THE APPLICATION OF ANALYTICAL PROCEDURES IN THE AUDIT PROCESS

by

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DECLARATION

I declare that this dissertation, which I hereby submit for the degree of MCom in Auditing at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at another university. Where secondary material is used, this has been carefully acknowledged and referenced in accordance with university requirements.

ABSTRACT

The application of analytical procedures has become an integral part of the audit process and indications are that the application of these procedures will increase in audits of the future. The factors that are causing a shift in audit methodologies towards increasing the application of analytical procedures are the adaptation of a business risk audit methodology, technological advancements and the incorporation of non-financial information in an audit. These factors enable the auditor to incorporate both financial and non-financial information into decision making and thus develop more precise expectations. Numerous studies have been conducted in various countries on the auditor's application of analytical procedures in the audit process. However, little is known about exactly how auditors in South Africa apply analytical procedures as part of the audit process. Owing to an ever-changing audit environment, a closer look into the application of analytical procedures by South African auditors was deemed both timely and appropriate.

The overall objective of this study was to investigate the application of analytical procedures by auditors in the audit process. To achieve the objective of this study, a qualitative research approach was applied whereby semi-structured interviews were held with senior audit managers from large audit firms in South Africa. This provided the researcher with rich and detailed descriptions of the application of analytical procedures by auditors in the audit process.

The findings of this study, which resulted from data analysis, indicated that there is a need to apply analytical procedures because this adds value to the audit and can enhance its efficiency and effectiveness. However, numerous challenges have been associated with the application of analytical procedures. The findings also indicated that the application of analytical procedures depends on the availability and integrity of clients' data and that it is difficult to obtain reliable data for the development of an expectation. It also emerged from the findings that auditors are unsure of the results obtained from analytical procedures owing to a lack of guidance in the auditing standards on the extent of assurance that can be

placed on analytical procedures and on how to apply professional judgement in drawing conclusions. Auditors' competence to perform analytical procedures limits them in applying these procedures. There seems to be a "gap" between university studies and audit practice relating to the application of analytical procedures (also data analysis) and the use of information technology.

The advantages, however, outweigh the challenges and it is therefore foreseen that the application of analytical procedures will increase in the future.

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LIST OF ABBREVIATIONS

THE FOLLOWING ABBREVIATIONS ARE USED IN THE STUDY:

AAA	American Accounting Association
ABASA	Advancement of Black Accountants of South Africa
ACL	Audit Command Language
AGSA	Auditor-General of South Africa
AICPA	American Institute of Certified Public Accountants
ASSC	Accounting Standards Steering Committee
CAATs	Computer Assisted Audit Techniques
GAS	General Audit Software
IAASB	International Auditing and Assurance Standards Board
IAASB Framework	International Framework for Assurance Engagements
IAASB Glossary	International Auditing and Assurance Standards Board's Glossary of Terms
IASB	International Accounting Standards Board
IDEA	Interactive Data Extraction and Analysis
IFRS	International Financial Reporting Standards
IRBA	Independent Regulatory Board for Auditors
IRC	Integrated Reporting Committee
ISA	International Standard on Auditing
ISQC	International Standard on Quality Control
IT	Information technology
JSE	Johannesburg Stock Exchange
PCAOB	Public Company Accounting Oversight Board
POPI	Protection of Personal Information
RSA	Republic of South Africa
SAICA	South African Institute of Chartered Accountants
STAR	Statistical Techniques for Analytical Review
UK	United Kingdom
US	United States of America
XBRL	eXtensible Business Reporting Language
VAT	Value-Added Tax

CHAPTER 1
INTRODUCTION TO THE STUDY

"Change is the law of life and those who look only to the past or the present are certain to miss the future" (John F. Kennedy).

1.1 INTRODUCTION

"The auditing field is at a critical juncture" (Lombardi, Bloch & Vasarhelyi 2014:21). Advances in information technology (IT) have led to the automation of business processes (Omoteso 2013:1) and caused businesses to operate without geographic boundaries, and the increased availability of financial and non-financial information has provided investors with timely and reliable information for business decisions (Kuenkaikaew & Vasarhelyi 2013:39).These developments have resulted in the traditional audit function of only providing assurance on financial statements becoming outdated (Lombardi *et al*. 2014:22). If the auditing function is to remain relevant in the current business environment, audit methodologies need to change in order to provide the auditor with deeper and more relevant insights into the client's financial position and operations (Liddy 2014:1). The application of analytical procedures is one method available to the auditor to gain deeper insight into the organisation (Bell, Peecher & Solomon 2005:13) and could result in more efficient and effective audits (Trompeter & Wright 2010:684; Lin & Fraser 2003:153; Cho & Lew 2000:435).

The first time that the term "analytical procedures" and a discussion thereof were formally included in an official auditing pronouncement was in 1972 (American Institute of Certified Public Accountants (AICPA) 1972). Since becoming a recognised audit procedure, the performance of analytical procedures has become an integral part of the audit process, and numerous studies, in various countries, have emphasised an increase in the use of such procedures (Abidin & Baabbad 2015:23; Pike, Curtis & Chui 2013:1414; Pinho 2013:3; Samaha & Hegazy 2010:902; Trompeter & Wright 2010:669; Lin & Fraser 2003:162; Mulligan & Inkster 1999:118; Hirst & Koonce 1996:458). All indications are that

the application of analytical procedures, as well as data analysis, will increase in audits of the future as clients' expectations are compelling audits to become more forward-looking and predictive in nature (Liddy 2014:2). The purpose of this study was to add to the existing body of knowledge by providing a South African perspective on the application of analytical procedures by auditors in the audit process.

The discussion above introduces the study. The remainder of the chapter provides the background and context for the study. It discusses the problem statement and objectives of the research. The chapter further explains the importance and benefits of the study with reference to the main stakeholders, namely scholars, regulators and professional bodies, audit practitioners and management of audit clients. It also briefly explains the qualitative research approach that was used as the research methodology for the study as well as the limitations of the study. The chapter concludes with the chapter layout.

1.2 BACKGROUND AND CONTEXT

1.2.1 The need for analytical procedures as part of an audit

In the ancient biblical times, accounting took place orally (Puttick, Van Esch & Kana 2007:2). The word "auditor" was derived from the Latin word *audire*, which means *"to hear"* (Spicer & Pegler 1921:2). The advent of writing, however, changed this "listening function" to a "checking function" of the steward's integrity (Chatfield 1977:26–27). The development of double-entry accounting made it possible to record all kinds of business transactions, which led to an increase in the demand for auditors. Up to this period, auditing had been concerned with the detection of fraud and restricted to a detailed verification of each transaction (Teck-Heang & Ali 2008:2; Chatfield 1977:112).

The Industrial Revolution led to a separation between management, who are responsible for the day-to-day operations, and owners of the business, who are not directly involved in the running of the business (Eilifsen, Messier, Glover & Prawitt 2014:5; Spicer & Pegler 1921:3). The managers serve as an agent for the

owners and fulfil a stewardship function by managing the corporation's assets (Eilifsen *et al*. 2014:5). This gives rise to an agency relationship where the owner appoints a manager to perform some service on his or her behalf, while the owner trusts the manager with his or her welfare and allows him or her to make decisions and take action on his or her behalf (Tiessen & Waterhouse 1983:254; Jensen & Meckling 1976:308).

The beginning of the 20th century marked the development of the capital market, and as companies grew in size, the separation of ownership and management became even more evident (Teck-Heang & Ali 2008:3; Porter, Simon & Hatherly 2003:26). During this period, the primary objective of an audit shifted to adding credibility to the financial statements rather than only detecting fraud and errors (Teck-Heang & Ali 2008:4).

Technological advancements during the last half of the 20th century led to the emergence of the so-called "information era" (Naisbitt 1982:11). It was during this period that companies started to use computerised systems to process their financial and other data (Porter *et al.* 2003:31). The increased use of technology allowed auditors to place reliance on computers as an audit tool (Porter *et al*. 2003:31). This period further gave rise to the development of risk-based audit methodologies which require the auditor to obtain a holistic view of the organisation and its environment in order to understand the nature of the audit challenges (Knechel 2007:388; Porter *et al*. 2003:33). Risk-based auditing placed a strong emphasis on examining audit evidence from a variety of sources, both internal and external to the audit client (Teck-Heang & Ali 2008:5; Porter *et al*. 2003:31), and the objective of auditing shifted to lending credibility to financial and non-financial information provided by management in annual reports (Teck-Heang & Ali 2008:6). It was these developments that afforded the auditor an opportunity to "add value" to an audit by providing consultancy services in addition to auditing services (Leung, Coram, Cooper & Richardson 2011:19; Suddaby, Cooper & Greenwood 2007:340; Porter *et al*. 2003:31).

By the year 2000, consulting revenues exceeded auditing revenues at all the major firms in the United States of America (US) (Suddaby *et al*. 2007:340). The

global significance of international scandals resulting from the consulting services placed the independence and quality of audits under scrutiny and gave rise to an increased level of regulation, which gave momentum to the notion of "audit quality" (Teck-Heang & Ali 2008:6; Khalifa, Sharma, Humphrey & Robson 2007:837). It can thus be said that even though the objective of auditing remains the same, namely to add credibility to the financial statements, the role of auditors is constantly changing in response to contextual factors and social developments. According to Liddy (2014:1) and Teck-Heang and Ali (2008:7), audits will continue to evolve in the future.

1.2.2 Defining an audit and the audit process

The International Auditing and Assurance Standards Board (IAASB) defines in the International Framework for Assurance Engagements (IAASB Framework) an audit as "an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria" (IAASB 2014b:Framework par. 7). In order to express this opinion, the auditor should obtain sufficient and appropriate audit evidence to support the audit opinion (IAASB 2014d:International Standard on Auditing (ISA) 200 par. 7). The importance of the audit evidence is described in the audit postulates as proposed by Mautz and Sharaf (1961) and Flint (1988). Mautz and Sharaf (1961:43) postulate that financial statements and financial data are verifiable and Flint (1988:31) that the subject matter of an audit is susceptible to verification by evidence. Mautz and Sharaf (1961:43) postulate clearly that without audit evidence, auditing cannot exist.

The ISAs provide guidance to the auditor on the process that should be followed to obtain sufficient and appropriate audit evidence to support the auditor's conclusion (IAASB 2014d:ISA 200 par. 7). Puttick *et al*. (2007:178) subdivide the audit process into four phases, namely pre-engagement activities, planning of the audit, obtaining audit evidence and conclusion, evaluation and reporting. Knechel, Krishnan, Pevzner, Shefchik and Velury (2013:391) emphasise that the way in which the audit process is followed is dictated by the audit methodology

applied. The traditional audit methodology is currently being challenged by changes in the business environment (Lombardi *et al*. 2014:22; Porter *et al.* 2003:18), changes in audit practices (Khalifa *et al.* 2007:833; Knechel 2007:385), advancements in technology (Omoteso 2013:17) and the availability of more non-financial information (Dyball, Thomson & Wilson 2014:44; Ames, Brazel, Jones, Rich & Zimbelman 2012:28). Analytical procedures, which are the focus of this study, are an integral part of the audit process (Bell *et al*. 2005:9) and they are a vital tool that auditors can use to address the changes in the traditional audit methodology (Knechel 2007:394; Lemon, Tatum & Turley 2000:18).

1.2.3 Analytical procedures as a concept and their application

Analytical procedures are defined as "an evaluation of financial information through an analysis of plausible relationships among both financial and non-financial data" (IAASB 2014m:ISA 520 par. 4). The performance of analytical procedures consists of two parts: firstly, it is a consideration of comparisons and relationships in order to create an expectation; and secondly, it is an investigation of any identified fluctuations or inconsistencies (IAASB 2014m:ISA 520 par. A1-A3, Pinho 2014:27). The more precise the expectation is, the more assurance can be obtained from analytical procedures (Messier, Simon & Smith 2013:147). Analytical procedures are applicable to the planning of the audit, obtaining audit evidence and the conclusion, evaluation and reporting phases of an audit (Messier *et al*. 2013:140).

Analytical procedures during the planning phase of an audit can be described as risk assessment procedures (IAASB 2014j:ISA 315 par. 6) aimed at gaining insight into the business and industry, identifying potential financial and operating weaknesses and determining significant fluctuations in the financial statements (Cho & Lew 2000:434). The objective of analytical procedures during the obtaining audit evidence phase (also referred to as the fieldwork phase) is to obtain relevant and reliable audit evidence (IAASB 2014m:ISA 520 par. 3), detect potential misstatements (Glover, Prawitt & Wilks 2005:200) and reduce the number of tests of details (Cho & Lew 2000:434). The auditor performs analytical procedures during the conclusion, evaluation and reporting phase to assess the

conclusions drawn during the audit and to evaluate the overall financial statement reasonableness before issuing an audit opinion (Flowerday, Blundell & Von Solms 2006:327; Glover *et al*. 2005:200; Cho & Lew 2000:434).

1.2.4 Changes in the use of analytical procedures

The auditor's use of analytical procedures is dependent on factors such as firm size (Abidin & Baabbad 2015:23), the auditor's experience (Knapp & Knapp 2001:27), the auditor's perceptions of the usefulness of these procedures (Abidin & Baabbad 2015:24) and the availability of information provided by management (Knechel *et al*. 2013:395). The auditor uses various techniques or methods to perform analytical procedures. These techniques range from relatively simple comparisons to more sophisticated and mathematically complex ones such as advanced statistical techniques (IAASB 2014m:ISA 520 par. A3; Koskivaara 2007:337; Lin & Fraser 2003:164; Cho & Lew 2000:437; Fraser, Hatherly & Lin 1997:35; Mahathevan 1997:238; McKee 1989:2). Studies have found that even though technology can assist the auditor to perform more sophisticated techniques, auditors prefer the more simple, judgemental techniques to the sophisticated ones (Abidin & Baabbad 2015:22; Samaha & Hegazy 2010:899; Trompeter & Wright 2010:689).

Numerous studies have been conducted during the past three decades that emphasise increased use of analytical procedures (Abidin & Baabbad 2015:23; Pike *et al*. 2013:1414; Pinho 2013:3; Samaha & Hegazy 2010:902; Trompeter & Wright 2010:669; Lin & Fraser 2003:162; Mulligan & Inkster 1999:118; Hirst & Koonce 1996:458). The main factors identified by these researchers for the increased use of analytical procedures are the adaptation of a business risk audit methodology, advancements in technology and the increased focus on non-financial information in financial reporting (Abadin & Baabbab 2015:23; Pinho 2013:13; Trompeter & Wright 2010:671; Samaha & Hegazy 2010:902; Lin & Fraser 2003:162; Mulligan & Inkster 1999:112). These factors enable auditors to develop more precise expectations in the performance of their analytical procedures (Trompeter & Wright 2010:681).

The application of analytical procedures is an integral part of the business risk audit methodology (Knechel *et al*. 2013:395). Bell *et al*. (2005:23) describe an audit as a recursive process of risk assessment in which the auditor uses analytical procedures to continuously develop and revise expectations which can be compared to management's representations. The application of analytical procedures as risk assessment tools affords the auditor an opportunity to see the whole of the organisation (Knechel 2007:394), reduce the extent of further procedures (Eilifsen, Knechel & Wallace 2001:205) and develop more sophisticated expectations (Chan & Vasarhelyi 2011:159; Trompeter & Wright 2010:681; Koskivaara 2004:219–220).

Advancements in technology have led to the automation of business processes and have enabled auditors to use computerised tools and techniques to improve the quality of their audits (Omoteso 2013:2) and create proactive predictive audits (Kuenkaikaew & Vasarhelyi 2013:63). These tools and techniques include the use of real time information in continuous auditing (Kuenkaikaew & Vasarhelyi 2013:43) and the use of audit support systems (Hunton & Rose 2010:298). Both of these advancements assist the auditor to alter the traditional audit methodology to perform more sophisticated analytical procedures and to develop more precise expectations (Chan & Vasarhelyi 2011:159; Koskivaara 2004:219–220).

Trompeter and Wright (2010:671) report an increase in the use of non-financial information in analytical procedures because of technological advancements that have made it easier for auditors to gather and access a broader array of non-financial information. ISA 520 (IAASB 2014m:par. 4) requires auditors to compare non-financial information with financial information as part of their performance of analytical procedures to assess the reasonableness of the financial data. The incorporation of non-financial information in the performance of analytical procedures enables the auditor to gain insight into clients' business models and how they control the business, and this has enabled auditors to create more precise expectations (Trompeter & Wright 2010:671; Hirst & Koonce 1996:462–463).

If the auditor identifies a difference between the auditor's expectation and management's representation, he or she has to assess the likelihood of the difference's possible causes (Wright & Berger 2011:155). ISA 520 (IAASB 2014m:par. 7) requires the auditor to investigate the differences by asking management to provide reasons for the differences and to corroborate these reasons with additional audit evidence. Peecher, Schwartz and Solomon (2007:473) suggest that auditors should refine their initial expectation to determine whether the difference is caused by a misstatement or a non-misstatement. It is clear from the literature review that auditors tend to be unwilling to investigate these differences (Knechel *et al*. 2013:395; Trompeter & Wright 2010:691; Hirst & Koonce 1996:476).

1.2.5 Advantages of and challenges in the application of analytical procedures

From the literature it is evident that there are numerous advantages in the application of analytical procedures. The use of analytical procedures enables auditors to conduct more effective and efficient audits (Trompeter & Wright 2010:684; Lin & Fraser 2003:153; Cho & Lew 2000:435). Analytical procedures have the potential to serve as "attention-directing" devices, to reduce the extent of detailed substantive work and assess the overall reasonableness of the financial statements (Cho & Lew 2000:433–434). The development of the business risk audit methodology and advancements in technology have enabled the auditor to form more precise expectations (Chan & Vasarhelyi 2011:159; Trompeter & Wright 2010:684) and to provide forward-looking information (Peecher *et al*. 2007:466).

Despite the fact that analytical procedures result in more effective and efficient audits, auditors are reluctant to apply them because they regard them as costly and time consuming (Wang & Cuthbertson 2014:9; Vuchnich 2008:40; Knechel 2007:391), they are reluctant to exercise the required professional judgement (Pinho 2013:5; Houck 2003:70) and they lack confidence in their own ability to perform analytical procedures (Braun & Davis 2003:731). Auditors should,

however, meet these related challenges to be able to capitalise on the advantages of analytical procedures.

1.3 PROBLEM STATEMENT

The literature review revealed that many studies have been done in the past three decades on the auditor's application of analytical procedures in the audit process. Studies have been conducted in various countries such as the US (Trompeter & Wright 2010; Hirst & Koonce 1996), Egypt (Samaha & Hegazy 2010), the United Kingdom (UK) (Mulligan & Inkster 1999; Fraser *et al*. 1997), Canada (Lin & Fraser 2003), Singapore (Mahathevan 1997), Hong Kong (Cho & Lew 2000), Australia (Smith, Psaros & Holmes 1999) and, more recently, in Portugal (Pinho 2014) and Yemen (Abidin & Baabbad 2015). All of these studies predicted an increase in the application of analytical procedures.

The problem is that little is known about how auditors in South Africa apply analytical procedures as part of the audit process. Although previous research on South African practices has referred to analytical procedures (e.g. Von Wielligh 2006:123), there is a paucity of such research. Owing to an ever-changing audit environment that demands more efficient and effective audits, a closer look into the application of analytical procedures by South African auditors was deemed both timely and appropriate. By providing a South African perspective, the researcher envisaged that the results of this study would contribute to the existing body of knowledge on the application of analytical procedures.

1.4 RESEARCH OBJECTIVES

Based on the problem statement as discussed above, the overall objective of this study was to investigate the application of analytical procedures by auditors in the audit process.

In achieving the overall objective of the study by providing a South African perspective, the following secondary research objectives were identified:

- To determine why auditors need to apply analytical procedures *(chapters 2 and 5).*
- To determine how auditors apply analytical procedures in the audit process *(chapters 3 and 5).*
- To determine whether the application of analytical procedures in the audit process has changed in response to the changing audit environment *(chapters 3 and 5).*
- To determine the advantages of and challenges experienced by auditors in the application of analytical procedures *(chapters 3 and 5).*

1.5 RESEARCH METHODOLOGY

The researcher used a qualitative research approach to investigate the application of analytical procedures by auditors in the audit process. This research approach enabled the researcher to gain an in-depth understanding of the application of analytical procedures by auditors in the audit process (Babbie & Mouton 2009:646). The research strategy used in this study entailed a combination of a literature review and multiple case study strategy. Big 4 audit firms, second-tier audit firms and the Auditor-General of South Africa (AGSA) were identified as cases for the study, allowing for a multiple case study strategy.

The literature review provided the foundation on which the research was built (Saunders, Lewis & Thornhill 2012:73) and the multiple case studies afforded the researcher the opportunity to compare and generalise the findings in the cases (Yin 2014:56; Saunders *et al*. 2012:180). Data was collected by means of 15 face-to-face, semi-structured interviews. The openness of the questions used in the interview afforded the researcher an opportunity to “probe” the participants to explain or elaborate on their answers (Saunders *et al*. 2012:389). All interviews were recorded with a voice recorder. The interviews were transcribed and the data was analysed using ATLAS.ti as the main data coding tool.

The researcher followed the strategies proposed by Creswell (2009:190–193) and Gibbs (2007:91–100) to ensure the trustworthiness of the study. The

researcher obtained approval from the University of Pretoria's Ethical Committee to conduct this study (Appendix C) and also obtained permission from each of the participants through a combined letter of introduction and informed consent (Appendix B).

1.6 IMPORTANCE AND BENEFITS OF THE STUDY

The researcher identified the following main stakeholders that could benefit from the study: scholars, regulators and professional bodies, audit practitioners and the management of audit clients.

Firstly, from a theoretical perspective, it was envisaged that the study would add to the body of knowledge on the application of analytical procedures in the audit process by providing a South African perspective. No previous South African study focusing on this phenomenon was found. This study should provide scholars with an understanding of why auditors apply analytical procedures, how they apply them in the audit process, how their application has changed in recent years and what the advantages and challenges experienced by professionals are in conducting analytical procedures. The results should provide a basis for scholars to perform further studies, for example, on how auditors interpret the results of data analysis and how these inform their audit methodologies and audit firms' business, training and recruitment models.

Secondly, it was envisaged that the study would provide professional bodies and regulators with information on the auditor's application of analytical procedures. Regulators could use such information to revise guidance for practitioners on the use of analytical procedures in the audit process. Professional bodies such as the South African Institute of Chartered Accountants (SAICA) could use the information to adapt its competency frameworks, inform continuous professional development offerings and inform the development of their education and training programmes. Academics could use such information to adjust their curricula.

Thirdly, it was envisaged that the study would provide practitioners with an overview of the application of analytical procedures in practice as well as the

challenges and advantages that practitioners experience in the application of analytical procedures. The findings of the study could be used by audit practitioners to benchmark their practices on the application of analytical procedures and to develop audit methodologies and business strategies to overcome challenges and exploit the advantages of analytical procedures.

In addition, management of audit clients could use the findings of the study to foster increased awareness of how their auditors apply analytical procedures in the audit process, why it is done and what the related advantages and challenges are. Such information could spark further engagement between auditors and their clients.

1.7 LIMITATIONS AND DELIMITATIONS OF THE STUDY

To achieve the objective of this study, namely to investigate the application of analytical procedures by auditors in the audit process, data was collected from participants from the Big 4 audit firms, second-tier audit firms and the AGSA. The researcher purposefully selected large audit firms because the literature review suggested that auditors from large firms apply analytical procedures to a greater extent than auditors from smaller audit firms (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896; Lin & Fraser 2003:159). Since the results of the study are representative of large audit firms, included as cases in the study, they cannot be generalised to small, medium or other large audit firms.

Semi-structured interviews were conducted with senior audit managers. Senior audit managers were selected because of their extensive knowledge of the clients and their ability to develop more precise expectations (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:897; Mahathevan 1997:230). One limitation of this study was therefore the exclusion of auditors and audit team members from other levels of experience.

The above limitations relate to the research methodology followed in this study, that is, a qualitative study using a multiple case study strategy. Strategies that were evident in the literature (Creswell 2009:190; Gibbs 2007:91; Creswell &

Miller 2000:129; Lincoln & Guba 1985:314) were followed to ensure the trustworthiness of the study.

In addition, the scope of the study was limited to the application of analytical procedures in the audit process and not to the application of these procedures in independent review engagements. The study was also limited to a South African perspective.

1.8 CHAPTER LAYOUT

The body of the dissertation comprises six chapters. The layout of the chapters is as follows:

Chapter 1: Introduction to the study

This chapter introduces the study and discusses the background and context of the study. It provides a discussion of the problem statement, research objectives and research methodology. The chapter further describes the importance, benefits and limitations of the study. The chapter concludes with an outline of the chapter layout.

Chapter 2: The need for and development of an audit

This chapter provides the theoretical underpinning for the study. The need for and development of an audit from ancient times up to the 21st century is highlighted. The chapter also focuses on the agency theory, which resulted from a separation between control and ownership and the audit postulates which form the basis, assumptions and foundation for building the auditing structure. The audit definition and the audit process the auditor follows to obtain audit evidence are explained. The chapter concludes with a discussion of the factors that have driven auditors to alter the traditional audit methodology.

Chapter 3: The application of analytical procedures in the audit process

This chapter contextualises the use of analytical procedures. It provides a broad overview of previous studies conducted in various countries on the application of analytical procedures. The definition and objective of analytical procedures are then elucidated. This is followed by a discussion of the role that analytical

procedures play in the audit process and this indicates that analytical procedures are in fact an integral part of the audit process. The use of analytical procedures and the techniques or methods used to perform analytical procedures are explained. This is followed by a discussion of the factors that are causing a shift in audit methodologies to increase the application of analytical procedures. It further describes the auditor's investigation of differences in analytical procedures. The chapter concludes with an overview on the advantages of and challenges in the application of analytical procedures.

Chapter 4: Research methodology

This chapter describes the methodology the researcher followed to achieve the overall objective of this study, namely to investigate the application of analytical procedures by auditors in the audit process. It explains the qualitative research approach and constructivist paradigm that were adopted in the study. This is followed by a discussion of the research design, which incorporates the research strategy, method of data collection and data analysis. The chapter concludes with a description of the strategies adopted by the researcher to ensure the quality of the research and the ethical factors the researcher considered as part of the study.

Chapter 5: Interpretation of the findings

This chapter deals with the interpretation of the findings of the investigation of the application of analytical procedures by auditors in the audit process. The chapter focuses on the four main themes that were identified in the literature. These themes were divided into sub-themes that emerged in the analysis of the transcripts. The chapter provides a discussion of the research findings for each of the three cases identified in the study and concludes with a cross-case analysis.

Chapter 6: Conclusions and recommendations

This chapter discusses the achievement of the overall and secondary research objectives. It provides a discussion of the achievement of the research objectives through the literature review and through this study. It makes recommendations arising from the research as well as suggestions for possible further research. The chapter concludes with a final conclusion.

1.9 CONCLUSION

This chapter introduced the study and provided the background and context for it. It focused on the development of an audit and predicted that audits would continue to evolve in future. It was shown that the performance of analytical procedures is an integral part of the audit process because it is applicable to the planning, obtaining audit evidence and conclusion, evaluation and reporting phases of an audit. The changes in the use of analytical procedures were explained and this indicated that factors such as the business risk audit methodology, advancements in technology and an increased focus on non-financial information in financial reporting have enabled the auditor to develop more precise expectations in the performance of analytical procedures. Against this background, the advantages of and challenges in the application of analytical procedures were presented.

The discussion further formulated the problem statement. From the problem statement, it is clear that although many studies have been conducted in the past three decades on the auditors' application of analytical procedures, little is known about how auditors in South Africa apply analytical procedures as part of the audit process. This gap led to the formulation of the research objectives, which describe the overall objective of the study namely to investigate the application of analytical procedures by auditors in the audit process.

The chapter further discussed the research methodology, namely the use of a qualitative research approach to investigate the application of analytical procedures by auditors in the audit process. Against this background, the discussion turned to the importance, benefits and limitations of the study. The chapter concluded with an outline of the chapter layout.

Chapter 2 provides the theoretical underpinning for the study, and by discussing the need for and development of an audit, it presents the context of the study on the application of analytical procedures by auditors in the audit process.

CHAPTER 2

THE NEED FOR AND DEVELOPMENT OF AN AUDIT

2.1 INTRODUCTION

The previous chapter introduced this study, and a brief discussion provided the background and context for the study and positioned the study within the existing body of knowledge. This led to the formulation of the problem statement and research objectives. The importance and benefits of the study were explained as well as the limitations applicable to the study. The chapter also presented an overview of the research methodology followed in the study and provided an outline of the chapters comprising the dissertation.

Organisations in today's business environment are characterised by a separation in ownership and control, and this separation creates the need for auditing (Porter *et al*. 2003:26). Auditing can be described as a systematic process that an auditor follows in order to provide assurance on an organisation's financial statements in the form of an audit opinion. Analytical procedures are an integral part of this process (Bell *et al*. 2005:9). Changes in audit methodologies which direct the audit process show that analytical procedures, the focus of this study, remain important procedures to be applied by auditors (Knechel 2007:394; Lemon *et al*. 2000:18).

This chapter provides the theoretical underpinning for the study. It demonstrates the need for and development of an audit from the earliest days up to the modern information era. It explains the need for an audit and the agency theory as a result of the separation between ownership and control. This is followed by a discussion of the audit postulates as the theoretical foundation for the section on the definition of an audit. It further describes the process the auditor should follow to obtain audit evidence to enable him or her to reach a conclusion and formulate an opinion on the financial statements. It concludes with a discussion of the factors that have driven auditors to alter the traditional audit methodology. This

chapter provides the context for the discussion in the next chapter on the application of analytical procedures in the audit process.

2.2 THE NEED FOR AN AUDIT

2.2.1 Ancient times

According to Genesis 1:28, God created man and commanded man and woman to rule over the fish in the sea, the birds in the sky, and over every living creature that moves upon the earth (Bible 1995). With this command, He ordered humankind to be accountable towards God. The teachings of Christ have extended this accountability of humans towards God to accountability towards other humans (Loots 1989:2). Flint (1988:9) describes an audit as a "social function of accountability". He states that an audit is required where there is a duty of accountability between different parties and that an audit is a means to ensure accountability (Flint 1988:12).

In ancient biblical times, accounting took place orally. The steward in charge of the cattle, goods and other forms of wealth would, from time to time, appear before his master, to give an account of his stewardship. The master would then listen to this recital of the steward's transactions, question him on the transactions and in this manner obtain assurance (Puttick *et al*. 2007:2). The master expected the steward to safeguard the assets entrusted to him, be accountable and use the assets efficiently and effectively (Loots 1989:14).

The master was the listener, the auditor. It can thus be said that the word "auditor" was derived from the Latin word *audire*, which means "to hear" (Spicer & Pegler 1921:2) or as a secondary meaning: "one who satisfies himself as to the truth of the accounting of another" (Puttick *et al.* 2007:2).

With the advent of writing, some form of written record was kept by the steward, and his master could now examine the record instead of merely listening to an account of stewardship (Puttick *et al.* 2007:2). It could thus be said that the auditing function evolved from a "listening function" into a "checking function".

According to Chatfield (1977:26–27), an audit during the Middle Ages was merely a check on the steward's accountability and this check was performed on an annual basis. Woolf (1912:34) also explains that the main audit function in ancient Greece consisted of checking accounts and passing the accounts to outgoing magistrates. This agrees with Mautz and Sharaf's (1961:1) statement that auditing developed as a procedure of detailed checking.

2.2.2 Before the Industrial Revolution

The concept of double-entry bookkeeping was first introduced in Genoa in the year 1340 in the accounts of the stewards to the local authority (Chatfield 1977:35; Brown 1968:99). Brown (1968:107), however, described this system as being futile as it was kept in Roman numerals and was a cumbrous system of notation. The renaissance in Italy in the 15th century brought with it bookkeeping complexities and problems. This led to the development of a mathematical double-entry bookkeeping system first published in 1494 by the mathematician, Frater Luca Paciolo, also known as the father of double-entry accounting (Brown 1968:108; Spicer & Pegler 1921:3). The purpose of Paciolo's work entitled *Summa de Arithmetica, Geometria, Pro-portioni et Proportionalita* (Brown 1968:108), was not to give instruction on bookkeeping, but to summarise the existing knowledge of mathematicians. According to Brown (1968:111), the objective of bookkeeping at that time was "to give the trader without delay information as to his assets and liabilities", and although this view had some shortcomings, for the time, it was the most convenient and only practicable method.

Double-entry accounting made it possible to record not only cash transactions, but also all kinds of business transactions, which led to an increase in the demand for auditors (Spicer & Pegler 1921:3). It is thus not surprising that from the 14th century onwards, there is ample evidence that the advisability of having accounts audited was widely recognised (Brown 1968:78). Until the 16th century, auditing was designed to "verify the honesty of persons charged with fiscal responsibilities", which means that the early audit tested the integrity of stewards rather than the quality of their accounts (Chatfield 1977:111–112). Until the late 18th and early 19th centuries, most organisations were relatively small and were

owned and operated by their owners with little accountability to outside parties (Eilifsen *et al*. 2014:5). Chatfield (1977:112) argues that until this time, fraud detection was the main goal of an audit, a notion supported by Teck-Heang and Ali (2008:2) and Porter *et al*. (2003:20), who state that auditing during this period was concerned with the detection of fraud. According to Teck-Heang and Ali (2008:2), auditing prior to the Industrial Revolution was restricted to performing a detailed verification of each transaction and that up to this stage, the concepts of testing or sampling and internal control did not form part of an audit.

2.2.3 After the Industrial Revolution

The Industrial Revolution during the 19th century, with the discovery of steam power and mechanical inventions, resulted in phenomenal growth of businesses and led to the formation of joint stock companies (Spicer & Pegler 1921:3). This enabled companies to sell small pieces of ownership or to borrow money in the form of loans (Eilifsen *et al.* 2014:5). It was during this period that a clear separation between the owners of a business and management developed (Eilifsen *et al.* 2014:5; Spicer & Pegler 1921:3). This period also led to the emergence of a "middle class" that was able to provide the funds for the establishment of large industrial and commercial undertakings (Porter *et al*. 2003:21). The share market at this stage, however, was unregulated and highly speculative and the rate of financial failure high (Porter *et al*. 2003:21). Porter *et al*. (2003:21) emphasise that "it was clear that the growing number of small investors needed some protection". Chatfield (1977:113) describes the situation as follows: "It was realised that the credibility of financial statements which represented management's communication with stockholders would be enhanced by outside verification." It was under these conditions that the advantages of appointing an auditor became clear to the general commercial public and out of this need grew the profession of accounting and auditing as we know it today (Eilifsen *et al.* 2014:5; Puttick *et al*. 2007:4; Spicer & Pegler 1921:3).

These social and economic developments gave rise to the development of the Joint Stock Companies Act which was passed in the UK in 1844 (Porter *et al.* 2003:21). The Act mandated the appointment of an auditor to examine the

accounts of a company (Leung *et al*. 2011:13; Puttick *et al.* 2007:4; Porter *et al.* 2003:21).The annual presentation of the statement of financial position to the shareholders and conducting a statutory audit, however, were only made compulsory in 1900 (Leung *et al.* 2011:13). Porter *et al*. (2003:24) believes that the primary audit objective during this period was still the detection of fraud and errors. Auditors were required to perform a detailed checking of transactions and little attention was paid to the internal controls of the company (Teck-Heang & Ali 2008:3).

2.2.4 The 20th century

During the years following the 1929 Wall Street Crash and ensuing depression, investments in businesses grew at an enormous pace, security markets advanced and credit-granting institutions facilitated the development the capital market (Teck-Heang & Ali 2008:3). This resulted in the separation of ownership and management functions to become even more evident, and it became important for the participants in the financial markets to feel confident that a company's financial statements reflected a true and fair portrayal of the company's financial position and performance (Porter *et al*. 2003:26). The primary objective of an audit thus shifted to adding credibility to the financial statements rather than only detecting fraud and errors (Teck-Heang & Ali 2008:4). According to Porter *et al*. (2003:26), in response to the growing size of companies and the resulting increase in the volume of transactions, the audit approach changed from a detailed checking of transactions to a testing of samples of transactions combined with a review and evaluation of the company's system of internal control.

The world economy continued to accelerate during the 1960s to the 1990s (Teck-Heang & Ali 2008:4). According to Porter *et al*. (2003:29), technological advances during this period aided companies to grow in size and enabled them to become extremely powerful and influential forces in society. Naisbitt (1982:11) describes this period as the "information era". It was in the 1980s that the term "globalisation" was used for the first time to characterise the changes in the economies of the countries owing to the significant developments in international

capital flows (Carmen 2013:401). According to Porter *et al*. (2003:31), during this period, almost all companies introduced computer systems to process their financial and other data, and to perform, monitor and control their operational and administrative processes. This increased use of technology allowed auditors to place reliance on computers as an audit tool to perform audit procedures (Porter *et al*. 2003:31). It was also during this time that the term "analytical procedures" and a discussion thereof were formally included in an official auditing pronouncement (AICPA 1972). This period further gave rise to the development of risk-based auditing (Knechel 2007:388; Porter *et al*. 2003:31). Risk-based auditing can be described as a holistic approach to the audit as the auditor needs to see the whole organisation and its environment in order to understand the nature of the audit challenges (Knechel 2007:388; Porter *et al.* 2003:33). It is based on the premise that any factor that will increase business risk will also increase audit risk (Knechel 2007:393; Robson, Humphrey, Khalifa & Jones 2007:411; Eilifsen *et al*. 2001:193). Risk-based auditing thus places a strong emphasis on examining audit evidence derived from a variety of sources, both internal and external to the audit client (Teck-Heang & Ali 2008:5; Porter *et al*. 2003:31), and the objective of auditing shifted to lending credibility to financial and non-financial information provided by management in annual reports (Teck-Heang & Ali 2008:6). These developments afforded the auditor new opportunities to identify areas in their clients where improvements could be made and the provision of consultancy services emerged as a secondary audit objective (Leung *et al.* 2011:19; Suddaby *et al*. 2007:340; Porter *et al*. 2003:31).

2.2.5 The 21st century

By 2000, the market for traditional audit services had become saturated and firms became increasingly reliant on the provision of consulting services (Suddaby *et al.* 2007:340). According to Teck-Heang and Ali (2008:6) and Suddaby *et al*. (2007:340), consulting revenues exceeded auditing revenues at all the major firms in the US. However, consultancy services, unlike auditing do not have the regulatory oversight that comes with professional status, and the public began to doubt whether audit firms could remain independent on audit issues while being so dependent on consulting revenues (Leung *et al.* 2011:19; Teck-Heang & Ali

2008:6; Suddaby *et al.* 2007:340). The global significance of scandals such as Enron, Worldcom, Parmalat and Waste Management placed the quality of audits under scrutiny (Teck-Heang & Ali 2008:6; Khalifa *et al*. 2007:837) and gave rise to an increased level of regulations to ensure improved independence and audit quality (Leung *et al.* 2011:19; Teck-Heang & Ali 2008:6). The passage of the Sarbanes-Oxley Act of 2002 in the US gave weight and momentum to the notion of "audit quality" (Khalifa *et al.* 2007:837). It can be said that even though the audit objective in the present period has remained the same, namely to give credibility to the financial statements, critical changes have been made to the audit practice because of extensive reform in various countries (Teck-Heang & Ali 2008:6). According to Liddy (2014:1), in future, the audit process should evolve to provide deeper and more relevant insights into an organisation's financial position while still maintaining audit quality.

2.2.6 Summary

From the above discussion it is clear that the objective of auditing and the role of auditors are changing in response to contextual factors and socioeconomic developments. In ancient times, accounting took place orally and was described as a listening function. The advent of writing, however, changed this listening function to a checking function because the main audit function during this period involved checking accounts. Recordkeeping based on double-entry bookkeeping added complexities which led to an increase in the demand for auditors. However, during this period, businesses were still owner managed and auditing was only concerned with the detection of fraud. The Industrial Revolution brought with it a separation between owners and management, and the appointment of an auditor became a statutory requirement. Auditors during this period, however, were still only required to perform a detailed checking of transactions and little attention was paid to concepts such as sampling and internal control. The 20th century was marked by the continued growth of companies, an increase in the volume of transactions, the emergence of technology and the development of risk-based audit methodologies. These factors caused the primary objective of an audit to shift from the detection of fraud and error to adding credibility to financial statements. It was during this period that the concepts of sampling and evaluation

of internal controls became an integral part of an audit. Auditors in the 21st century, however, are not only expected to enhance the credibility of the financial statements but to also add further value to the client. The global significance of international scandals gave rise to an increased level of regulation and led to an increased emphasis on audit quality rather than value-added services. It is therefore evident that the main objective of auditing has shifted over time. The fact remains, the theoretical foundation for auditing such as the agency theory and audit postulates is still a "perceptible body of theory" (Mautz & Sharaf 1961:5) to support the practice.

2.3 THE AGENCY THEORY

2.3.1 Conceptualising the theory

As discussed in the previous section, the Industrial Revolution brought with it the development of the modern corporation. This modern corporation is characterised by a separation between ownership and control (Berle & Means 1932:69). This led to diverse groups of owners who are not directly involved in the running of the business and the use of professional managers hired by the owners to run the corporation on a day-to-day basis and to perform a service on the owners' behalf. Berle and Means (1932:69) describe this separation as having ownership, on the one hand, and management, on the other. The managers serve as agents for the owners, also referred to as principals, and fulfil a stewardship function by managing the corporation's assets (Eilifsen *et al.* 2014:5). This is referred to as the agency theory.

2.3.2 Concepts of the theory

Jensen and Meckling (1976:308) define an agency relationship as "a contract under which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent". In an agency relationship, the owner appoints a manager to perform some service on his or her behalf, and it can be said that the owner thus trusts the manager with his or her welfare and to make

decisions and take actions on his or her behalf (Tiessen & Waterhouse 1983:254).

Accounting and auditing have a vital role in the principal-agent relationship (Eilifsen *et al*. 2014:5). The reasons for this are twofold. Firstly, the relationship between an owner and manager often results in information asymmetry between the two parties, and secondly, the goals of the owner and manager may not be the same, resulting in a conflict of interest (Eilifsen *et al*. 2014:6; Jensen & Meckling 1976:308).

The information asymmetry between the two parties results from the fact that the managers often have more information available than the owners, which in turn has a negative impact on the owners' ability to effectively monitor whether their interests are being protected by the managers (Eilifsen *et al*. 2014:6; Adams 1994:8). Furthermore, the managers could have a motive to maximise their own interest rather than the owners' interest (Eilifsen *et al*. 2014:6; Adams 1994:8; Jensen & Meckling 1976:308). The problem that arises out of the conflict between the interests and goals of the principal and those of the agent is that the principal needs assurance that the agent has behaved appropriately, and this leads to the concept of agency costs.

Adams (1994:8) argues that one way of aligning the interests of owners and managers is by implementing contracting costs to both the owner and the manager. The owner will incur monitoring costs to monitor the behaviour of the managers, for example, the costs of subjecting financial statements to external audit (Adams 1994:8; Jensen & Meckling 1976:308). The managers, however, will incur bonding costs, such as the cost of the internal and external audit in order to prove to the owners that they will act in the owners' best interest (Adams 1994:8; Jensen & Meckling 1976:308).

The agency theory demonstrates why managers would voluntarily provide accounting reports and why the owners would engage independent auditors to testify to the reliability of such reports (Jensen & Meckling 1976:306). Chow (1982:287) argues that one of the main reasons for firms to appoint external

auditors is to help control the conflict of interest between managers and owners. Austin and Herath (2014:63) confirm this conflict of interest, stating that managers have their own goals and interest in mind apart from the goals and interests of investors, and that the auditor should act as an intermediary to protect the investors from the managers' self-interest.

This conflict of interest can be traced back to medieval account keeping, which Chatfield (1977:27) describes as follows: "[T]he view of account thus became a subtle contest between auditor and steward. The latter wished to render accounts profitably for himself by estimating losses generously and revenues and natural increase conservatively. In contrast, the auditor's charge was that the lord must suffer no loss from fraud, negligence, or bad judgement."

2.3.3 Summary

From the above discussion it is thus clear that there is a need for an audit function to address the conflict of interest between the managers who prepare the financial statements and the users thereof, and that the auditor should be independent from either of the parties. According to Mautz and Sharaf (1961:204), the independence of the auditor is established as one of the cornerstones in any structure of auditing theory and that independence must be both evident and real. Flint (1988:20) underscores by postulating that distinguishing characteristics of audit are the independence of its status and its freedom from investigatory and reporting constraints. Austin and Herath (2014:63) more recently concurred with this, stating that independence is one of the most crucial attributes of the accounting profession.

2.4 THE AUDIT POSTULATES

2.4.1 The relationship between auditing and accounting

Even though the relationship between auditing and accounting is close, the distinction between these two disciplines should be clear (Krogstad 1977:177; Mautz & Sharaf 1961:14). Loots (1989:77) attributes this close relationship to two

factors. Firstly, the history of accounting ante-dates that of auditing, and secondly, it has become accepted practice to use the word “accounting” when in fact it has an auditing connection. Mautz and Sharaf (1961:14) contend that accounting and auditing are merely “business connections” in the sense that the one complements the other.

Their view is supported when considering the descriptions of accounting and auditing. Krogstad (1977:177) describes accounting as a management’s activity as it involves management’s generation of financial information about an entity and the creation of financial statements. Mautz and Sharaf (1961:14) describe it as the collection, classification, summarisation, measurement and communication of financial data, business events and conditions as they relate to and represent a specific entity. Its main aim is to reduce a vast amount of detailed information to manageable and understandable proportions. Auditing, described by the same source (Mautz & Sharaf 1961:14), is also the consideration of business events, but it does not have the task of measuring and communicating them, but rather the task of reviewing the measurements and communication of accounting data to the entity. Auditing provides support for financial statements and data and is concerned with the basis for accounting measurements and assertions (Mautz & Sharaf 1961:14).

An examination of the above definitions clearly indicates that although accounting and auditing are concerned with the same general subject matter, their functions, tools and approach are substantially different (Mautz & Sharaf 1961:15). The need for communication is a common element in both fields. Accounting is concerned with the communication of economic data, while auditing communicates the result of the completed audit work to the users (Loots 1989:78).

2.4.2 Postulates of Mautz and Sharaf (1961)

It is this distinction between accounting and auditing that led Mautz and Sharaf (1961:1) to outline the theory and philosophy of auditing. They emphasise the inappropriateness of the “existence of a professional group drawing its status

primarily from the practice of auditing, but having no perceptible body of theory to support that practice" (Mautz & Sharaf 1961:1). They motivated their investigation by stating that it would provide solutions to problems which auditors find difficult and that it would uncover the basic "laws" or postulates that govern auditing (Mautz & Sharaf 1961:5).

In their study of the philosophy of auditing, Mautz and Sharaf (1961:37) state that postulates are essential to the development of any intellectual discipline. They describe the postulates of auditing as "the basis, the assumptions, and the foundation for building the auditing structure". The relevance of these postulates in the current audit environment was emphasised by Cadotte (2015:188) stating that the postulates serve as the underlying foundation for current auditing principles and standards.

Postulates are assumptions that do not lend themselves to direct verification (Mautz & Sharaf 1961:37). The propositions deduced from the postulates of a given system, however, can be directly verified, and such verification bears evidence of the truth of the postulates themselves (Mautz & Sharaf 1961:37). Postulates can therefore be described as the basis of making valid and useful assumptions and of thinking about problems and arriving at solutions. Flint (1988:20) describes the postulates as "hypotheses about auditing".

After using their own judgement, Mautz and Sharaf (1961:42) proposed eight tentative postulates which can be briefly described as follows:

Postulate 1: Financial statements and financial data are verifiable. Mautz and Sharaf (1961:43–44) relate this postulate to the basis upon which auditors develop their theory of evidence and proof. They state that unless financial data is verifiable, auditing has no reason for existence and that it is the task of auditors to obtain evidence to verify and support the assertions made in financial statements and reports.

Postulate 2: There is no necessary conflict of interest between the auditor and the management of the enterprise under audit. With this postulate Mautz and

Sharaf (1961:45) make the assumption that there is generally no conflict of interest between the auditor and management of the entity under examination. They state that unless there is evidence to indicate otherwise, auditors may assume that management is honest and not involved in fraudulent activities (Mautz & Sharaf 1961:46). They do, however, remind the auditor to remain alert to any indications of fraudulent reporting (Mautz & Sharaf 1961:46).

Postulate 3: The financial statements and other information submitted for verification are free from collusive and other unusual irregularities. This postulate addresses the concept of due audit care and the auditor's responsibility to discover irregularities. It makes the assumption that the auditor can assume that the financial statements are free from unusual irregularities. If this assumption cannot be made, it would require the design of an extremely detailed audit programme (Mautz & Sharaf 1961:46–47).

Postulate 4: The existence of a satisfactory system of internal control eliminates the probability of irregularities. The existence of an effective system of internal control eliminates the possibility of irregularities and has a direct influence on the extent of detailed testing. The better the system of internal control, the lesser detailed testing that is required. However, the converse is also true, because if the internal control is not satisfactory, it will be impossible for the auditor to obtain reasonable audit evidence. In such instances, the auditor will have to disclaim his or her opinion for the discovery of irregularities or increase his or her extent of detailed audit procedures (IAASB 2014k:ISA 330 par. A46; Mautz & Sharaf 1961:47).

Postulate 5: Consistent application of generally accepted principles of accounting results in the fair presentation of financial position and the results of operations. In order to assess the fairness of the financial statements, the auditor should use some form of standard. This standard is provided by generally accepted accounting principles. In can thus be said that auditors borrow from accountants their general accepted principles and use them as a standard for assessing the reasonableness of the financial statement data (Mautz & Sharaf 1961:47). The International Financial Reporting Standards (IFRS) are one such global

accounting standard that auditors can use and are currently being used in more than 100 countries (Larson & Herz 2011:34). In South Africa, all companies listed on the Johannesburg Stock Exchange (JSE) are required to comply with the requirements of the IFRS (JSE 2015:120).

Postulate 6: In the absence of clear evidence to the contrary, what has held true in the past for the enterprise under examination will hold true in the future. This postulate provides a guide to the auditor in the performance of his or her examination and provides protection against economic and business changes that were unforeseen at the time of verification. According to Mautz and Sharaf (1961:48–49), unless the auditor can assume that what has held true in the past will hold true in the future for the entity, he or she will have no basis for accepting or rejecting the assertions of the financial statements being audited.

Postulate 7: When examining financial data for the purpose of expressing an independent opinion thereon, the auditor acts exclusively in the capacity of an auditor. Independence is of the essence in auditing and although independent accountants may serve their clients in a variety of ways, once they have commenced an audit examination, they must act exclusively in the role of an auditor. The postulate emphasises that auditors have a responsibility towards their clients but also towards society that recognises and encourages their professional status (Mautz & Sharaf 1961:49-50).

Postulate 8: The professional status of the independent auditor imposes commensurate professional obligations. This postulate addresses the professional concept of due care, the requirement of service before personal interest and the standard of professional efficiency. Mautz and Sharaf (1961:50) argue that if auditors claim professional status, they must accept the professional obligations and responsibilities that accompany it.

2.4.3 Postulates of Flint (1988)

The postulates discussed above, however, are regarded by Mautz and Sharaf (1961:42) as tentative, and they recommend that the postulates should be

continually reviewed to see if they have become invalid or if there is a need for other additional postulates. Flint (1988:14) describes an audit as "a social phenomenon" and proposes the following postulates:

Postulate 1: The primary condition for an audit is that there is a relationship of accountability or a situation of public accountability. This postulate states that there is a duty of acceptable conduct owed by one party to another party and that an audit is necessary to establish the authenticity of the information given or statements made by one party to the other (Flint 1988:22).

Postulate 2: The subject matter of accountability is too remote, too complex and/ or of too great significance for the discharge of the duty to be demonstrated without the process of audit. According to Flint (1988), remoteness, complexity and significance dictate the need for an audit as a way of securing accountability. Remoteness means that the interested parties face certain barriers in order to satisfy themselves on the matter of accountability (Flint 1988:26). Complexity refers to the specialised knowledge and resources that are necessary to investigate the operations of the organisation for which accountability is due (Flint 1988:26). Most interested parties do not possess this knowledge and these resources (Flint 1988:27). Significance refers to the importance of the information that is given to the interested parties for decision-making purposes. The more significant the information, the more essential it is to establish its reliability and credibility (Flint 1988:28).

Postulate 3: Essential distinguishing characteristics of audit are the independence of its status and its freedom from investigatory and reporting constraints. A distinctive characteristic of the audit process is that it should be independent of the organisation and the organisation's management. Flint (1988:29) postulates that it is this basis of independence that gives authority and acceptance to an audit. This postulate relates to postulate 2 formulated by Mautz and Sharaf (1961:45), namely that there should be no necessary conflict of interest between the auditor and the management of the organisation.

Postulate 4: The subject matter of audit, for example, conduct, performance or achievement or record of events or state of affairs, or a statement or facts relating to any of these, is susceptible to verification by evidence. Flint (1988:31) describes the audit as an investigatory process to obtain audit evidence in order to express an opinion. Without audit evidence, an audit is not possible as the auditor has no basis on which to form an audit opinion. This postulate relates to postulate 1 of Mautz and Sharaf (1961:43), namely that if financial data is not verifiable, auditing cannot exist.

Postulate 5: Standards of accountability, for example, of conduct, performance, achievement and quality of information, can be set for those who are accountable; actual conduct, performance, achievement, quality and so on can be measured and compared with these standards by reference to known criteria; and the process of measurement and comparison requires special skill and the exercise of judgement. This postulate relates to postulate 5 of Mautz and Sharaf (1961:47) and states that the parties to the audit should agree on the standards of conduct, performance or achievement, the quality of information and the kind of report that is required. By agreeing to the standards, the expectation of both parties should coincide. These standards should provide clear and specific guidance to the auditor for the performance of the audit (Flint 1988:32–35).

Postulate 6: The meaning, significance and intention of financial and other statements and data which are audited are sufficiently clear that the credibility which is given thereto as a result of an audit can be clearly expressed and communicated. An audit adds value to financial statements as it expresses an opinion on the credibility, meaning, significance, reliability and legitimacy thereof. For this opinion to add value, the way in which the financial statements were prepared should be clear, specific and unambiguous so that the parties who rely on the financial statements will be able to understand the opinion expressed thereon (Flint 1988:38–39).

Postulate 7: The audit produces an economic or social benefit. According to Flint (1988), an audit will only satisfy the social need if the benefit that it provides is greater than the sacrifice made to obtain it. This means that the cost of obtaining

additional audit evidence and the resultant increase in confidence which the auditor obtains from the evidence should be measured against the social good it produces (Flint 1988:39–40).

2.4.4 Summary

From the above it is clear that the postulates of auditing form the foundation for building the auditing structure. Both Flint (1988) and Mautz and Sharaf (1961) postulate that the information on which an auditor expresses an opinion should be verified. There are various procedures available to the auditor to obtain audit evidence in order to verify the information. One such procedure is analytical procedures, which is the subject of this study.

2.5 THE AUDIT DEFINITION

2.5.1 Earlier definitions

As discussed under the need for an audit, the word “audit” originated from the Latin word *audire*, which means to hear, and the auditor was the individual who *heard* the steward’s accounts (Spicer & Pegler 1921:2). With the advent of writing, this listening function turned to a checking function (Puttick *et al.* 2007:2). According to Chatfield (1977:27), auditors in the Middle Ages would often conduct a preliminary examination which included an assessment of managerial efficiency. This examination is described as follows: “[T]hey would examine the fields and see how much was sawn and whether it was well done; examine the stock and increase and investigate deaths and barrenness; inventory the grange; examine the equipment; assess any expenditure needed and incidental business; and recon the interim account of each official”. Chatfield (1977:27) describes this examination as a “subtle contest between auditor and steward”. In this subtle contest, the steward, on the one hand, wished to render accounts profitably for himself, while the auditor, on the other, was charged to detect any fraud, negligence or bad judgement on the part of the steward (Chatfield 1977:27). From these descriptions it is clear that the early audits were a “detailed examination of the stewardship report in a search for defalcations and fraud”

(Moyer 1951:3). Chatfield (1977:112) concurs with this view, stating that the goal of an audit before the Industrial Revolution was to detect fraud.

The Industrial Revolution brought with it a clear separation between the owners of a business and management, which led to an increase in the practice of auditing (Eilifsen *et al.* 2014:5; Spicer & Pegler 1921:3). The auditing practice had to adapt to these changes in order to stay relevant. This resulted in the auditor becoming increasingly concerned about the credibility of management assertions about financial statements and less concerned about defalcations and fraud (Krogstad 1977:177).

Spicer and Pegler (1921:4) define an audit as an "examination of the books, accounts and vouchers of a business, as shall enable the auditor to satisfy himself whether or not the statement of financial position is properly drawn up, so as to exhibit a true and correct view of the state of the affairs of the business, according to the best of his information and the explanations given to him and as shown by the books; and if not, in what respects it is untrue or incorrect". Mautz and Sharaf (1961:6) define auditing as being concerned with verification: "[I]t is the examination of financial data for the purpose of judging the faithfulness with which they portray events and conditions."

The American Accounting Association (AAA) defines auditing as "a systematic process of objectively obtaining and evaluating evidence regarding assertions about economic actions and events to ascertain the degree of correspondence between those assertions and established criteria and communicating the results to interested users" (AAA 1973:2).

2.5.2 A recent definition

From the early definition to the more recent ones, it can be said that auditing includes two fundamental processes, namely an investigative-evaluative process and a communicative process (Krogstad 1977:177). This is also clear in Flint's (1988:20) statement, namely that the purpose of an audit is to "investigate and review the actions (or inaction), decisions, achievements, statements or reports

of specified persons with defined responsibilities, to compare these actions, etc. with some norm, and to form and express an opinion on the result of that investigation, review and comparison". With the postulates proposed by Mautz and Sharaf (1961), it is clear that the investigative-evaluative process is guided by general accepted auditing standards (Krogstad 1977:177; Mautz & Sharaf 1961:47). The IAASB defines an audit in its ISAs as "an engagement in which a practitioner expresses a conclusion designed to enhance the degree of confidence of the intended users other than the responsible party about the outcome of the evaluation or measurement of a subject matter against criteria" (IAASB 2014b:Framework par. 7). The communicative process communicates the results of the investigative-evaluative process to the users in the form of an auditor's professional opinion (Krogstad 1977:177).

