

# **External Auditing in an Enterprise Resource Planning System Enabled Environment in South Africa**

**By  
Pym Don Tembo**

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the requirements for the degree of Master of Business Administration**

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## **ABSTRACT**

Enterprise Resource Planning (ERP) Systems are excellent software packages that enable businesses to integrate a variety of business functions. In particular, ERP systems have become systems of choice for many public and private companies and have radically changed the way accounting and business information is processed and audited.

The challenge for auditors is to keep up with the changing nature of ERP systems and how to cope with changes that come when companies implement new ERP systems. Auditors may need to keep abreast of the changes that ERP systems bring and also modify their auditing processes and procedures to ensure that there is less risk in providing incorrect audit opinions as a result of a lack of understanding of the ERP environment.

This research was conducted to investigate the impact of implementing an Enterprise Resource Planning System (ERP) System on the conventional statutory external audit process in South African companies. The research was conducted via an online questionnaire that was distributed to auditors across South Africa. In order to obtain explanations of the result findings, interviews were conducted with selected audit seniors in selected audit firms. A total of 137 questionnaire responses was collected and seven interviews done to triangulate the findings of the questionnaire.

The results of this survey indicate that ERP implementation inherently changes business processes and there are audit risks that are associated with auditing ERP-enabled environments compared to non-ERP environments . The results also suggest that auditors recognise the risks associated with inter-dependencies among business processes and control vulnerabilities after an ERP implementation.

Auditors also recognise that an overall understanding of ERP systems and different methods of auditing is a critical component of ensuring that correct opinions of the audit are formulated.

## DECLARATION

I, Pym Don Tembo, declare that this research report is my own unaided work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

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**Pym Don Tembo**

Signed at .....

On the 31<sup>st</sup> day of March 2012

## **DEDICATION**

To my Heavenly Father from whom I derive my strength, thank you for your loving kindness and mercy.

I dedicate my work to my Lord, Jesus Christ, for whom I live. With you all things are possible.

## **ACKNOWLEDGEMENTS**

To my supervisor, Rabelani Dagada, thank you for your guidance, support and belief in me.

To my fellow MBA students, it was a special privilege to work and learn with you. Thank you for sharing your knowledge and your experiences with me and making this study a reality.

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May God Bless you all.

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# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Purpose of the study**

The purpose of this research was to investigate the impact of implementing an Enterprise Resource Planning System (ERP) System on the conventional statutory external audit process in South African companies. This report established whether auditors, auditing in organisations that have implemented new ERP systems approached the audit in a similar way as they would have approached a non-ERP environment. The report also highlights the key risks that will need to be managed in auditing in a new ERP environment and methods that auditors can use to manage those risks.

### **1.2 Context of the study**

An ERP system is defined as an automated business management system that integrates all spectrums of an organisation's functions in order to manage all business resources more efficiently. Essentially, the concept of ERP systems is centred on mechanisms to unify various business functions in order to improve an organisation's operational efficiency (Eilifsen, Messier, Glover & Prawitt, 2010). This is met through correct and timely information that improves flexibility, reduces lead time and increases processing speed. Ultimately these key factors have led to the development and growth of the ERP market in South Africa (Frost & Sullivan, 2008).

The continued growth and proliferation of ERP systems present new challenges for auditors (Kelechi, 2007). In particular, ERP systems create substantial concerns about business interruption, system security, database security, and process inter-dependency (Girhard & Farmer, 1999). As technological developments continue, auditors may need to expand their technological knowledge and skills in order to perform effectively and efficiently in audit functions (Kinney, 2001). The audit of an ERP system requires the information technology audit and assurance professional to have specific knowledge and an understanding of the complex features and integrated processes built into, and required for, the successful implementation, use and control of specific vendor products (ISACA, 2003). This assertion is further strengthened by the Public Company Accounting Oversight Board (PCAOB) (2008) which specifically states that auditors will find it necessary to understand fully the risks associated with new and advanced business information systems and the controls that are needed to respond to those risks (Hunton, Wright & Wright, 2004). Auditors will also find that they must expand their technological knowledge and skills, devise more effective audit approaches by taking advantage of technology, and design different types of audit tests to respond to new business processes (Kinney, 2001). Highly skilled technology specialists will become even more essential members of audit engagement teams (Public Company Accounting Oversight Board 2008)

Since ERP systems represent an increasingly common choice among many major corporations across the world, one would expect a great deal of interest and activity in this area from audit researchers. However, to the researcher's knowledge, no prior auditing studies have been conducted in South Africa to investigate the impact of implementing ERP systems on the audit approach by external auditors. Kelechi (2007) investigated the impact of ERP systems on the audit process in a European setting,

concentrating on whether changes existed when auditing an ERP implementing company compared to a non-ERP implementing company and if such changes were beneficial to auditors. The paper did not specifically focus on the statutory external audit process but rather discussed views related to auditing the ERP implementation process itself. Hunton *et al* (2004) examined the extent to which financial auditors recognised differences in risk associated with ERP systems and their propensity to seek consultation with technology professionals in their firms. They found out that financial auditors were highly confident in their ability to assess risks in both an ERP and non-ERP environment and those financial auditors were unlikely to engage the services of the Information Systems risk management practice within their firm to assist in assessing computer system risks in an ERP system environment. This finding suggests that potential financial statement and audit risks may go unidentified.

In line with the various views from different academic researchers, this paper seeks empirical evidence in a South African context to investigate the auditing approach in companies that have implemented new ERP systems compared to companies running on non-ERP systems.

### **1.3 Problem statement**

#### **1.3.1 Main problem**

Investigate the effect of implementing an Enterprise Resource Planning System on the conventional statutory external audit process in South African companies.

### **1.3.2 Sub-problems**

The first sub-problem is to examine how auditors approach the conventional annual external audit process in South Africa.

The second sub-problem is to describe the key changes that are brought about by an ERP system implementation, the audit risks, and the impact of those risks on the audit approach.

### **1.4 Significance of the study**

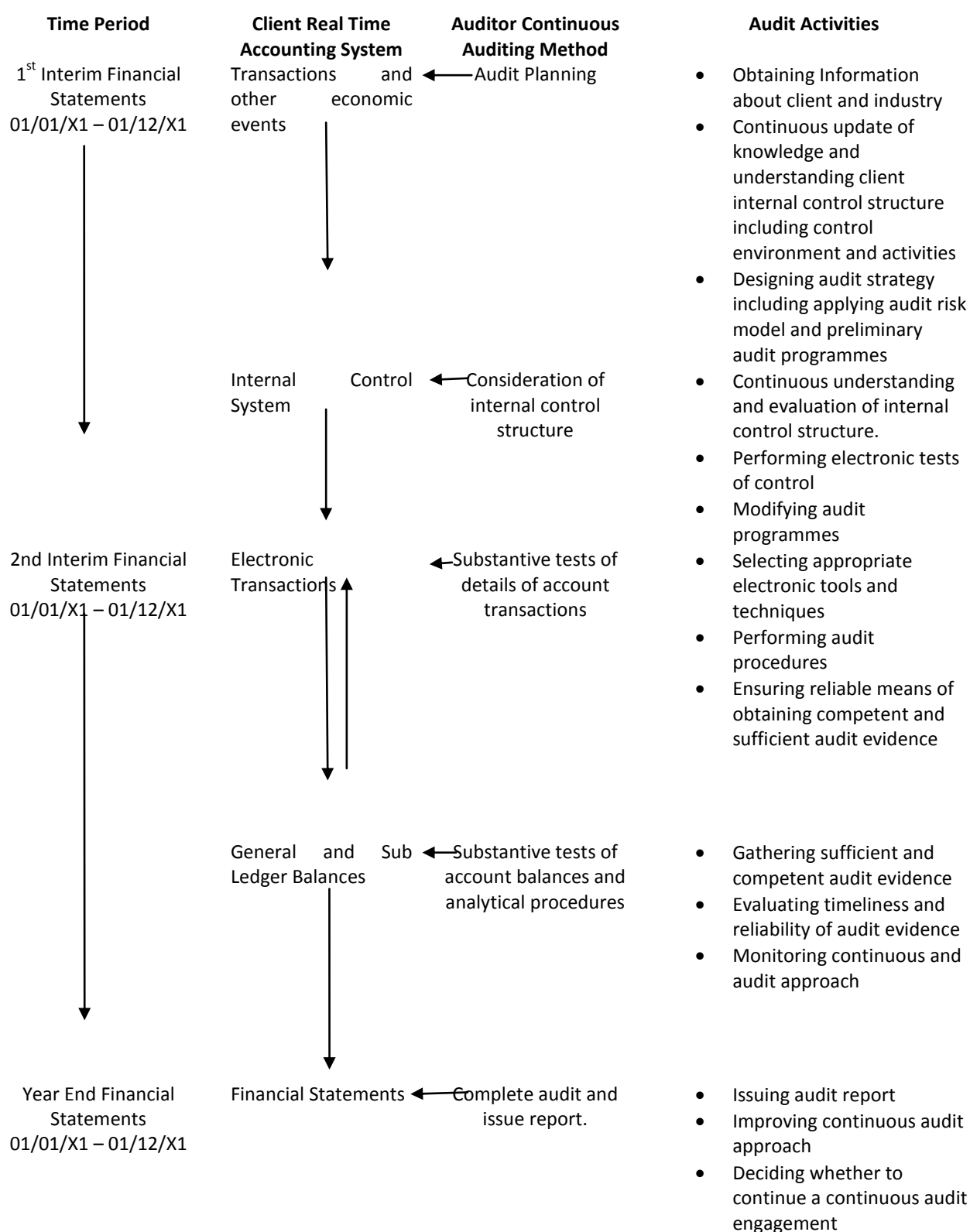
The study fills a gap in that there is currently no significant research addressing the impact of implementing ERP systems on statutory external auditing in South Africa. According to research carried out by Frost and Sullivan (2008), the demand for ERP systems from South African users continues to rise, boosted by the low cost systems available to the mid- and low-end enterprise markets. With the increased saturation in the high-end enterprise market, it is anticipated that more products will be developed to meet the needs of this market base. The mid and low-end enterprise markets, which account for the biggest client base in the country, have over 700 000 enterprises that are represented in this category as compared with less than 60 000 in the high-end enterprise market. At present, only a fraction of small and medium enterprises uses ERP systems. However, the speed in business transformation indicates that businesses will continue to implement new ERP systems to meet the business needs and Kelechi (2007) observed that auditors are faced with the daunting task of auditing in an ERP environment where internal control systems may seem to have been compromised.

The study will provide guidance to professionals working in external audit functions who wish to understand how to audit in an ERP-enabled environment. The report will also help finance and business executives understand the various risks to auditing that emanate from implementing new ERP systems.

### **1.5 Delimitations of the study**

This study addresses the effect of implementing an ERP system on the traditional annual audit process of South African companies which is depicted in Figure 1. Figure 1 illustrates the timeline and audit activities that are conducted from the issue of interim financial statement to year end. It explains the audit activities that take place in the traditional accounting and audit cycle. This audit process is generic and assumes a similar approach in auditing regardless of whether the audit is in an ERP/non-ERP-enabled environment.

## The Accounting Cycle and Related Audit Process



**Figure 1 : Typical ERP System Modules**

The study examines the effect of implementing an ERP system that informs the approach to audit activities. This is in essence a comparison of the audit activities between an ERP environment and a non-ERP environment. The study will not attempt to address any issues related to the methodologies adopted in the implementation of ERP or how well the ERP systems are implemented. Rather the focus will be on the changes that ERP systems bring, and which will have an effect on the statutory external audit process.

## **1.6 Definition of terms**

**Enterprise Resource Planning System (ERP):** automated business management system that integrates the full spectrum of an organisation's functions in order to manage all business resources more efficiently (Monk & Wagner, 2006).

**External Audit / Annual Audit:** an examination of financial statements with the objective being to express an opinion on whether the information presented in the financial statements reflects the financial position of an organisation at a given date (Association of Chartered Certified Accountants, 2009; Monk & Wagner, 2006).

**Auditor(s):** an independent firm engaged by a client required to do an audit to express an opinion on whether a company's financial statements are free from material misstatements whether due to fraud or error. For publicly traded companies, the firm may also be engaged to perform other agreed procedures related or unrelated to financial statements (Association of Chartered Certified Accountants, 2009).

**Audit Partner:** a person who is a member of the audit engagement team (who has responsibility for decision-making on significant auditing, accounting, and reporting matters that affect the financial statements or

who maintains regular contact with management and the audit committee (Barlow, Helberg, Large & Le Roux, 2005).

**IS Auditor:** Information Systems Auditor.

**ISACA:** a leading global provider of knowledge, certifications, community, advocacy and education on information systems assurance and security, enterprise governance of IT, and IT-related risk and compliance.

**Public Company Accounting Oversight Board (PCAOB):** a private-sector, non-profit corporation created by the Sarbanes-Oxley Act, a 2002 United States federal law ,to oversee the auditors of public companies (Wikipedia, 2008).

**ISA:** International Standards on Auditing set independently and under its own authority, facilitating the convergence of national and international auditing and assurance standards. These standards contribute to enhanced quality and uniformity of practice in these areas throughout the world, and strengthen public confidence in financial reporting.

## **1.7 Assumptions**

The following assumptions have been made regarding the study:

- a. The total number of respondents will be sufficient to gain adequate data. This assumption was based on a precheck that was conducted by researcher on the total potential respondents to the study.
- b. The sample will be able to share information on auditing experiences honestly and truthfully.
- c. The respondent sample will reflect the general experiences of the auditing environments in which they have worked. Any non-representative views will skew the results of the study and reduce its validity.

There is a stable business reality of the subject under discussion.

## chapter 2

### **LITERATURE REVIEW**

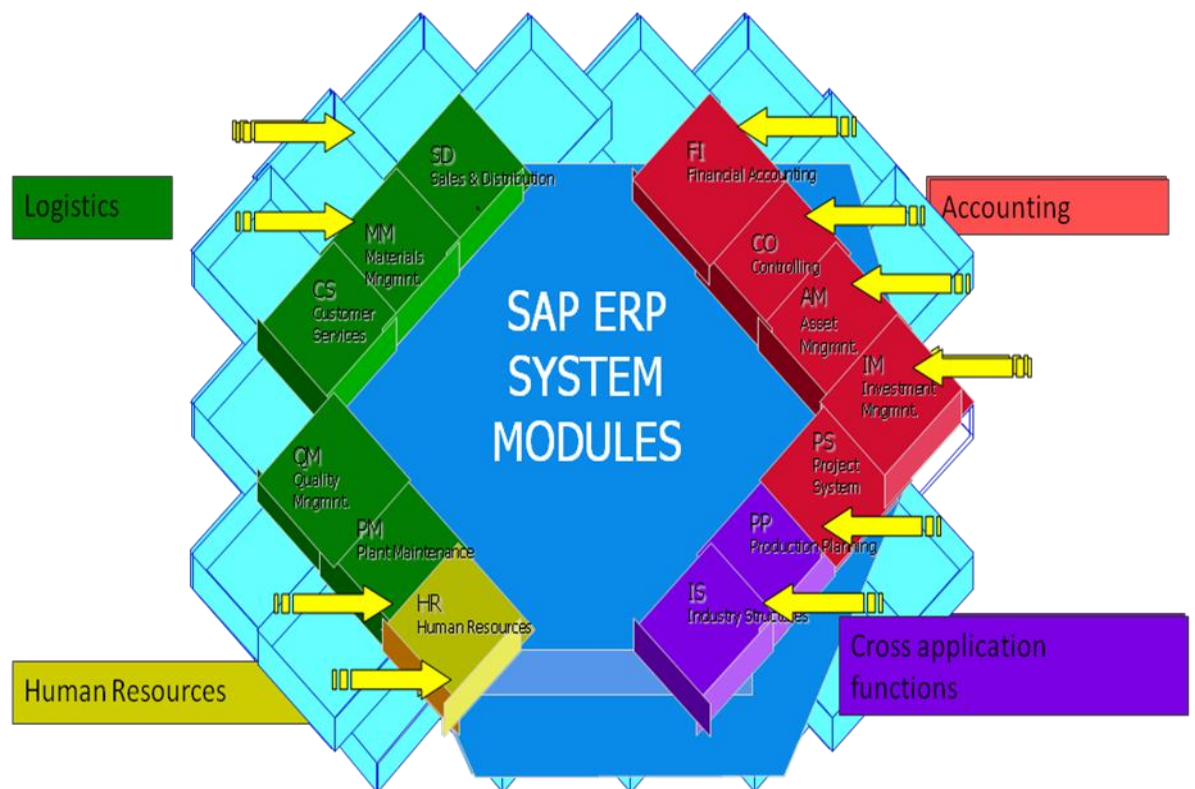
#### **2.1. Introduction**

This section contains a literature review on the key themes of relevance to this study. The first area is the traditional approach to an annual external audit, its process and its relevance to business. The second area is that of implementation of ERP systems in the automation of business processes and reporting and how an ERP systems implementation can influence the annual external audit approach.

