



Audit Methodologies: Developing an integrated planning model incorporating audit materiality, risk and sampling

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In memory of Jacobus Johannes Swart (Sr) 1935–2014

Thanks dad for teaching me accounting when I wanted to give up in the beginning of my school career. Without your explanations and fundamental basis laid I would never have followed the accounting and auditing career path. Thank you for the support throughout all my studies. Now the hours of being the apprentice in your woodwork, metal and mechanical projects make sense. Through the assistance you taught me to think practical and also measure twice and not just to jump in and get it done. The experience also taught me to solve problems although it may be in an accounting field.

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ABSTRACT

Title: Audit methodologies: Developing an integrated planning model incorporating audit materiality, risk and sampling

Keywords: Audit methodology, audit risk, audit sampling, audit techniques, integrated model, materiality and business risk

Planning of the audit directs the auditor throughout the audit process and the objective of an auditor is to execute the audit in such a manner that the audit risk is reduced to an acceptable low level. Applying the appropriate audit methodology is of utmost importance for the auditor to complete a quality audit with the lowest risk of failure or litigation. However, various regulatory bodies such as IRBA, IFIAR and PCAOB report on the deficiencies in audits although new audit methodologies are implemented. Investigations into audit firms in South Africa during 2017 and 2018 on possible audit regularities may suggest that the effective application of the business risk audit (BRA) is questioned. The business risk auditing developed in 1990 did not prevent the Enron and WorldCom scandals due to the BRA being in its developmental stage.

The BRA is still applied and concentrates on the high risk and understanding of the client on the financial statement level and to a lesser extent on transactional audits. Since the advent of the BRA, the auditors expanded their work to consulting and the distinction between audit and consulting services relevant to the auditor's independence became distorted.

The integrated planning model development spans over 5 phases. Phase 1 is the identification and accumulation of BRA elements that can assist in risk identification. Guidance regarding audit risk identification, assessment and response are lacking as indicated by IFAC (2016) and risk identification elements available in literature are included in the final model. Phase 2 is the development of the quantified sextant audit model from the business risk discipline and applied as a basis to quantify the audit risk at various levels. Phase 3 is the analysis and comparison of the financial information of the JSE-listed companies and the current materiality benchmarks correlate and benchmarks are therefore relevant. Benchmarks for cash flow and debt should be considered as new materiality benchmarks based on the current global

economic conditions. Phase 4 is the research and suggestion for sample sizes and it is relevant as the PCAOB (2014) reports on the sample sizes and suggests that the audit sample sizes should be increased, which indicate that the risk assessment and transaction verification at assertion level should receive more attention. The results from literature and the questionnaire administered to the auditing firms differentiate between the sample size for test of controls and suggest ranges between 6 and sixty per annum. The most recent responses indicate that stratified sampling is an acceptable method for sampling. The principle of stratified sampling is to select high value items and randomly select non-material items. The results of stratified sampling therefore convert to percentage coverage for Statement of financial performance (SOPF) balances. Phase 5 of the integrated planning model consists of the integration of risk identification, sextant risk model, materiality and sampling. Research methodologies include mixed, inductive, deductive, grounded theory, documentary review and statistical analysis to obtain results to develop the integrated planning model.

The difference between the integrated model as suggested by PCAOB and the current research is that the PCAOB requires for test of controls and substantive audit approach to be performed while the integrated audit planning model in this context is concerned with integrating planning concepts such as audit risk, materiality and sampling to enable the auditor to visually see the relationship as planning progresses.

The integrated model incorporates best practices from elements of BRA, sextant risk model, materiality and audit sampling to ensure that all material balances are verified. The results from the model applied in public practice and assignment and questionnaire administered to students all indicate positive results and supports the applicability of the integrated audit planning model. The advantage of this integrated planning model is that supervision can be performed on the document and responses to audit risk are indicated through working paper references. This model also complies with ISA 230 and ISQC1 requirements for documentation and engagement performance. The document serves as a useful tool for review and quality control purposes.

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LIST OF ABBREVIATIONS, SYMBOLS AND ACRONYMS

AGSA	: Auditor-General of South Africa
AICPA	: American Institute of Certified Public Accountants
AJPHRD	: African Journal for Physical Health, Education, Recreation and Dance
AP	: Analytical procedures
APA	: Auditing Profession Act 2005
ARM	: Audit risk model
BRA	: Business risk audit
BRM	: Business risk model
CL	: Confidence level
COSO	: Committee of Sponsoring Organizations of the Treadway Commission
CR	: Control risk
DR	: Detection risk
ERM	: Enterprise risk management
EVA	: Economic Value Added
GLOSS	: Glossary of Terms as per SAICA Handbook 2017/2018, Auditing Volume 2
IAASB	: International Auditing and Assurances Standards Board
IAPM	: Integrated audit planning model
IAS	: International Accounting Standards
IASB	: International Accounting Standards Board
IFAC	: International Federation of Accountants
IFIAR	: International Forum of Independent Audit Regulators
IoDSA	: Institute of Directors Southern Africa
IR	: Inherent risk
IRBA	: Independent Regulatory Board for Auditors

ISAs	: International Standards on Auditing
JSE	: Johannesburg Stock Exchange
KING IV	: King IV Report on Corporate Governance for South Africa 2016 or King IV code or King IV report
OM	: Overall materiality
PAAB	: Public Accountants' and Auditors' Board
PCAOB	: Public Company Accounting Oversight Board
PM	: Performance materiality
QMF	: Qualitative materiality factors
RBS	: Risk breakdown structure
RM	: Risk management
RMM	: Risk of material misstatement
ROMM	: Risk of material misstatement
SA	: South Africa
SAICA	: South African Institute of Chartered Accountants
SOCI	: Statement of Comprehensive Income
SOFP	: Statement of Financial Performance
SOX	: Sarbanes-Oxley Act of 2002
SPSS	: SPSS Statistics
SR	: Substantive risk
TD	: Test of detail
TOC	: Test of controls
TOD	: Tests of detail
WACC	: Weighted average cost of capital

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REMARKS TO THE READER

The following should be taken into consideration while reading this thesis:

The literature review in this thesis includes a seminal research of literature ranging from 1907 to 2017. The research is spread over such a period as to include all the audit methodologies up to the current methodology and to include relevant research and acknowledge the pioneers in auditing.

The referencing style used is based on the **Harvard style** as applied by the North-West University 2012 reference guide. The internet sources referenced to in this thesis include no page references as required by the above-mentioned reference guide.

The thesis is presented as per the policies required by the North-West University.

The following article on analytical review and documentary review, which forms part of the thesis, was published by an AJOL indexed and DHET peer-reviewed academic journal as follows:

Swart, J.J., Swanepoel M.J. & Surujlal, J. 2014 A critical analysis of government spending on sport: Mass participation and school allocation, African Journal for Physical, Health Education, Recreation and Dance (AJPHERD). (ISSN: 1117-4315).

The following **article was submitted** for publication to the IBSS indexed and internationally peer-reviewed academic journal as follows:

Swart, J.J. & Lucouw, P. 2018. Shareholders and auditor's materiality decision: Understanding of auditor materiality consideration on financial statements. International journal of auditing, Unpublished. (ISSN: 1099-1123).

The submitted article is submitted in accordance with the journal's author guidelines.

Confirmation of the submission is included in **Appendix 13**.

The submitted article was written by the PhD candidate as first author (Swart, J.J.) and contributed more than 50% of the article in accordance with the North-West University guidelines.

The promoter of this PhD thesis and second author (Lucouw, P.) was responsible for the review of the article prior to submission.

CHAPTER 1

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 INTRODUCTION

Bell *et al.* (2005:29) argues that the audit quality should be raised due to the changing business environment and accounting failures of Enron and similar companies, which had the largest impact on the American economy. The United States of America (USA) prescribed auditing standards, which were not International Standards of Auditing (ISAs) during the period of the accounting failures. IFAC (2012) indicated that the USA only converged to modified ISAs (SAS 122 to 127) to be effective for audits with periods ending on or after 15 December 2012. The effective date for SAS 128 is for all audits with periods ending on or after 15 December 2014. The convergence and clarity project brought the USA Auditing Standards, now called “Professional Standards”, in line with the ISAs that will have a significant influence on the global auditing profession as illustrated in the discussion below.

While the auditing literature mostly published in academic journals during the past 10 years are mostly from the USA, of which researchers such as Eilifsen *et al.* (2001); Eilifsen and Messier Jr (2015); Messier Jr and Austen (2000), Kinney Jr (1983), Johnstone (2000), and Flint *et al.* (2008) are examples, the list is exhaustive. It is important to understand the size of the USA auditing profession and Big4 (2013:7-8) is the most recent comparison of firm income available. The analysis indicates that PWC's assurance practice is the largest firm in the global audit services environment. The USA is a major role-player in the global auditing environment as the revenue for PWC in America for 2012 is 12.2 billion American dollars (\$), which is only 10% lower than the combined revenue of \$13.9 billion for Europe, Middle East and Africa. Big 4 (2013:9) confirms the USA dominance in the global auditing profession as Deloitte USA's figures also indicate that America's revenue of \$15.4 billion exceed the combined revenue of \$11 billion for Europe, Middle East and Africa. The figures illustrate that America is a global leader in the auditing profession. Taking into account the size of audit activities in the USA compared to the rest of the world, the auditing standards adopted by the USA, which is in line with the ISAs, will to a large extent, affect the global auditing standards (IFAC 2012:26). The relevance

of this research is therefore of the utmost importance as it will contribute to knowledge of a new developing but strong auditing profession. IFAC (2018q:12) indicated in their latest publication in 2017 that 175 countries and jurisdictions did adopt the ISAs on different basis, which is an indication that ISAs and the audit methodology needs to be reconsidered and improved.

Mentz (2014:289) recommended that “research should be expanded to include the risk assessment phase of the audit”. Mentz (2014:289) further suggested that the nature, appropriateness and tests of controls, substantive procedures should be researched further. As indicated in the paragraph above the development of an integrated model for audit planning is of utmost importance. The complexity, grouping and layout and way that the ISAs are structured, further supports the need for an integrated planning model to link the relevant sections of the ISAs. The standards follow a structure where every topic is separately dealt with, but need to be integrated to perform a quality audit. The ISAs as published by IFAC (2018a-p) are fragmented into four different stages of the audit:

- Pre-engagement, client acceptance and continuance (4 ISAs)
- Planning (9 ISAs)
- Gathering of audit evidence (12 ISAs)
- Completion, reporting and final review (12 ISAs)

IFAC (2018a-p) outlines in the index that there are 37 individual ISAs and each of these refer to various other ISAs and it is cumbersome for the new audit professionals to deliver a quality audit and remind themselves of the requirements and interrelationships within the ISAs. ISA 200 refers in 29 instances to other ISAs for example 210, 220, 230, 320 in the pre-engagement and planning standards and to the completion standards for example 540, 700 and 800. ISA 300 refers in 12 instances to other ISAs for example 210, 220, 320 in the pre-engagement and planning standards and to 510 and 600 in the completion standards. ISA 500 refers in seven instances to other ISAs for example 200, 220, 230, 315 and 320 in the pre-engagement and planning standards, 520 in the evidence gathering standards and to 560, 570 and 610 in the completion standards. ISA 700 refers in 27 instances to other ISAs for example 200, 210, 220 and 315 in the pre-engagement and planning

standards, to 540 in the evidence gathering standards and to 560, 570, 705, 706, 720, and 800 in the completion standards. The conclusion can be drawn that the separated standards, complicates, the integration of all standards into an audit to a large extent. Swart (2013) illustrated that the audit standards do not provide sufficient guidance on performance of audits and specifically on tests of controls.