2.5.3 Summary

From the above definitions and descriptions it can be concluded that although the definition of an audit has evolved over time to stay relevant to the user's needs, the fundamental concept has stayed the same. It can be regarded as a systematic process that the auditor follows in order to provide assurance on an organisation's financial statements in the form of an audit opinion. It is used to enhance the credibility of an organisation's financial statements. The methodology that the auditor should follow in conducting an audit is outlined in the ISAs.

2.6 THE AUDIT PROCESS

The purpose of an audit is to enhance the degree of confidence of the intended users in the financial statements. This is achieved by the expression of an opinion by the auditor on whether the financial statements are prepared, in all material respects, in accordance with an applicable financial reporting framework (IAASB 2014d:ISA 200 par. 3). In order to express this opinion, the auditor should follow a systematic process to obtain sufficient and appropriate audit evidence to support this opinion. The ISAs give guidance to the auditor on the process that

should be followed to obtain audit evidence and support him or her in obtaining reasonable assurance (IAASB 2014d:ISA 200 par. 7).

The audit process can be divided into a number of different audit phases (Eilifsen *et al.* 2014:17). Knechel *et al*. (2013:393) identify risk assessment, internal control evaluation, testing and review as general phases in an audit process. For purposes of this study, the four clearly identifiable phases as outlined by Puttick *et al*. (2007:178) will be discussed. These are pre-engagement activities, planning of the audit, obtaining audit evidence (also referred to as the fieldwork phase), and lastly, conclusion, evaluation and reporting. Although the different phases of the audit process are clearly identifiable, they are sequential, cumulative and interrelated (Eilifsen *et al.* 2014:17).

2.6.1 Pre-engagement activities

The International Standard on Quality Control (ISQC 1) (IAASB 2014c:par. 26) requires from the auditor to establish policies and procedures for deciding whether to accept new clients and retain current ones. ISA 220 (IAASB 2014f:par. A8–A9) gives guidance to the auditor on the specific elements to consider prior to accepting an engagement. The main purpose of these considerations is to limit the possibility that the auditor might be associated with a client who lacks integrity (Eilifsen *et al.* 2014:17). Knechel, Salterio and Ballou (2007:111) postulate that auditors tend not to turn away prospective clients or discontinue auditing current clients because the larger the client base, the greater their fee income. However, the fact remains that involvement with dishonest clients can have serious implications for the auditor. It is therefore imperative for the auditor to evaluate client-related risks and use that evaluation to determine the risk that it poses to the audit firm in terms of a loss suffered on the engagement, future litigation, regulatory fines or a decline in professional reputation (Knechel *et al*. 2007:111; Johnstone 2000:2). Once the auditor has accepted a new client or has decided to continue with an existing one, the terms of the engagement must be agreed upon by both parties in an engagement letter (IAASB 2014e:ISA 210 par. 9–12).

2.6.2 Planning of the audit

Eilifsen *et al.* (2014:19) and ISA 300 (IAASB 2014i:par. 2) emphasise the importance of proper planning of an audit because this ensures that the audit is conducted effectively and efficiently. ISA 300 (IAASB 2014i:par. A2) advises that planning should not be seen as a separate phase of an audit, but rather as a "continual and iterative process" that begins with the completion of the prior year's audit and continues until the completion of the current year's audit.

Planning of the audit encompasses two activities: it requires the auditor to first establish the overall audit strategy for the engagement, and secondly, to develop an audit plan (Eilifsen *et al.* 2014:67; IAASB 2014i:ISA 300 par. 7–11). The overall audit strategy outlines the scope, timing and direction of the audit and guides the development of the audit plan (IAASB 2014i:ISA 300 par. 7). The audit plan sets out the nature, timing and extent of audit procedures in order to reduce audit risk to appropriately low levels (IAASB 2014i:ISA 300 par. 9; Puttick *et al*. 2007:227). These two planning activities are closely interrelated since changes to the one will lead to changes in the other (IAASB 2014i:ISA 300 par. A10).

In establishing the overall audit strategy, the auditor shall consider the characteristics of the engagement, reporting objectives of the engagement, the direction of the engagement team's efforts, the results of the pre-engagement activities as well as the nature, timing and extent of resources necessary to perform the engagement (IAASB 2014i:ISA 300 par. 8). Once the overall audit strategy has been decided on, the auditor can develop an audit plan in order to address the matters identified in the audit strategy (IAASB 2014i:ISA 300 par. A10). The audit plan is more detailed than the overall audit strategy in that it includes the nature, timing and extent of audit procedures to be performed by the engagement team members (IAASB 2014i:ISA 300 par. A12). According to Eilifsen *et al*. (2014:75), the audit plan should consider how to conduct the audit effectively and efficiently.

The audit procedures contained in the audit plan shall include the nature, timing and extent of planned risk assessment procedures as determined by ISA 315

(IAASB 2014j), the nature, timing and extent of planned further audit procedures at the assertion level as determined by ISA 330 (IAASB 2014k) as well as other audit procedures required to be performed in order to comply with the standards (IAASB 2014i:ISA 300 par. 9).

The auditor performs risk assessment procedures in order to gain an understanding of the entity and its environment, including the entity's internal controls (IAASB 2014j:ISA 315). An understanding of the entity and its environment enables the auditor to understand the business risks the entity faces as well as the internal controls intended to address these business risks (IAASB 2014j:ISA 315 par. 11–12). There are different types of risk procedures that the auditor can use to evaluate risk which include inquiries of management and other relevant parties within the entity, preliminary analytical procedures, and observation and inspection (Eilifsen *et al*. 2014:81; IAASB 2014j:ISA 315 par. 6).

This type of audit approach is known as a business risk audit methodology (Knechel 2007:386). Business risk can be described as the risk that an entity's objectives will not be met as a result of numerous factors (IAASB 2014j:ISA 315 par. 4; Paino, Hadi & Tahir 2014:316). Business risk will ultimately translate into the risk of material misstatement (Paino *et al*. 2014:316). It is then this assessment of the risk of material misstatement, whether due to fraud or error, that will provide the basis for the design and implementation of the auditor's responses to the assessed risks of material misstatement (IAASB 2014j:ISA 315 par. 3). The development and underlying principles of the business risk audit methodology will be discussed in more detail in section 2.7.2.

The outcome of the risk assessment procedures provides the foundation for planning the nature, timing and extent of specific further audit procedures (IAASB 2014i:ISA 300 par. A12). In deciding on the further audit procedures, the auditor should determine whether the risks relate pervasively to the financial statements as a whole and affect many assertions or whether they pertain to specific assertions relating to account balances and disclosures (Eilifsen *et al*. 2014:111). In response to a risk at financial statement level, the auditor will implement overall responses. These responses will include, among other things,

emphasising to the engagement team that they should maintain professional scepticism, assigning more experienced staff to the engagement, providing a higher level of supervision and incorporating elements of unpredictability (IAASB 2014k:ISA 330 par. A1). In response to a risk at the assertion level relating to account balances and disclosures, the auditor shall consider the entity's internal controls (Eilifsen *et al.* 2014:112). If the controls are properly designed, the auditor tests the operating effectiveness of the controls (IAASB 2014k:ISA 330 par. 8). The operating effectiveness of the controls determines the extent and types of the substantive audit procedures that should be performed. However, the auditor is required to always perform substantive audit procedures for each material class of transaction, account balance and disclosure (IAASB 2014k:ISA 330 par. 18).

2.6.3 Obtaining audit evidence

The auditor performs audit procedures to obtain sufficient and appropriate audit evidence which will support his or her opinion on the financial statements (IAASB 2014l:ISA 500 par. 4). Eilifsen *et al*. (2014:127) describe the financial statements as a reflection of management's assertions about the various financial statement elements and state that the auditor gathers audit evidence in order to test these assertions. Assertions are defined by the IAASB's Glossary of Terms (IAASB Glossary) (2014a:Glossary) as "representations made by management, explicit or otherwise, that are embodied in the financial statements, as used by the auditor to consider the different types of potential misstatements that may occur".

The purpose of an audit procedure relates to its nature and type responding to the assessed risks and includes tests of controls and substantive audit procedures (IAASB 2014k:ISA 330 par. A5). Tests of controls are used to test the operating effectiveness of relevant controls in preventing or detecting and correcting, material misstatements at the relevant assertion level (IAASB 2014k:ISA 330 par. 8). In testing the operating effectiveness of a control, the auditor should determine whether the control is manual or automated. A manual control may be subject to human error, whereas an automated control should operate more consistently and has the ability to improve audit efficiency and

effectiveness (Omoteso 2013:65–66). Computer Assisted Audit Techniques (CAATs) can be used to test automated controls (Eilifsen *et al*. 2014:136). Substantive audit procedures are used to detect material misstatements at the relevant assertion level and include tests of details and substantive analytical procedures (Eilifsen *et al*. 2014:136). The types of audit procedures available to the auditor to obtain audit evidence include inspection, observation, inquiry, external confirmation, recalculation, reperformance and analytical procedures (IAASB 2014l:ISA 500 par. A14–A25). These procedures can be performed as risk assessment procedures, tests of controls or substantive audit procedures, depending on the context in which the auditor applies them (Eilifsen *et al*. 2014:136).

In assessing risks and designing audit procedures, the auditor must consider the sufficiency and appropriateness of the audit evidence (Eilifsen *et al*. 2014:136). Sufficiency is a measure of the quantity of audit evidence and is affected by the auditor's assessment of the risk of material misstatement as well as the quality of such audit evidence (IAASB 2014a:Glossary; IAASB 2014l:ISA 500 par. 5). Appropriateness is a measure of the quality of audit evidence, and the quality of audit evidence refers to the relevance and reliability of the evidence in providing support for the conclusions on which the auditor's opinion is based (IAASB 2014a:Glossary; IAASB 2014l:ISA 500 par. 5).

2.6.4 Conclusion, evaluation and reporting

The completion, evaluation and reporting phase of the audit is the fourth and final phase in the audit process. It is during this stage that the auditor performs completion procedures and evaluates the sufficiency and appropriateness of audit evidence gathered during the audit in order to form an audit opinion on the financial statements (Puttick *et al*. 2007:965). Completion procedures that the auditor should perform include a review of the financial statements on an overall basis, a going concern review, a subsequent event review and a final analytical review on period end financial information (Puttick *et al*. 2007:965). In evaluating the audit evidence, the auditor should be concerned with the sufficiency of the audit evidence as well as the effect that the misstatements have on the financial

statements (Eilifsen *et al*. 2014:574). The auditor will then be able to formulate an opinion based on the evaluation of the audit evidence and will express the audit opinion in a written report (IAASB 2014p:ISA 700 par. 10–19). The audit report should set out the responsibilities of management and the auditor relating to the financial statements, should explain what an audit entails and should express the auditor's opinion as well as any additional reporting responsibilities that he or she might have (IAASB 2014p:ISA 700 par. 24–39).

2.6.5 Summary

From the above discussions it is clear that the auditor should follow a process consisting of four clearly identifiable phases which are sequential, cumulative and interrelated. An integral part of the audit process is to obtain sufficient and appropriate audit evidence about whether financial statements are free from material misstatements in order to form an audit opinion (IAASB 2014d:ISA 200 par. 17). One method of obtaining audit evidence is through the use of analytical procedures. Analytical procedures can be used as risk assessment procedures to assist the auditor to gain an understanding of the entity and its environment as well as to identify problem and high-risk areas in order to plan the nature, timing and extent of the further audit procedures (Glover *et al*. 2005:200). Analytical procedures as substantive audit procedures are used to obtain evidence about particular assertions relating to account balances or classes of transactions, and during the finalisation of the audit, they are used as an overall review of the financial statements (Glover *et al*. 2005:200). Chapter 3 provides a detailed discussion of the use of analytical procedures as risk assessment procedures, substantive audit procedures and as an overall review procedure.

2.7 FACTORS DRIVING CHANGE IN THE TRADITIONAL AUDIT METHODOLOGY

As discussed above, the audit is an independent process that the auditor follows to enable him or her to provide an expert opinion that the financial statements as presented by management are in accordance with the applicable financial

reporting framework and fairly present, in all material respects, the financial performance and cash flows for a company (IAASB 2014p:ISA 700).

The audit process for an engagement is dictated by the audit methodology that is followed (Knechel *et al*. 2013:391). An audit methodology is specifically designed to systematically assist auditors with the uncertainties in an audit (Knechel *et al*. 2013:391). As indicated in section 2.2, initially auditors concerned themselves with detecting fraud in the accounts and indicating the accuracy of client's records, utilising internal evidence available in the business being audited. With the subsequent demand by stakeholders for reliable financial information, attention focused on external evidence to corroborate financial statement information (Stettler 1982:18). This focus required an interest in internal evidence relating to the accounting system and control (Stettler 1982:18). The emphasis on the accounting system resulted in a move from a transaction-based approach to a systems approach or audit methodology (Stettler 1982:18). During the 1990s, a shift was noted in the audit methodologies of audit firms, especially the Big 5 (as was) towards "value added audits" paving the way for business risk audit methodologies (Khalifa *et al.* 2007:827). Today this business risk focus has been supplanted by a methodological emphasis on "audit quality" (Khalifa *et al*. 2007:827).

Factors described in the literature that have driven the auditor to alter the current audit methodology are changes in the business environment (Lombardi *et al*. 2014:22; Porter *et al.* 2003:18), changes in audit practices (Khalifa *et al.* 2007:833; Knechel 2007:385) the advancement of technology (Omoteso 2013:17) and the availability of more non-financial information (Dyball *et al*. 2014:44; Ames et al. 2012:28). These factors are discussed in more detail in the next few sections. The aim is not to present a detailed discussion of the influence of these factors on an audit, because the audit impact of each factor represents a study field of its own. This section is included as background to illustrate that various factors, internally and externally, and the advancement of technology have an effect and are still influencing audit methodologies, also the use of analytical procedures (see chapter 3), which is the focus of this study.

2.7.1 Changes in the business environment

According to Vasarhelyi, Teeter and Krahel (2010:405), “the real-time economy is here”. They describe the real-time economy as a “now” economy, one in which information can be shared instantaneously and which allows for millions of transactions to flow through comprehensive information systems (Vasarhelyi *et al*. 2010:405). The real-time economy has caused businesses to operate without geographic boundaries and has enabled timely and reliable information for business decisions (Kuenkaikaew & Vasarhelyi 2013:39). Omoteso (2013:18) contends that advances in communication capabilities such as electronic data interchange, the internet and satellite technologies have enabled communication within and between companies. It is this integration of information and communication technologies that has resulted in the creation of multinational organisations which serve global markets through their global operations (Carmen 2013:403; Porter *et al*. 2003:32). Scholte (2008:1474) describes globalisation as a growth of transactions and interdependence between countries in which more messages, ideas, merchandise, money, investments and people cross borders. Vasarhelyi *et al*. (2010:406) predict that the coming years will see more nimble and adaptive companies being integrated into the global economy.

The introduction of IT in businesses poses specific risks to the business and increases audit risk (IAASB 2014j:ISA 315 par. A63). In a real-time economy, investors are able to receive real-time data about a company through public and proprietary databases (Zhao, Yen & Chang 2004:389–390). This poses a threat to the viability of the traditional audit function as investors have access to other sources of information, which has led to a decline in the importance of financial statements to investors (Zhao *et al.* 2004:390). This is confirmed by Lombardi *et al*.’s (2014:22) statement that the traditional audit function of only providing assurance on financial statements has become outdated.

Kuenkaikaew and Vasarhelyi (2013:38-39) also posit that companies need more than only financial statement audits because a purely financial statement audit cannot address current business and stakeholder needs because it uses historical financial information and provides substantially delayed backward-

looking assurance. This was predicted 20 years ago by Elliot (1994:74), who called for changes in the preparation and auditing of financial statements as IT provides real-time information to investors, creditors and analysts, whereas financial statements provide a historical view. Lombardi *et al.* (2014:21) concur by stating that the "gap" between data generation and information assurance causes stakeholders to view audited financial statements as not being useful for decision making in the current real-time economy.

The traditional audit methodology also tends to be more substantive in nature, using audit sampling as a basis for testing large volumes of transactions (Knechel 2007:389). Audit sampling is defined in ISA 530 (IAASB 2014n:par. 5) as "the application of audit procedures to less than 100% of items within a population of audit relevance such that all sampling units have a chance of selection in order to provide the auditor with a reasonable basis on which to draw conclusions about the entire population". This method of testing, however, has been criticised in the literature, which states that auditors follow poor sampling techniques (Knechel 2007:390; Peecher *et al*. 2007:468; Houck 2003:192). According to Knechel (2007:390), technology, globalisation, financial complexity and organisation size increase the risks relating to sampling. Rezaee, Elam and Sharbatoghlie (2001:151) maintain that in a real-time accounting system, the auditor should place less reliance on substantive tests of electronic documents and transactions and focus more on a risk-based audit plan that focuses on the adequacy and effectiveness of the internal control activities. Rezaee *et al*. (2001:151) further emphasise that in a real-time accounting system, the use of continuous auditing will enable the auditor to test up to 100% of a population, reducing the amount of time and costs that auditors spend on a manual examination of transactions and account balances. According to Hunton and Rose (2010:298), the use of audit support systems will enable the auditor to perform an evaluation of much larger volumes of data than in the past.

From the above discussion it is evident that changes in the business environment such as globalisation, the advancement of technologies and the real-time economy have forced the audit profession to change its audit methodologies in order to stay relevant. The traditional audit methodology is mostly criticised for

not providing real-time assurance and for focusing on testing only a sample of transactions. In their research, Lombardi *et al*. (2014:28) found that for audit services to stay relevant in the future, the nature of assurance should shift to real-time assurance through the use of continuous auditing (see section 2.7.3.1) and that auditors should provide more risk-based services as a wider form of assurance (see section 2.7.2). According to Hunton and Rose (2010:298), these changing economic conditions necessitate the use of audit support systems (see section 2.7.3.2).

2.7.2 Changes in audit practices

The development of the risk assessment orientation started in the 1970s, with the emergence of the audit risk model that decomposed audit risk into three components, namely inherent, control and detection risk (Pinho 2014:25; Knechel 2007:388; Bell *et al*. 2005:9). The IAASB (2014a:Glossary) defines audit risk as the "risk that the auditor expresses an inappropriate opinion when the financial statements are materially misstated". In using an audit risk model, the audit work was driven by financial statement captions and it made a clear distinction between the phases of audit planning and evidence collection (Curtis & Turley 2007:450). Bell *et al.* (2005:9) maintain that it was the audit risk model that has caused selective detailed testing and the application of analytical procedures to become an integral part of the audit process. The audit risk model, however, has been described as a narrow interpretation of risks and a methodology that only focuses on financial statement misstatements (Lemon *et al*. 2000:10).

In the early to mid-1990s, audit fee pressure and the competitive audit market were beginning to threaten the profitability of audit firms (Curtis & Turley 2007:445; Suddaby *et al*. 2007:340). It was during this period, that clients started asking for an audit that "does more than look at the numbers" (Jeppesen 1998:521). This paved the way for the provision of non-audit services, in particular general management consulting services (Curtis & Turley 2007:445; Suddaby *et al*. 2007:340). Suddaby *et al.* (2007:340) emphasise that during this period nearly 70% of some audit firms' revenue came from non-audit services. Khalifa *et al*. (2007:833) describe management consulting services as a

"hybridised version of an audit", in which the auditor assesses the entity's business risk which enables an assessment of its strategy and core business processes. Jeppesen (1998:532) defines consulting services as "services designed to improve the client's condition". It was said that audits founded on the analysis of business risk can cut audit cost, streamline the audit process, attract and retain expert staff and also offer better services to clients (Khalifa *et al*. 2007:833). Entering the new millennium Power (2000:1) describes this type of auditing as the "audit of tomorrow". Eilifsen *et al*. (2001:204) go on to say that this type of auditing can be used to increase the scope of assurance, add value to the client and stakeholders which would result in more effective audits. This is confirmed by Khalifa *et al*. (2007:833), Humphrey, Jones, Khalifa and Robson (2004:9) and Jeppesen (1998:520), who believe that the business risk audit could "add value" to the audit.

However, it was not until the late 1990s that many of the large audit firms implemented these new business risk audit methodologies (Robson *et al*. 2007:411). With this new methodology in place, it became clear that auditors had shifted their focus from financial reporting to gaining an understanding of the client's business and the related business risks (Eilifsen *et al*. 2001:195). To make this shift, the auditor is required to change the scope of planning and risk assessment processes as well as the related evidence-gathering procedures (Curtis & Turley 2007:439). This concurs with the view of Humphrey *et al*. (2004:8), who emphasise that the business risk audit methodology focuses on the modelling of risk in business processes as the basis for identifying financial statement risk resulting in direct audit testing. Table 2.1 summarises the key differences between the control paradigms of the traditional audit and the business risk audit methodologies. From table 2.1 it is evident that under the new business risk control paradigm, business risk assessment is a continuous process which involves the whole organisation, whereby risks and controls are integrated.

Table 2.1: Comparison of traditional and new business risk control paradigms

Old paradigm		New paradigm
1. Risk assessment occurs periodically	⇨	1. Risk assessment is a continuous process
2. Accounting, treasury and internal audit responsible for identifying risks and managing controls	⇨	2. Business risk identification and control management are the responsibility of all members of the organization
3. Fragmentation – every function behaves independently	⇨	3. Connection - business risk assessment and control are focused and coordinated with senior level oversight
4. Control is focused on financial risk avoidance	⇨	4. Control is focused on the avoidance of unacceptable business risk, followed closely by management of other unavoidable business risks to reduce them to an acceptable level
5. Business risk controls policies, if established, generally do not have the full support of upper management or are inadequately communicated throughout the company	⇨	5. A formal business risk controls policy is approved by management and board and communicated throughout the company
6. Inspect and detect business risk, then react at the source	⇨	6. Anticipate and prevent business risk, and monitor business risk controls continuously
7. Ineffective people are the primary source of business risk	⇨	7. Ineffective processes are the primary source of business risk

Source: Bell, Marrs, Solomon and Thomas (1997:50)

Knechel (2007:394) refers to the business risk audit methodology as a holistic approach to audit because the auditor needs to see the whole organisation and its environment in order to understand the nature of the audit challenges. The rationale behind this is that any factor that would increase business risk would also increase audit risk (Knechel 2007:393; Robson *et al.* 2007:411; Eilifsen *et al*. 2001:193). Erickson, Mayhew and Felix (2000:170–171) argue that gaining an understanding of the entity's business risk provides the auditor with a baseline for the identification of risks of financial statement error. Furthermore, a methodology that focuses on understanding a business, its environment and business processes provides the best means by which an auditor can recognise risks

associated with management fraud (Paino *et al*. 2014:316; Erickson *et al*. 2000:168). This argument is also reflected in ISA 315 (IAASB 2014j:par. A38), which states that an understanding of the business risks the entity faces will increase "the likelihood of identifying risks of material misstatement, since most business risks will eventually have financial consequences and therefore, an effect on the financial statements".

Curtis and Turley (2007:444) maintain that the implementation of a business risk audit methodology can be achieved in two ways, namely to shift the focus from financial statement risk to business risk, and to change the nature of testing from large volume tests of details to the testing of controls, supported by an increased use of analytical procedures. Knechel (2007:394) and Lemon *et al*. (2000:18) confirm the use of analytical procedures by stating that the business risk audit methodology requires the acquisition of new analytical tools.

The advantage of the business risk audit methodology is that it provides additional value to the client because it allows the auditor to comment and advise the client on business risks as well as the accounting implications of the business risks (Khalifa *et al*. 2007:833; Robson *et al*. 2007:412). This is in contrast to the traditional audit methodologies, which were oriented towards compliance and which were only transaction based (Robson *et al*. 2007:412). According to Knechel (2007:401) and Lemon *et al*. (2000:12), the business risk audit methodology leads to more efficient audits because it requires less detailed audit work, more effective audits as the auditor has a broader understanding of the entity and it provides better client service, which in turn justifies higher audit fees. Lemon *et al*. (2000:13) also see a link between the business risk audit methodologies and the auditor's engagement risk, stating that a broader understanding of the client's business risk will reduce the auditor's engagement risk.

To make the shift to the new business risk audit methodology, the IAASB issued several new and revised standards to provide clear guidance on the process of risk-based auditing (IAASB 2014d:ISA 200; IAASB 2014j:ISA315; IAASB 2014k:ISA330). According to the IAASB, the purpose of the new and revised

standards is to increase audit quality as a result of better risk assessments as well as improved design and performance of audit procedures to respond to the risks (IAASB 2002:1).

The IAASB (2014j:ISA 315 par. 4) defines business risk as "the risk that an entity's objectives will not be achieved". In short, the ISAs require the auditor to gain an understanding of the entity, the environment in which it operates and the internal controls that it has implemented in order to identify and assess the risks. This understanding will then provide the auditor with a basis for the design and implementation of responses to the assessed risks (IAASB 2014j:ISA 315 par. 3). The auditor gains this understanding by performing risk assessment procedures which include inquiries from management, analytical procedures, observation and inspection (IAASB 2014j:ISA 315 par. 6). The auditor then uses this understanding to assess the risk that the entity may not achieve its objectives, which includes the risks of material misstatement at both the overall financial statement level and at the assertion level for classes of transactions, account balances and disclosures (IAASB 2014j:ISA 315 par. 5). The IAASB (2014j:ISA 315 par. A1) describes the identification of risks as a "continuous, dynamic process of gathering, updating and analysing information throughout the audit". This understanding enables the auditor to design and perform audit procedures that are responsive to the assessed risks of material misstatement at the overall financial statement level and the assertion level (Kochetova-Kozloski, Kozloski, & Messier 2013:127; IAASB 2014k:ISA 330 par. 3).

From the above it is clear that the auditing standards encourage a business risk-based audit methodology but within a framework that places the emphasis on risk assessment at all levels of audit inquiry and requires the auditor to demonstrate a clear linkage between risk assessment and audit procedures (Humphrey *et al*. 2004:17). According to Humphrey *et al*. (2004:17), the business risk audit methodology has provided the audit industry with a new form of rationality and legitimacy for the audit task. Power (2000:2) and Jeppesen (1998:529) adopt a more critical view and caution that the distinction between consulting and auditing is becoming more unclear and that independence between audit and consulting services is a key problem to be managed by the profession.

Corporate failures such as Enron, Worldcom and Parmalat have led to numerous allegations made by business, investors, the general public and academics that the audit practice and audit regulation are flawed (Omoteso 2013:1; Teck-Heang & Ali 2008:6; Khalifa *et al*. 2007:837; Humphrey *et al*. 2004:4). The global significance of these scandals resulted in increased regulation of the audit profession and the passing of legislation for example the Sarbanes-Oxley Act of 2002 in the US (Khalifa *et al*. 2007:837; Knechel 2007:402). This placed restrictions on the provision of non-audit services by audit firms in order to enhance "independence" and required auditors to evaluate clients' internal control systems (Khalifa *et al*. 2007:837). These regulatory pressures focused the attention on audit quality and paved the way for a change from "value adding" to "audit quality" (Khalifa *et al*. 2007:837; Bell *et al*. 2005:17). In achieving audit quality, the emphasis has shifted from adding value to an evidence-led audit process (Khalifa *et al*. 2007:846). Houck (2003:69) maintains that auditors should perform "more and better" analytical procedures as a means of improving audit quality. The auditor must, however, be able to demonstrate to the regulators that the level of assurance obtained is a reasonable level of assurance (Bell *et al*. 2005:14).

It is evident from the above discussion that changes in audit practices led to the business risk audit methodology which focuses on business risks rather than risks that only affect the financial statements. A methodology in which the auditor obtains a holistic understanding of the entity can lead to more efficient audits, cut audit costs and result in better client service. Indications are that in future this audit methodology will become "audit quality" driven. The IAASB issued several new and revised standards that give guidance to the auditor on the process of business risk assessment. One method the auditor can use to identify risks is analytical procedures, and the business risk audit methodology has resulted in an increased use of analytical procedures (Knechel 2007:394; Lemon *et al*. 2000:18). Houck (2003:69) is of the opinion that the incorporation of more and better analytical procedures will result in better quality audits. Chapter 3, section 3.8.1, provides a description on the application of analytical procedures as part of the business risk audit methodology.

2.7.3 Advancements in technology

Advancements in technology have led to the automation of business processes and have affected the audit environment (Omoteso 2013:1; Porter *et al.* 2003:33). Auditors thus need to utilise computer tools and techniques to improve the quality of their audits (Omoteso 2013:2). This includes the use of real-time financial information in continuous auditing (Kuenkaikaew & Vasarhelyi 2013:43; Chan & Vasarhelyi 2011:153; Zhao *et al*. 2004:391) and the use of audit support systems (Hunton & Rose 2010:298; Dowling & Leech 2007:92).

2.7.3.1 Continuous auditing

As discussed in section 2.7.1, globalisation, the advancement of technology and changing business conditions have created the need for more real-time assurance. The move towards technologies such as electronic data interchange, electronic file transfer, online systems and the internet have resulted in the disappearance of the traditional audit trail and forced auditors to change their audit methodologies (Flowerday *et al*. 2006:326; Rezaee *et al*. 2001:150). Owing to these advances in technology, organisations are increasingly able to generate financial information on a real-time basis (Chan & Vasarhelyi 2011:152). Real-time financial reporting requires real-time assurance, which can only be provided by continuous auditing technologies (Flowerday *et al*. 2006:325). It is thus not strange that Rezaee *et al*. (2001:150) refer to continuous auditing as “the audit of the future”. This has also more recently been confirmed by Liddy (2014:3), who predicts that audits of the future will use advanced data and analytical capabilities to look beyond an organisation’s walls to understand the impact of broader forces.

Continuous auditing is not a new concept, and as early as 1921, Spicer and Pegler (1921:22) described a continuous audit as “one where the auditor’s staff is occupied continuously on the accounts the whole year round” and that “continuous audits should be adopted where the work involved is considerable”. During the 1980s, the auditing profession began using CAATs for ad hoc investigations and analysis of risk areas in determining their audit plans (Coderre

2005:3). However, it was not until the 1990s that there was increasing adaptation of data analysis to support the testing of controls. In today's audit environment, continuous auditing allows auditors to alter the traditional audit approaches and to overcome the limitations of sampling (Coderre 2005:4).

Continuous auditing can be defined as "a type of auditing that produces audit results simultaneously with, or within a short period of time after the occurrence of relevant events" (Kogan, Sudit & Vasarhelyi 1999:88). Rezaee *et al*. (2001:151) provide a broader definition and explain continuous auditing "as a systematic process of gathering electronic audit evidence as a reasonable basis to render an opinion on fair presentation of financial statements prepared under the paperless, real-time accounting system". In a later study, Kuhn and Sutton (2010:93) refer to it as the "analysis of data on a real- or near real-time basis against a set of predetermined rule sets". According to Kuenkaikaew and Vasarhelyi (2013:43), continuous auditing aims to satisfy real-time business needs as a number of audit tasks can be automated and efficiently performed.

From the discussion in section 2.7.1 it is evident that the traditional audit methodology should change from a review of a sample of transactions to a testing of 100% of the transactions. Continuous auditing is one method that the auditor can use to test 100% of transactions (Coderre 2005:1). Continuous auditing therefore has the benefit of reducing the time and costs that auditors traditionally spend on a manual examination of transactions and account balances because it enables an auditor to test the whole population of transactions and data and not only a sample of them, thus enabling him or her to form an opinion on a much broader set of data (Liddy 2014:1; Kuenkaikaew & Vasarhelyi 2013:39; Rezaee *et al.* 2001:151). Omoteso (2013:95) describes the main benefit of continuous auditing as the ability to perform a high-powered instantaneous analysis of raw data which makes it possible to identify problems early in the audit and to communicate these problems to management. Table 2.2 provides a summary of the main differences between traditional auditing and continuous auditing.

Table 2.2: Traditional auditing versus continuous auditing

Traditional auditing		Continuous auditing
1. Frequency: • Periodic	⇨	1. Frequency: • Continuous or more frequent
2. Approach: • Reactive	⇨	2. Approach: • Proactive
3. Procedures: • Manual	⇨	3. Procedure • Automated
4. Work and role of auditors: • Bulk of the work performed is centered around labor and time intensive audit procedures • Independent roles of the internal and external auditor	⇨	4 Work and role of auditors: • Bulk of the work performed is centered around handling exceptions and audit procedures requiring human judgement • External auditor role becomes the certifier of the continuous auditing system
5 Nature, timing and extent: • Testing consists of analytical review procedures and substantive tests of details • Control testing and detailed testing occur independently. • Sampling is used in testing	⇨	5 Nature, timing and extent: • Testing consists of continuous controls monitoring and continuous data assurance • Controls monitoring and detailed testing occur simultaneously • Whole population is considered in testing
6 Testing: • Humans perform testing	⇨	6 Testing: • Data modeling and data analytics are used for monitoring and testing
7 Reporting: • Periodic	⇨	7 Reporting: • Continuous or more frequent

Source: Chan & Vasarhelyi (2011:153)

From table 2.2 it is evident that continuous auditing is changing the role of traditional auditing in terms of the following seven major dimensions: continuous or more frequent audits; proactive audit approach; automation of audit procedures; evolution of the work and role of the auditors; change in the nature, timing and extent of audit procedures; use of data modelling and data analysis for monitoring and testing; and change in the nature and timing of reporting (Chan & Vasarhelyi 2011:153).

Chan and Vasarheyli (2011:157) divide the continuous audit into four stages, namely automation of audit procedures, data modelling and benchmark development, data analysis, and lastly, reporting. They state that in the continuous audit, the stages of data modelling and data analysis are used as analytical procedures (Chan & Vasarheyli 2011:156).

From the discussion on continuous auditing it is clear that continuous auditing is not a new concept and that it is one method available to the auditor to alter the traditional audit methodology. It was also demonstrated that continuous auditing uses real-time data to satisfy real-time business needs and that it can overcome the limitations of sampling. The discussion introduced the use of data modelling and data analysis as analytical procedures in continuous auditing. Chapter 3, section 3.8.2.2, provides a detailed description of the use of analytical procedures in a continuous audit.

2.7.3.2 Audit support systems

As discussed in sections 2.7.1 and 2.7.2, the changes in the business environment have forced the audit profession to alter its audit practices, especially the methodologies followed, in order to stay relevant. According to Hunton and Rose (2010:298), these changing conditions have put huge pressure on auditors to increasingly and continuously evaluate business risks from various perspectives and that the use of audit support systems should be incorporated into audit practice.

According to Dowling and Leech (2007:92), audit support systems are the key technology application used by audit firms to facilitate efficient and effective audits. They describe it as the “face” of an audit firm’s methodology and thus the firm’s audit approach (Dowling & Leech 2007:97). Synonyms used in the body of literature to describe audit support systems are information and communication technology tools (Omoteso 2012:8490), decision support systems (Hunton & Rose 2010:297), sophisticated auditing tools (Koskivaara 2004:192) and audit automation tools (Lombardi *et al.* 2014:25). For the purposes of this study, the term “audit support systems” was used.

Audit support systems are designed to enhance audit quality through promoting compliance with accounting standards and the firm's methodology and, to some extent, structure the audit process (Dowling & Leech 2007:101). It comprises standard software packages for widespread use in audit practice such as Audit Command Language (ACL) or purpose-written software (Omoteso 2012:8490), which includes electronic working papers, automated decision aids, checklists, pre-designed audit tests and procedures and artificial intelligence (Omoteso 2012:8490; Hunton & Rose 2010:297; Dowling & Leech 2007:92).

Dowling and Leech (2007:94) found that auditors utilise audit support systems to control and tailor audit programmes. They emphasise the fact that audit support systems assist auditors with, inter alia, identifying risks, planning the audit, determining sample sizes, performing analytical procedures and reviewing red flags (Dowling & Leech 2007:99–100). Lombardi *et al.* (2014:25) emphasise the fact that audit support systems assist auditors mainly with analysis and risk assessments, and that this allows auditors to spend more time reviewing the analysis and interpreting the results rather than performing tasks. Hunton and Rose (2010:298–299) maintain that the use of audit support systems such as data mining enables the auditor to evaluate larger volumes of data. Dowling and Leech (2007:102), however, caution auditors not to rely too much on audit support systems. In a later study, they advise auditors against not using their firm's internally developed software as this may result in an audit that does not comply with a firm's methodology and auditing standards, which could increase the risk of the firm being accused of not exercising professional care (Dowling & Leech 2014:231).

According to Omoteso (2012:8490), as part of the audit automation process, most firms have introduced the use of artificial intelligence to assist auditors to make audit judgements. Omoteso (2012:8491) and Abdolmohammadi and Usoff (2001:140) identify two types of artificial intelligence tools, namely knowledge-based expert systems and neural networks. Knowledge-based expert systems are computerised systems which attempt to provide the knowledge base of an expert and is intended to replace an expert in providing assistance to a less knowledgeable decision maker in making a decision (Abdolmohammadi & Usoff

2001:141). A knowledge-based expert system is not updated automatically, but can be updated and revised periodically for changes in expertise (Abdolmohammadi & Usoff 2001:140). By contrast, neural networks are mathematical models that can mimic the human brain (Omoteso 2013:85). Neural systems in contrast to knowledge-based systems, update as the knowledge base develops (Abdolmohammadi & Usoff 2001:140).

Omoteso (2012:8493) describes neural networks as a set of interconnected units that responds individually to a set of input signals and that it can help the auditor to create expectations based on a large database of past events and trends. Hunton and Rose (2010:300) describe neural networks as a data-mining technique that can be used to discover patterns in large sets of data and to analyse patterns in the digits of numbers to detect irregularities. According to Koskivaara (2004:195), neural networks are data-driven models that learn from examples and then generalise the learning to new observations. The findings of Omoteso (2012:8493) indicate that neural networks could be helpful in reducing control and detection risks while enhancing auditors' ability to predict and uncover financial statements fraud.

From the above it can be concluded that audit support systems provide structure to the audit, assist auditors to facilitate efficient and effective audits and enable the auditor to test large volumes of transactions. There are numerous support systems available to auditors. The use of neural networks as a method for data analysis is one such support system that the auditor can use to create expectations, which can then automatically be compared to actual values. Chapter 3, section 3.8.2.3, describes the use of audit support systems for the application of analytical procedures.

2.7.4 Non-financial information

The value and relevance of non-financial information have increased over the last few years (Cohen, Holder-Webb, Nath & Wood 2012:66). Liddy (2014:1) mentions that technology and the increasing availability of information to investors are forcing the audit process to change in order to stay relevant.

Investors these days have access to real-time information, such as company news in the financial press, information on competitors and product quality, and other industry information (Lombardi *et al*. 2014:22). The use of continuous reporting can be described as real-time reporting of financial and non-financial information to investors (Hunton, Wright & Wright 2004:92). Vasarhelyi *et al*. (2010:410) posit that continuous reporting provides a stakeholder with a clearer picture of the entity and this can overcome the disadvantage of traditional, delayed, backward-looking assurance.

The increasing value of non-financial information has also led to the development of an integrated reporting framework which integrates financial and non-financial data (Cohen *et al*. 2012:66). This type of reporting is not entirely new and was first recommended in 1975 by the UK Accounting Standards Steering Committee (ASSC) (ASSC 1975:8). They have taken the view that financial reporting should cover a wider range of information than only financial information, which will convey a clearer picture of the entity's economic activities than just a narrow view of only the financial position and transactions (ASSC 1975:10). This was confirmed by the Integrated Reporting Committee (IRC) of South Africa (IRC 2011:1), which states that reports based on financial information only do not provide sufficient insight into stakeholders to enable them to form a comprehensive picture of the organisation's performance and of its ability to create and sustain value, especially in the context of growing environmental, social and economic challenges. The IRC (2011:6) also states that an integrated report should tell the "overall story" of the organisation and recommends the inclusion of an overview of the organisation's structure, a description of the material risks and opportunities based on a review of financial, social, environmental, economic and governance issues, a description of the strategic objectives of the business and an account of the organisation's performance based on its strategic objectives in terms of key performance and risk indicators (IRC 2011:7).

Eccles and Saltzman (2011:59) describe integrated reporting as a "single report" on a company's financial and non-financial performance. Adams and Simnett (2011:300) describe integrated reporting as the evolution of traditional

accounting. They explain the difference between financial reporting and integrated reporting as follows: integrated reporting provides more information to investors and a forward-looking focus, while traditional accounting provides a backward-looking focus and links the company's performance to its strategic objectives (Adams & Simnett 2011:294–295). This view is supported by Dyball *et al*. (2014:44), who emphasise that integrated reporting provides a more holistic, multi-dimensional and lucid representation of the business than the traditional reporting model.

The IAASB (2014q:ISA 720 par. 5) gives guidance to auditors on their responsibility relating to other information and defines other information as "financial and non-financial information which is included, either by law, regulation or custom, in a document containing audited financial statements and the auditor's report thereon". It states that other information includes a report by management or those charged with governance on operations, financial summaries or highlights, employment data, planned capital expenditures, financial ratios, the names of officers and directors and selected quarterly data. The standard requires of the auditor to read the other information to identify material inconsistencies between this information and those in the audited financial statements (IAASB 2014q:ISA 720 par. 6).

There is a growing body of literature that suggests that an inconsistency between a company's financial and non-financial data could be an indicator of fraudulent financial reporting (Eilifsen *et al*. 2014:156; Ames *et al*. 2012:33; Brazel, Jones & Zimbelman 2009:1161). The reason advanced is that non-financial data is difficult or nearly impossible for management to manipulate, especially if the information has been gathered from external sources (Ames *et al*. 2012:33) and the verification of non-financial data is relatively straightforward (Eilifsen *et al.* 2014:17; Brazel *et al*. 2009:1137). It is these reasons that have led Ames *et al*. (2012:28) to emphasise that auditors must examine the relationship between financial and non-financial measures to validate financial statement data. Chapter 3, section 3.8.3, provides a description on the use of non-financial information in the application of analytical procedures.

From the above it is clear that the incorporation of non-financial information into an integrated report can provide stakeholders with a clearer picture of the organisation's activities. Nowadays, factors such as technology and the availability of information are enabling auditors to incorporate more non-financial information into an audit. Non-financial information can be of huge value to the auditor because it is extremely difficult to manipulate, and the auditor therefore has a responsibility to consider the relationship between financial and non-financial information in the identification of material misstatements.

2.7.5 Summary

This section provided a description of the factors that have driven the auditor to alter the current audit methodology. These factors include changes in the business environment, changes in audit practices, the advancement of technology and the incorporation of more non-financial information in an audit. The discussion demonstrated that changes in the business environment such as globalisation, technologies and the real-time economy have forced the auditor to adapt his or her audit methodologies in order to stay relevant. The changes in audit methodologies have led to the development of a business risk audit methodology which adds value to clients because it requires of the auditor to gain a holistic understanding of the entity in order to identify business risks rather than risks that affect only the financial statements. Regulatory pressures, however, have shifted the focus from "value adding" to a more evidence-led audit process with the goal of achieving audit quality. Various computer tools and techniques are available to auditors to improve the quality of their audits. This includes the use of real-time financial information in continuous auditing and of audit support systems. Both these advancements in technology enable auditors to satisfy real-time business needs and this allows them to test large volumes of transactions. The increased availability of non-financial information enables auditors to identify inconsistencies between financial and non-financial data. The incorporation of non-financial information in an audit gives a stakeholder a clearer picture of the organisation's performance and can overcome the limitations of traditional backward-looking assurance.

2.8 CONCLUSION

This chapter discussed the need for and development of an audit. It described the audit as an accountability function that originated in ancient times and has evolved in response to contextual and social economic developments in order to address the needs of the modern information era. The chapter went on to describe the agency theory which resulted from a separation between control and ownership, information asymmetry and differing motives. Next, the audit postulates as identified by Mautz and Sharaf (1961) and built on by Flint (1988), and the definition of auditing, were examined. The audit postulates can be described as the basis, assumptions and foundation for building the auditing structure. On the basis of the definition of an audit, it can be concluded that the auditing function has had to adapt throughout time to stay relevant. Nowadays, an audit is performed to express an opinion on whether the financial statements are prepared, in all material respects, in accordance with an applicable financial reporting framework.

An audit can be described as a systematic process that the auditor has to follow in order to provide assurance of an organisation's financial statements in the form of an audit opinion. The discussion divided the audit process into four phases, namely pre-engagement activities, planning of the audit, obtaining audit evidence and conclusion, evaluation and reporting. Each of these phases was discussed in detail, and from the discussion it can be concluded that analytical procedures have developed into an integral part of the audit process. In particular, analytical procedures can be used as risk assessment procedures during the planning of the audit, as substantive audit procedures during the obtaining evidence phase and as an overall review during the conclusion, evaluation and reporting phase.

The auditor uses an audit methodology to direct the audit process of an engagement. The traditional audit methodology, however, is being challenged by factors such as the following: the change in the business environment; changes in audit practices that have resulted in the business risk-based audit methodology now with more focus on audit quality; changes in IT (reflecting the need for continuous auditing and audit support systems); and the increased availability of

non-financial information. Each of these factors was explained and it is clear that analytical procedures are vital procedures available to the auditor and that audits of the future will have to incorporate more analytical procedures in order to stay relevant.

In chapter 3, the impact of these factors on the auditors' use of analytical procedures is further considered. Chapter 3 further contextualises the use of analytical procedures in the audit process and provides a detailed discussion of the literature available on the use of analytical procedures.

CHAPTER 3

THE APPLICATION OF ANALYTICAL PROCEDURES IN THE AUDIT PROCESS

3.1 INTRODUCTION

The previous chapter provided the theoretical underpinning for the study. It discussed the need for and development of an audit, the agency theory, audit postulates and the definition of an audit. It described the audit process as a systematic process comprising four different phases the auditor follows to obtain audit evidence to enable him or her to draw a conclusion and formulate an opinion on the financial statements. Chapter 2 also described the factors that have driven auditors to change from the traditional audit methodology. Chapter 2 concluded that analytical procedures are vital methods to obtain audit evidence, they are an integral part of the audit process and indications are that the application of analytical procedures will increase in audits of the future.

This chapter contextualises the use of analytical procedures. It commences with a broad overview of previous studies on the application of analytical procedures in the audit process. It then defines analytical procedures, and explains the objectives of such procedures and the role they play in the audit process. It discusses the use of analytical procedures and the techniques or methods used to perform analytical procedures. It further describes the factors that have been driving change in the application of analytical procedures in an audit during the past three decades. The chapter goes on to explain how auditors investigate the differences in the application of analytical procedures. Against this background, it provides an overview of the advantages and challenges auditors experience in the application of analytical procedures. The chapter concludes with an overview of the literature and introduces the methodology used in conducting this research in order to achieve its aim, namely to investigate the application of analytical procedures by auditors in the audit process.

3.2 CONTEXTUALISING PREVIOUS RESEARCH

The research of Hirst and Koonce (1996) was the first study to provide descriptive findings of audit practices relating to the use of analytical procedures (Messier *et al*. 2013:147; Trompeter & Wright 2010:672). This seminal study has served as an important benchmark for researchers, practitioners, standard setters and educators (Trompeter & Wright 2010:672). Since this study, many studies have been conducted on the auditor's application of analytical procedures in the audit process. Studies have been conducted in the US (Trompeter & Wright 2010), Egypt (Samaha & Hegazy 2010) the UK (Mulligan & Inkster 1999; Fraser *et al*. 1997), Canada (Lin & Fraser 2003), Singapore (Mahathevan 1997), Hong Kong (Cho & Lew 2000), Australia (Smith *et al*. 1999), and more recently in Portugal (Pinho 2014) and Yemen (Abidin & Baabbad 2015). Little is known on how auditors in South Africa apply analytical procedures in the audit process, a gap which this study attempted to fill. Table 3.1 provides a summary of previous studies on the application of analytical procedures. Table 3.1 shows the year and country in which the study was conducted and includes the objectives of each study, the method used to collect the data and a description of the participants/respondents in the studies. The findings of these studies are referred to in the remainder of this chapter.

Table 3.1: Previous studies on the application of analytical procedures

Study	Country	Objective	Method	Participants/ respondents
Abidin & Baabbad (2015)	Yemen	To investigate the extent to which Yemeni auditors use analytical procedures	Questionnaire survey	External auditors with offices in Yemen (Sanaa, Aden, Ta'izz and Al Mukalla)
Pinho (2014)	Portugal	To evaluate the extent to which analytical procedures are used during a financial audit engagement in Portugal, throughout the different phases involved in auditing	Questionnaire survey	Working auditors in Portugal
Samaha & Hegazy	Egypt	To examine differences in the auditors' perception of the use of analytical	Questionnaire survey	Audit partners, managers and seniors from Big

(2010)		procedures in audit engagements across types of firms, experience level and particular techniques used		4 and non-Big 4 audit firms in Egypt
Trompeter & Wright (2010)	US	To investigate how the use of analytical procedures has changed in recent years in response to significant drivers and enablers in the audit environment	Interviews	Audit partners, managers and seniors from Big 4 audit firms in the US
Lin & Fraser (2003)	Canada	To understand Canadian practice in the area of analytical procedures as well as the role of auditing standards in an analytical procedures context	Questionnaire survey	Audit partners, managers and seniors from Canadian accounting firms of different sizes
Cho & Lew (2000)	Hong Kong	To provide insight into analytical review applications among big accounting firms in Hong Kong	Questionnaire survey	Partners, managers, seniors, audit intermediates and juniors from seven big audit firms in Hong Kong
Mulligan & Inkster (1999)	UK	To investigate the usage of analytical procedures by auditors in the UK	Questionnaire survey	Audit partners from Big 6, large, medium and small audit firms
Smith *et al*. (1999)	Australia	To provide evidence on the use and perceived usefulness of analytical procedures by auditors in Australia	Questionnaire survey	Experienced auditors from Big 6 and non-Big 6 audit firms in Australia
Mahathevan (1997)	Singapore	To examine auditors' use and perception of analytical procedures in Singapore	Questionnaire survey	Audit partners, managers, seniors from Big 6 and non-Big 6 audit firms in Singapore
Hirst & Koonce (1996)	US	To describe how auditors perform analytical procedures at the planning, substantive testing, and overall review stages of the audit	Interviews	Audit partners, seniors and managers representing the US Big 6 audit firms

Source: Abidin & Baabbab (2015); Pinho (2014); Samaha & Hegazy (2010); Trompeter & Wright (2010); Lin & Fraser (2003); Cho & Lew (2000); Mulligan & Inkster (1999); Smith et al. (1999); Mahathevan (1997); Hirst & Koonce (1996)

Although some of these studies were conducted almost 20 years ago, they are still relevant to this study as their findings contribute to an understanding of the application of analytical procedures by auditors in the audit process and the understanding on how the practice thereof has changed, or remained the same, in the past 20 years. From the earlier to the more recent studies, the authors all indicate that there is a demand for an increased use of analytical procedures owing to numerous factors of which technological advancements and changes in audit methodologies are the most significant. The studies also highlight the usefulness of analytical procedures during each of the phases of the audit process and show that increased application thereof can enhance the efficiency and effectiveness of the audit.

Analytical procedures are widely explored in auditing literature and various terms are used (McKee 1989:1). Synonyms used in the body of knowledge to describe analytical procedures are analytical auditing (McKee 1989:1), analytical review (Koskivaara 2004:192), analytical review procedures (Abidin & Baabbad 2015:17) and reasonableness tests (Bell *et al.* 2005:48). They are also referred to as attention-directing devices (Bell *et al*. 2005:48; Cho & Lew 2000:433; McKee 1989:2) and are described as evidence creation techniques since analytical procedures produce data that had previously not existed (Pike *et al*. 2013:1413; McKee 1989:5). Other studies use terms such as diagnostic techniques (Asare & Wright 2001:205; Cho & Lew 2000:431), as well as incredibly potent tools (Houck 2003:69). More graphical descriptions include the “smell test” (McKee 1989:1) and “figuring out if a balance makes sense” (Houck 2003:69). For the purposes of this study, the term “analytical procedures” was used.

Although various terms are used to describe analytical procedures, there is general consensus about what the term entails, as described in the section below on the definition of analytical procedures.

3.3 THE DEFINITION OF ANALYTICAL PROCEDURES

The first time the term “analytical procedures” was used and a discussion of it formally included in an official auditing pronouncement was in 1972 (AICPA 1972). This early definition described analytical procedures as a review of significant ratios and trends and the resulting investigation of unusual fluctuations and questionable items (AICPA 1972:28). According to Stringer (1975:4), at that time, analytical procedures or variations thereof had been an accepted practice of most auditors for many years and had been a required procedure in his audit firm for at least 40 years. Many decades before, this practice had been confirmed by Spicer and Pegler (1921:9), who although they did not specifically refer to formal analytical procedures, stated that errors could be detected if accounts were compared with those of previous years.

Stringer (1975:4) describes the underlying rational of analytical procedures as “a conformity of amounts in financial statements with amounts reasonably expected on the basis of past experience and other known conditions that provides useful evidential matter for auditing purposes”. He describes the analytical review process in 1975 as comprising two phases, namely the identification of any "unusual fluctuations" and the investigation of such fluctuations (Stringer 1975:4).

More recent definitions of analytical procedures include “an evaluation of comparisons and relationships to assess whether account balances or other data appear reasonable compared to the auditor’s expectations” (Arens, Elder, Beasley & Hegazy 2013:208) and “it includes comparing a client’s unaudited balance to an independent expectation developed by auditors” (Pike *et al*. 2013:1413). It has been described as “developing an expectation for a company’s reported financial statement data, comparing the expectation to the financial statement data, and investigating any significant differences” (Brazel, Jones & Prawitt 2012:7). Knapp and Knapp (2001:27) describe the central task of an auditor in applying analytical procedures as “the development of an expectation derived from the application of a naïve or a complex prediction model”.

These definitions concur with the definition formulated by the IAASB (IAASB 2014a:Glossary). The IAASB defines analytical procedures in ISA 520 as "an evaluation of financial information through an analysis of plausible relationships among both financial and non-financial data". It further includes an "investigation as is necessary of the identified fluctuations or relationships that are inconsistent with other relevant information or that differ from expected values by a significant amount" (IAASB 2014m:ISA 520 par. 4).

From these definitions it is clear that the underlying rationale for analytical procedures is still the same as it was 40 years ago. Firstly, it is a consideration of comparisons and relationships in order to create an expectation, and secondly, it is an investigation of any identified fluctuations or inconsistencies (IAASB 2014m:ISA 520 par. A1-A3; Pinho 2014:27). According to Messier *et al*. (2013:147), the more precise the development of the expectation, the more assurance can be obtained from analytical procedures.

3.4 THE OBJECTIVE OF ANALYTICAL PROCEDURES

The use of analytical procedures may be appropriate whenever it is desirable to model a relationship to generate audit evidence (McKee 1989:2). According to Cho and Lew (2000:434), there are three main objectives for the performance of analytical procedures, and the objective depends on where in the audit process analytical procedures are being performed. During the planning of the audit phase, the main objective of the performance of analytical procedures is to serve as an attention-directing device. During the obtaining audit evidence phase (also referred to as the fieldwork phase), the main objective is to reduce the amount of detailed testing, and during the conclusion, evaluation and reporting phase, it is to assess the overall reasonableness of the financial statements (Cho & Lew 2000:434). They summarise these three main objectives of analytical procedures during each of the audit phases as "attention directing", "test reducing" and "assessing fairness" (Cho & Lew 2000:434).

These three main objectives can be further divided into seven sub-objectives, which are also dependent on the phase of the audit process. These seven sub-

objectives are as follows: to obtain knowledge of the business and industry; to identify potential financial and operational weaknesses; to identify significant fluctuations in financial statements; to determine the nature, extent and timing of substantive tests; to detect errors and misstatements in financial statements; to assess the reasonableness of specific account balances; and to assess the overall fairness of financial statements as a whole (Samaha & Hegazy 2010:889; Cho & Lew 2000:434).

From the above discussion it is clear that the objective of analytical procedures is not the computation of numbers, but that they are performed to obtain a better understanding of the financial results (Knechel *et al.* 2007:341). However, the auditor's objective with regard to the seven objectives as listed above depends on where analytical procedures are applied in the audit process.

3.5 ANALYTICAL PROCEDURES AS PART OF THE AUDIT PROCESS

As discussed in chapter 2, section 2.6, the audit process can be divided into four broad phases, namely, pre-engagement activities, planning of the audit, obtaining audit evidence and, lastly, the conclusion, evaluation and reporting phase (Puttick *et al.* 2007:178). Even though these phases are sequential, they are also interdependent and can be regarded as cumulative and interrelated (Eilifsen *et al.* 2014:17). The performance of analytical procedures has become an integral part of the audit process and is applicable to the planning of the audit, obtaining audit evidence and the conclusion, evaluation and reporting phases of an audit (Messier *et al*. 2013:140; Glover *et al*. 2005:200). According to Koskivaara (2007:336), the auditor can apply analytical procedures in each of these phases for the detection of material error and management fraud, the assessment of going concern and internal control risk and for the reduction of detailed testing. Analytical procedures can direct attention to areas of high risk, identify audit issues that detailed substantive work has not revealed, assist with the evaluation of audit conclusions and give substantive evidence (Glover *et al*. 2005:200).

ISA 315 and ISA 520 (IAASB 2014j; IAASB 2014m) provide guidance to the auditor on the application of analytical procedures as part of the audit process.

ISA 315 (IAASB 2014j) provides guidance on the use of analytical procedures as risk assessment procedures during the planning of the audit phase, and ISA 520 (IAASB 2014m) on the application of analytical procedures during the obtaining audit evidence phase and in drawing an overall conclusion on the financial statements. Both these standards mandate the use of analytical procedures in the planning of the audit and conclusion, evaluation and reporting phases of the audit process as they state that the auditor "shall" perform analytical procedures during the planning of the audit and when drawing an overall conclusion (IAASB 2014j:ISA 315 par. 6; IAASB 2014m:ISA 520 par. 6). The performance of analytical procedures as a substantive procedure, however, is optional as it is stated that the auditor's substantive procedures at the assertion level "may" be tests of details, substantive analytical procedures, or a combination of both these procedures (IAASB 2014m:ISA 520 par. A4).

The next section provides a description on how analytical procedures are used by auditors during the different phases of the audit process in order to achieve these objectives.

