business plan (www.aptean.com). A complete plan for the manufacturing and purchasing of all products, assemblies, components and materials is developed through Material Requirements Planning (MRP) (www.aptean.com)

Additional software modules assist in executing the plan, gather information 'for tracking status and feedback to planning and for accounting and control, as well as, in managing client orders and fulfilment, forecasting, pricing (often combined within the implementation roles), chief data (bills of material and routings), finance (accounts to be paid and receivables, payroll, general ledger, financial recording and inquiry), value and shop-floor data collection (www.aptean.com).

Once the ERP system has been successfully implemented, certain criteria should be utilized to evaluate the newly implemented ERP system.

2.4.2 Evaluating ERP systems Implementation

Hilman et al (2012: 3) suggest the following 12 criteria that can be utilised to evaluate the new ERP system implementation methodology with existing vendor perspective within an organization:

- **Taxonomy completeness** - skillful use of methodology in classifying architectural artifacts.
- **Process completeness** - the ability of the methodology to guide users in a step-by-step process.
- **Reference-model guidance** - the ability of the methodology in assisting users build set of reference paradigms.
- **Practice guidance** - the level the methodology is able to help users obtain a mind-set of enterprise architecture thus developing a valuable culture that can be used.
- **Maturity model** - the methodology's ability to assist users assess the maturity and effectiveness of various organisations.
- **Business focus** - the ability of the methodology to drive the business to profitability and cost reduction.
- **Governance guidance** - the skillful creation of effective governance through methodology. Partitioning guidance – the methodology's ability to drive users to autonomy in an effort to manage complexity.
- **Prescriptive catalogue** - skillful setting up of a catalogue of architectural assets to be utilised in future processes.

12

- **Vendor neutrality** – the objective choice made by an organisation to select preferred consultants without influence from prospective vendor consultants

- **Information availability** – the quantity and quality of free information provided by the methodology.

- **Time to value** – the amount of time users will likely to be utilising the methodology before solutions that are able to deliver high business value

Dantes and Hasibuan (2011) highlight two ERP vendor perspective implementation methodologies that can be utilised for a successful implementation of an ERP system, namely, which are represented by Accelerated SAP (Systems Application and Products) and Multi-factor Enterprise System methodology. According to Dantes and Hasibuan (2011) Accelerated SAP (ASAP) provides a step by step guide on how SAP may be implemented in the company, however, as one of the critical needs for ASAP business process re-engineering within the company is required before any implementation may be done. The following diagram depicts the reduction cost on SAP implementation that been guided by the ASAP (Dantes & Hasbiuan, 2011).

Figure 2.1 Accelerated SAP Roadmap - Adapted from (Dantes & Hasibuan, 2011)

13

Many consulting firms around the world have conducted ASAP roadmap (Dantes & Hasibuan, 2011). By this roadmap, companies may avoid unnecessary costs incurred during and after ERP systems implementation.

Figure 2.1 above indicates the phases of ASAP which are divided into 5, as follows:

1. Project Preparation

In the initial phase, information and resources are retrieved as the implementation goes through initial planning and preparation for the SAP project (Dantes & Hasibuan, 2011). According to Dantes and Hasibuan (2011) the initial phase constitutes of sub-phases, namely, milestone, objectives of the project, decision-making procedure, and a setting appropriate for modification and re-engineering, and constructing a capable project team.

2. Business Blueprint

This is a phase involving a common understanding of the strategy a business proposes utilising in its objective in running the SAP to support their businesses (Dantes & Hasibuan, 2011). This phase also constitutes a stage where the original project goals and objectives are refined and the overall project schedule is revised (Dantes & Hasibuan, 2011). This results in a Business Blueprint, a documentation containing results obtained during the requirements workshop.

3. Realization

The business process requirements that are based on the Blueprint are implemented. This phase consists of configuration testing and knowledge transfer (Dantes & Hasibuan, 2011).

4. Final Preparation

This final preparation stage tests workload and conducts integration to maintain accuracy of the obtained information and the SAP system's stability (Dantes & Hasibuan, 2011).

14

5. Go Live and Support

This phase consists of movement from a project-oriented, pre-production setting to a live construction process. The vital elements here are setting up construction sustenance, observing system dealings and optimising the complete system performance (Dantes & Hasibuan, 2011).

Even though this new methodology appears to be a recipe for successful ERP implementation, it has not been widely used with the professional. Dantes and Hasibuan (2011) suggest that assessment processes should be finished due to the complete certification and features as an ERP implementation methodology. The Dantes and Hasibuan ERP implementation methodology emphasises five aspects constituting the question of ERP implementation system. These five aspects are people/organisation, procedure, application, data, and infrastructure (Hilman et al., 2012). Hilman et al., (2012) categorise the stages constructing the entire methodology into five:

1) Project Preparation

The first state of ERP implementation is measuring development level of an organisation. Their study intended to determine if there was a relationship between ERP implementation accomplishments and the organisational development level. This action is the sole procedure of Dantes and Hasibuan methodology.

2) Technology Selection

Technology selection consists of the process to be followed in building a project team which will handle the ERP system's adoption. In this stage the IT/IS strategy that relates to the ERP system is defined.

3) Project Formulation

Project formulation phase starts with the position investigation of legacy system and begins on gathering supplies required by the business. The whole identification and gathering is prepared in this phase.

15

4) Implementation and Development

Customization ERP system takes place in this phase to ensure it is aligned with the organisation's business process. User training and monitoring of the system takes place at this time after migration.

5) Post Implementation

This stage marks the completion of the whole process. The only step that is left now is obtaining the decision from the top company decision makers to make the system go live.

2.4.3 Evaluation and Selection Criteria of ERP Systems Software

According to the findings in a study by Yu (2007) one of the reasons why ERP systems failed within companies was lack of involvement of employees in the selection committee for ERP systems. This was found to result in resistance from employees to utilize the ERP system (Yu, 2007). This was found to be the case with bigger industries. Various parties should be included in the selection and evaluation of ERP system to ensure universal acceptance within the company (Yu, 2007). The current study intends finding out if employees are involved in the selection of an appropriate ERP systems for their organisation.

Secondly, the study indicated that it was imperial for the valuation and selection criteria utilized to be in accordance with the strategic and operational needs and objectives of the company in order to arrive at final determination of product as well as non-product factors (Yu, 2007). The study indicated that companies lack the skills and expertise to select the evaluation approaches and methods using the different weightings, priorities and scores which were unsuitable for their companies (Yu, 2007). The equally weighted or semi-weighted criteria failed to provide companies with an advantage in overcoming the selection pandemonium.

Thirdly, the study indicated that the approaches and methods of ERP system implementation were poorly applied by companies (Yu, 2007). The reason for this was found to be that the approaches and methods used were low cost and of less complexity and cross-sector approaches and methods portfolio was not well structured and applied by those companies (Yu, 2007). The study then suggested

16

that the ERP system evaluation and selection approaches and methods should effectively and efficiently support the ERP selection decision making.

Fourthly, the study also highlighted the lack of organisations to use ERP system requirements drafting with 'submit requirements catalogue to ERP vendors' (Yu, 2007). This appeared to be a problem because it is necessary for organisations to do ERP information gathering and system requirements drafting with their selection criteria so that system requirements drafting needs will be based on the ERP information gathered and the strategic goals that have been identified by the organisation (Yu, 2007). This was found to indicate lack of expertise by organisations with regards to the selection criteria of ERP systems (Yu, 2007).

Lastly, since technology is evolving, decisions which are made by an organisation with regards to ERP systems should be forward looking. The organisation and its selection committee should not only consider the pressing and immediate goals of the organisation but also future looming goals which may become significant in the future (Yu, 2007). Since the ERP system of an organisation 'forms the information backbone of an organisation as it supports, underpins all business functions and links in the organization's value chain', therefore, the 'organisation's long term strategy will underlie the introduction of the ERP system selection process' (Yu, 2007: 121). Since no two organisations are similar, the organisation's internal conditions will determine the selection criteria of ERP systems which will be unique to each organisation. It is in the interest of the current study to conduct a comparative study to explore if similar situations arise in the companies under investigation.

A good ERP project selection team would include some of the following: Clearly defined strategic and operational objectives and goals, wider involvement of departments and specialist as part of the selection committee, a comprehensive information system, a well-structured criterion set (including both product and non-product factors), an optimized and designed cross-sector selection approach and methods portfolio (Muscatello et al., 2003; Yu, 2007).

A few more studies have agreed with the above studies on critical success factors for an ERP system. They have also suggested the following criteria:

a. Planning ahead which will include the establishment of business goals, strategising on how to get there, reengineering of the existing business processes and/or development of new business processes that will support the organisation's long- term objective (Purchasing Magazine, 1998; Muscatello et al., 2003; Yu, 2007 and de Jager, 2010).

b. Close relationship between the manufacturing strategy and a successful ERP implementation which incorporates "more futuristic, long-term perception of the enterprise's processes" and that will "link ERP investment with strategic planning and modern evaluation and control system" (Muscatello et al., 2003: 368).

c. A closer look into the competitive needs of the business and not the glitzy software (Purchasing magazine, 1998). This exercise involves an assessment of needs that will be extended to incorporate hardware requirements (Muscatello et al., 2003), also including cross-functional teams that incorporate the best and brightest of personnel from each functional department, as well as, members of the executive's input in identifying, examining, and rethinking current business processes while also ensuring fair representation of each department in the ERP configuration Yu, 2007).

d. The technology that is to be used should come after an extensive analysis of the needs of the reengineered processes. This ensures that reengineering is relative to the technology the business needs rather than the other way around (Muscatello et al., 2003).

e. A selection of a committee that will be skilful in identifying core competencies which will provide the business with a competitive advantage over its competitors (Yu, 2007). The selection of the requirements for the ERP system implementation featuring functionality, vendor service, future human resource portfolio needed to suit the ERP system, and the type of training that will be required in the future may then follow (Muscatello et al., 2003).

f. Evaluation of the company's full resources, such as, human resources, MIS infrastructure and how the present IT/IS limits the organization's maximum functionality Suggestions on how this should be changed in the future to integrate with the proposed ERP system should be done (Yu, 2007). Assessing the workflows and business processes and making suggestions on how these should work in future in order to support the organization's growth should go hand in hand with performance measurements to identify potential growth and the path that should be followed to reach this growth (Yu, 2007).

g. The committee should specify specific needs and ERP system functionality requirements, and then establish a financial plan and budget for the ERP project (Yu, 2007). The reasons why and how the ERP system will be able to support the overall business strategy as well as business processes must be clearly spelled out (Purchasing Magazine, 1998). The committee should conduct research and gather product information on the potential ERP system and ensure that the selected ERP system software meets the needs and financial requirements of the organization (Yu, 2007). de Jager (2010) suggested that even though factors, whether qualitative and quantitative measures, or quality and financial metrics, are significant in the capital budgeting decisions within the organisation, the committee should evaluate which one weighs heavier in the process of decision-making. He suggested that whether quantitative factors show a less favourable outcome, the significance of achieving qualitative factors will affect the motivation of key decision makers within the organisation. The study by de Jager (2010) indicated that most organisations/enterprises based their decision making on qualitative benefits rather than quantitative factors in their selection of ERP systems. However, the study concluded that even though these companies experienced some negatives on financial (quantitative) metrics they continued with ERP implementation basing their hopes on qualitative benefits they were achieving (de Jager, 2010).

h. The committee must possess the skill to select the ERP package and vendor that provides the best fit with regards to the organization's future growth and

stability (Yu, 2007). The consultants that have been selected by the business should understand business and the ERP technology (Yu, 2007).

i. The business must be flexible enough to change the manner in which it operates time and again. Effective communication should be maintained by management on a continuous basis if they are preventing resistance to change from within the company (Muscatello et al., 2003). Executive and divisional management have to focus on team building skills in order to create a climate where multi-layered project teams will thrive (Muscatello et al., 2003).

It will benefit this study a great deal to determine if suggestions indicated in the previous literature have been utilised by companies and the extent to which this has been done.

2.5 The Critical Success Factors of ERP System Implementation

Having mentioned that all costs and, more significantly, the type of industry, should be considered before the selection and implementation of the relevant ERP systems, it should be noted that each system has got its downfalls/failures as well as critical success factors. Critical success factors (CSF) have been defined as "factors which, if addressed, significantly improve project implementation chances" (Moohebat et al, 2010:100). Critical success factors often come out as result of several measures that have been undertaken by each organisation to ensure the success of each ERP systems implementation.

Gargeya and Brady (2005), proposed the following critical success factors for the implementation of ERP upon which basis this study will be conducted:
- Working with functionality and maintaining Scope
- Support from Management, Consultants and the Project Team
- Internal Readiness and Training
- Dealing with Organizational Diversity
- Planning, Development and Budgeting

- Adequate Testing of the System

Factor no. 1: Working with functionality and maintaining Scope

The ability to streamline operations is a very significant factor of working with the ERP functionality. Successful ERP implementation with minimal customisation needs assistance from factors such as streamlining operations and business reengineering, and business processes should be streamlined to fit the new system (Muscatello et al., 2003).

Factor no. 2: Support from Management, Consultants and the Project Team

For a successful ERP systems implementation it is critical that the team should, constitute of the best people in an enterprise (Gargeya & Brady, 2005). A cross-functional team comprising of internal staff and internal staff should be built for the internal staff to develop the much needed technical skills for design and implementation (Gargeya & Brady, 2005). It is often suggested that the selected team should be individuals with experience and who are familiar with the business. It highly recommended that high-level executives and/or top management who are strongly committed to the project be selected (Davenport, 2000; Muscatello et al., 2003). In cases where consultants are used, they should be individuals who possess extensive knowledge about the software, and, they must be involved in all the different stages of the ERP project implementation (Gargeya & Brady, 2005).

Factor no. 3: Internal Readiness and Training

It is imperative that companies be prepared for the radical change that will take place in their environment, otherwise internal resistance will surface. Studies indicate that companies with a strong corporate identity that is open to change often possess the ability to withstand internal resistance to change (Gargeya & Brady, 2005). It has been perceived that in spite of campaigns and trainings that users often undergo during an ERP systems implementation, companies still experience internal resistance as end-users find it hard to accept the initiated changes. To avoid this, companies need to put more emphasis on quality, strong computing ability and urge employees to accept new technology as early as in the implementation phase (Gargeya & Brady, 2005).

21

Companies are urged to invest in the training, re-skilling and professional development of the IT workforce (Gargeya & Brady, 2005). In addition to this, there should be on-site trainings, help desks and user manuals that will meet the user's needs post-installation (Gargeya & Brady, 2005). Due to the complexity of ERP systems these should be continued until all end-uses are comfortable with the use of the system.

Factor no. 4: Dealing with Organizational Diversity

When new ERP systems are implemented, organisational diversity be considered well in advance. This is because different organisations have many cultures which are different. This means that individual branches in the same organization operate in their own ways, and each function or department operates differently and has unique business necessities (Gargeya & Brady, 2005). Diversity has been found to be a major hindrance to success in larger and more global companies (Gargeya and Brady, 2005).

Factor no. 5: Planning, Development and Budgeting

As has been highlighted in other studies, a clear vision and a business plan is necessary when a project is to be steered throughout the ERP life cycle (Buckhout et al., 1999) in Gargeya & Brady (2005). A business plan outlining a proposed strategy and concrete benefits, resources, costs, risks and timeline should be in place (Wee, 2000). Projects should be aligned to this plan (Gargeya & Brady, 2005).

Since implementations can be quite costly, regardless of whether a company had planned or not, companies should at all costs attempt to keep the project within budget.

Factor no. 6: Adequate Testing

While system testing can be a critical success factor for another company, it can be a reason for failure for others (Gargeya & Brady, 2005). It is recommended that testing be done in accordance with a successful Implementation Methodology,

together with, consultants to ensure effective communication and proper working of the system (Swaminathan, 2011). Troubleshooting is also often suggested once implementation has been started. Users should be trained to use proper tools, techniques and skills for the success of the project (Rosario, 2000).

Holland et al (1999) maintain the significance of troubleshooting errors. Organisations implementing ERP should strive to maintain good relationships with vendors and consultants in order to resolve software crisis that may arise during and after implementation (Swaminathan, 2011). Rosario (2000) maintains that vigorous and sophisticated testing of software will ease implementation.

2.6 Costs in ERP and ICT

The above literature has indicated the significance of ERP systems implementation within organisations as well as suggestions on successful implementation thereof. Yu (2007) has maintained that the selection committee should ensure that the selected ERP system correlates with the needs and financial requirements of the organisation; however, it has also been mentioned that ERP systems are quite costly to implement. The costs associated with ERP systems implementation are identified by IT practitioners as direct and indirect costs only (de Jager, 2010).

Direct costs are often easy to quantify as they are 'based on market related prices and can be presented to decision makers without difficulty and margin of error' (de Jager, 2010: 17). Indirect costs are, however, quite difficult to quantify (de Jager, 2010). Another study has proposed that the reasons for the unquantifiable nature of indirect costs were relative to socio-technical dimensions that are associated with ICT adoption which incorporates failure of those in management to establish the real expenses of deploying ICT which is relatively due to scarcity of information and comprehension of ICT related costs (Love, Irani, Ghoneim and Themistocleous, 2006). Specified indirect costs have been identified to include reduced productivity, indirect cost of management time spent on revising, approving and amending IT-related strategies, system support and troubleshooting costs (Love et al, 2006).

A model for calculating direct and indirect costs was developed by the Gartner Group which was known as Total Cost of Ownership (TCO) which is defined as "a holistic

view of costs related to IT acquisition and usage at an enterprise level" (de Jager, 2010: 18). The model indicates that on top of direct and indirect costs of implementing ERP are hidden costs of ERP software, since the adoption often creates major distortions in the corporate decision-making process (Lindley, Topping & Lindley, 2008). This makes ERP systems implementation a difficult but necessary project. This implies that before an ERP system may be implemented; all costs should be highly considered by the selection committee as well as top management of the organisation. This should come out as a critical success factor for ERP system implementation within the organisation.

2.7 Failures of ERP System implementation

In spite of the perceived benefits that are earned from ERP systems, implementation of the systems can be very dangerous due to the complexity of their nature. ERP systems implementation has been found to be a failure in three quarters of the ERP projects (Moohebat et al., 2010). About 90% of ERP implementations were found to be late or over budget. Recent estimations found ERP rate of failure to be 40% to 60% (Moohebat et al., 2010). A study which compared ERP implementation in developed and developing countries indicated additional challenges facing technology in these developing countries relating to their economic, cultural and basic infrastructure issues (Moohebat et al., 2010). The study further identified high costs, culture, integration and lack of knowledge as the four factors that make ERP unsuitable for many organisations in Sri Lanka and Asia (Moohebat et al., 2010). The cases discussed in the above study highlight cultural issue as a very significant factor that differentiates developed and developing countries in ERP implementation.

Most companies reported failed ERP system, which then created excess shipments which was resulting from incorrect orders (Bicknell, 1998; Boudette, 1999). Accordingly, Dell Computer had to scrape their ERP system due to inflexibility to handle their growing global operations (Muscatello et al, 2003).

In their study Moohebat et al (2010) found that ERP implementation's critical success factors were similar in both developed and developing countries (Moohebat et al., 2010). ERP technology has changed in developed countries to include their culture

24

implicitly (Moohebat et al., 2010). These countries, therefore, may depend on vendors provide solution to their problems (Moohebat et al., 2010). It is not part of this study to study, either the critical success factors of ERP implementation in either developed or developing countries, or the culture of these countries since it is conducted on a small scale and within a period of six months. It would, however, benefit future studies to study the cultural differences existing in developed and developing countries and how these affect ERP implementation, and how these can be diminished and why these countries underestimate BRP and fit between ERP and business process Moohebat, et al., 2010).

In agreement with the above study is a study by du Plessis (2011) who found some companies that had experienced ERP systems implementation failure. The companies included Dell, which abandoned the system after two years and having spent about $200 million, Waste management which aborted the system after having spent $45 million of $250 million of their 2008 budget, Nike, whose inventory problems led to $100 million in the third quarter of year 2000, Cambridge University, which considered suing Oracle and KPMG Consulting for a faulty computer system which was worth $13 million of implementation costs, Dorsey County whose system became slower by an hour instead of the original 1 minute, as well as Phakama whose 65 000 account holders were negatively affected after having spent R600 million on the new SAP-based billing system (Du Plessis, 2011).

Despite such high failure rate of ERP systems implementation, its market appears to be growing substantially (Moohebat et al., 2010; Du Plessis, 2011).

2.8 A Review of ERP Systems Implementation in South Africa

A South African study of ERP systems implementation also indicated proper planning as the single most significant factor for successful ERP systems implementation (de Jager, 2010). In this study, Top Management Support rated at a similar status as proper planning (de Jager, 2010). Training and Support and End user involvement came second and third, while Effective Project Management ranked fifth and Team Work and Team Composition of the Project Team ranked thirteenth (de Jager, 2010).

25

Another critical success factor identified in the literature was the utilization of key metrics in monitoring ERP systems implementation (de Jager, 2010). It has been indicated that organizations (74% of respondents) that utilize key metrics in monitoring ERP systems implementation often experienced a higher level of success (de Jager, 2010). Most organizations indicated that where key metrics were tracked project was seen to deliver the expected value to the company (de Jager, 2010). The results in literature also indicated that most companies experienced both the use of key metrics as a monitoring tool after ERP systems implementation as well as success of the system. Also, most respondents agreed that they utilized both qualitative and quantitative metrics to measure post implementation success of the ERP systems (de Jager, 2010). Overall, de Jager's study indicates that companies who use any form of measurement are bound to succeed in comparison to those who do not.

Another factor that was evaluated in this study the rate of success amongst organizations that had implemented ERP systems. Previous studies had highlighted huge worldwide ERP systems implementation failure rate (Finney & Corbett, 2007; Markus, Axline, Petri & Tanis, 2000 and Woo, 2007). The study by de Jager (2010), however, proved differently with the JSE companies. The study indicated a high ERP systems implementation success rate amongst South African organisations that were investigated (de Jager, 2010). However, the researcher could not determine whether the respondents in those organisations clearly knew and understood what actually constituted a successful ERP systems implementation or not (de Jager, 2010). It would be of great interest and beneficial to future literature to study this further.

The study by de Jager (2010) also investigated if the size of the organization contributed to successful ERP systems implementations or not. His study established that all the respondents under study, namely, small, medium, and mega organisations, had experienced a higher rate of success with regards to ERP implementations (de Jager, 2010). The study concluded that size of an organisation did not play a role in the successful implementation rate of that organisation (de Jager, 2010). It was noted that the successful implementation rate was at 80 percent of small and 89 percent of medium enterprises, in particular. This has created the

26

basis upon which this study has been built since it is also studying ERP systems implementation status rate within the SMMEs.

From the previous studies, it has been noted that as much as there have been successes regarding ERP implementation, there have also been failures which led to failures of many organisations. These findings have been indicated in studies conducted a few years back. The current study hopes that its current findings will assist vendors that assist in implementing ERP systems as well as companies where the systems have to be implemented to scrutinise the current systems and make upgrades if necessary.

2.9 Summary

Previous studies have successfully indicated that there is a worldwide high success rate of ERP systems implementations. The South African study by de Jager (2010) also proved these studies to be correct. Some of the conclusions that have been drawn were that since the measurement of 'success' cannot be easily quantifiable, organizations should rather measure ERP systems implementation success by how much they lead to the organizational achievement of its goals. This means successful drive of business value and supporting 'the business in doing the right things well' (de Jager, 2010: 75). Also, critical success factors greatly rely on Proper Planning, Support from Top Management, Training and Support for users, involvement of End Users, Communication and Teamwork.

The current chapter introduced Enterprise Resource Planning as a business strategy most organizations have resorted to in order to obtain competitiveness in the current growing global market. The chapter started by introducing Enterprise Architecture which forms an umbrella for ERP system implementation. The chapter, then, highlighted the fact that Small Medium and Micro Enterprises (SMMEs) have identified the need for incorporating Information Technology into their business processes in order to stay competitive in the current economic environment. The chapter concluded by stating that companies have then sought ways to improve quality, decreasing costs in their supply chain, reducing inventories, diversifying products and services, and providing more consistent delivery dates in an better-

quality manner when compared to their competitors. ERP systems therefore brought solution to these problems by offering more flexible and productive ways of coordinating and integrating their business developments in order for them to focus on effective management of resources and customer service.

The next chapter discusses the research design and methodology. It discusses the essential issues associated with research design, instruments, sampling procedures and processes as well as pretesting and validation.

28

CHAPTER 3

METHODS OF DATA COLLECTION AND DATA ANALYSIS

3.1 Introduction

The current chapter discusses the methods of data collection and analysis utilised in this study. It incorporates descriptive and explanatory approaches to the analysis of data; therefore, it utilizes a quantitative approach to data analysis. As the study is quantitative in nature, it comprises the usage of surveys/questionnaires as means of data collection. These terms are further elucidated in the chapter. The chapter provides a gateway to the analysis of data that follows in the next chapter, and it has, therefore, been planned to show a relationship with the aims and objectives of this study.