Acito *et al.* (2014:5) identified the weaknesses in internal control, as reported by the PCAOB, being the major deficiency in integrated audits. The conclusion was made that internal controls are only used to reduce substantive audit tests. As the audit methodologies developed, various risk models were developed that formed part of the approaches and the integrated audit methodologies. The conclusion that can be drawn from above is that the integration has shortcomings as emphasised by the PCAOB (2013:4-5).

Prinsloo (2008), Robson *et al.* (2007) and Humphrey *et al.* (2004) are examples of researchers that published literature regarding the audit risk model, risk-based audit approach and business risk approach. The indication is that these approaches are separately researched and not specifically linked to an integrated audit topic. The following is a seminal indication of the relevant periods of which the different risk-based approaches were relevant:

1.1.1 Audit risk model

Akresh (2010:68) defines the audit risk model as “the risk that the auditor may unknowingly fail to appropriately modify his or her opinion on financial statements that are materially misstated”. Mentz (2014:105) summarised various definitions in such a manner that the audit risk model can be defined as a method to “plan and execute effective, efficient audits... to determine the appropriate mix of audit evidence”. The audit risk model consists of [1] inherent risk, [2] control risk and [3] detection risk. The latter does not form part of the risk of material misstatement, as it is an auditor’s risk and not management’s risk. Both aforementioned support the notion that audit risk should be applied at the financial statement level and assertion level.

Akresh (2010:65-66) suggests that the audit risk model (ARM) is relevant for audit of financial statements and not for internal controls. This method can therefore not be

used for integrated auditing. Allen *et al.* (2006:170) conclude that the audit risk model is a framework and several scholars of which Kinney Jr (1983:21-22), Cushing and Loebbecke (1983:24), Smieliauskas (1989:730) and Smieliauskas (2007:346) are examples, agree that the model has shortcomings. The specific shortcomings are further supported by Haskins and Dirsmith (1995:75-76) Messier and Austen (2000:129-130) who stated that inherent and control risk becomes a grey area while Kinney Jr (1983:22) and Sennetti (1990:111) critique that the risk of incorrect rejection is not considered.

The conclusion drawn from above is that the audit risk model on its own is not sufficient to perform an integrated audit and further development is required. The weaknesses shortcomings identified above lead to the development of the risk-based audit approach as discussed below.

1.1.2 Risk-based audit approach

The weaknesses identified in the approach above and the principles applied in the audit risk model and the risk-based model forms a basis for the integrated model. The elements and strengths of the approaches combined is important to develop an integrated model that assists the profession to understand the relevance of the audit risk approach on an integrated level.

Schroeder and Singleton (2010:66) state that the risk-based audit standards were adapted in 2006. Prinsloo (2008:352-381) argues that the risk-based audit approach has been a relevant research construct since 1972. These contradictory statements further indicate that there are uncertainty regarding the development of the risk-based audit approach and the complexity associated with the approaches.

Prinsloo (2008:29) suggests that the risk-based audit approach can be defined as: "The method an auditor follows to determine audit procedures to be performed, that is, based on risk, or the indication that there is a greater likelihood that the transactions or classes of transactions, accounts and balances; and/or disclosures are misstated, to enable the auditor to achieve the audit objectives".

Prinsloo (2008:11-12, 14) concludes that a risk-based audit approach is still a concern and a difficult topic to distinguish between the different approaches. The

arguments are further extended to conclude that this approach is not an “exact, clearly understood and ambiguous process”.

IFAC (2018g ISA 315 par A114) highlights the importance of the elements of the risk-based audit approach as it is relevant to the transactions, balances and presentation and disclosure as discussed by Prinsloo (2008:29) above. The elements are referred to as management assertions or audit objectives. The assessment of assertions combined with the risk and materiality may probably assist the users to a more understandable and consistent sample size selection and gathering of evidence.

1.1.3 Business risk approach

Curtis and Turley (2007:439), Abdullatif and Al-Khadash (2010:14), and Knechel (2007:384) explain that the business risk audit (BRA) originated during the mid-1990s. Flint *et al.* (2008:143) support the authors above in that the BRA was implemented and followed through the 1990s and is currently still being used.

Humphrey *et al.* (2004:8) state that the business risk approach (BRA) can be defined as the “focus upon the modelling of risk in business processes as the basis for establishing financial statement risk and ... audit testing”. Smieliauskas (2007:346) suggest that this model has shortcomings as accounting risks are not included in the business risk approach. Flint *et al.* (2008:143) support Houston *et al.*'s (1999:282) conclusion that the business risk approach does not address the financial statement risk or the risk of material misstatement. The focus is rather on the risk of the business and indirectly the audit firm's liability in the event or possibility of a company failure.

Houston *et al.* (1999:282) further argue that in a weak internal control system the ARM only deals with the risk of material misstatement while the BRA also deals with the financial failure risk. Knechel (2007:385) commented on the significance of the BRA and suggested that more attention should be given to risk management.

Power (2007:380), Curtis and Turley (2007:440) explain that the same audit procedures are still being used in the BRA and as a result changes in the approach necessitates a new approach. Beck (1992:97) critiques the BRA as a way of external

auditors opening legal avenues for them into the “risk society”. Power (2007:380) explains that in the BRA the current practice is rationalising the reinvention of auditing. Knechel (2007:383) questions whether the audit scandals (accounting scandals) that was prevalent in 2000 to 2002 in the USA, occurred while the business risk-based audit approach was followed, and whether it could have prevented the major corporate collapses.

Akresh (2010:67) and Allen *et al.* (2006:170) propose that research should be performed on integrated audit procedures on the following topics:

- Internal controls and financial statement audit.
- Relationship between risk assessment for financial statements and internal control.
- Link between the effectiveness of audit inputs and internal control.
- Nature of ARM for integrated audit with regard to internal control and financial statements.

An integrated model deals with all risk-related research constructs that may influence the planning, the nature and extent of audit procedures to be performed. Research constructs consist of audit methodologies and approaches, materiality, risk and audit sampling and the impact it may have on tests of controls, substantive procedures including analytical procedures.

Cushing and Loebbecke (1983:23) identify two separate audit approaches that consist firstly of a risk analysis approach and secondly the audit modelling approach. The difference between the approaches is that the first approach assesses and quantifies risk while the second approach distinguishes between various components of risk at an overall level. Akresh (2010:74) proposes a two-model approach for an integrated audit approach. The internal control risk model for test of controls and a financial statement model for substantive testing are combined to form an integrated model. The sections in the paper relating to integrated models do not contain any reference to any other literature studies. However, PCAOB (2007:6-7) refers to the integration of audits as tests of controls and a conclusion. The standards, however, state that substantive procedures should be performed notwithstanding the reliance on tests of controls. The interpretation that can be

drawn from the discussion above is that there are contradictory opinions on the development of audit models and integrated audit models.

The conclusion that can be drawn from the literature is that the researchers tend to have different opinions on what content the audit risk model, risk-based auditing and business risk approaches should consist of. IRBA (2011:10) evaluates the documentation deficiencies on audit engagement files and reported on the weaknesses in audit documentation. The public report proves that the business risk approach has weaknesses of which fraud risk identification, audit differences, support for audit report modifications, going concern consideration are a few examples.

1.2 PROBLEM STATEMENT

There is currently a gap in literature and in practice as far as any audit model since 1990 is concerned. Development on audit approaches since the accounting scandals of Enron, WorldCom and others have not been forthcoming as the same models were applied during the accounting scandal era. Research is lacking in the consistency and reliance placed on the effectiveness of the risk-based and business risk audit approach. Literature addressing the integrated model is limited.

The audit methodology addresses specific aspects of the audit as a unit, but when a major problem occurs, these issues are documented and the reviewer and engagement partner are manually required to carry those issues forward up to the completion stage of the audit. These issues are then finally incorporated in the completion documentation. IRBA (2011:10) and prior reports since 2007 to 2010, outline the deficiencies in audit documentation. A further problem is that electronic audit software currently available does not connect all aspects of the audit from planning to completion to ensure that major issues are not overlooked. The problem is that acceptable, but inadequate audit approaches lead to inadequate planning, resulting in an increase in audit risk.

1.3 OBJECTIVES OF THE STUDY

The following objectives have been formulated for the study:

1.3.1 Primary objective

Develop an integrated planning audit methodology where the balances and classes of transactions at assertion level in the financial statements, materiality, risk and audit sampling are combined.

1.3.2 Theoretical objectives

In order to achieve the primary objective, the theoretical objectives, were formulated for the study, which were achieved by a review of the following:

- Literature and theory with regard to the different audit risk models, approaches and the integrated audit planning process.
- Research on audit risk quantification and interpretation of these quantification on audit models.
- Literature, theory and practice clarifications on audit sample sizes.
- Based on literature and theory recommended sample sizes to be used, linked to materiality and audit risk assessment. The integrated model also ensures that compliance to the “audit documentation” auditing standard IFAC (2018d: ISA 230) is achieved, with reference to:
- Literature and theory to interpret and obtain reasons and methods for assessment of risk.
- Literature and theory to interpret and understand methods to respond to audit risk.

1.3.3 Empirical objectives

In order to achieve the primary objective, the following empirical objectives were formulated for the study:

- Analyse the literature and secondary data available in literature and compare to benchmarks set by auditing firms in their responses.

- Analyse the information from the participants and make the model more understandable and “user-friendly”.
- Formulate an audit approach that includes the strengths of all current models and prevent the weaknesses identified in literature and theory.
- Recommend sample sizes to be used, linked to materiality and audit risk assessment. The integrated model also ensures that compliance to “audit documentation” auditing standard IFAC (2018d: ISA 230) is achieved.
- Recommend practices and guidelines to apply this model as a monitoring and review tool for audit supervisors, managers and partners.

1.4 RESEARCH DESIGN AND METHODOLOGY

The study comprises a literature review and an empirical study. Quantitative and quantitative research, using the survey method, were used for the empirical portion of the study. Instructions were explained to the students before through an assignment which was the application of the model to evaluate their understanding and afterwards on whether their understanding of audit risk integration did increase.

1.4.1 Literature review

Secondary data sources included relevant textbooks, journal articles, newspaper articles and the internet. The literature study was conducted on the seminal development of the different audit methodologies since the 1970s to current periods. The purpose of the literature study is to gain an understanding of the methodology of different audit approaches and to identify the problems associated with the different approaches. Knowing the shortcomings and strengths of the available models support the empirical research, by complying with the objectives the integrated audit planning model was developed.

1.4.2 Empirical study

The empirical portion of this study comprised the following methodological dimensions:

The purpose of the empirical study is to obtain evidence of the audit approaches used by auditors and to identify problems they experience resulting from their approaches.

The empirical study was conducted by way of questionnaires with the four large auditing firms and mid-tier auditing firms in South Africa. The interview was performed with one audit firm and responses were manually recorded after the technical partner completed the questionnaire. Johnson (2014:100) applied a constructive grounded theory and discourse analysis. The process and outcome are analysed and the coding of wording and objectivity of interpretations.

Van Buuren *et al.* (2014:113) selected a sample of 38 experienced auditors and completed their research based on the number of interviews with small and medium size firm auditors. Van Buuren *et al.* (2014:115) explain that the results from the research indicate that the audit approaches vary from a substantive and detail testing to a more BRA “indirect approach”. Swart (2013:178) indicates that the number of auditing firms in South Africa with listed company exposure was limited to 27 auditing firms of which most audits were performed by the Big 4. The selection criteria for the firms were based on their audit exposure, willingness to participate and the number of listed companies in their portfolios and judgement sampling based on the sample of audit firms involved in listed company audits.

The conclusions drawn from the results were compared to the requirements of the ISAs to determine the deviation or interpretation of the ISAs and the practical implementation thereof by auditing firms. The results obtained from the empirical study were used in the development of an integrated model to be used as a planning tool, in accordance with the primary objective. The model also serves as a review or control mechanism to ensure that the appropriate risk areas are sufficiently addressed.