3.5.1 Analytical procedures during the planning phase of the audit

The IAASB (2014j:ISA 315) requires the auditor, during the planning of the audit phase, to obtain an understanding of the entity and its environment, including the entity's internal control in order to identify and assess the risks of material misstatement whether due to fraud or error at the financial statement and assertion levels. This understanding provides a basis for designing and implementing the auditor's responses to the assessed risks of material misstatement (IAASB 2014j:ISA 315 par. 3). Eilifsen *et al*. (2014:19) emphasise that proper planning is essential to ensure that the audit is conducted effectively and efficiently. Analytical procedures are one of the procedures that the auditor must use in order to obtain an understanding of the business and to identify and assess risk (IAASB 2014j:ISA 315 par. 6). Analytical procedures during the planning of the audit phase can thus be described as risk assessment procedures or as preliminary analytical review procedures (IAASB 2014j:ISA 315 par. 6; Vuchnich 2008:38; Glover *et al*. 2005:200).

Pinho (2013:6) describes the primary objective of analytical procedures in the planning phase as understanding the entity and its environment. This view was supported decades before by Spicer and Pegler (1921:28), who emphasised that no audit can be effective unless the auditor acquaints himself or herself as much as possible with the technical details, so that he or she may be in a position to ask intelligent questions. Cho and Lew (2000:434) provide a broader objective that is more in agreement with the objective of ISA 315 (IAASB 2014j), namely to gain insight into the business and industry, to identify potential financial and operating weaknesses and to identify significant fluctuations in the financial statements. Abidin and Baabbad (2015:19) emphasise the importance of analytical procedures during the planning of the audit phase by stating that analytical procedures during this phase can change the entire course of the audit, since the results of such procedures are used to plan the extent of substantive procedures.

Obtaining knowledge of a client, during the planning of the audit phase, enables the auditor to develop expectations about the results of the client's operations and to evaluate the reasonableness of the client's transactions (Erickson *et al*. 2000:191). Hirst and Koonce (1996:465) argue that in planning analytical procedures, the emphasis is on expectation development rather than on investigation. They found that when unexpected differences are observed, potential explanations are obtained primarily through inquiry, and that these explanations received are then not corroborated (Hirst & Koonce 1996:465). It can thus be said that in the planning phase of an audit, an information search is less critical as the auditor's goal is not to determine the "correct" explanation for fluctuations (Hirst & Koonce 1996:466). Glover *et al.* (2005:200) concur by postulating that because analytical procedures conducted in the planning phase are not primarily focused on substantive evidence, they are often conducted "at a high level". This agrees with the guidance given in ISA 315 (IAASB 2014j:par. A9) that analytical procedures as risk assessment procedures only provide a broad initial indication about whether a material misstatement may exist and that the auditor should also consider all the other information that has been gathered.

Over the past years, there has been an increase in the use of analytical procedures as risk assessment procedures (Pinho 2014:31; Trompeter & Wright 2010:682). This can be ascribed to the introduction of a business risk audit approach and the increasing use in recent years of technologies such as financial databases, internet search capabilities and analyst reports (Pinho 2013:11; Trompeter & Wright 2010:671). These technologies make financial and non-financial data about a client readily and easily accessible to auditors and are invaluable in conducting analytical procedures to gain an understanding of the client's business, its industry and its strategies, and to form more precise expectations (Trompeter & Wright 2010:671). For a detailed discussion of the factors driving a change in the application of analytical procedures as risk assessment procedures during the planning of the audit phase see section 3.8.

3.5.2 Analytical procedures during the obtaining audit evidence phase

The auditor has to obtain sufficient appropriate audit evidence to be able to draw a reasonable conclusion on which to base the audit opinion (IAASB 2014l:ISA 500 par. 4). In order to obtain this evidence, the auditor has to design and perform audit procedures for which the nature, timing and extent are based on and are responsive to the assessed risk of material misstatement at the assertion level (IAASB 2014k:ISA 330 par. 6). The audit procedures available to the auditor are tests of controls or substantive procedures (IAASB 2014k:ISA 330 par. A4). Substantive procedures at the assertion level may be tests of details, substantive analytical procedures, or a combination of both (IAASB 2014m:ISA 520 par. A4).

The decision about whether to perform tests of details, substantive analytical procedures or a combination of these procedures is based on the auditor's judgement (IAASB 2014m:ISA 520 par. A4). Although tests of details and substantive analytical procedures are performed to achieve the same goal, which is to obtain relevant and reliable audit evidence (IAASB 2014l:ISA 500 par. A10), analytical procedures differ from tests of details since they constitute indirect support for a particular balance, whereas tests of details directly test the details underlying the balance (McKee 1989:7). ISA 330 (IAASB 2014k:par. 21) does,

however, state that if the auditor has assessed a risk as significant, the auditor's procedures shall include tests of details.

The auditor's objective when performing analytical procedures during the obtaining audit evidence phase is to collect relevant and reliable audit evidence (IAASB 2014m:ISA 520 par. 3) and to detect potential misstatements (Knechel *et al.* 2007:350; Glover *et al.* 2005:200). Cho and Lew (2000:434) formulated the main objective of analytical procedures at the obtaining audit evidence phase as, to reduce the number of tests of details. Trompeter and Wright (2010:669) concur, and assert that this is because analytical procedures allow the auditor to consider the reasonableness of financial results based on expectations and provide a broader view than that provided by tests of details.

From these objectives it would seem as if there is an expectation that the performance of analytical procedures will reduce the amount of detailed substantive testing (Samaha & Hegazy 2010:888; Lin & Fraser 2003:153; Mulligan & Inkster 1999:118). However, this was contradicted in previous research that found that auditors do not reduce the level of detailed testing, even if the results from the use of analytical procedures are favourable (Samaha & Hegazy 2010:901; Houck 2003:70; Lin & Fraser 2003:161). From these studies it appears that auditors could lack confidence in the usage of analytical procedures as substantive procedures and rather opt to follow a more conservative approach by performing tests of details as substantive procedures (Pinho 2014:31; Samaha & Hegazy 2010:902; Lin & Fraser 2003:161). Houck (2003:70) explains this tendency by the fact that auditors regularly choose detailed tests over analytical procedures because detailed tests require less judgement and are more easily delegated to lower-level staff.

ISA 520 (IAASB 2014m) provides guidance on the performance of substantive analytical procedures and states, firstly, that the auditor shall develop an expectation of the recorded amounts or ratios, evaluate whether the expectation is sufficiently precise to identify a misstatement (IAASB 2014m:ISA 520 par. 5), and secondly, the auditor shall investigate the results of the analytical procedures (IAASB 2014m:ISA 520 par. 7). Substantive analytical procedures therefore rely

on the auditor's ability to identify plausible relationships between financial and non-financial data and then to generate expected amounts based on the auditor's prior knowledge and past experience (Menz 2014:119). Eilifsen *et al*. (2014:152-158) maintain that the decision process for the performance of analytical procedures as fieldwork consists of the following four components: the development of an expectation; the establishment of a tolerable difference between the auditor's expectation and the client's reported amount that would not warrant further investigation; a comparison of the expectation to the recorded amount; and an investigation of any differences greater than the tolerable difference.

The effectiveness of a substantive analytical procedure depends on a number of factors, namely the nature of the assertion being tested, the availability and reliability of the data from which the auditor's expectation is developed, the precision of the expectation that the auditor develops and the amount of difference that he or she is willing to accept without further investigation (IAASB 2014m:ISA 520 par. 5). The reliability of the data from which the auditor's expectation is developed is a function of the independence of the source of the evidence, the effectiveness of the entity's internal controls and the auditor's knowledge of the entity (Messier, Glover & Prawitt 2012:160). Messier *et al*. (2012:160) and Trompeter and Wright (2010:678) emphasise that the more disaggregated the data is that is used for the substantive analytical procedure, the more accurate and precise the expectation will be. For example, an expectation formed using monthly data will be more precise than an expectation using annual data, or an expectation formed at an individual product level will be more precise than an expectation formed for all products combined (Messier *et al*. 2012:160). They maintain that effective substantive analytical procedures cannot be performed at aggregated levels as misstatements are difficult to detect at an aggregated level (Messier *et al*. 2012:160). Kogan, Alles, Vasarhelyi and Wu (2010:1) agree with this view by stating that the use of disaggregated data allows for the detection of anomalies that will not be detected if the same procedure is applied to aggregated data. They concur that aggregation makes it possible to identify more general patterns, but caution that it inevitably leads to a loss of information about individual transactions (Kogan *et al*. 2010:18).

Glover *et al*. (2005:200) emphasise the fact that auditors should pay detailed attention to the underlying relationships between the data and develop a precise and independent expectation of the recorded amount. According to Houck (2003:95), auditors should understand the interrelationships between accounts – for example, when payroll increases, the auditor should expect an increase in payroll taxes and employee benefits. Glover *et al.* (2005:200–201) contend that the effectiveness of a substantive analytical procedure is affected by the quality of the expectation that is developed, and that if auditors do not understand the relationship between precision and the quality or strength of the evidence provided by analytical procedures, they may inappropriately rely on "weak" analytical procedures. The Public Company Accounting Oversight Board (PCAOB) (2008:15) inspection teams have also identified deficiencies in auditors' abilities to develop precise expectations and have stated that auditors do not test the data before using it to create expectations.

Any significant differences found between the auditors' expectations and financial data need to be investigated through inquiries from management as well as by performing additional audit procedures (IAASB 2014m:ISA 520 par. 7). Section 3.9 provides a detailed discussion of the auditor's investigation of differences. In their research, Hirst and Koonce (1996:476) found that auditors view the most difficult aspect of the performance of substantive analytical procedures to be the judgement required to decide to discontinue investigating an unexpected difference. They attributed this to the lack of guidance in ISA 520 (IAASB 2014m) regarding the extent of analytical procedures required to investigate a fluctuation or the reliance that may be placed on substantive analytical procedures (Hirst & Koonce 1996:476). This shortcoming has been confirmed in more recent studies that found that it is a matter of judgement in deciding whether a difference is reasonable or not, because the standard provides no specific guidelines (Pinho 2013:5; Samaha & Hegazy 2010:887).

Another related use of analytical procedures during the obtaining audit evidence phase is as a roll-forward procedure to verify the reasonableness of changes in an account from an interim test date to financial statement date. For example, if inventory was physically observed at an interim date, an auditor might use

analytical procedures to verify some or all of the changes in the inventory account that occurred between the interim testing date and year-end (McKee 1989:3). Omoteso (2013:136) emphasises the fact that the use of IT can be extremely useful in gathering audit evidence and that the performance of substantive analytical procedures can be greatly enhanced by IT as better insights can be obtained using computer-based data analysis techniques. For a detailed discussion of the factors that have led to an increased use of substantive analytical procedures, see section 3.8.

3.5.3 Analytical procedures during the conclusion, evaluation and reporting phase

During the conclusion, evaluation and reporting phase of an audit, the auditor evaluates all the audit evidence obtained during the audit in order to form an opinion on the financial statements (IAASB 2014p:ISA 700 par. 4). The primary objective of analytical procedures during this phase is to assess the conclusions reached during the audit and to evaluate the overall financial statement reasonableness before issuing an audit opinion (Flowerday *et al*. 2006:327; Glover *et al*. 2005:200; Cho & Lew 2000:434). This objective agrees with the guidance in ISA 520 (IAASB 2014m:par. 6) in that the auditor shall design and perform analytical procedures near the end of the audit that assist him or her with drawing an overall conclusion as to whether the financial statements are consistent with his or her understanding of the entity.

The objective of analytical procedures during the conclusion phase is similar to the objective at the planning phase. During the planning phase, analytical procedures are performed to identify all critical areas and to ensure that adequate audit attention is paid to these areas in obtaining audit evidence (see section 3.5.1), whereas during the conclusion phase, analytical procedures are performed to determine whether all critical areas have been addressed during the audit and if adequate audit evidence has been obtained to support the auditor's conclusions (Hirst & Koonce 1996:478). During this phase, analytical procedures are not primarily focused on substantive evidence and they are often conducted at a high level (e.g. financial statement or business level) (Glover *et al.*

2005:200). Analytical procedures during the conclusion, evaluation and reporting phase of an audit require reviewing the trial balance, financial statements and disclosed notes to judge the adequacy of the evidence gathered to support any unusual or unexpected balances investigated during the audit and determining if any other unusual balances or relationships have not been investigated (Eilifsen *et al*. 2014:160).

3.5.4 Summary

From the discussion above it is clear that although the objectives of performing analytical procedures during the planning of the audit, obtaining audit evidence and conclusion, evaluation and reporting phases of the audit are different, previous studies have found these procedures to be important applications. There are, however, differences in the extent to which analytical procedures are applied in each of these phases. The above discussion also highlighted variations in the use of analytical procedures during the different phases in the audit process. This topic is further deliberated on in the next section.

3.6 THE USE OF ANALYTICAL PROCEDURES

The previous discussion highlights the fact that analytical procedures are valuable during the planning of the audit, obtaining audit evidence and the conclusion, evaluation and reporting phases of an audit. Studies in Yemen, Portugal, Egypt, the US, Canada, Hong Kong, Australia and Singapore confirm this notion and provide evidence that auditors rely on analytical procedures during all three of these phases of an audit (Abidin & Baabbad 2015:22; Pinho 2014:30; Samaha & Hegazy 2010:895; Trompeter & Wright 2010:678; Lin & Fraser 2003:158; Cho & Lew 2000:433; Smith *et al*. 1999:69; Mahathevan 1997:238). Variations, however, exist in the use of analytical procedures in each of the phases in the audit process.

From a study conducted in Portugal, it is clear that auditors in that country use analytical procedures most frequently during the planning of the audit phase rather than in the other two phases. The reasons advanced for such conduct are

that Portuguese auditors still have conservative views about the usefulness of analytical procedures and therefore tend to use them as a planning technique, instead of for evidence-gathering purposes or as a tool for the overall revision of the financial statements and opinion forming (Pinho 2014:31). The findings of the study in Portugal are, however, in contrast to the majority of studies, which have found that analytical procedures are most frequently applied during the conclusion, evaluation and reporting phase of the audit process (Abidin & Baabbad 2015:22; Samaha & Hegazy 2010:895; Lin & Fraser 2003:159; Cho & Lew 2000:437; Smith *et al*. 1999:71; Fraser *et al*. 1997:40; Mahathevan 1997:232).

Factors identified by researchers that influence the use of analytical procedures are audit firm size, the auditor's experience and his or her perception of the usefulness of analytical procedures (Abidin & Baabbad 2015:22-23; Samaha & Hegazy 2010:904; Mahathevan 1997:238).

The literature supports the notion that auditors from Big 4 audit firms use analytical procedures to a greater extent than auditors from non-Big 4 audit firms (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896). This notion agrees with the results of previous studies on the effect that firm size has on the extent of the performance of analytical procedures (Lin & Fraser 2003; Mahathevan 1997). In these studies it was found that larger audit firms use analytical procedures to a greater extent than auditors from smaller audit firms (Lin & Fraser 2003:159; Mahathevan 1997:231). This has been ascribed to differences in the client base. Larger audit firms tend to have larger clients with good systems and strong internal controls which are conducive to the use of analytical procedures (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896; Lin & Fraser 2003:159; Mahathevan 1997:231). This relationship between the quality of internal controls of an audit client and the extent to which its auditors use analytical procedures is also emphasised by Trompeter and Wright (2010:679), who found that there is a relationship between strong internal controls and the reliance on analytical procedures.

In their studies, Abidin and Baabbad (2015:23), Samaha and Hegazy (2010:897) and Mahathevan (1997:230) found that the reliance on analytical procedures differs with audit experience, and that auditors in the higher ranks tend to use more analytical procedures than those with less experience. Auditing experience refers to auditing events that auditors are involved in over time (Abidin & Baabbad 2015:23). Audit partners and managers perform most of the analytical procedures during the planning and conclusion phases of an audit, with greater use by seniors during the obtaining audit evidence phase (Samaha & Hegazy 2010:897). This agrees with the results of a study by Knapp and Knapp (2001:27) which showed that an auditor's performance of analytical procedures may be affected by his or her post level, an indicator of his or her experience. They found that audit managers are able to identify more misstatements in financial statements by applying analytical procedures than audit seniors and are more able to provide explanations for the misstatements than the seniors (Knapp & Knapp 2001:33). They ascribed this to audit managers' knowledge of the client and industry, which enables them to create better expectations using not only external information but also their own existing knowledge (Knapp & Knapp 2001:35). According to Trompeter and Wright (2010:678), auditors with more experience are able to perform more effective analytical procedures as they consistently focus more attention on using disaggregated data for analytical procedures. They identified the ability to use disaggregated data to be lacking in auditors' abilities and suggested that greater emphasis should be placed on the competence of analysis of disaggregated data in university studies (Trompeter & Wright 2010:678).

By contrast, Hirst and Koonce (1996:462) found in an earlier study that analytical procedures were performed by the audit senior, with the audit manager's involvement only in an advisory capacity to the audit senior. In a more recent study, Trompeter and Wright (2010:688) also reported an increase in the tendency to assign analytical procedures to less experienced staff, which they ascribed to the availability of more powerful, easy-to-use technologies which increase productivity at lower staff levels.

The auditor's confidence in the application of analytical procedures and his or her perceptions of analytical procedures impact on the use of these procedures during the course of an audit (Abidin & Baabbad 2015:23–24). They found that auditors with limited knowledge of the use and interpretation of analytical procedures are least likely to use these procedures during audits (Abidin & Baabbad 2015:24). However, they did report that the majority of Yemeni auditors participating in their study on the use of analytical procedures still believed that analytical procedures are useful to obtain audit assurance (Abidin & Baabbad 2015:22). Hirst and Koonce's (1996:469) earlier study on analytical procedures found that the stability of relationships between financial and non-financial information over time, for example, affects the extent to which auditors rely on substantive analytical procedures, and when the expected relationships are stable, auditors are more inclined to apply analytical procedures frequently and they deem them to be effective.

In their consideration of how analytical procedures impact on the quality of an audit, Knechel *et al.* (2013:395) concluded that analytical procedures are an integral part of the audit process. They found that auditors' judgements in applying analytical procedures are influenced by information provided by management, as well as explanations provided by other auditors or revealed by other sources (Knechel *et al*. 2013:395). Auditors sometimes fail to adequately attend to the credibility of these sources and fail to "dig deeper" when information is consistent with their expectations (Knechel *et al.* 2013:395). They therefore came to the conclusion that auditors rely more on analytical procedures that result in favourable outcomes such as expectations that are not significantly different from the unaudited numbers (Knechel *et al.* 2013:395).

Studies conducted by Samaha and Hegazy (2010:904) and Cho and Lew (2000:434) found that the majority of auditors consider analytical procedures to be useful in achieving the seven audit objectives as discussed in section 3.4. These seven objectives are as follows: to obtain knowledge of the business and industry; to identify potential financial and operational weaknesses; to identify significant fluctuations in financial statements; to determine the nature, extent and timing of substantive tests; to detect errors and misstatements in financial

statements; to assess the reasonableness of specific account balances; and to assess the overall fairness of financial statements as a whole (Samaha & Hegazy 2010:889; Cho & Lew 2000:434). Respondents in these studies were asked to rank the effectiveness of analytical procedures in achieving the seven audit objectives. The results are shown in table 3.2.

Table 3.2: Auditors' ranking of analytical procedures in achieving audit objectives

	Samaha & Hegazy (2010)	Cho & Lew (2000)
Identify significant fluctuations in the financial statements	1	1
Assess the reasonableness of specific account balances	2	3
Identify potential financial and operational weaknesses	3	4
Obtain knowledge of the business and industry	4	6
Assess the overall fairness of financial statements as a whole	5	2
Determine the nature, extent and timing of substantive tests	5	5
Detect errors and misstatements in financial statements	6	7

Note: lower mean values indicating greater effectiveness
Source: Samaha & Hegazy (2010); Cho & Lew (2000)

Table 3.2 indicates that respondents in both studies considered analytical procedures to be most effective in identifying significant fluctuations in the financial statements, while respondents in the Samaha and Hegazy (2010) study ranked assessing the reasonableness of specific account balances in the second position. Because the identification of significant fluctuations in the financial statements is a high-level review procedure, the auditor performs this procedure during the planning phase and in the conclusion, evaluation and reporting phase. The assessment of the reasonableness of specific account balances points towards the obtaining audit evidence phase of the audit process. These findings concur with those of Messier *et al.* (2013:140) that analytical procedures are useful throughout the whole audit process.

The discussion in this section further shows that auditors in larger audit firms appear to use analytical procedures more than their counterparts in small audit

firms (owing to their clients' good systems and internal controls). Auditor experience has been found to be an indicator of the use of analytical procedures, although recent developments in technology have shown increased usage at lower levels. Auditor perceptions of the usefulness of analytical procedures, their confidence in applying such procedures and the availability of information to make the necessary judgement calls further impact on the usage of analytical procedures. There are, however, different techniques or methods that the auditor can use to perform analytical procedures. These range from simple comparisons to more sophisticated and mathematically complex ones as elucidated in the next section.

3.7 TECHNIQUES OR METHODS USED TO PERFORM ANALYTICAL PROCEDURES

Section 3.3, which focused on the definition of analytical procedures, demonstrated that there are two equally important parts in the application of analytical procedures. The first is the consideration of comparisons and relationships in order to develop an expectation, and the second an investigation of any identified fluctuations or inconsistencies (IAASB 2014m:ISA 520 par. A1; Pinho 2014:27). According Vuchnich (2008:38), for the effective consideration of comparisons and relationships, the auditor should develop an expectation of the balance using multiple information sources.

ISA 520 (IAASB 2014m:par. A1) provides a list of the information sources the auditor can use when developing an expectation. These include information from prior periods, anticipated results such as budgets, forecasts or estimations, industry information and relationships between elements of financial data and between financial information and relevant non-financial information. In their study, Hirst and Koonce (1996:470) found that auditors mostly take into account business trends and information obtained from discussions held with the client throughout the year when developing an expectation. They note that the use of budgets for the development of an expectation varies and depends, in part, on the reliability of the budgets (Hirst & Koonce 1996:470).

Various techniques or methods may be used to perform analytical procedures. These techniques range from relatively simple comparisons to more sophisticated and mathematically complex ones such as advanced statistical techniques (IAASB 2014m:ISA 520 par. A3; Koskivaara 2007:337; Lin & Fraser 2003:164; Cho & Lew 2000:437; Fraser *et al*. 1997:35; Mahathevan 1997:238; McKee 1989:2). These techniques all have one thing in common – they are indirect tests deriving their value from modelling a relationship (McKee 1989:2). This was confirmed by Pike *et al*. (2013:1415) who stated that regardless the types of analytical procedures used, the process the auditor follows remains the same.

The simple techniques require more judgement and are easy to apply and include scanning analysis, trend analysis and ratio analysis. The sophisticated techniques are quantitatively based, more objective, yield better precision and include reasonableness tests and regression analysis (Samaha & Hegazy 2010:899). Fraser *et al.* (1997:36) classified analytical procedures into the following three broad categories: non-quantitative or judgemental procedures, such as comparison and scanning of balances; simple quantitative techniques, such as trend, ratio and reasonableness tests; and advanced quantitative techniques, such as regression analysis and neural networks. These techniques can be described as follows:

- Comparison is a simple comparison of a financial statement balance with the same balance from the previous year's financial statements (Mulligan & Inkster 1999:119).
- Scanning analysis is a judgemental technique that enables the auditor to determine the reasonableness of the amounts based on client knowledge, past experience, operating history and economic conditions (Koskivaara 2007:337; Cho & Lew 2000:431).
- Trend analysis is the comparison of an account balance or item to the prior year balance or to a trend of balances from two or more prior periods (Georgiades 2013:2). Trend analysis can be used to assess whether there is a functional relationship between the variables over time (Koskivaara 2007:337).

- Ratio analysis relates to the relationship between two or more variables (Koskivaara 2007:337). It involves the comparison of a ratio calculated for the current period with a related or similar ratio for a prior period, an industry standard or a budget. Financial and operating ratios are commonly classified into the following four major categories: liquidity, profitability, leverage and activity ratios (Georgiades 2013:2). Ratios are generally easy to compute and are commonly used by auditors, but their interpretation can be problematic, especially when two or more ratios provide conflicting signals (Koskivaara 2007:337). According to Eilifsen *et al*. (2014:152), ratio analysis is more effective at identifying risks and potential misstatements than trend analysis because ratio analysis compares relationships between accounts and operating data, whereas trend analysis focuses on an individual account only.
- A reasonableness test is the determination of an expected value with data partly or wholly independent of the accounting information system and therefore provides more reliable audit evidence than other types of analytical procedures (Koskivaara 2004:195). Eilifsen *et al*. (2014:152) describe a reasonableness test as developing an expectation using a model. Using a model to create an expectation results in more precise expectations than using trend or ratio analysis (Eilifsen *et al*. 2014:152).
- Regression analysis can be used to create an expectation of the expected values for the current year financial account balances by incorporating economic and environmental data (Koskivaara 2007:337). These expected values can then be compared with the actual balances and are a powerful tool in understanding the factors that drive a business (Vuchnich 2008:39; Koskivaara 2007:337). The regression-based STAR (Statistical Techniques for Analytical Review) package is one program that is available to auditors to model the time-series behaviour of a firm to help auditors detect misstatements (Vasarhelyi, Alles & Kogan 2004:16).
- Neural networks are data-driven models capable of identifying and simulating non-linear relationships in the data with no prior assumptions about the properties of the data (Koskivaara 2007:337).

Earlier studies indicated that auditors prefer to use simple techniques, such as scanning, comparisons and ratio analysis rather than advanced quantitative methods such as sophisticated techniques or decision aids such as regression analysis (Lin & Fraser 2003:160; Cho & Lew 2000:437; Smith *et al*. 1999:68; Mahathevan 1997:236; Hirst & Koonce 1996:456). Despite their lack of use, sophisticated techniques have been described in the academic literature as being more effective techniques because they are more objective and provide more precise expectations, whereas the simpler techniques require more judgement and subjective evaluations (Samaha & Hegazy 2010:899; Lin & Fraser 2003:164).

The increased use of technology and specifically the introduction of software can assist the auditor with developing more precise expectations (Trompeter & Wright 2010:671; Vuchnich 2008:38). According to Omoteso (2013:23), IT is now being used from simple assignments to more complex operations such as flowcharting and statistical analysis. Vuchnich (2008:38) believes that IT makes it easier for an auditor to develop expectations because it automates calculations and comparisons so that the auditor can focus on the evaluation of the relationships. There is thus an expectation that auditors would utilise these technologies to help them perform sophisticated techniques, but more recent studies on analytical procedures used by auditors show that auditors still prefer the more simple, judgemental techniques to the sophisticated ones (Abidin & Baabbad 2015:22; Samaha & Hegazy 2010:899; Trompeter & Wright 2010:689). Table 3.3 provides a summary of the techniques or methods that respondents in the aforementioned studies used to perform analytical procedures. The results are ranked in order of frequency of use, where 1 indicates the most frequent application and 5 the lowest end of the scale.

Table 3.3: Type of analytical procedures most frequently used by auditors

	Abidin & Baabbad (2015)	Samaha & Hegazy (2010)	Lin & Fraser (2003)	Cho & Lew (2000)	Mulligan & Inkster (1999)	Smith *et al.* (1999)	Mahathevan (1997)
Comparison	*	*	*	1	1	*	1
Scanning analysis	1	2	1	*	2	1	*
Trend analysis	2	4	2	*	4	*	3
Ratio analysis	3	1	4	3	3	2	2
Reason-ableness test	4	3	3	2	*	*	*
Regression analysis	4	5	5	4	5	3	4

Note: lower value means indicating greater frequency

Source: Abidin & Baabbad (2015); Samaha & Hegazy (2010); Lin & Fraser (2003); Cho & Lew (2000); Mulligan & Inkster (1999); Smith et al. (1999); Mahathevan (1997)

*Key: * not included in the study.*

Table 3.3 indicates that respondents in the above-mentioned studies preferred the simple techniques to the more sophisticated ones. These studies confirm that a gap exists between academics and auditing practitioners on the potential usefulness of technology in the performance of analytical procedures (Cho & Lew 2000:437). They hypothesise that it is doubtful that the gap will be bridged in the near future because even though academics emphasise the precision, rigour and objectivity of sophisticated techniques, in practice, auditors prefer to use their own judgement (Cho & Lew 2000:437). From the results of the more recent studies, referred to in table 3.3, this view still appears to be true.

The discussion in this section provided an overview of the techniques or methods used by auditors to perform analytical procedures. In line with the aim of this study, that is, to investigate the application of analytical procedures by auditors in the audit process, a detailed discussion of the methods or techniques at the disposal of auditors was not provided. Based on the literature, it would appear that auditors are utilising non-quantitative or judgemental procedures rather than advanced quantitative techniques, even though developments in technology

make the latter feasible. However, as explained in the next section, there are factors that enable the auditor to form more precise expectations and that are driving an increase in the application of analytical procedures.

3.8 FACTORS DRIVING AN INCREASE IN THE APPLICATION OF ANALYTICAL PROCEDURES

In the early 1980s, Biggs (1982:102) suggested an expanded role for analytical procedures owing to a change in audit approach and an increase in the use of computers. He then predicted that audits of the future would place more reliance on inquiry, observation and analysis and move away from inspecting documents (Biggs 1982:102). The literature indicates that this prediction has come true because numerous studies during the past three decades have emphasised an increased use of analytical procedures (Abidin & Baabbad 2015:23; Pike *et al*. 2013:1414; Pinho 2013:3; Samaha & Hegazy 2010:902; Trompeter & Wright 2010:669; Lin & Fraser 2003:162; Mulligan & Inkster 1999:118; Hirst & Koonce 1996:458).

The main factors identified by these researchers for the increased use of analytical procedures are the adaptation of a business risk audit methodology, the advancement of technology and the increased focus on non-financial information in financial reporting (Abadin & Baabbab 2015:23; Pinho 2013:13; Trompeter & Wright 2010:671; Samaha & Hegazy 2010:902; Lin & Fraser 2003:162; Mulligan & Inkster 1999:112). These factors enable an auditor to develop more precise expectations and are discussed in more detail in the next sections.

3.8.1 Business risk audit methodology

Section 2.7.2 in chapter 2 described changes in audit practices focusing on the development of the business risk audit methodology as a means to address the current business environment needs, enhance audit quality, increase audit efficiency and add value. It describes the business risk audit methodology as a holistic approach based on the auditor's needs to see the whole of the

organisation in order to understand the nature of the audit challenges to be faced (Knechel 2007:394). It further provides a description of the procedures available to the auditor to obtain this understanding and to assess the risks. According to Bell *et al*. (2005:15), audit procedures, regardless of where they are performed in the audit process, are simply different and complementary kinds of risk assessment procedures.

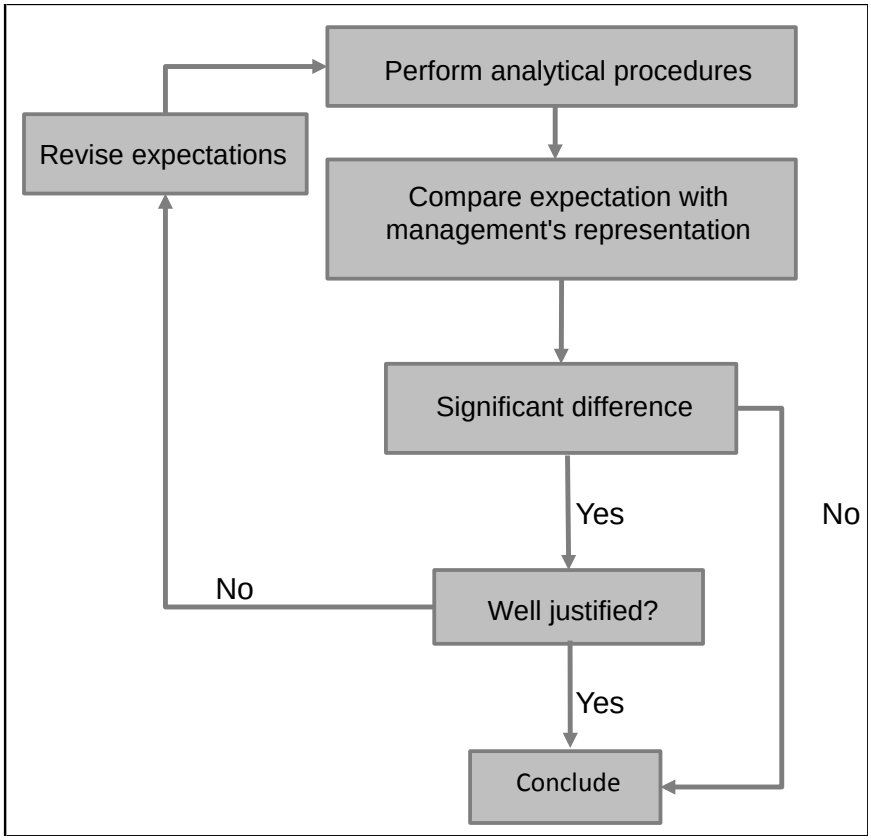
Eilifsen *et al.* (2001:205) describe the change from the audit risk model to the business risk model as pervasive. According to them, this change allows the auditor to devote less time to substantive testing of accounts that are not deemed to be at risk and more time being devoted to the use of "performance indicators" as evidence of risk conditions (Eilifsen *et al*. 2001:205). Knechel (2007:395) confirms this increased use, and states that the rationale underlying the business risk approach to auditing is highly logical, but requires an increased use of analytical procedures. In a later study, Knechel *et al.* (2013:395) confirmed that analytical procedures are an integral component of the audit process from which auditors' risk assessments greatly benefit. Bell *et al.* (2005:13, 32) go as far as to say that analytical procedures developed from the auditor's deeper understanding of the entity and its environment, which resulted in better knowledge of the client's business, which in turn assists the auditor to form more precise expectations.

The modern business environment is characterised by millions of transactions that occur in a short period of time, transactions being processed at the speed of technology, and the processing leaving no audit trail to be inspected by the auditor (Knechel 2007:390). These characteristics have led auditors to incorporate more tests of controls and analytical procedures into their audit methodologies (Knechel 2007:390). Furthermore, the financial statements in these modern businesses capture retrospective information as well as forward-looking consequences via numerous estimates and disclosures (Peecher *et al.* 2007:465). For such estimates and disclosures, the auditor must develop expectations to determine the reasonableness thereof as well as strategies to acquire additional sufficient audit evidence (Peecher *et al*. 2007:466).

Previous studies on the auditor's use of analytical procedures have identified the business risk audit methodology as one of the factors driving the increased use of analytical procedures. These include studies conducted in the US (Trompeter & Wright 2010:671), Egypt (Samaha & Hegazy 2010:902), Canada (Lin & Fraser 2003:162), Portugal (Pinho 2013:13), the UK (Mulligan & Inkster 1999:118) and Yemen (Abidin & Baabbad 2015:23). Auditors in Portugal describe the risk-based audit methodology as the most important driver of the increased use of analytical procedures (Pinho 2013:11). Trompeter and Wright (2010:671) explain the business risk audit methodology as an "enabler" of change, stating that the approach results in auditors' gaining deeper knowledge of a client's business strategies and processes as well as a better understanding of industry trends than previously, and this has resulted in an increased use of analytical procedures and the ability to develop more sophisticated expectations. They did, however, find that not all firms have fully adopted a business risk audit methodology (Trompeter & Wright 2010:681). Abidin and Baabbad (2015:22) found that auditors in Big 4 audit firms regard changes in audit methodology as a more important factor in driving an increased use of analytical procedures than those from small firms.

Bell *et al*. (2005:23) describe the audit as a recursive process of risk assessment. In this process, the auditor continuously develops and revises expectations which are compared to management's actual business representations to assess the degree of correspondence between the auditor's expectation and management's representations. The better the auditor's knowledge of the business, the more precise his or her expectations will be about the financial results the entity can expect (Schultz, Bierstaker & O'Donnell 2010:240; Knechel 2007:395). If there is a difference between the auditor's expectation and management's representation, the auditor should obtain additional audit evidence to refine the expectation and to determine whether the difference is caused by a misstatement or a non-misstatement (Peecher *et al*. 2007:473). The auditor will continue with this risk assessment process until he or she has obtained sufficient appropriate audit evidence for the relevant audit objectives and is in a position to draw a conclusion (Bell *et al*. 2005:23). Figure 3.1 illustrates the recursive process of risk assessment in relation to analytical procedures.

Figure 3.1: The recursive process of risk assessment in relation to analytical procedures



Source: Adapted from Bell et al. (2005:23)

Knechel (2007:395) cautions that the implementation of the business risk approach does create a number of challenges. He found that sophisticated and powerful analytical procedures can be just as time consuming and expensive as tests of details and that analytical procedures require extensive investment in technology and staff training to be effective (Knechel 2007:391). He expresses concern about whether the education of prospective auditors in the business risk audit methodology is effective because he has found academia slow in implementing this as part of their curriculum (Knechel 2007:401). Peecher *et al.* (2007:478) concur with this notion, asserting that prospective auditors should obtain model-building skills which are currently not addressed in the accountancy curriculum. Curtis and Turley (2007:453) report that although the business risk audit methodology has led to an increased use of analytical procedures during the preliminary analytical review, auditors are reluctant to replace detailed

substantive testing with analytical procedures. The reasons for auditors' reluctance to reduce detailed substantive testing were discussed in section 3.5.2.

From the above it can be concluded that the change in audit methodology towards a business risk focus, has caused an increase in the use of analytical procedures. It was demonstrated that the application of analytical procedures is an integral part of the business risk audit methodology. Analytical procedures as risk assessment procedures enable the auditor to gain a deeper understanding of the entity and the industry in which it operates. This insight allows the auditor to reduce substantive detailed procedures for analytical procedures, enables him or her to form more precise expectations and can provide him or her with a means to evaluate forward-looking information. The use of analytical procedures as risk assessment procedures, however, is not without challenges, which impacts negatively on its application in practice.

3.8.2 The advancement of technology

3.8.2.1 Introducing technology

The use of technology by audit firms, such as the use of electronic working papers and automation of the audit process, has led audit firms to increasingly use computerisation to improve audit efficiency and effectiveness (Trompeter & Wright 2010:671). Houck (2003:189) criticises this, stating that although audit firms make significant investments in technology, and use laptops, electronic audit files and various processing applications, they rarely use technology to fundamentally alter the way in which audit evidence is obtained and evaluated. Chan and Vasarhelyi (2011:152) support this notion and contend that the practice of auditing has not kept pace with the real-time economy and that the art of assurance has lagged behind.

Kuenkaikaew and Vasarhelyi (2013:39) call for a re-engineering of the audit function because the companies of today need assurance on a wider set of business information than solely on financial statements. Knechel (2007:393) describes it as the audit re-engineering phenomenon. Kuenkaikaew and

Vasarhelyi (2013:63) emphasise that the traditional audit is retrospective and does not respond to current business needs in a timely manner and that modern analytics and computer technologies have the ability to create proactive predictive audits.

Two advancements in technology that help the auditor to alter the audit approach to incorporate more analytical procedures and to develop more precise expectations are the use of real-time financial information in continuous auditing (Chan & Vasarhelyi 2011:159), and the use of audit support systems (Koskivaara 2004:219–220). These advancements are discussed in the sections below.

3.8.2.2 Continuous auditing

Section 2.7.3.1 in chapter 2 provides a description of the development and definition of continuous auditing. It describes continuous auditing as the "audit of the future" and concludes that the continuous audit aims to satisfy real-time business needs by using real-time data (Rezaee *et al*. 2001:150). Continuous auditing is divided into four stages, namely automation of audit procedures, data modelling and benchmark development, data analysis and reporting. The section concludes that two of these four stages, namely data modelling and data analysis, can be used as analytical procedures (Chan & Vasarhelyi 2011:157). These data modelling and data analysis techniques emerged from statistics and data mining research and can be used as analytical procedures instead of traditional techniques such as ratio, trend and regression analysis (Chan & Vasarhelyi 2011:156).

Data modelling involves the use of historical audited transaction data and account balances to create benchmarks (Chan & Vasarhelyi 2011:157). The audit is therefore not only driven by what audit evidence is available, but also by the benchmarks against which the audit evidence can be compared. It can be said that the benchmarks provide guidance to the auditor on "what the data is supposed to look like" (Kogan *et al*. 2010:8). These benchmarks are created using estimation, classification, association or clustering techniques on historical audited data (Chan & Vasarhelyi 2011:157).

Data analysis can be defined as a “process by which insights are extracted from operational, financial and other forms of electronic data internal or external to the organization” (KPMG 2012:2). These insights can be historical, real-time or predictive data which can be used to evaluate internal controls, transaction details and account balances (KPMG 2012:2). As an analytical procedure, the auditor will compare all of the extracted data to the benchmark of what the data should look like and an anomaly arises when the data falls outside the acceptable range of the benchmark (Kogan *et al*. 2010:14). Any anomaly found is flagged as an exception and reported in an exception report. The auditor should evaluate these exceptions and decide if any exceptions need to be investigated (Chan & Vasarhelyi 2011:158). Vasarhelyi, Halper and Ezawa (1991:86) describe data analysis as “audit by exception”. This procedure can be applied to the entire set of transactions and eliminates the need for sampling (Wang & Cuthbertson 2014:6; Kogan *et al*. 2010:15). Wang and Cuthbertson (2014:8) deem the interpretation of data analyses as a huge challenge, especially when auditors are distracted by false negative exceptions. They consider it as an area for further research (Wang & Cuthbertson 2014:8).

Rezaee *et al*. (2001:150) emphasise that the use of continuous auditing (making use of real-time data) (Wang & Cuthbertson 2014:6) makes it more feasible to perform sophisticated analytical procedures. Chan and Vasarhelyi (2011:156) underscore this view, stating that in a continuous audit the auditor can perform high-level analysis, such as data modelling and data analysis to detect material misstatements.

According to Kuenkaikaew and Vasarhelyi (2013:41), continuous auditing allows for the emergence of the predictive audit where analytical procedures are used to predict the possible outcomes of a process from operational parameters. This was confirmed in studies in which data mining and machine learning were used for bankruptcy prediction (Wu, Tzeng, Goo & Fang 2007:407), going concern prediction (Martens, Bruynseels, Baesens, Willekens & Vanthienen 2008:775), predicting different types of audit opinions (Pourheydari, Nezamabadi-Pour & Aazami 2012:11085) and the detection of fraudulent financial reporting (Kirkos, Spathis & Manolopoulos 2007:1002). Kirkos *et al.* (2007:1002) claim that the use

of financial ratios together with data mining algorithms has advanced classification and predicting capabilities. The auditor's role in this predictive auditing environment, however, becomes more complex because it involves investigating exceptions from the continuous auditing system and dealing with audit procedures requiring more judgement and professional scepticism (Chan & Vasarhelyi 2011:155).

From the above discussion it is clear that data modelling and data analysis are analytical procedures that the auditor can use in continuous auditing. Braun and Davis (2003:731), however, found that auditors lack confidence in their technical abilities in the use of data analysis. Vasarhelyi *et al.* (2010:420) contend that in order for audits to stay relevant, audit education must keep up with the progress in the business world. This concurs with the views of Wang and Cuthbertson (2014:8) and Koskivaara (2007:343), who found that auditors need training in data analysis tools and the use of the results of these tools.

3.8.2.3 Audit support systems

Section 2.7.3.2 in chapter 2 described the use of audit support systems as a means to facilitate more efficient and effective audits. It demonstrated that audit support systems can be used for identifying risks, planning the audit, determining sample sizes, performing analytical procedures and reviewing red flags. The section concluded by mentioning that audit support systems are a method the auditor can use to analyse large volumes of data.

The development of audit support systems for the application of analytical procedures dates back to the 1980s. It was during this decade that the feasibility of applying expert systems to analytical procedures was explored, but it was determined that technology for effective use was not yet available (Bell & Wright 1995:115). This, however, encouraged researchers to investigate the application of technology in analytical procedures and led to the development of microcomputer-based software designed as support systems for the use of simple time series analysis and for the application of regression analysis (Bell & Wright 1995:117–118). According to Omoteso (2013:73), by the late 1990s, the

profession was forced to adapt to computerised mechanisms in its operations in order to increase efficiency, reduce expenses and withstand competition.

Bell, Knechel, Payne and Willingham (1998:15) posit that most large audit firms have redesigned their audit methodologies as a result of computerisation to place more emphasis on analytical procedures and management controls. Sayana (2003:1) emphasises that the performance of audits in the current business environment without the use of IT is not an option because all the information needed to perform an audit is on the computer. Lombardi *et al.* (2014:25–26), however, caution that although automation tools can assist the auditor with analysis and risk assessments, they can never automate the human judgement component.

According to Sayana (2003:1), there are three prerequisites for using audit support systems. The first is that the auditor needs to obtain access to the client's "live" data in order to download the data. The data can then be transferred to the auditor's computer for analysis. The transfer can either be done by the auditor himself or herself or an IT audit expert (Sayana 2003:1). The second prerequisite is that the auditor should have knowledge of the support system and the data (Sayana 2003:2). Many audit firms use experts to perform application reviews, assisting the general auditors to perform compliance and substantive tests (Sayana 2003:2). The last prerequisite is that the auditor should have the necessary skill to know what type of analysis can be performed on the data. Sayana (2003:2) describes this as the skill of knowing what can be verified and tested, coupled with knowledge of the business.

The discussion below focuses on some of the audit support systems that are available to the auditor to perform analytical procedures. In line with the aim of the study, namely to investigate the application of analytical procedures by auditors in the audit process, only a cursory discussion of some the systems available to the auditor is provided.

(i) CAATs

CAATs are tools and techniques that can assist the auditor with the analysis of transactions (Flowerday *et al*. 2006:326). According to Omoteso (2013:69), CAATs are useful for viewing the overall business operations and examining a large volume of data within a short timeframe. Sayana (2003:1) describes data analysis software as the most popular audit software that can be used for the application of CAATs.

Data analysis software has the ability to extract data from commonly used file formats and the tables of most database systems (Sayana 2003:1). The audit software can perform analysis which includes data queries, data stratification, sample extractions, missing sequence identifications, statistical analysis and calculations (Sayana 2003:1). The auditor can thus sort, filter and analyse the entire set of transactions making it easier to drill down on those items with the highest risk (Liddy 2014:2). Wang and Cuthbertson (2014:5) state that data analysis software can also be used to provide evidence on the effectiveness of internal control procedures, for instance, to verify authorisation, perform limit tests and evaluate segregation of duties.

Data analysis software is also termed “General Audit Software” (GAS) (Sayana 2003:1). GAS programs enable an auditor to audit on the computer (Nieschwietz, Pany & Zhang 2002:307). The use of GAS allows the auditor to analyse data and extract information directly from the client’s database (Braun & Davis 2003:727) and includes applications such as Interactive Data Extraction and Analysis (IDEA) and ACL (Nieschwietz *et al*. 2002:307). Another software program available to auditors is the STAR package which can be used to model the time series behaviour of a firm to help auditors detect misstatements (Vasarhelyi *et al*. 2004:16).

The IAASB (2014a:Glossary) defines CAATs as the “application of auditing procedures using the computer as an auditing tool” and recommends the use thereof in ISA 240 and ISA 330 (IAASB 2014h:Appendix 2; IAASB 2014k:par. A27). Rezaee *et al*. (2001:157) emphasise that the use of CAATs makes the usage of analytical procedures more feasible than in a manual audit environment.

Using CAATs as an analytical computerised tool makes it possible to use larger sets of data when performing analytical procedures in order to provide more timely assurance (Kuenkaikaew & Vasarhelyi 2013:39; Flowerday *et al*. 2006:327).

(ii) Neural networks

An automated audit support system, namely neural networks, was introduced to assist auditors with making audit judgements (Omoteso 2012:8490). Omoteso (2013:85) describes neural networks as a form of artificial intelligence that mimics the human brain. Kanungo (2014:55) concurs by explaining that the process of neural networks is similar to the cognitive functions of the human brain as both these processes learn through different patterns to predict the most probable outcome. Koskivaara (2004:218) argues that neural network applications are an appealing technology embedded in the analytical procedures for forming expectations for auditing purposes. Omoteso (2013:85) concurs with this by stating that neural networks are useful in making predictions based on a large database of past events and trends.

(iii) eXtensible Business Reporting Language (XBRL)

An automation tool available to the auditor to assist with benchmarking and analytical review is electronic reporting such as XBRL (Lombardi *et al*. 2014:27). It is a computer language that allows data to be tagged and subsequently retrieved from a financial database to be analysed. This helps auditors to develop comparisons based on industry data to assess the risk of fraud and error (Lombardi *et al*. 2014:27; Plumlee & Plumlee 2008:366). According to Baldwin and Trinkle (2011:16), XBRL data is easier to manipulate for analytical purposes than non-XBRL data and helps the auditor to make more efficient decisions primarily because of increased timeliness.

(iv) Summary

From the above it is clear that numerous audit support systems are available to the auditor of which data analysis software is the most popular. Data analysis software enables the auditor to extract data from the client's computer to perform CAATs, which can help the auditor to identify anomalies. The use of GAS

includes software packages such as ACL, IDEA and STAR. Neural networks are an automated support system that mimics the human brain and assists auditors with making predictions on large datasets and modelling trends. The use of XBRL can help auditors to develop benchmarks for analytical procedures based on industry data.

3.8.3 Non-financial information

Section 2.7.4 in chapter 2 describes the value and relevance of incorporating non-financial information into an audit. It demonstrates that the advancement of technology has afforded the auditor greater access to non-financial information and that the incorporation thereof into an audit by means of an integrated report provides a stakeholder with a clearer picture of the entity. It also shows that auditors need to examine the relationship between financial and non-financial measures in order to detect fraudulent activities and to validate financial and non-financial data. This is in line with ISA 520 (IAASB 2014m:par. 4), which states that the auditor should evaluate financial information through an analysis of plausible relationships between both financial and non-financial data. It thus recommends the consideration of the relationships between not only financial data but also non-financial information when performing analytical procedures. This is in line with the opinion of Brazel *et al*. (2012:8) that non-financial information can serve as a unique and powerful evidence source.

Examples of non-financial information that auditors can use to verify whether financial statement figures appear reasonable would be the number of employees, number of retail outlets, square footage, warehouse space, customer satisfaction ratings and number of customer complaints (Eilifsen *et al*. 2014:156; Ames *et al*. 2012:33). In an analytical procedure, auditors could compare the non-financial information with the financial statement data to assess the reasonableness of the financial statement data (Messier *et al*. 2012:162). Auditors obtain such information about the client's business mostly from the client's internal reports, which often include divisional financial and non-financial information analysis written by the client's operating personnel (Hirst & Koonce 1996:462). These reports allow the auditor to gain insight into clients' business

models and how they control the business, and such information is valuable in the application of analytical procedures (Hirst & Koonce 1996:462-463). In addition, Messier *et al*. (2012:164) emphasise that analytical procedures can be an effective way to identify potential fraud because perpetrators of fraud can easily manipulate financial numbers, but it is difficult or nearly impossible to manipulate non-financial data from external sources.

Trompeter and Wright (2010:671) report an increased use of non-financial information in analytical procedures because of recent technological advancements that have made it easier for auditors of today to gather and access a broader array of non-financial information. Liddy (2014:2) concurs by stating that technology enables auditors to integrate unstructured data such as weather or traffic reports, unemployment figures or commodity prices to assess the potential impacts on a company's performance and its risk profile (Liddy 2014:2). This has enabled auditors to create more precise expectations and has led to an increase in auditors using non-financial information to assess the reasonableness of financial statement data (Trompeter & Wright 2010:671). Trompeter and Wright (2010:693) therefore suggest the use of a structured tool that incorporates non-financial information which could provide assistance to auditors when performing analytical procedures. Wang and Cuthbertson (2014:7) are more critical, however, warning that auditors should first confirm the reliability of the sources before incorporating them into analytical procedures.

According to Brazel *et al*. (2012:6), if auditors identify inconsistencies between financial and non-financial information they should address inquiries to management, increase their professional scepticism, and corroborate managements' answers with additional audit evidence. This is in line with the guidance provided in ISA 520 (IAASB 2014m:par. 7), namely that the auditor should investigate any inconsistencies through inquiries to management and obtaining appropriate audit evidence to support management's responses. Despite the value that can be obtained from incorporating non-financial information, Brazel *et al*. (2012:24) posit that auditors are "lazy" to investigate inconsistencies between financial and non-financial information resulting in their inability to detect fraud. This is supported by Cohen, Krishnamoorthy and Wright

(2000:44), who found in their study that auditors focus on financial trends as opposed to non-financial trends in determining the scope of the audit and use non-financial information only as corroborative evidence.

The advancement of technology has also introduced new sources of data such as the World Wide Web (e.g. news, magazines, corporate websites and blogs) and digital communication (e.g. electronic mail, discussion groups, financial forums and short message services) (Hunton & Rose 2010:300; Ananiadou, Rea, Okazaki, Procter & Thomas 2009:509). Nowadays, companies use social media for marketing and sales purposes, to provide customer support including obtaining feedback for improving quality and services, interacting with clients and suppliers and "just for fun" (Gattiker 2013:4). Liddy (2014:2) maintains that the ability to mine this data and incorporate it into an audit will provide for enhanced audit quality. One method of dealing with this data overload is to incorporate a powerful new technology known as text mining (Ananiadou *et al*. 2009:509). Text mining can be described as a specialised form of data mining that involves identifying patterns from text, rather than from numbers (Hunton & Rose 2010:300). Ma, Sheng and Pant (2009:413) demonstrated the use of text mining by using available online business news to predict revenue relationships between companies. Keila and Skillicorn (2005:183) used text mining on e-mails to identify patterns of unusual communications. Hunton and Rose (2010:301) predict an increase in the use of text mining as advanced analytical procedures.

3.8.4 Summary

The above discussion focused on the factors mentioned in the literature that have led to an increased use of analytical procedures. These factors are the adaptation of a business risk audit methodology, the advancement of the technology and the availability of non-financial information. Analytical procedures are an integral part of the business risk audit methodology because they enable auditors to create more precise expectations in their assessment of risks. The advancement of technology has led to the development of continuous auditing in which the auditor can use data modelling and data analysis as analytical procedures. The use of audit support systems assists auditors with their analysis

of data and can be used to analyse large volumes of data within a short timeframe. Technological advancements have also made it easier for auditors to gather and access a wide variety of non-financial information. The auditor should compare the non-financial data with financial data to assess the reasonableness of financial statement data.

3.9 INVESTIGATION OF DIFFERENCES

The performance of analytical procedures consists of two equally important parts. Firstly, it is the consideration of comparisons and relationships in order to create an expectation, and secondly, it is an investigation of any identified fluctuations or inconsistencies (IAASB 2014m:ISA 520 par. 4). Section 3.8 described the factors, such as the adaptation of a business risk audit methodology, the advancement of technology and the increased focus on non-financial information, that enable auditors to develop more precise expectations. This section focuses on the second part of the analytical procedure process, namely the investigation of differences.

According to Eilifsen *et al*. (2014:152–158), the performance of analytical procedures during the fieldwork phase comprises the following four components: the development of an expectation; the establishment of a tolerable difference between the auditor's expectation and the client's reported amount that would not warrant further investigation; a comparison of the expectation to the recorded amount; and an investigation of any differences greater than the tolerable difference. Asare and Wright (2001:205) divide the investigation of differences into three interrelated phases, namely the generation of plausible hypotheses to account for the significant discrepancies between expectations and realisations; the gathering of audit evidence to test these plausible hypotheses; and the identification of the most likely cause followed by appropriate follow-up actions.

The tolerable difference can be defined as "a monetary amount set by the auditor in respect of which the auditor seeks to obtain an appropriate level of assurance that the monetary amount set by the auditor is not exceeded by the actual misstatement in the population" (IAASB 2014a:Glossary). The amount of

difference from the expectation that can be accepted without further investigation is influenced by materiality and the desired level of assurance (IAASB 2014m:ISA 520 par A16). Hence the more assurance the auditor desires from the analytical procedure, the lower the tolerable difference will be (Messier *et al*. 2013:144). Messier *et al*. (2012:165) state that the auditing standards do not provide any specific guidance on how to set an amount of tolerable difference, and they contend that most firms use "rules of thumb" for establishing the difference.

The first phase, namely the generation of hypotheses, is largely cognitive in nature and numerous studies have focused on how auditors develop hypotheses (Knechel *et al*. 2013; Pike *et al*. 2013; Glover *et al*. 2005; Knapp & Knapp 2001; Cohen *et al*. 2000). These studies have found that there are various factors that influence an auditor's ability to develop a hypothesis, which include prior knowledge of current year unaudited balances (Pike *et al*. 2013:1426), auditor experience (Knapp & Knapp 2001:35), risk assessments (Glover *et al.* 2005:200) and the type, financial versus non-financial information (Cohen *et al*. 2000:44). Glover *et al*. (2005:200) maintain that the auditor should pay detailed attention to the underlying relationships in developing a precise and independent hypothesis because the effectiveness of the analytical procedure, thus the degree of reliance that can be placed on the procedure, depends on the quality of such hypothesis. Knechel *et al.* (2013:395) found that the auditor's ability to generate hypotheses for significant differences can be negatively influenced by information obtained by management or explanations provided by other auditors. However, it was not the purpose of this study to investigate the cognitive process that an auditor follows in formulating hypotheses, but rather an investigation into the gathering of audit evidence to test the hypotheses and the follow-up actions that the auditor takes to obtain explanations after identifying a significant fluctuation. This is in line with the aim of the study to investigate the application of analytical procedures by auditors in the audit process.

After identifying a difference between the auditor's expectation and management's representation, the auditor has to assess the likelihood of its possible causes (Wright & Berger 2011:155). Peecher *et al.* (2007:473) suggest that auditors should refine their initial expectation to determine whether the

difference is caused by a misstatement or a non-misstatement. ISA 520 (IAASB 2014m:par. 7) describes the follow-up actions that auditors can perform in the investigation of differences as, firstly, inquiries from management to obtain an explanation for significant discrepancies, and secondly, corroborations of every answer received by management with additional audit evidence. Trompeter and Wright (2010:690) and Hirst and Koonce (1996:466) found that inquiries from the client are the primary and sometimes the only source of evidence to explain significant discrepancies and that inquiries are mostly directed at accounting rather than at non-accounting staff. Other actions that auditors take to obtain explanations for a discrepancy are discussions among the audit team members and self-generation of explanations (Trompeter & Wright 2010:690; Hirst & Koonce 1996:466). According to Hirst and Koonce (1996:474), by exercising professional judgement, the auditor determines the acceptability of an explanation. Auditors in their study indicated that professional judgement was synonymous with a “warm, fuzzy feeling”, which can be described as a function of the strength of the control environment, the concreteness of the explanation, the size of the unexpected difference and the consistency of the explanation with other changes (Hirst & Koonce 1996:474). As discussed in section 3.5.2, auditors perceive the most challenging aspect of performing substantive analytical procedures as making the judgement call when to discontinue their investigation of a difference, and this has been ascribed to a lack of guidance provided by ISA 520 (IAASB 2014m).