#### **2.2. Definition of topic or background discussion**

External auditing has evolved from a routine checking of the books of account to a vital part of the governance process of companies (Marx, 2007). Factors such as the volume of transactions, information technology, globalisation, and the constant increase in the complexity and number of laws, regulations and standards governing entities and their auditors have all impacted drastically on the evolving role of the auditing profession (ISACA, 2003). The corporate collapses, business failures and fraudulent financial reporting scandals of the late 1990s and early 2000s led to a turbulent period and resulted in a credibility crisis for the auditing profession. Increasingly auditors are coming under scrutiny for their ability to give reasonable assurances in an ever-changing environment (Marx, 2007). The implementation of ERP systems in an organisation is usually accompanied by business process changes and these present a new set of complexities that must be dealt with by the external auditor (Hahn, 2009).

ERP systems encompass numerous business applications that cut across business operational areas such as customer relationship management, financial management, supply chain management, support services and business intelligence, amongst others. Figure 2 below illustrates modules of one of the world's most widely used ERP systems, SAP. As can be seen from the illustration, ERP systems integrate various business processes, giving a platform where business data and information can be centrally managed. The cross-functional applications in ERP systems enable business to handle logistics, accounting and operations as well as human resources.



<http://www.sysoft.eu/en/amarcoCase/sap-position.asp>

**Figure 1: Typical ERP System Modules**

Successful adoptions of ERP systems have also been linked to enterprise-wide re-engineering efforts and implementation of best practices (Scheer & Habermann, 2000). According to Hunton *et al* (2004), ERP systems bring about changes in internal control, business process, and segregation of duties. Typically, organizations may need to re-engineer business processes and make essential changes for successful implementation of ERP systems.

### **2.3. External Auditing Approach in South Africa**

An external audit involves an examination of a company's financial statements with a view to expressing an opinion as to whether the information presented in the financial statements reflects the financial position of a company at a given date (Centre for Audit and Quality, 2011). In South Africa, the use of the word external audit is regulated by the Auditing Profession Act of 2005. specifically in Section 41 of the Act where a person who is not registered under this Act is prohibited from being called an external auditor. The main duty of a registered auditor is emphasized in Section 44 as being the expression of an opinion on whether the financial statements fairly present, in all material respects, the financial position of the entity and the results of its operations and cash flow in accordance with the basis of an accounting and financial reporting framework (South Africa, 2005). The registered auditor's duty is therefore an expression of an opinion on the financial statements of an entity, subsequent to the performance of an audit (Independent Regulatory Board for Accountants, 2009)

### **2.3.1 Role of External Audit**

Managers often feel under pressure to portray their entities in a favourable light when they report to any interested parties. This is one reason why standard-setting structures have a detailed set of accounting standards to regulate the presentation of contentious items in the financial statements (CIMA Publishing, 2009). There is, however, an even more fundamental issue that must be addressed in the financial reporting process. It is not enough merely to publish rules and regulations governing the financial statements; there has to be some mechanism to enforce their implementation (Centre for Audit and Quality, 2011). Without enforcement, managers might distort the impression created by the statements in any number of ways. The nature of this distortion could vary from outright fabrication of the figures all the way through to the deliberate exploitation of a loophole in the system of rules (CIMA Publishing, 2009).

Auditing is largely about providing the readers of the financial statements a degree of confidence in the accuracy of the figures. This is highlighted by the accountancy profession's definition of an audit: it is defined as an exercise whose objective is to enable auditors to express an opinion as to whether the financial statements give a true and fair view ... of the affairs of the entity at the period end and of its profit or loss ... for the period then ended and have been properly prepared in accordance with the applicable reporting framework (for example, the relevant legislation and applicable accounting standards) (CIMA Publishing, 2009).

The logic that underpins this definition is that the auditor's opinion will add credibility to the financial statements. The auditor is an independent expert on financial reporting and will have conducted exhaustive checks before signing the audit report (Barlow, *et al.*, 2005).

### 2.3.2 The process of External Audit

Auditors are continually facing intense pressure to be more efficient in conducting audits without compromising quality and effectiveness (Krishnamoorthy, 2002). Generally the audit processes follow a process structure as illustrated in Figure 3.



<http://www.audit.ucsb.edu/what-external-audit-process>

**Figure 2: The External Audit Process**

#### Stage 1 – Initial Planning Process

The initial audit planning process details the objectives and steps required to fulfil the audit objectives. In any audit this will begin with a preliminary assessment of the control environment by reviewing existing standards and procedures. During the audit these standards and procedures should be assessed for completeness and operational efficiency. The preliminary

survey should identify the organisational strategy and the responsibilities for managing and controlling development. The auditor can provide reasonable assurance that the auditor understands the business and the accounting processes and process level controls (Gallegos, Manson & Allen-Senft, 2000). The planning process will typically achieve the following:

- a. Gather preliminary information about the client
- b. Mobilise team to conduct the audit
- c. Perform a preliminary risk assessment.

## **Stage 2 – Develop the Audit Plan**

The development of the audit plan details the steps to be conducted to fulfil the audit objectives. A high level account balance assessment is conducted to establish whether there are any potential account level errors. It is also at this stage that the scope of reliance on the work of other experts such as internal auditors or IS auditors is determined. It is important to discuss the key outcomes of this process which are the following.

### *a) Risk Assessment*

The risk assessment at this stage involves estimating a risk co-efficient or score to be associated with each auditable unit within the organization. Risk assessment is typically undertaken to focus attention on significant audit areas, to allocate scarce audit resources to the most important audit areas, and to help with key audit prioritizing decisions such as audit frequency, intensity and timing (Association of Chartered Certified Accountants, 2009). Audit risk is fundamental to the audit process because auditors cannot and do not attempt to check all transactions. It would be impossible to check all of these transactions, and few people would be prepared to pay for the auditors to do so, hence the importance of risk-based approaches toward auditing (Barlow, *et al.*, 2005).

Traditionally, auditors have used a risk-based approach in order to minimise the chance of giving an inappropriate audit opinion (Jones, 2010).

#### *b) Work of Experts*

According to ISA 620, “Using the Work of Experts”, auditors can utilise the work of other experts provided that the auditors have obtained adequate understanding of the scope of other experts’ work and the competency and capabilities of the experts to provide relevant conclusions on the work that they are relied on (Association of Chartered Certified Accountants, 2009). In this process auditors engage with internal auditors and other subject experts to determine the nature and extent of the work to be utilised by the auditor and what further work the auditor will need to conduct to obtain appropriate and sufficient evidence for the audit opinion.

#### *c) Tests of Control*

Tests of controls are audit procedures performed to test the operating effectiveness of controls in preventing, detecting and correcting material misstatements at the relevant assertion level. While always an option, tests of controls are necessary in two circumstances: when the auditor’s risk assessment includes an expectation of the operating effectiveness of controls and when substantive procedures alone do not provide sufficient appropriate audit evidence. Some examples of tests of controls include: inquiries of management and other staff, observation of the application of specific controls, walk-throughs and re-performance and inspection of documents, reports and electronic (Eilifsen, *et al.*, 2010).

Substantive procedures are used to detect material misstatements (i.e. monetary errors) in a transaction class, account balance or disclosure element of the financial statements. There are two categories of substantive procedures (Barlow, *et al.*, 2005):

- Tests of details of classes of transactions, account balances and disclosures, which test for errors or fraud in individual transactions and details of account balances (Barlow, *et al.*, 2005).
- Substantive analytical procedures, which involve a comparison of recorded values with the auditor's expectations. They help the auditor to understand the client's business, direct attention to high-risk areas, identify audit issues that might not otherwise be apparent, provide audit evidence, and assist in the evaluation of audit results (Jones, 2010).

It must be noted that tests of controls check the operating effectiveness of controls, while substantive tests test monetary misstatements. However, it is often more efficient to undertake dual purpose tests. Dual purpose tests conduct both tests of controls and substantive test of transactions simultaneously on the same document.

Analytical procedures are relatively inexpensive tests to perform. The purpose of the testing and client specific details will dictate the type of analytical procedure to be used to form an expectation and the techniques used to investigate a significant difference. Analytical procedures can range from simple trend analysis to use of complex regression models (Eilifsen, *et al.*, 2010).

### **Stage 3 – Perform Audit Plan**

This stage involves the implementation of the procedures specified in Stage 3 of the audit process. All the substantive tests and tests of controls are rolled out on the audit information.

## **Stage 4 – Report and Assess Performance**

This is the final stage of the audit process. The audit partner summarises all the data collected and assesses the information from the audit team. Based on the audit evidence collected, the partner expresses an audit opinion on the financial statements. In the audit report, that partner specifies the responsibilities of the auditor, their approach to the audit and any explanations that may be deemed to be necessary.

### **2.4. ERP Systems**

ERP systems are business process supporting systems. Common features include organization-wide integration, information transparency and process automation (Chand, Hachey, Hunton & Owoso, 2006). Several organizations in South Africa, such as Rand Refinery Limited, AngloGold Ashanti and Lonmin, are currently implementing and utilizing ERP systems in order to support their business. ERP implementations are different from “traditional” systems analysis and design projects. Among the significant differences are the scale, complexity, organizational impact, and the costs of ERP projects and subsequent business impact if the project does not succeed. An ERP implementation will impact the entire organization, whereas a traditional project often impacts only a limited area of the organisation (Gallegos, *et al.*, 2000). Furthermore, ERP projects are almost always associated with the re-engineering of business practices. This results from the desire to adopt the “best practices” inherent in the chosen software solution rather than changing the software to match current business practices (Chand, *et al.*, 2006). These changes present new challenges for auditors auditing in such an environment.

### **2.4.1 Key Audit Risks with ERP Implementations**

#### **a) Technical Complexity**

ERP systems do not always neatly fit the traditional distinction between “custom-built” software and “off-the-shelf” package in several important (Scheer & Habermann, 2000). As such, the scope of ERP implementations is much broader and packages typically integrate many formerly discrete applications around a common database either by unique configuration or by customisation (Lars, Armin, & Lynne, 2001). They enable adopters to integrate data and processes throughout the organization and they support nearly all functions, e.g., accounting, human resources, operations and logistics. This means that ERP systems are much more complex than traditional packages, requiring more knowledge, effort and skill to adapt them to the characteristics of a particular organization. Because of the way ERP packages are designed, some sort of configuration and customisations may be *always* required to get them up and running to meet specific needs of an organisation. However the extent of the configuration and customisation can vary from one organization to the next, based on a number of factors (Frost & Sullivan, 2008). One factor is the degree of fit between the features and functions of the package and the business processes of particular organizations and the uniqueness of specific business models that will need to be maintained from a commercial point of view (Hahn, 2009).

The technical complexities that arise from implementing new ERP systems will present new challenges for external auditors (Kelechi, 2007). For example, ERP access and authorization tables for a Treasury business section could be modified to identify failures to maintain appropriate segregation of duties. However, even with this technology underpinning, traditional audit processes which often relied on

representative samples, rather than assessing the entire population may also need to be modified (Institute of Internal Auditors, 2009). As a result, risk and control problems that arise with an ERP implementation will need to be identified and the audit approach needs to deal with it appropriately.

#### b) Re-engineered Business Processes

Typically an ERP implementation is combined with a business reorganisation and business process re-engineering process (Hahn, 2009). The organisational changes and new business processes might be extensive, resulting in controls being different from the traditional ones. Auditing of the business process and internal controls is thus likely to become the focus of the external audit tests (Marx, 2007).

### **2.4.2 Impact of ERP on the Audit Process**

Auditors are faced with the enormous challenge of working and keeping up to date with ERP technologies as well as the differences in configuration and customisation specific to individual organisations. ERP systems create seamless integration of information among cross-functional areas through automation of business processes (Chand, *et al.*, 2006). This differs from the traditional information flow in an organization where data is usually stored and isolated in a departmental structure.

ERP systems offer real-time access to information via a synchronised suite of modules, arguably creating an asymmetric gap between the accounting profession and the traditional audit process by removing traditional control mechanisms which auditors rely on. With such a level of integration, the audit profession is faced with the need to provide increased guidance for audits conducted in an ERP environment. Auditors are faced with the enormous challenge of auditing in an ERP environment where processes are integrated and control mechanisms can be difficult to understand.

Consequently auditors will need to rely on various audit-related tools and software applications to access information in the system (Kelechi, 2007).

## **2.5. Conclusion of literature review**

The literature reviews reveals that the approach adopted by auditors in the annual audit process is critical in arriving at the audit opinion. The pursuit of technological competitive advantage has led to a number of companies implementing ERP systems to support business processes and achieve operational excellence. However, the implementation of ERP systems does raise some audit and control risks .The question of whether the audit approach to auditing in a new ERP environment has to change and follow specific steps is not conclusively covered by the literature and it is the aim of this study to provide empirical evidence regarding the effect of implementing a new ERP system to the audit approach.

### **2.5.1 Research Question 1**

Of the companies that implemented ERP systems, to what degree and how is the auditing approach different to that of companies that have not implemented an ERP system?

### **2.5.2 Research Question 2**

What are the risks that new ERP systems bring to an organisation and what procedures and processes do auditors take to mitigate those audit risks?

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Overview**

This section outlines the methodology used to conduct this research. Firstly, the literature around qualitative research will be discussed, followed by a review of the research design and research instruments used. Issues of data collection and analysis in relation to this study will be provided, followed by a discussion on the validity and reliability of this study.

#### **3.2 Research methodology /paradigm**

This study used a qualitative methodology in order to gather appropriate data to answer the research questions. Qualitative research is empirical research where the data are not in the form of numbers (Punch, 2005). Quantitative research tends to involve collecting and analysing information in many forms, and on exploring in as much detail as possible smaller numbers of instances or numbers or examples which are seen as being interesting or illuminating, and aims to achieve depth rather than breadth (Blaxter, Hughes & Tight, 2010). Several factors called for the qualitative methodology approach to this research. The outcome-oriented nature of the subject that was under research was seeking facts as to whether there are changes in audit approach as a result of implementing an ERP system. Differences in audit approaches by different auditors also suggested that a qualitative analysis can take into account the particular set of circumstances under which the data was collected (Saunders, Lewis

& Thornhill, 1999). A stable reality was assumed in the use of a qualitative methodology to the study.