1.4.3 Target population

The target population consists of audit firms with JSE-listed clients for the questionnaire with regard to the audit firm’s methodology and their interpretation of the questionnaire relevant to the auditing standards. The target population of the

participants for the questionnaire consisted of 112 third-year students who were registered for Auditing 3 in their third year in 2015 at a selected university. The questionnaire could not be completed in 2016 as the curriculum for the third-year students changed and this can be seen as a limitation of the study.

1.4.4 Sampling frame

The sampling frame included a list of auditors responsible for listed companies and class list of auditing students at a medium size university in South Africa.

1.4.5 Sample method

Uprichard (2013:3) explains that non-probability sampling is not always directed at the knowledge obtained from the target population, but to “extend and deepen existing knowledge about the sample”. The sampling method used was a non-probability sampling method for the South African firms due to the size of the target population not exceeding 30 and to gain the knowledge as explained above. All the firms were included and convenience sampling was used based on the participants’ willingness to participate in the study. Due to the sensitivity and confidentiality of the audit firms’ information, convenience sampling was found to be the best method.

1.4.6 Sample size

The sample for the first questionnaire consisted of convenience sampling as there are only 27 audit firms with JSE-listed clients and due to confidentiality the firms that were willing to participate amounted to eight firms. These firms consist of firms with international network affiliations, which include some of the Big 4 firms and medium size firms. The firms agreed to participate but stipulated that the information should be kept anonymous, confidential and only be published as aggregated results. The sample size of the students whom participated in the study was 112 of which only 49 responded by completing the questionnaire. The instructions in Appendix 11 indicate that the participation is voluntary, anonymous, and confidential and the group results are aggregated and published as such. The students were only known as a group number and member number within the group as far as the questionnaire was concerned.

1.4.7 Measuring instrument and data collection method

The requirements and applications relevant to ISA's such as ISA 230, 300, 315, 320, 330 and 530 were used as a basis for the preparation of the questionnaire for the audit firms. The classification of the coding of the ISA's was explained in Swart (2013) dissertation. The findings of IRBA (2011 and 2016) on client audit engagement files also highlighted specific issues and queries received from audit practitioners since 2008 was instrumental in developing the questionnaire.

Swart (2013:116) states that a pilot test must be done and afterwards amended to improve the clarity and conflicting information. A pilot test was performed at an office of an international audit firm after which the corrections were made. The questionnaire was sent out to the different auditing firms, in Excel format, whom indicated that they would respond. The office of the firm that was part of the pilot test was not included in the final questionnaire.

The questionnaires were sent via e-mails after permission has been obtained from the firms and the questionnaires were sent back via e-mail. The data collected from the firm were accumulated on a summary Excel spreadsheet and percentages per question were analysed. Secondary data from the questionnaire developed in 2013 were used in the analysis of the data. The only significant changes to ISAs was IFAC (2018o: ISA 700) regarding audit reporting and therefore the interpretations with regard to the planning section of the audit was not influenced by the change in the audit report standard. The questionnaire included different sections including judgement of the technical department of the auditing firm. The questionnaire is divided into the materiality, risk assessment and audit sample sizes to determine appropriate benchmarks and interpretations of the standards. The coding consists of understanding, application, interpretation and guidance available in the standards to evaluate consistent application of the same concepts.

Swart (2013:184) explains that the five-point Likert scale is not effective for the auditing profession due to their risk awareness and interpretative nature. In his study the responses for the third point in the scale "neutral" did not provide the responses as expected due to their risk conscious environment. The conclusion that can be

drawn from the analysis of results in the above-mentioned research is that the four-point Likert scale is much more effective in the auditing environment.

1.4.8 Statistical analysis

The captured data were analysed using IBM SPSS Statistics (SPSS), Version 25. The following statistical methods were used on the empirical data sets:

- Descriptive analysis
- Correlations between the elements of the integrated planning model (Pallant: 2013:132,244).

1.4.9 Limitations

The fact that there are a limited number of auditing firms involved in the audits of listed companies and due to, the confidentiality of their audit approaches and the possible litigation, firms may elect not to participate. In the interviews with the audit firm, the size of the groups determines the reliability of the categorisation and coding.

1.5 ETHICAL CONSIDERATIONS

The standard NWU ethics checklist was completed and submitted to the Ethics committee of the Faculty of Economic Sciences and Information Technology. The ethical clearance number ECONIT2015-033 was issued by the Ethics Committee of the then Faculty of Economic Sciences and Information Technology for the continuation of the study including the use of Questionnaires used for the research. The information will be kept confidential and information will be aggregated, and no individual information will be disclosed. The completion of the questionnaire, focus group attendance and using the model are on a voluntary basis. The focus group was not requested to include any vulnerable information and was subject specific to obtain an understanding on the weaknesses and improvement required for the effective integration of the model.

1.6 CHAPTER LAYOUT

The study is divided into eight chapters, which are summarised below:

Following on Chapter 1, Chapter 2 comprises the literature review of journals, International Standards of Auditing and other available sources relating to the audit methodology and different audit approaches.

Chapter 3 comprises the literature review of journals, International Standards of Auditing and other available sources relating to the integration of sampling as part of the audit methodology and different audit approaches.

In Chapter 4, the literature review focusses on materiality, audit risk, audit sampling and planning and the interdependence to integrate audit approaches and risk methodologies. Furthermore, Chapter 4 includes reviews of journals, International Standards of Auditing and other available sources relating to audit sampling, the theory of sampling and sampling methods and concluding on audit errors will be researched. Audit sampling is concerned with accuracy and statistical sampling methods and the following definition of JCGM (2008) is therefore relevant to the auditing environment as accuracy indicates a: “closeness of agreement between a measured quantity value and a true quantity value.”

In Chapter 5, the research methodology is discussed.

In Chapter 6, the development of the questionnaire, discussion methods and sampling methods are described. The motivation for the questions used in the questionnaire is explained. Reference is also made to the literature study in Chapters 2 to 5. The feedback obtained from the questionnaires and the interpretation of the results, are discussed.

In Chapter 7, the development of the integrated audit planning model and the conclusions based on data analysis, responses and results of the literature research, are discussed.

In Chapter 8, the conclusions, recommendations and limitations to the study are dealt with.

1.7 CONCLUSION AND SUMMARY

The conclusion can be drawn that the audit risk and BRA models has deficiencies which should further be investigated to improve the audit models. This problem

statement and literature review in Chapter 1 indicate that the study should include investigation into the integration of the audit planning into a new model. The research will be performed to meet the theoretical and empirical objectives set in this Chapter.

The summary of the link between specific topics dealt with in Chapters 2 to 4 which forms part of the literature and limited empirical review and the analysis of the responses and the development of the IAPM from Chapters 6 to 7 is attached as Appendix 14 at the end of the thesis.

CHAPTER 2

AN OVERVIEW OF RISK, AUDIT METHODOLOGIES AND MODELS

2.1 INTRODUCTION

In Chapter 1 it was concluded that the ARM and BRA have various deficiencies and different opinions are held by various researchers listed in Chapter 1. The audit methodologies and models currently being used was implemented in the last three to four decades. Elliott and Rogers (1972:46) were of the earliest researchers that published literature on the audit risk model.

The theoretical objective of this chapter is to analyse the literature and theories available that comment and reports on the relevant audit models and methodologies developed in the auditing profession. The empirical objective of this chapter is to analyse the strengths and weaknesses of the current and historical audit models and methodologies. The chapter compares the business risk audit (BRA) methodology and the elements contained in the traditional business risks in other disciplines from which the BRA is developed. The final objective of this chapter is to obtain best practices from the historical and current audit models that can be applied and contribute towards the development of an integrated audit planning model.

The seminal development of the different audit models and methodologies with regard to risk forms part of the analysis of literature in order to analyse and thereafter supply recommendations for the improvement of the risk models. The elements, critique on the models, the effectiveness of these risk models throughout the decades and their impact on the financial auditing environment are analysed. The importance of the study and the link to additional risk that is placed on the auditors by the independent audit regulators and international standard setting bodies are highlighted to place the audit methodology and the integrated audit approach into perspective.

Elliot and Rogers (1972:46) illustrate that the auditor is at risk that an inappropriate opinion may be expressed. The importance for the management of risk therefore

indicates that the auditor is at risk throughout the audit and proper planning, execution and conclusion of an audit may reduce the audit risk.

Guénin-Paracini *et al.* (2014:266) state that the auditor is only comfortable after the completion of the audit. This fear that an auditor may experience is further enhanced by regulations such as the Sarbanes-Oxley Act and requirements placed on the auditor. The discussions below indicate that more improvement is required and that there are risks associated with audits.

IFIAR (International Federation of Independent Audit Regulators) (2016:1) called on its members for “Measurable improvement” in audit quality by 2019. The document also refers to the number of inspection findings in the 2015 findings survey. The findings survey reports include at least one finding for 43% of the “six largest global auditing firms” public listed entities. The survey highlights the deficiencies in audit procedures with regard to the gathering of sufficient appropriate audit evidence (IFIAR 2016:2). Areas of concern is the high frequency of findings with regard to the engagement quality control review and firms’ audit methodology for firm inspections and internal control testing (23%) and risk assessment (14%) for client audit engagement files. Internal controls and risk assessment are reported as the first and fourth highest occurrences on engagement files, respectively. The target on the reduction of findings is an improvement of 25% in the next four years (IFIAR 2016:1). The Independent Regulatory Board for Auditors (IRBA) is a member of IFIAR and need to apply with the requirements set by IFIAR on the improvement of findings (IRBA 2016).

IRBA is regulated by the Auditing Profession Act (APA) (2005). The APA (2005) states in its preamble “that the Act provide for the registration of auditors and to regulate the conduct of registered auditors.” The South African auditors are therefore regulated by the IRBA. The standards are set in the spirit that all audits should be performed to comply with all the auditing and accounting standards and should support the audit opinion in all material aspects IFAC (2018o: ISA 700 par 30). Each and every audit engagement should be completed in such a manner that it complies with the quality control and audit documentation ISAs such as ISQC1, ISA230, ISA500 and ISA700, as examples. The audit should not be completed for

the sake of the audit regulator to inspect the audit engagement file. This does not mean that the auditor should disregard the audit regulators requirements or standards but that any audit should stand up to the scrutiny of the audit regulator and the audit file should not be completed to satisfy only the audit regulator.

APA (2005 Sec 44(2)) prescribes the duties of a registered auditor similar to the requirements of IFAC (2018o: ISA 700 par 10) that requires from an auditor to express an *“opinion on whether the financial statements are prepared in all material aspects, in accordance with the applicable financial framework.”* The APA (2005 Sec 47-48) stipulates that auditors who are responsible for the audits of public interest entities should be independently reviewed at least once in a three-year cycle and actions can be taken against such registered auditors that is charged with improper conduct.

The conclusion that can be drawn that the registered auditor is regulated and needs to comply with various requirements such as IFRS, ISAs and APA. The first new constructs that forms part of the literature review is audit regulatory risk, followed by audit compliance risk, which is an external risk for the auditor based on the audit performed by the auditor.

Audit regulatory risk can be defined as the risk that an audit engagement file is selected for inspection and the audit file does not meet the documentation standards and other standards as required by the relevant audit regulatory authority (Own emphasis).

APA (2005 Sec 42) requires from an auditor to comply with all the rules of IRBA. Based on above the audit compliance risk can be defined as the risk that an auditor may have disciplinary action constituted against him/her for not fully complying with the auditing regulations and accounting requirements if the inspection findings from the audit regulator are deemed to be of a significant nature (Own emphasis).

The above illustrates that the auditor is not only exposed to audit risk during the audit but also to audit regulatory and audit compliance risk, which places a high

premium on an auditor to perform quality audits. The auditor needs any available tool at their disposal to deliver a quality audit.