The PCAOB (2008:15) has expressed concern about auditors’ lack of investigating identified fluctuations or inconsistencies and obtaining corroborating evidence. This is evident in the literature. For instance, Hirst and Koonce (1996:476) found that auditors do not know when to discontinue investigating a difference. According to Brazel *et al*. (2012:24), auditors are not likely to investigate inconsistencies between financial and non-financial information and this could prevent them from detecting fraud. The Trompeter and Wright (2010:691) study showed that one third of auditors do not perform additional audit procedures to corroborate management explanations. Knechel *et al*. (2013:395) contend that auditors fail to sufficiently attend to the credibility of their sources and fail to “dig deeper” when information is consistent with their expectations,

while Glover *et al*. (2005) believe that finding a significant difference when conducting analytical procedures is a concern for auditors because it requires more work to be done.

From the above it can be concluded that auditors lack a willingness to investigate differences related to their analytical procedures. Messier *et al*. (2013:157) emphasise the fact that auditors' willingness to investigate fluctuations depends on the perceived strength of the analytical procedure being performed and the perceived strength of the client's accounting system – hence their plea for more research on auditors' decisions to collect and evaluate corroborative evidence (Messier *et al*. 2013:141).

3.10 THE ADVANTAGES OF ANALYTICAL PROCEDURES

The use of analytical procedures could result in more effective and efficient audits (Trompeter & Wright 2010:684; Lin & Fraser 2003:153; Cho & Lew 2000:435). According to Cho and Lew (2000:434), the main advantage of analytical procedures during the planning phase is that they can serve as an "attention directing" device. This has the potential to direct the auditor's attention to areas of high risk, identify audit issues that detailed substantive work has not revealed, assist with the evaluation of audit conclusions and give substantive evidence (Glover *et al*. 2005:200). Auditors can apply analytical procedures to gain insight into the business and industry, to identify potential financial and operational weaknesses and to determine significant fluctuations in the financial statements (Cho & Lew 2000:434).

Analytical procedures during the obtaining evidence phase can be described as "test reducing" devices (Cho & Lew 2000:434). These have the ability to provide relevant and reliable audit evidence (IAASB 2014m:ISA 520 par.3), to detect potential misstatements (Knechel *et al*. 2007:350; Glover *et al*. 2005:200) and to reduce the number of tests of details (Trompeter & Wright 2010:669). According to Houck (2003:73), analytical procedures can provide more compelling evidence than tests of details because they include events happening inside and outside the company.

During the conclusion, evaluation and reporting phase, auditors rely on analytical procedures to form an opinion on the overall fairness of the audited financial statements (Cho & Lew 2000:433). These procedures are used by the auditor to assess the conclusions drawn during the audit, the reasonableness of specific account balances and the fairness of the financial statements as a whole (Flowerday *et al*. 2006:327; Glover *et al*. 2005:200; Cho & Lew 2000:434).

The implementation of the business risk audit methodology has led to an increase in the application of analytical procedures (Abidin & Baabbad 2015:23; Pinho 2013:13; Samaha & Hegazy 2010:902; Trompeter & Wright 2010:671; Lin & Fraser 2003:162; Mulligan & Inkster 1999:118). Analytical procedures such as risk assessment procedures enable the auditor to obtain a deeper understanding of the entity and its environment (Trompeter & Wright 2010:671), to form more precise expectations (Schultz *et al*. 2010:240; Trompeter & Wright 2010:671; Knechel 2007:395; Bell *et al*. 2005:32) and provide the auditor with a means to evaluate forward-looking information (Peecher *et al*. 2007:466). This will enable the auditor to add value to the client because it allows the auditor to comment and advise the client on business risks as well as the accounting implications of the business risks (Khalifa *et al.* 2007:833; Robson *et al.* 2007:412). The incorporation of more and better analytical procedures will also improve audit quality (Houck 2003:69).

The advancement of technologies has made it possible to apply analytical procedures to the entire set of transactions and has eliminated the need for sampling (Wang & Cuthbertson 2014:6; Kogan *et al*. 2010:15). Auditors can therefore examine large volumes of data within a short timeframe (Omoteso 2013:69) and this enables them to provide more timely assurance (Kuenkaikaew & Vasarhelyi 2013:39; Flowerday *et al*. 2006:327) resulting in a more effective and efficient audit. Wang and Cuthbertson (2014:9) and Curtis and Payne (2008:104) confirm this and state that the use of CAATs or data analysis has the ability to improve audit quality, effectiveness and efficiency. The use of GAS has also made it easier for auditors to develop more precise expectations because it automates calculations and comparisons and helps the auditor to make more efficient decisions because of increased timeliness (Baldwin & Trinkle 2011:16).

According to Hoitash, Kogan and Vasarhelyi (2006:53), the benefit associated with analytical procedures is considered substantial if they are proven to reduce the cost of the most expensive audit tasks, namely tests of details. Their application is also less time-consuming than tests of details (Houck 2003:74) and can easily be delegated to lower-level staff. Abidin and Baabbad (2015:17) describe analytical procedures as “one of the cheapest and most basic audit procedures”.

Houck (2003:78) emphasises the fact that analytical procedures require auditors to apply their minds. He states that the use of analytical procedures is far more interesting than inspecting documents, sending confirmations or performing recalculations (Houck 2003:78). An increase in the use of such procedures thus improves job satisfaction, which in turn will have a positive impact on staff morale (Houck 2003:78). The advancement of technologies has also made it easier to assign these procedures to lower-level staff and has increased their productivity (Trompeter & Wright 2010:688).

From the discussion above it is clear that an auditor could benefit by performing analytical procedures during the planning, obtaining audit evidence and conclusion, evaluation and reporting phases of an audit. Analytical procedures could even result in more compelling evidence than tests of details because matters, as well as risks both inside and outside the entity, are considered. They can reduce the amount of detailed testing which makes it cost effective and help the auditor to identify significant fluctuations, resulting in a more efficient audit. Advancements in technology have made it possible for the auditor to examine larger sets of data and that can assist him or her to provide more timely and forward-looking information. However, the auditor should carefully consider whether these advantages exceed the challenges in the application of analytical procedures because in some instances the advantages and challenges coincide.

3.11 CHALLENGES IN THE APPLICATION OF ANALYTICAL PROCEDURES

As discussed in the previous section, there are numerous advantages in the application of analytical procedures. However, there are also challenges with the

application of these procedures that need to be considered. According to Liddy (2014:2), “change will not come without challenges”. Houck (2003:83) mentions that even though there are multiple benefits in applying analytical procedures, auditors are accustomed to “flimsy” analytical procedures that provide little or no evidence. Glover *et al*. (2005:201) agree and assert that auditors inappropriately rely on “weak analytical” procedures because they do not understand the relationship between precision and the quality or strength of the evidence provided by analytical procedures. This was confirmed in a more recent study by Abidin and Baabbab (2015:24), who state that the less knowledgeable auditors are about the use and interpretation of analytical procedures, the less likely they are to use them.

One advantage of analytical procedures is that they reduce the amount of detailed testing. ISA 520 (IAASB 2014m:par. A4) provides guidance on the balance between tests of details and substantive analytical procedures, which are based on the auditor’s judgement about the expected effectiveness and efficiency of the available audit procedures to reduce audit risk at the assertion level to an acceptably low level. Research has found that auditors are reluctant to reduce the extent of detailed testing, even if the results of analytical procedures are favourable (Abidin & Baabbad 2015:22; Samaha & Hegazy 2010:901; Lin & Fraser 2003:161). Lin and Fraser (2003:161) argue that this reluctance is because auditors lack confidence in the use of analytical procedures as substantive procedures. Houck (2003:84) goes on to say that auditors are not reducing detailed testing because the design and execution of their analytical procedures are not powerful enough. This causes auditors to choose tests of details over analytical procedures because they require less judgement, and auditors feel more confident when examining a tangible document rather than relying on analytical skills (Houck 2003:70).

Vuchnich (2008:40) challenges the statement that analytical procedures are cost-effective, claiming that for financial statement analysis to be effective, the auditor must be able to interpret multiple financial statement relationships simultaneously, which is challenging and in itself a time-consuming process. This issue was also raised by Knechel (2007:391) asserting that sophisticated and

powerful analytical tests may be just as time consuming and expensive as traditional substantive tests of detail. Wang and Cuthbertson (2014:6) maintain that even though data analysis makes it possible to test 100% of the population, the analysis of the whole population may not be feasible because of the audit time and cost constraints. They call for more research on whether data analysis can reduce audit hours, provide better insights into transactions and have a higher chance of discovering and preventing fraud (Wang & Cuthbertson 2014:9).

According to Vuchnich (2008:39), the simplicity of analytical review procedures is both the greatest strength and greatest weakness of these procedures. He explains this statement by arguing that the underlying assumptions of these procedures could be regarded as fairly general, but at some point the auditor must evaluate the results subjectivity and that requires professional judgement (Vuchnich 2008:39). Pinho (2013:5) also underscores the fact that analytical procedures bring an undesirable degree of subjectivity to the auditor's work and to the auditing profession as a whole. He attributes this to the fact that there are no formal guidelines in ISA 520 (IAASB 2014m) with regard to the nature and extent of unusual and unexpected variations, which leaves it to the auditor's discretion to decide what is a reasonable and what is an unreasonable inconsistency. Wang and Cuthbertson (2014:10) concur and state that there is a need for guidance in using data analysis in audit engagements, understanding its application at the different phases of an audit and what the corresponding impacts might be.

Even though data analysis have the ability to improve audit quality, effectiveness and efficiency (Wang & Cuthbertson 2014:9; Curtis & Payne 2008:104), these techniques are being underutilised in practice (Curtis & Payne 2008:104). Wang and Cuthbertson (2014:2) ascribe this to the difficulty acquiring appropriate data, a lack of trained staff, auditors not knowing where to start and difficulty with the interpretation of the results of the data analysis. Liddy (2014:2) attributes this to concerns relating to data security and transparency issues, stating that auditors are unsure about how much data to share and how information should be secured and protected. Braun and Davis (2003:731) found that auditors lack confidence in their technical ability to use data analysis. Liddy (2014:2), however,

calls for increased use of technology in analytical procedures and data analysis. This requires auditors to keep abreast of IT developments through continued professional development initiatives (Lombardi *et al*. 2014:26; Omoteso 2013:161; Vasarhelyi *et al*. 2010:420; Koskivaara 2007:343).

As indicated earlier, the investigation of differences relating to analytical procedures (see section 3.9) poses challenges. It would appear that auditors do not investigate such differences (PCAOB 2008:15) because they are unsure about the extent of such investigations (Hirst & Koonce 1996:476) and they are therefore unwilling to investigate differences (Brazel *et al*. 2012:24; Knechel *et al*. 2013:395; Trompeter & Wright 2010:691; Glover et al. 2005:202). These challenges could undermine the quality of the audit and indicate the need for increased competence on the part of auditors in the application of analytical procedures.

According to Vasarhelyi *et al*. (2010:420), audit education needs to evolve to keep up with the progress being made in the business world. Hirst and Koonce (1996:459) posit that increased and improved classroom coverage of analytical procedures would enhance students' understanding of this vital procedure. It is thus evident that universities should adjust their curricula to place more emphasis on the use of sophisticated techniques (Cho & Lew 2000:437), the use of disaggregated data (Trompeter & Wright 2010:678), the use of data-mining tools (Wang & Cuthbertson 2014:8; Koskivaara 2007:343) and model-building skills (Peecher *et al*. 2007:478). Liddy (2014:3) maintains that the auditor of tomorrow will need to obtain a deeper understanding of IT and work more closely with data analysis specialists.

This discussion shows that despite the advantages, there are still numerous challenges in the application of analytical procedures. If auditors are not prepared to accept some degree of subjectivity, and exercise the required professional judgement to perform sophisticated analytical procedures, they will not be able to capitalise on their benefits. It further appears that the main advantage of analytical procedures, namely to perform a more effective and efficient audit, may not be attainable because sophisticated and powerful analytical procedures are

time consuming, which could prove to be expensive. However, complexities in the business environment and the expectations of clients are driving audits to become more forward looking and predictive in nature. These developments will require auditors to use sophisticated techniques and methods for analytical procedures, which will require of auditors to meet the related challenges. Universities should also adjust their curricula and teaching methods accordingly.

3.12 CONCLUSION

This chapter contextualised the use of analytical procedures by providing a broad overview of previous studies on the application of analytical procedures in the audit process. Previous studies report on the application of analytical procedures in various countries, but little is known on how auditors in South Africa apply analytical procedures in the audit process. This study attempted to fill the gap. This was followed by a discussion of the definition of analytical procedures showing that analytical procedures have been an acceptable audit procedure for the last few decades and that they comprise two parts, namely the consideration of comparisons and relationships to create an expectation, and then the investigation of identified fluctuations or consistencies. The auditor's objective in applying analytical procedures depends on the phase in which analytical procedures are applied in the audit process, either during the planning phase of the audit, or while obtaining audit evidence or during the conclusion phase.

A discussion of the application of analytical procedures in these three phases of the audit process revealed that analytical procedures are an integral part of the whole audit process. The use of analytical procedures during each of the phases in the audit process differs, and this is influenced by factors such as audit firm size, the auditor's experience, knowledge of the topic and perception of the usefulness of analytical procedures in relation to the audit objectives. The techniques and methods used to perform analytical procedures were then discussed, indicating that auditors still prefer simple to more sophisticated techniques.

The discussion provided some insight into the factors that are causing a shift in audit methodologies to increase the application of analytical procedures. These factors are the adaptation of a business risk audit methodology, the advancement of technologies such as continuous auditing and audit support systems, and the incorporation of non-financial information. These factors enable the auditor to incorporate not only financial but also non-financial information into decision making and thus develop more precise expectations. Any differences between the auditor's expectations and management's representations should be investigated. Auditors, however, lack a willingness and in some instances the competence to investigate differences relating to analytical procedures.

It was against this background that the advantages of the application of analytical procedures as well as the challenges in their application were discussed. It was also concluded that some of the advantages coincide with the primary challenges of analytical procedures, but that the future demands of and expectations for an audit will require auditors to meet these challenges.

In conjunction with chapter 2, this chapter concluded the theoretical underpinning and contextualisation of the study. Chapter 4 provides an overview of the research methodology and the approach adopted in this study. The chapter provides information on the methodology that was used in the investigation of the application of analytical procedures by auditors in the audit process.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 INTRODUCTION

The previous two chapters contextualised the use of analytical procedures by auditors and provided the theoretical underpinning for the study. Chapter 2 discussed the need for and development of an audit as the background of the agency theory and postulates in auditing. This was followed by a description of the process the auditor follows to obtain audit evidence. The chapter explained in detail the factors that have driven the auditor to alter the traditional audit methodology to increase the application of analytical procedures.

Chapter 3 built on chapter 2 and described the application of analytical procedures in the audit process. After defining analytical procedures and explaining their objective, the discussion turned to how auditors use analytical procedures in each phase of the audit process. The chapter went on to describe how the use of analytical procedures (including the techniques and methods) has changed in recent years as a result of changes in the audit environment, which include the focus on the business risk audit methodology, the advancement of technology and the emphasis of non-financial information. Thereafter an overview was provided of the auditor's investigation of differences and the advantages and challenges auditors experience with the application of analytical procedures. Chapter 3 concluded by making a case for an increased use of analytical procedures and supported the overall objective of the study, namely to investigate the application of analytical procedures by auditors in the audit process.

The objective of this chapter is to describe how the researcher conducted the research. Leedy and Ormrod (2005:2) define research as a "systematic process of collecting, analyzing, and interpreting information in order to increase our understanding of the phenomenon about which we are interested or concerned". This chapter outlines the methodology that was applied to investigate the

application of analytical procedures by auditors in the audit process. The chapter commences with a discussion of the research approach adopted in this study. This is followed by an identification of the research paradigm, the worldview for the study. The research design is discussed with reference to three components, namely the research strategy, method and analysis. The chapter further provides a description of the strategies adopted by the researcher to ensure the quality of the research, and concludes with the ethical factors the researcher deemed part of the study.

4.2 RESEARCH APPROACH

Creswell (2009:3) describes the research approach as a “strategy of inquiry” and classifies it into three types of approaches, namely qualitative, quantitative and mixed. The mixed approach of inquiry incorporates characteristics of both the qualitative and quantitative approaches. Rolfe (2006:306) argues that quantitative and qualitative approaches can be distinguished solely by the type of data being collected – quantitative research relates to numerical data, while qualitative research uses verbal and textual data. Hoepfl (1997:48) adopts a broader view and states that quantitative researchers seek causal determination, prediction and generalisation of findings, whereas qualitative researchers seek clarification, understanding and extrapolation of findings to similar situations. According to Babbie and Mouton (2009:646), a qualitative research approach is the “generic research approach in social research according to which research takes its departure point as the insider perspective on social action. The goal thereof is to describe and understand rather than to explain and predict” (Babbie & Mouton 2009:646).

Leedy and Ormrod (2005:133) describe a qualitative research approach as one in which the researcher focuses on a phenomenon that occurs in the “real world” and then investigates the phenomenon in order to understand it. It is this investigation that enables the researcher to gain new insight into the phenomenon and to identify problems within it. The researcher can therefore be described as the “instrument” that collects data, and the data is typically collected in the participant’s setting (Creswell 2009:4; Leedy & Ormrod 2005:133).

Stenbacka (2001:551) summarises the purpose of qualitative research as "generating understanding". This concurs with the description of Minichiello and Kottler (2010:19) that qualitative research is concerned with understanding people's experiences from the participants' perspective.

In order to achieve the overall objective of this study, namely to investigate the application of analytical procedures by auditors in the audit process, a qualitative research approach was employed. The qualitative approach enabled the researcher to focus on each participant's experiences relating to the application of analytical procedures. The characteristics of qualitative research as described above relate to the current study as the researcher collected data from participants by means of semi-structured interviews. On the basis of the interviews, the researcher was able to describe and understand the participants' views on the application of analytical procedures by auditors in the audit process rather than to provide explanations and predictions.

4.3 RESEARCH PARADIGM

Saunders *et al*. (2012:127) describe the research paradigm as an "over-arching term that relates to the development of knowledge and the nature of that knowledge". They state that the research paradigm includes the assumptions on how the researcher views the world and lays the foundation for the research methodology (Saunders *et al*. 2012:128). According to Creswell (2009:6), these worldviews are shaped by factors such as the discipline being researched, the beliefs of study leaders and the researcher's past research experiences.

The constructivist paradigm, as explained by Creswell (2009:8), is a worldview in which the researcher attempts to understand the world in which participants live and work. This view is often combined with the interpretivism paradigm, with a view to interpreting and understanding human behaviour (Babbie & Mouton 2009:643). In the constructivism paradigm, the researcher forms part of the research and can therefore not be seen as being independent of the data (Saunders *et al*. 2012:140). The constructivist researcher further develops subjective meanings from multiple participants through the use of open-ended

questions to achieve the aim of the research, namely to understand participants' views of a phenomenon being studied (Creswell 2009:8). In the constructivist paradigm, the researcher typically engages in discussions or interactions with persons. This is in contrast to positivism paradigm which focuses on laws or theories that can be tested or verified (Creswell 2009:7–8).

In this study, the researcher investigated the application of analytical procedures by auditors in the audit process from a constructivist paradigm. The constructivist paradigm implies that the researcher had to gain an understanding of the meaning that the participants attached to the application of analytical procedures by auditors in the audit process (Creswell 2009:8). For the purposes of this study, the researcher held semi-structured interviews with senior audit managers from large audit firms in South Africa in order to gain a deep understanding of their views on the application of analytical procedures by auditors in the audit process. The researcher was involved in the collection, analysis and interpretation of the data collected from the interviews and could therefore not be viewed as independent and free from bias (Saunders *et al*. 2012:140). As discussed in section 4.5, steps were taken to promote the research quality.

4.4 RESEARCH DESIGN

Yin (2014:28) defines the research design as the "logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusions". Babbie and Mouton (2009:74) regard it as the "blueprint" a researcher follows to conduct his or her research. According to Babbie and Mouton (2009:74), researchers often confuse research design with research methodology. However, these are two totally different dimensions. The research design focuses on the end product, that is, the kind of study planned and the kind of results aimed at (Babbie & Mouton 2009:74). By contrast, the research methodology focuses on the research process and the kind of tools and procedures to be used (Babbie & Mouton 2009:74). According to Voce (2005), the research design encompasses four components, namely the research paradigm, the research strategy, the method of data collection and the analysis of data. The research paradigm used for this study was a constructivist paradigm as

the researcher used open-ended questions to describe and understand the participants' views of the phenomenon under investigation (Creswell 2009:8). The research paradigm was discussed in section 4.3. In the sections below, the research strategy, method of data collection and data analysis will be discussed.

4.4.1 Research strategy

One strategy of conducting a qualitative study is the use of case studies as a method of inquiry (Minichiello & Kottler 2010:29; Creswell 2009:13). The research strategy of this study entailed a combination of literature review and a case study. These two research strategies are discussed in more detail below.

4.4.1.1 Literature review

A literature review provides the foundation on which research is built (Saunders *et al*. 2012:73). According to Leedy and Ormrod (2005:64), a literature review is conducted "to look again" at what other researchers have done in fields that are similar or related but not necessarily identical to a researcher's own area of interest. Babbie and Mouton (2009:565) therefore argue that all research should be placed in the "context of the general body of scientific knowledge". There are numerous benefits to performing a literature review (Saunders *et al*. 2012:71–72; Leedy & Ormrod 2005:64–65). These can be summarised as follows:

- It provides the foundation for developing new theories, perspectives and approaches;
- It provides insight into previous research on the same area of interest;
- It provides insight into how other researchers have approached and designed similar studies;
- It provides guidance on applicable and relevant research methods;
- It informs the researcher about other sources of data that might be relevant to the study; and
- It can assist with interpreting and making sense of research findings.

In this study, the purpose of the literature review was to gain an understanding of the body of knowledge on the application of analytical procedures by auditors in the audit process. Through the literature review, the most relevant studies relating to the application of analytical procedures by auditors in the audit process were studied, and this knowledge assisted the researcher with the development of the research problem as well as research objectives and her choice of the research strategy. The literature review shows that numerous studies have been conducted in various countries across the globe on the auditors' use of analytical procedures, but there is a paucity of research on this topic in a South African context. After completing the literature review and formulating the research objectives, the researcher decided to use a case study research strategy as a method of inquiry.

4.4.1.2 Case study

According to Creswell (2009:16–17), the constructivist paradigm supports the use of a case study strategy as a method of inquiry as the researcher seeks to understand a phenomenon on the basis of the views of participants. Yin (2014:16) provides a twofold definition of a case study. He uses the first part of the definition to contextualise a case study by stating that it is an "empirical inquiry that investigates a phenomenon in-depth and within its real world context, especially when the boundaries between phenomenon and context may not be clearly evident" (Yin 2014:16). The second part of the definition relates to the features of a case study which, according to Yin (2014:17), consists of a "technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis". Yin (2014:9) and Saunders *et al*. (2012:179) emphasise that a case study research strategy can answer questions such as "how, what and why". The use of a case study strategy addresses the research problem and objective, together with the secondary research objectives (as set out in table 4.4) as the researcher attempted to determine "why" auditors need to apply analytical procedures, "how" they apply them in the audit process, and

"what" the advantages and challenges are in relation to the application of analytical procedures.

Prior to data collection, the researcher had to decide between following a single or a multiple case study design (Yin 2014:51). A single case study design incorporates only one case and affords the researcher an opportunity to observe and analyse a phenomenon that few have considered before (Saunders *et al*. 2012:179). A multiple case study design incorporates more than one case and is used by the researcher to compare and generalise the findings within the cases (Yin 2014:56; Saunders *et al*. 2012:180). According to Babbie and Mouton (2009:282), in a multiple case study, convergence using multiple sources of evidence can be achieved by asking about the same phenomenon across cases, and this could represent aspects of thick description. Yin (2014:64) prefers multiple case studies to a single case study as the evidence from multiple case studies could have more impact because it has the potential for replication and can strengthen the findings. This is in contrast to a single case study design which can be described as "putting all your eggs in one basket" Yin (2014:64). However, Yin (2014:57) cautions that multiple case studies require more resources and time than a single case study and that the researcher should not take the decision to conduct multiple case studies lightly.

Since the overall objective of this study was to investigate the application of analytical procedures by auditors in the audit process, the researcher decided to follow a multiple case study strategy. She identified three cases, namely Big 4 audit firms, second-tier audit firms and the AGSA. Using these three cases as a point of departure, the researcher was able to obtain the views of the participants on the application of analytical procedures by auditors in the audit process. These views added to the researcher's understanding of the application of analytical procedures by auditors in the audit process and enabled her to compare the participants' views. For a detailed discussion of how the multiple cases were identified, see section 4.4.2.1.

According to Yin (2014:19–22), however, there are some concerns about case study research. The first and greatest concern relating to case study research is

the need for greater rigour because it is an unstructured form of inquiry. Rolfe (2006:308) confirms this by stating that there is no universal criterion for judging quality in qualitative research and each study should be judged on its own merits. Golafshani (2003:597) believes that the strength of any qualitative study lies in its quality. Section 4.5 describes the strategies the researcher has followed to ensure the quality of the study. A second concern relating to case study research is that the researcher can only expand and generalise theories but cannot extrapolate the findings to a physical population. The purpose of this study was not to extrapolate the findings of the study to the application of analytical procedures by all auditors and all audit firms, but rather to obtain an in-depth understanding of the views of participants relating to the application of analytical procedures by auditors in the audit process. A final concern pertaining to case study research is that a case study might require an unmanageable level of effort on the part of the researcher and might be a time-consuming process (Yin 2014:22).

4.4.2 Method of data collection

Creswell (2009:178) identifies two steps for data collection in a qualitative study, namely the purposeful identification of selected locations and participants for the study and the collection of the information through semi-structured interviews. Each of these steps is discussed in more detail below.

4.4.2.1 Purposeful identification of selected locations and participants for the study

Creswell (2009:178) emphasises that the researcher should purposefully select participants who will best help him or her to understand the problem and the research question. For this study, the researcher intentionally selected senior audit managers from large audit firms in South Africa. The selection criteria for inclusion could be divided into three components, namely large audit firms, senior audit managers and audit firms in South Africa. On the basis of the literature review, the researcher was able to justify all three criteria for inclusion as follows:

(i) Large audit firms

The researcher purposefully included large audit firms because evidence from the literature review suggested that auditors from large audit firms apply analytical procedures to a greater extent than auditors from smaller audit firms (Abidin & Baabad 2015:23; Samaha & Hegazy 2010:896). Previous studies on the effect that firm size has on the extent of the performance of analytical procedures also indicated that auditors from large audit firms apply analytical procedures to a greater extent than those from small audit firms (Lin & Fraser 2003:159; Mahathevan 1997:231). The reason for large audit firms' greater use of analytical procedures has been ascribed to differences in the client base. Large audit firms tend to have larger clients with better systems and strong internal controls which are deemed more conducive to the use of analytical procedures (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896; Lin & Fraser 2003:159; Mahathevan 1997:231).

Based on the literature, the application of analytical procedures is more evident in large audit firms than in small audit firms (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896; Lin & Fraser 2003:159; Mahathevan 1997:231). The researcher therefore decided to consider the higher end of the audit landscape. She identified large audit firms from the Independent Regulatory Board for Auditors (IRBA) classification. The IRBA classifies the size of an audit firm by the number of audit partners (IRBA 2015) and classifies a large firm as having more than 20 partners. Table 4.1 indicates the classification of audit firms by the number of partners.

Table 4.1: Classification of audit firms by number of partners

Classification	Number of partners
Large firms	20+
Medium firms	5-19
Small firms	2-4
Sole proprietors	1

Source: IRBA (2015)

Upon request, the IRBA provided the researcher with a list of all active audit firms registered in South Africa. The list classified the audit firms according to size and race. From the list, the researcher was able to identify audit firms with more than 20 partners. The list illustrated that there are 11 audit firms registered in South Africa with more than 20 audit partners. Using these firms as a point of departure, the researcher divided the 11 firms into two categories, namely Big 4 audit firms and second-tier audit firms. These two categories were identified as Case 1: Big 4 audit firms and Case 2: second-tier audit firms. The researcher decided to include the AGSA as Case 3. Table 4.2 shows the three cases and the number of selected practices and participants that were included in the study.

Table 4.2: Cases for the study

Cases for the study	Selected practices	Total number of participants
Case 1: Big 4 audit firms	4	8
Case 2: Second-tier audit firms	3	4
Case 3: AGSA	1	3

The researcher decided on these three cases as follows:

Case 1: Big 4 audit firms. The researcher intentionally included the Big 4 audit firms because the literature shows that auditors from Big 4 audit firms apply analytical procedures to a greater extent than auditors from non-Big 4 audit firms (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:904). The researcher included one practice from each of the Big 4 audit firms.

Case 2: Second-tier audit firms. The researcher classified the large audit firms, excluding the Big 4 audit firms, as second-tier audit firms. From the literature it is clear that these audit firms have emerged as an alternative to the Big 4 audit firms (Byrnes 2005:1). In South Africa, the second-tier audit firms are in a race to gain market share from the Big 4 audit firms owing to regulatory changes such as audit firm rotation and clients' need for high-quality audits (Gebhardt 2013:1). Owing to audit firm rotation, large clients are putting their audits out on tender every five years, which has brought with it opportunities to second-tier audit firms

to audit larger clients (Gebhardt 2013:1). Boone, Khurana and Raman (2010:350) found that the audit quality of Big 4 audit firms and second-tier audit firms is similar and that these audit firms can serve large clients just as well as the Big 4 audit firms. The researcher decided to include three second-tier audit firms in the study. The three audit firms were selected according to the following criteria:

- Firm 1: This firm has a global network of more than 1 300 offices in 152 countries, and audits many large companies, including companies listed on the JSE (BDO 2015). Since this firm is an emerging competitor to the Big 4 audit firms (Sibanda 2012:1), it was decided to include the firm in Case 2.
- Firm 2: The researcher included this audit firm because it is the largest black-owned accounting and auditing firm in South Africa as per the list provided by the IRBA. The aim of the firm is to make a meaningful contribution to the development of African leadership by creating a leadership legacy that transforms the economic landscape of Africa. The firm has been recognised by the Advancement of Black Accountants of South Africa (ABASA) for having produced the highest number of black chartered accountants in the second-tier audit firm category (Sizwe Ntsaluba Gobodo 2015). This firm employs over 1 000 staff members and has 11 offices in South Africa, two of which are in Gauteng (Sizwe Ntsaluba Gobodo 2015).
- Firm 3: This firm was included as it is currently in a growth phase, and through numerous mergers, grew by 30% during 2013 (Gebhardt 2013:1). According to the list supplied by the IRBA, this firm is the fifth largest audit firm in South Africa. The firm claims to have the power and presence to rival the world's largest accounting firms and renders services to organisations ranging from large listed companies to small owner-managed businesses (Mazars 2015).

Case 3: AGSA. The researcher included the AGSA as case 3 because it conducts all mandatory audits on all government departments, public entities, municipalities and public institutions in South Africa (AGSA 2014:23). It further conducts discretionary audits, such as performance audits, special audits and investigations (AGSA 2014:23). During the 2014 financial year, the AGSA also

took on the audit of three state-owned enterprises (AGSA 2014:30). The AGSA is the only institution that, by law, has to report on how the government is spending the South African taxpayers' money (AGSA 2014:24).

(ii) Senior audit managers

Creswell (2009:217) emphasises that in collecting qualitative data, the researcher should purposefully select individuals who have actually experienced the phenomenon. Leedy and Ormrod (2005:145) further posit that these individuals should have the most information about the phenomenon under investigation. The literature review indicated that the performance of analytical procedures is affected by experience (Abidin & Baabad 2015:23; Samaha & Hegazy 2010:897; Mahathevan 1997:230) and that audit managers tend to have extensive knowledge of the client and industry, which enables them to create more precise expectations (Knapp & Knapp 2001:33–34). Previous studies that targeted auditors with different levels of experience also reported on the extensive involvement of audit managers in the application of analytical procedures (Samaha & Hegazy 2010:897; Cho & Lew 2000:434). The researcher thus purposefully targeted participants who had met all of the following criteria to participate in the study:

- The participant had to be a chartered accountant;
- The participant had to be a senior audit manager;
- The participant had to have more than seven years' auditing experience; and
- The participant had to be actively involved in all phases of the audit process.

The population of audit managers can be described as a homogeneous group, and as the aim of the study was to understand the commonalities in auditors' application of analytical procedures it was decided to include 13 in-depth interviews. In their research, Guest, Bunce and Johnson (2006:75) found that data saturation in qualitative studies generally occurs after 12 semi-structured interviews because thereafter new themes from subsequent interviews emerge infrequently. All 13 senior audit managers (as set out in table 4.3) responded favourably to a request to participate in the study. Because the study was

relevant to their work experience and afforded them an opportunity to reflect on their application of analytical procedures, they were eager to participate, thus representing the ideal circumstances, according to Saunders *et al.* (2012:389).

Participants from Case 1 (Big 4 audit firms) and Case 3 (AGSA) recommended that the researcher also interview colleagues from their respective firm's technical department. The participants indicated that owing to technological advancements, those individuals involved in the firms' technical department had more in-depth knowledge of the advantages and challenges experienced in the application of analytical procedures. These advancements were identified as an important driver for the increased application of analytical procedures (see chapter 3, section 3.8.2).The researcher contacted these participants via e-mail to explain the purpose of the study. They both responded favourably to the request to participate in the study. The inclusion of these two additional participants (as indicated in table 4.3) can be described as snowball sampling (Noy 2008:330). Noy (2008:330) defines snowball sampling in qualitative research as follows: "when the researcher accesses informants through contact information that is provided by other informants". This technique is often applied in social research (Noy 2008:331), and provided the researcher with enriched information on the application of analytical procedures by auditors in the audit process.

Table 4.3: Participants in the study

Cases	Number of audit firms	Number of participants	Additional participants	Total
Case 1: Big 4 audit firms	4	7	1	8
Case 2: Second-tier audit firms	3	4	_	4
Case 3: AGSA	1	2	1	3
Total	**8**	**13**	**2**	**15**

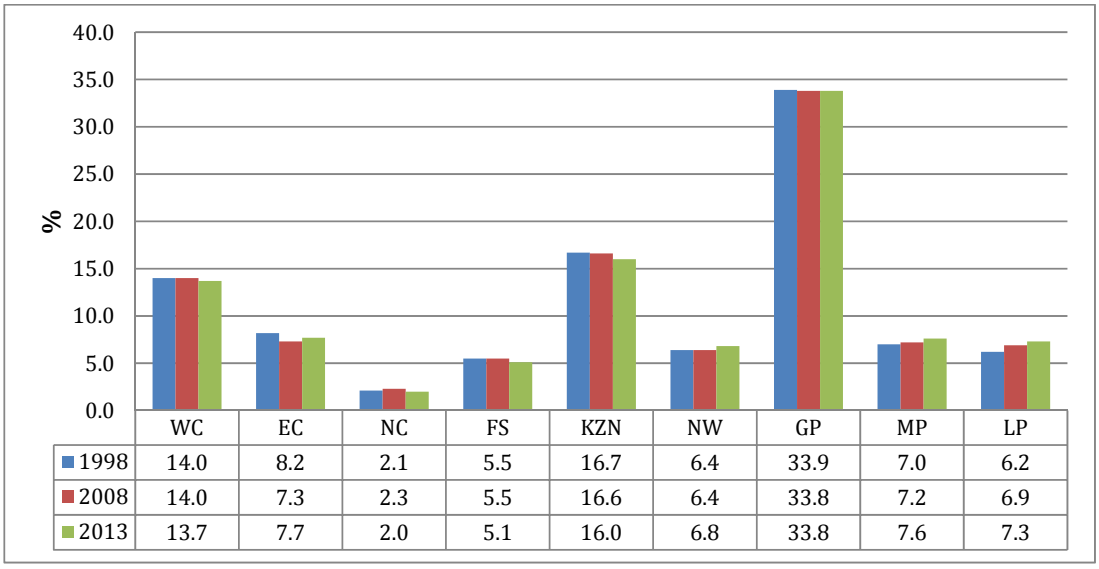
(iii) South African context

Audit firms in South Africa were selected. Previous research on the topic of the application of analytical procedures has been conducted in various countries across the globe. These include studies conducted in the US (Trompeter &

Wright 2010; Hirst & Koonce 1996), Egypt (Samaha & Hegazy 2010), the UK (Mulligan & Inkster 1999; Fraser *et al*. 1997), Canada (Lin & Fraser 2003), Singapore (Mahathevan 1997), Hong Kong (Cho & Lew 2000), Australia (Smith *et al*. 1999) and, more recently, in Portugal (Pinho 2014) and Yemen (Abidin & Baabbad 2015). There is, however, little literature available on auditors' application of analytical procedures in South Africa. The South African context of this study would close the aforementioned gap.

All the audit firms that were selected have offices located in Gauteng, South Africa. The researcher purposefully selected offices from the Gauteng province as this province contributes the highest percentage (34%) to the South African economy (Statistics South Africa 2014:10). It is based on the argument that larger clients, which, according to the literature have better systems and stronger internal controls that are more conducive to analytical procedures (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896; Trompeter & Wright 2010:679; Lin & Fraser 2003:159; Mahathevan 1997:231), are situated in Gauteng, the heart of the South African economy. Figure 4.1 shows the ranking of the contribution of the nine provinces in South Africa to the South African economy in 1998, 2008 and 2013.

Figure 4.1: Contribution of the nine provinces to the South African economy



	WC	EC	NC	FS	KZN	NW	GP	MP	LP
1998	14.0	8.2	2.1	5.5	16.7	6.4	33.9	7.0	6.2
2008	14.0	7.3	2.3	5.5	16.6	6.4	33.8	7.2	6.9
2013	13.7	7.7	2.0	5.1	16.0	6.8	33.8	7.6	7.3

Source: Statistics South African (2014:11)

Having discussed the selection criteria for inclusion in the study, it is necessary to explain how the qualitative data was collected.

4.4.2.2 Collection of information through semi-structured interviews

Data was collected by means of face-to-face, semi-structured and in-depth interviews. A total of 15 participants were interviewed and the interviews lasted between 45 and 60 minutes. The type of data collection was deemed relevant to the study based on the notion of Saunders *et al*. (2012:376) that semi-structured and in-depth interviews are used to gather data, which are qualitatively analysed when a case study is used as research method. Based on the literature review, a list of pre-determined, open-ended interview questions (included in the interview protocol) (see Appendix A) was compiled in order to investigate the application of analytical procedures by auditors in the audit process. The openness of the questions afforded the researcher an opportunity to "probe" the participants to explain or elaborate on their answers (Saunders *et al.* 2012:389).

Saunders *et al*. (2012:384–397), Creswell (2009:178) and Leedy and Ormrod (2005:147–148) provide guidelines to consider as part of the interview process, and these were followed in the current study.

- *Identify the questions to be asked in advance*. The interview protocol included the objective of the study as well as 13 open-ended questions. These questions formed the core of the interview. The questions were based on the literature review and were in line with the secondary research objectives of the study. The interview questions, together with the secondary research objectives, are summarised in table 4.4. The questions were of such a nature that the researcher could follow up on the participant's responses by asking them to explain their views in more detail or to elaborate on something that they had said (Leedy & Ormrod 2005:147). See Appendix A for the interview protocol.
- *Purposefully select the participants*. Section 4.4.2.1(ii) provides a description on how the senior audit managers as participants in the study were selected.

It demonstrates that the selection of senior audit managers would best help the researcher to achieve the research objective (Creswell 2009:178). Audit partners at audit firms of the three cases (Big 4 audit firms, second-tier audit firms and the AGSA) were contacted via e-mail or telephone and requested to identify a senior audit manager or managers at their respective firms who would meet the criteria as set out in section 4.4.2.1 (ii). An e-mail was sent to the prospective participants informing them that they had been identified by audit partners explaining the objective of the study and to confirm their availability and willingness to participate in the study.

- *Select a suitable meeting location*. For the sake of convenience and comfort, all of the interviews were conducted at the workplace of the participants. According to Saunders *et al*. (2012:389) and Leedy and Ormrod (2005:147), the meeting location should be one in which the participant feels comfortable and where the interview is unlikely to be disturbed. By conducting the interviews at the participant's workplace, these conditions were met.
- *Obtain written permission from the participants*. The objective of the study was again explained at the start of the interview, and each participant was asked to sign a combined letter of introduction and informed consent prior to the interview (see Appendix B). This procedure is in line with the University of Pretoria's ethical clearance policy.
- *Establish and maintain rapport*. A week prior to the interview, the interview protocol was sent to the participant. The interview protocol included the objective of the study and the interview questions. This allowed the participant to prepare for the interview (Saunders *et al*. 2012:385). While conducting the interview, the researcher chose her words carefully to ensure neutrality with regard to the participant's knowledge. The researcher showed genuine interest in what the participants had to say and also encouraged them to share their views. These techniques are acknowledged in the literature (Saunders *et al*. 2012:393; Leedy & Ormrod 2005:147).
- *The researcher's appearance*. The researcher wore clothes that were generally acceptable for the setting in which the interview was conducted. Saunders *et al*. (2012:393) maintain that the researcher's appearance may

affect the participants' perceptions and can help the researcher to gain their confidence.

- *Record the interview*. A digital voice recorder was used to record the interview. Prior to the recording, the researcher obtained informed consent from the participants to record the interview. This method of recording allowed the researcher to concentrate on the facilitation of the interview and ensured that the conversation was stored for analysis (Saunders *et al*. 2012:394). Directly after the interview, the researcher made a few reflective notes on her personal thoughts.

The use of interviews to collect data has advantages and limitations. The advantages include (Creswell 2009:179) the following in relation to the current study:

- An interview was deemed useful because the participants could not be directly observed;
- As the participants had extensive experience, they could provide in-depth information about the application of analytical procedures by auditors in the audit process; and
- The interview questions were of such a nature that they allowed the researcher to control the line of questioning.

The limitations of using interviews to collect data include the following (Creswell 2009:179), in relation to the current study:

- The interview provided only information on the views of the participants;
- The presence of the researcher could have affected the answers provided by the participants; and
- Not all participants were equally articulate in explaining their perceptions.

The above are limitations relating to the nature of qualitative research (Creswell 2009:179) and all steps were taken (see section 4.5) to promote the quality of the research.

The questions as per the interview protocol (see Appendix A) are listed in table 4.4, with the secondary research objectives of this study as discussed in chapter 1, section 1.4, indicated next to the interview question.

Table 4.4: Interview questions and secondary research objectives

Interview questions	Secondary research objectives
1. Why do you need to apply analytical procedures?	To determine why auditors need to apply analytical procedures
2. How do you perform analytical procedures during the: - planning phase - obtaining audit evidence phase - conclusion phase of an audit? 3. How do you decide on the extent of analytical procedures? 4. Who is mainly responsible for performing these analytical procedures during the: - planning phase - obtaining audit evidence phase - conclusion phase of an audit? 5. How do you decide on the types of analytical procedures to be performed?	To determine how auditors apply analytical procedures in the audit process
6. How has your application of analytical procedures changed over the past years? 7. What has driven the change in your use of analytical procedures? 8. How did the emphasis on risk-based audit methodologies impact on your application of analytical procedures? 9. How will developments in technology change analytical procedures of the future? 10. How do you believe that non-financial information such as industry knowledge will be integrated in analytical procedures of the future? 11. How do you treat material differences for analytical procedures?	To determine whether the application of analytical procedures in the audit process has changed in response to the changing audit environment
12. What do you consider to be the main advantages of analytical procedures? 13. What are the challenges experienced in applying analytical procedures in practice?	To determine the advantages of and challenges experienced by auditors in the application of analytical procedures

The above discussion explained how the researcher used semi-structured interviews as a method of data collection. Individuals were purposefully selected to participate in the study based on their experience in applying analytical

procedures in the audit process and the size and location of their firms. Guidelines, as provided in the literature, were followed during the interview process. The next step in the research process is the analysis and interpretation of the data collected. According to Saunders *et al*. (2012:549), data analysis shapes the direction of the data collection, and data analysis and data collection are interactive and concurrent actions in the research process.

4.4.3 Data analysis

The process of data analysis involves making sense of text and image data (Creswell 2009:183). Creswell (2009:185) suggests six interrelated stages of data analysis in qualitative research, and these were followed in the current research.

- *Organising and preparing the data for analysis.* The data collected in the interviews was recorded and transcribed. Transcription can be explained as "a reproduction of an interview to a written word account using the actual words" (Saunders *et al*. 2012:550). An independent transcriber was employed to do the transcriptions. In total, 15 interviews were transcribed that translated into 210 pages of transcriptions. The transcripts were e-mailed to participants, enabling them to consider the accuracy thereof. Participants were requested to review the transcripts and, if so required, to suggest changes. An electronic folder was generated for each participant and the folder included a copy of the voice recording, the researcher's notes and the transcribed interview files.
- *Reading through all the data*. The researcher read through the transcriptions several times to get a general picture of the information and to identify common themes and sub-themes from the data. The researcher then related the responses to the themes already identified from the literature review in chapters 2 and 3. The researcher also made notes of general ideas while reading through the transcriptions. This provided the researcher with an initial overall picture of the data and themes.

- *Coding the data either by hand or computer*. Creswell (2009:186) describes the coding process as the beginning of detailed analysis. To achieve the overall objective of this study, namely to investigate the application of analytical procedures by auditors in the audit process, the researcher coded the data according to the following categories (Creswell 2009:186–187):
  - Themes that the researcher expected to find based on the literature review that was conducted prior to the interviews; and
  - Themes that emerged from the interviews that were not anticipated by the researcher.

The themes and sub-themes identified in the literature review and the interviews are indicated in table 4.5.

Table 4.5: Identified themes and sub-themes

Themes			
The need to apply analytical procedures	The application of analytical procedures in the audit process	Changes in the application of analytical procedures	The advantages of and challenges in the application of analytical procedures
Sub-themes			
- General need	- Planning phase - Fieldwork phase - Completion, evaluation and reporting phase - Extent of use - Types of analytical procedures - Investigation of differences	- General change - Risk-based audit methodologies - IT - Non-financial information	- Advantages - Challenges

To assist the researcher with the coding process, she used a qualitative code sheet containing a list of predetermined codes (Creswell 2009:187). These predetermined codes were identified by the researcher from the literature review and the interviews. The code sheet included a list of the codes, a description of them and a reference to the different transcriptions. The computer program that the researcher used for the data analysis was Atlas.ti.

- *Categorising the data.* From the coded data, the researcher was able to identify broad themes and sub-themes (see table 4.5). These themes were used to analyse the data of the three selected cases (Big 4 audit firms, second-tier audit firms and the AGSA) as well as data across the different cases to help the researcher gain an in-depth understanding of the application of analytical procedures by auditors in the audit process.
- *Describing these themes*. In this study, the researcher used a narrative discussion to integrate, summarise and report the findings of the analysis (Creswell 2009:189). See chapter 5 for a discussion of the findings from the data analysis.
- *Integrating and interpreting the meaning of the themes*. The purpose of this final stage of data analysis was to compare the themes identified with the researcher's knowledge of the literature and to determine the extent to which the research objectives had been met. Chapter 6 provides a discussion on how the research objectives were achieved through the literature review and the findings of this study.

According to Creswell (2009:190), it is imperative that the findings of the data should be validated throughout all six stages of data analysis. The researcher incorporated the strategies as described in section 4.5 to ensure the quality of the findings.

4.5 RESEARCH QUALITY

As discussed in section 4.4.1.2, the strength of a qualitative study lies in its quality, but there is no universal criterion for judging the quality. Gibbs (2007:91) confirms the lack of a universal criterion, because for research conducted according to a constructivist paradigm, there is no reality against which the analysis can be compared, only multiple perceptions and interpretations. Rolfe (2006:309) suggests that in the absence of a universal criterion, each qualitative study should be judged on its own merits to determine its trustworthiness. Lincoln and Guba (1985:290) posit that a qualitative study can only be

trustworthy if the researcher can persuade his or her audience that the findings of the inquiry are worth paying attention to.

The terms “research validity”, “reliability” and “generalisability” have different meanings in a qualitative study in comparison with a quantitative study (Creswell 2009:190). Golafshani (2003:600) describes these different meanings as follows: when quantitative researchers refer to validity and reliability they are referring to the credibility of the research, while the credibility of qualitative research is dependent on the ability and effort of the researcher. Lincoln and Guba (1985:300) suggest that in a qualitative study, the conventional words “validity”, “reliability” and “generalisability” should be replaced with the words “credibility”, “dependability” and “transferability”. Krefting (1990:217) uses these terms to indicate that credibility refers to “true value”, transferability refers to applicability, dependability indicates consistency and conformability indicates neutrality. Other scholars use the terms “validity” and “reliability” (Creswell 2009:190; Golafshani 2003:600; Seale & Silverman 1997:380).

Even though there is disagreement among researchers about the exact terminology that should be used to describe quality in a qualitative study, there is general consensus in the literature that qualitative researchers should employ certain strategies to ensure the quality of their studies (Creswell & Miller 2000:124). In this study, the terms “validity”, “reliability” and “generalisability”, as suggested by Creswell (2009:190), were used. Creswell (2009:190–193), Gibbs (2007:91–100) and Lincoln and Guba (1985:301–318) describe strategies that are available to the qualitative researcher to ensure validity, reliability and generalisability. These strategies are discussed in more detail below.

4.5.1 Validity

Creswell and Miller (2000:124) describe validity as how accurately the researcher’s findings represent the participants’ realities of the social phenomenon. Simply put, results are valid if they are a true reflection of what is actually happening (Gibbs 2007:91). Creswell (2009:191-192) and Lincoln and

Guba (1985:301) recommend the following strategies to ensure the validity of the findings:

- *Spend prolonged time in the field.* Prolonged engagement can be defined as "the investment of sufficient time to achieve certain purposes" (Lincoln & Guba 1985:301). This means that the researcher should have a sound understanding of the context in which the phenomenon is being studied. In this study, the researcher performed an extensive literature review to familiarise herself with the application of analytical procedures. She had also taught the topic of analytical procedures at postgraduate level for more than five years. This extensive experience assisted the researcher to compare the data from the interviews with her own experiences (Creswell & Miller 2000:128).
- *Use rich, thick descriptions to convey the findings.* The qualitative researcher uses this strategy to establish validity by providing as much detail about the findings as possible. A rich description of the findings will enable the readers to make decisions about the applicability of the findings to other settings or similar contexts (Creswell & Miller 2000:129). In this study, the researcher was able to obtain in-depth information on the participants' perceptions on the application of analytical procedures as the flexible structure of the interview allowed the participants to elaborate on their answers.
- *Triangulate different data sources*. Triangulation is defined by Creswell and Miller (2000:126) as "a validity procedure where researchers search for convergence among multiple and different sources of information to form themes or categories in a study". In this study, the perceptions of eight participants from Big 4 audit firms, four from second-tier audit firms and three from the AGSA were obtained to enable the researcher to identify common themes. Further triangulation options (such as the use of an "inquiry team" (Lincoln & Guba 1985:317) were not used in this study.
- *Use member checking*. This strategy involves taking the data back to the participants from whom the data was originally collected to enable them to confirm the correctness of the data (Creswell & Miller 2000:127). Lincoln and Guba (1985:314) regard member checking as the most important technique

for establishing credibility. As part of this study, all participants were asked to read through their transcripts to confirm the accuracy thereof. This afforded them an opportunity to add to or elaborate on any previous answers.

- *Clarify the bias the researcher brings to the study.* The qualitative researcher should report on his or her personal beliefs, values and biases that may have an influence on his or her inquiry (Creswell & Miller 2000:127). Since the researcher in the current study, is not involved in practice, she could be regarded as independent.
- *Present negative or discrepant information.* The qualitative researcher should add credibility to the study by also examining the data for evidence that is contradictory to the general perspectives of the themes (Creswell 2009:192). By adding all the information, the researcher can refine a hypothesis until it "accounts for all known cases without exception" (Lincoln & Guba 1985:309). For the purposes of the current study, the researcher presented all of the views obtained from all the participants.
- *Use peer debriefing.* This strategy involves the identification of an individual with the relevant experience to review and ask questions about the qualitative study. The peer debriefer can add credibility to the study by providing written feedback, or to merely serve as a sounding board for the qualitative researcher (Creswell & Miller 2000:129). Lincoln and Guba (1985:308) maintain that peer debriefing helps to keep the inquirer honest. In this study, regular peer debriefings were held with a fellow academic who is also a chartered accountant.
- *Use an external auditor.* This involves using an independent individual to add credibility to the study by reviewing considerations such as the accuracy of the transcription of the interviews, the relationship between the research objectives and the data and the process of interpreting the raw data. In this study, the supervisor, an experienced researcher, was used to provide an objective assessment of the research project throughout the whole research process. This supervisor examined the process and product of the enquiry in order to determine the trustworthiness of the findings (Creswell & Miller 2000:128).

4.5.2 Reliability

Lincoln and Guba (1985:316) argue that there can be no validity without reliability, and a demonstration of validity is sufficient to establish reliability. According to Gibbs (2007:91), however, results are reliable if they are consistent across different researchers and different studies. It is, however, not easy to demonstrate consistency and reliability, and Gibbs (2007:98) suggests the following strategies the researcher can follow to ensure that the data is reliable:

- *Transcription checking*. The researcher should read through the transcripts to ensure they do not contain any mistakes (Gibbs 2007:98). In this study, the researcher listened to the voice recordings while checking the transcripts and read several times through the transcripts to ensure that they did not contain any obvious mistakes. In addition, a copy of the transcript was sent to the participant to also read through to confirm the accuracy thereof. Reading through all 210 pages of transcripts was time consuming, but helped the researcher to familiarise herself with the data (Gibbs 2007:98).
- *Definitional drift in coding*. A change in coding is likely to happen if material is coded at different time intervals which could cause codes used at the beginning of the analysis to differ from codes used later in the study (Gibbs 2007:98). Creswell (2009:187) recommends the use of a qualitative codebook to prevent this drift in coding. As discussed in section 4.4.3, the researcher used a code sheet that listed the codes.
- *Audit trail*. The above strategies followed by the researcher resulted in an "audit trail" as recommended by Lincoln and Guba (1985:319).

4.5.3 Generalisability

The objective of conducting interviews in a qualitative study is not to generalise the findings to individuals or sites outside the study but rather to obtain a description of the phenomenon in a particular context (Creswell 2009:193). The same applies to this study because the objective was not to generalise the findings of the study, but rather to gain an in-depth understanding of the views

that participants had on the application of analytical procedures by auditors in the audit process. As a multiple case study strategy was followed, it afforded the researcher the opportunity to compare and generalise the findings within the cases.

4.6 ETHICAL CONSIDERATIONS

The researcher has an obligation to carefully consider the ethical consequences of his or her behaviour as well as the impact of his or her research (Minichiello & Kottler 2010:137). Flick (2009:41) emphasises that the researcher should consider ethical issues during planning, conducting and reporting the results of the research. According to Leedy and Ormrod (2005:101), ethical research issues can be divided into four categories, namely protection from harm, informed consent, the right to privacy and honesty with professional colleagues. Each of the categories is discussed in detail below.

4.6.1 Protection from harm

Researchers should not physically or psychologically harm their participants (Leedy & Ormrod 2005:101). In the current study, the interview questions were work experience related and not of an emotionally sensitive nature, and the interviews were not conducted in a dangerous environment. The participants were therefore not exposed to any harm during the study.

4.6.2 Informed consent

Participation in any study should be strictly voluntary (Leedy & Ormrod 2005:101). In the current study, the participants were contacted via e-mail to explain the nature and purpose of the study. The e-mail stated that the interview would not take more than an hour of their time and the participants were given the choice of participating or not participating. A few days prior to the interview, the interview protocol was sent to the participants to enable them to prepare for the interview. At the start of the interview, the objective of the study was again explained to the participants and they were requested to sign a combined letter of

introduction and informed consent (Appendix B). In the letter, the participants were made aware that their participation was voluntary and that they could withdraw from the study at any time without any negative consequences.

4.6.3 Right to privacy

According to Flick (2009:42), readers of the research report should not be able to identify which individuals participated in the research. In the current study, the researcher assured the participants that their answers would be treated as strictly confidential and that their identities would remain anonymous. Their anonymity was also communicated in the combined letter of introduction and informed consent (Appendix B). All transcripts and recordings were saved in a secured electronic folder to ensure that nobody could gain access to the data.

4.6.4 Honesty with professional colleagues

The researcher reported the findings of the study in a complete and honest manner (Leedy & Ormrod 2005:102). All the sources used in the current study were indicated and acknowledged by means of complete references.

In addition to the above ethical considerations, the University of Pretoria's ethical committee scrutinised the researcher's proposal prior to the interviews. The committee read through the proposal and interview protocol before granting the researcher ethical clearance to proceed with the study (see Appendix C). The researcher was also held accountable in terms of the Codes of Research Ethics of the University of Pretoria.

4.7 CONCLUSION

In this chapter, the research methodology for the study was discussed. Research is described as a systematic process that the researcher has to follow to gain an understanding of a phenomenon. This study was based on a constructivist paradigm and on the principles of a qualitative research approach. To achieve the objective of the study, namely to investigate the application of analytical

procedures by auditors in the audit process, a qualitative research approach was followed. This enabled the researcher to gain an in-depth understanding of the application of analytical procedures by auditors in the audit process rather than to provide explanations and make predictions.

The research strategy used in this study involved a combination of a literature review and case study. Based on the literature, the focus of this study's was on the higher end of the audit landscape (Abidin & Baabbad 2015:23; Samaha & Hegazy 2010:896; Lin & Fraser 2003:159; Mahathevan 1997:231). Big 4 audit firms, second-tier audit firms and the AGSA were identified as cases for the study, allowing for a multiple case study strategy. Fifteen participants representing the cases were selected to participate in the study. These were audit managers who met the criteria of being a chartered accountant in a senior audit manager position, having more than seven years' auditing experience and all being actively involved in phases of the audit process. Audit managers from Gauteng offices of Big 4 audit firms, second-tier audit firms and the AGSA participated in the study. Their views represent a South African perspective which is not provided by previous studies on the application of analytical procedures by auditors in the audit process. It was explained that the literature review provided the foundation on which the research would build and that the multiple case studies afforded the researcher the opportunity to compare and generalise the findings in the cases.