3.2 Aim and Objectives of Study

The aim of study means a statement which indicates what the research aims to achieve, and, objectives are the precise concerns to be explored relative to the whole aim of study. Research objectives are the salient points the study hopes to attain and from which research questions are framed.

3.2.1 Aim

Most of the research that has been conducted on ERP system comprises the question of how to implement it effectively in an implementing organisation (Brehm & Markus, 2000). Research on the status of its implementation within the SMME Consulting Engineering sector is relatively scarce. This is the gap this study intended to bridge.

The aim of the current research was to study, investigate, assess and, therefore, measure the status of implementation of ERP within the SMME Consulting Engineering sector.

.

3.2.2 Objectives of Study

As this study intended investigating the current status of ERP within the SMME Consulting Engineering sector within Durban, its objectives, therefore, were:

29

(a) To establish the usage of IT in the sector;

(b) To establish the awareness of ERP;

(c) To establish the reasons why ERP has not been implemented;

(d) To establish the current levels of implementation of ERP;

(e) To assess the perceived benefits of implementation; and

(f) To assess the perceived challenges of implementation and the factors hindering implementation and maintenance.

3.3 Research Methodology/Strategy

Research has been defined as a process which involves attaining scientific knowledge through several objective approaches and processes (Welman, Kruger and Mitchell (2007). Kothari (2008) further defined research as a methodical and technical pursuit for knowledge on a precise topic.

When conducting a research study, it is essential that methods selected meet the objectives of the study. The methods that the researcher is likely to utilise will be determined by the type of information that he/she requires in the study (Denscombe, 2010). Another term that is often used to refer to research methodology is strategy. This term has its origins from the artistic manner in which war generals planned the overall attack in order to achieve overall victory which could only be achieved after skilful planning (Denscombe, 2010). Social research incorporates similar essential elements. However, before a research strategy may be selected, the researcher may be governed by inductive reasoning, which encompasses a procedure of simplifying one or more observations about an occurrence (Barbie, 2010) before preliminary hypotheses and an integrated theory that clarifies a set of events can be articulated (Dunn, 2010). A downside to inductive reasoning is that the overlooked factors that could be responsible for the effects we come across may be neglected (Dunn, 2010: 5). This study was not grounded on a preliminary hypothesis. In other words, the study was informed by the previous literature.

Research methodology postulates approaches and processes to be utilised and followed when collection, measuring and analysing data used by the researcher in the study (Botha, 2006). In his study, Denscombe (2010) maintains that a well-

30

defined strategy should consist of an overview often constituting a bigger picture on which to base the research approach, a reasonably and cautiously made plan that has the capability to offer the best projections of accomplishment, as well as, a well stated and achievable goal.

Denscombe (2010) also distinguishes between a research strategy and a method of data collection. He specifies that research methods involve "methods of data collection; and incorporate questionnaires, interviews, observation and documents" (Denscombe, 2010:4).

This study incorporates a quantitative research method. The rationale behind the utilisation of this method is based on the following circumstances:

- SMMEs are companies reliant heavily on making profit for their businesses' survival and growth. They are generally target oriented which and always conscious of time. This is easily provided for in quantitative research method.
- The research will be piloted through the utilisation of a questionnaire which will incorporate questions which are closed-ended. The Questionnaire design will follow the chronological sequence of the research objectives which will be used to assess the status of implementation of ERP within the SMME Consulting Engineering sector. This means that the questionnaire will be designed in accordance with the study objectives, and questions will be set to answer the research objectives.
- Due to time and cost constraints the study will not incorporate pilot studying. The researcher has opted to work painstakingly on the questionnaire design to ensure clarity with regards to questions in order to avoid ambiguity and misunderstanding.

This study incorporates the utilisation of surveys and as has been stated above, a questionnaire will be used as a data collection method. In research surveying involves an act of comprehensively inspecting something in detail (Denscombe, 2010). The researcher intended closely inspecting the status of ERP implementation in the companies under investigation, as well as, successes and failures thereof. This was the reason why surveys were utilised in the context of social research, that

31

is, involving people. Surveys in social research are an essential component in that they offer a wide and inclusive coverage, a snapshot of how things are at a specific point in time, and 'looking into' (empirical research). Surveys offer researchers accurate facts that are relative to individuals, that is, their behaviour, their thinking, and their identity (Denscombe, 2010). In addition, surveys play a substantial part in circumstances where a researcher intends dealing with specific issues and, at its best, when he/she can discern which factors are significant and the type of information he/she needs (Denscombe, 2010). Lastly, surveys offer a brilliant way of observing patterns of activity within groups or classifications of people (Denscombe, 2010). The types of surveys that may be utilised include postal, internet, telephone, group-administered, face-to-face, observational, and documents (Denscombe, 2010; Dornyei and Taguchi (2010).

This study opted for digital questionnaires and telephone surveys to investigate as well as measure the current status of ERP within the SMME Consulting Engineering sector within the Durban metropolitan area of KwaZulu-Natal. The researcher had pre-arranged for this method of data collection with the companies under investigation. The questionnaires were distributed electronically through the internet to the respondents. Respondents were given enough time to respond at the convenience of their time.

With regards to feasibility, the research had been estimated to be carried out within the stated period (6 months). This offered adequate amount of time for research design, collection of data and analysis of results (Hadebe, 2012).

All ethical aspects as a pre-requisite for research were adhered to. To guarantee that this was done, the researcher endeavoured that the following processes as suggested by Sekaran and Bougie (2010) were carried out:

- The fact that the anonymity of respondents was kept. Respondents were informed that their identity was protected, that is, their names were not going to be divulged.
- Data was kept in confidentiality. Respondents were informed that data would be kept by the institution and later destroyed. This would ensure confidentiality.

32

- The respondents were made to understand the nature of the research and their atmosphere.
- Informing all participants that their participation was voluntary and they can withdraw at any time during the survey

3.4 Participants and Location of Study

When conducting research, it is often impossible to survey the whole population at the same time. Sampling plays a major role in this regard in the sense that it allows a researcher to study a selected group of people within a specified period of time. Sampling often saves time and money. The study was conducted amongst the SMME Consulting Engineering sector within Durban. These enterprises have been identified and categorised according to their definition as follows:

A micro business employs fewer than five full time persons and annual turnover which does not exceed R 200 000. A very small business employs fewer than 20 full time persons and annual turnover which does not exceed R 3 million. A small business is defined as an enterprise that is independently owned and operated, organized for profit, and is not dominant in its field. A small business employs fewer than 50 full time persons with an annual turnover that does not exceed R 6 million. A medium sized business employs fewer than 200 full time persons with an annual turnover that does not exceed R 26 million. The total gross assets will not be considered for the categorization of the SMME's as it is confidential information and it unlikely the respondents will provide a response for the study.

These micro, small and medium enterprises are quite busy firms since they are striving to make profit on a daily basis generally for survival purposes. The selected quantitative research method is relevant in this regard since it can easily accommodate the element of "speed" through the types of questions that are brief and to the point.

In this study a questionnaire was used to study, assess and measure the current status of ERP systems usage within these enterprises. The researcher resorted to working comprehensively on the questionnaire design to utilize extra time for

ensuring clarity on questions with an aim of avoiding problems of misunderstanding and ambiguity.

A letter requesting permission to conduct the study had been written and permission granted by Consulting Engineers South Africa (CESA) to the researcher. This is attached as appendix 3.

3.5 Sampling

As has been stated above, data collection from large samples is mostly very expensive and time consuming; sampling thus offers a better option. Sampling incorporates a selection procedure of an adequate number of elements from the population, so that the study of that sample and an understanding of its properties or features would allow the researcher to make generalisations to the population elements (Sekaran, 2003). The researcher firstly defines the population before sampling can be done (Sekaran & Bougie, 2010).

3.5.1 Population and Sample

The term "population" incorporates all items in the category of things that are to be examined (Denscombe, 2010). For instance, this study involves investigating the status and usage of ERP systems amongst the 37 SMME in the Engineering sector in the greater Durban geographical area. The researcher cannot, however, study all enterprises in the engineering sector hence the research will therefore study only a sample of 37 enterprises in the engineering sector. By picking a sample from a population, the researcher attempts to acquire an illustrative sample (Sekaran & Bougie, 2010). In this case, the choice of a sample is not always to acquire a precise cross-section of the population (Denscombe, 2010). This study does not intend utilising an exploratory sample since it is quantitative in nature and, therefore, encompasses a larger survey. The study therefore intends obtaining a representative sample.

3.5.2 Sampling Design/Frame

In research, sampling is defined as a process from which a satisfactory number of the right elements are nominated from the population such that generalisability to both the designated and non-selected population elements is made possible through the study of that sample (Sekaran & Bougie, 2010). Generalisability of results from a sample acquired from a population is often considered very significant in research (Zwane, 2011). The results are only considered significant if they can be generalised, that is, they have the ability to provide meaningful extension that goes beyond the limited location in which they were initially acquired (Welman et al., 2007). This is what Terre Blanche (2006) refers to when he stipulates that a sample should best represent the features of the population. Kothari (2008) emphasises the following characteristics for a good sample design:

- The sample design must result in a truly representative sample.
- Ability to reduce sampling inaccuracy.
- Ability to minimise methodical prejudice.
- Applicability of results to the population from which the sample was drawn with a reasonable level of confidence.

Saunders, Lewis and Thornhill (2012) maintain that a sampling frame for any probability sample should constitute a comprehensive list of all the cases of the population from which a sample will be drawn. A sampling frame, therefore, becomes indispensable if probability sampling should be utilised (Saunders et al., 2012). Saunders et al (2012) emphasises utilisation of comprehensive, precise and up-to-date lists for sampling. When a researcher outlines a sampling frame, he/she describes the population about which he/she can generalise. A researcher cannot generalise outside of his/her sample frame as this could produce complications (Saunders et al., 2012). This study will, therefore, also generalise within the demarcated sample frame of enterprises from the consulting engineering sector in the greater Durban area.

35

3.5.3 The Need for Sampling

Sampling is beneficial to the researcher for the following reasons; firstly, it becomes a necessary alternative where the researcher is unable to conduct research on the whole population simultaneously (Sekaran & Bougie, 2010). Secondly, sampling advantages the researcher when his/her budget inhibits him/her from surveying the whole population (Saunders et al., 2012). Lastly, sampling assists the researcher when time does not allow the researcher to survey the entire population (Saunders et al., 2012). These reasons offer the basis for the choice of sampling criteria utilised in this study.

In research, two sampling techniques termed probability or representative sampling and non-probability sampling are used (Dunn, 2010). Probability sampling provides a known and equal opportunity that each case be nominated from the population (Dunn, 2010; Curwin & Slater, 2008). This indicates that 'it is possible to answer research questions and to achieve objectives that require the researcher to estimate statistically the characteristics of the population from the sample' (Saunders et al., 2012: 261-262). In theory, the features of any given simple random sample should thoroughly match the features of the population from which the sample has been obtained (Dunn, 2010: 205). Denscombe (2010) defines the pragmatic approach to sample sizing as appropriate in smaller scale surveys that use non-probability sampling from a representative sample. The pragmatic approach entails social research with fairly small numbers which range from 30 to 250, and when approximating the required sample size such as surveys, it often depends on non-probability sampling (Denscombe, 2010). Two reasons for this dependence on non-probability sampling are highlighted below:

- **Resources.** Resources often play a significant role when research cannot be carried out within the specified time and additional expenses are to be made. The study often requires to be custom-made to meet the limitations ordained by the amount of time and expenses to be made on the research (Denscombe, 2010).

36

- **Nature of the research population.** If the researcher is investigating small or medium-size enterprises with personnel of less than 200 individuals he/she is forced to work with lesser numbers (Denscombe, 2010).

The pragmatic approach maintains the certainty that, when used proficiently, non-probability sampling techniques can yield data which are adequately precise for the purposes of research (Dunn, 2010). The pragmatic approach intends eliciting accuracy that is good enough for the purposes of research within the resources available for research (Denscombe, 2010). This study undertakes this approach. With non-probability sampling, the probability of each case being selected from the total population is unknown and it is similarly impossible to answer research questions or to address objectives needing statistical inferences about the characteristics of the population (Saunders et al., 2012). From the non-probability sampling technique, generalisations about the population may be possible even though they may not be based on statistical grounds (Sekaran & Bougie, 2010). The reason why a probability sampling technique has been embarked on in this research is that the study itself incorporates a survey research strategy, which essentially needs inference from the sample about the population in order to answer the research questions and to meet the study objectives (Dunn, 2010). According to Saunders et al (2012: 262) there are four stages involved in probability sampling. They are:

- Identification of an appropriate sampling frame grounded on the researcher's research questions and objectives.
- Determining an appropriate sample size.
- Choosing the most applicable sampling techniques and deciding on the correct sample.
- Examining if the sample is illustrative of the population from which it has been obtained.

3.5.4 Purposive Sampling

For purposes of this study, purposive sampling was selected. Purposive sampling involves sampling that has been hand-picked exclusively for the topic. The

researcher utilised this method because through purposive sampling only the finest information can be acquired from a comparatively small number of respondents that have been deliberately designated for their acknowledged characteristics rather than through unsystematic or random selection (Denscombe, 2010). Purposive sampling allows the researcher to choose the sample based on:

- *Relevance*: to the subject/theory being examined.
- *Knowledge*: privileged information or experience about the topic (Denscombe, 2010:35).

Due to the fact that the researcher had prior knowledge about the specific people to be chosen as respondents, he purposefully hand-picked specific ones for the construction of the most valuable data for this study (Sekaran & Bougie, 2010). Using the Directory of Consulting Engineers of South Africa, Durban on page 40 of the directory, the researcher opted for the first person listed under each company. The researcher would then phone the person, and if that person could not help, he/she would be asked to provide the researcher with his/her partner or someone in a senior position than him/her. These participants were nominated with a specific purpose in the mind of the researcher which reflects certain characteristics these people had, their relevance to the topic, and their experience or expertise to provide superior information and valuable perceptions on the research topic (Curwin & Slater, 2008). Purposive sampling was going to be beneficial to the researcher it would award him an opportunity of accessing people or events believed to be indispensable for the research conducted (Denscombe, 2010). A sample of 84 companies was therefore chosen from the Consulting Engineers South Africa (CESA) firm directory for Durban. The companies that form part of this association are registered with the body and meet the CESA criteria for a responsible service provider that complies with the regulations of the country. The first person or partner or a superior filled in the questionnaire provided by the respondent.

3.5.5 Advantages of Surveys

The researcher opted for surveys due to their perceived advantages which greatly outweigh disadvantages thereof. There four perceived advantages for utilising surveys and sampling as highlighted in Denscombe (2010:49) are:

- **A focus on empirical data**, which refers to the obtaining of data from real-life or 'straight from the horses' mouth'.

- **Ability to collect both quantitative and qualitative data.** This refers to substantial data which is obtained through the completion of questionnaires by the subject/representative of a company. Invariably, the large volumes of quantitative data acquired can be evaluated statistically.

- **Wide and inclusive coverage.** In surveys of a large scale, it is often plausible to derive generalisations out of the large sample size, however, in small scale questionnaire/interview surveys, suitable sampling techniques can allow the researcher to develop an understanding based on a complete range of specific items relative to a study.

- **Cost and time.** Intrinsically, surveys usually offer a well-organized and somewhat economical means of accumulating data. Consequently, results and analysis are attainable over a brief period of time and the process is fairly cost effective.

3.5.6 Shortcomings of Surveys and Sampling

In spite of a few documented disadvantages, the researcher used surveys and sampling. These shortcomings are:

- The inclination to concentrate on data more than theory.
- Since the emphasis on empirical data is left speak for itself without a satisfactory interpretation of insinuations of those data for significant issues, problems and theories (Denscombe, 2010).

3.5.7 Deciding on Sample Size

'Generalisations about populations from the collected data using any probability samples are based on statistical probability' (Saunders et al., 2012: 265). A bigger sample size often mirrors a lower likely error in generalising to the population (Saunders et al., 2012). Probability sampling is a concession amid the accuracy of the outcomes in the study and the quantity of time and money capitalised in gathering, examination, and evaluating the data (Saunders et al., 2012). Saunders et

al (2012) highlights two factors determining a researcher's choice of sample size, namely;

- The assurance the researcher requires to have in his/her data. This is the level of inevitability that the features of the collected data will characterise features of the entire population.
- The margin of error the researcher is keen to endure, which refers to the accuracy (Saunders et al, 2012).

CESA indicates that there are about 500 engineering companies in South Africa that are affiliated to the organization. In the Durban region there are 84 companies which then determine the population size for this study. Even though the recommended sample size in this regard is 70, the researcher intends working with all 84 respondents. This is to accommodate non-responses that might lower the response rate.

3.6 Data Collection

Dunn (2010) differentiates data into primary and secondary data. Primary data primarily refers to 'first-hand information the researcher obtains on the variables of interest for the specific purpose of the study', while secondary data refers to information that has been acquired from sources that already exist, such as literature (Sekaran & Bougie, 2010:180). The technique that is to be utilised in data collection is often informed by the kind of data that is required. Sekaran (2003) highlighted a few data collection methods, namely, questionnaires or surveys, interviews, observations or focus groups. For purposes of this study, questionnaires will be used.

3.6.1 Questionnaires as a Method of Data Collection

Since this study incorporates a quantitative approach to research, it, therefore, utilised surveys as the technique of data gathering. A questionnaire has been described as a method of data collection all-encompassing methods of data collection in which an individual is requested to answer the identical set of questions in a prearranged order (deVaus, 2002). This method frequently comprises electronic

and telephone questionnaires (Saunders et al., 2012). A questionnaire is considered to be the most effective technique of data collection within the survey strategy from a large sample before quantitative analysis takes place since each respondent is requested to answer the same set of questions (Sekaran & Bougie, 2010). The questionnaire was designed in such a way that it enabled the researcher to collect the relevant data he needed to answer the research question/s as well as accomplish the study goals (Dunn, 2010). Since a questionnaire can only be used on one occasion when data is collected, the researcher ensured that its design was done extensively to enable high response rate, consistency and legitimacy of the data collected if it has not been carefully and extensively designed. To avoid this Saunders et al (2012: 419) suggest the following fundamentals for questionnaire design:

- Cautious design of each question;
- Cleary defined and pleasing layout of the questionnaire;
- Articulate justification of purpose of the questionnaire;
- Experimental testing;
- Judiciously prearranged and executed distribution and return of completed questionnaires.

The researcher ensured that these suggestions were adhered to. Questionnaires are often used for descriptive or explanatory research. Descriptive research that is carried out utilising attitude and opinion questionnaires facilitates the researcher to categorise and describe the variability in diverse occurrences (Sekaran & Bougie, 2010). Explanatory or analytical research allows the researcher to study and elucidate relationships between variables, particularly, cause and effect associations (Saunders et al., 2012). A questionnaire may be used with other methods of data collection, such as, in-depth interviews to discover and comprehend the attitudes of respondents (Denscombe, 2010). This study does not incorporate the questionnaire with in-depth interviews due to quantitative nature of study.

41

3.6.2 Types of Questionnaires

A questionnaire is designed in accordance with its delivery, return or collection, and the amount of contact the researcher has with the respondents (Saunders et al., 2012). Self-completed questionnaires are usually completed by respondents and are sent electronically via the internet, email, posted to respondents who also return them by post after completion, or delivered by hand to each respondent and collected later (Saunders et al., 2012). Completed questionnaires are then recorded by the interviewer based on the answers each respondent has given (Denscombe, 2010). Questionnaires undertaken through the use of a telephone are known as telephone questionnaires. Structured interviews incorporate questionnaires where the interviewer physically meet the respondents and ask questions face to face (Saunders et al., 2012). Structured interviews were not planned for this study.

The researcher intended sending questionnaires to respondents electronically via email, and requests a response within a prescribed period. Obtaining responses from SMME's in this sector was found to be a difficult task with very poor response rates as described in a study by Yu (2007). Should the respondents not respond within the prescribed period telephone interviews would be conducted recording their answers as they respond to the same questionnaire that was emailed to the targeted respondents. The researcher would then return completed questionnaires to the respondents. These methods would be conducted to ensure that a reasonable sample size was obtained that would provide clarity and reliability of data for the study.

3.6.3 Questionnaire Design

Questionnaire design in this study incorporates closed-ended types of questions which need a restricted number of response options that will be categorical or statistical (Dunn, 2010). Categorical response format includes the yes-no question and numerical format will involve the Likert-type scale that allows respondents to rate their degree of agreement or disagreement with opinion statements. The numerical format will be used for this study with the intention of obtaining responses to the

42

following broad objectives. In research, the methodology that is adopted by the researcher should meet the objectives to make the study successful (Zwane, 2011).

Sekaran and Bougie (2010) categorise advantages and disadvantages:

Mode of data collection	Advantages	Disadvantages
Personally administered questionnaires	• Can establish rapport and motivate respondents. • Doubts can be clarified. Less expensive when administered to groups of respondents. • Almost 100% response rate ensured. • Anonymity of respondents is high	• Organizations may be reluctant to give up company time for the survey with groups of employees assembled for the purpose.
Mail questionnaires	• Anonymity is high. • Wide geographic regions can be reached. • Token gifts can be enclosed to seek compliance. • Respondents can take more time to respond at convenience. Can be administered electronically, if desired.	• Response rate is almost always low. A 30% rate is quite acceptable. • Cannot clarify questions. • Follow-up procedures for non-responses are necessary.
Electronic questionnaire	• Easy to administer. • Can reach globally. • Very inexpensive. • Fast delivery. • Respondents can answer at their convenience like the mail questionnaire.	• Computer literacy is a must. • Respondents must have access to the facility. • Respondents must be willing to complete the survey.
Telephone surveys	• Less costly and speedier than personal interviews • Can reach a wider geographical area • Greater anonymity than personal interviews • Can be done using CATI.	• Nonverbal cues cannot be read. • Interviews need to be kept short. • Obsolete telephone numbers could be contacted, and unlisted ones omitted from the sample.

Table 3.1: Benefits and Drawbacks of questionnaires (Adapted from Sekaran & Bougie, 2010)

3.7 The Significance of a High Response Rate

To warrant that the researcher's data represents the entire population it is imperative that a comprehensive work is done on the questionnaire to avoid favouritism or bias of the questions asked. This bias is sometimes presented by the investigator, the

43

interviewee, or the situation. The interviewer can be biased if "proper trust and rapport are not established with the interviewee, or when responses are either misinterpreted or distorted, or when the interviewer unintentionally promotes or discourages certain types of response through gestures and facial expressions" (Sekaran & Bougie, 2010: 190). According to Sekaran & Bougie (2010), to ensure that the information obtained during the interview if as free of bias as possible the researcher should do some of the following:

- The researcher should then establish proper trust and rapport and gain confidence and approval of the company as well as the respondents before he/she can start working or conducting interviews in the organisation in order to obtain truthful answers from them.

- The rapport can be established by being pleasant, sincere, sensitive, and non-evaluative.

- The researcher needs to clearly state the purpose of the research, tactfully make respondents understand that the researcher does not intend to take sides, nor is he/ she intending harming them in any way, and above all, will ensure that the results of the research is presented in aggregates without disclosing the identity of the individuals.

- Listen attentively to the interviewee, displaying keen interest in what the respondent is saying, exercise tact in questioning, repeating, clarifying the questions posed, and paraphrasing some of the answers the respondent gives to keep alive the interest of the respondent.

- When a respondent cannot be reached during telephone interviews the researcher should use call-backs and other contacts to ensure that the sample does not become biased.

The researcher should be conscious non-responses in the survey. The American Association for Public Opinion Research (2008) identifies four levels of non-response that can be stated for questionnaires and structured interviews, namely;

- **Complete refusal**: Where none of the questions have been answered.
- **Break-off**: Where less than 50 per cent of all questions has been answered.

44

- **Partial response**: Where 50 per cent to 80 per cent of all questions have been answered.
- **Complete response**: Where over 80 per cent of all questions have been answered (American Association for Public Opinion Research, 2008).

According to the American Association for Public Opinion Research (2008) non-response can be as result of the following interconnected complications:

- Where a respondent refuses to respond;
- Where the respondent is ineligible to respond;
- Where the researcher is unable to trace the respondent;
- Where the respondent is located but is unable to make interaction (American Association for Public Opinion Research, 2008).

One of the most common non-response reasons is where a respondent refuses to respond to all questions or participate in the research, but offering no reason for it (Saunders et al., 2012). It is suggested that careful attention to the methods of data collection be paid in order to minimize non-responses (Saunders et al., 2012).