The development of the audit methodologies is discussed and thereafter the importance of regulations as stipulated in the International Standards of Auditing.

2.2 AUDIT MODELS AND METHODOLOGY

The literature uses the term approach, methodology and model as the same concept that may cause confusion for the practitioners. Curtis and Turley (2007:439) examined the audit methodologies such as business risk auditing (BRA) and then later on use the term audit approaches relevant to business risk auditing. Prinsloo (2008:1-218) posit that various audit approaches or methodologies were developed throughout history for the audit profession and the latest development was the risk-based approach. The term approach is more frequently used in the dissertation. Flint (2008:143) applies the term methodologies with reference to the BRA. AICPA (2006:par 26) and Von Wielligh and Prinsloo (2014:511) apply the term model to describe the audit risk model. However, these terms are not defined in the IFAC (2018a Glossary) and this indicates that either terms may be used in the context of audit developments. Not to change the context of the prior research the terms are used as published by the relevant researchers.

Marx, Van Der Watt and Bourne (2016: Chapter 5-14, 16) illustrate that the audit process comprises four main stages namely: [1] pre-engagement and retention considerations, [2] audit planning, [3] gathering of audit evidence and [4] completion, concluding and reporting. The emphasis of this research is on the planning stage of the audit. The audit methodology and models used to assess risk and assist in the planning process are important as highlighted by the various ISAs.

Johnson (2014:104) developed a constructivist grounded theory and illustrated that this approach combined with discourse analysis makes it possible to analyse and build on theoretical concepts. This approach is discussed further in Chapter 5 and 7 but it is of importance to refer to the method at this stage as the chapter

continues with the development of the first known audit methodology to the last known methodology. The best practices of all the methodologies or approaches are analysed and incorporated in the integrated model. The following sections follow the sequence of development of the audit methodologies and approaches.

2.2.1 Audit methodology development 1904 to 1940

Brown (1962:699) posits that Dicksee (1907) was the first author that described testing based on internal control although the norm was still detailed testing. Dicksee (1907:7) states the objectives of the audit is to detect fraud and error. The approach is called the balance sheet approach but the audit of the revenue account is also important (Dicksee, 1907:8). Cutforth (1931:162) as quoted by Prinsloo (2008:36) support Dicksee (1907) in the interpretation that a balance sheet approach was used during this era. IFAC (2018o ISA 700 par 39) also refers to fraud and error and therefore fraud and error are still relevant in the current audit approaches.

Brown (1962:700) supported by Hanson (1942:166-168) and Prinsloo (2008:38-39) explain that the approach was changing to include more emphasis on the statement of profit and loss. They further reported that changes to the audit report format causes the words “certify, true and correct” to be removed. Current audit reporting standards, IFAC (2018o ISA 700 par 39) refers to fair presentation and not to certify, and that financial statements are true and correct as in the past. The fair presentation concept derived from the use of risk-based approaches and audit sampling in the audit process. Auditors will be at risk if they had to present an audit report that includes the term correct, which implies that all transactions were tested which is not the case due to audit sampling.

The conclusion of this approach is that fraud and error and the emphasis on profit and loss and balance sheet is the only concepts that can be applied in the current audit approaches.

2.2.2 System-based audit approach 1940–1972

Prinsloo (2008:53-59) compares the different audit approaches and concludes that all the audit approaches up to this stage exclude risk-based approaches.

Willingham and Carmicheal (1971:107) highlight the objectives of the system-based approach as the expressing of an opinion on the fair presentation of the financial statements. Prinsloo (2008:54) supports this statement and states that the content of the opinion changed due to the McKesson and Robbins court case in 1939.

The court case changed the auditing environment. Brown (1962:702) stated that the auditor's responsibility with regard to detection of fraud has been influenced by the McKesson and Robbins court case. Brown further asserted that the "primary responsibility to discover and control irregularities lies with management".

The court case highlighted two prominent issues. Prinsloo (2008:40) and Taylor and Glezen (1979:107) construe that issues raised were twofold in nature. Firstly, the adherence to acceptable auditing standards by the company auditors and secondly to the profession as a whole for providing safeguards and reliability of standards.

The development of statements in auditing procedures, which later became auditing standards, were issued. Prinsloo (2008:40) states that Committee on Auditing Procedure (AIA) (1941) was the publisher of this standard and that the responsibility of the auditor to detect fraud was excluded as an objective of the audit. This exclusion did not deter the auditors from performing fraud detection audit procedures (Brown 1962:701).

Porter and Burton (1971:153) and Prinsloo (2008:43) illustrate that the changes of the auditor responsibilities changed the audit approach. The shift brought forward a major shift towards consulting due to more evaluations on client systems being performed. The system-based audit approach changed to the emphasis towards the information systems and away from balances and financial statement data. Mautz and Sharaf (1961:1) support the statement that information systems

became more prominent as information technology and academic research lead to the system-based and other audit approaches.

Mautz and Sharaf (1961:42) second postulate is that there should not be conflict of interest. SAICA (2018 Code of Professional Conduct (CPC) Sec 200.5) describes a self-review threat as: “the firm performing a service for an assurance client that directly affects the subject matter information of the assurance engagement.” The shift towards consulting for audit clients developed the opportunity for conflict of interest as the auditor was now consulting and auditing on the same set of financial data and systems and therefore a self-review threat of independence was created. Francis and Yu (2011:127-129) argue that audit failure may result from the auditor not being independent. The independence of the auditor was not questioned during this stage of the development of the audit approaches.

Arens and Loebecke (1976:19) state that the understanding of internal control consisted of the “general understanding of the client and its circumstances” and the description of the existing internal control system.

2.2.3 Theoretical audit approaches

Mautz and Sharaf (1961:24) are the pioneers in the thought process of auditing and applying the mind, which is currently referred to as professional judgement. Mautz and Sharaf (1961:42) developed the eight postulates of auditing that can be summarised as [1] Verifiable statements and data [2] No Conflict of interest, [3] Evidence free from collusion, [4] Effective internal control system [5] Application of GAAP, [6] Past evidence will hold true in the future unless contrary is proven, [7] Auditor acts in his capacity as auditor and [8] Status of independent auditor imposes professional obligations.

Mautz and Sharaf (1961:67) concluded and developed “*five primary concepts of auditing*” namely:

- *“Evidence*
- *Due audit care*
- *Fair presentation*

- *Independence*
- *Ethical conduct*

The elements of the postulates are clearly indicated in the primary concepts above and lead to the development of the methodical approach. Mautz and Sharaf (1961:27) supported by Lubbe (1981:142-143) and Prinsloo (2008:59-60) illustrate the importance of the postulates in auditing. Mautz and Sharaf (1961:27) supported by Prinsloo (2008:59-60) highlighted the elements of the audit methodology “for dealing with problems as follows:”

The auditing methodology for dealing with problems or issues of fact may be outlined in these steps:

1. *“Recognition (acceptance) of the composite problem (the audit assignment)*
2. *Observation of facts relevant to the problem*
3. *Subdivision of the composite problem into individual problems*
4. *Determination of available evidence pertinent to each individual problem*
5. *Selection of applicable audit techniques and development of appropriate procedures*
6. *Performance of procedures to obtain evidence*
7. *Evaluation of evidence*
 - a. *With respect to pertinence and validity*
 - b. *For indications of any additional problems*
 - c. *With respect to adequacy for judgement formation*
8. *Formulation of judgement*
 - a. *On individual propositions*
 - b. *On the composite problem”.*

Krogstad (1975: 106) and Prinsloo (2008:23-30) offered an alternative to the view held by Mautz and Sharaf that suggest that the system needs more specific and formal postulates. The new postulates need to support a more systematic approach to auditing.

Flint's (1988) conceptual framework is widely accepted and is based on Porter's (1988:92) clarification on the auditor's role. The auditor is responsible for the accountability monitoring presented by managers of entities.

Pratt and Van Peursem (1993:21) argue that the conceptual framework contains weaknesses and the credibility of the audit process will be influenced by the effectivity and quality of the audit. They further argue that materiality and evidence should be supported by audit risk construct (Pratt & Van Peursem, 1993:21). Mautz and Sharaf (1961) included audit risk as part of audit evidence and supported by Fogarty, Graham and Schubert (2006:45) which further state that audit strategy was used to alleviate the confusion around the understanding of the audit approach. Taylor & Glezen, 1979:107 further argue that the audit approach concept was also used when auditors referred to the audit strategy.

2.2.4 Risk auditing concept

Alderman and Tabor (1989:55) state that the risk concept has been part of the standards for more than 25 years. The implication is that audit and risk has been in existence from before 1974 which correlates with the literature that was published by Elliott and Rogers (1972). Although the concept has been researched for the past four decades the audit, risk assessment, responses to audit risk identified and audit sampling still remain topical issues. Currently there are no consensus reached on how to assess risks and impact on the gathering of sufficient and appropriate audit evidence as required by ISA 500.

Elliot and Rogers (1972:46) illustrate that there is an audit risk in that audit reports may be inappropriately issued. The risk item form the basis of audit sampling is applied to achieve audit objectives Elliot and Rogers (1972:49). They further suggested that α and β risk for sampling should be used. The conclusion drawn from the α and β risk used is that the higher reliance can be placed on control risk the lower the auditors risk is. The calculation and further discussion on the α and β risk are relevant to audit sampling and are discussed in Chapter 4.

Millichamp and Taylor (2012:132–133) used the term significant as a substitute for materiality, which creates a dilemma for assessing the risk of internal controls as

stated in this context. The concept of significant is also used to describe pervasive and that may contradict the types of risks of level of materiality that may have an impact on the result of the audit opinion. IFAC (2018g ISA 315) uses significant to describe risk and this use of significant to material amount and the impact on the audit opinion may cause confusion as the correct terminology is not used.

Swart (2013:90) supported by Sheehan (2010:27-36) and Olson (2002:19-20, 30-33) illustrate that medium risk is not a term used in the ISAs. Millichamp and Taylor (2012:133) state that risk should be subjective to simple judgement and assessed at a high, medium or low levels. Von Wielligh and Prinsloo (2014:511) support the opinion that risk can be assessed as high, medium and low. There is uncertainty about the content in the ISAs and the risk assessment level of high, medium and low is applied in various audit methodologies. The concern is that significant risk is not considered although referred to in IFAC (2018g ISA 315 par 4(e)). SAS 300 (2004:12 Appendix) illustrates the interrelationship between the components of risk and the highlighted area are relative to detection risk in the table below.

Table 2-1: Relationship between audit risk components

		Auditors assessment of control risk		
		High	Medium	Low
Auditors assessment of inherent risk	High	Very low	Low	Medium
	Medium	Low	Medium	High
	Low	Medium	High	Very high

Source: SAS 300 (2004:12 Appendix)

SAS 300 (2004) has since been replaced by IFAC (2018g ISA 315) and the illustration above has been omitted from the ISAs. The exception to the assessment above is that inherent and controls risk are classified as high, medium and low contrary to control risk that is classified as very low, low, medium, high and very high. The risk of material misstatement items (ROMM) (IR x CR) are classified at three levels while detection risk in comparison includes five levels in the (3 x 3) nine blocks above.

Elliot and Rogers (1972:48) suggest a confidence level of 95% which is supported by Millichamp and Taylor (2012:133). The implication is that change on the audit

sampling and audit risk was affected in the last four decades and Elliot and Rodgers can be seen as one of the first founding fathers for the principle of quantifying risk and sampling.

Knechel (2007:398) emphasises that concepts of business risk found their way into the external audits. Sobel (2008:92-93) states that risk management-based auditing also include enterprise risk management and that risk-based audits has commonalities with enterprise risk management.

Sobel (2008: 92-93) further refers in various instances to the internal audit methodology and point out similarities between the COSO's enterprise Risk Managements guide framework and ISAs with regard to processes, which include risk assessment and risk responses. This statement that the external audit process can also be classified as a risk management process is further supported by Swart (2013:115).