The method that the researcher followed to collect the data was discussed. This described the purposeful identification of selected locations and participants for the study as well as the semi-structured interview process that was followed. This was followed by an explanation of the six interrelated stages of data analysis that the researcher followed.

The strength of a qualitative study lies in its quality and there are numerous strategies available to the researcher to ensure the validity, reliability and generalisability of a study. The chapter discussed the strategies that the researcher followed to ensure the trustworthiness of the study. This was followed

by a description of the ethical considerations the researcher had to include as part of the study.

Chapter 5 focuses on the overall objective of this study, namely to investigate the application of analytical procedures by auditors in the audit process. It also deals with the interpretation of the data that was collected through the semi-structured interviews.

CHAPTER 5
INTERPRETATION OF THE FINDINGS

5.I INTRODUCTION

The aim of this study was to investigate the application of analytical procedures by auditors in the audit process. This is a topic that has been widely researched (see section 3.2 in chapter 3) in countries other than South Africa, and this study attempted to fill the gap. Chapters 2 and 3 positioned the study in the literature. In chapter 2, the need for and development of an audit was discussed. Chapter 3 built on chapter 2 and described the application of analytical procedures in the audit process.

Chapter 4 described the research methodology followed in the study. It provided a description of the constructivist paradigm and the qualitative research approach that was followed to achieve the objective of the study. It further provided a discussion of the multiple case study strategy that was used and provided the motivation for the selection of each of the three cases and targeted participants. The semi-structured interview process was discussed, and this was followed by a description of the process followed to analyse the data.

The purpose of this chapter is to present a discussion of the findings of the study, based on the information obtained from the semi-structured interviews. The aim of this discussion is to realise the overall objective of the study, namely to investigate the application of analytical procedures by auditors in the audit process.

5.2 DATA PRESENTATION

To gain an in-depth understanding of the application of analytical procedures by auditors in the audit process, the researcher decided to follow a multiple case study strategy (see section 4.4.1.2 in chapter 4). A multiple case study consists of single cases and is used by the researcher to compare and generalise the

findings in the cases (Yin 2014:56). The presentation of the findings of this study consists of a separate discussion on each of the three cases and concludes with a section dealing with the cross-case analysis.

The researcher's interpretation of the application of analytical procedures by auditors in the audit process was based on the literature study (chapters 2 and 3) and was restricted to the views of the participants. The researcher developed descriptions, themes and sub-themes from the data as identified from the analysis of the transcripts of the participants' interviews. All the responses are quoted verbatim and unchanged, and are presented in English in italics. Table 5.1 shows the themes and sub-themes identified from the analysis of the transcripts.

Table 5.1: Identified themes and sub-themes

Themes			
The need to apply analytical procedures	The application of analytical procedures in the audit process	Changes in the application of analytical procedures	The advantages of and challenges in the application of analytical procedures
Sub-themes			
- General need	- Planning phase - Fieldwork phase - Completion, evaluation and reporting phase - Extent of use - Types of analytical procedures - Investigation of differences	- General change - Risk-based audit methodologies - IT - Non-financial information	- Advantages - Challenges

Fifteen audit managers participated in this study. The motivation for targeting audit managers as participants in the study was explained in chapter 4 (see section 4.4.2.1(ii)). Participants who had met all of the following criteria were included in the study:

- the participant had to be a chartered accountant;

- the participant had to be a senior audit manager;
- the participant had to have more than seven years' auditing experience; and
- the participant had to be actively involved in all phases of the audit process.

Table 5.2 presents the selected cases, number of selected practices and participants and references used for participants.

Table 5.2: Cases for the study

Cases for the study	Selected practices	Total number of participants	References used for participants
Case 1: Big 4 audit firms	4	8	P3, P4, P5, P6, P7, P8, P9, P10
Case 2: Second-tier audit firms	3	4	P2, P11, P12, P16
Case 3: AGSA	1	3	P13, P14, P15

The findings of the study are presented per the individual cases as shown in table 5.2, and are in accordance with the themes and sub-themes presented in table 5.1. This is followed by a cross-case analysis.

5.3 RESEARCH FINDINGS – CASE 1: BIG 4 AUDIT FIRMS

5.3.1 The need to apply analytical procedures

5.3.1.1 General need

When asked why one needs to apply analytical procedures, Big 4 audit firm participants indicated that there is a need to perform analytical procedures because it is a requirement of ISA 520, *Analytical Procedures* (IAASB 2014m:ISA 520). One of the Big 4 audit firm participants explained this as follows: *"It is what the ISAs require from us. We must perform analytical procedures; different phases of the audit have different requirements"* **(P8:1, 9:9).**

In addition to the above, all Big 4 audit firm participants identified the need to perform analytical procedures, as it is done not only to meet regulators'

expectations, but because they can also add value to the audit and promote audit quality. One Big 4 audit firm participant described this need as follows: *"It is the way to audit … Regulators want it, clients want it and it makes sense. It is the only way, in my view that you can do a cost-effective quality audit*" **(P3:57, 106:106)**.

All Big 4 audit firm participants also perceived analytical procedures to direct audit work, providing the auditor with a holistic view of the entity's information. This was highlighted in the following two statements made by Big 4 audit firm participants:

"Someone once made the comparison that it is as if you are in a dark room and you switch on a flashlight, switching it on and off a few times, that is sampling. Analytical procedures is to switch the light on in the room and to choose where you want to look. It just makes more sense" **(P3:2, 10:10)**.

"… it is to get that holistic view. It is to get a picture of what happened at the entity or the business or at your audit client for a specific period of time" **(P4:1, 8:8)**.

According to three of the Big 4 audit firm participants, analytical procedures are comforting for the auditor, which one of them described as a "*warm and fuzzy feeling*" **(P4:1, 8:8)**.

Other Big 4 audit firm participants described the need for the performance of analytical procedures as twofold, stating that these procedures could be used for the identification of risks and areas that the auditor should focus attention on and to provide him or her with audit assurance. This was evident in the following quotation: *"We generally perform analytical procedures to identify risks or to provide us with sufficient and appropriate audit evidence to conclude on certain financial statement captions"* **(P7:1, 15:15)**. Another Big 4 audit firm participant viewed the performance of analytical procedures as *"a very smart method of gathering audit evidence"* **(P3:2, 10:10),** thereby alluding to the impact of these procedures on the cost effectiveness of an audit.

5.3.1.2 Summary of the need to apply analytical procedures

From the above it is clear that Big 4 audit firm participants performed analytical procedures not only because this is an ISA (IAASB 2014m:ISA 520) requirement, but also because it has the ability to add value to the audit and could promote audit quality. Big 4 audit firm participants perceived analytical procedures to add value to the audit process as the performance thereof enables the auditor to see the whole of the organisation and provides information that can be used to direct the audit. Furthermore, it is extremely comforting for the auditor because it can be used for the identification of risks and is deemed to be a cost-effective method to collect audit evidence.

5.3.2 The application of analytical procedures in the audit process

5.3.2.1 Planning phase

(i) General

There was general consensus among Big 4 audit firm participants that the main purpose of analytical procedures during the planning phase of an audit is to direct the auditor's attention to areas of risk. This was evident in the following views expressed by two Big 4 audit firm participants:

"During the planning phase we do risk assessment to identify if there are any specific balances, financial statement line items that we need to focus on that are outside our expectations" **(P4:2 10:10)**.

"As part of your planning you would use it to identify areas that you would possibly need to focus on. So it's sort of taking a high volume of information and by using trend analysis or ratio's you are able to identify the areas that you maybe need to focus on" **(P6:3, 9:9)**.

Big 4 audit firm participants in general perceived the effectiveness of analytical procedures as risk assessment procedures to be dependent on the auditor's knowledge of the client; the better one's knowledge of the client, the more precise

one's expectation. Their beliefs were expressed as follows by one Big 4 audit firm participant: *"The goal is to tell us where the risk will lie or what has changed in the business. So I think with preliminary analytical procedures we are relying a lot on our understanding of the business and what we expect to see"* **(P8:4, 15:15)**. One Big 4 audit firm participant emphasised the importance of not only incorporating knowledge of one's client, but also knowledge of the industry in developing an expectation. This participant described it as follows: "*As part of our risk assessment we'll look at the external factors like what the industry is doing. What happened to the customers? Look at the economy. So based on the information we get there, we take it into account doing our analytical procedures"* **(P9:54, 233:233)**.

One Big 4 audit firm participant perceived analytical procedures during the planning phase to be critical audit procedures in the audit, stating that *"… it drives the whole audit process going forward, so I mean by not doing it properly you're potentially sending your whole audit in the wrong direction"* **(P6:20, 41:41)**.

Three of the Big 4 audit firm participants were of the opinion that analytical procedures at the planning phase are not performed in too much detail because their objective is to provide the auditor with an overview of the financial statements. One of these participants described this as follows: *"During planning phase we are doing it at a very high level, financial statement level basically*" **(P5:4, 10:10)**.

On the basis of the above discussion, analytical procedures can be described as a *"risk assessment tool"* **(P9:1, 8:8)** because it focuses the auditor's attention on areas of risk. However, the auditor's ability to use it effectively is dependent on his or her knowledge of the client and of the industry. Analytical procedures during the planning phase have the ability to direct the audit and are performed at a high level as the goal is to obtain an overview of the financial results.

(ii) Performance and review

When Big 4 audit firm participants were asked who is mainly responsible for the performance and review of analytical procedures during the planning phase, they

indicated that the audit senior (who is generally a third-year audit trainee, or manager for listed clients), is responsible for performing the analytical procedures during this phase, and that the audit work is reviewed by both the audit manager and engagement partner. This was evident in the following two statements made by Big 4 audit firm participants:

"In the planning phase the auditor in charge (third-year trainee) will always do the preliminary analytical procedures and then the manager will definitely review it. And then the partner will also review it" **(P9:40, 138:143)**.

"Planning usually gets done by your third year. Because they have a bit of experience on the client, they understand the client; they understand the environment so the figures start to make sense to them. On bigger clients, on some of our listed entities the manager will do it. So it is done on a relatively high level. I think because it is of such importance for the rest of the audit process in your planning phase" **(P8:37, 52:52)**.

The above statements emphasise the importance of analytical procedures during the planning phase as they indicate that analytical procedures in this phase are mostly performed by senior members of the audit team who have experience and knowledge of the client, and the work is reviewed by managers or partners. These findings demonstrate that the more complex the client and the financial statements (as in the case of listed clients), the higher the level of experience that is required from the person responsible for performing analytical procedures during the planning phase of the audit.

(iii) Techniques or methods

From the views expressed, it is evident that Big 4 audit firm participants performed mostly comparisons as analytical procedures during the planning phase of the audit. Two of the Big 4 audit firm participants explained this as follows:

"You actually just compare this year with previous years as a starting point and then you can obviously go in more detail but I think if you go into more detail you move into your fieldwork phase" **(P5:5, 10:10)**.

"Planning phase we look at movements between prior year and current year of certain account balances of certain financial captions and we understand personally why those movements are the case of either increase or decrease" **(P7:4, 19:19)**.

Three of the Big 4 audit firm participants mentioned that in addition to comparisons, they also performed ratio analysis for their going concern assessment in the planning phase. One Big 4 audit firm participant, for example, stated the following: *"We also do identification of liquidity and solvency issues"* **(P7:6, 19:19)**.

The above quotations demonstrate that analytical procedures during the planning phase consist mostly of comparisons and ratio analysis. As these procedures were done on account balances and not on detail records, this suggests that Big 4 audit firm participants preferred to use aggregated data for applying analytical procedures during the planning phase. One Big 4 audit firm participant, however, disagreed, stating that technology makes it possible to have access to all of one's clients' data which enables one to perform more detailed and precise analytical procedures in the planning phase than before. This participant emphasised the importance of using audit support systems for the identification of risks during the planning phase as follows:

"With the historical analytical procedures you ask for, can I get the sales amount per month, and you put it in excel or make a chart, then you see that you have a spike, then you will say I see it. Now we get the whole sales ledger, the tool itself make the chart, we see a spike, press the button, drill down. Now you see it for every day of the month. Now you see oh, it was in the last week, here's a transaction on a Saturday, now your question is much more different. In the past you asked why there is a spike and now you ask why someone posted a transaction on a Saturday. On this day, on the 27th. So it is much more specific

because you have the data, you can drill down. With historical analytical procedures those data were flat, it is 12 months, and you can do nothing with it" **(P3:34, 49:52)**.

From the above discussion it appears that Big 4 audit firm participants preferred the use of simple techniques such as comparisons and ratio analysis during the planning phase. One Big 4 audit firm participant had a more contemporary view, acknowledging that the use of audit support systems and disaggregated data could enable the auditor to perform more sophisticated analytical procedures during the planning phase of an audit, which would result in a deeper understanding of the client's transactions or events for a period.

(iv) Summary

Based on the views expressed by Big 4 audit firm participants, analytical procedures were performed during the planning phase to direct the audit by identifying risk areas. Analytical procedures were thus performed at a high level to obtain an overview of the financial results. Since knowledge of the client and industry is needed, mainly senior staff members assume the responsibility and partners review such work. Although simple techniques (comparisons and ratio analysis) were used, the use of audit support systems and disaggregated data was mentioned.

5.3.2.2 Fieldwork phase

(i) General

Most Big 4 audit firm participants viewed analytical procedures valuable as a starting point for detailed substantive testing. This was confirmed by the following statement of one Big 4 audit firm participant: "*If you go from substantive analytical procedures, you see how much assurance you have and you top it up with key items which could be the outcome of your analytical procedures based on risks or materiality. And then residual evidence from a random sample if you really feel you must*" **(P3:7, 20:20)**. This participant was of opinion that the mindset should change as the auditor needs "*to go from the top down rather than from sampling up and to use the analytical procedures as a closing, as a summary, a sense*

check" **(P3:7, 20:20)**. It would seem that this "top down" approach was incorporated into audit software, as one Big 4 audit firm participant stated: *"we have a tool to select our samples for tests of details. And we are currently using a tool call IDEA and the parameters in this tool ask you 'have you obtained any other audit evidence from any other substantive work performed?', and if you say yes, it gives you a smaller sample size"* **(P7:19, 49:49)**.

Concurring with the aforementioned participants, other Big 4 audit firm participants suggested that analytical procedures can be valuable as a starting point for substantive procedures as they enable the auditor to test the whole population, they are efficient because the focus is on exceptions and they are a source of much comfort for the auditor. This view was evident in the following quotations:

"I just go back to my contribution example, we test the inputs into the system to make sure that the capturing was done accurately and then we do the analytic and that is kind of where we draw the line … and you have comfort over the inputs that you are doing your own independent recalculation and then compare the result, what more do you want to do because you can go test a thousand application forms, it is not going to give you the same level of comfort as what you have already achieved with this analytic" **(P4:18, 20:20)**.

"What I personally love is when we do sampling; let's take benefit testing on a pension fund. If you must draw a sample of say 50 items it gives you no value to select it randomly. I will rather do an analytic first and select those 50 items that looked a little funny, you know … So it depends on what type of tests you are doing or what line item you are testing, but I like to focus on exception reporting" **(P5:25, 37:37)**.

Big 4 audit firm participants generally described analytical procedures in the fieldwork phase as "*predictive analytics*" **(P7:7, 23:25)** making reference to the four components in the performance of substantive analytical procedures, namely the development of an expectation, the establishment of a tolerable difference, a comparison of the expectation to the recorded amount and an investigation of

any differences greater than the tolerable difference. These components were discussed in section 3.5.2 of chapter 3. Two of the Big 4 audit firm participants explained their use of predictive analytics as follows:

"… you will create an expectation based on the number of employees which has been detail tested and then we also create a threshold, we calculate a threshold and if the difference is within the threshold we will accept otherwise we have to go investigate" **(P9:13, 18:18)**.

"So we sort of develop an expectation of what the balance or the amount for that account should be and then we actually compare it to what actually is recorded and then depending on the result or the difference we either follow up or conclude or take it further" **(P7:7, 25:25)**.

One of the Big 4 audit firm participants emphasised the importance of following all four steps in the analytical process and cautioned that if all four steps are not followed, the auditor will not be able to rely on the outcome of the analytical procedure: *"At its simplest form, we can get many of our audit evidence from analytical procedures, but you should do it properly, you should be able to create an expectation, you must have a variance threshold, you must be able to quantify it or else it will not give you audit evidence. You need to identify an exception and follow up on it, and if you cannot do all these steps, then you have substandard audit evidence"* **(P3:18, 30:30)**.

In general, the Big 4 audit firm participants maintained that the auditor cannot develop a precise expectation if one cannot place reliance on the information that is used to create the exception. One Big 4 audit firm participant explained this as follows: *"go and test that underlying month that you are using as your base on a detailed testing base. And also go and test, because I mean there is usually a variable which says okay but this year this changed or this has changed. That variable should also be tested very carefully and detailed testing should be done on that variable"* **(P8:13, 22:22)**. Another Big 4 audit firm participant believed that an in-depth knowledge of the business is needed to form a precise expectation.

This participant had the following to say in this regard: "*it can only make sense if you can add your knowledge of the business*" **(P3:15, 30:30)**.

There was general consensus among Big 4 audit firm participants that analytical procedures cannot be performed on all financial statement items. According to one participant, *"it depends on the nature of the line items"* **(P5:12, 16:16),** while another posited that analytical procedures could only be performed on accounts that "*lend it to prediction*" **(P8:10, 21:21)**. The same participant mentioned that *"it also depends on the information that the client is having"* **(P8:48, 73:73)**.

Some Big 4 audit firm participants suggested that substantive analytical procedures are more effective on statement of profit and loss and other comprehensive income accounts than on financial posistion accounts. One of these participants explained this as follows: "*but in general I would say it is more income statement*[1] *balances that we would test with analytical reviews. A balance sheet*[2] *is at the end of the year. So to do an analytical review from last year to this year, it is not really, it is not meaningful. It is more on the income statement''* **(P8:12, 22:22)**. Another Big 4 audit firm participant believed that analytical procedures could also be applied for substantive procedures on transactions of financial posistion accounts: *"So the standard ones [analytical procedures] that we do is generally on the transactions, not the balances but I have seen analytics being performed on balances, so it's not unusual, it is just less frequent than on the transactions"* **(P7:8, 27:27)**.

Big 4 audit firm participants did, however, cautioned that the auditor should not look at the statement of profit or loss and other comprehensive income accounts in isolation as the statement of financial position account can provide valuable audit evidence on the reasonability of the statement of profit and loss and other comprehensive income account. This was noted in the following statement of one Big 4 audit firm participant: *"If you are doing an analytic on an income statement account trace it back and tie it to the balance sheet, because if there was an error or if there was something then for instance in our contributions even if the*

[1] Also referred to as a statement of profit or loss and other comprehensive income (International Accounting Standards Board (IASB) 2014:IAS 1).
[2] Also referred to as a statement of financial position (IASB 2014:IAS1).

analytic proof that you can place high reliance on it, but your outstanding receivable balance is growing or there is a lot of unallocated receipts, then you would know but there is another area that we need to perform additional work on. So I think it is also making sure you understand how your transactions are affected" **(P4:19, 22:22)**. Another Big 4 audit firm participant concurred with the aforementioned participant by stating that *"sometimes when you know what happened on the balance sheet, then you know the income sheet explanation doesn't make sense because you have the bigger picture"* **(P8:17, 26:26)**.

Some of the Big 4 audit firm participants revealed that the more disaggregated the data is, the more effective the analytical procedure will be. One participant explained this as follows: *"So you need to assess how do you want to unpack the information and how far you can actually break it down to provide you with the best answer you can have"* **(P4:68, 84:84)**.

From the above it can be concluded that most Big 4 audit firm participants considered analytical procedures during the fieldwork phase as an effective starting point to obtain audit evidence. The outcome of the analytical procedures and the amount of assurance that the auditor gains from it can be used to determine the extent of tests of details. Most of these participants perceived this as a "top-down" approach, from the balance to the underlying transactions which could be far more comforting for the auditor because the whole population is tested efficiently by focusing on exceptions. Audit software could be used in this regard. Analytical procedures during this phase were used to predict a balance and Big 4 audit firm participants emphasised the importance of testing the underlying assumptions (based on knowledge of the business) and using disaggregated data to develop these predictions. There was general consensus among Big 4 audit firm participants that care should be taken to follow all four components for the performance of substantive analytical procedures (see section 3.5.2 in chapter 3). Although Big 4 audit firm participants generally perceived analytical procedures to be effective as the performance thereof enables the auditor to test the whole population, their application would depend on whether the nature of the line items lends itself to prediction. They also believed that although analytical procedures are being performed more on the

statement of profit and loss and other comprehensive income balances than on statement of financial posistion balances, one should not look at the profit and loss and other comprehensive income accounts in isolation and should consider them in the context of the financial statements as a whole.

(ii) Performance and review

In general, Big 4 audit firm participants suggested that the performance and review of analytical procedures during the fieldwork phase could be performed by any member of the audit team. However, they suggested that the allocation of these responsibilities would depend on the auditor's risk assessment. If a high-risk account is involved, more experienced team members would be responsible for analytical procedures. One of these participants stated the following: *"Fieldwork depends on who works on the section. So it could be any one in the audit team who does the fieldwork and review also. So if a first-year does the work, a third-year can review his work. It also depends on the risk. If it is a high risk area the partner will look at the results but if it's something easy and simple and very straight forward I think anyone can do it"* **(P5:22, 33:33)**.

Some Big 4 audit firm participants cautioned that the performance of analytical procedures by lower-level staff requires a lot of guidance from a manager. One participant commented as follows: *"Field work is every trainee on the job. So if the section allocated to you requires analytical you will perform that analytical. Obviously with guidance, from the "in charge" or the third year or the supervisor or the manager. Especially when it's a first year or a second year, at the beginning of their second year. They don't always know the purpose of analyticals or how to use their professional judgement"* **(P7:23, 69:69)**.

Owing to the need for expert competence, one Big 4 audit firm participant acknowledged the value of using IT experts as part of fieldwork testing by stating that *"but on the fieldwork phase, I mean there are a number of people that are involved there. It is the audit team and then also the IT audit team is also involved because a lot of the time they need to pull independent data that we can use then to base our analytics on"* **(P4:14, 16:16)**.

From the above it is clear that the performance of analytical procedures during the fieldwork phase could be performed by any member of the audit team. The allocation of such responsibilities depends on the auditor's risk assessment. The involvement of lower-level staff in the performance of analytical procedures requires guidance from those with more experience because lower-level staff might lack the necessary skills to perform analytical procedures and exercise the required levels of professional judgement. The IT experts could provide valuable data for the performance of substantive analytical procedures.

(iii) Techniques or methods

As discussed earlier, in general, Big 4 audit firm participants believed that analytical procedures are most effective for accounts that lend themselves to prediction. Typical accounts that participants mentioned were employment costs, interest income, interest expense, rental expenses revenue, cost of sales and Value-Added Tax (VAT). One Big 4 audit firm participant summarised this as follows: *"Payroll lends itself to analytical procedures. VAT testing also actually, because it is an effective test; let's get an expectation of what VAT should be rather than doing VAT detailed testing. Revenue at a lot of clients, especially I do a lot of retail clients. So in a retail environment an analytical procedure on revenue makes sense. Because you have products that you sell, a sales price, you know a margin. So it lends it to prediction"* **(P8:10, 21:21)**.

Some Big 4 audit firm participants also perceived audit software as being valuable for creating an expectation. This was substantiated by the following view expressed by one Big 4 audit firm participant: "*One nice tool that we have, they call it STAR. That's when you actually predict either sales based on cost of sales or cost of sales based on sales … It's literally a regression analysis where it spits out all the coefficients and all of that"* **(P9:38, 116:116)**.

One of the Big 4 audit firm participants referred to his or her firm's use of audit software which enabled the auditor to test not only individual accounts but also an entire business cycle. This participant described how the firm used the audit software as follows: *"So you expect that in sales you have a certain pattern, so what of your sales does not come from bank or debtors. We can match invoice for invoice that you have a sale to a debtor and a debtor to bank. It is a three way*

match and you can see what sales you did not receive cash for at the end of the day. So it gives you much more assurance on the occurrence of the sale because someone paid you for that stuff" **(P3:28, 44:45)**. This participant went on to explain that the auditor could then consider the inventory being sold: "*for every sales transaction there is a cost of sales transaction, there is a transaction to inventory, you buy inventory so it goes to purchases and purchases goes to the bank. An entire business cycle. With data analysis we can connect all these points"* **(P3:28, 44:45)**.

From the above it can be concluded that, in general, Big 4 audit firm participants preferred to perform analytical procedures on accounts that lend themselves to prediction such as employment costs, interest income and expenses, rental expenses, revenue, costs of sales and VAT. These accounts mainly relate to statement of profit and loss and other comprehensive income accounts. The use of audit software makes it possible to perform sophisticated regression analysis and to test all the transactions in an entire business cycle.

(iv) Summary

According to Big 4 audit firm participants, analytical procedures during the fieldwork phase of the audit were used as starting point for detailed testing. By following a "top-down" approach from the balance to underlying transactions, audit procedures could be effective by focusing on exceptions. In general, Big 4 audit firm participants supported following all four components in the application of substantive analytical procedures. For these participants, analytical procedures are used to predict a balance, and therefore not all line items are conducive to prediction because it depends on the underlying assumptions and the availability of disaggregated data. It would appear that analytical procedures during this phase were used more on statement of profit and loss and other comprehensive income balances than those of the statement of financial prosition, and audit software was applied for more sophisticated procedures. All audit team members conducted these procedures, but for high-risk areas, more experienced staff were used. Junior staff were given guidance in performing analytical procedures and exercising their professional judgement. Some Big 4 audit firm participants mentioned the assistance obtained from IT experts in relation to data preparation.

5.3.2.3 Conclusion, evaluation and reporting phase

(i) General

In general, Big 4 audit firm participants indicated that analytical procedures during the conclusion, evaluation and reporting phase were performed to obtain an overall view of the financial statements. One of the Big 4 audit firm participants described this as follows: *"So the completion has an overall analytical review. We put all the different pieces in together and see if it makes sense overall"* **(P3:19, 34:34)**. Another Big 4 audit firm participant had the following to say about this: *"There you just step back and you look at it from a financial statement perspective, does it seem reasonable"* **(P5:9, 12:14)**.

Most Big 4 audit firm participants regarded the purpose of analytical procedures during the conclusion phase as being similar to the purpose of analytical procedures during the planning phase. During both phases, analytical procedures were done at a high level. One of these participants explained this as follows: *"In the completion phase of the audit, we generally confirm either what we've assessed in the planning phase, so we reconfirm that, or if something has changed we then document based on our actual field work what has changed and that's high level, an overview of what actually happened during the year"* **(P7:10, 31:31)**. Another participant concurred with this view and regarded analytical procedures during this phase as being performed at *"a very-very high level"* **(P8:30, 44:44)**.

According to three of the Big 4 audit firm participants, analytical procedures in this phase are also performed to conclude the initial assessment of the entity's going concern. As one Big 4 audit firm participant explained: *"and again final ratio analysis you can do to again address your going concern"* **(P9:32, 90:90)**.

From the above it can be concluded that Big 4 audit firm participants regarded the objective of analytical procedures during the conclusion phase to be similar to that of the planning phase. Similar to the planning phase, analytical procedures are also performed at a high level, and this enables the auditor to obtain an

overview and to assess the reasonableness of the entities financial statements. Most Big 4 audit firm participants viewed analytical procedures during this phase of the audit as being conducive to concluding on the initial assessment of the entity's going concern.

(ii) Performance and review

There was general consensus among Big 4 audit firm participants that in the conclusion phase, analytical procedures are usually performed and reviewed by the members of the audit team with the most experience and knowledge of the client. One of these participants explained this as follows: *"Completion phase I think is partner level, not do, but review. The manager does it and the partner reviews it. Seniors can do it but if it is at the end of your audit where you use your judgement about the overall, all over your audit process and the results. So I will say partners. They are the ones that sign off anyway"* **(P5:23, 35:35)**. Another Big 4 audit firm participant had the following to say: *"So, the more senior people for the prelim and concluding one"* **(P9:42, 152:152)**.

The discussion demonstrated that the performance and review of analytical procedures during the conclusion phase were being performed by those members of the audit team with the most experience and knowledge of the client, enabling them to exercise judgement. These were mainly partners and more senior managers.

(iii) Techniques or methods

In general, Big 4 audit firm participants indicated that during the conclusion phase, they mostly performed an analysis to reassess the reasonableness of the movements from last year to this year. According to one of these participants, *"during the completion phase we look … your financials again to see whether the result of your audit makes sense given what you have done, did your audit differences that you've identified, that they've corrected, you know, does the movements now make sense in terms of what you've done"* **(P6:9, 21:21)**. All Big 4 audit firm participants mentioned the use of ratios during this phase of an audit, while one of them explained that they used *"a combination of movement analysis and ratios"* **(P7:11, 33:33)** during the final phase of the audit.

From the above it is clear that the application of analytical procedures during the conclusion, evaluation and reporting phase involved the use of simple techniques such as comparisons and ratio analysis which were combined to consider the overall impact of audit differences and adjustments.

(iv) Summary

Big 4 audit firm participants perceived the objective of analytical procedures in the conclusion, evaluation and reporting phase of the audit to obtain an overview and to assess the reasonableness of the financial statements. As during the planning phase, they mostly applied comparisons and ratio analysis at a high level. Most of these participants believed that the performance of analytical procedures during this phase of an audit helped them to conclude on the initial assessment of the entity's going concern. These were mainly performed by experienced audit team members and were reviewed by partners because of their knowledge of the client, which enabled them to exercise judgement.

5.3.2.4 The extent of use of analytical procedures

All Big 4 audit firm participants mentioned various internal and external factors that had an effect on the extent to which the auditor can use analytical procedures. Six of them were of opinion that the auditor's risk assessment is the main determinant of the extent to which analytical procedures could be used. This view was evident in the following statement made by one of these participants:

"if you're sitting with a low risk, you're looking at an account balance where there is a low risk of misstatement, there's no fraud risk then potentially an analytical [procedure] is the only thing that you need to do, if you're sitting with a high risk, fraud risk area then you will have to do additional procedures but then you can use the analytical as a starting point maybe to identify, the items that you need to focus on, to identify unusual items or where you sort of break it down to see ok this is the area that you need to focus on" **(P6:12, 27:27)**.

Another factor that influenced the extent of the use of analytical procedures identified by some of the Big 4 audit firm participants was the strength of a client's internal control system and control environment. These participants reported that they were more inclined to increase the use of analytical procedures in an environment where control systems are strong.

"I think you firstly decide how much comfort you got from your control testing. So if you have little comfort, you will do more analytical and detail testing. If you have a lot of comfort from your control environment you will limit your analytics. It also depends on what line item you're doing. So if you can get comfort, it is obviously less work to go analytical than detail testing. So if you can get the same comfort level with analytics than with substantive then rather go full analytical. So I think it drives it" **(P5:19, 25:25)**.

The above views of Big 4 audit firm participants are indicative of the bucket approach used by some of them, whereby a combination of tests is performed (tests of controls, detailed substantive tests and substantive analytical procedures) to audit an assertion of an account balance or disclosure. The size of the bucket increases as more risks are revealed through the audit and if the bucket grows in size, more audit procedures are required.

Another factor identified by some Big 4 audit firm participants to determine the extent of their use of analytical procedures was their dependence on the availability, quality and reliability of the client's data. According to one of these participants, *"having an understanding of the data that's available and how reliable it is and whether it's possible to identify the right drivers"* **(P6:11, 25:25)** was necessary to determine the extent of analytical procedures**.** Another participant made the point that *"the better your data is, the better you can disaggregate … the better your audit evidence"* **(P3:21, 36:36)**.

Some Big 4 audit firm participants suggested that it was not only the availability of the client's data, but also the sophistication of the client's record-keeping and internal control as well as the size of the client that had an impact on the extent to which the auditor could perform analytical procedures. Larger clients have more

sophisticated systems which make the performance of analytical procedures easier. This argument was evident in the following words of one of these participants: *"Yes, I think if the data leans towards it, is the information there, but also I think in a way, how sophisticated the client is. If they can give you the correct inputs to do the analytical reviews, because you get some of the smaller clients who don't have an idea"* **(P8:33, 48:48)**.

Another Big 4 audit firm participant posited that the extent of use of analytical procedures was not only dependent on the sophistication of client's systems, but also on the sophistication of the audit support software that the auditor has available as well as the auditor's skill set to utilise the audit support software. He/she explained this as follows: *"It has very much to do with once again the complexity of the client, or the data analysis that you use, the tools that you have available and whether you can form an expectation and identify and expectation"* **(P3:9, 20:20)**.

The availability of external data to support the auditor's expectations also had an influence on the extent to which an auditor could perform analytical procedures. This was evident in the following statement from one Big 4 audit firm participant: *"it depends of course on, like benchmarks, how independent it is, what you measure it against, whether it is client data or external data that you use"* **(P5:17, 23:23)**.

Two of the Big 4 audit firm participants perceived the extent of use of analytical procedures as a matter of judgement, largely decided on by the partners. One of these participants explained this as follows: *"But if our risk of material misstatement is let's say high we'd either not do substantive analyticals, we'd rather do test of details or a combination of substantive analyticals and tests of details. But I think the essential thing here is that the extent is a judgement call, professional judgement by the partner but that's the way we decide on how much to do"* **(P7:13, 37:37)**.

The above discussion described the internal and external factors that Big 4 audit firm participants perceived to have an effect on the extent of use of analytical

procedures. It indicated that the auditor's risk assessment was the main determinant in the decision on the extent of analytical procedures. Other factors included the strength of the client's internal controls and control environment, the availability, quality and reliability of client's data as well as the sophistication of the client's record-keeping and internal control systems and the audit support software available to the auditor and his or her competence in the use such software as well as the availability of external data sources. Irrespective of these internal and external factors, the extent of use remains a judgement call which was mostly exercised by the audit partners.

5.3.2.5 Types of analytical procedures

The types of analytical procedures that Big 4 audit firm participants used during the different phases of the audit process were dealt with in the discussions on the planning (section 5.3.2.1 (iii)), fieldwork (section 5.3.2.2 (iii)) and conclusion, evaluation and reporting (section 5.3.2.3 (iii)) phases. The discussion below addresses the factors that influence the auditor's decision on what type of analytical procedures to perform.

When asked how they decide on the types of analytical procedures to be applied, Big 4 audit firm participants identified various factors that they considered. The following views expressed by a number of these participants indicated these factors:

"So it really depends on what software is available, what data are available and what your objective is with what you are doing" **(P3:42, 68:68)** and *"you should really understand the risk that you are auditing. If you do not understand the risk you are not going to get the procedure that fit with it"* **(P3:43, 68:68)**.

"So I think there is a lot of judgement involved and it also depends on the information or how you can unpack the information and how far you can unpack the information" **(P4:23, 25:25)**.

"I think it depends firstly of what information you have available and what you can get from the client, what type of data you can get, the format of reports, Whether you can bring in IT and do more or less and the comfort that you wants from it. And then I suppose client expectations also. If you can easily add value to the audit process with analytics and bring in IT" **(P5:24, 37:37)**.

The above quotations indicate that the types of analytical procedures were largely dependent on the objective of the audit procedure, the need for IT, the availability and quality of the data, the format of the data, the auditor's risk assessment and the clients' expectations. These factors were similar to the factors mentioned by participants when deciding on the extent of use of analytical procedures (see section 5.3.2.4). Some Big 4 audit firm participants alluded to the judgement needed to decide on the types of analytical procedures.

5.3.2.6 Investigation of differences

There was general consensus among Big 4 audit firm participants that the starting point for the investigation of differences between the auditor's expectation and management's reported amounts was to refine the assumptions used in the development of the auditor's expectation.

One of these participants explained this as follows: *"perhaps you should refine your expectation or maybe your expectation was wrong and you should get new information to adjust your expectation and then you are okay"* **(P3:63, 110:110)**. Another participant emphasised the sensitivity of analytical procedures by stating that *"the next step is to then refine those factors carefully because lots of these analytical procedures are very sensitive. I mean you change something with a half percent and you get a huge change. So are we really focused fine enough, are our factors accurate enough?"* **(P8:65, 128:128)**.

When asked how one refines one's expectations, one Big 4 audit firm participant responded as follows: *"I think you'll start with questions from the client but you cannot stop at queries, you will have to substantiate"* **(P5:50, 78:78)**. Another of these participants provided a practical example by referring to a month-on-month

analysis of employment cost. He/she mentioned that during the analysis, the auditor would identify an outlier and would then have to further investigate the occurrence of such an outlier by obtaining corroborative evidence. This participant mentioned the occurrence of a bonus payment in his/her example of employment costs: *"If there was a bonus payment, show me [as auditor] the bonus approval, show me on the pay slips where the payments were actually made, how it was decided who gets what or those kind of additional audit procedures"* **(P4:44, 47:47)**.

All Big 4 audit firm participants acknowledged that judgement would be required in deciding on the treatment of a difference between the auditor's expectation and the reported amount. According to one of these participants, it depends *"on firstly the level of audit comfort that you want and secondly your level of materiality"* **(P4:55, 65:65)**. Another participant alluded to the impact of such a judgement call by stating the following *"Take a VAT reasonability test. How close do you need to be? Take 14.9% is that close enough. Take 14.5%, [or] 15%. I do not know. On some clients that point five percent are millions and on some clients that point five percent is immaterial"* **(P3:56, 104:104)**.

When Big 4 audit firm participants were asked which parties provided explanations for differences, they indicated that in most instances such explanations were obtained from the person responsible for that particular account balance or division. For example, according to one of these participants, *"it would be the person that monitors that section because they would have an understanding of a bigger picture"* **(P6:39, 111:111)**.

According to some of the Big 4 audit firm participants, their discussions with non-financial staff members at the client revealed explanations for differences. Some of these participants were more sceptical about the answers provided by financial staff members of clients as they perceived their answers to be *"sugarcoated versions"* **(P4:46, 53:53)**. One Big 4 audit firm participant explained this as follows: *"A lot of times, the operational people, especially on analytical reviews, the people who don't have anything to do with finance, because finance always have a story. The operational guy can tell you that month the machine didn't*

work, so our production was down or there was no production. And they don't have an ulterior motive if they give you an answer" **(P8:67, 131:131)**. Another participant agreed by stating that he/she entered into discussions with the client's internal auditors "*because they are independent or they are supposed to be independent from management or what is happening at the client. So a lot of the time we have discussions with them … A lot of the time they are also chartered accountants, they have been through the audit process"* **(P4:46, 51:51)**. He/she, however, emphasised the importance of involving clients' staff members from various backgrounds in other divisions of the business "*because that is actually where you get the information as to what happened and the reasons why''* **(P4:46, 51:51)**.

From the above it is clear that for Big 4 audit firm participants, the investigation process for differences in analytical procedures usually started with the refinement of assumptions used in the development of the auditor's expectations. These participants refined these expectations through enquiries from management and obtaining corroborating evidence for their explanations. The participants acknowledged that they have to exercise judgement in deciding on the differences they could tolerate. Some Big 4 audit firm participants perceived explanations from financial personnel to be "sugar coated" as they always have an answer ready and acknowledged the value of engaging with internal auditors and non-financial personnel to obtain corroborative explanations for differences between their expectations and the reported amounts.

5.3.2.7 Summary of the application of analytical procedures in the audit process

From the discussion in the above sections it is clear that Big 4 audit firm participants applied analytical procedures in all the phases of the audit process. These participants applied analytical procedures during the planning phase to identify areas of risks and to direct the further audit procedures. In the fieldwork phase, analytical procedures were used by Big 4 audit firm participants as a starting point for detailed testing because it is effective for the prediction of a balance. The objective of analytical procedures during the conclusion phase, as

perceived by Big 4 audit firm participants was to obtain an overview and assess the reasonableness of the financial statements and to conclude on the auditor's initial assessment of the client as a going concern.

Analytical procedures during the planning and conclusion phases were mostly performed by experienced team members and reviewed by partners. During the fieldwork phase, analytical procedures were performed by all staff members, but junior staff required guidance in performing analytical procedures and exercising professional judgement. For high-risk items, more experienced staff members were used and IT experts were used in relation to data preparation.

The techniques or methods used as analytical procedures were similar in the planning and conclusion phases and consisted mainly of comparisons and ratio analysis. Analytical procedures during the fieldwork phase were mostly performed on statement of profit and loss and other comprehensive income balances rather than statement of financial position balances.

The discussion provided evidence that there are numerous internal and external factors that influence the auditor's decision on the extent of use of analytical procedures as well as the types of analytical procedures to be performed. The auditor's risk assessment was described as the main determinant in the decision on the extent of analytical procedures. Other factors considered included the strength of a client's internal control system and control environment, the availability, the quality and reliability of the client's data, the sophistication of the client's record-keeping and the availability of audit support software as well as the auditor's competence to use such tools. Auditor judgement remained a vital consideration.

The investigation process for differences between the auditor's expectations and management's representations usually started with enquiries to refine assumptions followed by corroboration of explanations. Big 4 audit firm participants generally obtained explanations from the client's financial staff (although their answers were treated with professional scepticism), internal auditors and non-financial staff members.

5.3.3 Changes in the application of analytical procedures

5.3.3.1 General change

(i) The use of analytical procedures in the past

There was general consensus among Big 4 audit firm participants that the application of analytical procedures had changed in recent years. The three participants with the most years of experience described their views on the change in the use of analytical procedures as follows:

"In the past it was a part of the standard that was easy. You decided on planning analytics or analytics that gives substantive evidence or an overall analytic procedure. You get the information, you create an expectation, you see what lies outside the expectation and you follow it up. Most of the time by talking with the client about what happened and to document it to corroborate it and to make a judgement call on is it acceptable or not. This is now changing to more, to get the data, do the analysis yourself and to ask more specific questions" **(P3:44, 70:70)**.

"And I think historically we have placed a lot of reliance on analytics but it was a flux analysis or a trend analysis and it doesn't give you the same level of comfort as it would do for instance in a 100% recalculation or those kind of analytics" **(P4:16, 18:18)**. *"I just remember when I started auditing, that was in 2004, you were just so happy if a client could give you something in excel. That was like this is absolutely amazing. Because a lot of the times you audited and you have stacks and stacks of those dot matrix papers, like printed stats of information and you had to capture all of what you had wanted by hand"* **(P4:16, 27:28)**.

"Ten years ago, you had to do everything by hand. I think approach wise, I think it goes through phases, first there was a lot of focus on planning analytics and less so in your fieldwork. I think currently there is less focus on the planning phase and also interesting, in our planning phase at a time, it was very focused on how you set your benchmarks in your planning phase, what data you use, how sure are you have the right data … So I guess, where the emphasis is in the audit process has changed. There is now more emphasis on the fieldwork phase of

analytics and we use it more because it becomes easier to use, I think" **(P5:30, 42:42)**.

From the above it is clear that analytical procedures have evolved over time into a more efficient audit procedure which has become easier to perform. In the past, they were mainly performed during the planning phase of an audit and consisted of simple techniques such as trend analysis. Some Big 4 audit firm participants believed analytical procedures were not a great source of comfort for the auditor.

(ii) The use of analytical procedures in the present

Nearly all Big 4 audit firm participants perceived advancements in IT such as the use of audit software, to have had the greatest impact on the current use of analytical procedures. One of these participants had the following to say about this: *"There are also easier tools available, I think with IT … it just makes it so much easier to put something in the computer and it gives you the answer"* **(P5:29, 42:42)**. These participants also felt that audit software enabled them to perform more sophisticated analytical procedures: *"So I think just the way it becomes easier for use and accessible, we'll start using it even more. To actually do like intelligent predictions and not just stupid ratios"* **(P9:52, 214:214)**.

Some Big 4 audit firm participants suggested that audit firms are currently investing more in the development of audit software to enable them to perform more analytical procedures. One of these participants explained this as follows: *"We are busy to develop them at the moment; it is a very big part of my job. We have been having software for years and we have many specialists in the firm writing queries on a data set. You can figure out anything in the world from a data set if you want. And we invest more and more in the tool part because you can get 100% of your population in it which is higher quality audit evidence than to do sampling for example"* **(P3:10, 24:24)**. Another participant perceived Big 4 audit firms to be currently competing against each other to determine who could add the most value by performing analytical procedures. According to him/her, "*I think the firm that in the end can do it the best, is the one that can add the most value"* **(P5:54, 88:88)**.

The perception of most Big 4 audit firm participants was that their clients expected them to perform analytical procedures. The views of these participants, namely that their clients perceived analytical procedures to be *"much more relevant"* **(P3:14, 28:28)** because their application afforded auditors an opportunity to *"give feedback on the performance of a company*" **(P10:1, 4:4),** substantiated this argument.

From the above it is clear that advancements in IT, specifically the development of audit software, have been responsible for the increase in the use of analytical procedures. This enables auditors to perform more sophisticated analytical procedures. It would appear from the views of Big 4 audit firm participants that these audit firms are investing a lot of money and resources in the development of software as they were of opinion that the firm that is the best positioned to perform analytical procedures would add the most value to the client and thereby ensure that clients' expectations are met.

(iii) The use of analytical procedures in the future

In general, Big 4 audit firm participants predicted that in future the use of analytical procedures, specifically data analysis, would increase significantly. Their predictions are reflected in the following views expressed by some of these participants:

"But in my personal opinion data analysis is the audit of the future" **(P3:77, 131:131)**.

"I think the future is analytical procedures, there is definitely a focus on it and we find that more and more of our clients want it" **(P5:54, 88:88)**.

"I believe the way we are auditing today will dramatically change, we will have mostly automated analytic and auditing applications where one will input our clients data and get results based on a pre-set of rules customised for our clients. Which will then enable us to focus more on the business of our clients and delivering a more quality audit" **(P10:9, 16:16)**.

"There is a drive towards using more and more data analytics" **(P6:14, 31:31)**.

Some Big 4 audit firm participants, however, cautioned that the increased application of analytical procedures in the future would not be without challenges: "*But there are a lot of risks to manage. Logistically, regulatory, litigation risk, standards, customers"* **(P3:77, 131:131)**.

There was agreement among some Big 4 audit firm participants that the increased application of analytical procedures would not happen overnight because both the audit team and the client would have to be receptive to the change and that would require increased competence. One of these participants explained this as follows: *"And I think that is a path you walk with the clients … So it is definitely not an overnight process, we are only going to do analytical reviews this year with data analytics. It is a process you have to work with for a while"* **(P8:29, 41:41)**.

Two of the Big 4 audit firm participants predicted that in future, control testing and substantive analytical procedures would be replaced by data analysis. He/she described in detail the fact that currently, the auditor considers whether a control works effectively to mitigate a risk. This is done by performing audit tests on the control. If in future, control testing is replaced by data analysis, then the auditor will have to determine by means of data analysis whether "*the risk did materialise in the transactions during the year"* **(P3:68, 114:114)**. This participant contended that it could be more effective because rather than "*look at a risk as what could go wrong, the data tells you what has gone wrong"* **(P3:71, 119:119)**. Another Big 4 audit firm participant concurred with this view stating that most systems have automated controls in place and by performing data analysis, instances where such controls are overridden could be identified.

From the above it is clear that Big 4 audit firm participants perceived analytical procedures, specifically data analysis, as the audit of the future. The application of these procedures, however, would pose challenges and would entail increased competence of the audit team and the client in order to become receptive to

change. Two of these participants predicted that in future, control testing and substantive analytical procedures would be replaced by data analysis.

(iv) Summary

Based on the views of Big 4 audit firm participants, the application of analytical procedures seem to have evolved over time. IT developments have made these tools more efficient and easier to apply and this has resulted in increased use. These participants reported that their firms were investing in the development of software for analytical procedures and they therefore predicted that data analysis would replace control testing and substantive analytical procedures and become the audit of the future. Some challenges, such as the need for increased competence of auditors and client staff, were identified and these are further considered in section 5.3.4.2.

5.3.3.2 Changes due to risk-based audit methodologies

In general, Big 4 audit firm participants were of the opinion that the implementation of risk-based audit methodologies has led to "*much more focused analytical procedures*" **(P8:55, 83:83)**. They perceived analytical procedures to be an extremely effective risk assessment tool because it "*shows immediately where there was a disconnect between data sets that are supposed to give you a correlation for a specific period of time*" **(P4:34, 37:37).** One of these participants regarded analytical procedures to be effective, not only for identification of risks, but also for the identification of fraud. Another participant supported the notion that analytical procedures were valuable for the identification of fraud: *"…. and it [analytical procedures] link well with fraud too. There is so much focus on fraud and to identify it. So this links nicely"* **(P5:37, 50:50)**.

A number of Big 4 audit firm participants indicated that the effectiveness of analytical procedures as a risk assessment procedure was dependent on the auditor's knowledge of the business and industry. One participant explained this as follows: *"So I think your knowledge of the industry and the environment is very important. Because it also gives you an idea of what you must expect of your client. If they say they are a going concern does it make sense? If they say*

revenue increased in the year, does it make sense with the environment that we are in? If you take into consideration the strikes do you actually expect that their revenue increased in the year?" **(P8:63, 115:115)**. Another participant concurred with this view by stating that analytical procedures only makes sense if one contextualises the results with one's knowledge of the business.

Building on the above argument about effectiveness, two Big 4 audit firm participants perceived analytical procedures to refine risk identification. They described them as cost effective because by using analytical procedures auditors could reduce their work. One participant explained this as follows: *"if you've got areas that's lower risk, often if you have a properly designed analytical procedure you would possibly be able to get sufficient audit evidence by just doing that, where in the past you would have just gone in and audited everything"* **(P6:31, 71:71)**. Another participant described the use of analytical procedures for risk assessment as follows: *"the other thing it does it pulls some of the work into planning which is good for the audit because you have more data so there is more risk analysis that you can do and then the loop starts between risk identification and evidence gathering. You learn more, it refines your risk identification"* **(P3:52, 90:90)**.

From the above it is clear that, overall, Big 4 audit firm participants believed their firms' risk-based audit methodologies placed more focus on analytical procedures. These participants perceived analytical procedures to be effective procedures for the identification of risks and fraud. Together with the in-depth knowledge required of the entity and the industry, the auditor could refine risk identification, which could result in cost-effective procedures because some Big 4 audit firm participants perceived the application of analytical procedures to save the auditor time by reducing the extent of further procedures.

5.3.3.3 Changes due to IT

In the discussion (section 5.3.3.1 (iii)) relating to the use of analytical procedures in the future, it was demonstrated that Big 4 audit firm participants predicted an increase in the use of analytical procedures in the future. They viewed

developments in IT, especially the development of audit software, as the main impetus for this increase. One participant explained this as follows: "*IT will lead to more data analytics to be used. I think we are talking about data analytics, and we are trying to move towards it"* **(P5:14, 18:18)**. In general, these participants perceived the developments in audit software to make it easier for them to identify exceptions. Two of these participants posited that the auditor's use of audit software was not only for the identification of exceptions, but also to perform more sophisticated analysis. The following was a positive view expressed by one of them: *"You can figure out anything in the world from a data set if you want"* **(P3:10, 24:24)**.

When asked about the audit software that participants use for the performance of analytical procedures, nearly all Big 4 audit firm participants referred to internally developed software as follows:

"And I think [it differs] probably from firm to firm, each has their own ways and their own tools that they use" **(P5:33, 46:46)**.

"And we have a lot of other tools that was internally developed" **(6:44, 123:123*)***.
"We are busy to develop them [applicable software] at the moment; it is a very big part of my job" **(P3:10, 24:24)**.

These Big 4 audit firm participants also acknowledged the value of using Excel software as follows: *"It's generally in Excel we do our substantive analytical*" **(P7:26, 83:83).**

According to Big 4 audit firm participants, developments in IT posed a threat for the audit profession because the audit software would become so sophisticated that it would be possible to obtain sufficient audit evidence on large volumes of data with the press of a button. This would have a direct impact on the number of people necessary to conduct an audit. The need for audit trainees at firms could decrease, and this would have a negative impact on the training opportunities provided by firms. One Big 4 audit firm participant explained this concern as follows: *"Yes, and that is actually a challenge for an audit firm as we are in a way*

a training institution and so how do you justify the training of fewer people. You know it is a catch twenty two" **(P5:40, 56:56)**. This participant predicted that in future, audit firms would make use of IT experts to perform analytical procedures because they would require expert competence: *"I think more people; all of us will have to be IT "fundies". There is no choice but it is where we are going"* **(P5:39, 54:54)**.

The inclusion of IT experts in the audit team to provide data analysis dominated much of the conversation. Big 4 audit firm participants shared positive views on the inclusion of IT experts on the audit team. One participant mentioned the value of their competence: *"They can do a much more in-depth analysis … To get those data analytics guys in, I mean the information they can give us on balances is unbelievable"* **(P8:25, 33:33)**.

In general, Big 4 audit firm participants identified various factors that should be considered for the use of IT experts as part of the audit team, namely the size and complexity of the client, the clients' expectations and related costs. In relation to the size and complexity of the client, one participant stated the following: *"On huge retail clients it is definitely the way we are trying to go. To get those data analytics guys in"* **(P8:25, 33:33)**. Another participant referred to the expectation of clients, arguing that if the client expects auditors to test the whole population, IT experts have to be involved because one *"cannot test that big population"* **(P5:13, 18:18)** without such support. The costs involved would be another factor to consider, and according to one participant, the practice of involving IT experts would only be feasible for high budget audits: *"I mean you can imagine a third of our budget for the client went to the IT, so we don't do it on our smaller jobs"* **(P7:29, 95:95)**.

Irrespective of the above factors that merit consideration, one Big 4 audit firm participant stated that having IT experts in the audit team would not be an option but a necessity because their involvement had the potential to reduce the amount of audit work.

Even though Big 4 audit firm participants acknowledged the value and need for using IT experts for an audit, they admitted to having limited knowledge on how data analysis was done. This shortcoming was evident in the following views expressed by these participants:

"To get those data analytics guys in. I mean the information they can give us on balances is unbelievable. You don't always understand the logic behind it, but they give you a report and it is absolute assurance that you can get on that balance" **(P8:25, 33:33)**.

"I mean, when you look at those reports the IT auditors give us … I understand the access controls" **(P9:69, 337:337)**.

The above discussion demonstrated that developments in IT would increase the usage of analytical procedures on audits, specifically data analysis. Most of the Big 4 audit firm participants reported that their audit firms made use of internally developed or general software for the performance of analytical procedures. Although developments in software have made it easier to perform more sophisticated analytical procedures on large volumes of data, according to Big 4 audit firm participants, developments in audit software posed a threat to the auditing profession as the number of audit trainees on an audit team could decrease, thus limiting the training opportunities provided by firms. In addition, Big 4 audit firm participants acknowledged their own limited competence in data analysis, resulting in extensive reliance on IT experts.

Positive views were expressed on the ability of IT experts to perform detailed and sophisticated analysis, but their involvement would depend on client size and complexities, client expectations and audit budgets because it is not a feasible option for small client, low budget audits.

5.3.3.4 Changes due to non-financial information

When asked how non-financial information such as industry knowledge would be integrated into analytical procedures of the future, Big 4 audit firm participants in

general indicated that they were already using non-financial information in developing their expectations. In the words of one participant: *"I don't think it is something we expect to do in the future, I think it is built in, in how we do our work"* **(P8:62, 115:115)**. Another participant argued that the auditors of today are *"very much focused on industry knowledge and being aware of how that impacts on the financial results of your specific entity that you are busy auditing"* **(P4:40, 43:43)**, and they are therefore already considering non-financial information in their audit work.

Some Big 4 audit firm participants believed that IT had made non-financial information more available and accessible. This was evident in the following view expressed by one of these participants: *"It is easily accessible, where five or ten years ago it was very difficult to get the information and trends. So I just think it makes the whole process easier"* **(P5:43, 60:60)**. The notion was supported that non-financial information could also assist the auditor with developing more reliable expectations: *"It is such an integrated society and everyone knows what is going on with everyone. So I think your knowledge of the industry and the environment is very important. Because it also gives you an idea of what you must expect of your client"* **(P8:62, 115:115)**.

One Big 4 audit firm participant cited the following example of how he/she used industry knowledge to develop an expectation: *"We definitely look at industry, like for the mining industry for example. It's terrible. All the strikes and all of … so you would expect profits to go down. You expect cost to go up and electricity, like if you see downwards in electricity … something went wrong there"* **(P9:55, 237:239)**. Another participant explained how he/she used non-financial information for the identification of fraud by stating that if the auditors were not aware of non-financial information they would not have been able *"to identify non-compliance and report that to the regulator. So you have to consider the non-financial information as to what is out there in the market"* **(P4:41, 44:44)**.

Two of the Big 4 audit firm participants cautioned that non-financial data is only valuable in creating expectations if there is a correlation between financial and non-financial data. This point was illustrated by one of these participants who

perceived the identification of such correlation as *"what is happening in the industry and how can you actually take that and make it applicable to a specific financial statement line item"* **(P4:63, 70:70)** to be challenging. Another participant reflected as follows on the challenges that the use of industry knowledge in data analysis poses by referring to the authenticity of the data: *"to really use industry information in data analysis is difficult because how do you get the data? And someone must capture it or do you download it from somewhere and in what format? So there is still work to do from a data analysis perspective"* **(P3:61, 108:108)**. This view was confirmed by another participant who referred to text mining, stating that his or her firm did not use it because the auditors mainly worked with numbers.

There was general consensus among Big 4 audit firm participants indicating that they mainly obtained non-financial information on the entity and the industry from the internet. One of these participants specifically referred to *"Google, look at News 24"* **(P9:57, 249:249)**, while another referred to the publicly available non-financial information for listed clients.

Three of the Big 4 audit firm participants mentioned that another source to obtain non-financial information was public opinions included in the social media: *"You have to understand what the public is saying, what is being said on Facebook, twitter on LinkedIn profiles and how that impacts on the [client's] business going forward"* **(P4:43, 45:45)**. However, there were conflicting views on the credibility of information in the social media as one Big 4 audit firm participant cautioned that *"you always need to assess the reliability of the underlying information that you're using. So I think social media is potentially a problem there because everyone has comments but you don't know how valid that is necessarily"* **(P6:35, 97:97)**.

Some Big 4 audit firm participants mentioned the value of other sources of financial information to gain industry knowledge. One of them referred to investment returns on databases of reputable sources, such as "*McGregor or Bloomberg"* **(P5:27, 40:40)**. Another participant cited the following example where he/she had used publicly available financial information from listed

companies in similar industries: *"I audit, a supermarket group in Botswana and what we then do is we look at like the Spars and the Shoprite's and …. we look at their trends for sales, maybe let's say over the December period, over the Easter period and we can obviously see a trend and we then apply that to our supermarket group"* **(P7:37, 115:115)**.