The collection of data in this research was done through a combination of methodologies. Survey questionnaires were initially sent to respondents with specific one-word answer questions on a Likert scale. Questionnaires were suitable for this study given the enormous range of occupations and work settings in which the respondents operated.

To further clarify and obtain explanations, a series of in-depth interviews was conducted, modelled in such a way as to elicit responses on issues that needed explanation. Further questions were followed up in writing. The choice of the in-depth interviews was also suitable for the purposes of obtaining clarity, although it was difficult to obtain all the interviews that had been intended for different reasons.

### **3.3 Research Design**

The research design was in form of an exploratory study and a survey was utilised in this study. Surveys have been found to be ideally suited for small-scale research with limited resources (Blaxter, *et al*, 2010) as is the case with this study.

Surveys involve systematic observation and systematic interviewing, and pose the questions which the researcher wants answered; they may also suggest the range of answers that may be given (Sapsford, 1999).

Pertaining to this study, the advantages of surveys were as follows:

1. The survey sample was deemed to be sufficient representation to provide a result.
2. The survey was relatively easy and quick to administer through [www.surveymonkey.com](http://www.surveymonkey.com) and could be distributed through several different ways i.e. e-mail and sharing of survey link.

The disadvantages of surveys pertaining to this study were as follows:

1. The truthfulness and accuracy of the responses to the surveys were not validated at a 100% level of accuracy. All responses were assumed to be true, and although the full response outcome was triangulated, there were clear indications in the responses where respondents did not fully understand a particular question.

### 3.4 Population and sample

#### 3.4.1 Population

The population of this study consisted of auditors and risk management professionals who work for audit firms specialising in audit services. The audit companies selected for the survey and expected survey respondents are listed in Table 1.

**Table 1: Profile of respondents**

| <b>RESPONDENT AUDIT FIRMS (Survey Respondents)</b> |                                                |
|----------------------------------------------------|------------------------------------------------|
| Deloitte and Touché (50)                           | BDO Spencer Stewart International (50)         |
| Price Water House Coopers and Lybrand (50)         | PDT & Co. Chartered Certified Accountants (20) |
| KPMG (50)                                          | RSM International (20)                         |
| Ernst and Young Services Ltd (50)                  | PKF (30)                                       |
| Grant Thornton (50)                                | Baker Tilly Morrison and Murray (30)           |

### **3.4.2 Sample and sampling method**

A non-probability sample was used. This method was considered appropriate because a probabilistic approach had been judged to be unnecessary in this study since questionnaires and in-depth interviews were used. The samples for this research were auditors who have had experience auditing in both ERP and non-ERP systems. For practical reasons, no prior selection was done to choose between auditors that had or had not been involved in auditing ERP systems. However, the survey respondents were asked to indicate whether they had experience in auditing both ERP/non-ERP systems, and the usability of the data was determined from the responses given by the auditors.

The questionnaires for this study were administered using a web-based questionnaire. To encourage respondents to participate, a R250 book gift was promised and awarded to two respondents randomly selected from all completed questionnaires. For the in-depth interviews, senior auditors were requested by e-mail and/or by telephone. They were given a brief of the objective of the proposed meeting and expectations. Whenever the selected individuals for the interviews were unavailable, the alternative was requested and contacted. Table 2 shows the profile of the proposed interviewees who were contacted and whether they had ERP/non-ERP experience.

**Table 2: Profile of interviewees**

| <b>Audit Firm</b>                         | <b>No. of Interview Respondents Contacted</b> | <b>No. of Interview Respondents who had both ER/Non ERP System Audit Experience</b> | <b>No. of Interview Respondents Requested for interviews</b> |
|-------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------|
| Deloitte & Touche                         | 4                                             | 4                                                                                   | 2                                                            |
| Price Waterhouse Coopers & Lybrand        | 3                                             | 2                                                                                   | 2                                                            |
| KPMG                                      | 4                                             | 4                                                                                   | 2                                                            |
| Ernst and Young                           | 2                                             | 2                                                                                   | 2                                                            |
| Grant Thornton                            | 2                                             | 2                                                                                   | 2                                                            |
| BDO International                         | 2                                             | 2                                                                                   | 2                                                            |
| PDT & Co. Chartered Certified Accountants | 3                                             | 2                                                                                   | 2                                                            |
| PKF                                       | 3                                             | 2                                                                                   | 2                                                            |
| Baker Tilly & Morrison                    | 2                                             | 2                                                                                   | 2                                                            |
| RSM International                         | 2                                             | 1                                                                                   | 1                                                            |

### **3.5 The research instrument**

The questionnaire and in-depth interviews were the research instruments of this study. The questionnaire which is provided in Appendix A was administered online. It consisted of 15 questions divided into three parts. The first part of the questionnaire was designed to obtain professional information about the auditor to determine whether they are qualified enough to give an opinion in this study. The second part of the questionnaire was designed to validate the research question of determining to what extent there are changes in audit approach when auditing in an ERP-enabled environment compared to a non-ERP environment. The third part of the questionnaire was designed to answer the second question about ERP audit risks and approaches to manage the risks. Questionnaires were used in this study and were relatively quick to gather information in a standardised manner.

Semi-structured interviews were used to follow the questionnaire data collection. The questions for the in-depth interviews which are listed in Appendix B were derived from literature review findings as well as any areas from the questionnaire that need further clarification and confirmation. Interviews were used because they provide the best opportunity for respondents to share information in a comfortable and familiar manner (Creswell, 2003). Another one of the advantages in using semi-structured interviews was that any interesting insights into the study could be explored and clarified in the conversations. However, the disadvantage with semi-structured interviews was that the interviews were time-consuming and also easily digressed and became sidetracked with anecdotes.

### **3.6 Procedure for data collection**

The approach taken to the data collection involved systematically gathering of information and recording it in a way that enabled conclusions on the study to be drawn. E-mail lists for auditors in each of the audit firms selected for the research were requested from the firms. An introductory cover note (Appendix C) was e-mailed to the auditors together with a web link for the questionnaire.

The interviews were pre-arranged with the selected audit seniors in the firms identified for the survey. Interviews were sought to be done with Johannesburg-based audit seniors at their respective corporate offices. This method was chosen to assist in preserving the business environment. In addition, the location was chosen to give an opportunity to further clarify any issues arising from the questionnaires as well as to gather data in supporting the assertions made by the respondents. Gestures and body language in giving responses by the respondents were also taken note of.

### **3.7 Data analysis and interpretation**

The data analysis procedure followed a qualitative data analysis system as described by Bogdan and Bicklen (1982). This involves organising the data, breaking it into manageable units, synthesising it, searching for patterns, discovering what is important and deciding what conclusions to draw (Bogdan & Bicklen, 1982). An inductive analysis was used, meaning that the critical themes of this study emerged out of the data collected.

Analysis of the data began with the identification of the key themes emerging from the data from questionnaires. This process is often called open coding (Strauss & Corbin, 1990).

During open coding the data from questionnaires and interviews is categorised into phenomenon observed from the responses to create a descriptive preliminary framework for analysis. Words, phrases and events that appeared to be similar were grouped into categories at this stage and gradually modified during the subsequent stages of the analysis that followed.

The next stage in the analysis of data involved re-examination of the categories identified to determine how they are linked. This process is sometimes called “axial coding” (Strauss & Corbin, 1990). The categories identified in the open coding process were re-evaluated with a view to acquire any new understanding of the phenomenon of interest as well as to explore any ramifications of the causal relationship assertions. At this stage, a descriptive content analysis was also applied to extract themes from the “big picture” as well as a determination as to whether sufficient data has been collected to support any interpretations.

The final stage of the analysis involved drawing conclusions and meaning from the data by creating a conceptual model which closely approximates the reality of the data. Patterns and trends of the data were used to draw the conclusions. The researcher verified and drew conclusions from questionnaire data during the semi-structured interview sessions.

There are two noteworthy limitations of this study: generalisability and longitudinal effects. The generalisability of these research findings is limited because they were generated in an exploratory qualitative inquiry. The research design was not intended to produce results that account for or predict the behaviour of a wide classification of people as most experimental, hypothesis-testing studies are. This liability was clear at the outset. However, because the inquiry generated relatively clear and specific grounded answers that can be applied to practical experiences, it was not difficult to design a series of focused hypothesis-testing studies to experimentally verify and expand the theory generated here.

### 3.8 Validity and reliability

This section evaluates the validity and reliability for this study. It is a necessary procedure in order to assess the quality of the study and its qualification to contribute to generally trusted knowledge. In this qualitative study the soundness of the research will be based on different validation from the traditional criteria for judging quantitative research. The criteria used is shown in Table 3 as the alternative criteria for judging qualitative research (Lincoln & Guba, 1985). The selection of the criteria is purely based on the argument that the traditional criteria of judging the soundness of research is based on the “belief in the assumption that what is known — be it an existent reality or interpreted reality stands independent of the enquirer and can be described without distortion of the enquirer” (Lincoln & Guba, 1985). In the opinion of the researcher, it does not make sense to be concerned with the “truth” or “falsity” of an observation with respect to an external reality, which is a primary concern of validity (Smith & Helshusius, 1986). Regarding this view, the alternative criteria reflect better validation of data collected in this study.

**Table 3: Criteria for Validation**

| <b>Traditional Criteria for Judging Quantitative Research</b> | <b>Alternative Criteria for Judging Qualitative Research</b> |
|---------------------------------------------------------------|--------------------------------------------------------------|
| internal                                                      | credibility                                                  |
| external validity                                             | transferability                                              |
| Reliabilit                                                    | dependability                                                |

#### 3.8.1 Internal Validity vs. Credibility

In conventional inquiry, internal validity refers to the extent to which findings accurately describe reality. Lincoln and Guba (1985) state that in principle it is impossible because one would have to know precisely the

nature of reality. However, a conventional researcher must postulate relationships and then test them (Hoepfl, 1997). Credibility is the test for this.

In this study the credibility criteria involved establishing that the results of this qualitative research are credible or believable from the perspective of the participant in the research. Since from this perspective, the purpose of qualitative research is to describe or understand the phenomenon of interest from the participant's perspective, the participants are the only ones who can legitimately judge the credibility of the results. Credibility was maximised by triangulation during the semi-structured interviews.

### **3.8.2 Internal validity vs. Transferability**

In conventional inquiry, external validity refers to the ability to generalise findings across different settings. Lincoln and Guba (1985) state that making generalisations involves a trade-off between internal and external validity and in order to make generalised statements that apply in many contexts, one can include only limited aspects of each local context. In this study any generalisation is a working hypothesis of the local conditions but not a conclusion. The test for validation for generalisation is transferability.

Transferability refers to the degree to which the results of qualitative research can be generalised or transferred to other contexts or settings (Lincoln and Guba, 1985). In this study transferability is primarily the responsibility of the one doing the generalisation depending on the degree of similarity between this study and the situation to be transferred to. To maximise transferability, a thorough job of describing the research context and the assumptions has been made central to the research. The person who wishes to "transfer" the results to a different context is then responsible for making the judgment on how sensible the transfer is.

### **3.8.3 Reliability vs. dependability**

In conventional inquiry, reliability refers to the extent to which results are consistent and yield the same results in repeated trials (Neuendorf, 2002). Lincoln and Guba (1985) state since there can be no validity without reliability, (and thus no credibility without dependability), a demonstration of validity is sufficient to establish reliability. In this study the test for reliability will be dependability. To enhance the dependability of this study, reviewers of this study examine both the process and the product of the research for consistency.

## **CHAPTER FOUR**

### **PRESENTATION OF RESULTS**

#### **4.1 Introduction**

In this chapter, the empirical findings of the survey responses are presented and described. A mixed research design was used to generate both quantitative and qualitative data. The demographics of the sample will be presented and compared with what the initial offering was expected to be. The findings of each question that was asked in the survey and its relationship to the research question will then be presented.

#### **4.2 Demographic profile of respondents**

The initial intention was to obtain auditor e-mail lists from the targeted audit firms and to send out five hundred e-mails to the audit firms. However, of the ten targeted audit firms, five agreed to give out e-mail addresses of auditors in their firms, whilst three firms requested the researcher to provide an online link to the survey that they promised to e-mail to auditors in their firms. Of the two remaining firms, they either declined the request for e-mail addresses or did not respond to the request.

With regard to obtaining demographic information of the respondents, the survey provided limited information. This was because the questionnaire was targeted at auditors at various audit firms and background information like age, gender or race was irrelevant. The underlying factor was to reach out to auditors with both ERP and non-ERP audit experience. To that extent, four questions relating to respondent information were asked and the results are presented in the following subsections.

#### 4.2.1 Question 1: Years Experience in Auditing

In Question 1 of the survey, respondents were asked to indicate how many years' experience they had in auditing and experience. They were asked to respond if their experience ranged between 0-2 years, 2-5 years, 5-9 years or +10 years. As of December 2012, 40.6% of the respondents had more than 10 years of audit experience. 31.2% had 5-9 years, 25.4% - 2-5 years and 2.9% less than two years experience. The bar chart in Figure 4 graphically depicts the findings to this question.