2.2.5 Audit risk model

IFAC (2018c ISA 200 par 13) explains that audit risk consists of three elements of the audit risk and they are inherent risk (IR), control risk (CR) and detection risk (DR). Von Wielligh and Prinsloo (2014:505) evaluated the audit risk model as stated in the standard formula and suggested that the inherent risk and control risk are inversely related to the detection risk. Von Wielligh and Prinsloo (2014:520) illustrated that the relationship between IR and CR and DR are as follows:

Table 2-2: Audit risk relationships

Detection risk (DR)	Inherent (IR) and control risk (CR)
Very high	Low IR and Low CR
High	Low IR and Medium CR or Medium Cr and Low CR
Medium	High IR and Low CR or Low IR and low CR or Medium IR and Medium IR and Medium CR
Low	High IR and Medium CR or Medium IR and High CR
Very low	High IR and High CR

Source: Von Wielligh and Prinsloo (2014:520)

Von Wielligh and Prinsloo (2014:511) argue that the risk assessment in the audit risk model can be assessed as high, medium and low while it may appear that five levels were used in the table above.

2.2.5.1 Elements of the audit risk model

AICPA (2006b par 26) is the first regulator or standard setter that published the audit risk model formula and publication has since been discontinued in further revisions of ISAs.

AICPA (2006b AU312 footnote 12 par 26) states that the audit risk model formula is: “AR = RMM x DR” that is further outlined in AU312 to include the following: *“Risk of material misstatement (RMM) is the product of inherent risk (IR) and control risk (CR); and detection risk (DR) is the product of test of details risk (TD) and substantive analytical procedures risk (AP).”*

Woodhead (1997:4) states that the simple multiplication model as in Equation 3-1 below is used by the large audit firms. Dusenbury *et al.* (2000:107); Messier Jr and Austen (2000:120) supported by Peter and Ebimobowei (2013:99) and Von Wielligh and Prinsloo (2014:505) further illustrate that the conventional audit risk model applied in practice is the simple multiplication model below:

$AR = IR \times CR \times DR$ where:

AR = Audit risk, IR = Inherent risk, CR = Control risk and DR = Detection risk

Equation 2-1

The equation quoted by Elder and Allen (2003:985) is as follows:

$AR = IR \times CR \times AP \times TD$ where;

AR = Audit risk, IR = Inherent risk, CR = Control risk, AP = Analytical procedure risk and TD = Detection risk from tests of controls.

Equation 2-2

Dunn (1996:124) suggests that detection risk should be replaced and the formulas should read as follows:

$$AR = IR \times CR \times DR \text{ (AR x SR).}$$

AR = Audit risk, IR = Inherent risk, CR = Control risk, DR = Detection risk is broken up into “analytical risk (AR)” and “substantive risk” (SR)”.

Equation 2-3

Dunn (1996:125) replaced the functions of the audit risk model with numbers to illustrate the example of the calculation of audit risk in the ARM. Guidance on which numbers to use for calculation is not provided in any other format. The quantification of risk is addressed in Chapter 3. The illustration of the example as presented by Dunn (1996:125 Figure 7-1) is illustrated in the figure below:

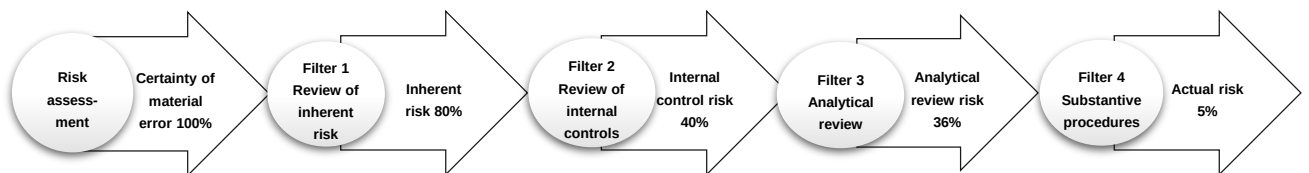


Figure 2-1: Links between various types of risks

Source: (Dunn, 1996:125) and Swart (2013:77) adjusted

Elder *et al.* (2010:259-260) represent the audit risk model as follows:

$$PDR = \frac{AAR}{IR \times CR}$$

where;

PDR = planned detection risk, AAR= acceptable audit risk, IR= inherent risk, CR = control risk.

Equation 2-4

Akresh (2010:68) argues that the formula for audit risk is as follows:

$$AR = f(RMM, DR)$$

where;

AR = Audit risk, RMM (Risk of material misstatement and DR) = Detection risk from tests of controls.

The formula can be further defined as follows:

$$RMM = f(IR, CR)$$

IR = Inherent risk, CR = Control risk

$$DR = f(TD, AP)$$

TD Tests of detail and AP = Analytical procedure

Equation 2-5

Akresh (2010:68) presented the formula for the audit risk model in Figure 2-2 as follows:

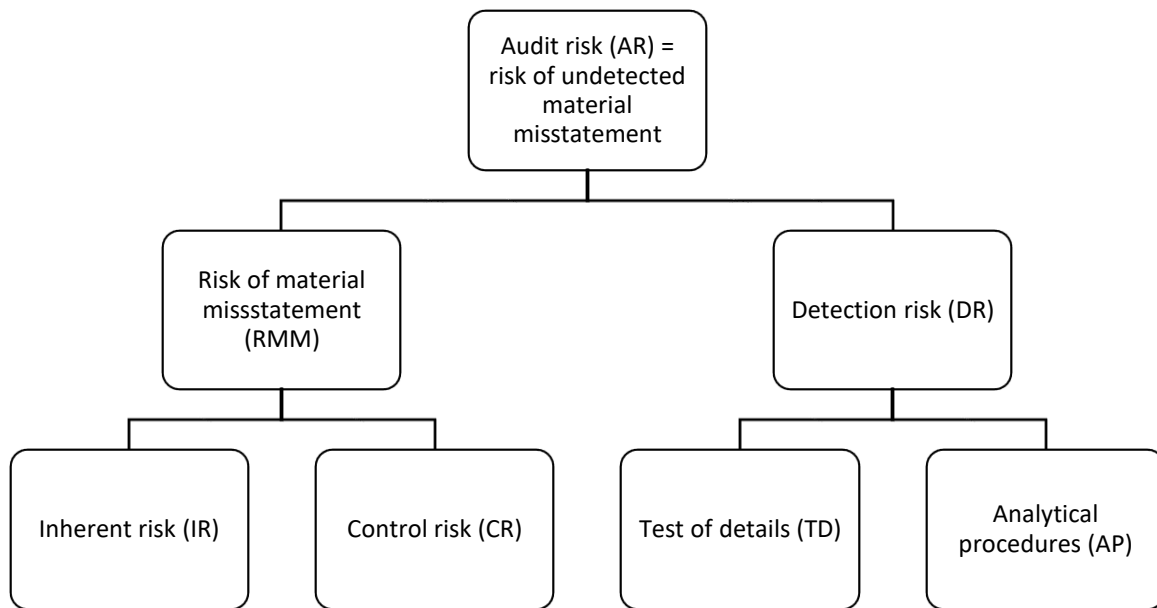


Figure 2-2: Akresh's audit risk formula

Source: Akresh (2010:68), adjusted

The equations listed and figure above illustrates that the audit risk model has various interpretations and elements and differs as far as the components of the detection risk is concerned.

AICPA (2006b AU312 par 24) states in that detection risk cannot be reduced to zero because the audit does not cover 100% of the target population. The inference of the relationship between the audit risk and audit sampling is evident from the discussion.

Elder *et al.* (2010:259-260) further posit that the audit risk model originates from the auditing standards AU350 on audit sampling and AU312 on audit risk and materiality. Elder *et al.* (2010:270) indicate that there is a relationship between audit risk and evidence. This relationship can be direct or inverse.

Gray and Manson (2011:172 Table 5-1) apply the audit risk model to calculate detection risk and also as an indicator of the confidence level. The confidence level is calculated by deducting the detection risk from 100% resulting in the confidence level of (100%-DR). Gray and Manson (2011:173) surmise that the audit risk is

determined by multiplying the three elements. There are qualitative issues that should be considered that make the calculation of audit risk more complex. They further state that the risk assessment is subjective and refers to a risk assessment of high, medium and low. The subjectivity of the risk assessment may therefore be seen to be a futile exercise. The fact that materiality includes a quantitative and qualitative assessment that is used to determine sample sizes. The confidence level is also part of the sample size calculation.

2.2.6 Comments on the audit risk model (ARM)

Akresh (2010:65) reasons that the audit risk model (ARM) provides a framework for financial statement audits. This approach has been applied for more than four decades. The ARM has its critics and the implementation has its complexities. The model assists the auditor to analyse risk effectively and develop the audit procedures with regard to the nature timing and extent of the audit procedures.

Houston *et al.* (1999: 282) conclude that the auditor reacts to both audit risk and their business risk. In order to compensate for their loss of reputation the auditor may invest more time on an audit. However, the auditor's business risk does not take those risks not considered in the ARM into account.

The ARM is not an effective method for auditing internal controls. The model is more suitable for substantive procedures than for audits of internal control (Akresh 2010:65). Akresh (2010:66) states that a different risk model should be developed as currently such a model is not covered in the auditing standards and literature. This is further supported by Blokdijk (2004:185) who insinuates that the audit risk model contains deficiencies with regard to tests of controls and suggest that a different approach should be adapted. Blokdijk (2004:186) proposes that only internal controls that are re-performable should be included in the control risk assessment.

Akresh (2010:67), Cushings and Loebbecke (1983:23, 30, 32), Kinney (1989:81-82) and Smieliauskas (2007:346) posit that the ARM does not include the accounting risks and the business risk approach is not compatible with the ARM.

The deficiencies of the ARM are further emphasised by researchers whom commented as follows:

Allen *et al.* (2006:165) argue that researchers previously listed at least five deficiencies in the ARM:

- Kinney (1989:68-69) and Sennetti (1990:111) states that the risk of “incorrect rejection” is not considered.
- Haskins and Dirsmith (1995:66-67, 74) and Messier and Austen (2000:120-121) argue that the distinction between inherent risk and control risk is not always clear and can be mixed.
- Dusenbury, Reimers and Wheeler (1996:13) assert that audit quality is not part of the ARM elements.
- Daniel (1988:176) and Strawser (1990:68-69) explain that the ARM assessment may not always correlate with auditor’s judgement.
- Bell *et al.* (1997:2) indicate that proponents argue that the traditional account-level approach to a financial statement-level (bottom-up) audit focus “can inhibit the auditor’s development of the level of business understanding needed to effectively judge financial-statement assertions”.

Akresh (2010:65-66) posits that the ARM is used as an integrated model for the audit of financial statements and audit on internal control effectiveness of financial reporting. The implementation of Sarbanes-Oxley Section 404 increased the costs of audits as it requires the auditors to report on the internal control effectiveness of financial reporting (Raghunandan and Rama 2006:99; Ettredge *et al.* 2006:3). Bell *et al.* (2005:3) state that the integrated audit referred to by the PCAOB serves the dual purpose audit of the company’s financial statements and the operating effectiveness of the internal control.

The integrated model discussed above is not the same as the topic of research as integration in this context means integrating two types of audits to obtain both the objectives of a financial statement audit and audit of internal control effectiveness.

2.2.6.1 Conclusions of the audit risk model

Power (2007:379) concluded that sampling and the audit risk model was problematic and was developed to justify audit approaches. This statement is supported by Akresh (2010:65). Dusenbury *et al.* (2000:113) support the strength of the ARM and further argues that it is more difficult to structure and plan an audit under the business risk model.