The above discussion demonstrated that IT has provided Big 4 audit firm participants with a broad array of financial and non-financial information, and such information is already used in the application of analytical procedures to develop more reliable expectations and to identify fraud. There should be a correlation between the non-financial information accessed and the financial information considered. All these participants indicated that they mostly obtained information from the internet because it was easily accessible. Some of these participants also suggested that social media was gaining prominence as a source of information about the industry and the client's business, but some concerns were expressed about the credibility of such information. In addition, other sources of financial information were used by Big 4 audit firm participants and these mainly consisted of publicly available information such as the annual reports of listed companies and investment returns.

5.3.3.5 Summary of changes in the application analytical procedures

Big 4 audit firm participants perceived an increase in the use of analytical procedures and ascribed this to IT developments which have made the performance of analytical procedures more efficient and easier. These participants reported that their audit firms were investigating the development of software for the performance of data analysis because the latter would replace control testing and substantive analytical procedures and would become the audit of the future.

Big 4 audit firm participants perceived risk-based audit methodologies to have led to an increase in the application of analytical procedures because such methodologies have the ability to refine the auditors' risk identification and reduce the extent of tests of details and assist with fraud detection. By utilising an in-

depth understanding of the client's business and the industry, some Big 4 audit firm participants believed that by applying analytical procedures they could refine risk identification and this could result in cost-effective procedures. Although these participants acknowledged the value of IT (internally developed and general software) in the performance of analytical procedures, they perceived it as a threat to the auditing profession as most of the audit work could be automated. In general, Big 4 audit firm participants reported on their reliance on IT experts to perform sophisticated techniques, but this depended on the client size and complexities, client expectations and audit budgets. IT further provided these participants with a broad array of financial and non-financial information which could be used, and were already being used to develop expectations. Non-financial information is mainly obtained from the internet because it is easily accessible, but other sources are also consulted despite the fact that questions have been raised about the authenticity of such information.

5.3.4 The advantages of and challenges in the application of analytical procedures

5.3.4.1 Advantages

There was general consensus among Big 4 audit firm participants that the main benefit of the application of analytical procedures lay in the improvement of audit efficiency. By applying analytical procedures, the auditor can obtain a holistic view of the client's financial information because it covers the whole population. One Big 4 audit firm participant explained this as follows: "*It gives you an entire holistic overview over a balance on your financial statements*" **(P4:59, 67:67).** Other benefits identified by these participants were that the application of analytical procedures was a cost-effective way of auditing and this would enable the auditor to add value because important information could be communicated to the audit committee and the client. The aforementioned participant referred as follows to firms' business models to illustrate cost effectiveness: "*I mean you sell audit hours or we are if you can do something in less time, it is a more efficient audit*". According to another Big 4 audit firm participant, *"cutting down 2/3 of time*

we would have spent doing it manually on a sample, and we also now test 100% of the population instead of just a sample" **(P10:5, 7:7)**.

The perceptions of some Big 4 audit firm participants revealed that analytical procedures had the ability to reduce the extent of tests of details: *"It gives much more reliable audit evidence. It gives you a better idea of what has been going on in that balance and audit support, than to detail test massive balances"* **(P8:68, 137:137)**, and can serve as a risk assessment tool: "*I think it shows you the risk areas, it shows you where your audit attention should be and it can even point out your fraud areas"* **(P5:51, 80:80)**.

Most of the Big 4 audit firm participants predicted that the use of analytical procedures would increase in future audits as it would add value to the client and become easier to use. This was evident in the following quotations:

"our customers ask for something extra on top of their audit report and this is a good way of doing it. We do not have a proposal [for audit work] at the moment where data analysis is not included" **(P3:74, 129:129)**.

"… it is almost like on an annual basis every time you can go into audit you can see how much more is available and how much more reliance you can place on your answer" **(P4:27, 28:28).**

Two of the Big 4 audit firm participants perceived analytical procedures to challenge the auditor, forcing him/her to think. In the opinion of one of these participants, analytical procedures challenged the auditor *"to be open minded and to apply [his/her] mind and not just to say, ok, this agrees"* **(P7:46, 139:139)**.

From the above it can be concluded that the general perception of Big 4 audit firm participants was that analytical procedures could improve audit efficiency because their performance would provide the auditor with a holistic view of the client's financial information and could reduce the extent of detailed testing and increase the focus on risks areas. Some of these participants deemed the application of analytical procedures as a cost-effective way of auditing and which

afforded them an opportunity to report in more detail thereby adding value for the audit committee and client. Big 4 audit firm participants believed that the application of analytical would increase in the future (see section 5.3.3.1 (iii)). Another advantage identified was that the use of analytical procedures compels auditors to apply their minds, as opposed to merely inspecting documents, which could improve the quality of an audit.

5.3.4.2 Challenges

The views expressed by Big 4 audit firm participants revealed that numerous challenges are associated with the application of analytical procedures. In the following section, a separate discussion of each of the identified challenges is presented.

(i) Availability and integrity of data

All Big 4 audit firm participants perceived the effectiveness of analytical procedures to be dependent on the availability and integrity of the data. They suggested that clients do not use their systems to their full capacity, were still working around the computer and were not capturing all of the fields. These constraints would thus limit the auditor's ability to perform analytical procedures. One of these participants explained this as follows: *"I think the challenge is to get the right data in the right format from the client, especially if you are going to start to go 100%"* **(P5:53, 82:82)**. Another participant stated that owing to the quality of available information, auditors are restricted in their application of analytical procedures *"because sometimes you have this brilliant procedure that you can perform but the information is not readily available"* **(P6:41, 115:115)**.

Another Big 4 audit firm participant referred to the integrity of the data and suggested that owing to the limited processing capabilities of the computer, auditors could be limited in performing analytical procedures on large volumes of data. In the words of this participant: *"Also processing power, we have so much data, but having computers to process the data is an issue"* **(P10:12, 26:26)**.

From the above it is clear that the availability and integrity of data are vital determinants in the application of analytical procedures. In general, Big 4 audit firm participants believed that auditors were challenged by the under-utilisation of clients' systems, resulting in limited capturing of data, thus making it difficult to find reliable data that could be used in the application of analytical procedures.

(ii) Resistance to reducing tests of details

In general, Big 4 audit firm participants were of the opinion that in some instances it would be easier to revert back to tests of details because it would be easier to perform them, it would require less judgement and it could even be more cost effective. One participant explained this as follows: "*Analytical reviews are sometimes a lot more difficult to get right than detailed testing. Because detailed testing is easy, you just go and test ten [items]. With an analytical review because you predict it, something, there are so many variables on some of the balances that come in"* **(P8:14, 24:24)**.

Another Big 4 audit firm participant argued that his/her firm's electronic working paper templates assisted the auditor to determine the necessary sample size for detailed testing. Because this was based on applicable sampling theories, the sample size could be justified: *"[N[obody can almost challenge you on that versus you have analytic so all this judgment that you have put in place to get to an answer"* **(P4:56, 65:65)**. This participant maintained that the risk of applying analytical procedures could simply be too high. According to another Big 4 audit firm participant, substantive analytical procedures could take longer to perform than tests of details: *"because you are trying to refine your assumptions and then you need to test all the inputs that you are using to the analytical where if you had just tested the test of details you would maybe have a sample of three or four items. So it's sometimes it's a cost benefit exercise that you also need to take into account"* **(P7:49, 153:155)**.

Some Big 4 audit firm participants believed that partners were reluctant to reduce the extent of tests of details and perceived them to be "*resistant to change*" **(P7:49, 153:153)**. However, with the complexity of the clients' business, IT developments and pressure on audit fees, such a change might become

inevitable. These participants ascribed this reluctance to change to two reasons, firstly, to audit partners not having enough confidence in the results of analytical procedures. One participant described this lack of confidence as follows: *"So it's a hot topic in the profession at the moment but it is a difficult thing for auditors at the end of the day to decide how much is enough and how much assurance you can get from the data"* **(P3:75, 129:129)**. The second reason suggested for partners' reluctance was the lack of guidance in the standard; this challenge is discussed in the next section (5.3.4.2 (iii)).

From the above it would appear that there was a resistance from audit staff (also at partner level) at Big 4 audit firms to reduce tests of details in favour of analytical procedures. A number of Big 4 audit firm participants ascribed this to the judgement needed to perform analytical procedures and the time needed to consider and refine assumptions. The latter could have a negative impact on the cost effectiveness of analytical procedures. In addition, it would appear that the risk of exercising judgement for analytical procedures could be too high which would make it easier for Big 4 audit firm participants' engagement team members to revert back to tests of details. This would reduce partners' confidence in the results of analytical procedures.

(iii) Regulatory challenges

Some Big 4 audit firm participants perceived the auditing standard relating to analytical procedures (IAASB 2014m:ISA 520) as a limiting factor in the application of analytical procedures. One of these participants explained this as follows: *"A regulator, will they be okay with it in terms of the extent of vouching that you do. They must be comfortable with it; our audit partners will never perform an audit procedure if they are not sure whether the regulator is happy with it. And if our standards remain the same, it is very difficult to evolve"* **(P3:78, 133:133)**. This participant explained that the standard lacked guidance on the amount of assurance the auditor could place on analytical procedures: *"what becomes more difficult and our regulators give us more and more pressure is also on the way you do it and how much assurance you really get from it. If you are not precise in your expectations and quantify within your variance threshold*

then how do you know you have something ... because what stands out for me is not necessarily something that does stand out for you" **(P3:48, 72:72)**.

According to another Big 4 audit firm participant, the standard did not provide sufficient guidance to auditors on how to exercise professional judgement on analytical procedures. Auditors appeared to be unsure when to accept a large difference or how much investigation would be required or how to corroborate the differences. The view of one Big 4 audit firm participant summarised this concern by referring to firm inspections of the IRBA and the firm's own quality control reviews: *"there is a lot of judgement involved in these analytics … and this is where we get challenged a lot – on your analytics and the judgements you have applied on your analytics. And I think that is one of the other reasons why people might shy away from analytics"* **(P4:56, 65:65)**.

Based on the views expressed by Big 4 audit firm participants, they deemed limited guidance provided by the auditing standard (IAASB 2014m:ISA 520) to be challenging. Inspections of the regulator and firms' own quality control reviews confirmed that auditors struggle to make judgement calls on analytical procedures and some of the Big 4 audit firm participants regarded these as challenges.

(iv) Risk for the profession

There was general consensus among Big 4 audit firm participants that data analysis could be a threat to the audit environment as audit procedures become increasingly more automated. One of these participants stated the following: *"I think that is the huge thing, and one needs to sit back and ask yourself at what stage will the auditor get redundant"* **(P8:57, 89:89)**. The aforementioned participant explained that as audit procedures become automated, the auditor would only be required to investigate exceptions. Another participant also referred to this threat and argued that it would reduce the need for audit trainees, which would impact negatively on the number of training opportunities provided by audit firms.

This argument was further deliberated by another Big 4 audit firm participant who suggested that not only would fewer auditors be needed, but there would also be more competition in the data analysis environment. This was evident in the following view expressed by this participant: *"Our competitors in analytics are not just other audit firms, it is Oracle and SAP and anyone else who uses big data words"* **(P3:50, 76:76)**.

There was consensus among Big 4 audit firm participants that, in future, all auditors would have to make use of IT experts to perform data analysis. One participant perceived this as follows: *"I think the requirement for an IT auditor will only increase. It is a very huge risk for the profession I think. But from an investor and from a quality information point of view, and as you say for the real time answer, it is definitely the right way"* **(P8:61, 113:113)**.

From the above it is clear that although Big 4 audit firm participants supported IT developments in analytical procedures they also expressed concern. In general, they indicated that the need for IT experts would increase and auditors would only be expected to investigate exceptions. Such a shift could result in increased competition from non-auditors and could limit training opportunities provided by firms.

(v) Legislative risk

Two Big 4 audit firm participants perceived the introduction of the new Protection of Personal Information (POPI) Act No. 4 of 2013 (Republic of South Africa (RSA) 2013) to be a huge challenge in the application of data analysis. They explained that where the auditor has access to large volumes of data from the client to be used for analytical procedures, the audit firms should be able to prove to the client that they can protect that data. One participant had the following thoughts on the matter: *"Where data is stored, I think it could have an impact on the future in our industry specifically … the risk is where is your data and your personal information [is stored]. Because in our environment, you have all your personal information in the administrator's record. I think that it is a risk in our industry, how do you protect the data"* **(P5:46, 62:62)**. The other participant made the point that the client's data used for data analysis would need to be stored on completion of

the audit: "*it is not our data. It is not audit evidence, but next year you want to have it for comparative purposes. Do we keep it, do our clients keep it*" **(P3:76, 129:130)**.

The above views highlighted legislative risk as a challenge relating to analytical procedures. To perform data analysis, high volumes of client's data are used, but this data has to be secured and stored.

(vi) Non-financial information

Section 5.3.3.4 discussed the use of non-financial information in order to develop an expectation. The discussion indicated that Big 4 audit firm participants viewed non-financial information as a valuable source of evidence and that there was currently a big drive to incorporate more non-financial information in the application of analytical procedures. The discussion also showed that the credibility of such information would remain a challenge because various sources were used to obtain non-financial information. Two Big 4 audit firm participants reflected on this matter. One Big 4 audit firm participant stated the following: "*To really use industry information in data analysis is difficult because how do you get the data. And someone must capture it or do you download it from somewhere and in what format? So there is still work to do from a data analysis perspective but with ordinary historical analytical procedures, much of it comes from experience, and it is very relevant*" **(P3:61, 108:108)**. Another participant concurred with this sentiment as follows: *"what is happening in the industry and how can you actually take that and make it applicable to a specific financial statement line item. I think for me those are kind of the challenges that we are struggling with"* **(P4:63, 70:70).**

From the above it is clear that although Big 4 audit firm participants viewed non-financial information as a valuable source of evidence, its use in data analysis would remain a challenge as the credibility of such information would depend on the source and there were uncertainties on the format in which the data should be downloaded and how it should be applied to a specific financial statement line item.

(vii) Competence of auditors

In general, Big 4 audit firm participants were of opinion that the application of effective analytical procedures would require a skill that was not currently embedded in the education of prospective auditors. These participants perceived trainees to be compliance driven, wanting to follow the same standardised procedures for all clients and not having a wider perspective. This sentiment was evident in the following views expressed by three Big 4 audit firm participants:

"Trainees are very 'text savvy' but you know, we have to do it on our audits otherwise it doesn't help" **(P3:25, 40:40)**.

*"it is also very difficult getting the trainees past that mindset of yes we are only ticking and bashing, you have to actually think what we are busy doing, and what we want to achieve. And I think a lot of the time that is where the challenge comes in***" (P4:33, 32:32)**.

"I think if you ask the [theoretical] question for them they can give you the answer. But to come and apply it that is what's lacking. That practical knowledge and practical application for things. Because they can all write an audit question and they will get hundred percent for the question, but they can't apply it in real life" **(P8:40, 56:57)**.

In general, Big 4 audit firm participants perceived the existence of a "gap" between university studies and audit practice in the application of analytical procedures. All the participants indicated that their respective firms provided on-the-job training as well as in-house training courses in order to fill this gap.

Based on the views expressed by Big 4 audit firm participants, there is a competence gap between the formal education of auditors and the expectations from practice on the application of analytical procedures. In general, these participants alluded to training opportunities (on-the-job training and in-house training courses) presented by their firms in an effort to close the gap.

(viii) Summary of challenges

From the above it is clear that numerous challenges were identified by Big 4 audit firm participants in relation to the application of analytical procedures. The discussion demonstrates that the auditor's performance of analytical procedures is dependent on the availability and integrity of the clients' data. It was shown that even though analytical procedures have the ability to reduce the number of tests of details, auditors in Big 4 audit firms still reverted back to tests of details because it is easier, requires less judgement and may be more cost-effective. Partners' reluctance to reduce tests of details was ascribed to their lack of confidence in the results obtained from analytical procedures, the lack of guidance provided in the auditing standard on the treatment of differences and the impact on IRBA firm inspections and quality control reviews. Big 4 audit firm participants agreed that the guidance provided in the aforementioned standard was insufficient. The discussion demonstrated that analytical procedures could pose a threat to the profession as audit procedures are becoming increasingly automated. Owing to auditors' lack of competence, IT experts are used to perform data analysis. The need for audit trainees could decrease, which would impact negatively on the training opportunities provided by firms. Big 4 audit firm participants also regarded the protection of the data needed for data analysis as a risk. The discussion indicated that the incorporation of non-financial information in data analysis was considered difficult because of credibility issues. The section concluded with a discussion of the last challenge, namely the competence of auditors. Big 4 audit firm participants identified a "gap" between university education and audit practice in the application of analytical procedures. These participants were of opinion that the skills necessary to perform analytical procedures were not being addressed in current university curricula and firms would therefore have to provide their own in-house and on-the-job training on the application of analytical procedures.

5.3.4.3 Summary of the advantages of and challenges in the application of analytical procedures

From the discussion in the above sections, it is clear that there are numerous advantages and challenges relating to the application of analytical procedures.

Advantages include efficiency considerations as analytical procedures focus the auditor's attention on areas of risks, reduce audit costs and tests of details and could afford the auditor the opportunity to add value to the audit committee and the client.

Challenges identified by participants were the availability and integrity of data, the resistance to reduce tests of details, regulatory challenges, risks for the profession, legislation risks, the use of non-financial information and the competence of auditors.

5.4 RESEARCH FINDINGS - CASE 2: SECOND-TIER AUDIT FIRMS

5.4.1 The need to apply analytical procedures

5.4.1.1 General need

There was general consensus among second-tier audit firm participants that analytical procedures are valuable for the identification of risk because they can direct the auditor's attention to misstatements. One second-tier audit firm participant described analytical procedures as a *"risk analysis tool"* **(P16:11, 25:25)**. According to another participant, the auditor needs to apply this tool because *"it is part of an audit"* **(P11:1, 9:9)**. The aforementioned participant regarded analytical procedures as valuable not only for risk identification, but also for obtaining audit assurance and concluding on a set of financial statements. The participant explained this as follows: *"and it is there to just at the end of the day, when you conclude, to make sure that you have covered your entire basis"* **(P11:1, 9:9)**.

Three of the second-tier audit firm participants described analytical procedures as an effective audit procedure to obtain audit assurance. One participant explained this as follows: *"it is a great cost-effective way to get assurance over the population"* **(16:1, 9:9)**. The same participant was of opinion that the performance of analytical procedures could assist the auditor to gain an understanding of the entity and that such an understanding could add value to the audit.

One second-tier audit firm participant, however, questioned the value of analytical procedures for obtaining audit assurance. The participant referred to his/her application of analytical procedures as being limited to risk assessment procedures and shared the view that he/she only performed analytical procedures *"because the ISA [ISA 520- Analytical Procedures] says so"* **(P2:1, 9:9)**.

5.4.1.2 Summary of the need to apply analytical procedures

From the above it is clear that second-tier audit firm participants felt that analytical procedures were valuable for the identification of risk, to obtain audit assurance and to conclude on the financial statements. Three of them described analytical procedures as cost effective because they provide the auditor with assurance over the whole population. They mentioned that the performance thereof could help the auditor to gain a better understanding of the entity, which would enable the auditor to add more value to the audit client. One second-tier audit firm participant, however, contradicted this by stating that analytical procedures had limited risk assessment qualities and were only performed to meet the regulatory requirement.

5.4.2 The application of analytical procedures in the audit process

5.4.2.1 Planning phase

(i) General

All four second-tier audit firm participants asserted that analytical procedures were used in the planning of an audit phase mainly for the identification of risks. This was evident from the following views expressed by two of these participants: *"It is really just to look at unusual things"* **(P2:11, 15:15)**.

"The first step in the planning phase is to do a risk analysis" **(P16:7, 18:18)**.

The aforementioned participant described analytical procedures during the planning phase as a *"risk identification tool"* **(P16:7, 18:18)**.

These second-tier audit firm participants perceived analytical procedures during the planning phase to be conducted at a high level. One participant described this as follows: *"during the planning phase it is not detailed, it is basically just an analysis"* **(P11:2, 13:13)**. Another participant, however, cautioned against the use of high-level analytics, stating that it would be easy to provide an explanation for a difference with high-level analytics because one would not go into the detail. According to this participant, if the trainee responsible for performing planning analytics were to perform a high-level analysis, he or she could provide a superficial explanation for a difference in order not to raise the risk, which would demand additional audit work. The participant substantiated this view as follows: *"a lot of the time people are just explaining things away and not using it [analytical procedures] for identifying risks"* **(P12:18, 56:56)**.

Two second-tier audit firm participants posited that analytical procedures during the planning phase could be used as a planning tool for the allocation of staff and time. One of these participants explained this as follows: *"What we want to take out of it at the end of the day is what are your risks and what must we do in each section"* **(P16:9, 21:21)**.

From the above it can be concluded that second-tier audit firm participants used analytical procedures during the planning phase of an audit mainly as a risk identification and planning tool (to allocate staff and time). Analytical procedures during this phase were performed at a high level. One second-tier audit firm participant, however, cautioned that with high-level analytics it would be easy to provide superficial explanations thereby limiting risk areas that demand additional audit work.

(ii) Performance and review

In general, second-tier audit firm participants indicated that it was usually the audit senior (who is generally a third-year audit trainee or manager for listed clients) who was responsible for the performance of analytical procedures during the planning phase of an audit and that the audit work was reviewed by the audit manager. This was evident in the following view expressed by a second-tier audit firm participant: *"They [seniors] will go and do the preliminary analytical review*

during the planning phase and then as a manager you would need to then just review that because it is part of risk identification and assessment and the responsibility is from a manager's perspective to make sure that they have identified all the risks from that specific assignment or engagement" **(P11:10, 29:29)**. Another participant shared the view that on smaller audits the responsibility for the performance of analytical procedures could be allocated to trainee accountants in their second year of training.

One of the participants (an audit manager in a second-tier audit firm) mentioned that he/she preferred to perform the analytical procedures himself/herself. The participant referred to the trainee's performance of analytical procedures as a mere extension of his/her own performance. In his/her words: *"So what I would do is to get a trial balance at my client a couple of days before we go on the audit, to see myself … So at the high level [analytical procedures] I do it myself"* **(P2:27, 55:55)**. According to this participant, he/she performed analytical procedures during this phase because it assisted him/her with the allocation of audit work and time to members of the engagement team.

Only one of the second-tier audit firm participants referred to the engagement partner's involvement in the review of analytical procedures during the planning phase of the audit. The participant felt that partners' involvement varied from partner to partner, and stated the following: *"So they are involved but I must tell you it really depends from partner to partner"* **(P16:38, 80:80)**. This participant asserted that the partner's involvement could add a lot of value to the audit as follows: *"if he looks at your planning, he knows the industry. He will tell you that debtors are not supposed to be on 60 days. Or why did you not put that in as a risk?* **(P16:38, 80:80)**.

From the above views expressed by second-tier audit firm participants, it is clear that analytical procedures were usually performed by the audit senior and reviewed by the manager. For smaller clients, the performance of analytical procedures could be allocated to lower-level staff. One of these participants preferred to perform the procedures himself/herself because it enabled him/her to allocate audit work and time to members of an engagement team. In general,

second-tier audit firm participants believed that the involvement of engagement partners could add value to the audit because they would have a wealth of knowledge of the industry. Their involvement, however, would vary from partner to partner.

(iii) Techniques or methods

Second-tier audit firm participants indicated that they mostly perform comparisons in their performance of analytical procedures during the planning phase of an audit. This practice was evident from the following views of two of the second-tier audit firm participants:

"So that is more a comparison than anything else" **(P11:2, 13:13)**.

"do a risk analysis where you compare last year to this year" **(P16:7, 18:18)**.

One of the second-tier audit firm participants referred to trend analysis as follows: *"The planning phase, what I would do I would look at the financials as a whole, balance sheet and income statement and then I will see okay PPE [property, plant and equipment] is up, so ok depreciation is also up, or no it is not, oh hell let's find out why not, or it will be okay, sales is up and debtors are up, okay cool it makes sense"* **(P2:5, 15:15)**.

According to three of the second-tier audit firm participants, their use of analytical procedures during the planning phase also included the use of ratios. When they were asked what type of ratios they performed one participant answered as follows: *"so your GP [gross profit], your net profit ratio, inventory days, debtors days, creditor days, what else, a lot of going concern things, liquidity, solvency"* **(P16:6, 17:17)**.

One second-tier audit firm participant explained that his/her firm's methodology required third-year audit trainees to develop an expectation of the current year's figures, based on their initial planning discussions with management. The expectation could either be a descriptive or a numerical expectation. These expectations were then compared to the actual numbers on the trial balance for

the current year in order to identify risks. The participant described the firm's methodology as follows:

"So what we do is you create an expectation of what we expect this year's numbers to be, right, and that can either be a descriptive or a numeric expectation. And then you create the actual numbers this year on the trial balance and then the difference then points to okay, does this movement actually make sense based on what I was told and if not then it's a possible risk for us to raise" **(P12:13, 27:32)**.

From the above it can be concluded that second-tier audit firm participants preferred the use of comparisons and trend and ratio analysis for their performance of analytical procedures during the planning phase of an audit. One of these participant's firm methodology required trainees to perform reasonableness tests whereby they would create an expectation independent of the accounting information system and compare their expectation with the actual numbers.

(iv) Summary

According to second-tier audit firm participants, analytical procedures during the planning phase were mainly performed for the identification of risks and as a planning tool. The procedures were performed by audit seniors and reviewed by audit managers, with limited involvement by audit partners. These participants generally made use of high-level analytical procedures such as comparisons, trends and ratio analysis during this phase of the audit. These could result in superficial explanations. One of these participants mentioned that in accordance with the firm's audit methodology, reasonableness tests were used as planning analytical procedures whereby an explanation would be created (from financial and non-financial information) and this would be compared with recorded amounts as per the trial balance.

5.4.2.2 Fieldwork phase

(i) General

Three of the second-tier audit firm participants felt that the performance of substantive analytical procedures was an effective method to obtain audit assurance. One of them asserted that the performance of analytical procedures could be more conducive to specific assertions, and explained this as follows: *"so it is basically to address your assertions, most probably accuracy, definitely completeness. You can also test and then in some extent occurrence and existence as well"* **(P11:3, 15:15)**. The aforementioned participant cited the following example on his/her use of analytical procedures during the fieldwork phase: *"where it works effective is when … you can predict what the amount is going to be, like for example depreciation. If you think about it, it is actually a substantive analytical procedure that you perform. We don't call it that, but that is what it is"* **(P11:16, 35:35)**.

One second-tier audit firm participant, however, had a contradictory view. The participant was of the opinion that his/her performance of analytical procedures in the fieldwork phase could not provide him/her with audit assurance. The participant explained this as follows: *"But it is also out of a risk point of view, it is not really, it is not that you would, it is not assurance that you are getting"* **(P2:13, 18:18)**. Another participant mentioned that his/her firm did not ardently support substantive analytical procedures. This participant, however, perceived that the firm's methodology was slowly changing to incorporate more substantive analytical procedures but that at the time of the interview, the application had been limited to employee costs.

One second-tier audit firm participant referred to the value of using of disaggregated data as follows: *"… some people like to do it across the entire group, I like to do it per product, and will get sales and cost of sales per product"* **(P16:10, 23:23)**.The aforementioned participant did, however, state that his/her firm's methodology was not clear in terms of the use of substantive analytical procedures and that other members of this audit firm preferred to do it on aggregated data. Another participant asserted that analytical procedures were

more conducive to statement of profit and loss and other comprehensive income accounts. He/she stated that *"it is an easy and effective way of testing the transactions that occurred throughout the year"* **(P11:18, 37:37)**.

From the above it is clear that most of the second-tier audit firm participants felt that analytical procedures provided the auditor with some assurance that could depend on the assertion under consideration. Although these participants perceived the performance of analytical procedures to be effective in predicting a balance, their use was regarded as limited because it would appear that second-tier audit firms' methodologies were not clear in relation to the type of accounts and data that could be used to develop an expectation. One participant mentioned that his/her firm's methodology was slowly changing to incorporate more substantive analytical procedures. Another perceived analytical procedures to be more conducive to statement of profit and loss and other comprehensive income accounts than statement of financial position accounts. These participants had contrasting views on the application of aggregated or disaggregated data for analytical procedures during the fieldwork phase of an audit.

(ii) Performance and review

In general, second-tier audit firm participants were of the opinion that analytical procedures during the fieldwork phase could be performed by lower-level staff. One of them stated that the availability of software, such as Excel, made it possible to allocate the performance of analytical procedures during the fieldwork phase to second-year trainees. He/she explained this as follows: *"[T]he fact that you most probably have a template by which you calculate and perform substantive analytical procedures and you have the standard sort of steps, you can let a second year do it, but again you would need to have just that pre-populated audit program"* **(P11:11, 31:31)**. Another participant explained his/her firm's application as follows: *"done by the second year, they [the firm] are not comfortable to really give it to a first year trainee"* **(P12:22, 78:78)**.

However, there was consensus among second-tier audit firm participants that lower-level staff needed guidance in understanding the purpose and objective of substantive analytical procedures. According to one of them, *"you as the*

manager will see you need to sit with that person so that they can engage in the understanding of what they need to do before the time" **(P11:11, 31:31)**.

Based on the view expressed by second-tier audit firm participants, analytical procedures during the fieldwork phase were usually reviewed by the audit senior or the audit manager. This was evident in the following statement made by one of these participants: *"all the audit work generally goes down to the senior to review or the audit manager"* **(P12:22, 78:78)**. Another second-tier audit firm participant agreed with the aforementioned statement and said that *"a third year can review it and if there is any findings from it then naturally what would be something that the manager will have a look at"* **(P11:11, 31:31)**.

One of the second-tier audit firm participants perceived partners to have a limited involvement in the review of analytical procedures. This was reflected in the following statement: *"partners do a high level review, they're hardly looking at the actual SAPs [substantive analytical procedures]"* **(P12:29, 96:96)**.

From the above views of second-tier audit firm participants, it was clear that analytical procedures in the fieldwork phase of an audit were usually performed by the second-year trainees and reviewed by the audit manager. The use of general software such as Excel made it possible to allocate the performance thereof to lower-level staff. All second-tier audit firm participants agreed that lower-level staff require guidance from more experienced audit team members as they lack an understanding of what needs to be done. According to one of these participants, engagement partners had a limited involvement in this phase as their reviews were mostly done at a high level.

(iii) Techniques or methods

All four second-tier audit firm participants described their use of substantive analytical procedures on employee costs, which indicates that this appears to be an area especially suited to analytical procedures. One participant, however, explained that he/she could only provide an example of payroll because the performance of analytical procedures at his/her firm was limited to payroll substantive analytics. Another participant described how he/she used analytical

procedures, but made it clear that he/she did not obtain any assurance from it. This participant explained his/her use as follows: *"Firstly, with payroll do monthly analytical reviews. Say okay, this month it is extremely up, why? Okay they received bonuses, yes corroborate it with a salary slip, okay cool fine. So you don't get assurance out of it, but you do get the comfort in the sense of there are no additional weird things to look at"* **(P2:14, 18:18)**. Another participant was more sceptical and explained his/her reluctance to perform analytical procedures on payroll as follows: *"there are some people who love doing it with salaries … I have a different approach when it comes to salaries … for me the biggest problem with salaries is your variable compensation which is actually a small component of your total salary expense. That is where your risk lies and I don't think it will be highlighted with that process"* **(P16:15, 27:29)**.

One of these participants perceived analytical procedures during the fieldwork phase to be highly effective on accounts with a fixed-cost element: *"like a rental income or if you pay a monthly rental fee for using photocopiers"* **(P11:17, 37:37)**.

Other practical examples cited by one of these participants included the following: *"you decide either sales or cost of sales to go and audit in detail and then you take the other one and you start a comparison from there"* **(P16:10, 23:23)**.

"then people that offer a service, like us, or engineers and so on, I love to work with the time sheets to say that I have an expectation of time booked times charge out rate together with a recovery rate and I compare that with actual income" **(P16:13, 25:25).**

From the above it can be concluded that even though all four of the second-tier audit firm participants used analytical procedures during the fieldwork phase on payroll accounts, there was no consensus on the value they obtained from using such procedures. Some of the second-tier audit firm participants claimed that payroll analytical procedures did not provide assurance and did not highlight the underlying risks in the balance. In one instance, it was only done because the audit firm's methodology required it. Other accounts mentioned by second-tier audit firm participants on which analytical procedures were performed included

those with a fixed-cost element (rental income), accounts that could be used for comparisons (sales or cost of sales) or accounts that lend themselves to prediction (service income in relation to time sheet records) and these mainly related to statement of profit and loss and other comprehensive income accounts.

(iv) Summary

From the above it is evident that most of the second-tier audit firm participants used analytical procedures during the fieldwork phase to predict a balance in order to obtain audit assurance, and the level of assurance depended on the assertion under consideration. Concerns were expressed about the guidance provided by second-tier audit firms' methodologies relating to the amount of assurance from analytical procedures, the extent to which such procedures could be used and the type of accounts that could be used. One participant perceived the firm's methodology to be slowly changing to incorporate more analytical procedures. Analytical procedures in this phase were generally performed by lower-level staff, with managers providing guidance and assistance and software developments in IT (Excel) also contributing to such practice. It would appear from the view of one second-tier audit firm participant that partners were not involved in the performance of substantive analytical review procedures, except for consideration during a high-level review process. Although all second-tier audit firm participants mentioned the application of analytical procedures for payroll, there was a lack of consensus about the value of such procedures. It would appear that analytical procedures were used by second-tier audit firm participants for statement of profit and loss and other comprehensive income accounts with a fixed-cost element (e.g. rental income), allowing for comparisons (e.g. sales and cost of sales) and prediction (e.g. service income based on time sheets).

5.4.2.3 Conclusion, evaluation and reporting phase

(i) General

Three of the second-tier audit firm participants asserted that analytical procedures during the conclusion, evaluation and reporting phase of an audit were applied to obtain a high-level overview of the financial statements. They perceived the purpose of analytical procedures during this phase to be similar to

the purpose of analytical procedures during the planning phase. This was evident in the following view expressed by one of the second-tier audit firm participants: *"At the completion of the audit again it is just like an overview, so again it is not a detailed thing. You will basically just go back to your financials and look at your financials that you have audited now and compare that against what you have done in the planning"* **(P11:4, 17:17)**. Another second-tier audit firm participant concurred with this view, stating that "*you perform exactly the same work"* **(P16:25, 46:46)**. This second-tier audit firm participant went on to say that *"the completion phase we will look at mostly the same ratios as we looked at in the planning phase and we will look at whether they still talk to each other and if it is in line to what we expect"* **(P16:22, 42:42)**.

One of the second-tier audit firm participants stated the exact opposite: *"We don't really look at it"* **(P2:17, 21:21)**, indicating that he/she perceived the performance of analytical procedures to be unnecessary during the conclusion phase owing to his/her in-depth involvement in the audit process. He/she explained the statement as follows: *"me myself is very much involved in the audit … it is not something critical for me to do because I know how the annual financial statements look*" **(P2:18, 21:21)**.

The discussion above demonstrated that most second-tier audit firm participants applied analytical procedures during the conclusion, evaluation and reporting phase at a high level in order to assess the reasonability of the financial statements. These participants described their application of analytical procedures in this phase as being similar to that in the planning phase. One participant perceived the performance of analytical procedures during this phase to be unnecessary and ascribed this to his/her in-depth involvement in the audit process, resulting in a detailed understanding of the figures disclosed in the financial statements.

(ii) Performance and review

Second-tier audit firm participants indicated that the same individuals who were responsible for the performance and review of analytical procedures in the planning phase were responsible for analytical procedures in the conclusion

phase. One participant shared the following view: *"the senior will definitely do that [analytical procedures] as well because of the fact that they did that at the beginning they will also know what need to happen. It will trigger their memory again and then you will as a manager just review it again"* **(P11:13, 33:33)**.

Another participant referred to the partners' involvement in this phase as follows: *"partners also do high level review and if need be then he does a more detailed review"* **(P12:27, 88:88)**.

From the above discussion it can be concluded that the same individuals responsible for the application of analytical procedures during the planning phase were responsible for their application during the conclusion phase. Based on a view expressed by one of the participants, the partners' involvement with analytical procedures during this phase entailed a high-level review.

(iii) Techniques or methods

In general, second-tier audit firm participants perceived analytical procedures in the conclusion phase to provide them with an overview of the financials and to further assure them that all risk areas had been addressed. One participant described his/her use of analytical procedures during this phase as mainly comparisons between the audited figures and the figures for the previous year to ensure that the *"movements match the audit work we did in each section"* **(P12:23, 80:80)**. Another participant concurred with this view by stating that they *"compare that [the audited financial statements] against what you have done in the planning"* **(P11:4, 17:17)**.

Two of the second-tier audit firm participants mentioned the use of ratios during this phase. One of them described his/her performance of ratios as follows: *"the same ratios as we looked at in the planning phase. I would say specifically those key ratios, net profit ratios … you would just like to know overall*' **(P16:24, 42:42)**.

From the above views expressed by second-tier audit firm participants, it is evident that the application of analytical procedures during the conclusion, evaluation and reporting phase of an audit involved the use of simple techniques

such as comparisons and ratio analysis. These procedures were mainly performed to obtain an overview of the financial statements and to determine that all risk areas had been addressed.

(iv) Summary

Most second-tier audit firm participants reported that they used analytical procedures during the final phase of the audit, while one participant described it as unnecessary because of his/her high level of involvement in the audit. The participants perceived the objective of analytical procedures during the conclusion, evaluation and reporting phase as performing an overview, assessing the reasonability of the financial statements and determining that all risk areas had been covered. The same individuals responsible for the application of analytical procedures during the planning phase were responsible for their application during the conclusion phase. The use of analytical procedures during this phase was limited to the performance of simple techniques such as comparisons and ratio analysis.

5.4.2.4 The extent of use of analytical procedures

In general, second-tier audit firm participants perceived the extent of analytical procedures to be dependent on the size of the client and the extent to which management of the client company monitored their data. If the entity's internal controls were functioning effectively more analytical procedures could be performed. Two of these participants emphasised that in most of their audits they used analytical procedures to a limited extent. One of the two participants explained this as follows: *"we have a lot of small clients where it is actually a full blown detail substantive testing audit because they don't have internal controls … I call it a "me, myself and I" business"* **(P11:31, 59:59)**.

The same second-tier audit firm participant linked the use of analytical procedures to the auditor's knowledge of the business. This participant's view is reflected in the following statement: *"the more you know about the business the more reliable you can use substantive analytical procedures"* **(P11:8, 23:23)**. According to another participant, the experience levels of the audit team

members had an effect on the use of analytical procedures. This was substantiated by the following view expressed by this participant: *"If I go to an audit with first years, I will not tell them to go with analytics"* **(P16:29, 54:54)**.

It was apparent from the above perceptions of second-tier audit firm participants that the extent of analytical procedures depended on the client size, the client's internal control system, the auditor's knowledge of the business and the level of experience of audit team members.

5.4.2.5 Types of analytical procedures

The types of analytical procedures that second-tier audit firm participants used during the different phases of the audit process were dealt with in the discussions on the planning (section 5.4.2.1 (iii)), fieldwork (section 5.4.2.2 (iii)) and conclusion, evaluation and reporting (section 5.4.2.3 (iii)) phases. The discussion below addresses the factors that influence the auditor's decision about what type of analytical procedures to apply.

When asked how participants decide on the types of analytical procedures to be performed, one second-tier audit firm participant responded as follows: *"It will depend on the nature of the account or the balance that you are auditing, it will depend on the risks that you have identified, it will depend on the information that you have available"* **(P11:14, 35:35)**.

Two of the second-tier audit firm participants referred to the availability of IT experts in deciding on the types of procedures. Both participants mentioned the IT experts' abilities to perform CAATs. This was clear from the following statement made by one of these participants: *"the big clients in Johannesburg that are listed, for them that [IT expert involvement] would already be a requirement to run those CAATs"* (P16:43, 112:112).

From the above discussion, it is clear that factors such as the nature of the account balance, the auditor's evaluation of risk, the availability of client information and the availability of IT experts influenced the second-tier audit firm

participants' decision making on the types of analytical procedures that could be performed.

5.4.2.6 Investigation of differences

All four second-tier audit firm participants indicated that they commenced their investigation of differences by having discussions with the personnel in the client's financial department. Three of the four participants mentioned the value of having discussions with the financial manager. The other participant suggested that the discussions would depend on the client's size, and explained this as follows: *"… it's also client specific, if you're on a smaller client, because you're only addressing the financial manager, you go directly to the financial manager but our bigger clients for sure I've just been to the debtors person*" **(P12:60, 226:226)**.

Two of the four participants perceived trainees to be reluctant to corroborate management's explanations for differences, and according to these participants, trainees tended to stop their investigation once they had obtained an explanation. One of the second-tier audit firm participants acknowledged the value of using external sources in the investigation process, and had the following to say in this regard: *"If someone tells you travel has increased by so much due to the Gautrain, you cannot simply write it down you would have to investigate what [cost implications using] the Gautrain was last year and what is it this year*" **(P16:67, 184:184)**.

From the above discussion it is clear that second-tier audit firm participants mainly obtained explanations for differences in analytical procedures from a client's financial personnel. Two of the participants expressed their concerns about trainees' reluctance to obtain corroborating evidence for explanations. One of these participants perceived information obtained from external sources to be valuable in the investigation process.

5.4.2.7 Summary of the application of analytical procedures in the audit process

From the above discussion it is clear that most second-tier audit firm participants applied analytical procedures during all the phases of the audit process. Analytical procedures during the planning phase afforded the auditor the opportunity to identify risks and plan the audit. During the fieldwork phase, second-tier audit firm participants applied analytical procedures to obtain audit assurance and during the conclusion, evaluation and reporting phase, the performance of such procedures enabled them to obtain an overview to assess the reasonability of the financial statements and to determine that all risk areas had been covered. Based on the views of second-tier audit firm participants, it would appear that audit seniors performed analytical procedures during the planning phase of the audit. The same individuals were responsible for the performance of analytical procedures during the conclusion phase. Their work was reviewed by audit managers, and one second-tier audit firm participant maintained that partner involvement was limited to a high-level final review. During the fieldwork phase, lower-level staff members were involved in the performance of analytical procedures and this was attributed to general software (Excel) availability. All second-tier audit firm participants agreed that lower-level staff required guidance from experienced audit team members. These participants mainly used simple techniques (comparisons, trends and ratio analysis) when performing analytical procedures, and the emphasis during the fieldwork phase was on statement of profit and loss and other comprehensive income accounts with a fixed-cost element, which are conducive to comparisons and predictions. One participant deemed analytical procedures during the final phase of the audit to be unnecessary because of his/her high level of involvement in the audit.

The extent to which second-tier audit firm participants applied analytical procedures was dependent of factors such as the client's size, the monitoring of data by the client and internal control systems, the auditor's knowledge of the business and the auditor's level of experience. In deciding on the types of analytical procedures to be performed, second-tier audit firm participants

considered the nature of the account, the risks associated with the account, the availability of information and the use of IT experts.

For the investigation of differences in analytical procedures, second-tier audit firm participants mainly turned to the clients' financial personnel for explanations. A concern was expressed by two of the participants about audit trainees' reluctance to obtain corroborative evidence for explanations, and they suggested that external sources should be used in this regard.

5.4.3 Changes in the application of analytical procedures

5.4.3.1 General change

(i) The use of analytical procedures in the present

There was general consensus among second-tier audit firm participants that the application of analytical procedures had increased in past years. Three participants ascribed their increased use to new firm audit methodologies that provided them with more guidance and assistance in terms of how to conduct substantive analytical procedures. This was apparent in the following statement made by one participant: *"I think it is about two years that we have the [firm's] audit manual. So I think everyone's eyes have been opened. Back then it was about substantive procedures so you tested here and then you continued. So analytics was not really something that they really saw as something being worthwhile"* **(P16:45, 131:131)**. Two of the participants shared the view that they had only realised the value of analytical procedures once they had *"started understanding the methodology and use it"* **(P2:42, 78:78)**. Another second-tier audit firm participant, however, stated that although his/her firm had a new methodology, the firm *"is not a fan of substantive analytical procedures, it is just a little bit out of their comfort zone"* **(P12:20, 64:64)**.

According to one second-tier audit firm participant, in order for second-tier audit firms to stay competitive in a market dominated by the Big 4 audit firms, the second-tier audit firms had no choice but to change their audit methodologies. This participant explained that the Big 4 audit firms had the ability to perform

more cost-effective audits than the second-tier audit firms as they applied analytical procedures to a larger extent than second-tier audit firms. He/she explained this as follows: *"You cannot compare our [second-tier audit firms'] charge out rate to theirs [Big 4 audit firms] as theirs are much more but they still compete in the same market as we do … And the reason that they can do that is because most of the time we would tick hundred invoices and then they already went analytical"* **(P16:49, 143:145)**.

One second-tier audit firm participant asserted that nowadays, information is more easily and readily available than in the past and this enables auditors to perform more types of comparisons. *"So I think that is also what changed the use of it, it's not just a normal calculation of 12 times 10 000 and there you go. You can compare it against a lot of industry analysis and there is trend analysis out there and statistics and all sorts of things you can use. So that definitely changed, the information era if you can call it that*" **(P11:23, 46:46)**.

The above discussion indicates that the application of analytical procedures in second-tier audit firms has increased in the past few years. Second-tier audit firm participants ascribed their increased use of analytical procedures to the guidance provided by new firm audit methodologies as well as their increased understanding of the value of analytical procedures. The increased availability of information also afforded second-tier audit firm participants an opportunity to perform more comparisons. One of the participants perceived the second-tier audit firms to be in competition with the Big 4 audit firms, and argued that if second-tier audit firms could apply analytical procedures to a greater extent, they would become more effective and this would provide them with an advantage in the market currently dominated by the Big 4 audit firms.

(ii) The use of analytical procedures in the future

Three of the four second-tier audit firm participants expected to see an increase in the use of substantive analytical procedures in the future. One of these participants perceived IT to be driving an increase in control and analytical testing and was of the opinion that in future these two concepts would become increasingly integrated.

The fourth second-tier audit firm participant referred to the use of data analysis, and perceived this as an area on which audit firms other than the Big 4 could capitalise: *"at this stage it is not available for the medium and smaller clients and I think it could really help them a lot"* **(P16:56, 160:162).** The participant went on to say that in future, auditors' focus would be towards value adding because *"if you cannot do it then someone else will"* **(P16:50, 147:147)**.

From the above it is clear that second-tier audit firm participants perceived the use of substantive analytical procedures and data analysis as the audit of the future because of IT developments. One of the participants predicted that control and substantive analytical testing would become more integrated, and that this also pointed towards the use of data analysis. Another participant further predicted that for second-tier audit firms to challenge the market share of Big 4 audit firms, they would have to audit more effectively and substantive analytical procedures could provide a way forward.

(iii) Summary

From the above views expressed by second-tier audit firm participants, it was evident that the application of analytical procedures had increased in the past few years. These participants ascribed the increase in use to the implementation of new firm audit methodologies, which provided them with guidance on the application of substantive analytical procedures. Other factors that had driven this increase were the availability of more information as a result of IT developments and participants' deeper understanding of the value of substantive analytical procedures. Second-tier audit firm participants predicted that audits of the future would require the extensive use of substantive analytical procedures and data analysis. According to one of these participants, control and substantive analytical testing would become more integrated in the future. Another participant further predicted that for second-tier audit firms to challenge the market share of Big 4 audit firms, they would have to audit more effectively and add more value, and that an increase in the application of analytical procedures could provide a way forward.

5.4.3.2 Changes due to risk-based audit methodologies

According to two of the second-tier audit firm participants, the implementation of risk-based audit methodologies did not have an effect on their performance of analytical procedures. One of them perceived the emphasis still to be on tests of details and ascribed the firm's limited use of substantive analytical procedures to risks not being properly identified in the planning phase. The other participant described his/her firm's limited use to the process used by the IRBA during firm inspections as *"an IRBA problem",* stating that *"I feel there are some things [line items] that have no risks and you almost do not need to look at them but the IRBA still requires you to*" **(P16:52, 152:152)**.

One of the second-tier audit firm participants acknowledged that the implementation of risk-based audit methodologies had an effect on the performance of analytical procedures during the planning and conclusion phase, but he/she believed that the change did not impact on the extent of substantive analytical procedures because the firm had used substantive analytical procedures before. This participant explained this as follows: *"I don't think the execution phase of it so much because it was in any case, you know it is not like you know you will do more substantive analytical procedures just because it is a high risk client"* **(P11:24, 48:48)**. The last second-tier audit firm participant disagreed with the aforementioned participant, and referred to the use of the bucket approach whereby the risk assessment has an effect on one's extent of substantive analytical procedures.

From the above it is clear that there was no consensus among second-tier audit firm participants regarding the changes in the application of analytical procedures because of risk-based audit methodologies. According to two of the second-tier audit firm participants, the implementation of risk-based audit methodologies did not affect their application of analytical procedures and mentioned factors such as the auditor's inability to identify risks and regulatory requirements as reasons for the slow implementation of such procedures. One participant perceived the implementation of the firm's risk-based audit methodology to have an effect on analytical procedures during the planning and conclusion phases, but not on the

extent of substantive analytical procedures, because the firm had already emphasised such procedures. The last participant, however, perceived risk-based audit methodologies to drive the extent to which the auditor could apply substantive analytical procedures.

5.4.3.3 Changes due to IT

In general, second-tier audit firm participants concurred that IT developments have made it easier to develop expectations for the application of analytical procedures as information is more readily and easier available. All four participants referred to the use of general software such as Excel for the performance of analytical procedures. They ascribed their extensive use of Excel to a lack of *"an in-house developed audit tool"* **(P12:53. 197:197)** which could assist them with their performance of analytical procedures.

In their application of analytical procedures, second-tier audit firm participants mainly used Excel to identify exceptions. One participant described his/her use of Excel as follows: *"so it is more like data manipulation, play around with things, put things together to say okay I've got a population"* **(P2:48, 100:100)**. Another second-tier audit firm participant explained this as follows: *"We also have ways and means to do that [identify exceptions]"* **(P16:44, 116:116)**. These participants, however, acknowledged that their use of Excel to perform analysis depended on their own competence in using the software. According to one of these participants, *"I learned to program in Excel"* **(P16:32, 62:62)**, while another participant admitted that he/she relied on the trainees to analyse the data because *"I don't know how it [formulas in Excel] works*" **(P11:26, 50:50)**.

Two of the second-tier audit firm participants stated that their audit firms outsourced the analysis of data to external IT experts. One of them explained their firm's use of the IT experts as follows: *"We give that electronic data to them. They perform the CAATs for us and we get it back and we filter and evaluate and do what we then need to do*" **(P11:33, 68:68)**. The other two participants mentioned that although their firms did have IT experts, they rarely made use of them. One participant admitted that IT experts had better skills than he/she had,

but that he/she preferred to do the analysis himself/herself as it is more cost effective. Another participant perceived trainees to lack an understanding of the IT expert's work, stating the following: *"The IT audit will come and say do the assessment of the IT environment, you'll find a lot of the trainees not even reading the reporting, just putting it on file …"* **(P12:57, 204:204)**.

From the above it is clear that second-tier audit firm participants perceived the use of IT developments to have driven their increased use of analytical procedures. In general, participants made use of general software, such as Excel, to manipulate data in order to identify exceptions. All four second-tier audit firm participants perceived their ability to manipulate data to be dependent on their own competence. All these participants reported that their firms had access to IT experts either within the firm (as in the case of two of the participants) or from external sources (two participants mentioned outsourced practices). There was no consensus among second-tier audit firm participants on the value that IT experts can provide. Two of these participants felt that the work of IT experts added value, while the other two participants (with IT experts in their firms) were reluctant to use them. The reason cited by one of these participants was the cost implications of using IT experts, while the other participant preferred to perform analytical procedures because he/she deemed it to be more cost effective.

One interesting finding was that it appears if second-tier audit firms did not have IT expertise, outsourcing arrangements were made to obtain such expertise, and these participants were more inclined to use such expertise than their counterparts who had such expertise within the firms and expressed concern about the cost implications.

5.4.3.4 Changes due to non-financial information

In general, second-tier audit firm participants perceived non-financial information to be valuable in developing expectations for analytical procedures. According to one of these participants, *"it is not only just financial information that drives [analytical procedures], it is a lot of other information, non-financial information as well"* **(P11:34, 70:70)**. In addition, three second-tier audit firm participants

perceived non-financial information to be valuable for the identification of risks and fraud.

Overall, the second-tier audit firm participants indicated that they mostly obtained industry information from the annual financial statements that are publicly available on the internet for listed entities. They used these financial statements to perform comparisons between ratios such as gross profit percentages, inventory days, inventory turnover and debtor days. One participant used Google to collect information on the client and described his/her use of this as follows: *"when we consider the pre-engagement activities you will google the company name and browse through the first four items to ensure that there is no negative publicity"* **(P16:59, 170:170)**.

From the above it is clear that second-tier audit firm participants regarded the availability of non-financial information as an important driver of their performance of analytical procedures. The majority of these participants believed such information to be valuable for the identification of risks and fraud. These participants mainly referred to the annual financial statements that are publicly available on the internet to help them perform more detailed comparisons. One of the participants perceived Google to be a valuable source of evidence.

5.4.3.5 Summary of changes in the application of analytical procedures

From the sections on the discussion of changes in the application of analytical procedures it is clear that second-tier audit firm participants felt that the application of analytical procedures had increased in past years. This increase was ascribed to factors such as new firm audit methodologies, IT developments, the availability of data and auditors' competence. These participants referred to substantive analytical procedures and data analysis as the audit of the future, and one participant believed that for second-tier audit firms to challenge the Big 4 audit firms' market share, they would have to audit more effectively and this would require more emphasis on substantive analytical procedures.

There was a lack of consensus among participants on the effect that risk-based audit methodologies have had on the application of analytical procedures. The second-tier audit firm participant who mentioned that risk-based audit methodologies did not impact on their usage of analytical procedures ascribed his/her view to the auditor's inability to identify risks and regulatory requirements, in particular the IRBA firm inspections. Advances in IT have made information more readily available for use, and this has led to an increase in the application of analytical procedures. Participants from second-tier audit firms mainly used Excel to identify exceptions. Their success in identifying exceptions depended on their own competence. An interesting finding that emerged from the study was that all second-tier audit firm participants reported that they had access to IT experts, but those who sourced such expertise from outside, used it for analytical procedures, while those who had the IT expertise within the firm did not use these experts because of the cost implications. IT has further made non-financial information (e.g. on the industry) more available. Second-tier audit firm participants used this information to perform more detailed comparisons. These participants regarded the increased availability of non-financial information as an important driver in their performance of analytical procedures, and the majority of them viewed such information as valuable for identifying risks and fraud. Second-tier audit firm participants mainly used publicly available financial statements of listed companies to help them perform more detailed comparisons. One of the participants also referred to Google as a source of non-financial information.

5.4.4 The advantages of and challenges in the application of analytical procedures

5.4.4.1 Advantages

Three second-tier audit firm participants perceived the main benefit of the application of analytical procedures as the ability of such procedures to identify areas of risks for audit direction. One of these participants explained this as follows: *"it is a very effective tool to identify risks and to focus your audits where it is supposed to be focused"* **(P11:40, 82:82)**. Three participants described analytical procedures as cost effective because it *"saves loads of time"* **(P12:8,**

13:13), while another asserted that analytical procedures provide the auditor with a great deal of assurance.

One of the second-tier audit firm participants was of the view that the benefit was more than a mere cost saving. The participant perceived analytical procedures to add value to the client as their performance enabled the auditor to gain an understanding of the client's business, which in turn afforded the auditor an opportunity to give valuable feedback to the client. This could result in more sustainable income for the auditor because he/she could attract more clients and render additional services to existing clients. He/she explained this as follows: *"you want to have that [adding value] drive rather than having a 10% or 15% savings on costs … the possibility of future income and clients is where the main benefit is"* **(P16:70, 190:190)**.

From the above discussion based on the views expressed by second-tier audit firm participants, it can be concluded that analytical procedures can help the auditor to identify risks. Three second-tier audit firm participants referred to these procedures as cost effective because they save the auditor time, while providing him/her with audit assurance. One of the participants further perceived analytical procedures to add value to the client as they afford the auditor an opportunity to give valuable feedback to clients, and such value adding could ensure that the second-tier audit firm retains its clients or attracts further business.

5.4.4.2 Challenges

The views expressed by second-tier audit firm participants revealed that there are numerous challenges associated with the application of analytical procedures. In the following section, each of the identified challenges is discussed separately.

(i) Availability and integrity of data

In general, the second-tier audit firm participants perceived the availability of data to develop an expectation as a challenge. According to these participants, since their firms' client base usually consisted of smaller clients, these clients generally did not have the necessary internal controls and systems in place. The availability

and credibility of data could be compromised, and these factors impact on the development of their expectations. This was evident in the following two views expressed by participants from second-tier audit firms:

"because we have the smaller clients they would say to you they don't have a contract, they just know that this is what they pay. So then you can't use it [the data] reliably" **(P11:45, 87:87)**.

"you would have to ask so many questions and would have to make so many assumptions to get at a stage to say I can create an expectation, that it is not actually an expectation that you can compare with the actuals" **(P2:26, 51:51)**.

Two of the participants perceived the shortage of audit software to help them apply analytical procedures as a challenge. This was reflected in the view of one of them: *"the amount of data you have, the limit we sometimes have is that everything does not fit into Excel anymore*" **(P16:34, 71:71)**.

From the above it is clear that second-tier audit firm participants perceived the availability and credibility of data as a challenge in their application of analytical procedures. They ascribed the lack of credible information to their firms' client base, stating that they usually had small clients with limited internal controls and systems. Two of the participants further perceived the shortage of software to assist them with their expectations as a challenge.

(ii) Resistance to reducing tests of details

There was general consensus among the second-tier audit firm participants that they would not reduce the extent of tests of details based on the result of analytical procedures. One participant explained this as follows: *"analytical reviews for me are a risk assessment procedure, what I get won't minimise my standard procedures. I just won't make it more"* **(P2:64, 141:141)**. Another participant ascribed the resistance to reducing tests of details to risk assessment not being properly performed in the planning phase, which then compelled the auditor to *"just defaulting to test of detail"* **(P12:46, 179:179)**.