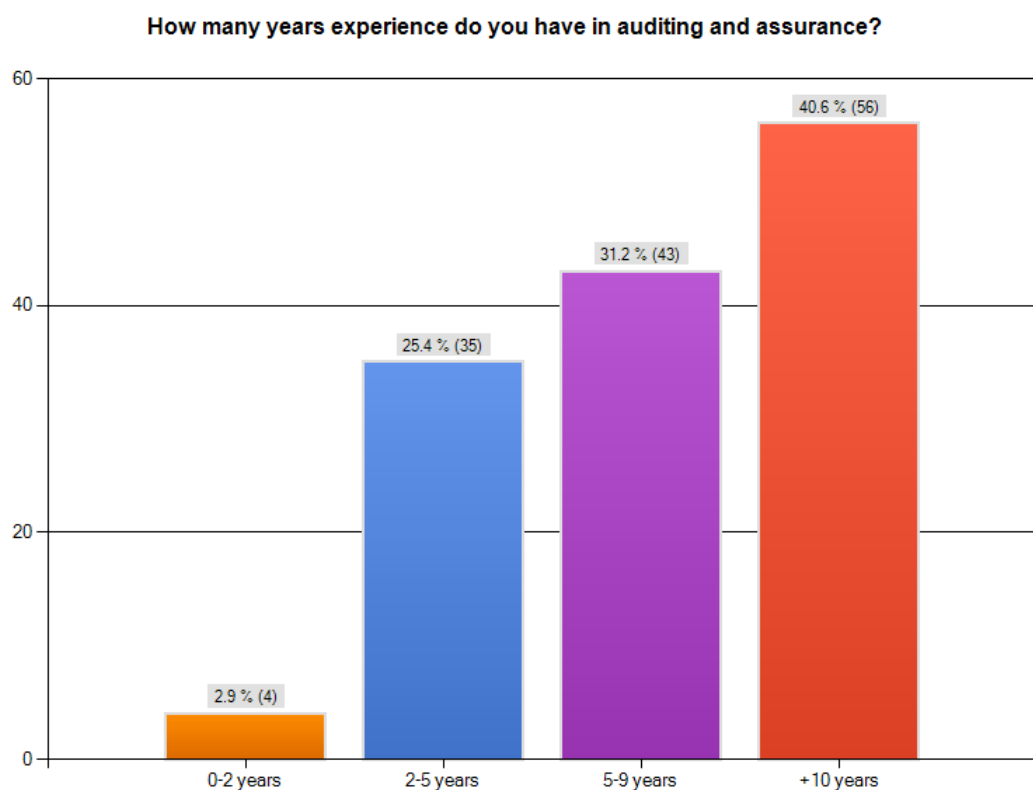
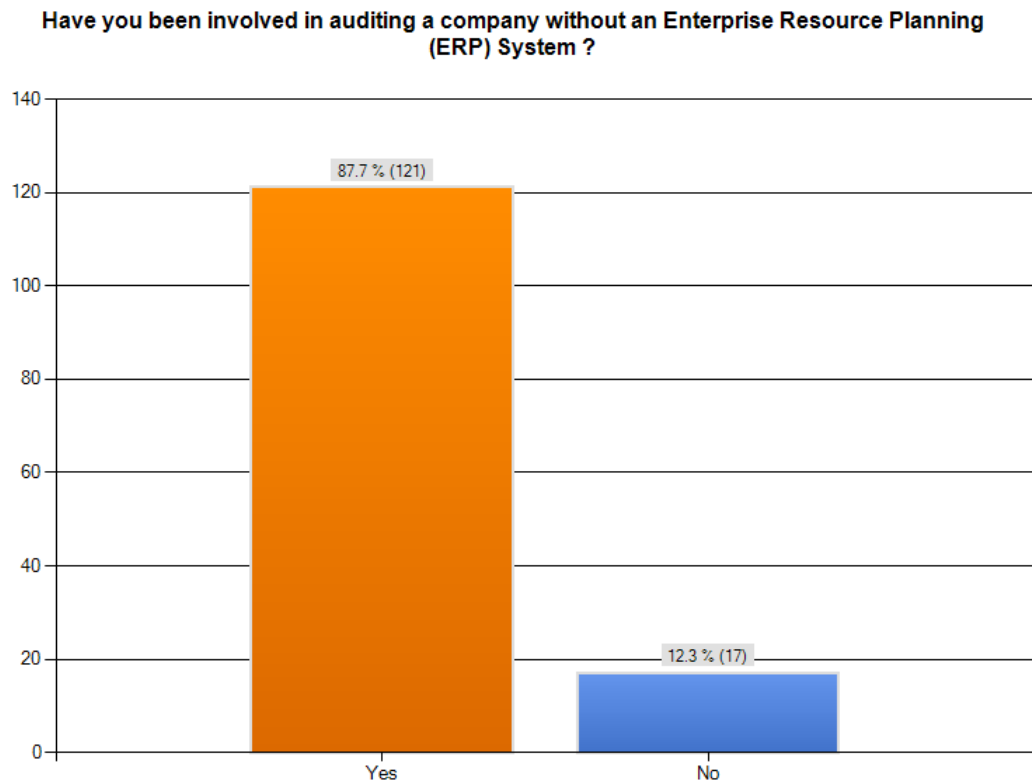


Figure 3: Respondent No of Years Auditing Experience

#### 4.2.2 Question 2: Experience in Auditing in a Non-ERP System

The second question of the survey requested respondents to indicate whether they had been involved in auditing any company without an ERP

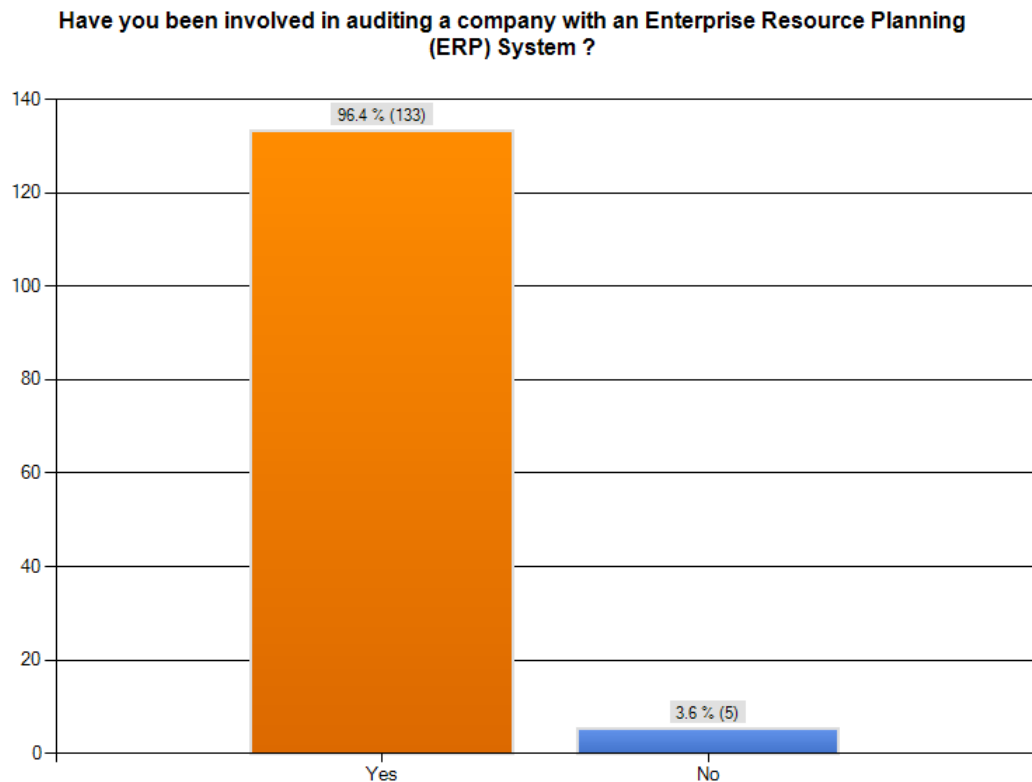
system. As can be seen in Figure 5, 121 of the 138 (87.7%) had at least been involved in auditing a company without an ERP system whilst 17 of the 138 (12.3%) had not been involved at all.



**Figure 4: Respondent Experience: Auditing in a Non ERP System**

#### **4.2.3 Question 3: Experience in Auditing in an ERP System**

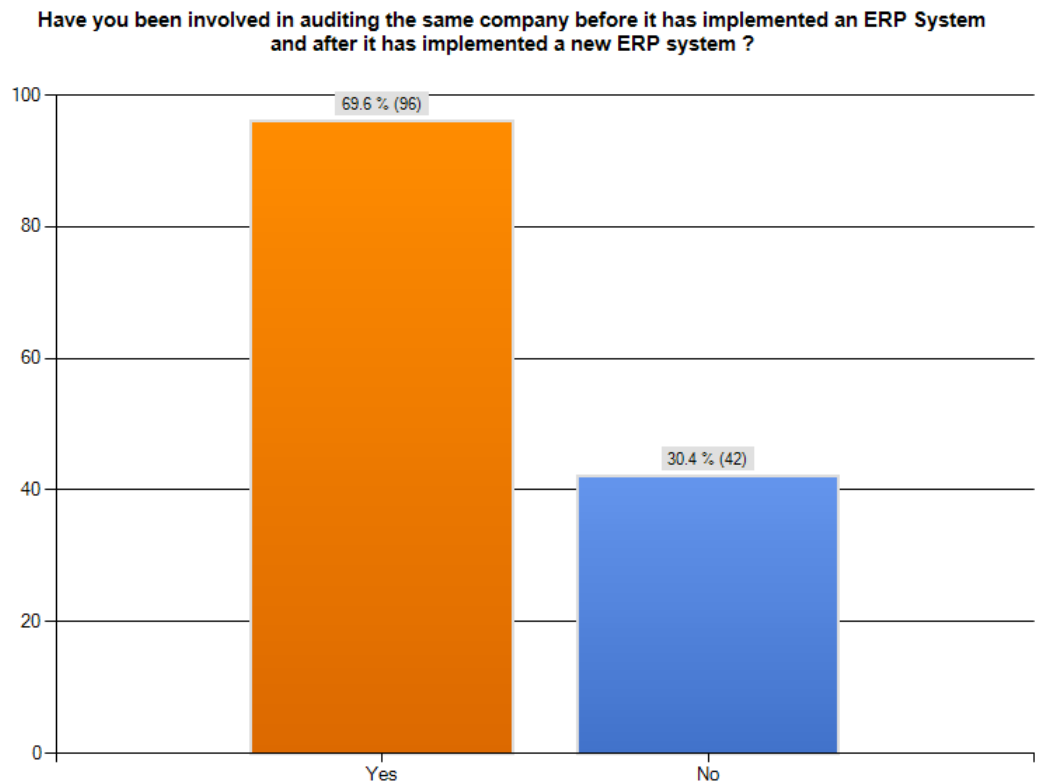
In the third question of the survey, respondents were asked to indicate by answering yes or no whether they had been involved in auditing any company with an ERP system. As can be seen in Figure 6, of the 138 respondents, 133 (96.4%) had audited at least a company with an ERP system whilst only 5 (3.6%) had not been involved at all in auditing in a company with an ERP system.



**Figure 5: Respondent Experience: Auditing in a ERP System**

#### **4.2.4 Question 4: ERP/Non-ERP Same Company Audit**

In Question 4, respondents were asked whether they have previously been involved in auditing the same company before the company had implemented an ERP system and after the same company had implemented a new ERP system. The responses, as presented in Figure 7, indicate that 96 (69.6%) of the 138 respondents had been involved in auditing the same company before and after that company had implemented an ERP system. However, 42 of the 138 (30.4%) had not been involved in auditing the same company before and after that company had implemented an ERP system.



**Figure 6: Respondent Experience: ERP/Non-ERP Same Company Audit**

#### **4.3 Results pertaining to Research Question 1**

##### **Research Question 1**

Of the companies that implemented ERP systems, to what degree and how is the auditing approach different to companies that have not implemented an ERP system?

In order to answer this research question, the respondents were given five statements that related to the approach that auditors take towards auditing in both an ERP and Non-ERP Environment. In the five statements, respondents were asked to rate their extent of agreement with the statement given. Four answer options were given, from which respondents had to select one response. The options were:

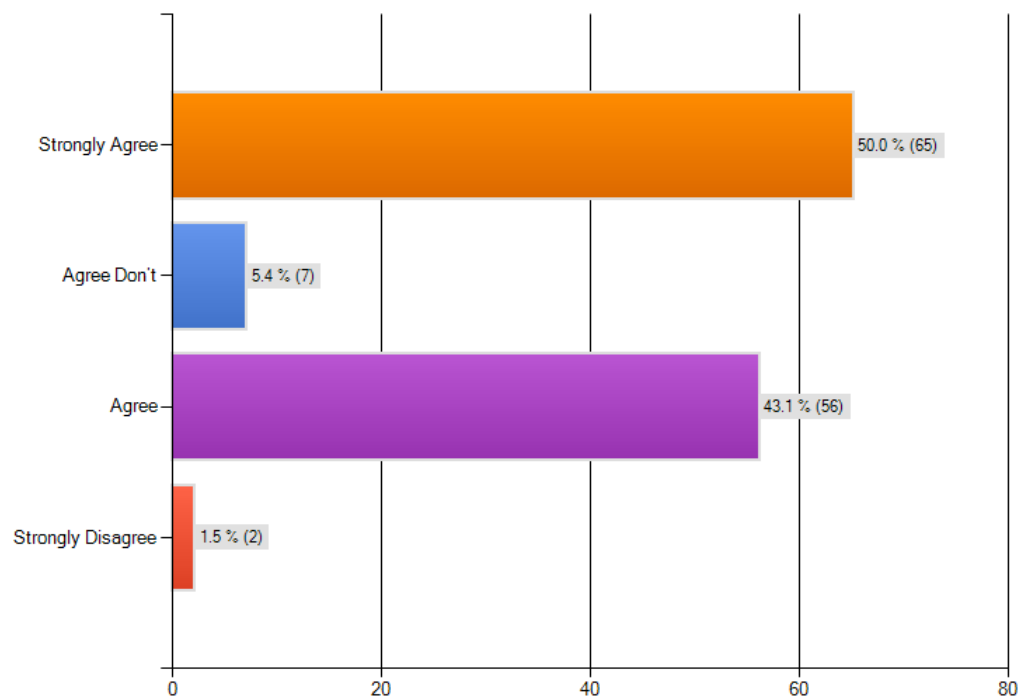
1. Strongly Agree
2. Agree
3. Do Not Agree
4. Strongly Disagree.

The results are presented and discussed in the following sub-sections.

#### **4.3.1 Research Question 5**

The responses to this statement indicated that 50% strongly agreed with the assertion whilst 43.1% agreed; 5.4% of the respondents disagreed with this statement, with 1.5% indicating that they strongly disagreed. The result of the survey response with absolute values is presented in Figure 8.

**Auditing in a company with an ERP System differs from auditing a company without an ERP system .**

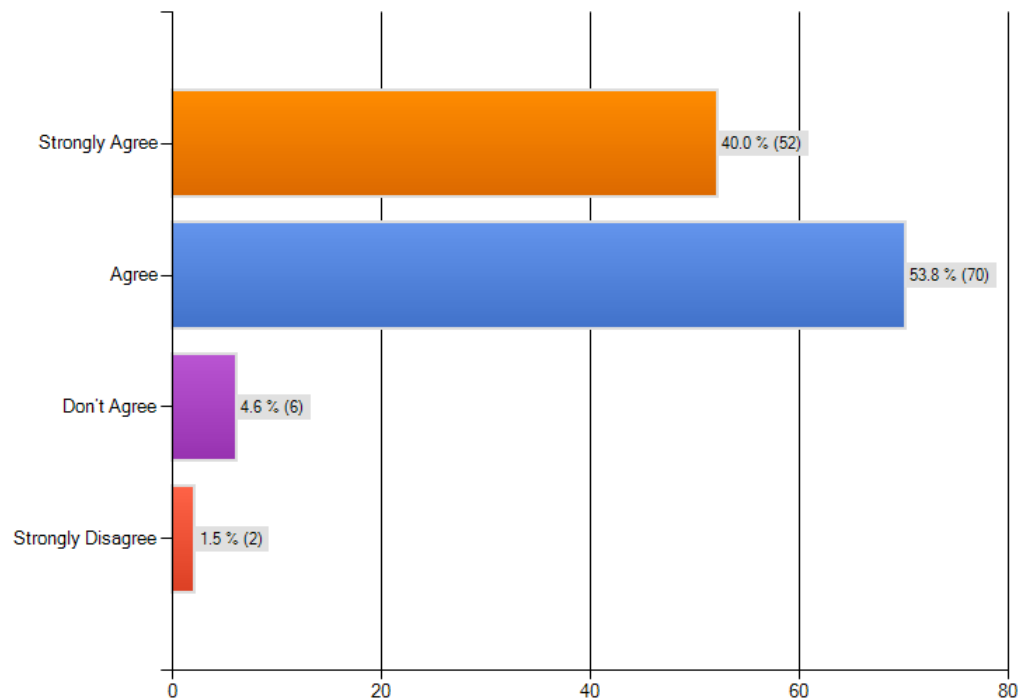


**Figure 7: Response Result Chart: Research Question 5**

#### **4.3.2 Research Question 6**

Of the 130 respondents, 52 (40%) indicated that they strongly agreed whilst 70 (53.8%) indicated that they agreed, whereas 6 (4.6%) did not agree with this statement and 2 (1.5%) indicated that they strongly disagreed.