Internal control effectiveness is not part of the model and therefore the model is not all-inclusive. Guidance on the audit risk model is not clear as there are differences between the interpretation and calculation of audit risk as illustrates in the equations above. Guidance in the ISAs and literature on the calculation and benchmarks for the different risk levels are limited. The model illustrated deficiencies with regard to internal control, inherent and control risk that can be mixed, incorrect rejection, links to audit quality, link to accounting risks and the support of the ARM for the business risk approach.

2.2.7 Business risk approach (BRA)

Power (2007:379) suggests that risk-based auditing focused on high risk balances and understanding of the business environment and risk-based auditing strategies. Power (2007:380) further concludes that the risk management principles including the COSO framework were introduced into the auditing environment.

Abdullatif and Al-Khadash (2010:2) conclude, that based on research by researchers such as Eilifsen *et al.* (2001:194) and Robson *et al.* (2007:410-412), the reporting on audit approaches are still a continuing practice. The Big 4 firms adopted the new approach called the business risk audit. Abdullatif and Al-Khadash (2010:3) confirm in their evaluation of the audit approaches that international audit approaches are used by the Big 4 audit firms. The implementation of these approaches in the developing countries were found to increase fees and after the risk evaluation the same substantive approach is followed.

2.2.7.1 Elements of the business risk model

Lemon *et al.* (2000: 15) and Prinsloo (2008:193) posit that the objective of an audit still remains to express an opinion on the financial statements although the understanding of the entity is performed on a more comprehensive level. The obtaining of knowledge of the business and business risk assessment form an integral part in the performance of the audit. Ballou *et al.* (2004: 71), Bell *et al.* (1997:34) and Eilifsen *et al.* (2001:194-195) state that the entity is assessed at the strategic and process levels.

Prinsloo (2008:193) and Rittenberg *et al.* (2008: 107) explain and summarises the planning phase in the business risk audit approach as follows:

“Step 1: Obtain an understanding of management’s risk processes.

Step 2: Develop this understanding of the business and evaluate business risks.

Step 3: Develop a set of expectations about financial results and non-financial results of the entity and evaluate business risks.

Step 4: Evaluate the quality of the control system that is designed to mitigate business risks.

Step 5: Determine the potential of risk of account misstatement (residual risk) relating business risks to audit risk.

Step 6: Consider the remaining audit risk and perform additional audit procedures”.

Various interpretations and reporting on the content of the business risk exist. Prinsloo (2008:229) summarises the interpretations of various researchers that reported on the elements of business risk in the table below.

Table 2-3: Risk management frameworks

Risk management frameworks					
Suggested tasks for the study	Sources				
	AS/NZS 4360 (2004: 9)	AIRMIC, ALARM, IRM (2002:4)	McNamee (1998:81)	Valsamakis, et al. (2005:13)	COSO (2004:3-4)
Task 1: Setting objectives	Establish the context	Determine organisation's strategic objectives	-	-	Objective setting and internal environment
Task 2: Risk identification and Assessment	Risk assessment • Identify risks • Analyse risks • Evaluate risks	Risk assessment • Risk analysis (identification, description, estimation) • Risk evaluation	Risk assessment • Identification • Measurement • Prioritisation	Risk identification • Risk evaluation and Assessment	Event identification • Risk assessment (analyse for likelihood and impact)
Task 3: Response to risks	Treat risks	Decision Risk treatment	Response (avoid, control, share)	Risk control/responses (avoid, accept, mitigate, and financing)	Risk response (avoid, accept, reduce or share according to risk tolerances and appetite)
Task 4: Reporting	Communicate and consult	Reporting - threats, opportunities, residual risk	-	-	Information and communication
Task 5: Monitoring	Monitor and review	Modification	-	Monitoring and administration	Monitoring

Source: Prinsloo (2008:229)

The conclusion from above is that the literature is not forthcoming in guidance on the elements of the business risk model and reporting is limited.

Eilifsen and Messier, Jr. (2014:278) is the first researcher that published a detailed description of the business risk audit approach. IFAC (2018g ISA 315 par A39) list examples of matters that the auditor may consider “*when gaining an understanding of the entity’s objectives, strategies and related business risks that may result in a risk of material misstatement of the financial statements*”. These matters were compared to requirements of IFAC (2018n ISA 570), King code IV (IoDSA 2016) and the model suggested by Eilifsen and Messier Jr. (2014:278). The main elements of the BRA model suggested by Eilifsen and Messier Jr. (2014:278) and King code IV (IoDSA 2016) compared to IFAC (2018g ISA 315) and IFAC (2018n ISA 570) requirements and applications in the relevant ISAs indicate similarities. The table below is a result of the comparison performed.

Table 2-4: Messier RBA project and IFAC (2018g ISA 315) comparison

The RBA project Messier Jr. (2014:278)	IFAC (2018g ISA 315) (2018) requirements on the contents page		
RBA elements	IFAC (2018g ISA 315)	Requirements ref	Application ref
Demonstrate an understanding of the auditor’s risk assessment process.	Risk assessment procedures and related activities	5–10	A1 – A23
Develop an understanding of an entity and its environment.	The required understanding of the entity	11–24	A24 – A117
Recognise the components that make up the entity and its environment.	The required understanding of the entity and its environment, including the entity’s internal control	11–24	
Identify business risks for each entity component.	Identifying and assessing the risks of material misstatement	25–31	A118 –A143
Demonstrate an understanding of industry-specific business risks.	Documentation	32	A144 –A147
Evaluate how identified business risks may affect specific accounts and assertions.	N/A	N/A	N/A

Source: Messier Jr. (2014:278) and IFAC (2018g ISA 315) contents

Business risk factors listed below each category.

Table 2-5: Entity and environment category and the relevant business risk factors

Entity and environment category	Messier Jr (2014:278)	ISA315	ISA570	King IV
Nature of the entity				
Entity's major sources of revenue and the nature of its products and/or services	☒	☒	☒	☐
Entity's key customers	☒	☒	☒	☐
Entity's key suppliers	☒	☐	☒	☐
Major locations	☒	☐	☒	☐
Entity's major assets	☒	☐	☒	☐
Entity's major liabilities	☒	☐	☒	☐
Entity's sources of financing and current and prospective financial condition (Ratio analys)	☒	☒	☒	☐
Potential related parties	☒	☐	☒	☒
Any significant events and transactions (e.g., acquisitions or disposals of subsidiaries, businesses, or product lines) that occurred during the year	☒	☐	☒	☒
Entity have any major uncertainties or contingencies (e.g., lawsuits)	☒	☒	☒	☒
Industry, regulatory, and external factors				
Level of competition in industry and level of competitiveness present any risks for entity	☒	☒	☐	☒
Technological factors present any risks for entity	☒	☒	☒	☒
General economic conditions present any risks for entity	☒	☒	☒	☒
Regulatory environment present any risks for entity	☒	☒	☒	☒
Legal/political environment present any risks for entity	☒	☒	☒	☒
Accounting principles, including those that is industry-specific or determined by a regulatory authority, present any risks for entity	☒	☒	☒	☒
Social/environmental factors present any risks for entity	☒	☒	☒	☒
Any or external factors that present a risk for entity	☒	☒	☒	☒

Entity and environment category	Messier Jr (2014:278)	ISA315	ISA570	King IV
Objectives, strategies, and business risks				
Entity have an entity risk assessment process that includes estimating significance of risks, assessing likelihood of it occurring, and determining actions needed to respond to risks	☒	☒	☐	☒
Management adequately monitor business risks	☒	☒	☐	☒
Entity performance measures and monitoring				
Key performance indicators the entity use to measure performance	☒	☒	☒	☒
Communication channels within entity for individuals to report suspected improprieties	☒	☐	☐	☒
Entity have an internal audit function	☒	☐	☐	☒
Internal audit function have a charter	☒	☐	☐	☒
Chief audit executive report to	☒	☐	☐	☒
Management				
One or a few individuals manipulate management and operating decisions	☒	☐	☐	☒
Code of conduct that includes appropriate entity policies regarding acceptable business practices and conflicts of interest	☒	☐	☐	☒
Policies adequately communicated to employees	☒	☐	☐	☒
Management encourage that everyday dealings with customers, suppliers, employees, and or parties be based on honesty and fairness	☒	☐	☐	☒
Management established and maintained effective internal control over financial reporting	☒	☒	☐	☒
Motivation for management to engage in fraudulent financial reporting	☒	☒	☒	☒
High turnover of senior management, legal counsel or board members	☒	☐	☒	☒
Known history of securities law violations or claims against entity or its senior management alleging fraud or violations of securities laws	☒	☒	☒	☒
Governance				
Board of directors and its major committees (e.g., audit committee) contain an appropriate number of "independent" directors	☒	☐	☐	☒
Regular meetings of board of directors to set policies and objectives, review entity's performance and take appropriate action	☒	☐	☐	☒
Audit committee charter	☒	☐	☐	☒
Audit committee adequate resources and authority to discharge its responsibilities	☒	☐	☐	☒
Frequency of audit committee meeting	☒	☐	☐	☒
Audit committee meet individually with external auditor and internal audit executive without management present	☒	☐	☐	☒

Source: Messier Jr. (2014:278) Exhibit 1. RBA questionnaire

The considerations and comparison above indicate that various sources indicate similarities between the business risks and that the ISA was developed based on

market and company's requirements. The audit direction changed from a transaction-based audit to more value added audit as illustrated by Knechel (2007:393).

Additional guidance on elements of the BRA are found in the ISAs. IFAC (2018 ISA 315 par 28 (a-f)) highlights examples of significant risks that requires special consideration, which can also be included in the comparison above. These considerations include:

1. *"Fraud risk*
2. *Economic and accounting developments*
3. *Complexity of transactions*
4. *Related parties*
5. *Measurement ranges (Subjectivity and uncertainty)*
6. *Normal course of transactions*
7. *Additional considerations (par A141-A142)*
 - a. *Non-routine transactions*
 - b. *Complex transactions or accounting principles*
 - c. *Revenue recognition*
 - d. *Subjectivity of judgements".*

Knechel (2007:383) posits that the expansion of the risk management theory and processes provides the opportunity for auditors to re-engineer the audit process. The conclusion is that the business risk audit development and implementation is a complex process. Stakeholders in Enron considers the BRA to be a contributing factor of the Enron scandal.

Bell et al. (1997:34), Eilifsen et al. (2001:195) and Knechel (2007:405) state that the basis for the BRA methodology were based on risk management theories and principles. The effort to link and drill business risk analysis down to the transaction and account-level require more effort. Traditional substantive evidence can be used to evaluate and analyse risk at this level.

Knechel (2007:399) states that the mapping of assertion based audit risk and business risk proved to be complex. Lemon et al, (2000:11) support the statement as the evidence obtained is of a more indirect or “soft” manner, which contributes difficulty of interpretation of evidence and to the questioning of the level of rigor of the process”. Ballou and Knechel (2002:296) state that the linking of risk and the tests on assertion level is difficult as the relationship between inherent risk and business risk based on judgement and the lines may not always be clear and may create uncertainty.

Business risk principles were used in the BRA and the relevant relationship should be highlighted to create the perspective of the principles applied in the development of the BRA.

Knechel (2007:388) posits that the growth and adoption of risk management principles in auditing resulted in the understanding of internal control but not the testing of its operating effectiveness. The development of structured risk understanding lead to the incorporation of enterprise risk management into auditing.

Knechel (2007:393) Eilifsen et al. (2001:204) and Lemon et al. (2000:11) state that generally the BRM comprise the following procedures:

“Step 1: Define process-control objectives.

Step 2: Assess business risk at the process level.

Step 3: Design and implement appropriate and effective controls.

Step 4: Measure process performance.

Step 5: Monitor process-control activities”.

Knechel (2007:388) further compares the timing of the development of the first Internal Control-Integrated framework issued by the Committee for sponsoring Organisations (COSO: 1992) and the issue of revised statements. The US culminated the COSO framework into SAS No. 55, which was issued in 1995.