Even though it may be anticipated that some respondents may be unwilling to participate, the researcher attempt needs to ensure that this number is always kept to the lowest (Hadebe, 2012). To be able to do this, a researcher must consider the following which may have a bearing on the possible response rate realised by a survey:

- **Nature of the respondents** (sex, age, disability, literacy, employment status, etc.). This study considered the fact that some respondents are quite busy people, while others may not be as busy. The study also made considerations with regards to people with hearing disabilities, and decided that more attention will be paid to their needs. (Denscombe, 2010).
- **Subject of research**. Since other respondents tend to be more sensitive than others, care has been taken in this study to ensure that very personal or embarrassing matters are omitted.
- **Researcher identity (**age, sex, social class, ethnicity, clothes, accent**).** Care has been taken in this study that the researcher does not present himself in a

threatening or unworthy manner so as to prevent his identity from impacting on the potential respondent. (Denscombe, 2010).

- **Nature of contact.** The researcher has ensured that the method used to connect with the respondents poses less influence on the response rate

- **Social climate.** In research, it is imperative that respondents are allowed a free speech atmosphere in order for them to freely collaborate with the research and provide honest and complete responses (Denscombe, 2010). The researcher has ensured that a free speech atmosphere is provided.

3.8 Quantitative Data Analysis

Once data has been collected from the representative sample it has to be analysed to test the research hypothesis. However, before data is analysed a few but necessary steps have to be undertaken.

3.8.1 Coding and Data Entry

The first step in the preparation of data is data coding. This refers to allocating a digit to participant responses to enable entering them into a database. For instance, 1 = part-time and 2 = full- time. Non-responses also need to be coded. After coding, raw data can be entered through a software program. SPSS Data Editor, for instance, can enter, edit, and view contents of the data file (Sekaran & Bougie, 2010). Each row of the editor represents a case or an observation, and each column represents a variable (different items of information collected.

3.8.2 Reliability of the Questionnaire

Reliability is refers to the findings of the research and relates to the reliability of the results (Welman et al., 2007). The reliability of a measuring instrument, such as a questionnaire, refers to the degree to which the measure is without prejudice (error free) and, thus, offers dependable measurement across time and across numerous items in the instrument (Sekaran 2003). A measuring instrument is deemed to reliable if it produces constant results (Zwane, 2011; Saunders et al., 2012). Stability and consistency are two significant aspects of reliability. According to Sekaran and Bougie (2010) stability refers to the ability of a measure to stay the same over time in

46

spite of intense testing conditions or the condition of the respondents themselves, and consistency indicates the similarity of the items in the measure that tap the paradigm.

Cronbach's alpha provides an effective tool to verify the reliability of a set of tests/questions taken. The Alpha coefficient ranges in value from 0 to 1 and can be used to describe the reliability of multi-point formatted questionnaires or scales (rating scale: 1 = poor, 5 = excellent). It is generally accepted that an alpha value of above 0.7 indicates a reasonable level of reliability. Cronbach's alpha is therefore a measure of internal consistency, i.e. how closely related a set of questions are as a group. A high alpha value (> 0.7) may therefore be used to form part of other substantive arguments and statistical measures as evidence that the specific set of questions measure a primary hypothesis. It must also be noted that Cronbach's alpha is technically not a statistical test, but rather a coefficient of reliability or consistency in a set of questions.

3.8.3 Correlation

The study employed correlation as a method of data analysis. Correlational research concentrates on quantifying variables (Dunn, 2010). Correlational method is significant where cautious (and not experimental) measurement is of requirement in the study. According to Saunders et al (2003), a correlation coefficient is utilised to establish the strength of a relationship between two ranks or computable variables. Correlational research is powerful since it permits researchers to still ask central questions and to discern fascinating first-hand relationships concurrently, even if the exact causal reinforcements remain mysterious (Dunn, 2010:241). In using the Likert scale, responses to each question are quantified and totals obtained for the group of factors. This study undertook an approach involving computing individual responses to variables, such as, age, employment positions, company size, company turnover, consulting disciplines, and registration. The Cronbach coefficient of reliability would be computed and the Spearman's rank correlation coefficient used as a measure of correlation between the two.

Because of time limitations, the study did not incorporate a pilot study. The researcher exerted more effort on working on the questionnaire design to ensure clarity of questions and language so that complications and ambiguity might be avoided at all costs.

3.9 Summary

This chapter defined and discussed the research methodology incorporated in the study. It also discussed the research strategies and diverse methods of data collection as well as offering the reasons behind the selection thereof. The chapter also discussed the questionnaire design, administration of the questionnaire, as well as, Quantitative Data Analysis. The following chapter will present data obtained from the study and provide the analysis of results acquired from the questionnaires.

CHAPTER 4

PRESENTATION OF DATA

4.1 Introduction

Chapter 3 in this study discussed methods of collecting data to be used in this study. It discussed methods of data in accordance with the questionnaire for easy analysis. The current chapter is to present data which was obtained in the survey.

Data presentation in this chapter follows the sequence of the questionnaire that was used in this study from question 2 onwards. Question 1, reflects demographic information incorporating gender, age of respondents, company size, company turnover, race, disciplines, employment positions, professional registration, as well as, the study objectives which examine ERP systems implementation, challenges encountered as well as benefits experienced in the Engineering sector. Data is presented using descriptive statistics and the questionnaire sequence has been rearranged to better illustrate the findings.

Each section of the questionnaire is presented with questions as well as the reasoning behind them. Frequencies are visually displayed with the aid of pie charts and bar graphs for easy data analysis to enable the understanding of data (Sekaran & Bougie, 2010). Questionnaires were administered to 84 potential respondents electronically which comprised the population. The required sample for the study was 70.

The Informed consents were made with the companies under investigation and under the under authority of Consulting Engineers South Africa (CESA). The researcher ensured that all respondents were informed about the study and their rights to participate voluntarily, or even withdraw if they wished to do so at any stage of the survey and there were no costs involved. Surveys were sent and received electronically, and in a case where the respondent was busy, telephone surveys were conducted. These surveys were also conducted in cases where there was no electronic response from the respondent by the prescribed return date. Obtaining responses from SMME's in this sector was found to be a difficult task with very poor

49

response rates as described in a study by Yu (2007). A response rate of 44% (37 respondents) was achieved for the study.

4.2 Treatment of Data

Accuracy in research plays a significant role and this is maintained through the research ensuring that incomplete data is avoided to minimize errors. This was done comprehensively by the researcher.

Data presentation was done through the use of diagrams in an attempt to capture data accurately and was done using descriptive and inferential statistics. The Likert scale was used to rate responses on a five point measure ranging from 1 representing strongly disagree to 5 representing strongly agree (Sekaran & Bougie, 2010). Data was entered into SPSS Data Editor through coding and editing (Sekaran & Bougie, 2010). Percentages were rounded off to 2 decimals for ease of reference.

4.3 The Questionnaire

The questionnaire required the respondents to complete the survey by inserting a cross next to their answer of choice. The telephone surveys followed a similar process where the information was obtained from the respondent and captured onto a questionnaire form by marking the appropriate box. The data could therefore be used confidently for further analysis and interpretation.

4.4 Demographics

In research, demographic data provides, firstly, a better understanding of respondents with regards to their background, secondly, better analysis of results, and lastly, better means of understanding the different response patterns amongst respondents in terms of their gender, age groups, employment information and educational background.

4.4.1 Gender of Respondents

Respondents were asked to indicate their gender profile. This always offers the researcher a better understanding of the gender profile of all respondents and

possible reasons why they respond the way they do. The researcher depended on prior knowledge about the respondents in order to carefully select them. This would enable him to construct data relevant for this study. As has been stated before, the Directory of Consulting Engineers of South Africa was used to select the first person listed under each company. The researcher used Consulting Engineers South Africa (CESA) firm directory for Durban companies which form part of this association and are registered with the body and meet the CESA criteria for a responsible service provider that complies with the regulations of the country. The listed person could be a male or female. The researcher would phone the person and ask him/her if he could participate in the research. If that person could not due to lack of specific knowledge that would benefit the study, he/she would be asked to provide the researcher with a partner or someone in a senior position who could have the relevant information. The presented data in the table regarding gender of respondents, therefore, depended on who was available to partake in the research.

	GENDER CATEGORY			CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
GENDER	MALE	34	91.89	91.89
	FEMALE	3	8.11	100
TOTAL		37	100	

Table 4.1: Gender Category

The survey indicates that 34 of the respondents were male and 3 female.

4.4.2 Age of Respondents

This question involved the categorization of respondents into age groups which would assess if age is a contributory factor to the way the respondents provides answers.

	AGE GROUPS			CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
AGE GROUPS	20 to 29	3	8.11	8.11
	30 to 39	9	24.32	32.43
	40 to 49	11	29.73	62.16
	50 to 59	11	29.73	91.89
	60 +	3	8.11	100
TOTAL		37	100	

Table 4.2: Age Groups

51
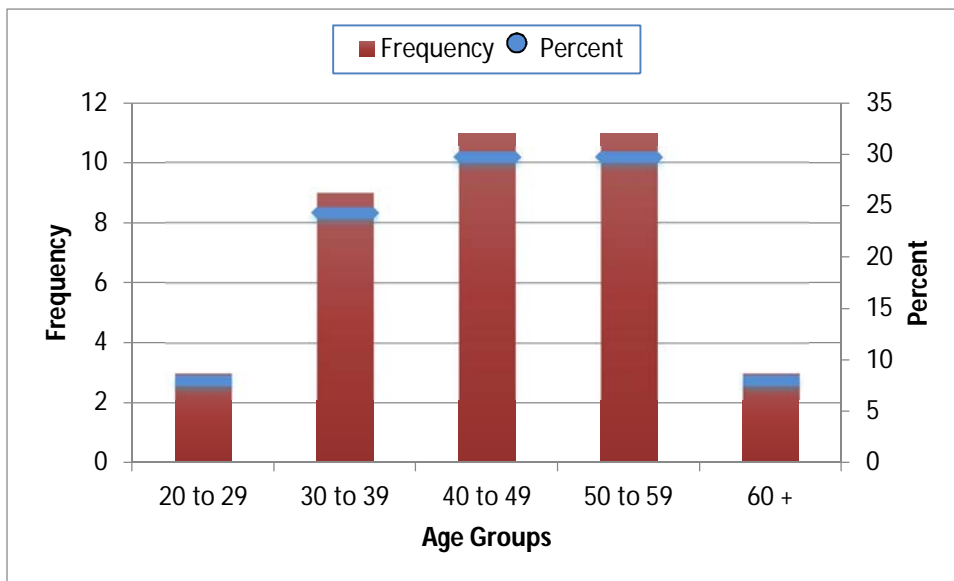
Figure 4.1: Age Groups

The results from the survey indicate that 12 respondents ranged between the ages of 20 and 39. The age groups of 40 to 59 equally shared the majority with 22 responses. The 60+ age group comprised of just 3 respondents.

4.4.3 Race

The question on race or ethnicity is one of the factors that could be explored in the research to establish Black Economic Empowerment status quo in the engineering industry, however, the question in this study was asked for demographic purposes only.

		RACE GROUPS		CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
RACE	Black	2	5.41	5.41
	Coloured	2	5.41	10.81
	Indian	15	40.54	51.35
	White	18	48.65	100.00
	Other	0	0.00	100.00
TOTAL		**37**	**100**	

Table 4.3: Race Groups

52
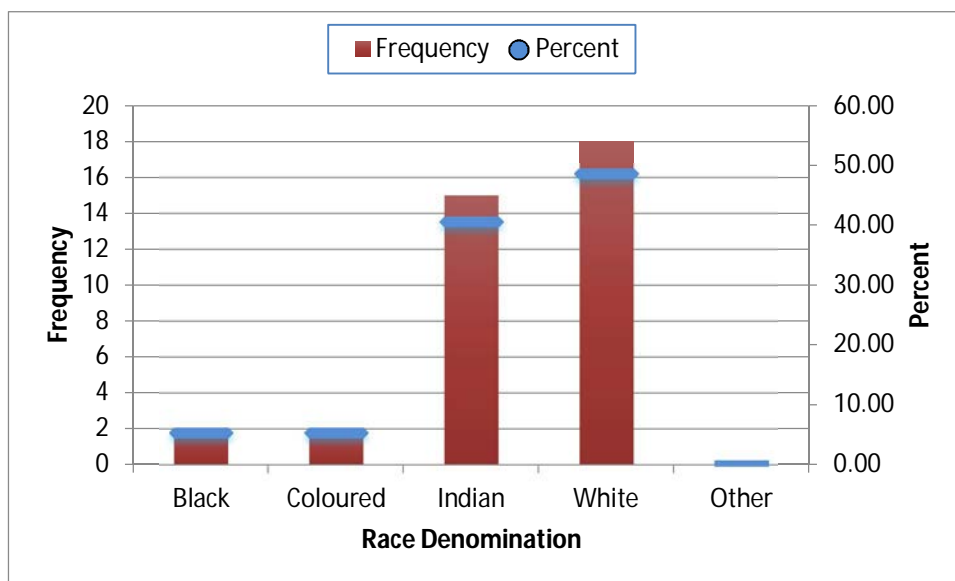
Figure 4.2: Race Groups

Results from Table 4.3 indicate that four of the respondents were black and coloured respectively and constituted 11% of the 37 companies that responded. The remaining 33 companies make up 89% of the respondents with 49% White and 40% Indian respectively.

4.4.4 Employment Positions

The next question required respondents to identify themselves according to position of responsibility in the company.

		EMPLOYMENT POSITION		CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
POSITION	Director/Partner	25	67.57	67.57
	Manager	4	10.81	78.38
	Team Leader	1	2.70	81.08
	IT	0	0.00	81.08
	Other	7	18.92	100.00
	TOTAL	**37**	**100**	

Table 4.4: Employment Positions

53
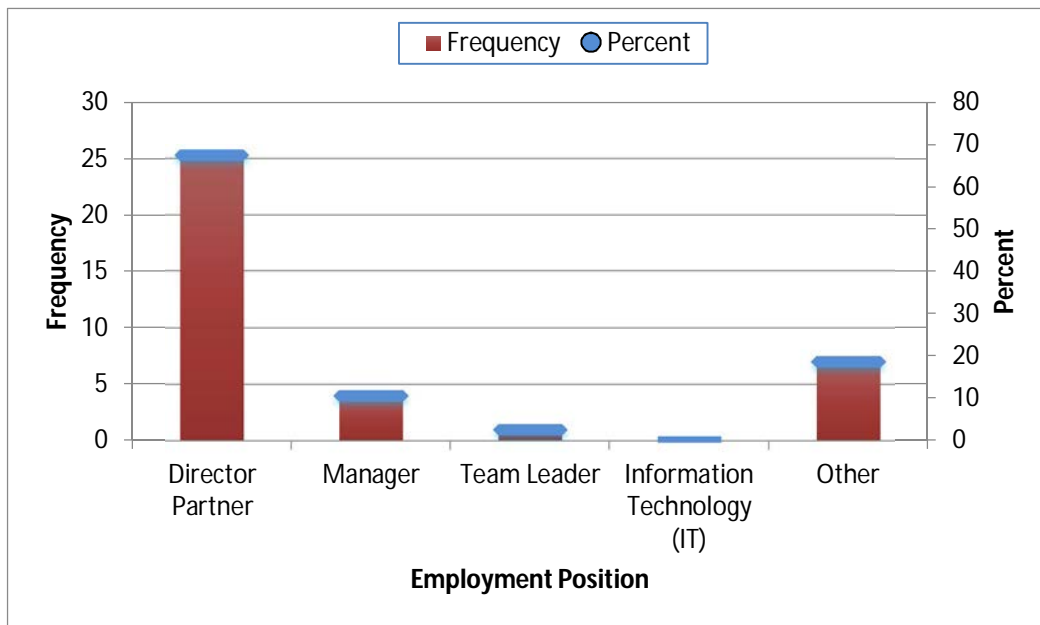
Figure 4.3: Employment Position

This question checked the employment position the respondents held in their companies to ensure accuracy of information. The results indicate that 25 (68%) of the employees held senior positions as Directors or Partners in the companies. Four (11%) of the respondents were managers, One team leader, while the remaining 7 (19%) held 'other' positions which consisted of associates, lead engineers or technologists. The results indicate that no one from the IT sector participated in the study. This was due to the fact that the method of extraction depended on the Directory for Consulting Engineers of South Africa. Since the method incorporated speaking to the first person on the list of each company, after which any individual with relevant knowledge would be used for the study, no IT people could be found at the time of study. It was not intentional.

4.4.5 Company Size

SMMEs are identified by the number of employees as well as the annual turnover. Companies that have less than 200 employees are known as small, micro and medium enterprises, while those with more than 200 employees are regarded as macro enterprises. Company size will be further analysed in item 4.11 where cross tabulations are done in order to further analyse the results of 3 objectives.

54

	COMPANY SIZE		CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
EMPLOYEES	< 5	2	5.56	5.56
	5 to 19	12	33.33	38.89
	20 to 49	12	33.33	72.22
	50 to 199	8	22.22	94.44
	200 +	2	5.56	100
TOTAL		36	100	

Table 4.5: Company Size
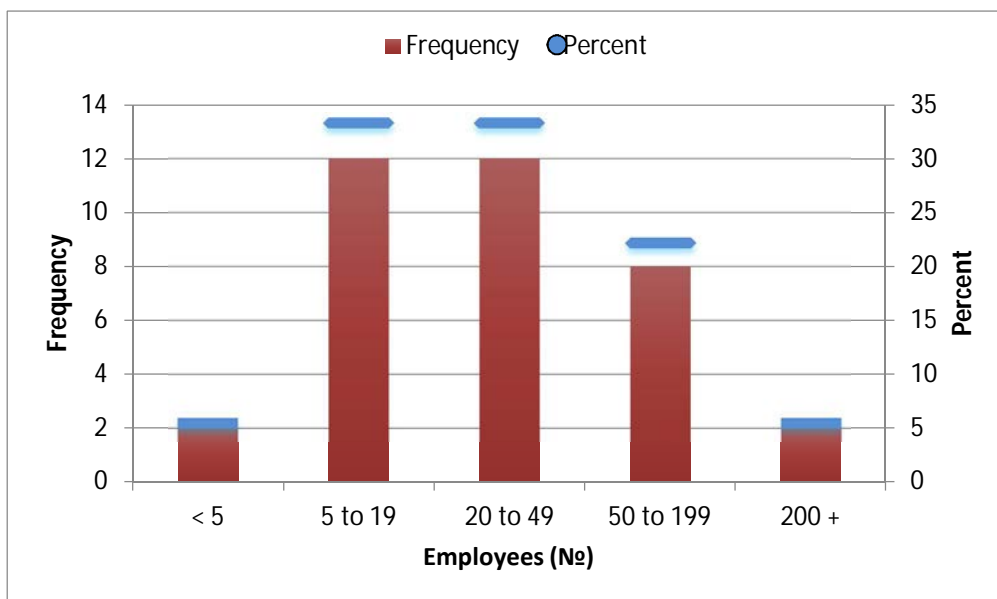
Figure 4.4: Company Size

The survey indicated those 24 companies with (5 to 19) and (20 to 49) employees respectively accounted for 66% of this response. Eight (22%) of the companies had 50 to 199 employees, while 2 of the respondents each had less than 5 employees and more than 200 employees respectively. Accordingly, the latter company indicates that these 2 companies that responded were macro enterprises and does not fall within the SMME sector.

4.4.6 Company Turnover

SMME enterprises as indicated above have limitations on the number of employees; annual turnover is the second factor that differentiates between SMME's and macro enterprises. Firms that generate turnovers of less than R26 million are considered

You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)

SMME's while the macro companies have a turnover of greater than R26 million per annum.

		COMPANY TURNOVER		CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
TURNOVER (Millions)	< 3	1	2.7	2.7
	3 to 6	5	13.51	16.21
	6 to 26	10	27.03	43.24
	> 26	9	24.32	67.56
	No response	12	32.44	100
TOTAL		**37**	**100**	

Table 4.6: Company Turnover
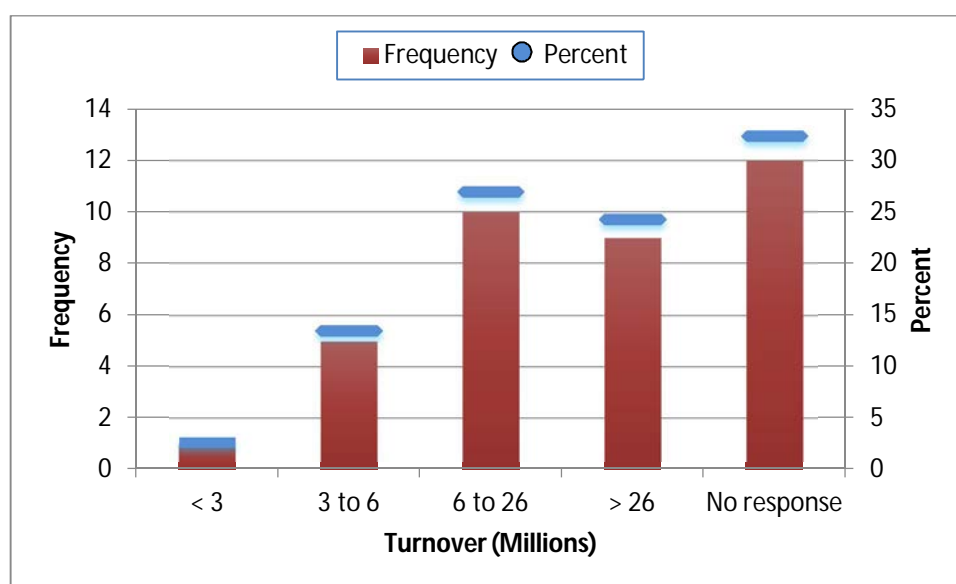
Figure 4.5: Company Turnover

The results indicate that only 1 (3%) company had an annual turnover of less than R3 million and 5 companies had an annual turnover ranging from R3 to R6 million. Nine (24%) companies had a turnover of more than R26 million. Table 4.6 also indicates that amongst the 37 companies that responded 12 (32%) of the companies did not offer their responses with regards to their annual turnover. This poses a limitation on the study as the company turnover now cannot be used to establish the number of SMME's that participated in the study. The company size will therefore be used to establish number of SMME's and the implementation levels in the sector.

56

4.4.7 Disciplines

		COMPANY DISCIPLINE		CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
DISCIPLINE	Civil/Structural	23	62.16	62.16
	Mechanical/Electrical	5	13.51	75.68
	Project Management	0	0.00	75.68
	Multi-Disciplined	9	24.32	100.00
	Other	0	0.00	100.00
TOTAL		**37**	**100.00**	

Table 4.7: Company Discipline
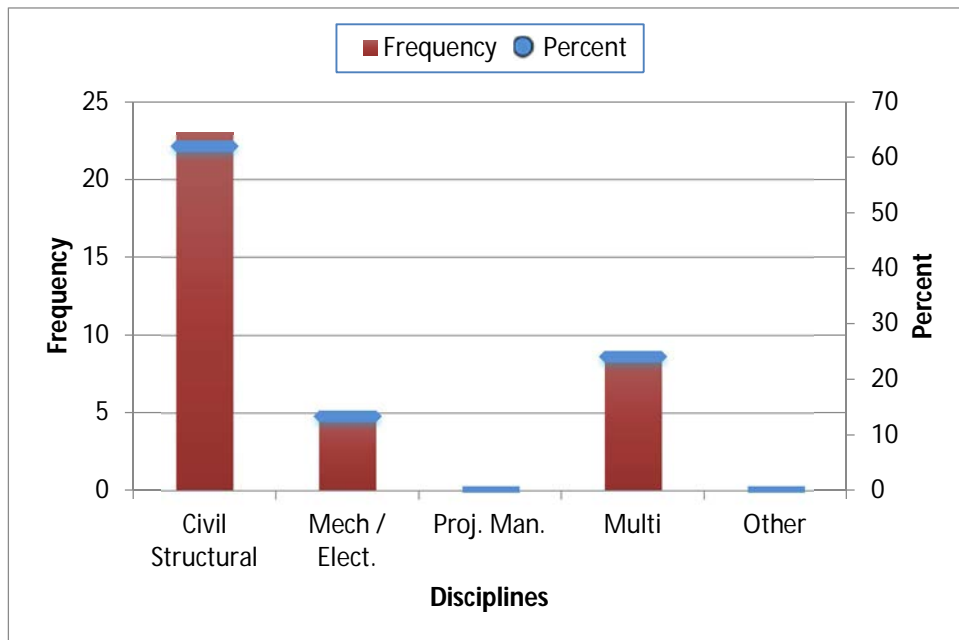
Figure 4.6: Company Discipline

This question required respondents to identify their companies' capabilities according to engineering disciplines that they practice. Twenty Three (62%) of the companies constituted of Civil or Structural Engineers. Five (14%) practised Mechanical and Electrical Engineering and the remaining 9 constituted of Multi-disciplined companies. No responses were received from project management or 'other' companies for the study.

4.4.8 Professional Registration

The next question required respondents to confirm their professional registration based on the professional body they subscribe to in the industry.