The same participant perceived auditors to be reluctant to reduce the extent of tests of details, and ascribed this reluctance to audit team members being *"just a little bit out of their comfort zone"* **(P12:19, 64:64)** and not wanting to apply their minds. Two other second-tier audit firm participants shared this view, stating that the performance of analytical procedures required a lot of judgement. One of them stated the following in this regard: *"trainees are scared of it because they don't understand it and not only just trainees even on a manager level. They don't really, they have never learned how to correctly apply it [their judgement]"* **(P11:22, 42:42)**.

One of the second-tier audit firm participants challenged the statement that analytical procedures are cost effective and defended his/her view as follows: *"you can't always do what the ISA [ISA 520] wants you to do, or they would say to you, you must do this and this and this, then I'm like I don't have the time"* **(P2:61, 137:137)**.

From the above it is clear that there was a resistance on the part of second-tier audit firm participants to reduce tests of details based on the results of analytical procedures. Analytical procedures were mainly used to identify risks and not to determine the extent of tests of details. These participants ascribed their resistance to reducing tests of details to them being uncomfortable about analytical procedures replacing tests of details because of the judgement required and risks not properly identified during the planning phase of the audit. According to one of these participants, analytical procedures took more time than tests of details.

(iii) Regulatory challenges

One of the second-tier audit firm participants perceived the main challenge in the application of analytical procedures to be deciding how much assurance one could obtain from analytical procedures. He/she described this challenge as being *"100% IRBA driven"* **(P16:53, 154:154)**. This participant went on to say that the extent of analytical procedures depended on the auditors' *"risk appetite"* **(P16:53, 156:156)** and that auditors preferred to play it safe as *"you don't know … what they [IRBA] want"* **(P16:74, 195:195)**. Another second-tier audit firm

participant concurred with this view and asserted that partners tended to shy away from the application of analytical procedures as they *"are scared to fail an [IRBA] review"* **(P12:39, 130:130)**.

The above discussion demonstrates that two second-tier audit firm participants regarded the lack of guidance from the auditing standard on the extent of assurance that could be placed on analytical procedures as a challenge. Both of these participants expressed the concern that this uncertainty could result in insufficient audit evidence being documented and the audit partner failing an audit inspection by the regulator, the IRBA.

(iv) Non-financial information

As discussed in section 5.4.3.4, in general, the second-tier audit firm participants regarded non-financial information as a valuable source of evidence. However, according to one of the participants, auditors were narrow minded, did not want to see the bigger picture and lacked the competence to identify relationships between financial and non-financial information. This participant explained his/her view as follows: *"if there is no level of skill to do a basic substantive analytical procedure, the level of skill [needed] to interpret external information [is much higher] … and auditors want something that tells you exactly what you must do"* **(P12:53, 204:204)**.

From the above it can be concluded that although the second-tier audit firm participants believed non-financial information to be a valuable source in performing analytical procedures, one of them believed that because of a lack of competence, auditors found it challenging to identify the relationships between financial and non-financial data.

(v) Competence of auditors

Overall, the second-tier audit firm participants perceived auditors to lack the skills necessary to perform analytical procedures. One of them shared his/her view as follows: *"not a lot of trainees have those skills and not a lot of the managers have those skills*" **(P11:43, 87:87)**. According to his/her, more emphasis should be placed on advanced computer skills (specifically advanced Excel skills) to identify

exceptions at university level. Another participant perceived trainees to have no logical thought process, not being able to apply their minds and referring back to their textbooks for guidance on audit procedures (see section 5.4.4.2 (iv)).

From the above it is evident that second-tier audit firm participants felt that auditors lack the necessary competencies to perform analytical procedures. According to them, trainees were not able to apply their minds, not demonstrating higher-order thinking skills because they tended to fall back on textbooks. One of these participants suggested that university curricula should make provision for education on advanced computer skills such as Excel to enable auditors to identify and interpret exceptions.

(vi) Summary of challenges

From the discussions in the sections above, it can be concluded that there are numerous challenges in the application of analytical procedures. These challenges include the lack of available data and software, the resistance of auditors to reduce tests of details, regulatory challenges, availability of non-financial information and auditor competence.

The availability and integrity of data is a challenge in the application of analytical procedures. This is especially true of second-tier audit firms, which participants from these firms ascribed to the nature of their clients (small clients with limited internal controls and systems) and the shortage of software because the participants tend to rely mainly on general software (such as Excel), which does not meet all requirements.

The discussion further indicated resistance on the part of auditors at all levels to reduce tests of details because second-tier audit firm participants perceived analytical procedures to be valuable for the identification of risks, but not for determining the extent of tests of details, and they were also uncomfortable with the judgement needed to apply analytical procedures. The lack of guidance provided in the auditing standard on the extent of assurance that can be obtained from analytical procedures also seemed to be a challenge as two second-tier audit firm participants were afraid to fail their firm inspections by the IRBA. The

section concluded with a discussion of the competence of auditors and indicated that second-tier audit firm participants perceived a "gap" between university studies and audit practice relating to the application of analytical procedures. These participants believed that this "gap" was also impacting negatively on the usage of non-financial information during the application of analytical procedures.

5.4.4.3 Summary of the advantages of and challenges in the application of analytical procedures

From the above discussions it is clear that there are numerous advantages and challenges in the application of analytical procedures. According to the second-tier audit firm participants, the main advantage of the application of analytical procedures was the assistance provided to the auditor in identifying risks. Some of them also felt that the usage of analytical procedures could result in time and cost savings and could provide audit evidence that could be used to add value to a client. One of these participants believed that by adding value, second-tier audit firm auditors could retain their clients and attract further business.

Challenges identified by the participants included the availability and integrity of data, auditors' reluctance to reduce tests of details, the lack of guidance provided by regulatory bodies, the incorporation of non-financial information and the competence of auditors.

5.5 RESEARCH FINDINGS – CASE 3: AGSA

5.5.1 The need to apply analytical procedures

5.5.1.1 General need

In general, the AGSA participants perceived the performance of analytical procedures to increase audit efficiency because such procedures have the ability to provide audit evidence on the entire population and enable the auditor to *"audit smarter"* **(P13:3, 10:10)** as *"it speeds up the [audit] process"* **(P15:7, 31:31)**. They described analytical procedures as effective in identifying areas of risk because

the application of such procedures would provide the auditor with an understanding of the entity and the data. This view was reflected in the following statements of two AGSA participants:

"it [analytical procedures] helps you focus because you do one thing and you identify areas where you will then have to zoom in" **(P14:4, 9:11)**.

"… that you can identify, we call it exceptions that is non-homogeneous … and to analyse trends and pick up irregularities" **(P13:1, 10:10)**.

One of the AGSA participants shared the view that analytical procedures, and specifically data analysis, should be embedded in the entire audit process otherwise the auditor "*cannot complete the audit process"*. Another participant also supported the need to perform data analysis by describing it as follows: *"I mean technology influence[s] the need for analytical procedures"* **(P14:29, 99:99)**.

5.5.1.2 Summary of the need to apply analytical procedures

From the above it is clear that the AGSA participants perceived the performance of analytical procedures to increase audit efficiency because it provides the auditor with audit evidence of the entire population within a short timeframe. It can be used for the identification of risks as it enables the auditor to identify exceptions. According to some of the AGSA participants, advancements in technology, and more specifically data analysis, had increased the need for analytical procedures, and they argued that these procedures should be an integral part of the audit process.

5.5.2 The application of analytical procedures in the audit process

5.5.2.1 Planning phase

(i) General

There was general consensus among AGSA participants that analytical procedures in the planning phase were mainly used to identify risks. One AGSA

participant described this use as *"just sort of a risk identification thing"* **(P13:37, 14:14),** while another referred to it as a *"risk assessment tool"* **(P14:5, 15:15)**.

One of the AGSA participants referred to the value of using IT experts during the planning phase to help identify risks. This participant's view is reflected in the following statement: *"we have our IT auditors to pull data from our clients or sometimes we provide them with the data, and then they will do like checks on it as part of planning to say look for indicators of fictitious transactions, look for indicators of conflict of interest* **(P14:5, 13:15)**. The participant further suggested that the risk assessment done by the IT experts assisted them with the planning of their further procedures.

The above discussion provided evidence that the AGSA participants performed analytical procedures during the planning phase in order to identify risks. IT experts played a vital role assisting with the application of analytical procedures, resulting in the identification of risk indicators as their findings were used by auditors to plan their further audit procedures.

(ii) Performance and review

When asked who was mainly responsible for the performance and review of analytical procedures during the planning phase of the audit, one of the AGSA participants responded as follows: *"Our trainees in their second year, they mostly do the planning … our first level review is sometimes assistant manager but the analytics will be reviewed by a manager"* **(P13:12, 32:32)**.

When asked about the audit partner's involvement in the review process, the participant explained that in the firm's hierarchy, the senior managers were defined as the engagement partners. The participant went on to say that *"they [senior managers] are only required to review it [analytical procedures] if it's related to a significant risk"* **(P13:15, 38:38)**.

One of the other AGSA participants, however, had a different view, which he/she explained as follows: *"During the planning phase, the guys who do the risk assessment procedures would be our information system auditors because they*

have the tools to run through the population and give us the results" **(P14:7, 43:43)**.

From the above views expressed by the AGSA participants, it can be concluded that diverse views were expressed about the parties responsible for the performance of analytical procedures during the planning phase of the audit. Analytical procedures were performed by second-year audit trainees and reviewed by the audit manager, and the partner's (or senior manager in the AGSA) involvement was then limited to the review of analytical procedures relating to a significant risk. A counter view was that the involvement of IT experts could add value to the audit as they used audit support software to identify risks.

(iii) Techniques or methods

In general, the AGSA participants indicated that their use of analytical procedures in the planning phase mainly consisted of comparisons. One of these participants emphasised that besides comparing the current year's figures to those from the previous year, he/she also compared the current year's figures with the budgeted figures. The participant explained that in their environment, the public sector environment, *"government budget is so important"* **(P13:5, 12:12)**.

One of the AGSA participants provided two practical examples on how the IT auditor could assist with the identification of risks at that planning phase. The first example referred to the use of CAATs to identify risks during the planning phase. The participant's view is reflected in the following statement: *"You have an audit procedure to identify ghost employees. There are three tests for this; does the person have a valid ID number, does he have medical aid, does he have pension? If you add these factors you can identify a risk transaction. It is not necessarily that the person is a ghost employee, but the person is now pinpointed"* **(P15:5, 29:29)**. The aforementioned participant explained that CAATs were pre-defined procedures and could be regarded *"an audit procedure which we turned into an analytical procedure and which you execute"* **(P15:4, 27:27)**.

The second example refers to the use of data enhancement techniques that provided the auditor with a broader database for the identification of risks. The

participant explained his/her use of data enhancement techniques as follows: "*that is basically where you take employee information and do a population register. From the population register I can check your ID number and determine who your spouse is. So this gives me more information, which I did not have in the single population register. It is a data enhancement exercise which enables you to do your work properly*" **(P15:9, 39:39)**.

From the above it is clear that the AGSA participants preferred the use of comparisons in their performance of analytical procedures during the planning phase of an audit. They deemed the comparison of current year figures to budgeted figures to be an important procedure in the public sector environment where budget allocations drive behaviour. The discussion further demonstrated that the IT expert could perform CAATs and data enhancement techniques in the performance of analytical procedures during this phase.

(iv) Summary

The AGSA participants performed analytical procedures at the planning phase primarily for the identification or risks. Risks identified by IT experts involved in this process assisted them with the planning of further procedures. Diverse views were expressed about the parties responsible for analytical procedures during the planning phase of the audit. One view was that analytical procedures during this phase were performed by second-year audit trainees and reviewed by the audit manager, while the partners' involvement was limited. A counter view was that IT experts took responsibility for the application of analytical procedures during this phase of the audit. Participants perceived the use of comparisons, specifically comparisons to budget figures as an important procedure for the identification of risks. The prominence given to budgets is understandable because of budgetary control in the public sector (RSA 2009). The AGSA participants acknowledged the value that IT experts could add to the audit as they had the tools to perform CAATs and data enhancement techniques in their performance of analytical procedures.

5.5.2.2 Fieldwork phase

(i) General

In general, the AGSA participants perceived the development of an expectation for the performance of substantive analytical procedures during the fieldwork phase of an audit as *"not very effective"* **(P14:8, 21:21)** and *"not successful"* **(P13:7, 24:24)**. One of them explained that even though the AGSA's methodology supported the development of an expectation, which should fall within a certain interval, he/she found it difficult "*to find reliable based data or data that you can actually develop an expectation from"* **(P13:7, 24:24).**

One of the AGSA participants further mentioned that his/her use of analytical procedures in the fieldwork phase was limited to the exceptions identified by the IT expert during the planning phase of the audit. Another AGSA participant concurred with this view and described his/her use of the procedures as follows: *"test if the exceptions are valid and if it's valid … verify the extent of such exception and then report that there's a misstatement or non-compliance"* **(P14:19, 53:53)**.

All three AGSA participants mentioned their reluctance to perform substantive analytical procedures as the firm's methodology classified these procedures as a level one assurance, which means they should be done in conjunction with tests of controls and/or substantive tests of details. Hence these procedures do not carry the weight of substantive tests of details which could serve as an appropriate audit procedure on its own. Participants' reluctance was evident in the following statement: *"we have relied more on, you know … normal traditional testing"* **(P14:9, 21:21)**. One participant expressed his/her frustration about the level of assurance that could be placed on substantive analytical procedures as follows: *"Substantive analytics is re-performance. It is like taking a calculator, recalculating something and then confirming the results. So why is it not at the same level?"* **(P15:3, 21:21)**.

Two of the AGSA participants, however, did refer to the development of a new firm methodology, which would support increased use of analytical procedures

during the fieldwork phase of the audit. This was reflected in the following statement of one of the two participants: *"what they're proposing to change is to actually bring in more computer type analytics and train staff more to be able to use the computer to extract the data and just do calculations without having to actually do substantive test of details"* **(P13:20, 48:48)**.

The above indicates that the AGSA participants were reluctant to perform analytical procedures during the fieldwork phase as they perceived them to be unsuccessful and ineffective. They ascribed their limited performance of analytical procedures during the fieldwork phase to the shortage or reliable data as well as their firm's methodology of not acknowledging the value of these procedures. The AGSA audit methodology only made provision for performing analytical procedures together with tests of controls and/or substantive tests of details. Two of the AGSA participants, however, perceived the firm's attitude towards the assurance that could be placed on analytical procedures to be changing. According to these two participants, the performance of analytical procedures during the fieldwork phase was to be limited to the investigation of exceptions which had been identified by IT experts during the planning phase of the audit.

(ii) Performance and review

Overall, the AGSA participants indicated that it was mostly *"trainees under supervision of the audit manager and the assistant manager"* **(P14:19, 53:53)** who were responsible for applying analytical procedures during the fieldwork phase. One of these participants, however, asserted that substantive analytical procedures could not be performed by first-year trainees because *"it is a bit complicated"* **(P13:13, 34:34)**. This participant indicated that he/she would allocate the audit work to the second- and third-year trainees and that the audit manager would review the work.

According to one of the AGSA participants, the implementation of the new methodology would place a responsibility on the senior manager (the partner level at the AGSA) to be more involved in the performance of analytical procedures. This participant's view was reflected in the following statement: *"going forward with the new methodology, is that the senior manager who's*

partner equivalent, will have to one, identify the type of procedure that's needed to be performed and then pull the data that's needed to be performed indicating the fields from the data that should be basically analysed" **(P14:23, 67:67)**.

From the above it is clear that analytical procedures during the fieldwork phase of an audit were usually performed by trainees and reviewed by the audit manager. However, there were conflicting views on the allocation of analytical procedures to first-year trainees as one AGSA participant perceived the application of these procedures to be too complicated. Another participant posited that the audit manager should provide guidance to the trainee responsible for the performance of substantive analytical procedures. One of the AGSA participants predicted that in the future, with the introduction of the firm's new audit methodology, there would be increased involvement at senior manager level (equivalent to partner level at other firms) in the application of analytical procedures during the fieldwork phase of the audit.

(iii) Techniques or methods

In general, the AGSA participants indicated that they performed analytical procedures to a limited extent during the fieldwork phase. Two of these participants described their use of analytical procedures as being limited to investigations of exceptions identified by IT experts. One of these two participants referred to the work done by IT experts on *"employee cost and supply chain management"* **(P13:23, 40:40)**.

The third AGSA participant provided the following practical example of how the IT expert could assist them in applying substantive analytical procedures:

"[IT experts] reconcile it [data] in such a way to enable the [auditor] to perform an audit. [IT experts] ensure that the population is complete, before [the auditor] can draw his samples and before he can start doing his work" **(P15:5, 29:29)**.

The above quotation indicates that the AGSA participants perceived their performance of analytical procedures during the fieldwork phase to be limited to investigations of exceptions identified during the planning phase of the audit in

accounts such as employee cost (section 5.5.2.1) and supply chain management. One AGSA participant explained how IT experts could then further assist during the fieldwork phase to prepare data for substantive analytical procedures.

(iv) Summary

It is clear from the above discussions that analytical procedures that enable the auditor to develop an expectation were performed to a limited extent since the AGSA participants perceived the application of these procedures to be ineffective. These participants were more inclined to investigate exceptions identified by IT experts in the performance of their analytical procedures during the planning phase of the audit. The reasons given for participants' limited use included poor data quality and the firm's current methodology of not encouraging the use of such procedures. The AGSA audit methodology requires that analytical procedures should be applied in conjunction with tests of controls and/or substantive tests of details.

Analytical procedures during the fieldwork phase of an audit were performed by trainees, with guidance from and reviewed by the audit manager. With the introduction of the AGSA's new audit methodology, increased involvement at senior manager level (equivalent to partner level at other firms) was foreseen during the fieldwork phase of the audit. The AGSA participants perceived exceptions identified by IT experts on accounts such as employee cost and supply chain management to be valuable. In addition, one participant explained how IT experts could assist with the preparation of the data which would enable the auditor to perform substantive analytical procedures. It therefore appears that the AGSA participants placed much reliance on IT experts (to identify exceptions during the planning phase and prepare data in the fieldwork phase) to apply analytical procedures.

5.5.2.3 Conclusion, evaluation and reporting phase

(i) General

In general, the AGSA participants perceived the purpose of analytical procedures in the conclusion phase to be similar to the purpose of analytical procedures in

the planning phase. This was reflected in the following statement made by an AGSA participant: *"planning and the final analytical review … that's just sort of a risk identification thing"* **(P13:9, 28:28)**. The aforementioned participant described his/her use of analytical procedures during this phase as *"just having a relook at the financial statements"* **(P13:8, 26:26)**. One of these participants perceived analytical procedures in this phase to be done at a high level and described it as follows: *"it is just basic"* **(P14:12, 35:35)**.

The above discussion demonstrates that the AGSA participants regarded the objective of analytical procedures during the planning phase and conclusion phase as being similar. During the planning phase, analytical procedures were performed to identify risks, while during the conclusion phase they were applied to reassess the risks. The performance of these procedures during both phases of the audit was at a high level.

(ii) Performance and review

When asked who was responsible for the performance and review of analytical procedures during the conclusion phase of an audit, one of the AGSA participants shared the following view: *"our third year trainees usually deal with the completion and the finalisation so it'll usually be a third year and obviously reviewed by a manager again"* **(P13:14, 36:36)**. Another participant's view was reflected in the following statement: *"Again the managers"* **(P14:21, 58:58)**. It was evident from both participants' views that involvement at manager level was necessary, and this was also the case for the planning phase of the audit.

The above discussion indicates that third-year trainees were responsible for the performance of analytical procedures during the conclusion, evaluation and reporting phase and, as in the case of the planning phase of the audit, the managers reviewed the audit work.

(iii) Techniques or methods

In general, the AGSA participants indicated that their performance of analytical review in the conclusion phase consisted of comparisons. One of them described this as follows: *"… you're finding closure to compare balances"* **(P14:12, 35:35)**.

He/she explained that the comparisons helped him/her to assess the reasonability of the financial statements. Another participant concurred with this view by stating that procedures during the *"completion phase [are] the same thing as the planning phase"* **(P13:8, 26:26)**.

On the basis of the above discussion, it can be concluded that the application of analytical procedures by the AGSA participants involved the use of simple techniques such as comparisons and these were mainly performed to assess the reasonability of the financial statements. The comparisons performed during the completion phase were similar to those being performed during the planning phase.

(iv) Summary

The AGSA participants perceived the objective of analytical procedures to be similar during the planning and conclusion phases of an audit to identify and reassess risks. Analytical procedures during the conclusion phase consisted mainly of comparisons at a high level in order to reassess risks. Analytical procedures during the conclusion, evaluation and reporting phases were mainly performed by third-year trainees and, as in the case of the planning phase of the audit, managers reviewed the work. An interesting finding was that the AGSA participants explained the involvement of IT experts in the performance of analytical procedures during the planning and fieldwork phases of the audit, while they were silent on IT experts' involvement during the conclusion phase of the audit.

5.5.2.4 The extent of use of analytical procedures

In general, the AGSA participants indicated that they performed analytical procedures to a larger extent during the planning and conclusion phases of an audit than during the fieldwork phase. This was evident in the following view of one of the AGSA participants: *"We always do the planning and the final analytical review … depending on the suitability of the data, we perform analytical procedures [during the fieldwork phase] whenever it's possible"* **(P13:10, 28:28)**. One of the AGSA participants concurred with the aforementioned participant's

view that the extent depended on the availability and quality of clients' data, but he/she also blamed their limited use on the auditor's perceptions of the usefulness of analytical procedures. This view was reflected in the following statement made by the participant: *"if you were to look at ourselves as to say we haven't reached a point where we appreciate the contribution of analytical procedures, we have been traditionally relying on tests of detail"* **(P14:16, 41:41)**.

Two of the participants perceived the AGSA's methodology to be slowly changing towards applying more analytical procedures during the fieldwork phase. They ascribed the change in audit methodology to cost considerations and the advancement of IT. These opinions were evident in the following two statements of the participants:

"and now there's pressure coming in [to perform more analytical procedures] because I mean we don't have the luxury anymore to just audit and audit and audit" **(P13:20, 48:48)**.

"We've also as an organisation got to a point where we've realised that technology is pushing us towards relying more on analytics" **(P14:25, 85:85)**.

According to the same two AGSA participants, the extent of analytical procedures depended on risk identification. One of them suggested that procurement and contract management had become a focus area in the public sector where *"we increase the extent of our data analytics to minimise our risk*" **(P14:7, 19:19)**. The other participant referred to employee cost and supply chain management as an area of increased focus.

From the above it is clear that the AGSA participants performed analytical procedures to a larger extent during the planning and conclusion phases of an audit than during the fieldwork phase. Participants perceived the availability and quality of data as well as the auditor's assessment of risks to have a direct impact on the extent to which auditors could apply analytical procedures. Participants indicated that areas such as contract and procurement management, employee cost and supply chain management were identified as areas of high risk in the

public sector for which the extent of data analysis should be increased in order to test the whole population.

One of the AGSA participants perceived the inclusion of analytical procedures during the fieldwork phase of the audit to be slow owing to the availability and quality of clients' data and auditors' negative perceptions of the usefulness of analytical procedures because they had traditionally relied on tests of details. Two of the AGSA participants, however, maintained that the AGSA's methodology was slowly changing to incorporate more analytical procedures.

5.5.2.5 Types of analytical procedures

The types of analytical procedures that the AGSA participants used during the different phases of the audit process were dealt with in the discussions on the planning (section 5.5.2.1 (iii)), fieldwork (section 5.5.2.2 (iii)) and conclusion, evaluation and reporting (section 5.5.2.3 (iii)) phases. The discussion below addresses the factors that influence the auditor's decision about what type of analytical procedures to apply.

In general, the AGSA participants perceived the firm's methodology to provide guidance on the type of analytical procedures that could be performed. According to one AGSA participant, *"it's basically a standard type procedure which was prescribed by our audit research and development unit to say for these type of clients, [at a] minimum, these are the things that needs to be done"* **(P14:22, 65:65)**.

All three AGSA participants mentioned the use of IT experts in deciding on the types of analytical procedures that could be performed. Some of these participants perceived the performance of CAATs by IT experts on accounts with increased risk such as employee cost, supply chain management and procurement to be valuable. As one of the AGSA participants explained: *"we've got an information system auditing section, so they actually do the CAATs analysis of certain areas. So they assist us mainly in the area of employee cost and supply chain management"* **(P13:17, 40:40)**.

From the above it is clear that the AGSA's methodology provided guidance on the type of analytical procedures that could be performed. The nature of the account balance, related risks and the use of IT experts influenced the participants' decision making on the types of analytical procedures to apply.

5.5.2.6 Investigation of differences

In general, the AGSA participants indicated that if they found a difference between an expectation and management's representations, they reverted back to tests of details. According to one of the participants, *"then we have to cancel the whole procedure unfortunately so then the procedure is unsuccessful and you have to do something else … so then you have to revert to standard test of details"* **(P13:34, 80:80)**. This participant explained that if a material difference was found, he/she would regard the analytical procedure as "*an unsuccessful procedure*" **(P13:34, 80:80)**.

One of the AGSA participants referred to the exceptions identified by the IT experts in the performance of CAATs or data analysis. This participant described his investigation of exceptions as follows: *"in the event that we pick up that there are valid exceptions and then try and extend, you know, our detailed testing"* **(P14:40, 136:136)**.

The above discussion demonstrated that the AGSA participants perceived analytical procedures to be unsuccessful if there was a difference between their own expectations and management's representations. In such instances, these participants would revert back to tests of details.

5.5.2.7 Summary of the application of analytical procedures in the audit process

From the discussion in the above sections it is clear that although the AGSA participants performed analytical procedures to a limited extent, they applied them during all phases of the audit process. During the planning phase, participants perceived analytical procedures to be valuable for the identification of

risks and to plan their further audit procedures. During the fieldwork phase, they perceived analytical procedures to be performed to a limited extent and they were inclined to investigate exceptions identified by IT experts during the planning phase of the audit. These participants ascribed their limited use to the poor quality of the data and the firm's methodology, which did not encourage the use these procedures. Analytical procedures during the conclusion, evaluation and reporting phase were similar to those performed during the planning phase of the audit and were performed at a high level in order to reassess the risks.

Analytical procedures during the planning phase of an audit were performed by second-year audit trainees and reviewed by the audit manager. During the fieldwork phase, according to the participants, irrespective of the level of experience, the audit manager should provide guidance to the trainee responsible for applying analytical procedures. During the conclusion phase of the audit, analytical procedures were mainly performed by third-year audit trainees and, as in the case of the other phases, audit managers reviewed the work. An interesting finding was that IT expert involvement in the performance of analytical procedures was mentioned in relation to the planning and fieldwork phase of the audit in contrast to no mention of their involvement during the conclusion phase of the audit.

The AGSA participants mainly performed simple techniques (such as comparisons with budgets, an important financial control indicator in the public sector (RSA 2009)) when performing analytical procedures during the planning and conclusion phases. During the fieldwork phase, their performance was limited to investigations of exceptions identified by IT experts in high-risk accounts during the planning phase of the audit. In addition, IT experts assisted AGSA participants with the data preparation for substantive analytical procedures. It therefore appears that the AGSA participants placed much reliance on IT experts in their performance of analytical procedures. Participants perceived the availability and quality of data, the auditor's risk assessment and the auditor's perceptions of the usefulness of analytical procedures to have an impact on the extent of their performance of analytical procedures. Based on the views of the AGSA participants, indications were that with the introduction of the

new methodology, the AGSA would place more emphasis on analytical procedures. Hence this implies that these procedures would be used more extensively and senior manager (equivalent to partners) would also become more involved with the performance of analytical procedures. In deciding on the types of analytical procedures to be applied, the participants referred to the guidance provided by the firm's methodology, the nature of the account balance, related risks and the use of IT experts.

For the investigation of differences in analytical procedures, the participants mainly reverted back to tests of details.

5.5.3 Changes in the application of analytical procedures

5.5.3.1 General change

(i) The use of analytical procedures in the past

In general, the AGSA participants felt that the application of analytical procedures had changed in recent years. Two of these participants described their use of analytical procedures in the past as follows:

"when I joined … it [the use of analytical procedures] was almost zero, … analytics just did not exist" **(P14:24, 83:83)**.

"we were used to nothing, no analytics at all" **(P13:20, 48:48)**.

These views indicated that past practices at the AGSA did not consider analytical procedures in the performance of audits.

(ii) The use of analytical procedures in the present

In general, the AGSA participants perceived the application of analytical procedures to be *"getting more attention"* **(P14:24, 85:85)**. Participants ascribed their increased use of analytical procedures to continuous changes in the firm's methodologies. Two of the AGSA participants ascribed these changes to cost

considerations as well as the advancement of IT. These two participants' views were as follows:

"We've also as an organisation got to a point where we've realised that technology is pushing us towards relying more on analytics because we're getting to a point where less and less papers are kept so data sits now on the computers" **(P14:10, 25:25)**.

"everyone's under pressure obviously to save cost, so this methodology, the new one … is more based in terms of how can we save costs … we don't have the luxury anymore to just audit and audit and audit … so there's pressure now to use the computer more" **(P13:20, 48:48)**.

One of the aforementioned participants cautioned that increased use of analytical procedures and specifically data analysis would require the AGSA to *"prepare the client as much as we prepare ourselves"* **(P14:10, 25:25)**. This participant asserted that the performance of data analysis would require both the audit team and the client to become receptive to the change before they could successfully apply data analysis.

From the above discussion it is clear that the AGSA participants felt that there was a greater focus on the application of analytical procedures than in the past in the AGSA practices. The reasons they put forward for the increased application of analytical procedures were changes in the firm's methodologies, cost considerations and the advancement of technologies. Indications are that the AGSA's methodologies will continue to evolve. In this regard, one of the AGSA participants cautioned that an increased application of analytical procedures would require the audit team and the client to be receptive to the changes.

(iii) The use of analytical procedures in the future

In general, the AGSA participants expected to see an increase in the use of data analysis in the future. They perceived advances in technology to be driving this increase. This was reflected in the following statement of one of the participants: *"the more you move forward with technology, the more you will have to do data*

analytics" **(P14:30, 101:101)**. Another participant concurred with this view and explained this as follows: *"So I think what will change in future … is to actually bring in more computer type analytics and train staff more to be able to use the computer to extract the data and just do calculations without having to actually do substantive test of details*" **(P13:20, 48:48)**.

One of the AGSA participants predicted the use of a risk assessment model in future, which would integrate financial and non-financial information to identify risks or fraud. This participant described the use of the model as follows: *"to look at the whole environment, various factors that contribute to it and social media or big data and then it [the model] gives you answers [relating to risks]"* **(P15:6, 31:31)**. The participant went on to explain that it is about integrating *"social media, newspaper articles, twitter"* **(P15:15, 93:93)**. He/she provided the following practical example of how the model would be used to identify fraud: *"if one can browse the internet [social media, newspaper articles, twitter] and discover through this process that there is an accusation against a specific government official about an offence. This does not exist in any system. So I get that, I pull it through and match it with his entity, or I can even broaden it and match it with his spouse and then I build the picture out".* This participant described this integration of financial and non-financial information as "big data" and perceived the use of "big data" as a *"long-term goal"* **(P15:6, 31:31)**.

From the above it is clear that the AGSA participants expected to see an increase in the application of analytical procedures, specifically the use of data analysis, in the future. They perceived advances in technology to be the main reason for the increased use of these procedures in the future. One participant predicted the use of a risk assessment model in future which would be able to integrate financial and non-financial information for the identification of risks and fraud. The participant described this as using "big data" for the identification of risks and fraud. However, he/she added that this would not happen in the near future.

(iv) Summary

From the above views expressed by AGSA participants, it was clear that past practices at the AGSA did not involve analytical procedures and that the

application of these procedures, specifically data analysis, had increased over time. In the preceding few years, the AGSA participants had not applied analytical procedures in their execution of audit procedures. The participants ascribed their increased application of analytical procedures to changes in the firm's methodologies, cost considerations and the advancement of technologies. One AGSA participant perceived an increase in the use of "big data" involving financial and non-financial information for the identification of risks and fraud but he/she believed that such a change would take some time.

5.5.3.2 Changes due to risk-based audit methodologies

In general, the AGSA participants were supportive of risk-based audit methodologies as these provide the auditor with an overall view of the client's financial position and operations. One of them explained this as follows: *"so there is a big focus on analysing the data you know, what does the financial statements tell you at face value before you even start digging into the transactions"* **(P13:26, 58:58)**.

According to two of the AGSA participants implementation of risk-based audit methodologies had focused the auditor's attention on areas of risk. One of these participants regarded the use of analytical procedures as extremely applicable in their environment *"because of the nature of our auditees"* **(P14:28, 95:95)**. The same participant cited the following practical example of his/her use of a risk-based audit methodology: *"there was a huge risk of fraud around contract and procurement therefore we thought no, let's use analytical accounts to cover a big pool of the data set and identify contracts or areas that are indicators of fraud"* **(14:28, 93:93)**.

The third AGSA participant was more sceptical and cautioned that auditors rely too heavily on the use of the IT experts to identify risk areas. The participant's view was as follows: *"An audit is supposed to be risk-based. Most people forget this the moment they work with data. Suddenly [the auditor] does not [identify] a risk, there are no objectives and [the IT expert] are now going to miraculously fix*

it. It does not work like that, you still have to start with the requirement, pulling it through and checking whether the data can support it" **(P15:11, 57:57)**.

One of the AGSA participants perceived the effectiveness of analytical procedures as a risk assessment procedure to be dependent on the auditor's knowledge of the public sector. He/she stated that in the public sector, the auditor should know how the operations of one state department could impact on the operations of another state department. He/she went on to explain that it is important *"that we don't have a situation where police are saying crime [is] going down in the country but then you have correctional services on the other hand saying the number of cases or inmates coming in has gone up*" **(P14:37, 126:126)**.

The above discussion demonstrated that AGSA participants supported the implementation of risk-based audit methodology because it provided the auditor with a holistic view of the clients' financial position and operations and enabled him or her to focus attention on areas of risks and indicators of fraud. A risk-based audit methodology was deemed to be especially applicable to the public sector audit environment as the identification of fraud in the audit of public entities was receiving a lot of attention. One of the AGSA participants perceived the effectiveness of analytical procedures to depend on the auditor's knowledge of the public sector as a whole because the operations of one state department could influence the operations of other state departments. One of these participants cautioned that these developments tend to make auditors reluctant to perform their own risk identification procedures and motivate them to rely too heavily on IT experts to identify of risk areas.

5.5.3.3 Changes due to IT

In general, the AGSA participants perceived technology to be driving an increase in their use of analytical procedures and data analysis. According to one of the participants, auditors in the current business environment have no choice but to rely on analytical procedures because *"we are getting to a point where less and less papers are kept so data sits now on the computers"* **(P14:25, 85:85)**. This

participant went on to say that auditors would have to *"use computers to audit smart"* **(P14:47, 154:154)**.

All three of the AGSA participants perceived their clients' systems to have a direct influence on their performance of analytical procedures. One of them stated that although there were enough audit tools available to perform analytical procedures, the auditees' systems remained a concern. According to this participant, *"it depends where our clients move … where government moves, if their systems can be better and they can use better stable technology, then that will assist us to do more analytics"* **(P13:29, 60:60)**. Another participant agreed with the aforementioned participant as follows: *"It [IT] can speed up the process but you would not necessarily get more value out of the process until you address the data quality"* **(P15:14, 83:83)**. The other participant, however, had a more positive view: *"our clients are improving on their systems because it's easy now to capture data on the computers and transmit and … share the data"* **(P14:25, 87:87)**.

From the above views expressed by the AGSA participants it is clear that advancements in IT have compelled and enabled auditors to perform more analytical procedures as well as data analysis. The participants acknowledged the role of audit support systems in the application of analytical procedures, but indicated that the quality of client data and auditees systems remained limiting factors in their use of these procedures. One of the participants, however, indicated that the clients' systems were improving, which was conducive to the performance of analytical procedures and data analysis.

5.5.3.4 Changes due to non-financial information

In general, the AGSA participants perceived the use of non-financial information for the development of an expectation to be valuable. One of them maintained that financial and non-financial information had *"to talk to each other"* **(P13:32, 74:74)**. All three AGSA participants indicated that they already used non-financial information in the performance of analytical procedures. One of the three participants explained this as follows: *"in our environment there is also pressure*

to be able to link the two [financial and non-financial information]" **(P13:32, 74:74)**.

One of the AGSA participants referred to the use of non-information that the AGSA receives from Statistics South Africa, the Human Sciences Research Council and the South African Social Security Agency. This participant explained his/her use of the information as follows: *"if we integrate what those researchers are telling us versus what the department [the auditee] is telling us, we are able to get a clear picture"* **(P14:32, 105:105)**. The participant perceived the use of this information to increase audit efficiencies as *"it is information from a third party, it is very reliable"* **(P14:35, 118:118)**. Another participant cited the following practical example of how he/she used non-financial information to develop an expectation: *"the health department … you should be able to develop some financial expectation from your patient base or, you know, how many patients you have, it should link to your expenditure"* **(P13:32, 74:74)**.

Two of the AGSA participants regarded the use of non-financial information as valuable for the identification of fraud as such information is more difficult to manipulate than financial information. One of the participants explained that in the public sector environment, the risk of material misstatements and fraud varied because some auditees "*are doing well while [others] are not so well"* **(P14:34, 110:110)**. According to the same participant, non-financial information could assist him/her to determine whether his/her clients did in fact achieve their targets. The other participant concurred with this opinion as follows: *"you can't just spend a full budget and then you actually did not perform"* **(P13:32, 74:74)**. Both these participants acknowledged the use of non-financial information by the IT experts to identify fraud. One participant described the IT expert's work as follows: *"where they use non-financial information to compare databases to each other to identify conflicts of interest"* **(P13:18, 42:42)**.

Another AGSA participant predicted the use of a risk assessment model in the future which would integrate financial and non-financial information to identify risks or fraud. He/she predicted that the model would have the potential to integrate non-financial information that is available on the internet with the client's

financial information. This participant's view on the use of the risk assessment model was discussed in the section that dealt with the use of analytical procedures in the future (see section 5.5.3.1 (iii)).

As demonstrated in the above discussion, the AGSA participants were already using non-financial information in the performance of analytical procedures and they perceived it as a valuable source for the development of expectations. The participants felt that information obtained from external sources (such as Statistics South Africa, the Human Sciences Research Council and the South African Social Security Agency) provided them with reliable information and a holistic view of their clients' operations. These participants described the use of non-financial information as valuable for the identification of fraud in the public sector. They further perceived the use of IT experts to be useful in identifying fraud because these experts have the ability to compare different databases in order to identify conflicts of interest. One AGSA participant predicted that advancements in IT would lead to even more integration of financial and non-financial information, which could be valuable for the assessment of risks.

5.5.3.5 Summary of changes in the application of analytical procedures

From the above it is clear that the application of analytical procedures by the AGSA participants had increased in the preceding years. According to these participants, the firm's methodology, cost considerations and the advancement of technology had driven the increase. They predicted even greater use of analytical procedures, specifically data analysis and "big data" (involving financial and non-financial information) in the future.

The AGSA participants also supported risk-based audit methodologies. A risk-based audit methodology provides an auditor with a holistic view of the entity, and the AGSA participants perceived it as valuable for the identification of risk areas and indicators of fraud, which is especially applicable to the public sector environment which tends to be constantly in the spotlight. The effectiveness of analytical procedures as risk assessment procedures, however, depended on the auditor's knowledge of the public sector as a whole. According to the participants,

much reliance was placed on IT experts to perform analytical procedures and this had raised some concerns, because instead of performing their own risk assessment procedures, auditors were becoming overly reliant on IT experts.

The AGSA participants perceived advancements in IT to have compelled and enabled auditors to apply more analytical procedures and data analysis. Client systems and quality of client data, however, remained a concern. These participants indicated that they were already using non-financial information to develop their expectations and to identify fraud. They further deemed non-financial information obtained from external sources to be valuable. One AGSA participant predicted an even greater integration of financial and non-financial information in the future.

5.5.4 The advantages of and challenges in the application of analytical procedures

5.5.4.1 Advantages

In general, the AGSA participants perceived the main benefit of the application of analytical procedures to be the increase in audit efficiency because it provided evidence on *"a greater size of the population at the minimum cost"* **(P14:41, 142:141)** and *"minimises [the auditor's] risk of not detecting certain misstatements"* **(P14:6, 9:9)**. The aforementioned AGSA participant related audit efficiency to audit time and claimed that analytical procedures had the ability to increase audit efficiencies as such procedures reduced the *"amount of time needed"* **(P14:43, 144)**.

All three of the AGSA participants perceived analytical procedures to provide the auditor with a better understanding of the entity. This was evident in the following statement of one of these participants: *"having a broader view of what is going on in the audit file"* **(P13:35, 86:86)**. Another AGSA participant referred to the use of data analysis which enabled the auditor *"to put data sets together to get insight from it and from this insight you will start doing predictive testing"*(P15:4: 25:27).

From the above discussion it is clear that the AGSA participants regarded analytical procedures as cost effective because performing them enables the auditor to save time, while providing audit assurance on the whole population. The performance of analytical procedures provided the auditor with a better understanding of the entity and this insight assisted the auditor to identify areas of risks and develop more precise expectations.

5.5.4.2 Challenges

According to the AGSA participants, numerous challenges were associated with the application of analytical procedures. The next section deals with each of the identified challenges separately.

(i) Availability and integrity of data

One of the AGSA participants perceived his/her performance of analytical procedures to depend on the availability of "*stable data*" **(P13:36, 88:88)**.

In general, the AGSA participants all agreed that it was not only the availability of data that was a challenge, but also and even more the quality of the data. This was reflected in the following two views expressed by the participants:

"to find reliable data … that you can actually develop an expectation from" **(P13:7, 24:24)**.

"data quality is a huge challenge" **(P15:12, 59:59)**.

From the above discussion it is clear that participants perceived the availability and integrity of data to be limiting factors in their application of analytical procedures. According to them, it was difficult to find reliable data that could be used to develop an expectation.

(ii) Resistance to reducing tests of details

In general, AGSA participants perceived auditors to be reluctant to reduce the extent of their tests of details. This was evident in the following words of one of

the participants: *"especially at the fieldwork phase we have relied more on … normal traditional testing"* **(P14:8, 21:21)**. The participant stated that there were two reasons for auditors' reluctance to apply analytical procedures, namely their clients' systems and the auditor's perception of the usefulness of analytical procedures. Another participant concurred with this view and said that it is difficult to find reliable data – hence the application of analytical procedures is *"not that successful"* **(P13:7, 24:24)**.

According to two of the AGSA participants, the AGSA's changing audit methodology was focusing more on the application of analytical procedures. As explained in section 5.5.2.2 (i), all the AGSA participants attributed their reluctance to perform substantive analytical procedures to the AGSA audit methodology, which regarded the level of assurance provided by substantive analytical procedures as low – hence the requirement that these procedures should be performed in combination with other audit procedures. One AGSA participant expressed his/her concern about the level of assurance that could be placed on analytical procedures as follows: *"In our [AGSA] methodology we talk about levels of assurance. So before anyone can sign off on an audit they must have a level three assurance and any analytical procedure provides a level one assurance"* **(P15:2, 19:19**). The participant described this as *"a bit ridiculous"* **(P15:2, 19:19)**.

The above discussion demonstrated that the AGSA participants were reluctant to reduce the extent of their tests of details. The reasons provided by participants for their reluctance were the reliability of the client's data and systems as well as their perceptions of the usefulness of analytical procedures. The latter was based on requirements of the firm's audit methodology, compelling them to perform more tests of details because the firm's methodology regarded assurance obtained from analytical procedures to be low.

(iii) Regulatory challenges

Two of the AGSA participants perceived the auditing standard relating to analytical procedures (IAASB 2014m:ISA 520) to lack guidance on how to exercise professional judgement and how to draw conclusions. One participant

described this as *"a big problem"* **(P15:2, 19:19)**, while the other perceived ISA 520 (IAASB 2014m) to be outdated and not relevant to the current business environment. The participant's view was evident in the following statement: *"the auditing standards are not, I think they [the standards] are not adjusted"* **(P13:33, 76:76)**.

From the above views it is evident that the AGSA participants perceived the guidance provided by the auditing standard on analytical procedures (IAASB 2014m:ISA 520) to be limited. According to them, the standard lacked guidance on how to exercise professional judgement and how to draw conclusions, and the participants perceived this as a huge challenge. One participant felt that the standard was outdated and not relevant to the current business environment.

(iv) Non-financial information

The discussions on the use of analytical procedures in the future (section 5.5.3.1 (iii)) and on changes in analytical procedures due to non-financial information (section 5.5.3.4) demonstrated that one of the AGSA participants predicted a risk assessment model for the AGSA that could integrate financial and non-financial information. This participant explained that the use of various sources such as social media, Twitter and newspaper articles could provide the auditor with better insights into the company. He described this process of using unstructured data as *"that is actually what big data is all about"* **(P15:16, 95:95)**.

The aforementioned participant, however, also stated that *"the problem with big data is that it is currently seen as a business function"* **(P15:15, 93:93),** which businesses could use to increase their sales margins but not as an auditing tool. He described the challenge in using "big data" for audit purposes as follows: *"What is it that you will download from the internet and how will you filter through it?* The participant further perceived the protection of the data used for "big data" as a challenge and explained this as follows: "*where will you store it [the data]? ... How much do you keep and for how long do you keep it [the data]"* **(P15:16, 95:95)**.

It is clear from the above discussion that although the participants perceived non-financial information to be valuable for the application of analytical procedures, the integration of this information in data analysis remained a challenge because it was not clear how to identify relevant information, in what format to download the information or how the information should be secured.

(v) Competence of auditors

In general, the AGSA participants felt that auditors lacked the IT skills necessary to perform analytical procedures and they were therefore inclined to rely on IT experts, which as explained previously, could resulted in over-reliance (see section 5.5.3.2). One of the AGSA participants referred to his/her own shortcomings as follows: *"if there are comparisons of data that can be done then they [IT experts] do it from their side. I don't know exactly how"* **(P13:17, 40:40)**.

According to one AGSA participant, *"the more you move forward with technology, the more you will have to do data analytics and it will therefore impact also on the expertise of the auditor … .you will now have to be clued up on how computers work, how systems works, understanding the technology"* **(P14:30, 101:101)**. Another participant asserted that the performance of data analysis required a *"scarce skill"* **(P15:19, 125:125)** in the sense that the person should have knowledge of the audit process, an IT background and mathematical skills. The participant explained that it is difficult to find *"all these traits in one person"* **(P15:20, 129:129)** as these skills were currently not integrated in university studies.

From the above it is clear that the AGSA participants perceived auditors to lack the necessary IT skills to perform analytical procedures, especially data analysis – hence their reliance on IT experts, which some participants even regarded as being overly reliant. The participants predicted that auditors of the future should have knowledge of the audit process, IT and mathematical skills. Participants perceived there to be a "gap" between university studies and audit practice relating to the application of analytical procedures (also data analysis) and the use of IT.

(vi) Summary of challenges

From the discussion in the above sections it is clear that there are numerous challenges in the application of analytical procedures. The participants described these challenges as availability and integrity of data, resistance to reducing tests of details, regulatory challenges, the use of non-financial information and the competence of auditors.

The discussion demonstrated that the auditor's performance of analytical procedures depended on the quality of data, and owing to limitations in the availability and integrity of data, the AGSA participants perceived this to be a huge challenge. The discussion further demonstrated that the participants were reluctant to reduce the extent of their tests of details and ascribed this to the reliability of client data and systems, the auditor's perceptions of the usefulness of analytical procedures and the firm's methodology. One participant referred to the firm methodology as ridiculous because it regarded the assurance that could be obtained from analytical procedures as low.

Two of the AGSA participants criticised the auditing standard relating to analytical procedures for not providing sufficient guidance on how to apply professional judgement in drawing conclusions. One AGSA participant perceived the auditing standard to be outdated and irrelevant to the current business environment.

Although the AGSA participants acknowledged the value of using non-financial information, the integration thereof in data analysis remained a challenge. The last challenge, namely auditors' competence, indicated that the participants felt that auditors lacked the necessary skills (audit, IT and mathematical) to perform analytical procedures, and ascribed this to a "gap" between university studies and audit practice. This was one reason why the AGSA participants made use of IT experts in their use of analytical procedures (also for data analysis), which some of the participants even regarded as being overly reliant.

5.5.4.3 Summary of the advantages of and challenges in the application of analytical procedures

The above discussions indicated that there are numerous advantages and challenges in the application of analytical procedures. According to the AGSA participants, they could audit more efficiently by performing analytical procedures because these enabled them to cover the whole population while saving costs and time. These procedures provided the auditor with a better understanding of the entity and the ability to develop more precise expectations.

The challenges identified and discussed by AGSA participants were the lack of reliable data, the auditor's reluctance to reduce tests of details, regulatory challenges, the integration of non-financial information in data analysis and auditors' competence.

5.6 CROSS-CASE ANALYSIS

5.6.1 The need to apply analytical procedures

5.6.1.1 General need

Participants in all three cases perceived the performance of analytical procedures to add value to the audit as it enables the auditor to gain a better understanding of the client in order to see the whole of the organisation. Big 4 audit firm participants referred to the application of analytical procedures as a regulatory requirement, which has the ability to promote audit quality. This is in line with the guidance provided in ISA 315 (IAASB 2014j) and ISA 520 (IAASB 2014m) and supports the notion of Houck (2003:69) that auditors should increase their use of analytical procedures as a means of improving audit quality.

The participants from all three cases perceived analytical procedures to form an integral part of the audit process. The AGSA participants shared the view that advancements in technology, and more specifically data analysis, had increased the need for analytical procedures. This is in line with Liddy's (2014:3) prediction

that audits of the future would use advanced data and analytical capabilities to look beyond an organisation's walls to understand the impact of broader forces.

In general, the participants regarded the performance of analytical procedures as an effective method for identifying risks during the planning phase because it enabled the auditor to identify exceptions within a short time frame. One second-tier audit firm participant expressed a contrasting view, stating that analytical procedures had limited risk assessment qualities.

The perceptions of participants as described above are in line with the literature discussed in chapter 3 (section 3.4), which indicated that analytical procedures are performed to gain a better understanding of the entity (Knechel *et al.* 2007: 341). Participants' views on the objective of analytical procedures in the planning phase of the audit were in line with the main objective described by Cho and Lew (2000:434), namely that analytical procedures can focus the auditor's attention on areas of risks in the planning phase of the audit. The application of analytical procedures during each of the phases is discussed in sections 5.6.2.1 to 5.6.2.3.

5.6.1.2 Summary of the need to apply analytical procedures

From the above it is clear that the participants from all three cases performed analytical procedures because they add value to the audit and enable the auditor to gain a better understanding of the client. The participants applied analytical procedures, not only because this is an ISA (IAASB 2014m:ISA 520) requirement, but also because they perceived it to form an integral part of the audit process. They described analytical procedures as being effective for identifying risks. According to the AGSA participants, advancements in IT, and more specifically data analysis, had driven the need to apply analytical procedures.

5.6.2 The application of analytical procedures in the audit process

5.6.2.1 Planning phase

All the participants agreed that the main objective of analytical procedures in the planning phase was to identify areas of risk. Participants in all three cases used

the results of their risk assessment to direct the audit in the planning of further procedures and for the allocation of staff and time. The Big 4 audit firm participants and second-tier audit firm participants perceived the performance of analytical procedures to be at a high level because the goal was to obtain an overview of the financial results. One of the second-tier audit firm participants, however, cautioned against high-level analytics because it was easy to provide superficial explanations for differences in order to reduce audit work.

The perceptions of participants were in line with the findings in the literature (chapter 3, section 3.5.1) describing analytical procedures as risk assessment procedures (IAASB 2014j:ISA 315 par. 6; Vuchnich 2008:38; Glover *et al*. 2005:200) and stating that the results of such procedures could be used to plan the extent of further audit procedures (Abidin & Baabbad 2015:19). The literature describes the performance of analytical procedures as being “at a high level” (Glover *et al*. 2005:200) since the goal is not to determine the reason for fluctuations (Hirst & Koonce 1996:466), but to provide a broad initial indication about whether a material misstatement may exist (IAASB 2014j:ISA 315 par. A9).

The performance of analytical procedures during the planning phase requires knowledge of the client and industry, and the Big 4 audit firm participants and second-tier audit firm participants concurred that the audit work was allocated to staff members with the most experience. The Big 4 audit firm participants emphasised that the auditor’s ability to apply analytical procedures effectively depended on the knowledge of the client and industry. This agrees with the research of Trompeter and Wright (2010:678), who found that the auditor’s performance of analytical procedures could be affected by experience.

The AGSA participants indicated that in their firm methodology, analytical procedures could be allocated to a second-year audit trainee and reviewed by the audit manager. The second-tier audit firm participants contested the AGSA’s view and were of the opinion that the performance of analytical procedures could only be allocated to lower-level staff on the audits of small clients. The views of the participants seem to indicate that partners from Big 4 audit firms were more actively involved in the review of analytical procedures than audit partners from

second-tier audit firms and senior managers (equivalent to partners) at the AGSA. According to the AGSA participants, the partner's (or senior manager in the AGSA) involvement was limited to the review of analytical procedures relating to a significant risk. Based on the views expressed by AGSA participants, it would seem that IT experts were used to perform analytical procedures in the planning phase of the audit.

Participants from all three cases preferred the use of simple techniques such as comparisons during the planning phase. The AGSA participants emphasised that in the public sector environment, the comparison of financial statement figures to budgeted figures was an important procedure because budget allocations drive behaviour (RSA 2009). Hirst and Koonce (1996:470) caution that the success of comparing financial statement figures to budgeted figures depends on the reliability of the budgets.

Big 4 audit firm participants and second-tier audit firm participants further mentioned the use of ratios and trends in the performance of their analytical procedures. The participants' preference for simple techniques was supported by the literature in chapter 3 (section 3.7) indicating that auditors preferred to use simple techniques rather than sophisticated techniques in their performance of analytical procedures (Lin & Fraser 2003:160; Cho & Lew 2000:437; Smith *et al*. 1999:68; Mahathevan 1997:236; Hirst & Koonce 1996:456). According to Big 4 audit firm and the AGSA participants, the use of audit support systems and disaggregated data could add value during the planning phase of an audit in identifying risks. The AGSA participants mentioned their reliance on IT experts in this regard. These perceptions support Vuchnich's (2008:38) notion that IT makes it easier for an auditor to develop expectations.

5.6.2.2 Fieldwork phase

According to Big 4 and second-tier audit firm participants, the objective of the performance of analytical procedures during the fieldwork phase was to obtain audit evidence. Their perceptions were in line with the guidance provided by ISA 520 (IAASB 2014m:par. 3), namely that the objective of the auditor when

performing analytical procedures during the audit evidence phase is to obtain relevant and reliable audit evidence (see chapter 3, section 3.5.2). These participants further perceived the outcome of their analytical procedures to determine the extent of tests of details. According to Cho and Lee (2000:434), the main objective of analytical procedures in the fieldwork phase is to reduce the number of tests of details.

However, the second-tier audit firm participants mentioned that even though the performance of analytical procedures was an effective method to obtain audit evidence, their use of such procedures was limited. The AGSA participants had a different view to those of the Big 4 and second-tier audit firm participants, who regarded the performance of analytical procedures during the fieldwork phase as ineffective and unsuccessful. According to the AGSA participants, their performance of analytical procedures during the fieldwork phase was limited to the investigation of exceptions identified by IT experts during the planning phase of the audit.

The second-tier audit firm and AGSA participants ascribed their limited use of analytical procedures to the shortage of reliable data and limited guidance provided by firm methodologies on the extent to which analytical procedures could be used and the amount of assurance that these procedures provided. These participants' reluctance to perform substantive analytical procedures was in line with the literature, namely that auditors lack confidence in the use of analytical procedures and opt instead to adopt a more conservative approach by performing tests of details (Pinho 2014:31). Participants from both second-tier audit firms and the AGSA perceived firm methodologies to be changing to incorporate more substantive analytical procedures.

The Big 4 and second-tier audit firm participants mentioned all four components for the performance of substantive analytical procedures. These four components were described by Eilifsen *et al*. (2014:152–158) as the development of an expectation, the establishment of a tolerable difference between the auditor's expectation and the client's reported amount that would not warrant further investigation, a comparison of the expectation to the recorded amount and an

investigation of any differences greater than the tolerable difference (see chapter 3, section 3.5.2). The aforementioned participants perceived their ability to predict a balance to depend on the assertion under consideration, the underlying assumptions and the availability of disaggregated data. The Big 4 audit firm participants emphasised that the more aggregated the data, the more precise the auditor's expectation would be. Their view agrees with that of Messier *et al*. (2012:160), which asserts that the more disaggregated the data used for a substantive analytical procedure, the more accurate and precise the expectation would be. One second-tier audit firm participant perceived his/her firm's methodology to be unclear on the use of disaggregated data.

The Big 4 and second-tier audit firm participants mentioned that analytical procedures during the fieldwork phase were used more on statement of profit and loss and other comprehensive income balances than on statement of financial position balances. The Big 4 audit firm participants agreed with Houck's (2003:95) notion that auditors should, however, understand the interrelationships between accounts and should not look at the accounts in isolation.

Participants from all three cases indicated that analytical procedures during the fieldwork phase were performed by lower-level staff members. The second-tier audit firm participants perceived the use of general software such as Excel to have made it possible for lower-level staff to perform analytical procedures. This was in line with the findings of a previous study conducted by Trompeter and Wright (2010:688), who found that IT has made it possible to assign analytical procedures to less experienced staff (see chapter 3, section 3.6). The Big 4 audit firm participants perceived the allocation of analytical procedures in the fieldwork phase to depend on the auditor's risk assessment.

There was consensus among the participants from all three cases that lower-level staff require guidance from more experienced staff members in their performance of analytical procedures because lower-level staff lack the necessary skills to perform these procedures and to exercise professional judgement. The second-tier audit firm participants described partners' involvement in the fieldwork phase as limited, while the AGSA participants

predicted increased involvement by senior managers (equivalent to partner level in other firms) in the fieldwork phase under the firm's new audit methodology. The Big 4 audit firm and AGSA participants mentioned the value of the involvement of IT experts on the audit team in the performance of analytical procedures during the fieldwork phase of an audit.