The COSO (2013) Framework objectives are categories into three parts which are [1] operations, [2] reporting, and [3] compliance. The frame work further consists of the following integrated internal control components are: “*control environment, risk assessment, control activities, information and communication, and monitoring activities*”. The management is able to consider the internal controls from a divisional, segmental or entity level and may support them in adapting the framework to suit their own implementation of internal controls and risk assessment process. The following cube is a represents a visual representation of the “COSO’s Internal Control—Integrated Framework”.

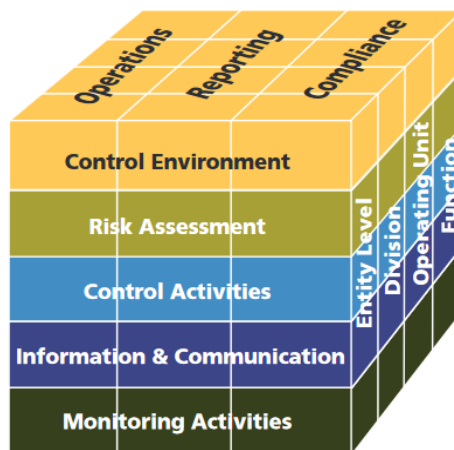


Figure 2-3: COSO Cube

Source: COSO (2013)

The comparison in literature between the different risks forms part of the discussion below to determine commonalities and differences to form a comprehensive list of risk that businesses are facing at this stage.

Millichamp and Taylor (2012:217-220) classifies the following type of risk as external risks to the business:

- “*Political risk*”
- *Economic risk*

- *Legislative risk*
- *Compliance risk*
- *Physical risk*
- *Technological risks*
- *Market risk*
- *Financial risk*

ASB (Accounting Standards Board) (2015:6-25) defines and lists the following financial risks that are not all included in the risks already mentioned and may also be considered as external risks.

- *“Credit risk*
- *Currency risk*
- *Interest rate risk*
- *Liquidity risk*
- *Market risk*
- *Other price risks”*

Millichamp and Taylor (2012:220-221) highlight the internal risk of a business to be:

- *“Strategic risk*
- *Operational risk*
- *Governance risk*
- *Financial risk”*

2.2.7.2 Comments on the business risk approach

Flint *et al.* (2008:143) emphasise that the business risk focus on the clients' risk and the impact on audit risk and not primarily on the financial statements. Houston *et al.* (1999: 282) state that the business risk model reacts to both audit risk and business risk but does not reflect business risks not captured by the ARM. ARM concentrates on financial statements risk while business risk is more towards business operations and business success.

Knechel (2007:384) defines the business risk audit as “*client business risk as part of the audit evidence process*”. Robson *et al.* (2007:413) state that the BRM “*Rely on transformation language*” and emphasises technical response to clients’ needs.

Flint *et al.* (2008:143) argue that even the implementation of the business risk audit approach was not met with a sense of agreement. Significant different opinions between academic scholars since the implementation of the business risk approach in the 1990s raise the question whether the approach was successful. The audit approach includes materiality but is not clear on the basis of determining the materiality driver based on risk identification and risk assessment.

Lemon *et al.* (2000:10) theorise that the business risk approach is the opportunity for audit professionals to justify the value added concept on the entity’s long-term continuity and identification of weaknesses in the operations that may threaten the objectives of the entity. The business risk audit approach provide assurance on the financial statements as an additional service. Lemon *et al.* (2000: 11) posit that business risk audit approaches extend the audit risk model and therefore, client service considerations are additional to, rather than alternative to financial statement attestation.

Fischer (1996: 222) suggests that the auditor had to generate other types of fees to complement the audit firm’s income. Prinsloo (2008:181) and Robson (2007:417) stress that the increase in audit firm revenue and profitability were driven by providing the client with non-audit services such as consulting. Hansen (2015:2) summarises the revenue from 2002 to 2014 and indicate that the revenue for audit fees increased in due to the implementation of Section 404 of the Sarbanes-Oxley Act (2004) (SOX 404) that required additional reporting on internal control of the effectiveness over financial reporting. Hansen (2015:2) further states that the majority of US company’s non-audit fees was below 30% since 2004.

The following are reported figures for the periods 1992 to 2001 when the BRA was introduced before and from 2002 to 2014 after the Enron scandal period, respectively. The indication is that BRA included consulting and non-audit fees

increased that questioned and placed the auditor's independence under scrutiny. The following two figures are summarised from published information and indicate the different reporting of the audit versus non-audit fees since the implementation of the BRA. The first figure below illustrates the reported audit fees versus non-audit fee for the periods 1992 to 2001 as reported by Robson *et al.* (2007: 417), Prinsloo (2008:181). The second figure below illustrates the reported audit fees versus non-audit fee for the periods 2002 to 2014 as reported by Whalen, Hannen and Lussier (2015:2).

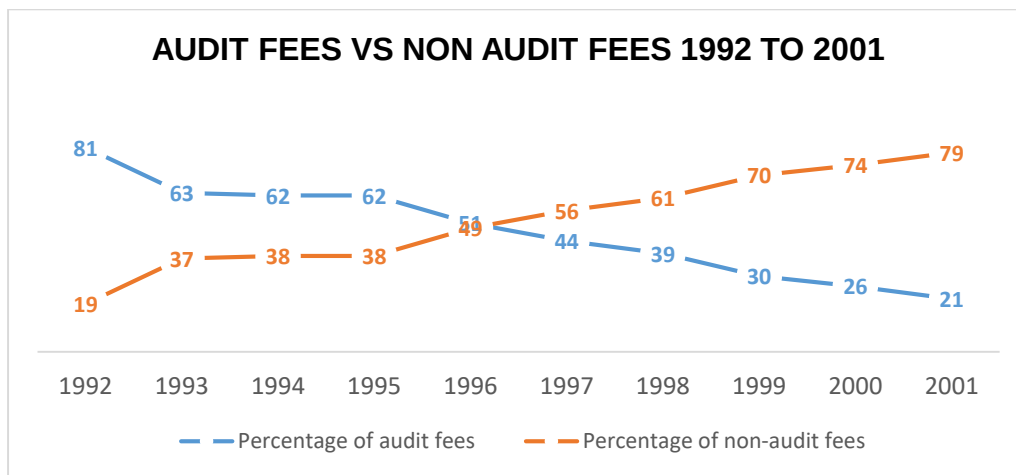


Figure 2-4: Audit fees vs. non-audit fees 1992 to 2001

Source: Extract from Robson *et al.* (2007:417), Prinsloo (2008:181) adjusted

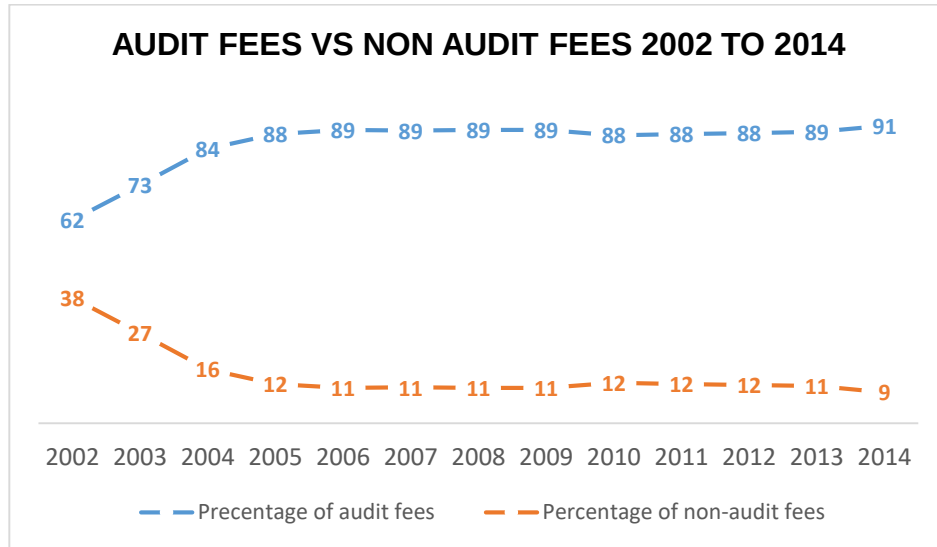


Figure 2-5: Audit fees vs. non-audit fees 2002 to 2014

Source: Whalen *et al.* (2015:2)

The information on the two figures above indicates that the relationship between audit and non-audit services fee had a major turnaround in 2002. There is an increase of 300% in audit fees between 2001 (21%) and 2002 (62%) and a decrease of 50% in non-audit services for period between 2001 (79%) and 2002 (38%). The reasons are not clear and a possibility is that more non-audit audit fee were included in the audit fee. The literature does not give reasons for the fluctuations.

The major discrepancies are in the timeframe from the Enron scandal period. Cullinan (2004:854) explains that the corporate failures such as Enron, WorldCom and Waste management caused the regulators to investigate the auditor's independence. The SOX404 legislation was implemented primarily due to the failure of Enron in 2001 to 2002 and aims to prohibit certain consulting services.

Cullinan (2004:855) posits that due to the current audit models less transactions are tested and the probability is lower that a problem transaction may be selected. Cullinan and Sutton (2002:298-299) discuss that the audit re-engineering diminished the probability of investigating or selecting a problem transaction for the

sake of greater audit efficiency. Bernardi (1993:75) and Cullinan (2004:856) illustrate that the literature also supports the notion that auditors may not always be able to identify a problem transaction. This is due to the required competence and diligence that is required from audit staff not always being met. The research further indicated that many audit seniors and 38% of audit managers were unable to identify fraudulent transactions.

Cullinan (2004:855) illustrates in “*Figure 1: The auditor’s misstatement detection and reporting model*” below the process for identifying problem transactions and the impact on the audit report.

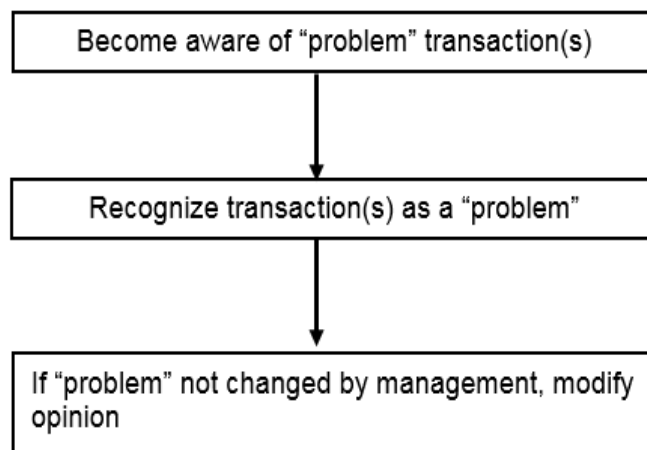


Figure 2-6: The auditor’s misstatement detection and reporting model

Source: Cullinan (2004:855)

The implication of the business risk model and the gathering of less transactional evidence may therefore lead to a lower probability of identifying “problem transactions” and fraudulent transactions. Knechel (2007:384) questioned whether the approach added value to the audit or is merely a method to understand the clients’ business risks or a way to increase consulting revenue. Knechel (2007:384) questioned whether the approach lead to the audit failures. The conclusion drawn was that a judgement could only be made on the contribution of the business risk-based audit to the audit failures with access to documents and files could.

Van Buuren *et al.* (2014:110) illustrates in a XY graph, similar to the figure below, that the primary direct and primary account-level evidence are more prominent in the traditional audit than in the BRA approach. The BRA methodology shifted the process from a direct evidence on the X and Y line right and upwards to an indirect evidence point on the graph. Knechel (2007:393) and Lemon *et al.* (2000:11) illustrate in the graph below that the extent of service moved the emphasis of the financial statement audit in the audit risk approach to values added assurance in the business risk approach.