		PROFESSIONAL REGISTRATION		CUMULATIVE TOTAL
		FREQUENCY	PERCENT	
BODY	ECSA/SACPMP	29	78.38	78.38
	Other	2	5.41	83.78
	None	6	16.22	100.00
TOTAL		**37**	**100**	

Table 4.8: Professional Registration
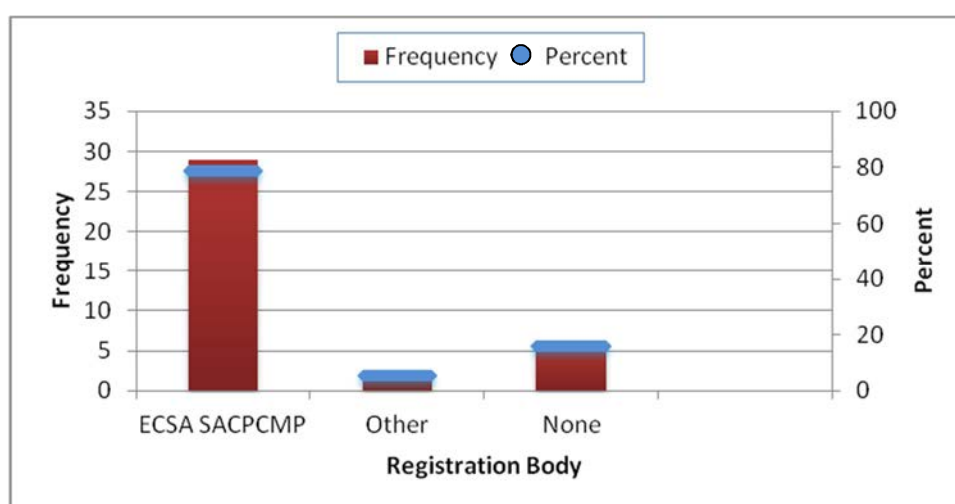
Figure 4.7: Professional Registration

This question checked the professional registration status of the respondents in order to establish registration trend in the industry sector. The results indicated that 29 (78%) of the respondents were registered under ECSA/SACPCMP. Two (5%) of the respondents were registered with other professional bodies. It was also noted that 6 (16%) of the respondents were not registered.

4.5 OBJECTIVES OF STUDY

The following 6 objectives were researched. The data reflected in the tables refer to the number of responses that participated in the study and percentages are reflected in brackets (%).

4.5.1 OBJECTIVE 1: To Establish the Usage of IT in the Sector

This objective aimed to establish the usage of IT systems in place in the companies under investigation. It has been established that businesses are gearing more toward incorporating IT into their businesses (Beig et al., 2012). ERP systems were not considered at this stage for investigation.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.1 Is there is an Information Technology (IT) system in place in the company?	0	0	0	28 (76)	9 (24)
1.2 Has the introduction of Information Technology (IT) and Information Systems (IS) contributed to the growth of production?	0	0	2 (6)	23 (62)	12 (32)
1.3. Has the introduction of Information Technology (IT) and Information Systems (IS) contributed to the speed of service provided by the firm eg. CAD, Prokon, Civil Designer, etc.?	0	0	1 (3)	21 (57)	15 (40)
1.4 Has the quality of your products and service improved with the use of IT?	0	0	4 (11)	20 (54)	13 (35)
1.5 Has your current I.T system help improve your competitiveness?	0	2 (5)	4 (11)	23 (62)	8 (22)
1.6. Has the current I.T. system help reduce costs?	0	4 (11)	6 (16)	22 (60)	5 (13)
1.7 Has your current I.T. system help diversify products?	0	3 (8)	9 (24)	22 (60)	3 (8)
1.8 Has your current I.T system provided more reliable delivery dates?	0	0	3 (8)	29 (78)	5 (14)

Table 4.9: IT System Usage
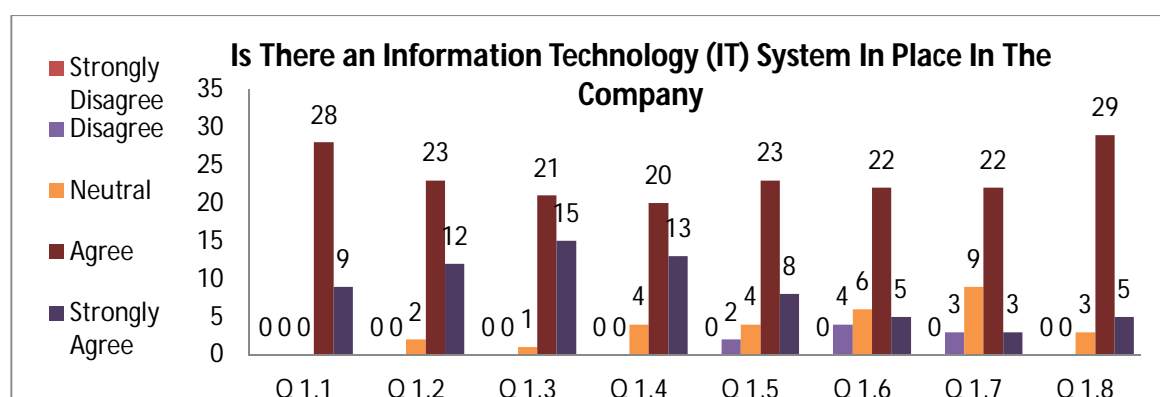
Figure 4.8: IT System Usage

Data was grouped according to five categories, namely, Strongly agree, Agree, Strongly disagree, Disagree and Neutral. The first question asked the respondents to indicate if there was an IT system in place in their companies. All the 37 (100%) respondents agreed that there was an IT system in place in their companies at various levels. Question 1.2 checked if the existing IT system contributed to the growth of production in the companies. Results indicated that 35 (94%) of the 37 respondents agreed that the existing IT system contributed to growth of production within the company and 2 (6%) of the respondents remained neutral. Question 1.3 asked the respondents to indicate if the current IT system contributed to the speed of service provided by the firm. 36 (97%) of the respondents agreed that the IT system in place contributed to the speed of service that was provided by the firm and the remaining 1 (3%) was neutral. Question 1.4 asked if the current IT system had contributed to the quality of products and services in the company. Thirty three (89%) of the respondents agreed that the quality of their products and services had grown since the implementation of the IT system within the company and the remaining 4 (11%) of the respondents were neutral. Question 1.5 asked the respondents to indicate whether the current IT system had contributed to the company competitiveness. Thirty one (84%) of respondents agreed that the current IT system contributed to the competitiveness of the company. Only 2 (5%) of the respondents disagreed, while 4 (11%) remained neutral. Question 1.6 checked if the current IT system helped reduce costs. Twenty seven (73%) respondents agreed that it has, while 4 (11%) disagreed, and 6 (16%) remained neutral. Question 1.7 asked if the current IT system helped diversify products. Twenty five (68%) of the respondents agreed that the current IT system assisted in diversifying products. Three (8%) disagreed while the remaining 9 (24%) of the respondents were neutral. Question 1.8 confirmed if the current IT system assisted in providing more reliable delivery dates. Thirty four (92%) of the respondents agreed while the remaining 3 (8%) were neutral. The responses obtained indicate that the ERP systems have been implemented successfully in this firms. Dantes and Hasibuan (2011) indicated that with a successful implementation methodology, companies can ensure benefits are obtained.

60

4.5.2 OBJECTIVE 2: To Establish the Awareness of ERP Systems

This objective sought to establish the awareness of ERP systems in the companies under investigation.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
2.1. Are you familiar with the term ERP?	3(8)	17(47)	5(14)	9(25)	2(6)
2.2 Do you have an ERP system installed in the company?	5(14)	15(41)	1(3)	14(39)	1(3)
2.3 Is the company considering implementing an ERP system within the next 5 years?	4(11)	7(20)	12(33)	10(28)	3(8)

Table 4.10: Awareness of Usage
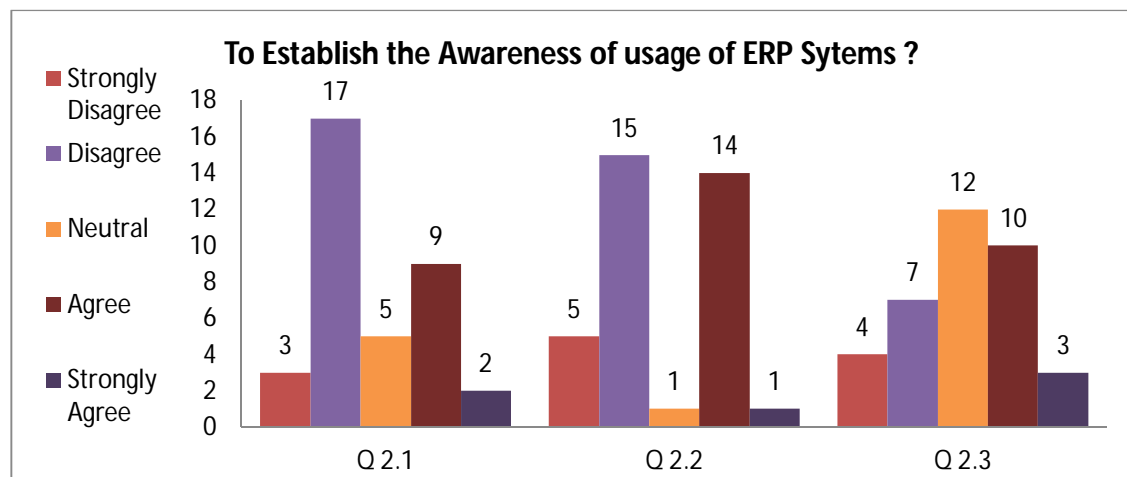
Figure 4.9: Awareness of Usage

The questions asked under this objective were intended to establish the awareness of ERP in the industry sector. Question 2.1 required the respondents to indicate if they were familiar with the term ERP. Eleven (31%) of the respondents agreed while 5 (14%) remained neutral and the remaining 20 (55%) majority disagreed. Question 2.2 asked the respondents to indicate if an ERP system had been installed in their companies. Twenty (54%) of the respondents disagreed that an ERP system had been installed in their companies while fifteen (42%) agreed and 1 (3%) company remained neutral in this question. The high percentage of respondents who disagree that an ERP has been installed could indicate that most employees have no knowledge of ERP systems. Question 2.3 checked if an ERP system was going to be implemented within the next 5 years. Eleven (31%) disagreed that an ERP

61

system was going to be installed while 12 (33%) were neutral and the remaining 13 (36%) the respondents agreed. The fact that most employees were unfamiliar with ERP systems implementation in their workplaces indicates that there is a lack of employee involvement in the entire process of implementation. Yu (2007) had suggested the necessity for this to ensure that there was no resistance amongst employees. If this is not ensured, employees are bound to resist.

4.5.3 OBJECTIVE 3: To Establish the Reasons why an ERP System has not been Implemented

In this objective respondents had to identify reasons for non-installation of ERP systems. This question was only posed to respondents that do not have an ERP system implemented.

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1 Non implementation is due to cost (expensive)?		0	7 (35)	8 (40)	5 (25)	0
3.2 Non implementation is due to the complex nature of ERP systems?		0	3 (15)	12 (60)	5 (25)	0
3.3 Non implementation is due to time (time consuming/takes a long time to implement)?		0	4 (19)	10 (48)	6 (28)	1 (5)
3.4 There is lack /no support from top management?		0	6 (30)	12 (60)	2 (10)	0
3.5 No proper training has been provided for internal staff.		0	5 (26)	11 (58)	3 (16)	0

Table 4.11: ERP Non-Implementation

62
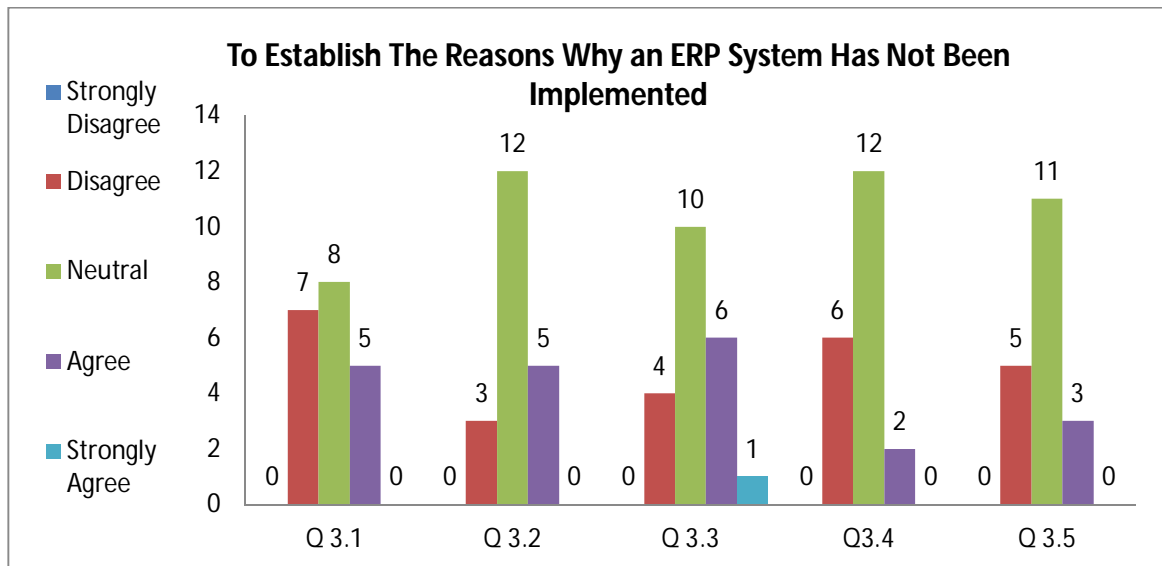
Figure 4.10: ERP Non-Implementation

In this objective respondents had to identify reasons for non-installation of ERP systems. Only those respondents that have not begun implementation of an ERP system answered this section as their last question for the study while the remaining respondents were implemented ERP systems moved onto the next objectives.

Question 3.1 asked if the non-installation was due to high costs (Moohebat et al., 2010). Five (25%) of the respondents agreed and seven (35%) disagreed while 8 (40%) remained neutral. The next question 3.2 required respondents to indicate whether non-implementation was due to the complex nature of ERP systems. Five (25%) of the respondents agreed, while 3 (15%) disagreed and, 12 (60%) of the respondents remained neutral. Question 3.3 asked the respondents to indicate if non-implementation was due to time (time consuming/takes a long time to implement). Seven (33%) of the respondents agreed that non-implementation was due to long timelines, while 4 (19%) disagreed, and the other 10 remained neutral. Question 3.4 confirmed if there was a lack of support from top management. Two (10%) respondents agreed while 6 (30%) disagreed and twelve (60%) of the respondents remained neutral. Question 3.5 checked if any proper training had been provided for internal staff. Three (16%) of the respondents agreed that there was no proper training of internal staff with regards to ERP systems while 5 disagreed and the remaining 11 (58%) were neutral. This section indicated high response rates for neutral answers.

63

4.5.4 OBJECTIVE 4: To Establish Current Implementation Status of the ERP System

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
4.1 Has the ERP system been fully installed in the company?	0	1 (6)	1 (6)	13 (82)	1 (6)
4.2 Is it a phased implementation?	3 (19)	6 (38)	2 (12)	5 (31)	0
4.3 Is it operational?	0	0	0	15 (83)	1 (6)
4.4 Most employees have been trained in the usage of the ERP systems?	0	1 (6)	1 (6)	14 (88)	0
4.5 Most key employees were included in the ERP selection committee	0	3 (20)	3 (20)	9 (60)	0
4.6 The methods used for the ERP selection process have proven to be correct and has posed fewer challenges during the implementation process?	0	2 (13)	5 (31)	9 (56)	0
4.7 The implementation process was completed within the scheduled timelines or if currently still being installed, the installation is still within scheduled timelines?	0	3 (19)	5 (31)	8 (50)	0
4.8 The implementation process was completed within the planned financial budget or if currently still being installed, the installation is still within budget?	0)	1 (6)	7 (44)	8 (50)	0

Table 4.12: Level of Implementation

In this objective respondents had to identify the status of their installation of ERP systems. This question was only posed to respondents that have an ERP system implemented or are currently implementing.

64

To Establish the current level of implement of ERP.

Legend: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree

	Q 4.1	Q 4.2	Q 4.3	Q 4.4	Q 4.5	Q 4.6	Q 4.7	Q 4.8
Strongly Disagree	0	3	0	0	0	0	0	0
Disagree	1	6	0	1	3	2	3	1
Neutral	1	2	0	1	3	5	5	7
Agree	13	5	15	14	9	9	8	8
Strongly Agree	1	0	1	0	0	0	0	0

Figure 4.11: Level of Implementation

The next objective intended to establish the current level of ERP implementation of the companies under investigation. Question 4.1 sought to establish if the ERP system was fully installed in the company. Fourteen (88%) of the respondents agreed that an ERP system was fully installed in their companies. This number could include both respondents who knew the systems have been installed but were unfamiliar with how they worked. Two (6%) of the respondents disagreed, while 2 (6%) remained neutral. Question 4.2 checked if the implementation was a phased approach, which five (31%) of the respondents agreed, nine (57%) disagreed while 2 (12%) remained neutral. The next question 4.3 asked if the current ERP system was operational. All sixteen (89%) of the respondents agreed that the current ERP system was operational. Question 4.4 checked if most employees have been trained in the usage of ERP system. Fourteen (88%) of the respondents agreed that most employees had been trained in the ERP system usage. One of the respondents disagreed while the other (6%) remained neutral. Question 4.5 asked if key employees were included in the ERP selection committee. Nine (60%) of the respondents agreed that their key employees were included while 3 of the respondents disagreed and the remaining 3 (20%) were neutral. Question 4.6 asked if the methods used for the ERP selection process had proven to be correct and has

65

posed fewer challenges during the implementation process. Nine (56%) of the respondents agreed that the methods used for ERP selection process had proven to be correct and there were fewer challenges experienced during the implementation process. Two (13%) of the respondents disagreed while 5 (31%) remained neutral. Question 4.7 under this objective checked if the implementation process was completed within the scheduled timelines or if currently still being installed, is the installation still within scheduled timelines. Eight (50%) of the respondents agreed that the implementation process was done within the scheduled timelines, while 3 (19%) disagreed with this and five (31%) remained neutral. The final question 4.8 in this section checked if the implementation process was completed within the planned financial budget or if it was currently still being installed, the installation was still within budget. Eight (50%) of the respondents agreed that that the implementation process was completed within the planned financial budget while one (6%) of the respondents disagreed, and seven (44%) remained neutral in this question.

4.5.5   OBJECTIVE 5: To Assess the Perceived Benefits of Implementation

In this objective, respondents were required to assess the perceived benefits of their ERP system installation. This question was only posed to respondents that have an ERP system implemented or are currently implementing.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5.1 in your opinion has the new system resulted in greater efficiencies administratively?	0	1 (7)	1 (7)	13 (86)	0
5.2 The new ERP system has improved service delivery by fast-tracking processes?	0	2 (13)	3 (19)	10 (63)	0
5.3 The new ERP system has improved information networking across users substantially?	0	0	5 (31)	11 (69)	0

Table 4.13: Perceived Benefits
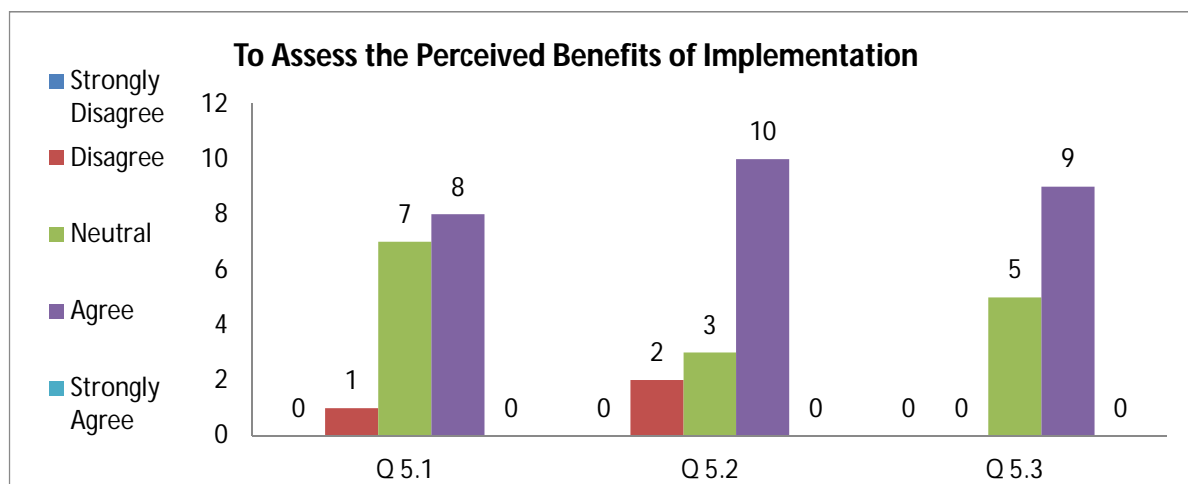
Figure 4.12: Perceived Benefits

The next objective assessed the perceived benefits of ERP system implementation. Question 5.1 assessed whether the new system resulted in greater efficiencies administratively. Thirteen (86%) companies agreed that it had improved their efficiencies while one respondent (7%) disagreed and the other one (7%) was neutral. Question 5.2 asked if the new system improved service delivery by fast-tracking processes. Ten (63%) of the respondents agreed with the fast-tracking improvement and two (13%) disagreed while 3 (19%) remained neutral. The last question 5.3 checked if the new system had improved the information networking across all users substantially. Eleven (69%) of the respondents agreed and the remaining five respondents (31%) were neutral.