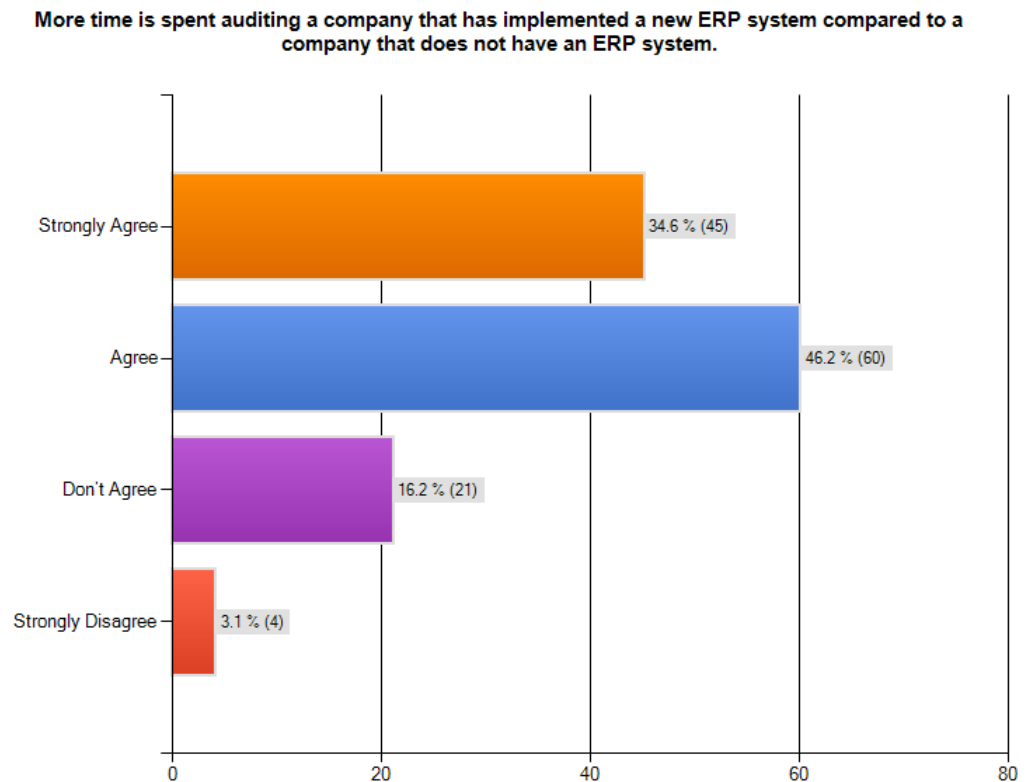
**Auditing in a company that has implemented a new ERP System differs from auditing the same company without an ERP System.**



**Figure 8: Response Result Chart: Research Question 6**

#### **4.3.3 Research Question 7**

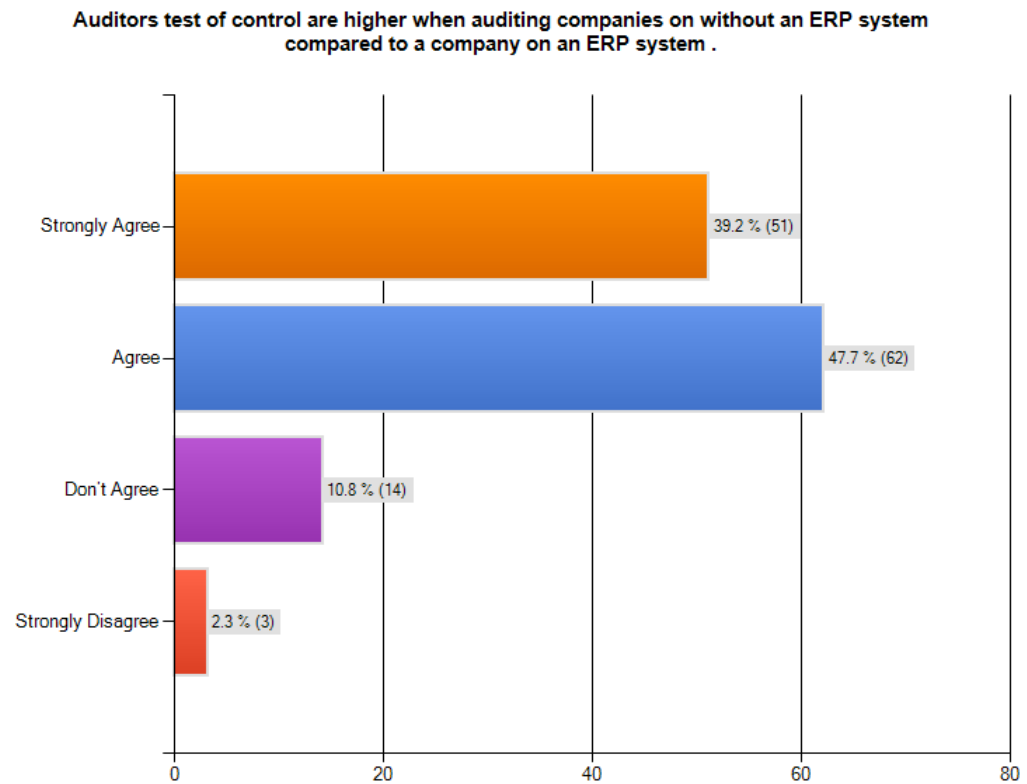
As shown in Figure 10 below, 45 respondents (34.6%) strongly agreed with this statement, with a further 60 respondents (46.2%) agreeing with the statement. However, 21 respondents (16.2%) did not agree with the statement and a further 4 respondents (3.1%) indicated that they strongly disagreed with the statement.



**Figure 9: Response Result Chart: Research Question 7**

#### **4.3.4 Research Question 8**

As can be seen on the chart in Figure 11 below, 51 respondents (39.2%) strongly agreed that auditors tests of control are higher in a Non ERP Environment compared to an ERP environment . 62 respondents (47.7%) further agreed . However 14 respondents did not agree to the statement with 3 more respondents (2.3%) indicating that they strongly disagreed with the statement.

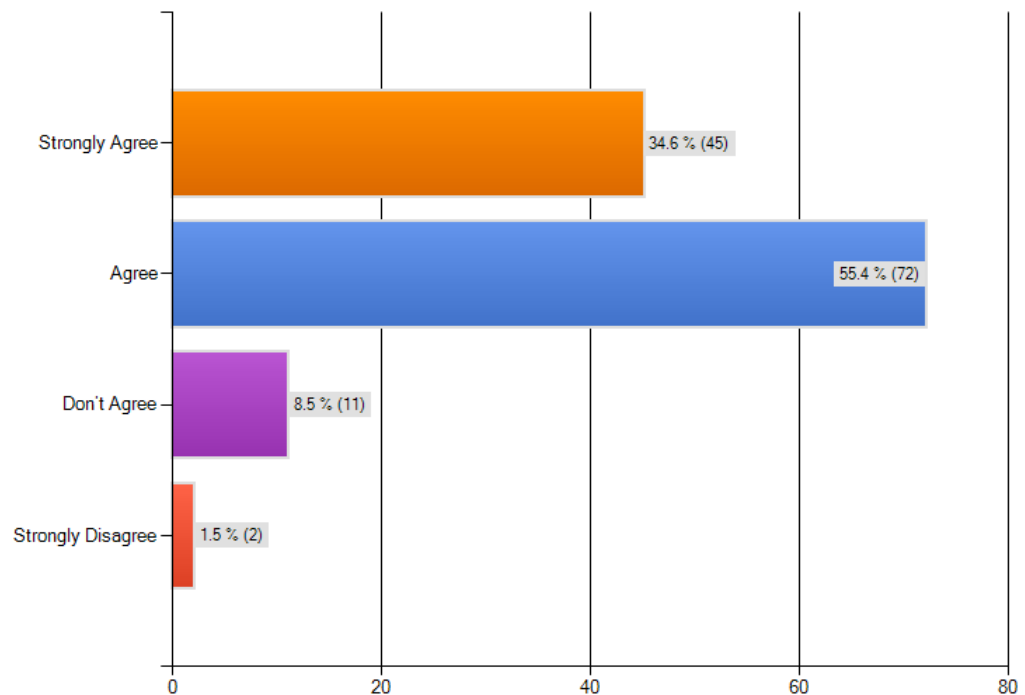


**Figure 10: Response Result Chart: Research Question 8**

#### **4.3.5 Research Question 9**

The responses to this statement indicated that 34.6% of the 130 respondents strongly agreed that tests of control are higher in a non-ERP environment compared to an ERP environment; 55.4 % agreed further but 8.5% did not agree and 1.5% of the respondents strongly disagreed.

**Audit substantive tests are higher when auditing companies without ERP systems compared to companies on an ERP system.**



**Figure 11: Response Result Chart: Research Question 9**

#### **4.4 Results pertaining to Research Question 2**

##### **Research Question 2**

What are the risks that new ERP systems bring to an organisation and what procedures and processes do auditors take to mitigate those audit risks?

In order to answer this research question, the respondents were given six statements that pertained to audit risks in both an ERP and non-ERP environment. Respondents were asked to rate the extent of their agreement with the statement given. Four answer options were given from which respondents had to select one, and these options were:

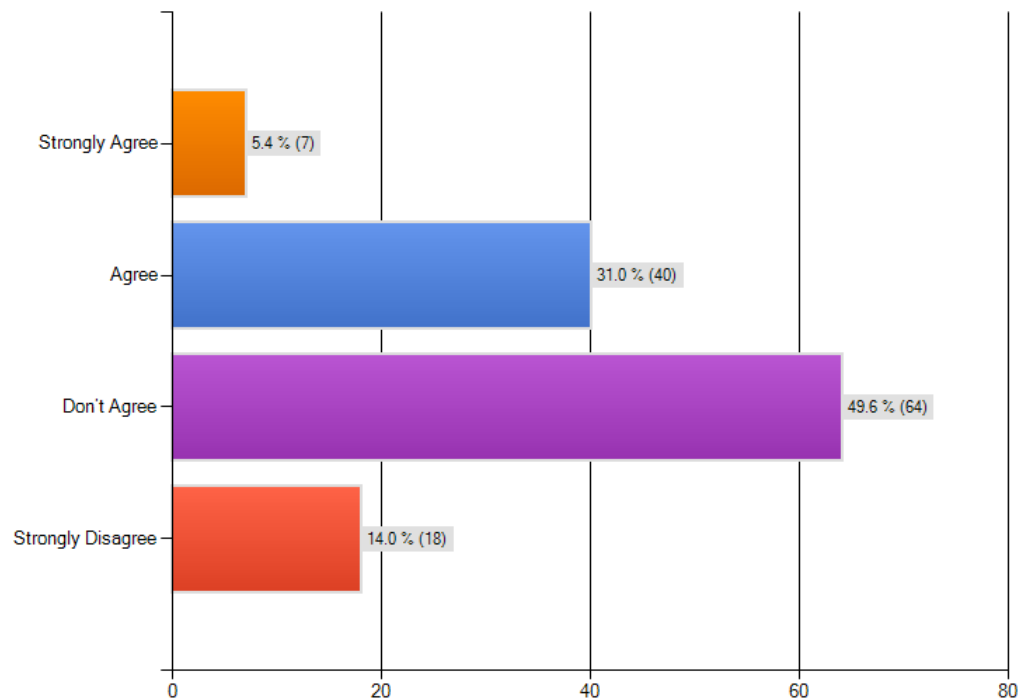
1. Strongly Agree
2. Agree
3. Do Not Agree
4. Strongly Disagree.

The results are presented and discussed in the following sub-sections.

#### **4.4.1 Research Question 10**

The responses to this statement indicated that 5.4% of the respondents strongly agreed with the assertion whilst 31% agreed. A total of 49.6% of the respondents disagreed that there is a high risk of giving an incorrect opinion in a company that has implemented a new ERP system. In further support of the 49.6% who disagreed, 14% strongly disagreed. The result of the survey response with absolute values is presented in Figure 13.

**There is a high risk of giving an incorrect audit opinion in a company that has implemented a new ERP system compared to auditing a company running on its traditional non-ERP system.**

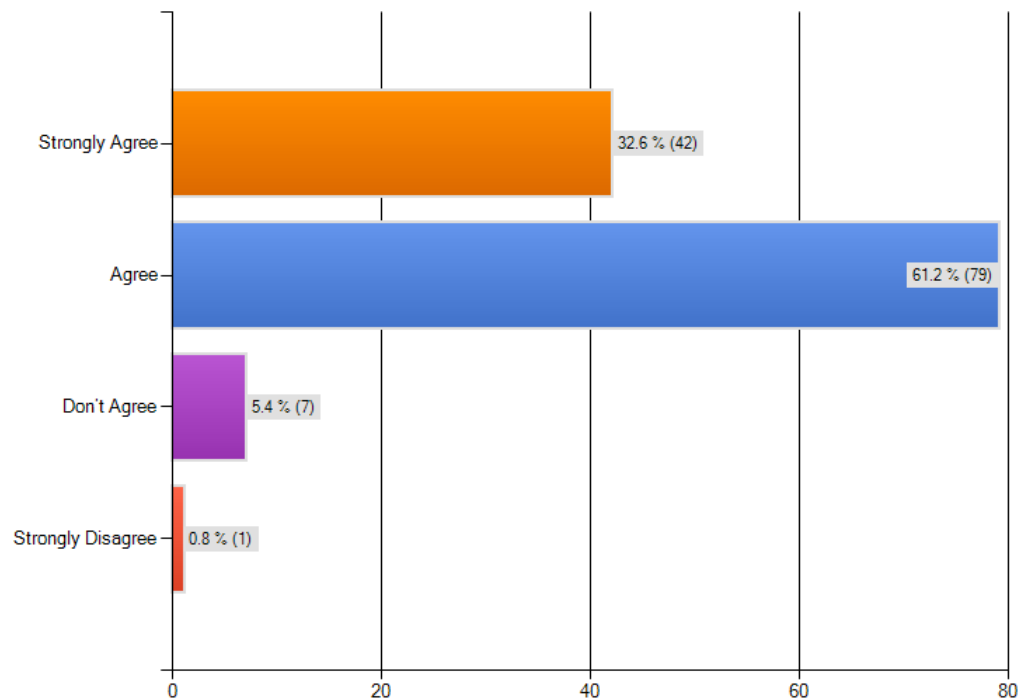


**Figure 12: Response Result Chart: Research Question 10**

#### **4.4.2 Research Question 11**

As can be seen on the chart in Figure 14 below, 42 respondents (32.6%) strongly agreed that business processes will need to be audited because there are additional risks that are brought about by a new ERP implementation. Furthermore, 79 respondents (61.2%) indicated that they agreed with the assertion while 7 respondents (5.4%) mentioned that they did not agree. Only 1 respondent (0.8%) indicated that they strongly disagreed with this assertion.