The Big 4 and second-tier audit firm participants preferred to perform analytical procedures on accounts with a fixed-cost element, or accounts that were conducive to comparisons and prediction. Participants from all three cases perceived the application of substantive analytical procedures on employee cost to be valuable. Other accounts mentioned by the Big 4 and second-tier audit firm participants included those that lend themselves to prediction such as rental income and expenses, interest income and expenses, revenue, cost of sales, VAT and service income. These accounts mainly relate to statement of profit and loss and other comprehensive income accounts.

The Big 4 audit firm participants regarded the use of audit software to have made it possible to perform sophisticated regression analysis and to test all the transactions in an entire business cycle. Their view supports Omoteso's (2013:136) notion that the use of IT could help the auditor to apply substantive analytical procedures because better insights can be obtained using computer-based data analysis techniques.

5.6.2.3 Conclusion, evaluation and reporting phase

There was general consensus among the participants from all three cases that the objective of analytical procedures during the conclusion phase was similar to that of the planning phase. According to the Big 4 and second-tier audit firm participants the objective of analytical procedures during the conclusion phase of an audit was to obtain an overview of the financial statements and to assess the reasonability of these statements. This is in line with findings in the literature (see chapter 3, section 3.5.3) which describe the primary objective of analytical procedures in the conclusion phase to be to assess the conclusions drawn during the audit and evaluate the overall financial statement reasonableness before

issuing an audit opinion (Flowerday *et al*. 2006:327; Glover *et al*. 2005:200; Cho & Lew 2000:434).

The AGSA and second-tier audit firm participants emphasised the value of analytical procedures in reassessing the initial risk assessment during the planning phase of the audit, while the Big 4 audit firm participants stated that analytical procedures during this phase of an audit helped them to conclude on the initial assessment of the entity's going concern. This ties in with Hirst and Koonce's (1996:478) notion that analytical procedures during the planning phase are performed to identify critical areas, whereas during the conclusion phase, these procedures are performed to determine whether all critical areas have been addressed during the audit. Participants from all three cases supported the view of Glover *et al*. (2005:200) that analytical procedures during the conclusion, evaluation and reporting phase of an audit are applied at a high level.

Diverse views were expressed on the parties responsible for the performance of analytical procedures during the conclusion phase of the audit. According to the Big 4 audit firm participants, mainly audit partners and senior managers were responsible for such performance. The second-tier audit firm participants expressed the view that the same individuals responsible for the application of analytical procedures during the planning phase were responsible for applying them during the conclusion phase. The AGSA participants stated that third-year audit trainees were responsible for the performance of analytical procedures and, as in the planning phase, managers reviewed the audit work. Participants from all three cases posited that these were individuals with the most experience and knowledge of the client as they needed to exercise judgement. This concurs with findings in the literature (chapter 3, section 3.6), namely that knowledge of the client and industry enables auditors to create better expectations (Knapp & Knapp 2001:33).

In general, participants from all three cases performed simple techniques such as comparisons and ratio analysis in their performance of analytical procedures during the conclusion phase. The AGSA participants described the comparisons

during the conclusion phase as being similar to those performed during the planning phase of an audit.

5.6.2.4 The extent of use of analytical procedures

The discussion in above sections indicated that participants perceived analytical procedures to be valuable during the planning, fieldwork and conclusion phases of an audit. Internal and external factors, however, had an effect on the extent of use of analytical procedures.

The Big 4 audit firm and AGSA participants perceived the auditor's assessment of risks to be the main determinant in the decision on the extent of analytical procedures. This ties in line with findings in the literature (chapter 3, section 3.8.1), which demonstrated that the auditor's risk assessment and specifically risk-based audit methodologies have an impact on the extent to which auditors apply analytical procedures (Abidin & Baabbad 2015:23; Pinho 2013:13; Trompeter & Wright 2010:671; Samaha & Hegazy 2010:902; Lin & Fraser 2003:162; Mulligan & Inkster 1999:118). Some of the Big 4 audit firm participants referred to the use of a bucket approach whereby a combination of tests (tests of controls, detailed substantive tests and substantive analytical procedures) are performed to audit an assertion of an account balance or disclosure. The size of the bucket increases as more risks are revealed through the audit, and if the bucket grows in size, more audit procedures are required. The AGSA participants indicated that areas such as contract and procurement management, employee cost and supply chain management were identified as areas of high risk in the public sector for which the extent of data analysis should be increased in order to test the whole population.

In general, according to the participants, the availability, quality and reliability of data as well as the client's size and internal control system have a direct impact on the extent to which auditors can apply analytical procedures. This concurs with what was reported in the literature (chapter 3, section 3.6), namely that larger clients have better systems and stronger internal controls than smaller clients, which enables the auditor to perform more analytical procedures (Abidin

& Baabbad 2015:23; Samaha & Hegazy 2010:896; Lin & Fraser 2003:159; Mahathevan 1997:231). Trompeter and Wright (2010:679) also emphasise the relationship between the quality of internal controls of an audit client and the extent to which its auditors use analytical procedures. They conclude that there is a relationship between strong internal controls and the reliance on analytical procedures. The Big 4 audit firm participants referred to other factors needed to determine the extent of analytical procedures, the availability of audit support software, the auditor's competence in using such software and the sophistication of the client's record-keeping and internal control systems. The AGSA participants ascribed the AGSA auditors' limited performance of analytical procedures during the fieldwork phase of the audit to the unavailability of quality data and the firm's audit methodology.

Second-tier audit firm participants perceived the extent of use of analytical procedures to further depend on the auditor's knowledge of the business and the level of experience and knowledge of the audit team members. This agrees with the findings of Abidin and Baabbad (2015:23), Samaha and Hegazy (2010:897) and Mahathevan (1997:230), who reported that reliance on analytical procedures differs with audit experience and that auditors in higher ranks tend to use more analytical procedures than those with less experience.

The AGSA participants deemed auditors' perceptions of the usefulness of analytical procedures as negative because they have traditionally relied on tests of details. Their view was supported in the literature by Abidin and Baabbad (2015:23–24), who found that the auditor's confidence in the application of analytical procedures had an impact on his or her performance of these procedures. However, the AGSA participants maintained that the AGSA methodology was slowly changing to incorporate more analytical procedures.

The Big 4 audit firm participants shared the view that irrespective of internal and external factors, the extent of use of analytical procedures remained a judgement call mainly exercised by audit partners.

5.6.2.5 Types of procedures used

The types of analytical procedures that participants used during the different phases of the audit process were dealt with in the discussions on the planning (section 5.6.2.1), fieldwork (section 5.6.2.2) and conclusion, evaluation and reporting (section 5.6.2.3) phases. The discussion below addresses the factors that influence the auditor's decision making on what type of analytical procedures to perform.

Participants from all three cases perceived the auditor's risk assessment and the availability of IT experts to perform data analysis to be key factors in decision making on the types of analytical procedures to be performed. This ties in with the findings of other researchers who reported that the auditor's risk assessment (chapter 3, section 3.8.1) and technology (chapter 3, section 3.8.2) could assist the auditor to develop more precise expectations (Chan & Vasarhelyi 2011:159; Trompeter & Wright 2010:671; Bell *et al*. 2005:13 & 32; Koskivaara 2004:219–220).

Other factors mentioned by participants included the availability and quality of the data, client's expectations, the nature of the account balance and the objective of the audit procedure. This agrees with the guidance in ISA 520 (IAASB 2014m:par. 5), which states that in the design and performance of substantive analytical procedures, the auditor shall evaluate the reliability of the data and consider the nature and relevance of the information available as well as the controls over the preparation of data. The Big 4 audit firm participants viewed the availability of software as a vital determinant in their decision on the types of analytical procedures to be performed. Their view is supported by findings in the literature (chapter 3, section 3.7), namely that audit software can assist the auditor to develop more precise expectations (Trompeter & Wright 2010:671; Vuchnich 2008:38).

The factors described above are similar to those described by participants when deciding on the extent of use of analytical procedures. The Big 4 audit firm participants alluded to the importance of the auditor exercising judgement in

deciding on the types of analytical procedures to be used. Their view supports the notion of Lombardi *et al*. (2014:25–26) that although IT can assist the auditor with analysis and risk assessments, it can never automate the human judgement component.

5.6.2.6 Investigation of differences

The Big 4 audit firm participants again alluded to the fact that auditors need to exercise judgement, in this instance, deciding on the degree of difference between the auditor's expectation and management's representation that they can tolerate. This is in line with the findings in the literature discussed in chapter 3 (section 3.5.2), namely that auditors need to use their judgement in deciding whether or not a difference is reasonable (Pinho 2013:5; Samaha & Hegazy 2010:887; Hirst & Koonce 1996:476). The Big 4 audit firm participants described the first step in their investigation process as the refinement of assumptions used in the development of their own expectations. Their first step corresponds with the suggestion made by Peecher *et al*. (2007:473) (chapter 3, section 3.9) that auditors should refine their initial expectation to determine whether the difference is caused by a misstatement or a non-misstatement.

In general, the Big 4 and second-tier audit firm particpants mainly obtained explanations for differences through enquiries from management and financial personnel. This concurs with the finding of Hirst and Koonce (1996:466) that inquiries are mostly directed at accounting rather than at non-accounting staff. However, the Big 4 audit firm participants acknowledged the value of engaging with internal auditors and non-financial personnel to obtain corroborative explanations for differences as they perceived financial personnel's explanations to be "sugar coated". Although the Big 4 and second-tier audit firm participants emphasised the importance of obtaining corroborative evidence (also from external sources) for their explanations, some participants from second-tier audit firms expressed their concerns about trainees' reluctance to obtain corroborating evidence for explanations. Their view agrees with the PCAOB (2008:15) concerns about auditors' lack of investigating differences and obtaining corroborating differences.

The AGSA participants, however, disagreed because they perceived analytical procedures to be unsuccessful if there was a difference between their own expectations and management's representations. In such instances, the AGSA participants said that they would revert back to tests of details.

5.6.2.7 Summary of the application of analytical procedures in the audit process

The discussion in the above sections demonstrated that participants from the three cases applied analytical procedures during all the phases of the audit process. These participants applied analytical procedures during the planning phase of an audit to identify areas of risks because this assisted them with the planning of the audit. During the fieldwork phase, analytical procedures were used to obtain audit evidence and to determine the extent of tests of details. There were, however, diverse views on the extent to which analytical procedures were applied during the fieldwork phase, and some participants ascribed their limited use of substantive analytical procedures to the shortage of reliable data and limited guidance provided by firm methodologies on the assurance that analytical procedures provide. It would appear that the Big 4 audit firm participants applied analytical procedures to a larger extent during the fieldwork phase than their counterparts, and they made use of software for sophisticated regression analysis. The objective of the performance of analytical procedures during the conclusion phase was to obtain an overview of the financial statements and to reassess the risk assessment and going concern assessment performed during the planning phase. Analytical procedures in the conclusion and planning phases were applied at a high level.

The second-tier audit firm participants indicated that analytical procedures during the planning and conclusion phases were mainly performed and reviewed by the same individuals, while in the Big 4 audit firms, the involvement of senior managers and partners during the planning and conclusion phases of the audit was emphasised. Individuals involved in the performance of analytical procedures would require experience and knowledge of the client and industry because they needed to exercise professional judgement in assessing risks and

drawing conclusions. In general, participants indicated that analytical procedures during the fieldwork phase could be allocated to lower-level staff because the availability of audit software made it easier to apply these procedures. However, there was consensus among these participants that lower-level staff required guidance in their performance of analytical procedures as they lacked the necessary skills to perform these procedures and to exercise professional judgement.

Participants from the three cases preferred the use of simple techniques such as comparisons, ratios and trends in the application of their analytical procedures during the planning and conclusion phases of an audit. Owing to the importance of the budget process in the public sector, the AGSA participants emphasised comparisons with budgeted amounts and also referred to the use of IT experts during the planning phase of the audit. During the fieldwork phase, participants preferred to perform substantive analytical procedures on accounts that lent themselves to prediction (based on underlying assumptions and the availability of disaggregated data), and these accounts mainly related to statement of profit and loss and other comprehensive income accounts. Participants further acknowledged the value of including IT experts in the audit team for the performance of substantive analytical procedures.

The discussion described the internal and external factors that participants from all three cases perceived to have an effect on the extent of the use of analytical procedures as well as the types of analytical procedures to be performed. Participants perceived the auditor's risk assessment as the main determinant in the decision on the extent and types of analytical procedures to be performed. The availability, quality and reliability of data, the client's size and the sophistication of its internal control and record-keeping systems, the knowledge and experience of auditors and the availability of IT, and the auditor's competence to perform data analysis further impacted on their decision on the extent and type of procedures that could be performed. Irrespective of these factors, participants alluded to the importance of the auditor exercising judgement in deciding on the extent of use and type of analytical procedures. In deciding on the types of analytical procedures, participants also considered clients'

expectations, the nature of the account balance and the objective of the audit procedure.

Participants indicated that they started their investigation process for differences with the refinement of assumptions used in the development of expectations. The majority of participants indicated that they obtained explanations for differences from management and financial personnel. Some participants referred to the value obtained from internal auditors and non-financial personnel. The AGSA participants tended to revert back to tests of details where differences occurred.

5.6.3 Changes in the application of analytical procedures

5.6.3.1 General change

Based on views expressed by participants from large audit firms in South Africa, it is clear that analytical procedures have evolved over time into more efficient procedures that have become easier to perform. In general, participants from all three cases perceived the application of analytical procedures, specifically data analysis, to have increased in past years. This is in line with findings in the literature (chapter 3, section 3.8), which indicate that there has been an increased use of analytical procedures (Abidin & Baabbad 2015:23; Pike *et al*. 2013:1414; Pinho 2013:3; Samaha & Hegazy 2010:902; Trompeter & Wright 2010:669; Lin & Fraser 2003:162; Mulligan & Inkster 1999:118; Hirst & Koonce 1996:458). The Big 4 audit firm participants shared the view that in the past, analytical procedures had been performed simply because it was an ISA requirement, while the AGSA participants indicated that past practices at the AGSA had not involved analytical procedures.

Participants from all three cases ascribed their increased use of analytical procedures to advancements in IT, which had made the performance of analytical procedures easier and more efficient. Some of the Big 4 audit firm participants indicated that their respective audit firms had been investing huge sums of money and resources in the development of software for the performance of analytical procedures aimed at adding value and meeting clients' expectations.

This is in line with the discussion in chapter 3, section 3.8.2, which indicated that advancements in technology have helped the auditor to alter the audit approach to incorporate more analytical procedures and to develop more precise expectations (Chan & Vasarhelyi 2011:159; Koskivaara 2004:219–220). The second-tier audit firm participants perceived that their firms would only be able to challenge the market share of the Big 4 audit firms if second-tier audit firms became more effective, and to that end they would have to extend the use of analytical procedures to add value to the client.

According to the second-tier audit firm and AGSA participants, IT has led to the implementation of new firm methodologies, which provide them with more guidance on the application of substantive analytical procedures. This is in line with findings in the literature (chapter 3, section 3.8.2.3). According to Sayana (2003:1), the performance of audits in the current business environment without the use of IT is not an option, while Bell *et al*. (1998:15) posits that most large audit firms have redesigned their audit methodologies as a result of computerisation to place more emphasis on analytical procedures. The AGSA participants indicated that their firm methodologies would continue to evolve to incorporate more analytical procedures.

Participants from all three cases perceived data analysis to be the audit of the future. Their perceptions support the notion of Liddy (2014:3) and Rezaee *et al*. (2001:150) (see chapter 2, section 2.7.3.1) who predicted that auditors of the future would use advanced data and analytical capabilities to obtain audit evidence. The Big 4 and second-tier audit firm participants predicted that in the future, control testing and substantive analytical procedures would be replaced by data analysis. The Big 4 audit firm and AGSA participants cautioned that the use of data analysis would require the audit team and the client to be receptive to the changes. For a discussion on the challenges relating to analytical procedures and data analysis, see section 5.6.4.2.

One AGSA participant predicted an increase in the use of “big data” integrating financial and non-financial information for the identification of risks and fraud. The participant’s prediction supported the finding in the literature in chapter 3 (section

3.8.3) that technology enables auditors to integrate unstructured data such as weather or traffic reports, unemployment figures or commodity prices to assess the potential impacts on a company's performance and its risk profile (Liddy 2014:2). This AGSA participant, however, believed that such a change would take some time.

5.6.3.2 Changes due to risk-based audit methodologies

In general, participants from all three cases perceived the implementation of risk-based audit methodologies to provide auditors with a holistic view of the clients' financial operations and position and to place more emphasis on analytical procedures to identify risks and fraud. This is in line with the finding in the literature (chapter 2, section 2.7.2), which indicated that the business risk audit methodology focuses on understanding a business, its environment and business processes, and this understanding provides the best means for an auditor to recognise risks and fraud (Paino *et al*. 2014:316; Erickson *et al*. 2000:168). Their perceptions are also in line with the guidance provided in ISA 315 (IAASB 2014j:par. A38) that an understanding of business risks would increase the likelihood of identifying risks of material misstatement. One second-tier audit firm participant perceived the implementation of risk-based audit methodologies to impact on the planning and conclusion phases of the audit more than the fieldwork phase. This view concurs with the findings of Curtis and Turley (2007:453), who reported that the business risk audit methodology has led to increased use of analytical procedures during the planning phase of an audit, but that auditors are reluctant to replace detailed substantive testing with analytical procedures. According to the AGSA participants, risk-based audit methodologies would be especially applicable to the public sector environment because the identification of fraud in public entities is currently receiving a lot of attention.

Most participants indicated that the effectiveness of analytical procedures as risk assessment procedures would depend on the auditor's knowledge of the entity and industry. They indicated that this insight would enable the auditor to refine his/her risk identification which, in turn, would result in more effective audits which could save audit costs and time because further audit procedures could be

reduced. This agrees with findings in the literature (chapter 3 section 3.8.1), which indicated that the better the auditor's knowledge of the business, the more precise his or her expectations would be about the financial results the entity could expect (Schultz *et al*. 2010:240; Knechel 2007:395). Findings in the literature (chapter 2, section 2.7.2) also indicated that the implementation of a business risk audit methodology has led to more efficient and effective audits (Knechel 2007:401; Lemon *et al*. 2000:12).

Two second-tier audit firm participants, however disagreed with the views highlighted above. According to them, the implementation of risk-based audit methodologies did not impact on their application of analytical procedures, and they ascribed this to the auditor's inability to identify risks and regulatory requirements. One AGSA participant also alluded to the auditor's inability to perform risk identification procedures and felt that auditors rely too heavily on IT experts for the identification of risks.

5.6.3.3 Changes due to IT

According to the discussion in section 5.6.3.1, participants from all three cases indicated that developments in IT have increased their application of analytical procedures on audits, specifically data analysis, and they predicted that this would continue in the future. In general, participants ascribed their increased use of analytical procedures to audit software that could be used to manipulate data in order to identify exceptions. The Big 4 audit firm participants reported that their audit firms had been investing in internally developed software for the performance of analytical procedures, but they also used general software for this purpose.

Participants from all three cases perceived developments in audit software to have made it easier to perform more sophisticated analytical procedures and to test large volumes of data. This is in line with findings in the literature (chapter 2, section 2.7.3.2), which suggested that audit support systems are the "face" of an audit firm's methodology and the key technology application used by audit firms to facilitate efficient and effective audits (Dowling & Leech 2007:92). The AGSA

participants acknowledged that the quality of client data and the client's system remained negative factors in their use of audit software for the application of analytical procedures. According to the Big 4 and second-tier audit firm participants, however, their own competence in using audit software (especially for data analysis) was a limiting factor. These challenges are discussed in section 5.6.4.2.

The Big 4 and second-tier audit firm participants expressed positive views on the ability of IT experts to perform detailed and sophisticated analysis, but the former cautioned that their involvement depended on client size and complexities, client expectations and audit budgets because this was not a feasible option for small client, low budget audits. Second-tier audit firm participants also cautioned against the cost implications of using IT experts.

According to the Big 4 audit firm participants, advancements in IT posed a threat to the auditing profession because the number of audit trainees on an audit team could decrease, thus limiting the training opportunities provided by firms.

5.6.3.4 Changes due to non-financial information

The majority of participants perceived IT to have provided them with a broader array of financial and non-financial information, and participants from all three cases indicated that they already used non-financial information in their application of analytical procedures. Their perceptions were supported by findings in the literature (chapter 3, section 3.8.3), which suggested that recent technological advancements have made it easier for auditors to gather and access non-financial information (Trompeter & Wright 2010:671). In general, participants from all three cases described the use of non-financial information to be valuable for the identification of fraud. This is in line with findings in the literature, which indicate that the integration of non-financial information in analytical procedures would be an effective way to identify fraud because it is almost impossible to manipulate non-financial data from external sources (Messier *et al*. 2012:164). The AGSA participants deemed the use of IT experts

to be valuable for the identification of fraud as they have the ability to compare different databases in order to identify any conflicts of interest.

The Big 4 and second-tier audit firm participants indicated that they obtained non-financial information from the internet (e.g. Google, news24) and other information such as annual financial statements that are available on the internet to help them perform more detailed comparisons. According to the AGSA participants, in their environment, external sources such as Statistics South Africa, the Human Sciences Research Council and the South African Social Security Agency provided them with a holistic view of their clients' operations.

Some of the Big 4 audit firm participants also suggested that social media was gaining prominence as a source of information about the industry and the client's business, but other Big 4 audit firm participants expressed concerns about the credibility of such information. One AGSA participant predicted the use of a risk assessment model in future, which would integrate financial and unstructured non-financial information that is available on the internet (such as social media) to identify risks or fraud. The participant's prediction supported the notion of Liddy (2014:2) that technology enables auditors to integrate unstructured data such as weather or traffic reports, unemployment figures or commodity prices to assess the potential impacts on a company's performance and its risk profile. Wang and Cuthbertson (2014:7) caution auditors to first confirm the reliability of the sources before incorporating them into analytical procedures.

5.6.3.5 Summary of changes in the application of analytical procedures

From the above discussion it is clear that participants perceived the application of analytical procedures to have increased, and they ascribed this to advancements in IT, which have made the performance of these procedures easier. In general, participants referred to analytical procedures, and specifically data analysis, as the audit of the future. Some participants predicted that in future control testing and substantive analytical procedures would be replaced by data analysis. One participant predicted an increase in the use of "big data".

According to the participants, risk-based audit methodologies have led to an increase in the application of analytical procedures as these have the ability to provide auditors with a holistic view of the entity and are valuable for identifying risks and fraud. Participants believed that after gaining an in-depth understanding of the client's business and industry, the application of analytical procedures could refine risk identification, and this would result in audit effectiveness (saving costs and time) because the extent of further audit procedures would be limited. The majority of participants referred to the use of audit software, which made it easier to manipulate large volumes of data to perform sophisticated analytical procedures. Also, most participants further perceived IT experts to add value to an audit. The use of audit software and IT experts, however, was not without challenges, and these could impact negatively on the application of analytical procedures. For a discussion of the challenges relating to the application of analytical procedures, see section 5.6.4.2.

IT further provided participants with a broad array of financial and non-financial information that could be used, and was already being used to develop expectations. In general, participants perceived non-financial information valuable in identifying fraud. According to the participants, non-financial information was mostly obtained from the internet because it is easily accessible, but other sources such as Statistics South Africa were also consulted. Some participants alluded to social media as a valuable source of information, while others questioned the credibility of such information.

5.6.4 The advantages of and challenges in the application of analytical procedures

5.6.4.1 Advantages

In general, participants from all three cases perceived the application of analytical procedures to improve audit efficiency because these procedures provide the auditor with a holistic view of the client's financial information and help him or her to identify risks. Most participants referred to analytical procedures as cost effective because they reduce the extent of detailed testing and save the auditor

time, while providing audit assurance on the whole population. This is in line with findings in the literature (chapter 3, section 3.10), which suggest that the use of analytical procedures could result in more effective and efficient audits (Trompeter & Wright 2010:684; Lin & Fraser 2003:153; Cho & Lew 2000:435). Curtis and Payne (2008:104) agreed with this, and stated that the use of data analysis has the ability to improve audit quality, effectiveness and efficiency.

The Big 4 and second-tier audit firm participants perceived the application of analytical procedures to add value to the client as the insight that could be obtained affords the auditor the opportunity to give valuable feedback to clients, which, according to the second-tier audit firm participants was a way to retain and attract business. The Big 4 audit firm participants indicated that this feedback could also add value to the audit committee. These participants' perceptions were in line with findings in the literature, which indicate that a deeper understanding of the client enable the auditor to add value to the client because it allows the auditor to comment and advise the client on business risks as well as the accounting implications of the business risks (Khalifa *et al.* 2007:833; Robson *et al.* 2007:412).

According to the Big 4 audit firm participants, the application of analytical procedures requires auditors to apply their minds rather than merely inspecting documents, and this could improve the quality of an audit. This view is supported by Houck (2003:78), who emphasises that analytical procedures require auditors to apply their minds, which increases job satisfaction.

5.6.4.2 Challenges

The views expressed by participants from all three cases revealed that there were numerous challenges associated with the application of analytical procedures. In general, participants felt that the advantages outweighed the challenges, and they therefore predicted that the application of analytical procedures would increase in the future.

Participants from all three cases perceived the availability and integrity of data to be a challenge in the application of analytical procedures. The Big 4 audit firm and AGSA participants were challenged by the under-utilisation of the client's system, making it difficult to find reliable data to develop an expectation. Second-tier audit firm participants ascribed the lack of available data to the nature of their client base (small clients with limited internal controls and systems) and the shortage of audit software. This concurs with findings in the literature (chapter 3 section 3.11), which indicated that analytical procedures are underutilised in practice because of a lack of available data (Wang & Cuthbertson 2014:2).

Auditors' resistance to reduce tests of details was perceived to be a challenge by participants from all three cases. However, participants from the three cases had diverse views on the reason for this reluctance. Big 4 audit firm participants indicated that they reverted back to tests of details because it was easier, required less judgement and could be more cost effective. According to them, partners' reluctance to reduce tests of details was because of a lack of guidance provided in the auditing standard on the treatment of differences. Second-tier audit firm participants agreed with the aforementioned view and indicated that they felt uncomfortable with the judgement needed to apply analytical procedures. They also asserted that analytical procedures could not replace tests of details if risks were not properly identified during the planning phase of the audit. The AGSA participants ascribed their resistance to reducing tests of details to the reliability of client data and systems and the auditor's perceptions of the usefulness of analytical procedures. The AGSA participants regarded the assurance obtained from analytical procedures to be low because firm methodologies compelled them to perform more tests of details. The resistance to reducing tests of details concurred with findings in the literature (chapter 3, section 3.11), which indicated that auditors are reluctant to reduce the extent of detailed testing, even if the results of analytical procedures are favourable (Abidin & Baabbad 2015:22; Samaha & Hegazy 2010:901; Lin & Fraser 2003:161). Reasons provided in the literature for auditors' resistance to reduce tests of details included their lack of confidence in the use of analytical procedures as substantive procedures (Lin & Fraser 2003:161) and their inability to exercise judgement (Houck 2003:70).

According to participants from all three cases, there were regulatory challenges because the auditing standard lacks guidance on the extent of assurance that can be placed on analytical procedures and on how to apply professional judgement in drawing conclusions. This is in line with findings in the literature (chapter, 3 section 3.11), which indicated that no formal guidelines are given in ISA 520 (IAASB 2014m) regarding the assurance that can be placed on analytical procedures. From findings in the literature, it is clear that there is a need for guidance in using data analysis in audit engagements (Wang & Cuthbertson 2014:10). The Big 4 and second-tier audit firm participants explained that they feared failing firm inspections (and peer reviews by Big 4 audit firms) by the regulator, the IRBA. One AGSA participant referred to the auditing standard as being outdated and not relevant to the current business environment.

Some of the Big 4 audit firm participants perceived IT experts to pose a threat to the profession. They explained that, the need for IT experts to perform data analysis would increase in the future, and auditors would only be expected to investigate exceptions. These participants feared that such a shift could result in increased competition from non-auditors and could limit the training opportunities provided by firms. The Big 4 audit firm participants also mentioned a legislative risk as a challenge relating to analytical procedures. They ascribed this risk to the high volumes of client data that are necessary to perform data analysis, which have to be secured and stored. Their concern supports findings in the literature that have shown concerns relating to data security as auditors are unsure about how data should be secured and protected (RSA 2013; Braun & Davis 2003:731).

Section 5.6.3.4 dealt with the use of non-financial information in the application of analytical procedures. The discussion demonstrated that participants from all three cases regarded non-financial information as a valuable source of evidence. Participants from all three cases, however, found it challenging to identify the relationship between financial and non-financial data and to apply non-financial data to a specific financial line item. Big 4 audit firm participants referred to the credibility of non-financial information, while both Big 4 audit firm and the AGSA participants were uncertain about the format in which non-financial data should

be downloaded, made applicable for specific financial statement line items and protected.

In general, participants from all three cases perceived a “gap” between university studies and audit practice relating to the application of analytical procedures (also data analysis) and the use of IT. Second-tier audit firm participants believed that this “gap” was demonstrated by trainees’ inability to apply their minds to the audit and their lack of higher-order thinking skills. The AGSA participants predicted that auditors of the future should have knowledge of the audit process, IT and mathematical skills. Big 4 audit firm participants alluded to training opportunities (on-the-job training and in-house training courses) presented by their firms to close the gap. This is in line with the opinion of Vasarhelyi *et al*. (2010:420) that audit education should evolve in order to keep up with the progress being made in the business world. The literature (chapter 3, section 3.11) indicates that universities should adjust their curricula to place more emphasis on the use of sophisticated techniques (Cho & Lew 2000:437), the use of disaggregated data (Trompeter & Wright 2010:678), the use of data-mining tools (Wang & Cuthbertson 2014:8; Koskivaara 2007:343) and model-building skills (Peecher *et al*. 2007:478).

5.6.4.3 Summary of the advantages of and challenges in the application of analytical procedures

From the discussion in the above sections it is clear that there are numerous advantages and challenges relating to the application of analytical procedures. The advantages include efficiency considerations because they provide the auditor with a holistic view and focus attention on areas of risk. In addition, the application of analytical procedures could provide assurance over the whole population while reducing audit costs, audit time and the extent of tests of details. These procedures further provide the auditor with deep insights, creating an opportunity to add value to the audit committee and the client.

The discussion demonstrated that the auditor’s performance of analytical procedures is dependent on the availability and integrity of the clients’ data and

that participants felt that it was difficult to find reliable data for the development of an expectation.

Even though the performance of analytical procedures could decrease the auditor's tests of details, participants from all three cases still reverted back to tests of details because of their ease of application, and the fact that they required less judgement and could be more cost-effective. According to second-tier audit firm participants, analytical procedures could not replace tests of details if risks were not properly identified during the planning phase of the audit. The AGSA participants reported that their firm's audit methodology required the performance of tests of details.

Partners' reluctance to reduce tests of details was ascribed to their lack of confidence in the results obtained from analytical procedures and the lack of guidance provided in the auditing standard on the extent of assurance that could be placed on analytical procedures and on how to apply professional judgement in drawing conclusions. Participants from all three cases agreed that the guidance provided in the aforementioned standard was insufficient. In addition, Big 4 and second-tier audit firm participants stated that they were reluctant to reduce tests of details because they were concerned about the impact on the IRBA firm inspections (Big 4 audit firm participants also referred to their firms' peer review).

Big 4 audit firm participants perceived analytical procedures to pose a threat to the profession because audit procedures are becoming increasingly automated. Owing to auditors' lack of IT competence, IT experts were used to perform data analysis. Participants stated that they feared that such a shift could result in increased competition from non-auditors and the need for audit trainees could decrease, which would impact negatively on the training opportunities provided by firms. Big 4 audit firm participants also perceived the protection of the data needed for data analysis as a risk.

The incorporation of non-financial information in data analysis was considered a challenge as participants felt that it was difficult to identify the relationship

between financial and non-financial data and to download and apply non-financial data to a specific financial line item. Big 4 audit firm participants cautioned against the credibility of non-financial information obtained through social media.
The discussion concluded with the last challenge, namely the competence of auditors. Participants from all three cases identified a “gap” between university education and audit practice regarding the application of analytical procedures (also data analysis) and the use of IT. According to all the participants, the skills necessary to perform analytical procedures were not being addressed in current university curricula, and Big 4 audit firm participants indicated that they provided their own in-house and on-the-job training in an effort to close the gap.

5.7 CONCLUSION

In this chapter, the findings of the study were presented and discussed. The aim was to achieve the overall objective of the study, namely to investigate the application of analytical procedures by auditors in the audit process. The chapter demonstrated that three individual cases were selected for this study, namely Big 4 audit firms, second-tier audit firms and the AGSA. Fifteen participants representing the three cases were selected to participate in the study and data were collected through semi-structured interviews with these participants. On the basis of the data collected, the researcher was able to identify themes and sub-themes.

The findings of the study were presented per the individual cases and were according to the identified themes and sub-themes. This was followed by a cross-case analysis, which enabled the researcher to compare and generalise the findings in the three cases to gain an in-depth understanding of the application of analytical procedures by auditors in the audit process.

The next chapter focuses on the conclusions and discusses the achievement of the research objectives through the literature review and through this study. It also makes recommendations and suggestions for possible further research.

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

In chapters 2 and 3, the literature review was presented in order to lay the foundation for the study, while the detailed findings of the study were discussed in chapter 5. The findings were presented for the three individual cases, namely Big 4 audit firms, second-tier audit firms and the AGSA. This was followed by a cross-case analysis.

This chapter deals with the achievement of the research objectives as set out in chapter 1, section 1.4. It discusses how the research objectives were achieved through the literature review and the findings of the multiple case study. This is followed by a discussion of the recommendations arising from the research findings, and suggestions are made for possible further research. The chapter ends with a final conclusion.

6.2 ACHIEVEMENT OF THE RESEARCH OBJECTIVES

The overall objective of this study was to investigate the application of analytical procedures by auditors in the audit process. The overall objective of this study was based on the problem statement, namely that many studies have been conducted on the application of analytical procedure by auditors in various countries, but little is known about exactly how auditors in South Africa apply analytical procedures in the audit process. Owing to an ever-changing audit environment with increased demands for more efficient and effective audits, a closer look at the phenomenon was deemed both timely and appropriate. To achieve the overall objective, the researcher identified the following four secondary research objectives:

- To determine why auditors need to apply analytical procedures.
- To determine how auditors apply analytical procedures in the audit process.

- To determine whether the application of analytical procedures in the audit process has changed in response to the changing audit environment.
- To determine the advantages of and challenges experienced by auditors in the application of analytical procedures.

The next two sections explain how the secondary objectives were achieved, firstly, through the literature review (see chapters 2 and 3), and secondly, through the findings of this multiple case study (see chapter 5).

6.3 ACHIEVEMENT OF THE RESEARCH OBJECTIVES THROUGH THE LITERATURE REVIEW

Secondary objective 1: To determine why auditors need to apply analytical procedures

The first secondary objective was achieved in chapter 2 of this study. This chapter discussed the need for and development of an audit. The chapter went on to describe the factors that have driven auditors to alter the current audit methodology. These factors include changes in the business environment, changes in audit practices, the advancement of technology and the incorporation of more non-financial information into an audit. From the discussion on each of these factors, it is clear that analytical procedures are vital tools available to auditors and that they need to apply these procedures in order to stay relevant in the current auditing environment. Furthermore, the incorporation of more analytical procedures could result in better quality audits.

Secondary objective 2: To determine how auditors apply analytical procedures in the audit process

The second secondary objective was achieved in chapter 3 of the study. The discussion indicated that analytical procedures are an integral part of the audit process. It also identified variations in the use of analytical procedures during the different phases of the audit process, depending on the auditor's objectives. It was shown that auditors in larger audit firms use analytical procedures more than their counterparts in small audit firms, and that factors such as auditors'

experience, their knowledge of the topic and their perception of the usefulness of analytical procedures impact on the usage of these procedures. The discussion revealed that auditors still prefer the use of non-quantitative or judgemental procedures rather than advanced quantitative techniques, even though developments in technology have made the latter feasible. The chapter further demonstrated that auditors tend to be unwilling, and in some instances, lack the competence to investigate differences relating to their application of analytical procedures.

Secondary objective 3: To determine whether the application of analytical procedures in the audit process has changed in response to the changing audit environment

The third secondary objective was achieved in chapter 3 of the study. The chapter provided a description of the factors mentioned in the literature that have led to an increased use of analytical procedures. These factors are the adaptation of a business risk audit methodology, the advancement of technology and the availability of non-financial information. The discussion indicated that analytical procedures are an integral part of the business risk audit methodology because their application enables the auditor to create more precise expectations in their assessment of risks. The advancement of technology has further led to the development of continuous auditing in which the auditor can use data modelling and data analysis as analytical procedures. The increased use of audit support systems assists auditors with their analysis of data and can be used to analyse large volumes of data within a short timeframe. Technological advancements have also provided auditors with a broader array of financial and non-financial information. The literature suggests that the auditor should compare comprehensive non-financial data with financial data to assess the reasonableness of financial statement data.

Secondary objective 4: To determine the advantages of and challenges experienced by auditors in the application of analytical procedures

The fourth and final secondary objective was also achieved in chapter 3 of the study. The chapter showed that the main advantage of the application of analytical procedures is to perform a more efficient and effective audit. The

chapter further indicated that advancements in technology have made it possible for the auditor to examine larger sets of data which can assist him or her with the provision of more timely and forward-looking information. From the literature it is clear that despite the advantages, there are still numerous challenges in the application of analytical procedures. It demonstrated that the main advantage of analytical procedures, namely to perform a more effective and efficient audit, may not be attainable because sophisticated and powerful analytical procedures are time consuming, which could prove to be expensive. Complexities in the business environment and the expectations of clients, however, are compelling audits to become more forward looking and predictive in nature, and these developments will require auditors to use sophisticated techniques and methods for analytical procedures, which, in turn, will require them to meet the related challenges. The chapter also indicated that universities need to adjust their curricula and teaching methods to include greater coverage of the application of analytical procedures.

6.4 ACHIEVEMENT OF THE RESEARCH OBJECTIVES THROUGH THE MULTIPLE CASE STUDY

Chapter 4 discussed the research methodology that the researcher followed to attain the overall objective of the study, namely to investigate the application of analytical procedures by auditors in the audit process. It indicated that the researcher adopted a qualitative research approach to collect data. Semi-structured interviews were conducted to collect the data, and the researcher used Atlas.ti to analyse the data. This enabled the researcher to gain an in-depth understanding of the application of analytical procedures by auditors in the audit process rather than to provide explanations and make predictions. The findings of the study were discussed in detail in chapter 5. The sections below discuss the key findings presented in chapter 5 in relation to the four secondary objectives.

Secondary objective 1: To determine why auditors need to apply analytical procedures

This study found that participants need to apply analytical procedures because this:

- adds value to the audit;
- enables auditors to gain a better understanding of the client;
- is a regulatory requirement;
- is an integral part of the audit process; and
- could be an effective way to identify risks.

Secondary objective 2: To determine how auditors apply analytical procedures in the audit process

The study found that auditors do apply analytical procedures during the planning, fieldwork and conclusion, evaluation and reporting phases of the audit. However, there are variations in their application of these procedures in each of these phases, the people responsible for performing and reviewing these procedures and the techniques or methods applied.

The findings of this study demonstrated that participants applied analytical procedures during the planning phase of an audit as follows:

- Analytical procedures were used mainly for the identification of risks, for planning purposes and to obtain an overview of the financial results.
- In Big 4 and second-tier audit firms, analytical procedures during the planning phase were mainly performed and reviewed by members of the audit team with the most experience as the auditor's ability to apply these procedures depends on his or her knowledge of the client and industry. The AGSA participants reported that second-year audit trainees performed analytical procedures during the planning phase of the audit, but that IT experts were also involved.
- The involvement of partners during the planning phase, however, varied, and partners from Big 4 audit firms appeared to be more actively involved than partners from second-tier audit firms and the AGSA.
- Participants preferred the use of simple techniques such as comparisons, ratio analysis and trend analysis in the performance of their analytical procedures.

According to the participants, analytical procedures were applied during the fieldwork phase for the following reasons:

- Participants used these procedures to obtain audit evidence and to determine the extent of their tests of details.
- Big 4 audit firm participants applied substantive analytical procedures to a larger extent than their counterparts because of the shortage of reliable data and limited guidance provided by firm methodologies on the assurance that analytical procedures provide.
- Participants perceived the application of analytical procedures to be more successful on statement of profit and loss and other comprehensive income balances than on statement of financial position balances, but this would also depend on the assertion under consideration.
- Analytical procedures during the fieldwork phase could be performed by lower-level staff, but the allocation was dependent on the competence of the staff and the guidance provided.
- Big 4 audit firm and AGSA participants acknowledged the value of including IT experts on the audit team for the performance of substantive analytical procedures.
- Analytical procedures during the fieldwork phase were performed on accounts that lend themselves to prediction and comparison and that have a fixed-cost element.

The findings of this study indicated that participants perceived analytical procedures to be applied during the conclusion, evaluation and reporting phase for the following reasons:

- Analytical procedures would enable the auditor to obtain an overview of the financial statements and to reassess the initial risk assessment and initial going concern assessment performed during the planning phase of the audit.
- These procedures were performed at a high level.
- The parties performing analytical procedures were managers and partners in Big 4 audit firms, and the same individuals responsible for the application of

these procedures during the planning phase in second-tier audit firms and the AGSA. All of these individuals had to have sufficient experience and knowledge of the client as they needed to exercise judgement in drawing conclusions.

- Participants used simple techniques such as comparisons and ratio analysis in their performance of analytical procedures during the conclusion phase.

The study found that participants perceived various internal and external factors to have an effect on the extent of use of analytical procedures, but the extent of use remained a judgement call that was mostly exercised by audit partners. The following external and internal factors were identified:

- the auditor's assessment of risks as the main determinant in the decision on the extent of analytical procedures;
- the availability, quality and reliability of client data;
- client size;
- the sophistication of the client's internal control record-keeping systems;
- the availability of audit support systems;
- the auditor's competence to perform analytical procedures;
- the auditor's knowledge of the business;
- the level of experience and knowledge of the audit team members; and
- the auditor's perception of the usefulness of such procedures.

The findings of the study demonstrated that, in general, participants perceived the following factors to impact on the types of analytical procedures used:

- the auditor's risk assessment;
- the availability of IT experts to perform data analysis;
- the availability and quality of data;
- the availability of audit software;
- the client's expectations;
- the nature of the account balance; and
- the objective of the audit procedure.

The study found that Big 4 audit firm participants started their investigation process for differences between their own expectations and management's representations with the refinement of assumptions used in the development of their own expectations. Participants indicated that they mainly obtained explanations for difference through:

- enquiries from management and financial personnel;
- engaging with internal auditors; and
- discussions with non-financial personnel.

Secondary objective 3: To determine whether the application of analytical procedures in the audit process has changed in response to the changing audit environment

The study found that participants perceived the application of analytical procedures, specifically data analysis, to have increased in past years. In general, participants predicted that the application of analytical procedures would continue to increase in future. Participants ascribed their increased use of analytical procedures to:

- advancements in IT which had made their performance easier and more efficient.
- the implementation of risk-based audit methodologies; and
- increased emphasis on non-financial information.

In general, participants referred to data analysis as the audit of the future and indicated that the use of IT would increase. The following key findings were evident:

- Big 4 audit firm participants indicated that their firms were making huge investments in IT.
- Predictions were made that advancements in IT would make it possible for control testing and substantive analytical procedures to be replaced by data analysis.

- The use of “big data” in the future, which would integrate financial and non-financial information for the identification of risks and fraud, would increase.
- There would be an increase in the use of audit software which would make it easier to manipulate large volumes of data in order to perform more sophisticated analytical procedures.
- The use of audit software for the application of analytical procedures would depend on the auditor’s competence, the feasibility of involving IT experts (based on the audit fee), the quality of client data and client size, systems and expectations.
- Second-tier audit firms did not appear to have IT expertise, outsourcing arrangements were made to obtain such expertise and these participants were more inclined to use such expertise than their counterparts, who did have such expertise in their firms and expressed concern about the cost implications.
- Big 4 audit firm participants felt that advancements in IT posed a threat to the auditing profession as the number of audit trainees in an audit team could decrease, therefore limiting the training opportunities provided by firms.

The majority of participants perceived the implementation of risk-based methodologies to have provided auditors with a holistic view of the entity and had led to increased use of analytical procedures for the identification of risks and fraud. The key findings on risk-based audit methodologies were as follows:

- The effectiveness of analytical procedures as risk assessment procedures would depend on the auditor’s knowledge of the entity and industry.
- Analytical procedures as risk assessment procedures could save costs and time because the extent of further tests could be reduced.

IT had further provided participants from all three cases with a broader array of financial and non-financial information, and all of the participants indicated that such information was already used in the application of analytical procedures. In general, participants indicated that non-financial information was valuable for the

identification of fraud. The key findings on non-financial information were as follows:

- The participants acknowledged the value of IT experts as they have the ability to compare different databases in order to identify conflicts of interest.
- The participants identified the sources of non-financial information as the internet (e.g. company websites and annual reports), external sources such as Statistics South Africa, the Human Sciences Research Council and the South African Social Security Agency (identified by the AGSA participants) and social media. However, concerns were expressed about the credibility of information gathered from social media.

Secondary objective 4: To determine the advantages of and challenges experienced by auditors in the application of analytical procedures

This study found that the application of analytical procedures had the following advantages:

- improving audit efficiency;
- assisting with the identification of risks;
- promoting cost effectiveness (reducing the extent of detailed testing and saving the auditor time);
- reporting in more detail thereby adding value to the audit committee;
- attracting new and retaining existing clients based on an increased value proposition; and
- compelling auditors to apply their minds instead of inspecting documents, because this could improve the quality of an audit.

Numerous challenges, however, were identified by participants from all three cases in relation to the application of analytical procedures. Owing to these challenges, the study found audit partners to be reluctant to reduce the extent of their tests of details. Participants identified the following challenges:

- The auditor's performance of analytical procedures would depend on the availability and integrity of clients' data, and participants felt that it was difficult to obtain reliable data for the development of an expectation.
- Analytical procedures would depend on the proper identification of risks during the planning phase of the audit.
- Limited guidance was provided by firms' audit methodologies.
- There was a lack of auditor confidence in the results obtained from analytical procedures.
- There was a lack of guidance in the auditing standard on the extent of assurance that could be placed on analytical procedures and on how to apply professional judgement in drawing conclusions.
- Extensive analytical procedures had an impact on the IRBA firm inspections (Big 4 audit firm participants also referred to their firms' peer review).
- Big 4 audit firm participants perceived analytical procedures to pose a threat to the profession as audit procedures were becoming increasingly automated. Owing to auditors' lack of competence, IT experts were used to perform data analysis. Participants feared that such a shift could result in increased competition from non-auditors and the need for audit trainees could decrease, which would impact negatively on the training opportunities provided by firms.
- The data needed for data analysis would require protection.
- Non-financial information would need to be included in data analysis because the perception was that it is difficult to identify the relationship between financial and non-financial data.
- Difficulties would be experienced in downloading and applying non-financial data to a specific financial line item.
- There was a "gap" between university education and audit practice relating to the application of analytical procedures (also data analysis) and the use of IT. All participants asserted that the skills necessary to perform analytical procedures were not being addressed in the current university curricula, and Big 4 audit firm participants indicated that they provided their own in-house and on-the-job training in efforts to close the gap.

6.5 RECOMMENDATIONS

Chapter 1, section 1.6, identified the main stakeholders that could benefit from this study, namely scholars, regulators and professional bodies, audit practitioners and management of audit clients. The recommendations are aimed at these stakeholders on the basis of the literature review and conclusions drawn from the findings of this study.

6.5.1 Recommendations for scholars

The findings of this study add to the body of knowledge on the application of analytical procedures in the audit process by providing a South African perspective. This is the first South African study focusing on this phenomenon. It demonstrated that auditors need to perform analytical procedures because this could add value and result in better quality audits. It is recommended that scholars should use the findings of this study to perform further studies. Suggestions for possible further research are provided in section 6.6.

6.5.2 Recommendations for regulators and professional bodies

Enhancements in IT as well as the increased availability of data have led to analytical procedures (also data analysis) becoming an integral part of the audit process. However, there are still numerous regulatory and legislative challenges in the application of analytical procedures as indicated in the literature review and findings of this study. The following recommendations were made to overcome these challenges:

6.5.2.1 Recommendations for the IAASB

Based on the literature review and the findings of this study, regulatory challenges were identified because of the fact that the auditing standards lack guidance. It is therefore recommended to the IAASB that changes should be made to the current ISA 520 (IAASB 2014m), to ensure that the standard remains relevant in a changing audit environment. It is recommended that the IAASB

should provide increased guidance in ISA 520 (IAASB 2014m) or in a practice note on the assurance that can be obtained from analytical procedures as well as on the extent to which auditors should investigate differences in analytical procedures.

Secondary to the guidance in ISA 520 (IAASB 2014m), it is also recommended that the IAASB should revise and consider the guidance provided in other auditing standards relating to the application of analytical procedures, as well as data analysis in the audit process. These standards include the following:

- ISA 315 (IAASB 2014j). It is recommended that the IAASB revise the guidance on how analytical procedures and specifically data analysis can be used as risk assessment procedures during the planning phase of the audit and its impact on the risk assessment process.
- ISA 330 (IAASB 2014k). It is recommended that the IAASB revise the guidance on how the auditor should respond to risks identified through analytical procedures and data analysis relating to the mix of audit procedures that should be performed to obtain appropriate audit evidence. Also, guidance should be provided on how the results obtained from analytical procedures and data analysis could impact on audit sampling.
- ISA 230 (IAASB 2014g). It is recommended that the IAASB should provide further guidance on how auditors should document their professional judgement to explain their conclusions based on the results of analytical procedures and data analysis.
- ISA 620 (IAASB 2014o). It is recommended that the IAASB should refer to data analysis as a form of expertise in the standard.

6.5.2.2 Recommendations for the SAICA

From the literature review and the findings of this study it became clear that there is a “gap” between university education and audit practice relating to the application of analytical procedures (also data analytics) and the use of IT. It became evident that the skills necessary to perform analytical procedures are not

being addressed in current university curricula, and participants from Big 4 audit firms revealed that they provide their own in-house courses and on-the-job training in an effort to close the gap. It is therefore recommended that the SAICA should revise the current competency framework which outlines the competencies expected of a chartered accountant in South Africa, to include greater coverage of analytical procedures in university studies. This would guide academics in adjusting their curricula and revising their teaching methods relating to the application of analytical procedures.

It is further recommended that that the SAICA should offer higher-level continued professional development training courses to ensure that auditors obtain the necessary IT skills to perform analytical procedures and data analysis. Training courses on how to identify the relationship between financial and non-financial information is also recommended. Such training courses would increase auditors' awareness of the advantages that can be derived from the application of analytical procedures and would enable them to utilise these procedures to a greater extent.

6.5.2.3 Recommendations for the IRBA

The findings of this study demonstrated that even though analytical procedures can provide the auditor with audit assurance, participants were reluctant to reduce the extent of their tests of details as they were concerned about the impact of this on the IRBA firm inspections. It was clear from the participants' responses that they perceive the IRBA not to be a proponent of analytical procedures. It is therefore recommended that the IRBA should consider their inspection policies relating to the assurance that can be placed on analytical procedures.

6.5.2.4 Recommendations for the South African government

The literature review and findings indicated a legislative risk as a challenge relating to analytical procedures. A high volume of client data is necessary to perform data analysis which has to be secured and stored. However, participants

expressed their concern about data security as auditors are unsure about how data should be secured and protected. The researcher therefore recommends that the South African government, through the POPI Act of 2013 (RSA 2013), should provide guidelines that ensure that data is secured and protected.

6.5.3 Recommendations for audit practitioners

The research findings based on the literature review and this study characterised the application of analytical procedures by auditors in the audit process. The findings indicated that analytical procedures could add value to the audit because they help the auditor to gain a better understanding of the client. This should be regarded as an integral part of the audit process and technological advances have made it possible to apply more and better analytical procedures. In order to increase the quality of audits, the study recommends to practitioners that they should integrate more analytical procedures into their performance of audits. It is further recommended that audit practitioners use the results of this study to benchmark their practices on the application of analytical procedures.

The findings of this study also indicated concerns about increased competition from non-auditors regarding the performance of data analyses. To eliminate this competition, it is recommended that audit practitioners should include individuals with the necessary IT expertise in their engagement teams. This would ensure that IT skills are embedded in the audit team, which would eliminate the need for reliance on non-auditors for the performance of data analysis.

6.5.4 Recommendations for management of audit clients

The literature review and findings of this study indicated that the application of analytical procedures could add value to an audit and thus promote audit quality. The application of analytical procedures provides the auditor with a deeper knowledge of the client, which would create an opportunity to report in more detail to the audit committee and the client. The extent to which the auditor can apply analytical procedures, however, depends on the strength of a client's internal control system and control environment, the availability, quality and

reliability of the client's data and the sophistication of the client's record-keeping. It is recommended that management should be made aware of the advantages of and related challenges in the application of analytical procedures. Management could engage with auditors to overcome these challenges and ensure that they capitalise on the advantages.

6.6 SUGGESTIONS FOR FURTHER RESEARCH

The investigation of the application of analytical procedures by auditors in the audit process highlighted the following areas for possible further research:

- The findings of this study are representative of large audit firms in South Africa. An opportunity therefore exists to investigate the application of analytical procedures by small and medium audit firms in South Africa.
- This study was restricted to the views of senior audit managers. An opportunity therefore exists to compare the views of senior audit managers to audit team members of other levels of experience.
- The scope of the study was limited to the application of analytical procedures in the audit process. An opportunity thus exists to investigate the application of analytical procedures by auditors in an independent review engagement.

The findings of this study further indicated that the application of data analysis would increase in the future. Its application is particularly relevant to the planning and obtaining audit evidence phases of an audit. The following opportunities for further research relating to data analysis exist:

- To investigate the application of data analysis in the audit process, with the emphasis on the impact of data analysis on the auditor's risk assessment process and the extent of reliance that can be placed on audit evidence obtained from the application of such procedures.
- To investigate how the SAICA should revise and adapt its competency framework to include greater coverage of the application of data analysis in

university curricula, with the emphasis on the IT skills that trainees require to perform data analysis.

The findings of the study indicated that auditors tend to rely too heavily on IT experts, especially for the identification of risks. The opportunity therefore exists:

- to investigate the engagement between auditors and IT experts, and the reliance they place on one another's work.

The findings of the study also indicated that auditors find it difficult to identify the relationship between financial and non-financial data as well as difficulties to download this data. An opportunity therefore exists:

- to investigate how auditors download non-financial information from the internet (including social media) and how they apply it to specific line items.

6.7 FINAL CONCLUSION

The overall objective of this study was to investigate the application of analytical procedures by auditors in the audit process. To achieve this objective, the researcher applied a qualitative research approach which enabled her to generate an in-depth understanding of the application of analytical procedures by auditors in the audit process. It is hoped that the findings of this study will motivate auditors to increase their application of analytical procedures, therefore adding value to an audit and increasing audit quality. Hopefully, the relevant stakeholders will consider the recommendations made in this study. This would assist auditors to overcome the challenges experienced in the application of analytical procedures and enable them to capitalise on the advantages of analytical procedures.

The researcher would like to end this study with the following quotation:

"Whosoever desires constant success must change his conduct with the times" – Niccolo Machiavelli

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APPENDIX A

INTERVIEW PROTOCOL

OBJECTIVE OF THE STUDY

Previous studies conducted in various countries other than South Africa show the importance of the performance of analytical procedures in the audit process. The aim of this study is to investigate how South African auditors apply analytical procedures in the audit process.

INTERVIEW QUESTIONS

1. Why do you need to apply analytical procedures?
2. How do you perform analytical procedures during the
   - planning phase
   - obtaining audit evidence phase
   - conclusion phase of an audit?
3. How do you decide on the extent of analytical procedures?
4. Who is mainly responsible for performing these analytical procedures and reviewing the results during the
   - planning phase
   - obtaining audit evidence phase
   - conclusion phase of an audit?
5. How do you decide on the types of analytical procedures to be performed?
6. How has your application of analytical procedures changed over the past years?
7. What has driven the change in your use of analytical procedures?
8. How did the emphasis on risk-based audit methodologies impact on your application of analytical procedures?
9. How will developments in technology change analytical procedures of the future?
10. How do you believe that non-financial information such as industry knowledge will be integrated in analytical procedures of the future?
11. How do you treat material differences for analytical procedures?

12. What do you consider to be the main advantages of analytical procedures?
13. What are the challenges experienced in applying analytical procedures in practice?

APPENDIX B

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Economic and Management Sciences

Combined Letter of Introduction and Informed Consent

Dept. of Auditing

The application of analytical procedures in the audit process

Research conducted by:
Mrs JA Kritzinger (96035456)
Cell: 082 292 4874

Dear Participant

You are invited to participate in an academic research study conducted by Jana Kritzinger, Masters student from the Department Auditing at the University of Pretoria.

The purpose of the study is to investigate the application of analytical procedures in the audit process.

Please note the following:

- This is an anonymous study survey as your name will not appear on the questionnaire. The answers you give will be treated as strictly confidential as you cannot be identified in person based on the answers you give.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the interview as completely and honestly as possible. This should not take more than 1 hour of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my study leader, Prof K. Barac (karin.barac@up.ac.za), if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

_____ _____

Participant's signature **Date**

APPENDIX C

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES

RESEARCH ETHICS COMMITTEE

Tel: +27 12 420 3395
E-mail: ronel.rensburg@up.ac.za

13 May 2015

Strictly confidential

Prof K Barac
Department of Auditing

Dear Professor Barac

Project:	The application of analytical procedures in the audit process
Researcher:	JA Kritzinger
Student No:	96035456
Supervisor:	Prof K Barac
Department:	Auditing

Thank you for the application you submitted to the Committee for Research Ethics, Faculty of Economic and Management Sciences.

I have pleasure in informing you that the above study was approved on an *ad hoc* basis on 13 May 2015. The approval is subject to the candidate abiding by the principles and parameters set out in the application and research proposal in the actual execution of the research.

The approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Codes of Research Ethics of the University of Pretoria if action is taken beyond the approved proposal.

The Committee requests that you convey this approval to the researcher.

We wish you success with the project.

Sincerely

pp **PROF RS RENSBURG**
CHAIR: COMMITTEE FOR RESEARCH ETHICS

cc: Student Administration