4.5.6 OBJECTIVE 6: To Investigate the Success of ERP Implementation

The aim of this objective was to investigate the success of implementation of the ERP system. This question was only posed to respondents that have an ERP system implemented or are currently implementing.
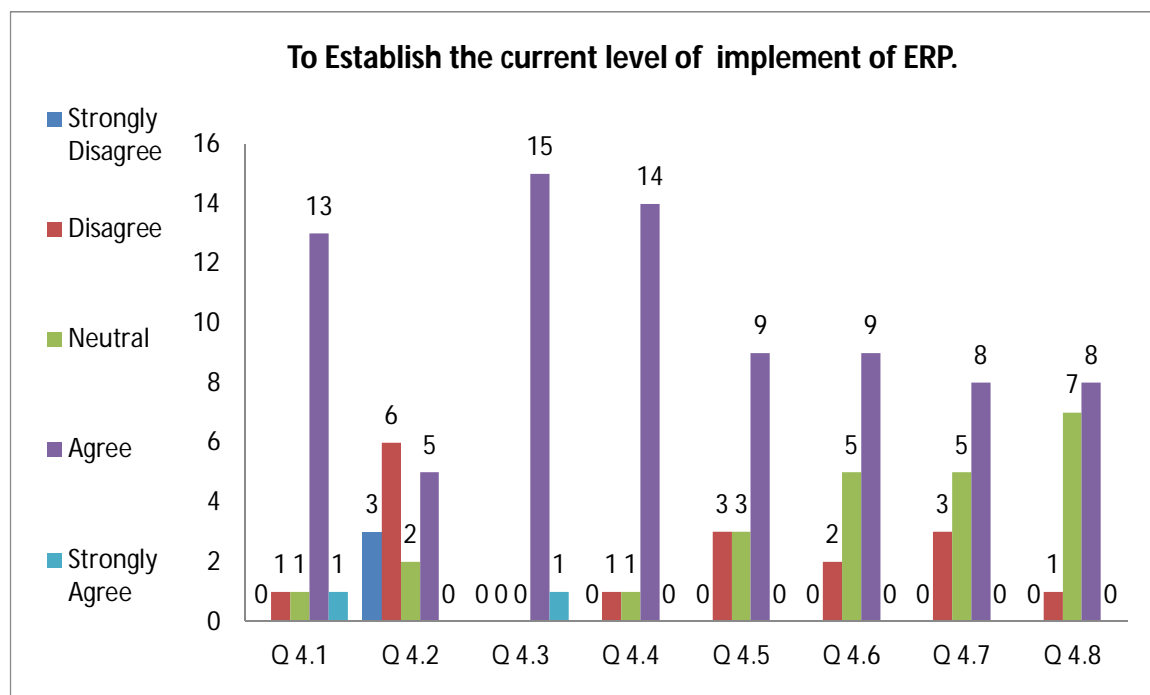
67

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
6.1 The system is fully integratable and has created fewer challenges	0	0	5 (31)	11 (69)	0
6.2 The change management process was seamless and employees adapted easily	0	1 (6)	4 (25)	11 (69)	0
6.3 Implementation downtime was minimal and recovered with new ERP processes	0	0	6 (38)	9 (56)	1 (6)
6.4 Training that has been provided for internal staff has been successful	0	0	3 (18)	14 (82)	0
6.5 The selected ERP team has been composed of most appropriate people in the organization such as consultants and internal staff which includes top management	0	0	3 (18)	13 (81)	0
6.6 Organisational diversity (departmental differences) has been considered in the implementation process of ERP systems	0	1 (6)	3 (19)	12 (75)	0

Table 4.14: Success Factors
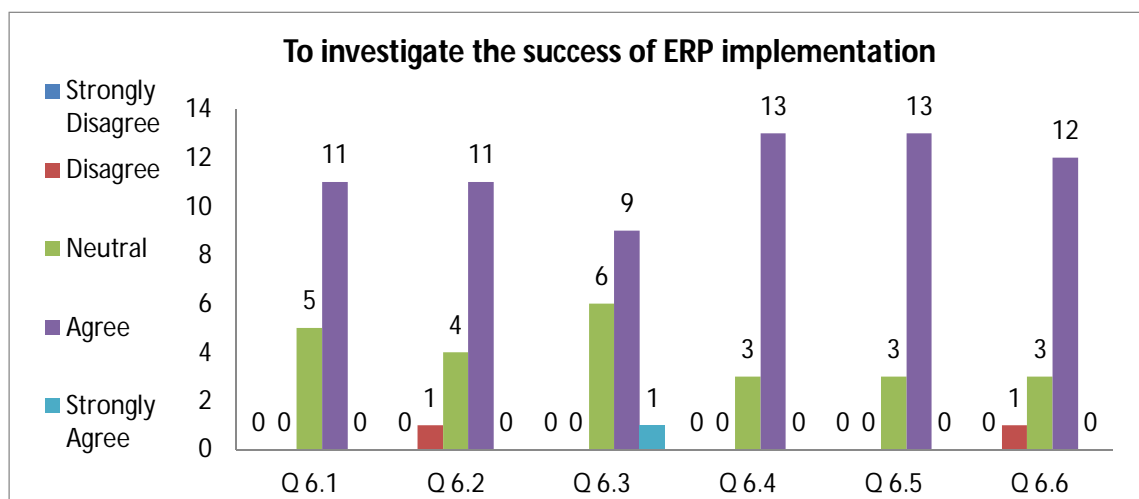
Figure 4.13: Success Factors

The aim of this question was to investigate the success post implementation of the ERP system. Question 6.1 checked if the system is fully integratable and has created fewer challenges. Eleven (69%) of the respondents agreed that the ERP system was fully integratable and had created fewer challenges while 5 (31%) of respondents remained neutral in this question. Question 6.2 asked respondents to indicate if the change management process had been seamless and employees adapted easily. Eleven (69%) of the respondents agreed that the management process had been seamless and that the employees adapted easily. One (6%) of

68

respondents, however, disagreed while 4 respondents (25%) remained neutral. Question 6.3 asked the respondents to indicate if the implementation downtime was minimal and recovered with new ERP processes. Ten (62%) of the respondents agreed that the implementation downtime was minimal and recovered with new ERP processes while 6 (38%) respondents remained neutral. Question 6.4 checked if training that had been provided for internal staff had been successful. Fourteen (82%) of the respondents agreed that the training provided for staff proved successful while three 3 (18%) of the respondents remained neutral. Question 6.5 asked the respondents to indicate if the selected ERP team had been composed of most appropriate people in the organization such as consultants, internal staff and top management. Thirteen (81%) of the respondents agreed while three (18%) remained neutral. Question 6.6 checked if organisational diversity (departmental differences) had been considered in the implementation process of ERP process. Twelve (75%) of the respondents agreed that organisational diversity had been considered in the implementation process while three (19%) were neutral and the remaining one (6%) respondent disagreed.

4.6 Cross Tabulations

We further analyse the research data by cross tabulating specific questions and responses to obtain more outcomes to the research. We investigate company size versus the results of the following objectives,

- To establish the reasons why an ERP system has not been implemented;

- To establish the current level of implementation of the ERP system;

- To assess the perceived benefits of implementation;

- To investigate the success of implementation of the ERP system.

We also investigate employment position against the following objectives,

- To establish the reasons why an ERP system has not been implemented;

- To assess the perceived benefits of implementation.

In the questionnaire under the Demographics section, twelve 'no responses' were received to question 1.4 which requested information on the company annual turnover. These responses provide a limitation to the study as we cannot not use the

69

information from this question to cross tabulate against other responses in the research as it will be invalid or inconsistent. Based on the above, this cross tabulation assessment of the research to establish the status of implementation of ERP amongst the consulting engineering SMME sector will be based on Company size (question 1.3) of the demographics section instead of company turnover.

4.6.1 Company Size and Implementation

In this section we will investigate the company size of the different categories against the reasons for non-implementation. The sample for this section is 20 respondents. Respondents that answered this section were not required to continue further with the survey. No macro companies existed in this section.

		Q4.1 - NON IMPLEMENTATION IS DUE TO COST					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	2	0	0	**2**
	5-19 (Very Small)	0	3	3	4	0	**10**
	20-49 (Small)	0	3	2	1	0	**6**
	50-199(Medium)	0	1	1	0	0	**2**
	200+ (Macro)	0	0	0	0	0	**0**
	Total	**0**	**7**	**8**	**5**	**0**	**20**

Table 4.15: Non Implementation

Table 4.15 indicates that both micro companies provided a neutral response. Three the very small companies either disagreed or remained neutral while four of the companies agreed. Three of the small companies disagreed while two remained neutral one respondent agreed. Of the two medium companies, 1 disagreed and the other remained neutral. Eight neutral replies provided the highest overall response.

		Q4.2 - NON IMPLEMENTATION IS DUE TO THE COMPLEX NATURE OF ERP SYSTEMS					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	2	0	0	**2**
	5-19 (Very Small)	0	2	5	3	0	**10**
	20-49 (Small)	0	1	3	2	0	**6**
	50-199(Medium)	0	0	2	0	0	**2**
	200+ (Macro)	0	0	0	0	0	**0**
	Total	**0**	**3**	**12**	**5**	**0**	**20**

Table 4.16: Non Implementation due to complex nature

70

Table 4.16 indicates that both micro companies provided a neutral response. The majority of the very small companies remained neutral while two of the companies disagreed and the remaining three agreed. One of the small companies disagreed while 3 were neutral and the other 2 agreed. Both medium companies remained neutral. Neutral replies were the highest overall response.

	Q4.3 - NON IMPLEMENTATION IS DUE TO TIME					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	2	0	0	**2**
	5-19 (Very Small)	0	3	3	4	0	**10**
	20-49 (Small)	0	1	3	2	1	**7**
	50-199(Medium)	0	0	2	0	0	**2**
	200+ (Macro)	0	0	0	0	0	**0**
	Total	**0**	**4**	**10**	**6**	**1**	**21**

Table 4.17: Non Implementation due to time

Table 4.17 indicates that both micro companies provided a neutral response. The majority of the very small companies either disagreed or remained neutral while four of the companies agreed. One of the small companies disagreed while three were neutral and the other two agreed. Of the two medium companies, both remained neutral. Ten neutral replies were the highest overall response.

	Q4.4 - THERE IS A LACK/NO SUPPORT FROM TOP MANAGEMENT					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	2	0	0	**2**
	5-19 (Very Small)	0	5	3	2	0	**10**
	20-49 (Small)	0	1	5	0	0	**6**
	50-199(Medium)	0	0	2	0	0	**2**
	200+ (Macro)	0	0	0	0	0	**0**
	Total	**0**	**6**	**12**	**2**	**0**	**20**

Table 4.18: Lack or no support from Top Management

Table 4.18 indicates that both micro companies provided a neutral response. The majority of the very small companies disagreed while three were neutral and the remaining two companies agreed. Majority of the small companies remained neutral while one company disagreed. Of the 2 medium companies, both remained neutral. Twelve neutral replies were the highest overall response.

71

4.6.2 Company Size and Level of Implementation

In this section we will investigate the company size of the different categories against the level of implementation of the ERP system. Respondents that answered this section were required to continue further with the survey. No micro companies existed in this section. The sample for this section is 16 respondents.

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
	Q5.1 - HAS THE ERP SYSTEM BEEN FULLY INSTALLED IN THE COMPANY						
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	1	0	3	0	**4**
	20-49 (Small)	0	0	1	4	0	**5**
	50-199(Medium)	0	0	0	4	1	**5**
	200+ (Macro)	0	0	0	2	0	**2**
	Total	**0**	**1**	**1**	**13**	**1**	**16**

Table 4.19: ERP Installation

Table 4.19 indicates that one of the very small companies disagreed while three agreed. Majority of the small companies agreed while 1 of the small companies remained neutral. All of the 5 medium companies agreed. The 2 macro companies also agreed. Thirteen agreements were the highest overall response.

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
	Q5.2 - IS IT A PHASED IMPLEMENTATION						
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	2	1	0	1	0	**4**
	20-49 (Small)	1	1	1	2	0	**5**
	50-199(Medium)	0	3	1	1	0	**5**
	200+ (Macro)	0	1	0	1	0	**2**
	Total	**3**	**6**	**2**	**5**	**0**	**16**

Table 4.20: Phased Implementation

Table 4.20 indicates that three of the very small companies disagreed and one agreed. Two of the small companies disagreed while one of the small companies remained neutral and the other two agreed. Three medium companies disagreed while one agreed and the other remained neutral. One macro company agreed while the other disagreed. This question produced six disagreements as the highest overall response.

72

	Q5.3 - IS IT OPERATIONAL					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	0	0	4	0	**4**
	20-49 (Small)	0	0	0	5	0	**5**
	50-199(Medium)	0	0	0	4	1	**5**
	200+ (Macro)	0	0	0	2	0	**2**
	Total	**0**	**0**	**0**	**15**	**1**	**16**

Table 4.21: ERP Operations

Table 4.21 indicates that all four of the very small companies agreed. Five of the small companies agreed while none remained neutral or disagreed. No medium companies disagreed, 5 agreed and none remained neutral. Both macro companies agreed. This question produced 16 agreements as the highest overall response.

	Q5.4 - MOST EMPLOYEES HAVE BEEN TRAINED IN THE USAGE OF THE ERP SYSTEM					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	0	0	4	0	**4**
	20-49 (Small)	0	1	0	4	0	**5**
	50-199(Medium)	0	0	1	4	0	**5**
	200+ (Macro)	0	0	0	2	0	**2**
	Total	**0**	**1**	**1**	**14**	**0**	**16**

Table 4.22: ERP Employee Training

Table 4.22 indicates that none of the very small companies were neutral or disagreed while four agreed. One of the small companies disagreed and none remained neutral while the other four agreed. No medium companies disagreed, four agreed and one remained neutral. Both macro companies agreed. This question produced 14 agreements as the highest overall response.

	Q5.5 - MOST EMPLOYEES HAVE BEEN INCLUDE IN THE ERP SELECTION COMMITTEE					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	2	0	2	0	**4**
	20-49 (Small)	0	0	1	4	0	**5**
	50-199(Medium)	0	0	2	2	0	**4**
	200+ (Macro)	0	1	0	1	0	**2**
	Total	**0**	**3**	**3**	**9**	**0**	**15**

Table 4.23: ERP Selection Committee

73

Table 4.23 indicates that two of the very small companies disagreed and two agreed. None of the small companies disagreed and one remained neutral while the other four agreed. No medium companies disagreed, agreed and two remained neutral. One macro company agreed while the other disagreed. This question produced nine agreements as the highest overall response.

Q5.6 - ERP SELECTION PROCESS PROVEN TO BE CORRECT AND POSED FEWER CHALLENGES							
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	1	0	3	0	**4**
	20-49 (Small)	0	0	1	4	0	**5**
	50-199(Medium)	0	0	4	1	0	**5**
	200+ (Macro)	0	1	0	1	0	**2**
	Total	**0**	**2**	**5**	**9**	**0**	**16**

Table 4.24: ERP Selection Process

Table 4.24 indicates that one of the very small companies disagreed while three agreed. None of the small companies disagreed while one of the small companies remained neutral and the other four agreed. No medium companies disagreed, one agreed and four remained neutral. One macro company agreed while the other disagreed. This question produced 9 agreements as the highest overall response.

Q5.8 - IMPLEMENTATION PROCESS WAS COMPLETED WITHIN PLANNED FINANCIAL BUDGETS							
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	1	1	2	0	**4**
	20-49 (Small)	0	0	2	3	0	**5**
	50-199(Medium)	0	0	3	2	0	**5**
	200+ (Macro)	0	0	1	1	0	**2**
	Total	**0**	**1**	**7**	**8**	**0**	**16**

Table 4.25: ERP Implementation Process

Table 4.25 indicates that one of the very small companies disagreed and two agreed while the other remained neutral. None of the small companies disagreed while two of the small companies remained neutral and the other three agreed. No medium companies disagreed, two agreed and three remained neutral. One macro company

74

agreed while the other remained neutral. This question produced eight agreements as the highest overall response.

4.6.3 Company Size and the Perceived Benefits of Implementation

In this section company size was investigated against the perceived benefits of ERP implementation. No micro companies existed in this section. The sample for this question is 16 respondents. A non-responsive submission was received by 1 of the respondents.

		Q6.1 -HAS THE NEW SYSTEM PROVIDED GREATER EFFICIENCIES ADMINISTRATIVELY					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	0	0	4	0	**4**
	20-49 (Small)	0	1	0	4	0	**5**
	50-199(Medium)	0	0	0	4	0	**4**
	200+ (Macro)	0	0	1	1	0	**2**
	Total	**0**	**1**	**1**	**13**	**0**	**15**

Table 4.26: ERP Implementation Efficiencies

Table 4.26 indicates that none of the very small companies disagreed and four agreed. One of the small companies disagreed while none remained neutral and the other four agreed. No medium companies disagreed and four agreed. One macro company agreed while the other disagreed. This question produced thirteen agreements as the highest overall response.

		Q6.2 -HAS THE NEW SYSTEM IMPROVED SERVICE DELIVERY DATES					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	0	1	3	0	**4**
	20-49 (Small)	0	1	1	3	0	**5**
	50-199(Medium)	0	0	1	3	0	**4**
	200+ (Macro)	0	1	0	1	0	**2**
	Total	**0**	**2**	**3**	**10**	**0**	**15**

Table 4.27: ERP Implementation Service Delivery

Table 4.27 indicates that none of the very small companies disagreed while three agreed and one remained neutral. One of the small companies disagreed while one remained neutral and the other three agreed. No medium companies disagreed, three agreed and one remained neutral. One macro company agreed while the other remained neutral. This question produced ten agreements as the highest overall response.

		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
	Q6.3 -HAS THE NEW SYSTEM IMPROVED INFORMATION NETWORKING						
Q1.3 COMPANY SIZE	< 5 (Micro)	0	0	0	0	0	**0**
	5-19 (Very Small)	0	0	0	4	0	**4**
	20-49 (Small)	0	0	2	3	0	**5**
	50-199(Medium)	0	0	2	2	0	**4**
	200+ (Macro)	0	0	1	1	0	**2**
	Total	**0**	**0**	**5**	**10**	**0**	**15**

Table 4.28: ERP Implementation Information Network

Table 4.28 indicates that none of the very small companies disagreed or remained neutral while four agreed. No disagreement responses were received from the small companies and three of the small companies agreed and two remained neutral. No medium companies disagreed, two agreed and two remained neutral. One macro company agreed while the other remained neutral. This question produced ten agreements as the highest overall response.

4.6.4 Employment and Implementation

In this section we will investigate the employment position of the different categories against the reasons for non-implementation. The sample for this section is 21 respondents. Respondents that answered this section were not required to continue further with the survey. No macro companies existed in this section.

76

	Q4.1 - NON IMPLEMENTATION IS DUE TO COST					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	6	6	3	0	**15**
	Manager	0	0	0	0	0	**0**
	Team Leader	0	0	0	0	0	**0**
	IT Employee	0	0	0	0	0	**0**
	Other	0	1	2	2	0	**5**
	Total	**0**	**7**	**8**	**5**	**0**	**20**

Table 4.29: Non Implementation due to cost

Table 4.29 indicates that six of the directors disagreed while six agreed and three remained neutral. Managers, Team leaders and IT specialists did not provide any response to this question. 'Other' employees were represented by associates, senior engineers, principals and engineers. One respondent agreed, two disagreed and the other remained neutral. This question produced seven neutral indications as the highest overall response.

	Q4.2 - NON IMPLEMENTATION IS DUE TO THE COMPLEX NATURE OF ERP SYSTEMS					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	2	9	4	0	**15**
	Manager	0	0	0	0	0	**0**
	Team Leader	0	0	0	0	0	**0**
	IT Employee	0	0	0	0	0	**0**
	Other	0	1	3	1	0	**5**
	Total	**0**	**3**	**12**	**5**	**0**	**20**

Table 4.30: Non Implementation due to complex nature

Table 4.30 indicates that two of the directors disagreed while four agreed and nine remained neutral. Managers, Team leaders and IT did not provide any response to this question. One 'Other' respondent disagreed, one agreed while three remained neutral. This question produced twelve neutral indications as the highest overall response.

	Q4.3 - NON IMPLEMENTATION IS DUE TO TIME					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	3	7	5	1	**16**
	Manager	0	0	0	0	0	**0**
	Team Leader	0	0	0	0	0	**0**
	IT Employee	0	0	0	0	0	**0**
	Other	0	1	3	1	0	**5**
	Total	**0**	**4**	**10**	**6**	**1**	**21**

Table 4.31: Non Implementation due to time

Table 4.31 indicates that three of the directors disagreed while six agreed and seven remained neutral. Managers, Team leaders and IT did not provide any response to this question. One 'Other' respondent disagreed, one agreed while three remained neutral. This question produced ten neutral indications as the highest overall response.

	Q4.4 - THERE IS A LACK OR NO SUPPORT FROM TOP MANAGEMENT					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	6	9	0	0	**15**
	Manager	0	0	0	0	0	**0**
	Team Leader	0	0	0	0	0	**0**
	IT Employee	0	0	0	0	0	**0**
	Other	0	0	3	2	0	**5**
	Total	**0**	**6**	**12**	**2**	**0**	**20**

Table 4.32: Non Implementation due to lack or no support

Table 4.32 indicates that six of the directors disagreed while none agreed and nine remained neutral. Managers, Team leaders and IT did not provide any response to this question. No 'other' respondents disagreed, two agreed while three remained neutral. This question produced twelve neutral indications as the highest overall response.

You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)

4.6.5 Employment and Benefits of Implementation

In this section we will investigate the employment position of the different categories against the perceived benefits of implementation. The sample for this section is 21 respondents. Respondents that answered this section were required to continue with the remainder of the survey.

	Q6.1 -HAS THE NEW SYSTEM PROVIDED GREATER EFFICIENCIES ADMINISTRATIVELY						
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	1	1	5	0	**7**
	Manager	0	0	0	4	0	**4**
	Team Leader	0	0	0	1	0	**1**
	IT Employee	0	0	0	0	0	**0**
	Other	0	0	0	3	0	**3**
	Total	**0**	**1**	**1**	**13**	**0**	**15**

Table 4.33: Greater Efficiencies Administratively

Table 4.33 indicates that one of the directors disagreed while five agreed and one remained neutral. Four Managers agreed, one team leader agreed and IT did not provide any response to this question. No other respondents disagreed, three agreed while none remained neutral. This question produced thirteen agreements as the highest overall response.

	Q6.2 -HAS THE NEW SYSTEM IMPROVED SERVICE DELIVERY DATES						
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	1	1	5	0	**7**
	Manager	0	0	1	3	0	**4**
	Team Leader	0	0	1	0	0	**1**
	IT Employee	0	0	0	0	0	**0**
	Other	0	1	0	2	0	**3**
	Total	**0**	**2**	**3**	**10**	**0**	**15**

Table 4.34: Improved Delivery Dates

Table 4.34 indicates that one of the directors disagreed while five agreed and one remained neutral. Three managers agreed and one remained neutral, one team leader remained neutral and IT did not provide any response to this question. One 'Other' respondent disagreed, two agreed while none remained neutral. This question produced ten agreements as the highest overall response.

79

		Q6.3 -HAS THE NEW SYSTEM IMPROVED INFORMATION NETWORKING					
		S. Disagree	Disagree	Neutral	Agree	S. Agree	Total
Q1.7 EMPLOYMENT POSITION	**Director**	0	0	2	5	0	**7**
	Manager	0	0	2	2	0	**4**
	Team Leader	0	0	1	0	0	**1**
	IT Employee	0	0	0	0	0	**0**
	Other	0	0	0	3	0	**3**
	Total	**0**	**0**	**5**	**10**	**0**	**15**

Table 4.35: Improved Networking Information

Table 4.35 indicates that none of the directors disagreed while five agreed and two remained neutral. Two managers agreed and two remained neutral, one team leader remained neutral and IT did not provide any response to this question. Three 'other' respondents disagreed. This question produced ten agreements as the highest overall response.

4.7 Summary

This chapter presented data that was obtained in the surveys. The data was presented following the questionnaire design with the aid of descriptive statistics. Tables and bar graphs were utilised to illustrate the findings. The next chapter will interpret the data presented in this chapter.

CHAPTER 5
DISCUSSION OF RESULTS

5.1 Introduction

The previous chapter presented data that was obtained in the surveys. It presented as per questionnaire design with the aid of descriptive statistics. Tables and bar graphs were utilised to illustrate the findings. The current chapter aims to examine and give explanation to the data obtained in the survey.

Questionnaires were administered to 84 companies electronically after informed consents had been provided by the companies under investigation. It was identified that a substantial number of respondents chose not to answer the question regarding company turnover. This has a significant impact on the fundamental question of the study which seeks to investigate the status of implementation of ERP systems in SMME consulting engineering sector. It was then concluded that an accurate inference could not be made in this regard and instead, the analysis of the study was based only on company size instead of company size and company turnover.

The discussion of data again in this chapter does not follow the order of the questionnaire that was used for the study. The discussion is divided into demographic information incorporating gender, age of respondents, race, employment position, company size, company turnover, consulting discipline and professional registration. The second part of the discussion incorporates the 6 study objectives which examine ERP systems usage, awareness, implementation, non-implementation, challenges / benefits and success factors experienced by firms investigated in the study. The results from the questionnaires were cross-tabulated to the literature as discussed in Chapter 2 to determine if a correlation exists or not between the current study and previous studies.

5.2 Reliability

Cronbach's alpha provides an effective tool to verify the reliability of a set of tests/questions taken (Sekaran & Bougie, 2010). The Alpha coefficient ranges in value from 0 to 1 and can be used to describe the reliability of multi-point formatted questionnaires or scales (rating scale: 1 = poor, 5 = excellent) (Sekaran & Bougie, 2010). It is generally accepted that an alpha value of above 0.7 indicates a reasonable level of reliability. Cronbach's alpha is therefore a measure of internal consistency, i.e. how closely related a set of questions are as a group. A high alpha value (> 0.7) may therefore be used to form part of other substantive arguments and statistical measures as evidence that the specific set of questions measure a primary hypothesis (Saunders et al., 2012). It must also be noted that Cronbach's alpha is technically not a statistical test, but rather a coefficient of reliability or consistency in a set of questions.

k	∑ var	var	Cronb α
35	15.57	102.6951	0.873317

Figure 5.1: Cronbach Alpha

Figure 5.1 notes that a 0.87 value is recorded for this study which then confirms the research exceeds the accepted minimum norm of a 0.7 significance value (Sekaran & Bougie, 2009).

5.3 Demographic Information

This section discusses the demographic data associated with ERP systems implementation, challenges as well as benefits experienced by SMME's in the Engineering sector. The section, therefore, discusses issues such as gender, age, race, employment positions, company size, company turnover, consulting disciplines, and registration. Demographic data possesses essential information highly regarded in the understanding of the respondents' background, as well as, their different responding patterns.

The researcher depended on prior knowledge about the respondents in order to carefully select them. This would enable him to construct data relevant for this study. As has been stated before, the Directory of Consulting Engineers of South Africa

was used to select the first person listed under each company. The researcher used Consulting Engineers South Africa (CESA) firm directory for Durban companies which form part of this association and are registered with the body and meet the CESA criteria for a responsible service provider that complies with the regulations of the country. The listed person could be a male or female. The researcher would phone the person and ask him/her if he could participate in the research. If that person could not due to lack of specific knowledge that would benefit the study, he/she would be asked to provide the researcher with a partner or someone in a senior position who could have the relevant information. The presented data in the table regarding gender of respondents, therefore, depended on who was available to partake in the research.

With regards to gender, as was noted in Chapter 4, 97% of the respondents were male compared to only 8% which were female. The research suggests there is an increase in females being employed or promoted to senior positions within the sector compared to the past of a generally more male oriented industry. Results from age question indicate that 22 (59%) of the respondents were middle aged (ranging from 40 to 59 years of age). The perceived interpretation implies that the focus area is dominated by the middle-aged workgroup in management levels as compared to younger and older generation. This middle-aged majority is good for the industry as the sharing of knowledge and opportunities are being passed down as noted from the low response rate (3) of the 60+ age group.