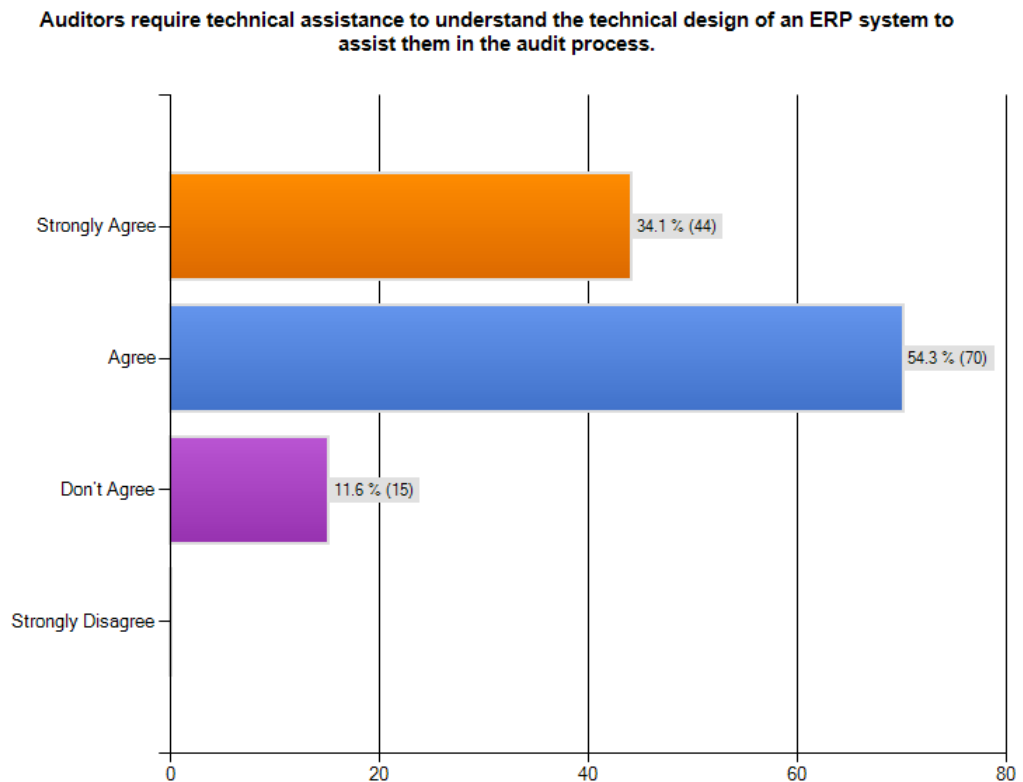
The changes in business processes by a new ERP implementation will lead to additional audit risks such that auditors will need to audit the business process of the ERP system .



**Figure 13: Response Result Chart: Research Question 11**

#### 4.4.3 Research Question 12

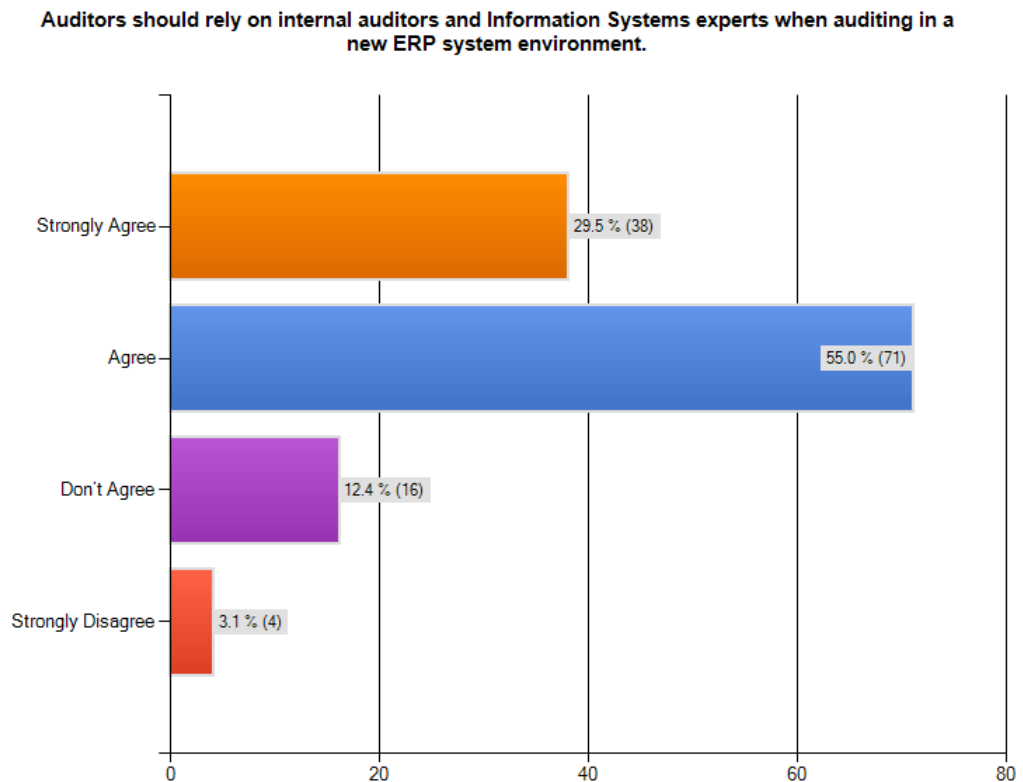
Of the 130 respondents who responded to this statement, 44 (34.1%) indicated that they strongly agreed whilst 70 (54.3%) indicated that they agreed to this statement. Fifteen respondents (11.6%) did not agree with this statement, and no-one disagreed strongly with the statement.



**Figure 14: Response Result Chart: Research Question 12**

#### **4.4.4 Research Question 13**

It can be seen from Figure 16 below that 38 respondents (29.5%) strongly agreed with this research statement whilst 71 respondents (55%) indicated that they agreed with the statement. Sixteen respondents (12.4%) disagreed with the statement with 4 respondents (3.1%) indicating that they strongly disagreed with the statement.

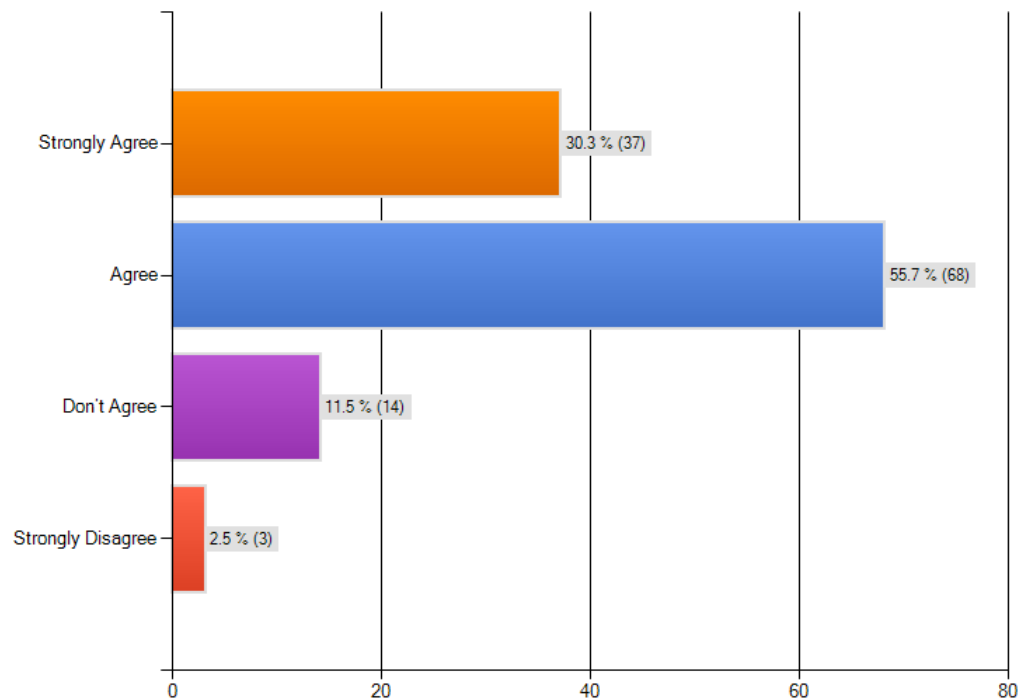


**Figure 15: Response Result Chart: Research Question 13**

#### **4.4.5 Research Question 14**

As can be seen on the chart in Figure 17 below, 37 respondents (30.3%) strongly agreed that auditors spend more time assessing the control risk in an ERP implementing company as compared to a non-ERP implementing company. There were 68 respondents (55.7%) who indicated that they agreed with the assertion; 14 respondents (11.5%) mentioned that they did not agree, and only 3 respondents (2.5%) indicated that they strongly disagreed with this assertion.

**Auditors spend more time in assessing control risk in an ERP implementing company compared to a non ERP implementing company.**

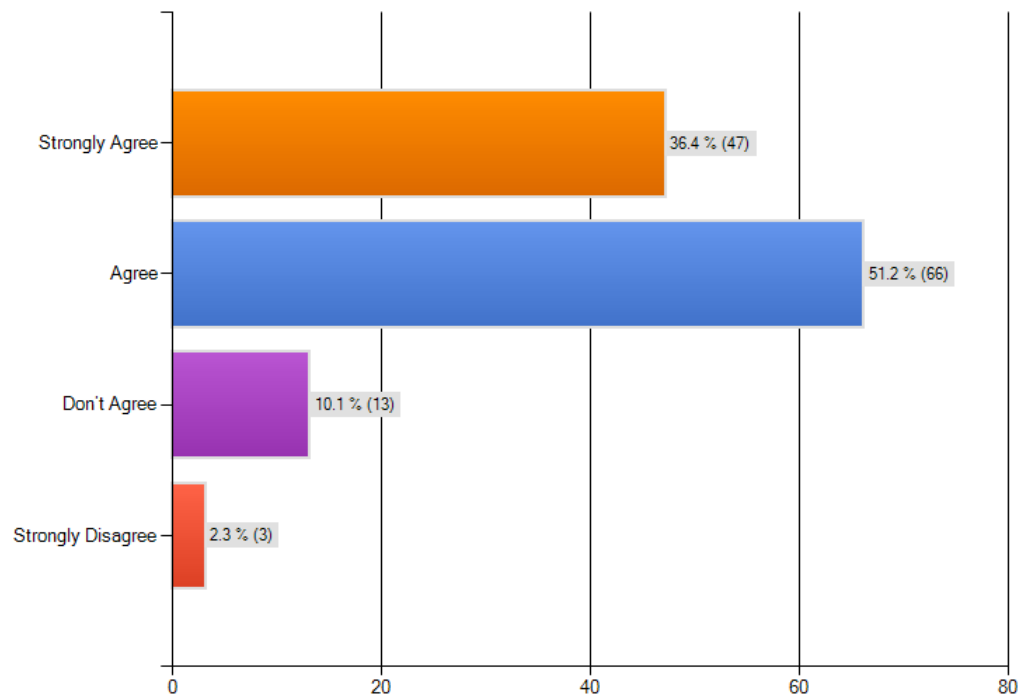


**Figure 16: Response Result Chart: Research Question 14**

#### **4.4.6 Research Question 15:**

Of the 130 respondents who responded to this statement, 47 (36.4%) indicated that they strongly agreed that less time is spent to assess and retrieve information when auditing a company that has implemented an ERP System, whereas 66 (51.2%) indicated that they agreed with this statement. There were 13 respondents (10.1%) who did not agree with this statement whilst 3 (2.3%) responded that they strongly disagreed with the statement.

**When auditing a company that has implemented a new ERP System less time is spent to assess and retrieve information.**



**Figure 17: Response Result Chart: Research Question 15**

#### **4.5 Summary of the results**

The responses to Questions 1 to 15 of the online survey as discussed above provide a context for the rest of the survey in terms of respondents' perceptions of the impact of implementing an ERP System on the external audit process. The broad themes that emerged from the data generated from the online survey will be discussed and the results explained.

## **CHAPTER FIVE**

### **DISCUSSION OF THE RESULTS**

#### **5.1 Introduction**

The aim of this chapter is to discuss and explain the results presented in the previous chapter. The chapter will focus on responding to the research objectives which sought to investigate the effect of implementing an ERP System on the conventional statutory external audit process in South African companies.

#### **5.2 Response Rate**

The survey questionnaire was sent out to a total of 432 auditors across various geographic locations in South Africa. In addition, 13 interviews were conducted to triangulate the findings from the online questionnaires. The first questionnaires were distributed and completed between August and September 2011. Altogether, 432 questionnaires were distributed and 138 auditors completed the questionnaires. Due to incorrect e-mail addresses, 17 e-mails could not reach the intended recipients. These are not included in the 432 sample size. There were 19 'out-of-office' responses and the assumption is made that those who were not in the office were still able to see the questionnaires when they returned. The response rate of 37.9% which was achieved in this study was considered adequate for the purposes of this survey. Of the 62.1% who could not respond to the questionnaire, several reasons can be attributed to this, namely:

- The e-mails that were sent out could have been considered as spam in the recipient inbox.
- Some auditors who received the e-mails did not find time to complete the questionnaires.
- There was not enough incentive or seriousness on the part of some auditors to complete the survey.

Despite the above reasons, the response rate was considered very satisfactory.

In November 2011, several telephone calls were made to identify auditors to triangulate the findings of the online survey. The initial plan was to interview 20 audit seniors to triangulate the findings. However, five meetings took place where 7 interviewees were asked to triangulate the findings of the questionnaires. There were different reasons for the interviews not taking place, including:

- Many auditors specified that most of their clients had just completed their year-end financial statements and they were too busy with audit assignments to sign off financial statements.
- Some audit seniors merely mentioned that they did not have time to put aside for the survey.

**Table 4: Response Rate**

| Description                                                                         | Count      | Percentage  |
|-------------------------------------------------------------------------------------|------------|-------------|
| Total No of E-mail lists obtained to which the researcher sent out questionnaires.  | 268        | 62.1%       |
| Total number of questionnaires distributed by audit firms to their internal staff   | 164        | 37.9%       |
| <b>Sub Total</b>                                                                    | <b>432</b> | <b>100%</b> |
| Total Number of respondents who completed study                                     | 138        | 31.9%       |
| No of interviews and (interviewees) conducted to triangulate findings of the study. | 5 (7)      |             |

### 5.3 Discussion pertaining to Research Question 1

**Table 5: Statistics for Questions pertaining to Research Question1**

| <b>Confidence Level Statistics</b><br><b>Confidence Level – 95% Sample Size – 130 , T-Value -1.978524465</b> |                           |             |                        |                      |                      |
|--------------------------------------------------------------------------------------------------------------|---------------------------|-------------|------------------------|----------------------|----------------------|
| Question No.                                                                                                 | Sample Standard Deviation | Sample Mean | Standard Error of Mean | Interval Lower Limit | Interval Upper Limit |
| 5                                                                                                            | 0.576833625               | 1.153846154 | 0.050591656            | 1.05                 | 1.25                 |
| 6                                                                                                            | 0.553408692               | 1.138461538 | 0.048537153            | 1.04                 | 1.23                 |
| 7                                                                                                            | 0.869684211               | 1.415384615 | 0.076276351            | 1.26                 | 1.57                 |
| 8                                                                                                            | 0.749517833               | 1.284615385 | 0.065737063            | 1.15                 | 1.41                 |
| 9                                                                                                            | 0.658688095               | 1.215384615 | 0.057770768            | 1.10                 | 1.33                 |

The results of the survey support the view of respondents that there is a difference in auditing approach between auditing companies that have implemented ERP systems compared to companies that have not implemented an ERP system. Since the statement was rated on a four-point Likert scale, a hypothesised mean value of 2 was used to determine whether the auditors agreed or disagreed with the statement. A mean value smaller than 2 would indicate that the auditors either agreed or strongly agreed with the statement. A mean value larger than 2 suggests that the auditors either disagreed or strongly disagreed with the statement under test.