A question about race or ethnicity is one of the more serious questions that could be asked in research, however, the question in this study was asked for demographic purposes only. The results show a low number of Black and Coloured respondents, while eighteen (18) were White and fifteen (15) Indian. This suggests that the White and Indian communities are dominant in the engineering sector at higher level positions compared to Coloured and Black communities, however, this is a perceived observation as there are generally multiple directors/partners and other senior positions in most engineering organisations. The partner/contact person that was chosen to participate in the questionnaire was obtained from the CESA directory that formed the basis for the study sample. If there was no response by the nominated

83

person within the prescribed date, then a telephone survey was initiated. After two attempts to contact the designated contact, an alternate person was then chosen from the company for the study.

The question regarding employment position would assist the researcher in the analysis of data which sometimes requires clarification in terms of the degree to which all stakeholders are involved in the ERP implementation process. The results from the previous chapter, reflect that 25 (68%) of the employees held senior positions such as Directors or Partners, while four (4) were managers, one (1) Team Leader, and seven (7) respondents held "other" positions. The "other" position consisted of engineering principals, lead engineers/technologists, senior or junior engineers and associates. The fact that most respondents held senior positions is beneficial to the research as they can offer more reliable and accurate information based on their involvement and the implementation process. Even though information from senior respondents has a high regard in this study, it should be noted that information from individuals on lower positions also played a significant role in this study since they provided information on issues such as, familiarity with ERP systems, on-the-job training provided to employees, as well as, involvement on the systems' selection criteria. This group of employees play a major role as they are the ones expected to use the ERP systems to the benefit of the company. Failure to involve or train them could result in the systems' failure.

The company size/turnover question required respondents to identify themselves in terms of number of employees and company turnover for the local branch only if multiple branches of the firm exist. This criterion was essential as SMMEs can easily be identified by the number of employees and annual turnover. To restate the definition of SMMEs, those companies that have an annual turnover of less than R26 million are known as micro to small and medium enterprises, while those with more than 200 employees and a turnover of R26 million or more are termed macro enterprises. A study by de Jager (2010) investigated if the size of the organization contributed to a successful ERP systems implementation. It was established from de Jager's study that not all the respondents investigated, namely, small, medium, and macro organizations, had experienced a higher rate of success with regards to ERP implementations (de Jager, 2010). The study concluded that size of an organization

84

did not play a role in the successful implementation rate of that organization (de Jager, 2010). It was noted that a successful implementation rate was at 80 percent of small and 89 percent of medium enterprises, in particular. This study found that 24 (65%) of the companies had between 5 and 49 employees, eight (23%) had 50 to 199 employees, while 2 companies each had less than 5 employees and more than 200 employees respectively. The results from the study concur that size of a company is not directly related with a successful implementation rate since many of the companies under investigation, regardless of size, had already implemented ERP systems. This also correlated with studies by Moohebat et al (2010) and de Jager (2010) which indicated high implementation success rate of ERP systems implementation in spite of a high failure rate of implementation.

Small, Medium and Macro enterprises are identifiable through their annual turnover and company size as described above. Enterprises that earn less than R0.2 million per annum are classified as micro enterprises, while companies earning up to R3 million annual turnover are classified as very small businesses. Enterprises earning between R3 to R6 million are known as small organisations and the last band of SMME's are defined as medium sized organisations which generate a turnover of between R6 and R26 million per annum. Enterprises earning more than R26 million are classified as macro enterprises. As observed from results in the previous chapter, amongst the 37 companies investigated only 1 (3%) company had an annual turnover of less than R3 million, and 5 firms (13%) had an annual turnover ranging from R3 to R6 million. Nine (24%) companies had a turnover of more than R26 million. Accordingly, this indicates that these companies were macro enterprises. The remaining (12) 32% companies did not offer their responses with regards to their annual turnover. It was not identified why there was no response on this matter from these companies since the study was more quantitative than qualitative and did not allow any open-ended responses. The perceived reasons for this could be fear that revealing such information could possibly end up in the hands of SARS and would bind the organisations to tax laws which govern macro companies. Our tax laws apply different taxation rules to the various size of companies registered, some of the companies in the study could possibly have avoided revealing their annual turnover as that could affect their current taxation

85

status if they are investigated. The second possible reason could be fear that their competitors may improve market share if they knew their turnover hence it is regarded as confidential. On a very basic level, however, it is likely that some companies simply did not want to reveal information that would compromise their privacy in any way. Nonetheless, the poor response rate to this question places a limitation on the study as it cannot be accurately established how many of the 12 respondents SMME's are. It was therefore decided that in order to answer the main research question, company turnover will not be used as the basis to confirm the SMME status of the companies investigated. Only company size will be used to confirm representation by SMME's.

This question on disciplines required companies to identify themselves according to consulting engineering disciplines for easier identification and analysis. Results from the previous chapter identified 23 (62%) of the companies constituted of Civil or Structural Engineers. Five companies were mechanical or electrical engineers and the remaining nine companies investigated companies constituted of multi-disciplinary organisations. Based on the list of eighty four (84) registered companies in the CESA directory that were used for the study, sixty six (79%) represented the civil/structural companies. Of the 37 companies that responded to the study, twenty three (62%) were civil/structural companies which indicates there was a good representation by the company discipline that forms the majority of the consulting engineering sector.

The question on professional registration was asked because companies are legal entities and professional registration provides them with rights, benefits, authorities and limitations. Professional registration is in accordance with South African law that allows an individual to practice their trade within limitations to protect the public. CESA also requires a minimum percentage of professionally registered individuals in the organisation for their affiliation to the organisation. Any company that does not meet these requirements will not have similar rights, benefits, protection that professional bodies like CESA offer to the industry. The results from the survey indicate that 29 (78%) of the respondents were registered under ECSA/SACPCMP, while two (2) respondents were registered with other professional bodies, and 6 from different companies were not registered. The registration results obtained in the

86

study are acceptable as many of the respondents that are not registered could possibly be in the candidate training phase (3 to 4 years) prior to registration or serving in a non-technical role in the company and does not require professional registration for their portfolio.

OBJECTIVES OF STUDY

5.4 OBJECTIVE 1: ESTABLISH THE USAGE OF IT IN THE SECTOR

This objective aimed to establish the usage of IT systems in place in the companies under investigation. ERP systems were not considered at this stage for investigation. The sample for this objective was 37 respondents.

5.4.1 Question 1.1 checked the status of IT systems in the organisations.

All the respondents agreed that there was an IT system in place in their companies Beig et al., 2012). This correlated with two studies, firstly, by Moohebat et al (2010) and Du Plessis (2011) which declared that despite such high failure rate of ERP systems implementation, its market appears to be growing substantially. This means that more companies realize the significance of IT/ERP systems implementation. The results suggest that all companies under investigation have implemented an IT system to some degree and have acknowledged the necessity of IT in the industry.

Secondly, in spite of previous studies which had highlighted huge worldwide ERP systems implementation failure rate (Finny & Corbett, 2007; Markus et al., 2007), a study by de Jager (2010) proved differently with the JSE companies. The current study correlates with findings from de Jager (2010) which indicated a high ERP systems implementation success rate amongst South African organizations that were investigated. It must be noted, however, that his study did not focus on specific definitions and the extent of the IT implementation. It was rather perceived as a general reference to IT system implementation without being too specific.

5.4.2 Question 1.2 investigated if the existing IT system contributed to the growth of production in the companies.

Results indicated that 35 of the respondents agreed that the existing IT system contributed to growth of production within the company. Only two of the respondents remained neutral in this question. The large percentage of respondents indicating growth possibly results from efficient IT systems which have streamlined work processes as suggested by Muscatello et al., (2003), or it may be deduced that respondents have identified the necessity for IT systems and subsequently growth would not be possible without IT infrastructure. Adopting the same rationale, the neutrality of some respondents could be directly as a result of poor IT frameworks or a mind-set that does not place much emphasis on IT systems which would invariably result in a minimal degree of growth being attributed to IT. Neutrality could also be a result of newly introduced systems which have not been fully utilised to date.

5.4.3 Question 1.3 sought to establish from the respondents if the current IT system contributed to the speed of service provided by the firm.

Thirty six (94%) of the respondents agreed that the IT system in place greatly contributed to the speed of service that was provided by the firm. The high positive response meant that companies are already experiencing the benefits from the current IT systems and more so, speed of service is a common benefit associated to IT systems. Speed of service, however, is not necessarily proportional to increase of production in companies. Two of the respondents were neutral, which can be attributed to a newly implemented IT infrastructure which has not reached its full potential in terms of improving efficiency as yet.

5.4.4 Question 1.4 checked if the current IT system had contributed to the quality of products and services in the company.

Thirty three (89%) of the respondents agreed that the quality of their products and service offerings have improved since the implementation of an IT system within their company. This response rate, however, includes those respondents that were unfamiliar with ERP systems. It appears that even though they may not be familiar with ERP systems, they are able to notice their contribution to quality of products and services. This response was anticipated considering the response to the preceding two questions. It is interesting that four respondents decided to remain neutral. It can

be safely inferred that companies are already benefiting from their standard existing IT systems in comparison to manual processes that were only available earlier.

5.4.5 The next question 1.5 asked the respondents to indicate whether the current IT system had contributed to the company competitiveness.

Thirty one (84%) of respondents agreed that the current IT system contributed to the competitiveness of the company. This does not include respondents who were unfamiliar to ERP systems. The number of the respondents that disagreed increased to 2, while the 4 neutral responses remained unchanged. This meant that although most companies have become more competitive through the use of IT systems, which is expected since the majority of respondents had previously indicated that growth, efficiency and quality were improving as a result of IT systems, six (16%) of the companies interviewed have not agreed with the increase in competitiveness. It is perceived that the negative/neutral responses could be due to the underutilisation of the IT infrastructure or a lack of training to maximise the full benefits of the implementation. A poor annual turnover and high implementation costs could also be attributed to the negative results received.

5.4.6 Question 1.6 sought to establish if the current IT system helped reduce operating costs in terms of service delivery.

Twenty seven (73%) of the respondents agreed that the current IT system assisted in reducing operating costs. Four (11%) of the respondents disagreed while the remaining 6 the respondents were on the fence. This was perceived as a positive attribute as lower operating costs means lower capital budgets and/or higher profit margins. This in turn improves the liquidity of the organisation and possibly improves market share.

5.4.7 Question 1.7 asked if the current IT system helped diversify products.

Twenty five (68%) of the respondents agreed that the current IT system assisted in diversifying products. Three disagreed while nine of the respondents remained neutral in this diversity question. It is interesting to note that 25 of the respondents indicated that the introduction of IT has helped them diversify their product offerings

further. Taking into account the limitation of the study in terms company annual turnover, it can then be assumed that almost 95% of the respondents are SMME's and have noted an increase in their product offerings they supply to the industry. This is an extremely difficult and erratic sector to be in, with an exceptionally high failure rate, the diversification of product offerings generally improves their opportunity to increase market share and survival of the organisation. As organisations allow themselves to develop further, there are initial capital costs but the losses are realised as the product offerings start to produce profit. It must be noted, however, that the reason for the lower positive percentage is possibly because diversification is a secondary benefit of IT implementation. Diversification is not a direct result of IT infrastructure but instead, it offers the option of expansion and the offering of more products/services.

5.4.8 The final question 1.8 asked the respondents to indicate if the current IT system assisted in providing more reliable delivery dates.

Thirty four (92%) of the respondents agreed, and three remained neutral in this question. One of the primary needs for an IT system is reduction of production time and more reliable delivery times. The responses indicate that companies were experiencing shorter production times and would therefore be able to deliver goods and services on time, which was essential for organisation sustainability. Software programmes such as Microsoft projects, Primavera, etc. provide good management tools that assist organisations to track costs, project progress, etc. The high positive response rate is not surprising because 97% of respondents had previously indicated that their speed of service had improved. It is logical therefore that as the speed of a service is improved; it is more likely that delivery dates/deadlines become more reliable.

5.4.9 Summary

It may be concluded that results correlated with the research objective in that all respondents were found to have implemented IT systems, The results also indicated that most companies were already benefiting from the implementation in terms of growth of production, speedy delivery dates, quality of products and services,

company competitiveness, reduction of operating costs with regards to product delivery time, product diversity, as well as providing more reliable delivery dates. This greatly correlates with findings in a study by Moohebat et al (2010) which indicated that companies have been compelled to seek ways through which quality can be improved, while keeping costs down within their supply chains, reducing inventories, diversifying products and services, and providing more reliable delivery dates in an improved manner when compared to their rivals.

5.5 OBJECTIVE 2: TO ESTABLISH THE AWARENESS OF ERP SYSTEMS

This objective sought to establish the awareness of ERP systems in the companies under investigation. The sample for this objective was 36 respondents.

5.5.1 Question 3.1 asked if respondents were familiar with ERP.

Studies have indicated that with the introduction of IT and Information Systems (IS), production and service has grown substantially, while the quality of products and competition between companies have also increased (Moohebat et al., 2010). This has prompted companies to seek ways to improve quality, keep costs down within their supply chain, reduce inventories, diversify products and services, and provide more reliable delivery dates in an improved manner when compared to their rivals (Moohebat et al., 2010). The introduction of ERP systems has offered these companies a way to overcome these problems (Moohebat et al., 2010). ERP systems have offered companies a more flexible and productive way of coordinating their business processes as well as integrating these processes in order to focus on efficient management of resources and customer service (Moohebat et al., 2010), most companies either have not implemented it or have experienced problems with the implementation. The survey that was conducted for this study revealed that when companies were asked if they were familiar with ERP systems, 20 of the respondents disagreed. Eleven (11) of the respondents agreed that they were familiar with ERP systems while 6 respondents remained neutral. The large percentage of respondents disagreeing or remaining neutral could also be attributed

to lack of knowledge as in the next question the high rate of installations contradict these responses.

5.5.2 Question 3.2 asked the respondents to indicate if an ERP system had been installed in their companies.

Fifteen (42%) of the respondents agreed that an ERP system had been installed in their company while twenty respondents disagreed that an ERP system had been installed in their companies and one (1) remained neutral in the study. These results reflect that most companies have not yet installed ERP systems which highlight the difference of installation rates between a basic IT infrastructure and comprehensive ERP framework. Some of the possible reasons for non-implementation are explored in the next objective. The two (2) macro companies in this study have implemented ERP systems. Assuming that we use company size as a basis to answer the research question it can be deduced that the current status of implementation in the SMME consulting engineering sector based on this questionnaire only 14 (38%) of the companies in the study have implemented or commenced implementation. The neutral respondent who is also a macro company only realised in the next question that they have an ERP system. The other macro company was the strongly agree respondent. The result of 14 SMME companies concurs with the remainder of the study as the other two (2) companies are macro enterprises but have been included as part of the remaining research questions.

5.5.3 The final Question 3.3 required the respondents to indicate if an ERP system was going to be implemented within the next 5 years.

Eleven (31%) of respondents disagreed that an ERP system was going to be installed in the next 5 years, while thirteen (36%) agreed and twelve of the respondents remained neutral. This indicates that among the twenty companies that do not have an ERP system installed, eleven have indicated they have no current intention to implement within the next 5 years. There remains indecision on the necessity and importance of implementation within the next 5 years for twelve of the respondents, this high rate of neutrality is possibly due to the respondents being unaware of what management is planning for the future or they are unaware of the

92

different levels of ERP systems that exist. ERP implementations vary largely in price according to the client needs, where a basic system could around a hundred thousand rand to an advanced model that cost hundreds of millions or even billions. These respondents could also have indicated a neutral view because they are happy with their current ERP system and do not have any intention to expand the system further over the next few years. The 12 respondents that have agreed could also possibly just be upgrading their system by putting in additional modules to an existing system or it could be a full upgrade from standard IT infrastructure. The negative responses could also imply that there are companies who are still inclined to stick to old fashioned methods of production for reasons best known to them or it is likely that companies who have not yet implemented ERP systems are not fully aware about the benefits of system. Unawareness, uncertainty and negative reviews regarding the ERP concept are also part of the root causes of the non/poor implementation rates. This lack of implementation poses problems for the industry when a number of companies do not implement, as this slows down the SA engineering sector technological advances in comparison to similar markets in the world.

5.5.4 Summary

Results based on the overall objective of establishing ERP systems awareness amongst companies under investigation indicated that although all respondents indicated that IT systems had been installed in their companies many of them were unfamiliar with ERP systems. This was perceived to mean that more continuous information transfer of stakeholders was necessary for the industry.

It has also been perceived that in spite of campaigns and trainings that users often undergo during an ERP systems implementation, companies still experience internal resistance as end-users find it hard to accept the initiated changes. To avoid this, companies are urged to do three things, namely, putting more emphasis on quality, strong computing ability and urge employees to accept new the new technology as early as in the implementation phase (Gargeya & Brady, 2005). Secondly, companies are urged to invest in the right training, re-skilling and professional

development of the information technology workforce, and lastly, there should be on-site trainings, help desks and user manuals that will meet the user's needs post-installation (Gargeya & Brady, 2005). Due to the complexity of ERP systems these should be continued until all end-uses are comfortable with the use of the system.

5.6 OBJECTIVE 3: TO ESTABLISH THE REASONS WHY AN ERP HAS NOT BEEN IMPLEMENTED

In this objective respondents had to identify reasons for non-installation of ERP systems. This question was only posed to respondents that do not have an ERP system implemented. The sample for this objective was 21 respondents

5.6.1 Question 3.1 checked if non-installation was due to high costs.

Five of the respondents agreed that non-installation was due to costs,seven disagreed while eight respondents remained neutral. This is in agreement with findings from previous literature which clearly indicated that ERP systems implementations can be quite costly, despite all efforts at developing a solid plan (Gargeya & Brady, 2005). Literature indicates that many projects fail because they had been over the budget, some by as much as 189% (Gargeya and Brady, 2005). Only one-sixth of projects have been found to be completed on time and within the budget (May, 1998). Companies such as NOV tried to keep their project within budget and they report they were partially successful (Gargeya & Brady, 2005). It is indicated, therefore, that costs be considered as a significant factor when project implementation is considered, as underestimating this could lead to project failure, whether partially or dismally. Studies, therefore, indicate that costs should be included in the planning phases of the project, and costs should not only include software but also hardware (Swaminathan, 2011). Neutrality on this matter could be attributed to a poor understanding of the subject or the willingness to withhold information regarding the project financial status quo. Neutral respondents may also have felt that non-implementation on the basis of costs may have reflected the current success of the company in a negative financial view.

An interesting outcome from the research indicates that thirteen respondents were undecided or agree that ERP systems are too expensive to install. Again, the lack of

94

knowledge on the subject possibly allows respondents to report negatively as ERP systems vary significantly in price for the different type of systems available.

Based on the cross tabulation of company size and non-implementation due to cost, Table 4.15, it is evident that the majority of companies generally agree that cost is not a major factor of non-implementation. The study however indicates that four of the ten very small firms agree that cost is considered a significant negative factor to implementation. The cross tabulation (Table 4.29) of employment position and non-implementation due to high cost of ERP systems, indicate that the majority of the respondents feel that cost was not the reason that ERP systems were not implemented. The study also reflected that six of the fifteen directors remained neutral. The high number of neutral responses could be attributed to the multiple partners that exist in most engineering firms; decisions are therefore sometimes split and hence are not taken.

5.6.2 Question 3.2 required respondents to indicate whether non-implementation was due to the complex nature of ERP systems.

Five of the respondents agreed that non-implementation was due to complexity, while three respondents disagreed and the remaining twelve respondents remained neutral. Previous studies indicate that despite benefits that are gained from ERP systems, implementing these programmes can be very risky because of their complex nature (Gargeya & Brady, 2005). The critical issue with ERP systems is the organization's ability to link and match the organisational and the ERP systems business process (Hilman et al, 2012:2). Due to the complex nature of ERP systems most companies end up discarding implementation altogether. Most organisations also find it quite expensive to implement the system. Earlier ERP systems implementation has been found to be a failure in three quarters of the ERP projects (Moohebat, et al, 2010). About 90 percent of ERP implementations were found to be late or over budget and recent estimations found ERP failure rate to be 40% to 60% (Moohebat, et al, 2010).

A study which compared ERP implementation in developed and developing countries recorded that technology faces additional challenges in developing countries relating to economic, cultural and basic infrastructure issues (Moohebat, et al, 2010). The study further identified high cost, culture, integration and lack of knowledge as the four factors that make ERP unsuitable for many organizations (Moohebat et al, 2010). The cases discussed in the above study highlight cultural issue as a very significant factor that differentiates developed and developing countries in ERP implementation. Even though it was not part of this study to investigate cultural issues relating to ERP systems implementation, it was realised that cultural diversity plays a significant role in the implementation of most ERP systems. Studying this could clearly benefit future studies. An interesting outcome from this research question indicates that 17 respondents will not implement because they are unsure or agree that ERP systems have a complex nature and is difficult to install.

During cross tabulation (Table 4.16) of company size and non-implementation due to complex nature of ERP systems, it is evident that the companies are largely indecisive whether complexity of the systems is a major factor of non-implementation. The study indicated that five of the sixteen small and very small firms agree that the complex nature of the systems is considered as a significant contribution to non-implementation of the ERP systems. The cross tabulation (Table 4.30) of employment position and non-implementation due to complex nature of ERP systems, it seems that the majority of the directors and 'other' staff remained neutral to this question regarding non implementation due to complexity of the system. The study indicated that five of the twenty respondents agreed. It is important to note that this study has revealed that a high percentage of non-implementations are due to the lack of knowledge of ERP systems. This could be again could be due to multiple partners not agreeing due to a lack of knowledge or having a spilt in their decision.

5.6.3 Question 3.3 asked the respondents to indicate if non- implementation was due to time (*Time consuming or takes a long time to implement*).

Seven of the respondents agreed that non-implementation was due to time constraints. Four respondents disagreed, and ten remained neutral with regards to implementation time. It has been indicated in previous studies that ERP systems implementation may take a long time to actualize. It is clear though, that based on this study most companies do not implement ERP systems due to fear that it is time consuming as it might take a considerable time to successfully implement and get the full benefits or a high efficiency from the system.. This can be considered as an irrational viewpoint because if the subject was better understood as the implementation of a system which requires systematic execution will never yield quick time implementation results. In the engineering sector it is likely that all companies implement a high degree of quality control measures due to the complex technical nature of the industry which is very similar to ERP implementation in that it requires gradual integration and a reasonable amount of time to produce accurate results. Based on this research question it is evident that 17 respondents will delay implementation because they are unsure or agree that ERP systems take a long time to install.

In the cross tabulation (Table 4.17) of company size and non-implementation due to time, again it is evident that the companies are still largely indecisive whether timelines of implementation of the systems are a major factor for non-implementation. The study indicated that six of the seventeen small and very small firms agree that the timelines of the system installation is considered as a significant contribution to non-implementation of the ERP systems. In the SMME sector, time is a significant attribute for survival in the market, downtime of any sort has a detrimental financial impact of the organization. In Table 4.31 it reveals that when employment position versus non-implementation due to time, the results indicate that the majority of the staff remained neutral to the question. The study also indicated that six of the twenty one respondents agreed. It is also important to note that, this study has again revealed that a high percentage of non-implementations were due to the lack of knowledge of ERP systems. This could again be due to multiple partners not agreeing due to a lack of knowledge of how the systems are created, for

97

instance, there are multiple modules in most recognized ERP systems like finance, procurement, HR, etc. which can be installed individually with the additional or remaining modules being added as funding, need or time become available. Many of the system modules are integratable, so, when these modules are added on, they simply link up with each other and the transition is normally seamless.

5.6.4 Question 3.4 asked if there was a lack or no support from top management.

The majority of respondents remained neutral on this question. Literature stipulates that for a successful ERP system implementation, the selected ERP team should comprise of the best people in the organization (Gargeya & Brady, 2005). The studies also indicated that successful implementation was only achievable when high-level executives had a strong commitment to the project (Gargeya & Brady, 2005; (Muscatello et al., 2003). Studies suggest that there are higher success levels if there is a high management approval, support, commitment, involvement and participation in all stages of the project (Gargeya & Brady, 2005). Top management also need to be involved in the establishment of new policies and organizational structures (Gargeya & Brady, 2005); (Muscatello et al., 2003). In addition to this, the literature suggests that in times of conflicts, management always stay in the middle.

A study by de Jager (2010) also indicated that Management Support was the single most important factor together with proper planning in the success of ERP systems implementation. Findings from the current study indicated that two respondents agreed that there was lack of support from top management, compared to six who disagreed. Twelve of the respondents, however, remained neutral to this question. Two possible reasons for the high neutrality count are due to respondents not being completely aware of high level management intentions and fear that revealing such information could jeopardise their jobs. A more abstract analysis could indicate that the respondents form part of higher management and perhaps a percentage of them have not supported ERP implementation whilst others might have agreed. The quantitative nature of the study does not allow this to be revealed by respondents; hence the high percentage of neutrality in this question limits the research.

98

Based on the cross tabulation (Table 4.18) of company size and support from top management for the implementation of ERP systems, it is evident that companies are still generally uncertain about whether support from top management is a major factor of non-implementation or not. The study indicated that five of the ten very small firms agreed that there is support from top management for the system installation, although this response is not considered as a significant contribution to the implementation of the ERP systems but it reveals that there is an indication of staff stating that top management does provide support for the implementation. The cross tabulation (Table 4.32) of employment position and non-implementation due to lack of support from top management, further indicates that the majority of the directors and other staff remained neutral to the question. The study also indicated that two of the twenty respondents agreed. It is important to note a high percentage of neutral and agree responses are recorded as part of this study. It is surprising that so many of the director responses are neutral; it is assumed that at this level of responsibility a clear answer would be obtainable. However, this yet again could be due to multiple partners not agreeing due to a lack of knowledge of how the systems are created, operated, including their cost, etc. A future study in analyzing non-implementation due to lack of knowledge by top management of ERP systems has presented itself.

5.6.5 The final Question 3.5 asked the respondents if no proper training had been provided for internal staff.

Three of the respondents agreed that there were no proper training of internal staff, while five respondents disagreed and the majority of respondents remained neutral. Again, the neutrality of most of the respondents is questionable. It may indicate that respondents are not sure about the extent of training required which would directly inform their comments on the adequacy of current training structures. In their study, Gargeya and Brady (2005) indicated the significance of investing in re-skilling, training and professional development of end-users as well as IT workforce. The obvious lack of this results in internal resistance (Gargeya & Brady, 2005). If companies are to succeed, they need to train their employees properly in the use of ERP systems.

5.6.6 Summary

To sum up, results in this study reiterate what the previous studies have established, that cost is one of the most significant factors leading to high failure rate of ERP systems implementation. Studies clearly indicated that in spite of having a solid plan, ERP systems implementations tend to be quite costly (Gargeya & Brady, 2005). As a result many projects fail because they had been over the budget, some by as much as 189% (Gargeya and Brady, 2005). Only one-sixth of projects have been found to be completed on time and within the budget (May, 1998). It is highly emphasised, therefore, that costs be considered as a significant factor when project implementation is considered, as underestimating this could lead to failure, whether partially or dismally. As a result, it is suggested that costs be included in the planning phases of the project, and not only include software but also hardware (Swaminathan, 2011). The second most significant factor leading to failure of ERP systems implementation is that implementing these systems can be very dangerous because of their complex nature. As a result of its implementation complexity and cost, most organisations end up discarding the system altogether. Hilman et al (2012), therefore, suggests that the success rate of implementation is greatly linked to the organization's ability to link and match the organisational and the ERP systems business process.

5.7 OBJECTIVE 4: TO ESTABLISH THE CURRENT IMPLEMENTATION LEVEL OF THE ERP SYSTEM

In this objective respondents had to identify the status of their installation of ERP systems. This question was only posed to respondents that have an ERP system implemented or are currently implementing. The sample for this objective was 16 respondents.

5.7.1 Question 4.1 to 4.3 sought to establish if the ERP system was fully installed in the company, phased or operational.

Thirteen of the respondents agreed that an ERP system was fully installed in their companies. One of the respondents disagreed, while one remained neutral. The next question intended to establish if the implementation was a phased approach. Five of

the respondents agreed, nine disagreed while two remained neutral. Question 4.3 investigated if the current ERP system was operational. This indicates insufficient knowledge about the systems from employees. It has been suggested in the previous studies that all employees should be comprehensively trained and a business plan outlining a proposed strategy and timeline be revealed to them (Rosario, 2000; Gargeya & Brady, 2005; Swaminathan, 2011). The current study indicates lack of this. All respondents have confirmed that their current ERP system was operational. The findings reflect that in companies where ERP systems were implemented, the execution is not particularly laboured. Due to planned time and cost parameters, it is understandable that ERP systems are implemented with intensity, whether phased or not.

During cross tabulation (Table 4.19) of company size and level of implementation of ERP systems, it became evident that most of the companies have agreed that the ERP system was fully installed in the company. The study indicated that only two of the nine very small and small firms disagreed that the system had not been fully installed. Tables 4.20 confirmed most companies did not have a phased implementation process. Table 21 highlighted that all the companies have confirmed that the system is operational.

5.7.2 Question 4.4 asked if most employees have been trained in the usage of ERP systems.

It has been suggested that education should be prioritized from the initiation of the system and that time and money be spent on various forms of education and training to prepare users. This will provide users with the skills and expertise to fully utilise the ERP system to the benefit of the whole organisation (Gargeya & Brady, 2005). A study by Swaminathan (2011) suggested furthermore that training to communicate user skills and proper use of tools and techniques is critical for successful implementation. The findings from the survey indicated that fourteen (88%) of the respondents agreed that most employees had been trained in the ERP system usage. One respondent disagreed while the other remained neutral.

101

Cross tabulation (Table 4.22) of company size and employee training indicates that most of the companies have agreed that employees have been trained in the usage of the ERP system which was installed in the company. The study indicated that only two of the ten small and medium firms did not agree that adequate training was provided for the system.

5.7.3 Question 4.5 checked if most key employees have been included in the ERP selection committee.

Literature has suggested that as part of the change management efforts, users of the system need to be involved in the design and implementation of business processes and the ERP system. The survey response indicates that nine (60%) of the respondents agreed that key employees were involved in the selection committee, while three disagreed and three remained neutral. It was also suggested that the main body of the project team should not only include members from the parent company but also some skilled and influenced users, selected as power users, who should to be involved in the design and implementation of the new processes in order to find the glitches in the system (Gargeya & Brady, 2005; Yu, 2007; de Jager, 2010).

During cross tabulation (Table 4.23) of company size and ERP selection committee it was revealed that nine of the companies have agreed that employees have been included in the selection committee of the ERP system which was installed in the company. The study indicated that three of the six very small and macro firms disagreed, while three of the small and medium companies remained neutral as their responses to confirm if most key employees were included in the ERP task team.

5.7.4 Question 4.6 and 4.7 checked if the methods used for the ERP selection process had proven to be correct and has posed fewer challenges during the implementation process and was completed within timelines

Nine of the respondents agreed that the methods used for ERP selection process had proven to be correct and there were fewer challenges experienced during the implementation process. Two of the respondents disagreed while the remaining five respondents were neutral. A reason for the high percentage of neutrality is possibly

102

due to some organisations that are still implementing hence they cannot confirm if the methods chosen are correct.

The respondents were asked to comment on the timelines of the implementation, which eight of the respondents indicated was done within the scheduled timelines while three disagreed and five remained neutral. Again, the high neutrality could be because they are still implementing and it was difficult to confirm their response in this question if they are still implementing. The question was however structured to take current implementation into account by checking if the timelines are still on track if the ERP system is still being implemented. Quite often, timelines are delayed not due to challenges in the setting up of the programme but rather delays from management in finalising or changing decisions related to the implementation process.

These responses reflect that a large percentage of the companies were satisfied that the methodology adopted for the implementation timelines used by most companies were met or being met.

The cross tabulation (Table 4.24) of company size and ERP selection process indicated that although nine of the companies have agreed that the selection proved to be correct, the other seven companies sized from very small to macro remained neutral or disagreed. It was interesting to note that the majority of the very small and small companies were satisfied that their selection methods proved to be successful. Table 4.25 also reflects a high count of companies that agreed that the system was installed timeously. The disagreements and neutral views were shared by all sizes of companies and again could be due to delayed responses from management.

5.7.5 The last question 4.8 asked if the implementation process was completed within the planned financial budget or if it was currently still being installed, the installation was still within budget.

It has been highlighted in other studies that a clear business plan and vision to steer the direction of the project is necessary throughout the ERP life cycle (Gargeya & Brady (2005). A business plan should outline proposed strategic and tangible

103

benefits, resources, costs, risks and timelines. Projects should be aligned to this plan for improved levels of successful implementation (Gargeya & Brady, 2005). Studies indicate that implementations can be quite costly, despite all efforts at developing a solid plan (Gargeya & Brady, 2005). Many projects, especially failed ones, have found themselves to be over the budget, some by as much as 189 percent (Gargeya and Brady, 2005). Only one-sixth of projects have been found to be completed on time and within the budget (May, 1998). It was interesting to find that in this study eight (50%) of the respondents agreed that the implementation process was completed within the planned financial budget. One of the respondents disagreed with this, and seven remained neutral in this question. This high neutrality is of concern as literature has indicated a very percentage generally of projects being completed out of budget. A possible reason for this high neutral figure is due to respondents not being able to answer the question as they were not involved with the financial process, or unaware of the financial status of the implementation amongst other possible reasons.

The cross tabulation (Table 4.26) of company size and financial budgets indicated that although eight of the sixteen companies have agreed that the system was completed within budget, seven of the companies *from very small to macro* sized remained neutral. It was interesting to note that they chose neutral instead of disagreeing. This could possibly be due limited knowledge of the financials of the implementation process.

5.7.6 Summary

Relating the results to the overall objective which sought to establish the level of implementation within the investigated companies, it became evident that the highest percentages of companies have ERP systems currently installed whether fully, phased or operational. The results, also, indicated that most companies have had their employees trained to use the ERP systems as suggested by two previous studies which, firstly, indicated that formal education and training will help companies in implementing (Gargeya & Brady, 2005). A study by Swaminathan (2011), secondly, suggested that user skills training be adopted to use proper tools and

104

techniques for implementation. It has been perceived, also, from the survey results that key employees had been included in the selection committee as suggested by Davenport, (2000) and Muscatello et al., (2003) and that high-level executives and/or top management who are strongly committed to the project be selected. It was worth noting also that the selection methods utilised in the ERP systems selection proved to be successful in this study with a high percentage of implementations that were within timelines and budget as suggested in the previous studies such as, Gargeya and Brady (2005) and Swaminathan (2011).

5.8 OBJECTIVE 5: TO ASSESS THE PERCEIVED BENEFITS OF IMPLEMENTATION

In this objective, respondents were required to assess the perceived benefits of their ERP system installation. This question was only posed to respondents that have an ERP system implemented or are currently implementing. The sample for this objective was 16 respondents.

5.8.1 Question 5.1 asked if the new system had resulted in greater efficiencies administratively.

Thirteen (86%) of the respondents agreed that it had resulted in greater efficiencies administratively. One disagreed and another remained neutral. This indicated that most companies interviewed have clearly benefited in the implementation of ERP systems administratively. This tallies with other studies which have indicated that in spite of the documented failure rates of ERP systems, there are several other success factors for the systems (de Jager, 2010).

During cross tabulation (Table 4.26) of company size and improved efficiency administratively through ERP systems, it became clear that most of the companies have agreed that administrative efficiency has improved by using the ERP system which was installed in the company. The study indicated that only two of the seven small and macro firms did not agree that efficiencies has resulted in the system. The cross tabulation (Table 4.33) of employment position and improved efficiencies

105

indicates that the majority of the directors and 'other' staff agree that the ERP system has provided greater efficiencies than their basic IT infrastructure. The study also noted that two of the fifteen directors disagreed or remained neutral. This is possibly due to them being unaware of the efficiency of the program or the system is still being implemented or has not produced the desired levels of efficiencies as planned.

5.8.2 Question 5.2 investigated if the new ERP system had improved service delivery by fast-tracking processes.

Ten (63%) of the respondents agreed that it has improved service delivery by fast-tracking processes. Two of the respondents disagreed with the improved service while three remained neutral. The high positive rate is perceived as a success when 63% of ERP systems that were implemented indicate improved service delivery. The magnitude of this success is concurs with the similar question that was posed in Question 2.3 where almost 97% of the respondents indicated that IT has improved their service delivery. These results vary by 20 to 30% as the IT infrastructure has been utilised for many years whilst the ERP systems are a recent installation.

During cross tabulation (Table 4.27) of company size and improved service delivery dates, it was clear that most of the companies have agreed that service delivery has improved by using the ERP system which was installed in the company. The study indicated that only two of the seven small and macro firms did not agree that service delivery dates have improved with the new system. The cross tabulation (Table 4.34) of employment position and improved service delivery dates, it is indicates that the majority of the staff agree that the ERP system has improved the business operations. The study also indicated that five of the fifteen staff disagreed or remained neutral. This is possibly due to them being unaware of the efficiency of the program or the system is still being implemented or has not produced the desired levels as planned.

5.8.3 Question 5.3 asked if the new ERP systems have improved information networking across users substantially.

Eleven (69%) of the respondents agreed that it has while the remaining five provide a neutral response. This indicates that the ERP system helps organisations to improve their information networking across all users. In essence, the transfer of information and communication strategies are improved and better streamlined when ERP systems are introduced Swaminathan (2011). The high degree of neutrality possibly indicates that respondents have not been able to clearly assess the improvement on information networking and success within the organisation as yet or they are unaware of the networkability status of the system.

During cross tabulation (Table 4.28) of company size and improved information networking through ERP systems, it is clear that most of the companies have agreed that information networking has improved by using the ERP system which was installed in the company. The study indicated that five of the eleven *small, medium and macro* firms did not agree that service delivery dates has improved with the new system. The cross tabulation (Table 4.35) of employment position and improved information networking, it can be deduced that the majority of the directors and other staff agree that the ERP system has improved the information networking of their operations. The study also indicated that five of the fifteen respondents remained neutral. This is possibly due to them being unaware of the improvements with the program or the system is still being implemented or has not produced the desired levels as planned.

5.8.4 Summary

When relating the results from this study to the overall objective which sought the perceived benefits of ERP systems, the respondents claimed to have benefited from the implementation of the ERP systems through greater efficiencies with regards to administration of the business processes, improving service delivery as well as improving information networking across users. This correlates with another study which maintains that effective communication should be maintained by management

on a continuous basis if they want to prevent resistance to change from within the company (Muscatello et al, 2003).

5.9 OBJECTIVE 6: TO INVESTIGATE THE SUCCESS OF ERP IMPLEMENTATION

The aim of this objective was to investigate the success of implementation of the ERP system. This question was only posed to respondents that have an ERP system implemented or are currently implementing. The sample for this objective was 16 respondents.

5.9.1 Question 6.1 asked the respondents if the system is fully integratable and has created fewer challenges.

Eleven (69%) of the respondents agreed that the ERP system was fully integratable and had created fewer challenges. Five of respondents remained neutral in this question. This is somewhat expected as it was previously indicated that there was adequate training done and key personnel involved in the selection committee within most organisations that have implemented ERP infrastructure. Previous studies have highlighted huge worldwide ERP systems implementation failure rate (Finney & Corbett, 2007; Markus et al., 2000 and Woo, 2007). The study by de Jager (2010) correlates with the current study in that it proved differently with the JSE companies which experienced high ERP systems implementation success rate amongst South African organizations that were investigated (de Jager, 2010). However, the researcher could not determine whether the respondents in those organizations clearly knew and understood what actually constituted a successful ERP systems implementation or not (de Jager, 2010). The study by de Jager (2010) also investigated if the size of the organization contributed to the success of the ERP systems implementation or not. The study found that all the respondents under study, namely, small, medium, and mega organizations, had experienced a higher rate of success with regards to ERP implementations (de Jager, 2010). The study concluded that size of an organisation did not play a role in the successful implementation rate of that organisation (de Jager, 2010). It was further indicated

108

that the successful implementation rate was at 80 percent of small and 89 percent of medium enterprises, in particular. It can be concluded that implementation results will vary significantly across sectors, industries and countries.

5.9.2 Question 6.2 asked respondents to indicate if the change management process had been seamless and employees adapted easily.

According to the Purchasing Magazine (1998), change is everything. Since ERP brings in information and processes never traditionally thought of as possible, organisations have been urged to be open to change and be flexible enough to change the way they operate over and over again. It is also anticipated that change brings inherent resistance. To avoid internal resistance to change, executive management and divisional management need to focus on developing effective communication and team building skills if they want to create a climate for these multi-layered project teams to thrive (Muscatello et al., 2003). The results from the current study indicated that eleven (69%) of the respondents agreed that the management process had been seamless and that the employees adapted easily. It is interesting to note that most companies in this study had experienced seamless implementation and adaptation of the ERP system. This study has indicated almost 70% of the companies that have installed an ERP system are confident that if proper communication and training is in place, the change management process will be almost seamless and employees will adapt easily. One of respondents, however, disagreed while four remained neutral. A study which compared ERP implementation in developed and developing countries recorded that technology faces additional challenges in developing countries relating to economic, cultural and basic infrastructure issues (Moohebat et al., 2010). The study further identified high cost, culture, integration and lack of knowledge as the four factors that make ERP unsuitable for many organizations (Moohebat et al., 2010). The study highlights cultural issues as a significant factor that differentiates developed and developing countries in ERP implementation. These could be possible reasons which prevent some companies from implementing the system. Even though this is not in the scope of this study it is noted that culture could be another hidden reason for such high failure rate of ERP systems implementation amongst companies, especially in countries that have higher cultural diversities.

5.9.3 Question 6.3 asked the respondents to indicate if the implementation downtime was minimal and recovered with new ERP processes.

Ten (62%) of the respondents agreed that the implementation downtime was minimal and recovered with the new ERP processes. Six respondents remained neutral and there were no disagreements. This indicates that the new ERP systems installation had improved delivery time sufficiently to cover up for downtime and thus allowing for higher production rates in the companies who implemented.

5.9.4 Question 6.4 investigated if training that had been provided for internal staff had been successful.

According to Gargeya and Brady (2005) companies should invest in training and professional development of the IT workforce. This is said to provide internal readiness of the company and its employees. From the results it could be perceived that companies that have invested in training, re-skilling and professional development of their staff benefited from an almost seamless implementation. As indicated in the previous chapter under question 5.4, 88% of the respondents agreed that training had been provided for internal staff and that it had been successful. Question 5.4 correlates with this question by almost 81%. This finding is expected considering the positive views provided in earlier objectives. It is clear that the effectiveness and benefits of training is not debatable for this study.

5.9.5 Question 6.5 asked the respondents to indicate if the selected ERP team had been composed of most appropriate people in the organization such as consultants and internal staff which included top management.

One of the highly named hindrances to successful implementation of ERP system is the lack of involvement of employees in the selection committee for ERP systems. In a study by Yu (2007), this was found to result in resistance from employees to utilise the ERP system. This was common with bigger industries. It is emphasised that various parties should be included in the selection and evaluation of ERP systems to ensure universal acceptance within the company (Yu, 2007). It is also echoed that the selected ERP team should comprise of the best people from throughout the

organization (Gargeya & Brady, 2005). It is also significantly emphasised that a cross-functional team be built for the project implementation. The team should consist of a mix of consultants and internal staff so that the internal staff can develop the much needed technical skills for design and implementation (Gargeya & Brady, 2005). The current study correlates with these previous studies as the results indicated thirteen (81%) respondents agreed that their companies had used the appropriate people in the ERP team selection. Studies have further suggested the inclusion of cross-functional teams that incorporate the best and brightest of personnel from each functional department, as well as, executive-level input to identify, examine, and rethink existing business processes (Purchasing Magazine, 1998; Yu, 2007). The selected personnel should be individuals who understand the inner processes within the organisation and who will be the potential end-users of the ERP system (Yu, 2007). The needs of each department must be fairly represented in the ERP configuration. The selection team or committee should be led by someone who directly reports to the CEO or by the CEO (Yu, 2007). Most companies in this study were found to have followed similar patterns within their organisations implementation hence a high success rate.

5.9.6 The final question 6.6 asked the respondents if the organisational diversity (departmental differences) had been considered in the implementation process of ERP systems.

Previous studies have indicated that it is imperative that when implementing new ERP systems, organizational diversity be considered well in advance (Gargeya & Brady, 2005). Studies maintain that the reason for this is because different organisations possess numerous cultures which are different. This is said to mean that individual branches of the same organisation have their own ways of doing things, and each functional department operates using different procedures and business requirements (Gargeya & Brady, 2005). Within larger and more global companies diversity has been found to be a hindrance to success (Gargeya and Brady, 2005). As a result, therefore, diversity and doing business process reengineering in each business unit has been found to be a critical factor that has strong influence on the implementation project (Gargeya & Brady, 2005). Also, it is indicated that since no two organisations are similar, the organisation's internal

You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)

conditions will determine the selection criteria of ERP systems which will be unique to each organisation to accommodate the diversity of each organisation (Yu, 2007). These studies correlated with the current research in that twelve (75%) companies agreed that organisational diversity had been considered in the implementation process of ERP system. Even though 19% of the respondents remained neutral and one company disagreed, it could be concluded from the findings that most companies have managed to accommodate diversity in their companies in order to maintain successful implementation of ERP systems.

5.9.7 Summary

Results based on the overall objective of investigating the success of implementation of the ERP system indicated a higher implementation success rate amongst the respondents in this study. Previous research have correlated that respondents under study, namely, small, medium, and mega organizations, had experienced a high rate of success with regards to ERP implementations (de Jager, 2010). This study has further indicated that those companies that had implemented or were implementing were already reaping the fruits of implementation in the sense that companies were benefiting from this and they had applied the relevant protocol to be followed before, during and after implementation such as proper training of all stakeholders including internal staff, consideration of organisational diversity, as well as including top management in the pre-implementation period as well as in the post- implementation period.

5.10 SUMMARY

This chapter discussed results that were presented in Chapter 4. The core analysis was expanded to all companies and not exclusively SMME's because many companies offered no response to the question regarding turnover, which is a fundamental aspect of determining a company's classification.

The Cronbach alpha reliability test confirmed a high percentage of reliability and consistency of the research.

The findings of this chapter indicated that most respondents that have ERP systems in place in their companies indicated that the implementation was generally executed fairly smoothly. The analysis revealed that most companies are experiencing benefits relating to ERP implementation, especially on an administrative and service delivery level. This is crucial since efficiency of service provides opportunities for expansion and ultimately, increased revenue.

It was identified that the main reasons for non-implementation rested with price and probable lengthy timeframes for implementation. ERP systems are widely regarded as costly but it was surprising to note that time played a crucial role in considering implementation in this study. Processes that require systematic implementation such as quality control will inevitably require adaptation periods so it is unreasonable to expect quick results.

It was also noted that there was a high degree of neutrality in the responses and this lends to the idea that understanding of ERP systems is lacking or perhaps, senior managers opted to remain neutral in some critical questions for fear that revealing such information would compromise their companies in some way. It is clear that there are inconsistencies in some responses which suggest that ERP success is not easily implemented in all companies.

The fact that there are still a large number of companies who have not implemented poses a challenge for the South African consulting engineering SMME economy, since their lack of implementation leads to a waning economy.

The next chapter draws conclusions and makes recommendations for future studies.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

Chapter 5 in this study discussed findings presented in Chapter 4 as obtained in the survey. This chapter constitutes conclusions drawn from the findings, and then makes recommendations for further studies.

Literature in this study has indicated that the introduction of technology and later ERP systems has brought great innovation to businesses all over the world as well as increased competitiveness. It has also highlighted some facts with regards to the implementation of ERP systems indicating that while most businesses have implemented the systems there are still those which still struggle with implementation because of various reasons.

Reasons highlighted in the previous literature include, firstly, lack of involvement of employees as well as top management in the initial stages of implementation such as assessing company needs so as to link these to ERP systems requirements, planning, initiating stages, implementation, monitoring as well as post-implementation stages. Secondly, literature has highlighted that the valuation and selection criteria utilised by firms lacked correlation with the strategic and operational needs and objectives of the company which would enable the company to arrive at final determination of product as well as non-product factors. Studies are concerned that companies lack the skills and expertise to select the evaluation approaches and methods using the different weightings, priorities and scores which were unsuitable for their companies, and to top it all, the equally weighted or semi-weighted criteria have failed to provide companies with an advantage in overcoming the selection pandemonium.

Furthermore, studies have also indicated that the approaches and methods of ERP system implementation used by companies were poorly applied by them. The reason for this was found to be that the approaches and methods used were low cost and of less complexity and cross-sector approaches and methods portfolio was not well structured and applied by those companies. Companies were found also to lack

You created this PDF from an application that is not licensed to print to novaPDF printer (http://www.novapdf.com)

budgeting skills and as a result their projects failed because they would be over the budget or even sometimes under the budget.

In spite of these challenges companies still strive to seek ways to improve quality, keep costs down within their supply chain, reduce inventories, diversify products and services, and provide more reliable delivery dates in an improved manner when compared to their rivals. The introduction of Enterprise Resource Planning (ERP) systems offered these companies a way to overcome these problems. ERP systems offered companies a flexible and productive way of coordinating their business processes more closely as well as integrating these processes in order to focus on efficient management of resources and customer service. While ERP installations can greatly assist micro, small and medium enterprises in improving their strategic and competitive capabilities, a large portion of SMME enterprises, however, take time not to rush into ERP installations because of the perceived expenses and implementation failures.

The aim of this study was, firstly, to determine the level of ERP systems implementation within the SMMEs, secondly, to study challenges experienced by these enterprises, as well as, determine the potential benefits of ERP systems implementation.