**Question 5: Auditing in a company with an ERP system differs from a company with an ERP system.**

This question was asked to determine whether there were any differences in the process of external auditing. At a confidence level of 95%, the sample mean of the results was 1.15, providing moderate support to the belief that indeed there were differences in the audit approach. Support of this survey finding was confirmed during triangulation that was conducted during the interviews. Interviews specifically indicated that the differences were primarily in the methods used to gather information, and in the nature of substantive and analytical procedures that are conducted during an audit. In companies that did not have ERP systems, the control system is primarily human driven, whilst in an ERP system, technology supports the control environment. As such, in a non-ERP environment, more work is done in assessing the reliability of the control environment.

**Question 6: Auditing in a company that has implemented a new ERP system differs from auditing the same company without an ERP system.**

This question was asked to ascertain auditors' perceptions of the audit approach between companies that had just implemented an ERP environment compared to the same company without an ERP system. The usability of the response data to this question was considered valid because of the response rate of 69.6%, who indicated that they had been involved in auditing the same company before and after that company had implemented an ERP system. The results showed a mean value of 1.13 with an interval upper limit of 1.23. The result gave support to the research question: of the companies that had implemented an ERP system, there was a difference in audit approach compared to companies that had not.

The answers to question 7 of this survey support the findings of Kelechi (2007), who concluded that ERP systems have affected the audit process in organisations. His results indicated that auditors spent more on control testing after ERP implementation and in fact auditors need to be more knowledgeable to achieve better utilisation of ERP functions in auditing. A strong point that emerged from the triangulation interviews was that implementing an ERP system did not change the scope of the audit overall. However, in the planning phase, audit partners will need to consider very high level training on the information systems infrastructure before commencement of the audit.

**Question 7: More time is spent auditing a company that has implemented a new ERP system compared to a company that does not have an ERP system.**

This question was asked in order to measure the extent to which audit programme timelines are affected by the fact that a company has implemented a new ERP system. The question was, however, unintentionally suggestive of a comparison between the times within companies that have recently implemented a new ERP system. An alternative way to ask the question would have been simply a comparison between a company that has a ERP system rather than a “new” ERP system. Despite that, the results of the survey reflect that more time is actually spent auditing a company that has implemented a new ERP system. Possible reasons attributed to these findings were:

- There are initially greater control risks that are associated with a new ERP system.
- Auditors do not have a proper understanding of an ERP system when it is new and accordingly they will spend more time understanding the system and designing better methods and procedures to analyse the data.

- Auditors spend more time because client staff takes more time when an ERP system is still new.
- More time is spent because of having to access previous year balances from one system, and access current balances and data from the new ERP system.

Despite these findings, it was unanimously strongly agreed by all interviewees that less time will be taken to conduct an audit once the ERP system is established. In fact, more time will be taken in auditing a non-ERP system environment compared to an ERP system environment due to the ease of access to information and audit trails that ERP systems typically bring to organisations. The answers to the survey question itself did not provide any direct support to the research question. As discussed, the phrasing of the question could have diluted the objective. However, as discussed the interviewees did agree that the approach to auditing will be different in a Non-ERP system compared to an ERP system.

**Question 8: Auditors tests of control are higher when auditing companies without an ERP system compared to companies with ERP systems.**

The results of this question supported the fact that the audit approach is different between companies that implemented ERP systems compared to those who did not. As can be seen in the results and statistics, 86.9% of the respondents agreed that tests of control are higher. The reasons for the higher tests of control were found to be as follows:

- With proper controls , ERP systems are more reliable than non-ERP systems
- There are lesser tests of control in ERP systems because once data is entered at source, future data postings are often generated automatically without further human intervention. This point of view

gives auditors strong confidence in the control systems and thus demands lesser tests of controls.

- The integrated nature of ERP systems is one significant advantage as to why companies implement ERP systems. The integrated nature naturally enhances the internal control system and is normally supported by vast access security and systems control. Auditors, with assurance from systems experts, do have confidence in ERP systems control structures.

There was, however, an argument for those who disagreed that there are higher tests of control in non-ERP systems compared to ERP systems. Their argument was that,

- In ERP systems, certain control procedures leave no documentary evidence whilst other evidence may be indirect. Therefore, more tests are required to confirm the programming logic. Observations of client control procedures in ERP systems also become very important.

**Question 9: Audit substantive tests are higher when auditing companies without ERP systems compared to companies on an ERP system.**

The results of this question supported the fact that audit approach is different between companies that implemented ERP systems compared to those who did not. As can be seen in the results and statistics, 90% of the respondents agreed that substantive tests of control are higher. The finding revealed that auditors conducted less substantive testing in an ERP implementing company compared to a non-ERP implementing company. This could be partly because the ERP system offered an integrated solution to companies' business processes and thereby limits the need for rigorous substantive testing when auditing an ERP

implementing company. This finding was considered very significant in this study because it corroborated the findings in Question 9 which further provided support to the research question.

#### 5.4 Discussion pertaining to Research Question 2

**Table 6: Statistics for Questions pertaining to Research Question 2**

| <b>Confidence Level Statistics</b><br><b>Confidence Level – 95% Sample Size – 130 , T-Value -1.978524465</b> |                           |             |                        |                      |                      |
|--------------------------------------------------------------------------------------------------------------|---------------------------|-------------|------------------------|----------------------|----------------------|
| Question No.                                                                                                 | Sample Standard Deviation | Sample Mean | Standard Error of Mean | Interval Lower Limit | Interval Upper Limit |
| 10                                                                                                           | 1.119140142               | 2.415384615 | 0.098155084            | 2.22                 | 2.61                 |
| 11                                                                                                           | 0.519219174               | 1.130769231 | 0.045538534            | 1.04                 | 1.22                 |
| 12                                                                                                           | 0.641442917               | 1.230769231 | 0.056258265            | 1.12                 | 1.34                 |
| 13                                                                                                           | 0.812249686               | 1.284615385 | 0.065737063            | 1.20                 | 1.48                 |
| 14                                                                                                           | 0.766532892               | 1.302325581 | 0.067489458            | 1.17                 | 1.44                 |
| 15                                                                                                           | 0.749517833               | 1.284615385 | 0.065737063            | 1.15                 | 1.41                 |

The results of the survey confirm that there are different types of risks that ERP systems bring in an organisation. In light of these risks, auditors require procedures and processes to mitigate those risks. These are discussed in the detailed analysis of the questions that were put to the respondents.

Since the statements which were presented were rated on a four-point Likert scale, a hypothesised mean value of 2 was used to determine whether the auditors agreed or disagreed with the statement. A mean value smaller than 2 would indicate that the auditors either agreed or strongly agreed with the statement. A mean value larger than 2 would suggest that the respondents either disagree or strongly disagree with the statement under test.

**Question 10: There is a high risk of giving an incorrect audit opinion in a company that has implemented a new ERP system compared to a company running on its traditional non-ERP system.**

This question was asked to generally determine the overall risk to any audit due to implementing a new ERP system in organisations. At a confidence level of 95%, the sample mean of the results was 2.41, providing moderate support to the fact that implementing a new ERP system does not necessarily result in a higher risk of an incorrect audit opinion. Interviewees supported this fact by mentioning that where a company had implemented a new ERP system this did not change the scope of the whole audit. Therefore auditors are still expected to give an opinion on the basis of objective facts as to the truthfulness and fairness of financial statements and operational position of any business. If auditors are unable to form an opinion for reasons of new ERP systems, they are expected to disclose all material facts as to why they are unable to form an opinion or give reasonable assurance as to the truthfulness and fairness of financial statements.

A sizeable proportion of the respondents, 36%, still responded that they agreed that there was a high risk of auditors giving an incorrect opinion. The basis of this opinion was derived from the fact that respondents believed that in the absence of appropriate guidance to an audit, auditors are faced with enormous challenges in auditing in a new ERP environment

due to the difficulties presented by the integrated solutions. This finding was somewhat surprising because it seemed that although the majority of respondents believed that there was not a high risk of giving an incorrect audit opinion, a fair number still believed that there was a high risk.

**Question 11: The changes in business processes by a new ERP implementation will lead to audit risks such that auditors will need to audit the business process of the ERP system.**

This question was asked to determine whether there were any additional audit risks brought about by a new ERP implementation and whether auditors needed to also audit the business process in the event that they were additional audit risks. At a confidence level of 95%, the sample mean of the results was 1.04, providing strong support to the fact that indeed there are additional audit risks and that auditors therefore needed to audit the business processes as well. The auditors agreed that ERP projects are always associated with re-engineering of business practices as a result of the desire to adopt best practices and remove inefficiencies from existing business processes. In such situations, auditors need to be sure that the changes in the business processes will not reduce the effectiveness of the control environment. Auditors therefore need to pay specific attention to the following areas:

- Segregation of duties
- Authorisation levels and conflict of interest
- Business process integration levels
- Documentation and possible manipulation of records
- Customisations and processes that have third party interfaces.

In the course of the statutory external audit process, auditors do not ordinarily become involved in auditing the business processes. The interviewees were asked to comment on their views regarding business process auditing. All interviewees agreed that additional audit resources would be required. However, 6 of the interviewees made it clear that the business process audit need not be conducted at the same time the external audit process takes place but should preferably be done as a separate audit process just after going live with the ERP implementation. There was also a divided view as to who the appropriate resources would be to conduct the business process audit. Nine interviewees stated that the internal audit function was the more appropriate function to conduct the business process audit, whilst 4 indicated that information systems auditors were more appropriate. However, all interviewees indicated that the use of expert opinion by the external auditors was a more appropriate way for external auditors to approach the audit.

**Question 12: Auditors require technical assistance to understand the technical design of an ERP system to assist them in the audit process**

The sample mean to this survey question was 1.04, indicating strong support for the use of technical assistance to understand the technical design of the ERP system. These findings corroborated the responses to question 11 where the respondents to the survey indicated that external auditors definitely required the use of experts. The respondents also agreed here that the auditors should only rely on the work of experts, provided that they have obtained sufficient understanding of the scope, competencies and capabilities of those experts on whose work reliance is being placed.

**Question 13: Auditors should rely on internal auditors and IS experts when auditing in a new ERP system environment.**

The sample mean to this survey question was 1.2, indicating strong support for the use of experts in the external audit process. These findings corroborated responses to question 11 where the respondents to the survey indicated that external auditors definitely required the use of experts. The respondents also agreed here that the auditors should only rely on the work of experts provided that they have obtained sufficient understanding of the scope, competencies and capabilities of those experts on whose work reliance is being placed.

**Question 14: Auditors spend more time in assessing control risk in an ERP implementing company compared to a non-ERP implementing company.**

This question was asked to find out if auditors realised that there were differences in the audit approach of an ERP implementing company compared to a non-ERP implementing company. At a confidence level of 95%, the sample mean of the results was 1.30, providing strong support that auditors do spend more time assessing the control risk.

The auditors indicated that when managing significant initiatives like ERP systems, organizations must consider risk and controls as an additional dimension in managing a system change. When designing controls, an organization should seek a balance across four dimensions: risk and controls; process optimization; organization and people; and technology. Because of their inter-dependencies, no single dimension can be the sole focus at any one time. A concerted effort is therefore needed when designing and integrating controls into an ERP system solution. The auditors therefore believe that more time should be spent in assessing the risks thereof.

An interesting dimension to this question was that the question was asked in the context of a company that was implementing an ERP System. The auditors who were interviewed indicated that many organisations typically implemented ERP systems in phases, normally over a 2 to 3-year timeline. They indicated that in the present environment it is becoming very important for auditors to have audit representation in an ERP project in order to continually assess the control risk as well as to be proactively involved in establishing the control foundation for an initiative's success with their knowledge of internal control practices, compliance requirements, and business processes.

**Question 15: When auditing a company that has implemented a new ERP system, less time is spent to assess and retrieve information.**

In this question, the degree of risk to the audit was measured as a function of time spent to retrieve information. The sample mean to this survey question was 1.28, indicating strong support for the fact that less time is spent in retrieving information in companies that have implemented ERP systems.

The responses to this question supported findings in the literature of the perceived benefits of an ERP system to organisations. Specifically the auditors interviewed agreed that the real-time capabilities of ERP systems provided them with a less time-consuming effort in retrieving information. This finding was important because it demonstrated that companies that implemented ERP systems had a more solid base for institutional memory and this could suggest that there are fewer risks in the information control system of the companies being audited.

## **5 Conclusion**

This chapter discussed and explained the findings from the empirical research. The results of the empirical study revealed that there were significant differences to the auditing approach between the companies that implemented ERP systems and those that had not implemented ERP systems. The implementation of an ERP system also brings new risks to the business and auditors therefore need to adopt modified procedures and processes to mitigate those audit risks.

## **CHAPTER SIX**

### **CONCLUSIONS AND RECOMMENDATIONS**

#### **6.1 Introduction**

This research was conducted to investigate the impact of implementing an Enterprise Resource Planning System (ERP) System on the conventional statutory external audit process in South African companies. The aim was to establish whether auditors, auditing in organisations that have implemented a new ERP system, will approach the audit in a similar way as they would approach a non-ERP environment. The researcher also sought to describe the key changes that are brought about by an ERP system implementation, the audit risks, and the impact of those risks on the audit approach. All findings, references and conclusions that are made in this chapter pertain to the findings of this research.

#### **6.2 Conclusions of the study**

The results of the empirical study revealed that of the companies that implemented ERP systems, there were significant differences in the auditing approach to those companies that had not implemented ERP systems. The implementation of an ERP system also brings new risks to the business and auditors need to adopt modified procedures and processes to mitigate those audit risks.

The study established that there were some significant changes in audit approach as a direct result of a new ERP implementation. This meant that auditors had to adjust their ordinary audit cycle as would happen if the companies they are auditing had not implemented an ERP system. The results of the survey further showed that even in the standard ordinary

audit cycle, auditors tests of control and substantive tests would increase with the implementation of a new ERP system. This was an important observation because the risk assessment stage of the audit is a key aspect of the audit. Risk assessment is typically undertaken to focus the audit on the most important audit areas as well as prioritising decisions such as audit frequency and timing. Since an audit cannot and does not check all transactions, the increase in tests of control and substantive tests will allow auditors to observe specific controls and to detect business areas which could possibly even result in misstatements due to error or due to changes that are brought about by ERP systems.

The empirical results from this study has confirmed findings by Kelechi (2007) that auditors felt that business control risks increased after an ERP implementation which brought audit risks amongst auditors. One of the more common advantages that is cited for implementing the ERP system is the integrated nature of ERP systems and added business controls that ERP systems are expected to bring. This view is brought into question by the research findings which indicate that auditors believe that companies are at greater exposure to the unique risks that are brought about by a new ERP setting as compared to a non-ERP system. The results further suggest that auditors recognise the risks associated with interdependencies among business processes and control vulnerabilities after an ERP implementation in an ERP setting, and also recognise an overall understanding of methods that could have a bad impact on the overall audit quality. In a very positive finding, auditors recognised the importance of using the work of other experts such as internal auditors and information technology specialists as evidence to help in the assessment of the business control risks.

### **6.3 Recommendations**

The aim of this study was to provide guidance to professionals working in external audit functions who wish to understand how to audit in an ERP-enabled environment. The report will also help finance and business executives to better understand the various risks to auditing that emanate from implementing new ERP systems.

The results from this study clearly indicate the importance of auditors having a sound understanding of the risks that arise as a result of an ERP implementation. Some of the unique challenges in managing enterprise-wide/ERP projects which are highlighted through these findings include the re-design of business processes; investment in recruiting and re-skilling ERP systems developers; and the challenge of using external consultants and integrating their application-specific knowledge and technical expertise with existing teams. A further challenge is that of recruiting and retaining business analysts who combine technology and business skills.

The following recommendations are therefore made for consideration by the auditing sector.

| Audit Area        | Learnings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Audit Methodology | <ul style="list-style-type: none"> <li>• Auditors need to take note that ERP implementations bring business process risks and as such a risk-based audit approach is more appropriate for companies that have implemented ERP systems.</li> <li>• Most ERP systems are customised to meet specific company requirements. In auditing new ERP environments auditors need to take note that customisations are high risk areas and as such the audit methodology needs to be structured to mitigate customisation risks.</li> <li>• It maybe be worthwhile for auditors to develop software that assists online auditing. This may mean that software houses have to embed audit software in their ERP solutions.</li> </ul> |
| Role of Auditors  | <ul style="list-style-type: none"> <li>• It is recommended that auditors need to have an integrated approach to auditing companies that have recently implemented new ERP systems. Involvement early in the design of the systems or as part of the implementation take is becoming more of a prerequisite for auditors.</li> <li>• Internal auditors need to do pre-implementation reviews before going live in order to mitigate the risks of time for external auditors.</li> <li>• Auditors should also consider, as part of the external audit process, ensuring they have information systems</li> </ul>                                                                                                             |

|                                   |                                                                                                                                                                                                                                                                                                               |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                   | experts on their audit teams.                                                                                                                                                                                                                                                                                 |
| Audit Involvement on ERP Projects | <ul style="list-style-type: none"> <li>• During selection of ERP systems, auditors need to contribute towards establishing the control environment.</li> <li>• Auditors as part of their professional continuous development should update their knowledge and trend awareness in the ERP markets.</li> </ul> |

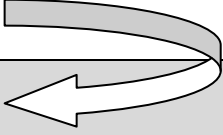
It is further recommended that prior to an ERP audit, auditors should conduct an ERP risk assessment as part of the audit planning process that is specific to the ERP system. To do this, a five-phase model to risk assessment is proposed. The pre-audit deliverable is that key business processes need to be studied in detail to identify their vulnerabilities to the implementation of ERP systems. For each business process, auditors need to capture the risk impact and the risk exposure of the change.

Auditors need to apply the following incremental process:

- 1) Collate Business Process Risk Statements
- 2) Determine the ERP Business Process Risk Exposure
- 3) Determine the ERP Business Process Risk Impact
- 4) Plot ERP Module on Risk Map
- 5) Determine best audit approach, such as Materiality Levels, Use of Experts.

### 6.3.1 Business Process Risk Statements

The first step in a risk-based audit of an ERP environment is to identify the business process risks and record them on a risk register. Figure 19 below is an example of a business process risk statement.



| Reference No. | Risk Statement                                               | Risk     |               |        |               |
|---------------|--------------------------------------------------------------|----------|---------------|--------|---------------|
|               |                                                              | Severity | Detectability | Impact | Risk Exposure |
| 1001          | Invoice may be raised without delivery of goods and services |          |               |        |               |
| 1002          | Incorrect pricing for sales material and services            |          |               |        |               |

**Figure 18: ERP Business Process Risk Register**

### 6.3.2 Risk Exposure

The second step is then to determine business processes risk exposure. The researcher defines risk exposure as the likelihood of occurrence which can be measured on a scale of 0–100, 100 being the highest likelihood of occurrence. This risk exposure is determined based on auditors' risk appetite. In ERP auditing, the consideration of the following parameters in determining the risk exposure of an ERP module is recommended.

- a. Source Data
- b. Systems documentation
- c. Segregation of duties
- d. Process Complexity
- e. Configuration Logic
- f. Software Design & General Ability.

### **6.3.3. Risk Impact**

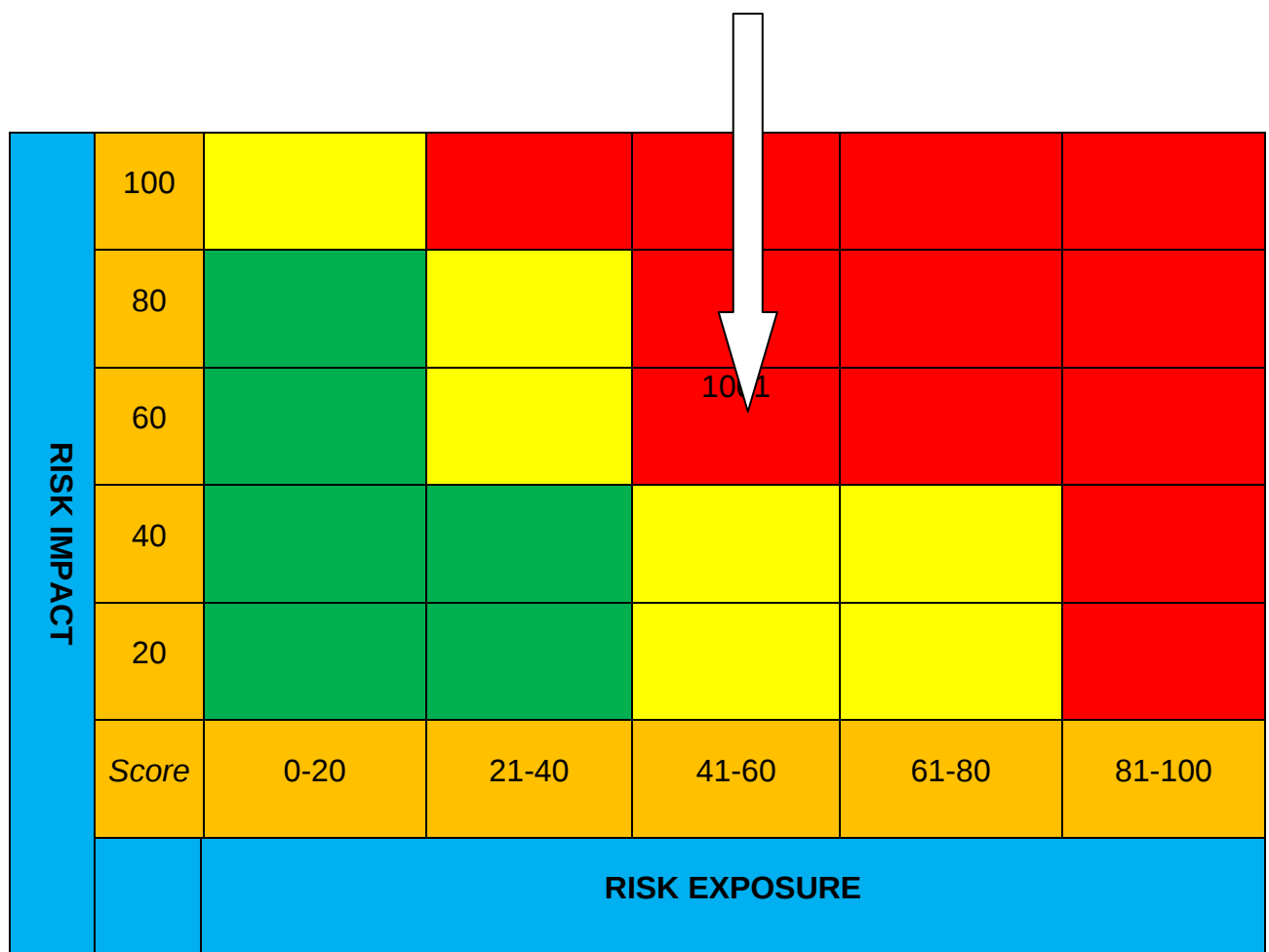
The third step for auditors is to determine the risk impact of the identified business processes. The risk impact of an ERP process is defined by the researcher as being the likelihood of occurrence based on possibility of detection and risk of severity. This can be measured on a scale of 0–100, 100 being the highest likelihood of occurrence. The researcher recommends that in determining severity, auditors should consider the risks in terms of the following:

- 1. Strategic Value
- 2. Statutory Compliance
- 3. Accuracy
- 4. Reliability and operational effectiveness.

Auditors need to consider detection as the possibility of an adverse impact being detected by any stakeholder, such as customers. Whilst detectability is measure on a 0–100 scale, severity is measured as a percentage. The risk impact in this case will then be detectability **multiplied** severity.

### 6.3.4 Risk Mapping

The last step in the recommended approach is then to plot all items of the risk register on a risk map. For example, Item Reference 1001 on the risk register will have an average risk score of  $(56+50)/2=53$  and will be plotted in the risk map as shown in Figure 20. The risk map will then be used as a basis of making decisions on how to approach the external audit process. Auditors and business executives can also use the risk map for budgeting audit hours, resources and expectations.



**Red** – Very High Risk, **Yellow** – Medium Risk, **Green** – Low Risk

**Figure 19: Risk Impact & Exposure Map**

#### **6.4 Suggestions for further research**

There are many opportunities for further research arising from these studies which are explored briefly below:

- Firstly, the role of auditing is currently under heightened scrutiny especially in the wake of the increasing complexity of ERP and other supporting systems. The global financial upheaval of the past three years has seen commentators questioning the value of large company audits. It is the view of the researcher that the accountancy profession should re-examine the role of audit and consider whether a sufficiently strong case is being put forward of the benefits audit can provide to businesses, the economy and society. There is little published research which demonstrates the value of audit in promoting business confidence .The value of audit needs to be evidence-based.
- Secondly, it might be worthwhile to conduct research that will examine the future role and skills set required of auditors in view of the changing technological environment.
- Thirdly, one can investigate auditors' perceptions towards proposals to develop audit software to be embedded in ERP software.
- Lastly, there is merit in investigating the risk factors in implementing ERP projects and identifying which risk factors in ERP projects are unique to these projects. Some of the risks were identified in this study. However the challenge of re-engineering business processes which the ERP software supports, investment in recruiting and reskilling technology professionals, the challenge of using external consultants and integrating their application-specific knowledge and technical expertise with existing teams, could be further investigated.

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## APPENDICES

### APPENDIX A

#### Respondent Information

1. How many years experience do you have in auditing and assurance?

|           |           |           |               |
|-----------|-----------|-----------|---------------|
| 0-2 years | 2-5 years | 5-9 years | over 10 years |
|-----------|-----------|-----------|---------------|

2. Have you been involved in auditing a company without an Enterprise Resource Planning System?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

3. Have you been involved in auditing a company with an Enterprise Resource Planning System?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

4. Have you been involved in auditing the same company before it has implemented an ERP System and after it has implemented a new ERP system?

|     |    |
|-----|----|
| Yes | No |
|-----|----|

#### Audit Approach Information

5. Auditing in a company with an ERP System differs from auditing a company with an ERP system

|                |       |             |                   |
|----------------|-------|-------------|-------------------|
| Strongly Agree | Agree | Don't Agree | Strongly Disagree |
|----------------|-------|-------------|-------------------|

6. Auditing in a company that has implemented a new ERP System differs from auditing the same company without an ERP System.

|                |       |             |                   |
|----------------|-------|-------------|-------------------|
| Strongly Agree | Agree | Don't Agree | Strongly Disagree |
|----------------|-------|-------------|-------------------|

7. More time is spent auditing a company that has implemented a new ERP system compared to a company that does not have an ERP system.

|                |       |             |                   |
|----------------|-------|-------------|-------------------|
| Strongly Agree | Agree | Don't Agree | Strongly Disagree |
|----------------|-------|-------------|-------------------|

8. Auditors test of control are higher when auditing companies on without an ERP system compared to a company on an ERP system

|                                                                                                                                                                                            |       |             |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------------|-------------------|
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |
| 9. Audit substantive tests are higher when auditing companies without ERP systems compared to companies on an ERP system                                                                   |       |             |                   |
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |
| <b>ERP Audit Risks and Approaches to manage the Risk</b>                                                                                                                                   |       |             |                   |
| 10. There is a high risk of giving an incorrect audit opinion in a company that has implemented a new ERP system compared to auditing a company running on its traditional non-ERP system. |       |             |                   |
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |
| 11. The changes in business processes by a new ERP implementation will lead to an audit risk such that auditors will need to audit the business process of the ERP system                  |       |             |                   |
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |
| 12. Auditors require technical assistance to understand the technical design of an ERP system to assist them in the audit process.                                                         |       |             |                   |
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |
| 13. Auditors should rely on internal auditors and IS experts when auditing in a new ERP system environment                                                                                 |       |             |                   |
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |
| 13. Auditors spend more time in assessing control risks in an ERP implementing company compared to a Non ERP implementing company.                                                         |       |             |                   |
| Strongly Agree                                                                                                                                                                             | Agree | Don't Agree | Strongly Disagree |

## APPENDIX B

### Consistency matrix

| <b>Research problem:</b> Investigate the effect of implementing an Enterprise Resource Planning System on the conventional statutory external audit process in South African companies. |                                                                                                                           |                                                                                                                                                                   |                                                                                                     |                  |                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------------------------------------|
| Sub-problem                                                                                                                                                                             | Literature Review                                                                                                         | Hypotheses or Propositions or Research questions                                                                                                                  | Source of data                                                                                      | Type of data     | Analysis                                                                                 |
| Examine how auditors approach the conventional annual external auditing process in South Africa.                                                                                        | Gallegon, Manson and Allen-Senft (2000)<br>Jones (2009)<br>Eilifsen, Messier, Glover and Prawitt (2010)                   | Of the companies that implemented an ERP systems, to what degree and how is the auditing approach different to companies that have not implemented an ERP system? | Online Questionnaire<br>Semi-Structured Interviews<br>Case Study<br>Audit Approach<br>Documentation | Qualitative Data | Organising data<br>Synthesising data<br>Searching patterns<br>Prioritising<br>Concluding |
| The second sub-problem describe the key changes that brought about by an ERP system implementation, the audit risks and the impact of those risks on the audit approach                 | Lars, Armin and Lynne (2001)<br>Institute of Internal Auditors (2009)<br><br>Hahn (2009)<br>Marx (2007)<br>Kelechi (2007) | What are the risks that new ERP systems bring to an organisation and what procedures and processes do auditors take to mitigate those audit risks?                | Online Questionnaire<br>Semi-Structured Interviews<br>Case Study<br>Audit Approach<br>Documentation | Qualitative Data | Organising data<br>Synthesising data<br>Searching patterns<br>Prioritising<br>Concluding |

## APPENDIX C

Dear Participant,

I am completing my MBA studies at the Wits Business School; I am conducting a research analysing the impact of implementing an Enterprise Resource Planning System on a statutory external audit. I would be very grateful if you could spare 20 to 25 minutes of your time to answer the online questionnaire on the above subject, which would constitute the data gathering phase of the research.

The purpose of the research is to investigate the effect of implementing an Enterprise Resource Planning System on the conventional statutory external audit process in South African companies. Kindly provide answers that come to mind first and not to ponder too much on what the answers should be. This will maximise the accuracy of the instrument.

The research questionnaire is anonymous. There will be R250 book voucher to be awarded to two lucky participants at the end of the study.

You are most welcome to contact me should you want the results to this research.

Thank you in advance for your time and participation.

Yours sincerely,

Pym D. Tembo

Tel: 0713209542

Email: [pymdon@gmail.com](mailto:pymdon@gmail.com)