Findings in the current study have shown that the highest percentage of the respondents came from senior management, which strengthened data in this study as they are expected to provide reliable information regarding the ERP systems. It was also identified in this study that a substantial percentage of companies did not want to reveal their annual turnover to the researcher. However, it was interesting to see a higher percentage of findings in the study correlating with the findings from previous local literature with regards to the success rate of ERP systems implementation in the companies under investigation. It was also noted that the perceived benefits far outweigh the perceived disadvantages with the system. It was surprising, though, to find some companies that did not want to respond to questions regarding turnover, and in other questions only half of the respondents responded.

6.2 Conclusions from the Objectives of Study

The objectives of the study were:

a) To establish the usage of IT in the sector
b) To establish the awareness of usage of ERP
c) To establish the reasons why an ERP has not been implemented
d) To establish the current level of implementation of the ERP system
e) To assess the perceived benefits of implementation
f) To investigate the success of implementation of the ERP system

6.2.1 Objective 1: To establish the usage of IT in the sector

It has been perceived from the results that 16 companies in this study have installed or implemented IT systems. The results correlated with the research objective in that all respondents were found to have implemented IT systems, The results also indicated that most companies were already benefiting from the implementation in terms of growth of production, speedy delivery dates, quality of products and services, company competitiveness, reduction of operating costs with regards to product delivery time, product diversity, as well as providing more reliable delivery dates.

6.2.2 Objective 2: To establish the awareness of the usage of ERP

Results based on the overall objective of establishing ERP systems awareness amongst companies under investigation indicated that although all respondents indicated that IT systems had been installed in their companies most of them were unfamiliar with ERP systems. Only 30% of the respondents claimed to be familiar with the system, and the percentage of those who maintained to have the system installed in their companies decreased compared to the responses in the first objective. This was perceived to mean that more and continuous training of stakeholders was necessary in order to increase the familiarity with the ERP systems. The other percentage of respondents who remained neutral regarding this issue could be related to the various challenges regarding the implementation of ERP systems within the SMMEs in the engineering sector in South Africa.

116

6.2.3 Objective 3: To establish the reasons why an ERP has not been implemented

It was also noted in the findings that some companies had no intention of implementing ERP systems in the next five years. Results in this study reiterate what previous studies have established, that cost is the number one factor leading to high failure rate of ERP systems implementation. Other factors were the complex nature of the system, the perceived expenses and implementation failures, the installation process which was perceived as time consuming, as well as, the lack of support from top management. The fact that 60% of the respondents remained neutral in this question indicated that there were unperceived challenges when it came to involvement of top management in the process of ERP implementation.

6.2.4 Objective 4: To establish the current level of implementation of the ERP system

Relating the results to the overall objective which sought to establish the level of implementation within the investigated companies, it became evident that the majority of companies have ERP systems installed in their workplaces, whether fully, phased or operational. It was also perceived that most companies have had their employees trained to use the ERP systems, and the methods that had been used for ERP selection process had proven to be correct. It was also perceived that 50% of the ERP implementation processes were completed within the planned financial budget. This high neutrality is of concern as literature has generally indicated a very high percentage of projects being completed out of budget. A possible reason for this high figure is due to respondents not being able to answer the question, not involved with financial process, and responded with a neutral answer.

6.2.5 Objective 5: To assess the perceived benefits of implementation

The results from this study indicate that all respondents investigated had ERP systems installed in their companies. The perceived benefits included

- growth in production,
- contribution to speed in delivery of products and services,
- quality of products and services provided by companies,

117

- competitiveness of the companies,

- diversity of production,

- reliable delivery dates, as well as,

- greater efficiency with regards to administration.

6.2.6 Objective 6: To investigate the success of implementation of the ERP system

The overall results of ERP systems implementation were evident in the improvement of information networks across all users. The majority of the companies were found to have used correct implementation methods. Companies had experienced fewer challenges in the installation process, and the change management process had been commonly seamless. Most implementation processes was completed within the planned financial budget and timelines, and organisation diversity was considered in the implementation process.

In conclusion, it was evident, even though most ERP implementations had been successful; there were still areas that exhibited problems. Recommendations to address these problems are discussed in Section 6.3 below.

6.3 Recommendations arising from this study

There are still companies within the Engineering sector that have not yet implemented ERP systems. This calls for more involvement of experts in teaching companies about that value of having ERP systems installed in their companies (Gargeya & Brady, 2005).

There were challenges with regards to ERP systems implementation which included costs, the complex nature of the systems, lack of training for end users and lack of involvement from top management. This also calls for more training on budgetary skills, operations skills, as well as support from top management (Yu, 2007; Swaminathan, 2011).

There were other challenges regarding non-implementation of ERP systems, such as, cultural diversity within companies. As this was not part of this study it would benefit further studies to implement a larger study constituting a larger sample size.

Results from such a study would hopefully provide solutions that may decrease the perceived challenges regarding the installation of ERP systems.

Furthermore, it is recommended that more implementation techniques be applied by companies when they implement ERP systems, such as suggested in Hilman et al (2012), namely;

- **Project Preparation**

    Assessing maturity levels of an organization before the initial implementation stage of the ERP system.

- **Technology Selection**

    This phase involves determining the conceptual stage especially defining IS/IT strategy related to the ERP system that will be adopted by the company.

- **Project Formulation**

    The project formulation phase begins with the status analysis of legacy system and requirements needed by the company are collected.

- **Implementation & Development**

    This is the process of ERP system customization, which ensures its alignment to the organization business process. The procedures employed here are user training and system monitoring to see the system stability after migration.

- **Post Implementation**

    In this phase the whole adoption process is complete. All that is left is obtaining the decision from the company's top decision makers to make the system go live.

6.3.1 Summary

Findings in this study indicate that there are still employees who are unfamiliar with ERP systems. This suggests that companies still need to involve their staff right through implementation and train them in the use of the systems ((Gargeya & Brady, 2005). They indicate also that most respondents that have implemented ERP systems in their companies felt that the implementation was generally executed fairly smoothly. The analysis revealed that most companies were experiencing benefits

relating to ERP implementation, especially on an administrative and service delivery level. This is crucial since efficiency of service provides opportunities for expansion and ultimately, increased revenue. It was identified that the main reasons for non-implementation rested with price and probable lengthy timeframes for implementation. ERP systems are widely regarded as costly but it was surprising to note that time played a crucial role in considering implementation in this study. Processes that require systematic implementation such as quality control will inevitably require adaptation periods, so it is unreasonable to expect quick results. Recommendations listed above are a reasonable guide for companies considering implementation in the short term.

6.4 Limitations of this Study

6.4.1 Sample size

The fact that a larger sample size which had been anticipated could not be found poses as limitation to the current study. The research constituted studying a sample of 37 companies in the engineering sector in Durban. Amongst the 37 investigated, a third of the respondents did not declare their turnover status, making it impossible to accurately establish the number of SMME's that participated in the study. The company size was, therefore, the only remaining attribute that could be used to categorise the respondents. Although a Cronbach Alpha coefficient of 0.87 was noted for this study which confirms the research utilised in the research is reliable, the results, findings and conclusions can, in no way be all conclusive and generalisable due to this limitation in accurately confirming the SMME status of the respondents. Making conclusive evidence from this study alone would be committing a fallacy of composition since a larger sample would obviously yield different results. This, then, awards more room for further studies in this area to make results and conclusions generalisable and all conclusive.

6.4.2 Literature

The study was mostly based on older literature as more recent literature on the topic was minimal. Most of the literature in this study deals with ERP systems

implementation and implementation methodologies. Literature on the status quo of ERP systems implementation is scarce.

6.4.3 CESA Directory

The list of companies chosen for the research was based on the CESA directory of consulting engineers for Durban, hence a large number of companies will be not included in the research. The sample of 37 respondents is however considered as an acceptable sample size. The questionnaire was sent to the listed person in the CESA directory of the selected company, which will then unavoidably exclude other key persons in the employ of the company whom could offer a different response from the listed person. A possible technique to avoid this in future research would be to consult companies in advance and inform them about the kind of study that would be conducted, and then ask them to assist by selecting relevant individuals who fit the researcher's description of the study.

6.4.4 Inference

The sample cannot be assumed to represent all the consulting engineers in South Africa as various factors could skew the inferences that this study would make about the remainder of the SMME consulting engineers in the country.

6.4.5 Specific relevance in the Engineering sector

The quantitative approach sought to establish answers to general questions relating to ERP system implementation, i.e. success, failure, status of implementation etc. In essence, there are much more in depth studies that could be done to ascertain specific, inherent challenges relative to the Engineering environment which invariably poses a unique set of obstacles. This study focused on outcomes which may be discussed across a spectrum of disciplines and sectors whereas an investigation into unique challenges faced by engineering companies relative to ERP systems was not tackled.

6.5 Recommendations for further studies

Shortage of similar studies in the South African context poses a problem for this country. It is recommended that more studies be done on the status of ERP systems in the SMME's in South Africa so that more means to assist these companies could be made available.

This study poses a problem in the sense that results cannot be generalizable and be made all conclusive. The recommendation from this is that a comprehensive study which will incorporate the KwaZulu-Natal province be conducted so that more conclusions and generalisation may be made.

A study may be conducted researching the challenges to implementation from a top management level. From this study, it is evident with the high number of neutral responses from top management that there are distinct challenges in decision making. A qualitative study should produce more accurate results.

A study may be conducted to delve deeper into ERP systems implementation relative to the Engineering sector only. The questionnaire for this type of study may be specifically tailored to discuss specific challenges.

6.6 Summary

This chapter drew conclusions and made recommendations for further studies. It has concluded that a little more than a third of the sample identified as SMMEs have implemented the ERP systems. While this is true it has also been noted from the findings that some of the enterprises are not familiar with the newly installed technology. It was worth finding that those enterprises that have implemented the system have benefited from the system usage. It has also been perceived that there are still enterprises that are experiencing challenges with regards to ERP systems implementation. It has, therefore, concluded that more training on the system implementation and usage be done by ERP experts, and more involvement of top management is necessary.

REFERENCES

Al-Mashari, M.; Zairi, M. and Al-Mudimigh, A. 2010. *ERP Implementation: An Integrative methodology: Doctoral Thesis.* University of Bradford, UK.

American Association for Public Opinion Research. 2008. *Standard Definitions: Final Dispositions of case Codes and Outcome rates for Surveys.* 5th ed. Lenexa, KA: AAPOR.

Babbie, E. 2010. *The Practice of Social Research.* Library of Congress, USA.
Beig, M., Pourhasomi, M. H. & Ghorbanzad, Y. 2012.The Role of Information Technology and Customer Relation Management in the Supply Chain. *Interdisciplinary Journal of Contemporary Research in Business.* Islamic Azad University. *Institute of Interdisciplinary Business Research 5,* Vol. 4, No. 8. pp. 570 – 574.

Bernus, P., Nemes, L. & Schmidt, G. 2003. *Handbook on the enterprise architecture,* Berlin, Springer-Verlag.

Brehm, L. and Markus, M. 2000. The Divided Software Cycle of ERP Packages. *In Proceedings of Global Information Technology management. Memphis, USA (GITM).*

Botha, M. 2006. *Measuring the effectiveness of the women entrepreneurship programme as a training intervention on potential start –up and established women entrepreneurs in South Africa.* Doctoral Thesis. University of Pretoria, South Africa.

Curwin, J. & Slater, R. 2008.*Quantitative Methods for Business Decisions.*6th ed. British Library cataloguing-in-Publication Data, United Kingdom.

Dantes, G.R. and Hasibuan, Z.A. 2011. "Step-Wise Approach toward ERP Implementation Success" in *Proceeding International Conference IBIMA 16th,* Kuala Lumpur.

Davenport, T. 2000. "Mission Critical: Realizing the Promise of Enterprise Systems." *Harvard Business School Press,* USA.

De Jager, D. 2010. ERP value determination in South African Companies. Master's Thesis, University of Pretoria, South Africa.

Denscombe, M. 2010. *The good research Guide: For small-scale social research projects.* 4th Ed. Open University Press, New York.

DeVaus, D. A. 2002. *Surveys in Social Research.*5th Ed. Routledge.London.

Du Plessis, K. 2011. Methodologies: Improving ERP success? Available [Online]. WWW: www.saoug.co.za. Accessed 13 May 2013.

Dunn, D. S. 2010. *The Practical Researcher: A Student guide to Conducting Psychological Research.* Wiley-Blackwell, United Kingdom.

Finney, S & Corbett, M. 2007. ERP implementation: a compilation and analysis of critical success factors. *Business Process Management Journal,* Vol. 13, No. 3, pp. 329-347.

Fleishaker, C. 1999. ERP options expand for the middle market. *APICS-The Performance Advantage,* Vol. 9 No. 10, pp. 64-6.

Gargeya, V.B. and Brady, C. 2005. Success and failure factors of adopting SAP in ERP system implementation. *Business process Management Journal*, Vol. 11, No.9.

Hadebe, S.E. 2012. *Personal Finance Challenges Facing Taxi. Drivers at Umbumbulu, Kwazulu-Natal: A Case Study.*Unpublished Thesis. Graduate School of Business and Leadership. University of KwaZulu-Natal, South Africa.

Hilman, M., Setiadi, F., Sarika, I., Budiasto, J. & Alfian, R. 2012. Comparative Study Of ERP Implementation Methodology Case Study: Accelerated Sap Vs Dantes & Hasibuan Methodology. Faculty of Computer Science, Universitas Indonesia.

Holland, C. & Light, B. (1999). "A Critical Success Factors Model for ERP Implementation". *IEEE Software*, May/June, pp. 30-35.

Kothari, C. 2008. *Research methodology - Methods and techniques.*New Age International Publishers, New Delhi. Available [Online] WWW: http://books.google.com/books. Accessed (2 June 2012).

Lindley, J.T., Topping, S. & Lindley, L.T. 2008. The hidden financial costs of ERP software. *Managerial Finance*, Vol. 34, No. 2, pp. 78-90.

Love, P.E.D., Irani, Z., Ghoneim, A. & Themistocleous, M. 2006. An exploratory study of indirect ICT costs using the structured case method, *International Journal of Information management*, Vol. 26, pp. 167-177.

Markus, M., Axline, S., Petri, D. & Tanis, S. 2000. Learning from adopter's experience with ERP: problems encountered and successes achieved. *Journal of Information Technology,* Vol. 15(4). Pp. 245-265.

Matthee, M.C., Tobin, P.K.J. & van der Merwe, P. 2007. The status quo of enterprise architecture implementation in South African financial services companies, *South African Journal for Business Management, Vol. 38, No. 1*, University of Pretoria, South Africa.

Moohebat, M.R., Asemi, A. & Jazi, M.D. 2010. A Comparative Study of Critical Success Factors (CSFs) in Implementation of ERP in Developed and Developing Countries, *Moohebat International Journal of Advancements in Computing Technology Vol. 2, No. 5, University of Isfahan, p. 99.*

Muscatello, J.R., Small, M.H. & Chen, I.J. 2003. Implementing enterprise resource planning (ERP) systems in small and midsize manufacturing firms. *International Journal of Operations & Production Management, Vol. 23 No. 8, 2003, pp. 850-871.* Available WWW: http://www.emeraldinsight.com/researchregister.

O'Brien, J.A. 2002. Management Information Systems: Managing Information Technology in the E-Business Enterprise, 5th Ed: McGraw-Hill Higher Education.

Parker, K. 1999. Ready, steady, go. Manufacturing Systems, Vol. 17 No. 4, pp. 16-18.

Purchasing Magazine. 1998. [Online]. Available WWW: http://www.manufacturing.net/magazine/purchasing/archives/1998/pur0716.98/071erp.htm (Accessed 13 May 2013).

Rosario, J.G. 2000. On the leading edge: critical success factors in ERP implementation projects. BusinessWorld.

Saunders, M, Lewis, P. and Thornhill, A. 2012.Research methods for Business Students.Sixth Ed. British Library Cataloguing-in-Publication Data, England.

Sekaran, U. 2003. *Research methods for business.*Wiley, West Sussex.

Sekaran, U & Bougie, 2010. *Research methods for business.*Wiley, West Sussex.

Sor, R. 1999. Management Reflections in Relation to Enterprise Wide Systems. Proceedings of the Americans and Conference on Information Systems (AMICS).

Sowa, J.F. & Zachman, J.A. 1992. 'Extending and formalizing the framework for information systems architecture'. *IBM Systems Journal, Vol. 31 No. 1, pp. 590-617.*

Swaminathan, S. 2011. Critical Success Factors of ERP Implementation. Masters Dissertation. Graduate Faculty of Mechanical Engineering. The University of Toledo.

Terre Blanche. M. Durrheim. K. & Painter, D. 2006. *Research in practice.* UCT Press, Cape Town.

The American production and Inventory Control Society dictionary. 2014. http://www.apics.org/industry-content-research/publications/apics-dictionary

The Business Dictionary. http://www.businessdictionary.com/

Van Oyen, M.P. Enterprise Resources Planning. [Online]. Available WWW: www.ERP_Enterprise%20Resource%20Planning.Mark (Accessed 28 June 2013).

Wallace, T.F., Kremzar, M. H. 2001. Making it happen (John Wiley & Sons, Inc.).

Welman, C. Kruger, F. & Mitchell, B. 2007, *Research methodology*, 3rd edition, Oxford University Press, Cape Town.

Woo, H.S. 2000. Critical Success Factors for Implementing ERP: The case of a Chinese Electronics Manufacturer. *Journal of Manufacturing Technology Management,* Vol.18, No.4, pp. 431-442.

Yu, Q. 2007. An Investigation Of Problem Factors in ERP Selection in Kwazulu-Natal Organizations. Masters Dissertation. Graduate School of Business, University of KwaZulu-Natal.

Zwane, B. K. 2011. *The Use of Financial Bootstrapping by Small Businesses at eThekwini.* Unpublished Master's Thesis. Graduate School of Business & Leadership. University of KwaZulu-Natal, South Africa.

APPENDICES

APPENDIX 1 – Research Questionnaire

Kindly complete your choice by highlighting the relevant cell.		Name:		Company:		

Question 1: Demographic Information

1.1	Gender	MALE	FEMALE			
1.2	Age Groups	20 to 29	30 to 39	40 to 49	50 to 59	60 +
1.3	Company Size	< 5	5 to 19	20 to 49	50 to 199	200 +
1.4	Company Turnover	< 3 million	3 to 6 million	6 to 26 million	> 26 million	No Response
1.5	Race	Black	Coloured	Indian	White	Other
1.6	Discipline	Civil/Structural	Mechanical/Electrical	Project Management	iT Employee	Other
1.7	Employment Position	Director/Partner	Manager	Team Leader	IT Employee	Other
1.8	Professional Registration	ECSA/SACPCMP	Other	None		

Question 2: To Establish The Usage Of IT In The Sector

		1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
2.1	Is there is an Information Technology (IT) system in place in the company ?	1	2	3	4	5
2.2	Has the introduction of Information Technology (IT) and Information Systems (IS) contributed to the growth of production ?	1	2	3	4	5
2.3	Has the introduction of Information Technology (IT) and Information Systems (IS) contributed to the speed of service provided by the firm eg. CAD, Prokon, Civil Designer, etc.?	1	2	3	4	5
2.4	Has the quality of your products and service improved with the use of IT ?	1	2	3	4	5
2.5	Has your current I.T system help improve your competitiveness ?	1	2	3	4	5
2.6	Has your current I.T system help reduce costs ?	1	2	3	4	5
2.7	Has your current I.T. system help diversify products ?	1	2	3	4	5
2.8	Has your current I.T system provide more reliable delivery dates?	1	2	3	4	5

Question 3: To establish the awareness of Enterprise Resource Planning Systems (ERP)

		1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
3.1	Are you familiar with the term ERP ?	1	2	3	4	5
3.2	Do you have an ERP system installed in the company?	1	2	3	4	5
3.3	Is the company considering implementing an ERP system within the next 5 years ?	1	2	3	4	5

Question 4: To establish the reasons why an ERP system has not been implemented

If you have not yet implemented an ERP System, please answer the following. If you have begun implementation, please move to question 5.

		1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
4.1	Non implementation is due to cost (expensive) ?	1	2	3	4	5
4.2	Non implementation is due to the complex nature of ERP systems ?	1	2	3	4	5
4.3	Non implementation is due to time (time consuming/takes a long time to implement) ?	1	2	3	4	5
4.4	There is lack /no support from top management ?	1	2	3	4	5
4.5	No proper training has been provided for internal staff ?	1	2	3	4	5

Question 5: To establish the current level of implementation of the ERP system

		1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
5.1	Has the ERP system been fully installed in the company ?	1	2	3	4	5
5.2	Is it a phased implementation?	1	2	3	4	5
5.3	Is it operational?	1	2	3	4	5
5.4	Most employees have been trained in the usage of the ERP systems ?	1	2	3	4	5
5.5	Most key employees were included in the ERP selection committee	1	2	3	4	5
5.6	The methods used for the ERP selection process have proven to be correct and has posed fewer challenges during the implementation process ?	1	2	3	4	5
5.7	The implementation process was completed within the scheduled timelines or if currently still being installed, the installation is still within scheduled timelines ?	1	2	3	4	5
5.8	The implementation process was completed within the planned financial budget or if currently still being installed, the installation is still within budget ?	1	2	3	4	5

Question 6: To assess the perceived benefits of implementation

		1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
6.1	In your opinion has the new system resulted in greater efficiencies administratively ?	1	2	3	4	5
6.2	The new ERP system has improved service delivery by fastracking processes	1	2	3	4	5
6.3	The new ERP system has improved information networking across users subtantially	1	2	3	4	5

Question 7: To investigate the success of implementation of the ERP system

		1 = Strongly Disagree	2 = Disagree	3 = Neutral	4 = Agree	5 = Strongly Agree
7.1	The system is fully integratable and has created fewer challenges	1	2	3	4	5
7.2	The change management process was seamless and employees adapted easily	1	2	3	4	5
7.3	Implementation downtime was minimal and recovered with new ERP processes	1	2	3	4	5
7.4	Training that has been provided for internal staff has been successful	1	2	3	4	5
7.5	The selected ERP team has been composed of most appropriate people in the organization such as consultants and internal staff which includes top management	1	2	3	4	5
7.6	Organisational diversity (departmental differences) has been considered in the implementation process of ERP systems	1	2	3	4	5

127

APPENDIX 2 – Ethical Clearance

UNIVERSITY OF
KWAZULU-NATAL [TM]

INYUVESI
YAKWAZULU-NATALI

29 October 2013

Mr Deon Govender (210531019)
Graduate School of Business & Leadership
Westville Campus

Protocol reference number: HSS/1267/013M
Project title: Status of Implementation of ERP within the SMME Consulting Engineering Sector
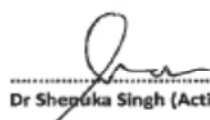
Dear Mr Govender,

Expedited Approval

I wish to inform you that your application has been granted Full Approval.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. Please note: Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

....
Dr Shenuka Singh (Acting Chair)
/ms

cc Supervisor: Dr Brett van Niekerk
cc Academic Leader Research: Dr E Munapo
cc School Administrator: Ms Wendy Clarke

APPENDIX 3 – Gatekeepers Letter

CESA
Consulting Engineers South Africa

6 September 2013

TO WHOM IT MAY CONCERN

This letter serves to confirm that Deon Govender is a *bona fide* employee of the firm BVi Consulting Engineers which is a CESA member. We would appreciate it if you could assist him with his request, however the amount of information you wish to disclose is entirely at your discretion.

WALLACE MAYNE PrEng, MBA
CONTRACTUAL AFFAIRS MANAGER

APPENDIX 4 – Language Editor

63856 Adams mission

P. O. Adams

Amanzimtoti

4126

Editor: Ms Elizabeth Hadebe

Qualifications: Masters in Applied Linguistics; MBA

To: Deon Govender

This letter serves to confirm that I, Elizabeth Hadebe, have read and edited the Dissertation titled:

STATUS OF IMPLEMENTATION OF ERP WITHIN THE SMME CONSULTING ENGINEERING SECTOR;

and thereby endorse that English proficiency in the document meets the standards in terms of submission at University level.

Sincerely

S. E. Hadebe (Ms)

130

APPENDIX 5 – Statistician

Address: 47 Mnini Road

Kloof

3610

Date: 20 November 2013

Statistician: Mr Toit Oosthuizen

Qualifications: BSc. Eng (Civil)

MSc. Eng (Civil): Probabilistic based evaluation of the structural reliability achieved for a typical building designed according to SANS 517 and SANS 10162:2

To: Deon Govender

This letter serves to confirm that I, Toit Oosthuizen, have compiled the statistical data of the Dissertation titled:

STATUS OF IMPLEMENTATION OF ERP WITHIN THE SMME CONSULTING ENGINEERING SECTOR;

and thereby endorse that statistical data in the document is correct and meets the standards in terms of submission at University level.

Sincerely

Toit Oosthuizen

(MSc. Eng)

131