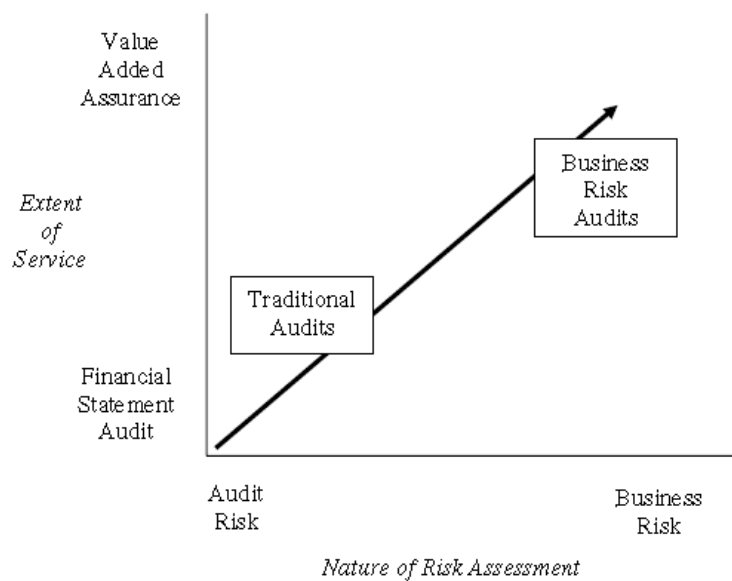


Figure 2-7: Expansion of risk considerations in the audit process

Source: Knechel (2007:393) and Lemon *et al.* (2000:11)

The figures and discussions above indicate that the BRA model focus more on the business risk than on transaction level. Literature on the BRA only reports on the risk at business level and literature does not report in detail on the assertion level. Curtis and Turley (2007:444) point out that test of controls and substantive procedures are not as important as obtaining evidence from client entity in the BRA model.

Griffiths (1998:17) defines risk as “the threat that an action or event will adversely affect an entity's ability to achieve its objectives and successfully execute its strategies”. Moraru, Grosu and Dumitri (2013:114) considers that risk *“is an inseparable companion of the auditor, the audit contract beneficiary and potential users of financial reporting, that need to be aware of the necessity to monitor any risk, to know the variables that condition the audit report, to know their dimension, to foresee their influences and monitor the results”*.

There is an indication in the literature that researchers differ on their opinions of the business risk model. There are scholars that are for and against the BRA and the comments of various researchers are included in the summary and conclusions in the table below.

Table 2-6: Comment on BRA

Author	Year	Page	Comment and conclusion	Pro	Against
Flint <i>et al.</i>	2008	143	Revolutionary but the impact is unclear	☐	☒
Flint <i>et al.</i>	2008	143	Big six familiar. Uncertain on how BRA informed audit process	☐	☒
Flint <i>et al.</i>	2008	143	Initial focus on client business risk and impact on audit risk. Focus not as much on financial statements	☐	☒
Flint <i>et al.</i>	2008	143	Differ from earlier methodologies Client business risk and impact on audit risk. Impact on practice problematic. Not concentrating on financial statements	☐	☒
Flint <i>et al.</i>	2008	144	BRA articulated as business risk	☐	☒
Robson <i>et al.</i>	2007	413	Rely on transformation language	☐	☒
Robson <i>et al.</i>	2007	429	No change from the audit risk model change from the classic audit risk model.	☐	☒
Robson <i>et al.</i>	2007	433	Did not yet consider the change of practice. BRA enabled auditors to renegotiate their professional identity and to widen their claims over other areas of expertise.	☐	☒
Robson <i>et al.</i>	2007	421	Accent of business advice embodied in the BRA methodology potentially offered higher prestige and identity to auditors	☐	☒
Robson <i>et al.</i>	2007	430	The changes were justified through audit theory	☐	☒
Robson <i>et al.</i>	2007	421	Legitimised by an abstract academic theory of business strategy	☐	☒
Power	2007	380	Reinventing auditing to rationalise existing practice	☐	☒
Elliot <i>et al.</i> Flint	1999 2008	143	Technical response to changing clients' needs Emphasise technical response to clients' needs	☐	☒
Knechel	2007	395,405	Changing the focus to risk management and complicating the approach	☐	☒
Houston <i>et al.</i>	1999	282	Reacts to both audit risk and business risk. ARM focusses on financial statements. Does not reflect business risks not captured by the ARM. In such circumstances describes audit behaviour.	☐	☒
Eilifsen <i>et al.</i>	2001	194	Broad array of potential risks is identified.	☐	☒
Knechel	2007	394	Revolutionary	☒	☐

Author	Year	Page	Comment and conclusion	Pro	Against
Eilifsen <i>et al.</i>	2001	194	Various rules and guidelines cause practitioners to apply judgement and informal and inconsistent use of rules are applied. Difficult to implement.	☐	☒
Curtis and Turley	2007	454	Many or more of the procedures are still performed.	☐	☒
Curtis and Turley	2007	459	Business risk presumes familiarity with business risk.	☐	☒
Curtis and Turley	2007	449	Demands were higher on low level staff due to the complexity and the judgement involved in the process.	☐	☒
Flint <i>et al.</i>	2008	144	Difficulty experienced with linking risk to impact on AFS. Paradigm shift in audit methodology in 1980 to audit risk-based marketed as fundamental change.	☐	☒
Flint <i>et al.</i>	2008	144	Deals explicitly with business risk. Auditing standards revisited with advent of BRA.	☐	☒
Lemon, Tatum and Turley	2000	22	BRA practitioners to be strongly conversant in strategic management literature.	☐	☒
Curtis and Turley	2007	440	Argue that by identifying sources of business risk and evaluating the systems to monitor and control those systems, auditors can decrease substantive testing.	☒	☐
Bell <i>et al.</i>	2005	51	Auditor will identify the business risks highlighted by management that may impact on financial reporting and disclosures.	☒	☐
Dusenbury <i>et al.</i>	2000	194	States that it is more difficult to structure and plan an audit under this model.	☐	☒
Knechel	2007	384	Indicated that this model is less successful than expected.	☐	☒
Knechel	2007	403	BRA may form part of the risk assessment to identify fraudulent reporting on Financial statements.	☒	☐
Kopp and O'Donnell	2005	423	Analytical procedures will assist in identifying more risks.	☒	☐
Eilifsen <i>et al.</i>	2001	194	New skills are needed.	☒	☐
Eilifsen <i>et al.</i>	2001	200	Going concern issues may be identified through residual risks.	☒	☐
Eilifsen <i>et al.</i>	2001	200	Weaknesses in internal control could hint towards management actions to manipulate information.	☒	☐
Eilifsen <i>et al.</i>	2001	200	Inherent risk could be identified which links directly to financial statement assertions	☒	☐

Author	Year	Page	Comment and conclusion	Pro	Against
Ballou <i>et al.</i>	2004	71	The auditor will obtain a better understanding of the client's business.	☒	☐

Source: The Authors listed above

The summary above indicates that 10 positive against 25 negative responses on the BRA is reported in literature. The BRA methodology was implemented in 1990 and could not prevent or detect the fraudulent activities of the Enron scandal in 2001. The BRA is more non-audit-based and therefore consulting orientated the independence of the auditors are questioned and therefore the auditor's reputation could be tainted if a scandal occurs. The opinions between the researchers indicate different opinions on the BRA, which suggest that the BRA need further investigation and even more guidelines for more consistent opinions. The final conclusion is that the literature above indicates that the BRA methodology is complex and costly for the auditors to interpret and analyse. The new methodology should be developed and more transactions should be verified and less reliance on risk management because it may appear that the auditor's independence can be tainted with the BRA methodology. The BRA is not currently the best approach for the auditing profession. The literature above indicates that the BRA in its current state should be rejected and new audit methodologies should be developed.

2.3 INTERNATIONAL STANDARDS OF AUDITING

The seminal development of the BRA methodology indicate that the regulatory bodies changed the ISA to comply with the business development and that the ISAs contains various references to BRA but specifically to business risk management. The compliance and relevance of the ISAs and the BRA methodology are illustrated in the following part of the research.

The compliance to the ISAs are regulated in South Africa by the Independent Regulatory Board for Auditors (IRBA). IRBA (2016) outlines the risk-based process that is followed to determine the selection of practitioner's subject to inspection based on their public exposure. IRBA (2016) also currently follows a risk identification approach to review audit firms and engagements. The higher the risk the more frequently the auditor will be reviewed.

IRBA (2016:17) concluded and reported on deficiencies in the application of ISAs. The findings and results indicated that risk assessment and response ranked third highest with 134 out of 375 inspections performed for 2015 financial year, which represents 13% of the significant findings. These figures indicate the importance of

research on audit risk to assist and develop more clarity on the application of audit risk. Swart (2013:5) posits that there is no clear guidelines or benchmarks in the ISAs for assessing and identifying risk. This may result in the frequency of the deficiencies as reported by IRBA.

IRBA (2016:10-11) concluded and reported on deficiencies in the application of ISAs on the client audit engagement files. The findings and results indicated that risk assessment and response ranked second highest with 147 out of 237 inspections performed and reported on for the 2016 financial year on the client audit engagement files, which represents 10% of the significant findings. The findings were categorised between larger firms and smaller firms for the 2015/2016 year and the percentage are 10% for both size firms. The figure above illustrates the importance of the understanding of the risk assessment and risk responses as the findings increased from the third highest to the second highest ranking. The concern with regard to the statistics is that risk remains an issue where guidance is required. The public inspection report indicates that compliance to the ISAs as interpreted by the IRBA may not be fully complied with according to the following requirements regarding risk as stated in the ISAs. The comparison between the IRBA's and IFIAR findings with regard to the risk assessment and responses correspond as the second highest ranked at a rate of 13% and a 14% respectively. Therefore, the Figures illustrate that the risk assessment and responses are still a matter of concern and is still relevant in the current auditing environment. The following ISAs refer to the relevance and importance of the concepts related to audit planning and risk.

The reporting standards IFAC (2018o ISA 700 par 39) places the responsibility on the auditor, relevant to audit planning, to:

IFAC (2018c ISA 200 par 5) requires that an audit should be free from material misstatement and reasonable assurance of a high level should be obtained. The auditor should reduce audit risk to an acceptably low level. IFAC (2018c ISA 200 par 13(3)) defines audit risk as “the risk that the auditor may express an inappropriate opinion”. The definition highlights two important constructs with

regard to risk and that is high level of assurance and reducing audit risk to a low level. These constructs form the part of various risk assessment levels, which are discussed further in Chapter 3. IFAC (2018o ISA 700 par 39) further indicates that the risk of fraud is higher than the risk of error and therefore implies that fraud risk should be incorporated in the risk models.

IFAC (2018c ISA 200 par 7) requires an auditor to apply professional judgement and maintain professional scepticism, which include the identification and assessment of risk of material misstatement. The audit risk is defined as “the risk that the auditor expresses an inappropriate audit opinion when the financial statements are materially misstated. Audit risk is the function of the risk of material misstatement and detection risk” IFAC (2018c ISA 200 par 13(c)). IFAC (2018c ISA 200 par 13(e)) emphasises that Risk of Material Misstatement (ROMM) and detection risk are factors of the audit risk. These components of audit risk form the basis of the audit risk model.

IFAC (2018c ISA 200) defines the following audit risk elements as follows:

- Detection risk par 13 (e) *“as the procedures performed by the auditor to reduce audit risk to an acceptably low level will not detect a misstatement and that could be material....”*
- Inherent risk par 13 (n(i)) *“as susceptibility of ... before consideration of any related controls”*.
- Control risk par 13 (n(ii)) *“risk that could occur in an assertion.... will not be prevented, or detected and corrected in a timely basis by the entity’s internal control”*.

As a result, the conclusion that can be drawn that audit risk consists of two major components namely detection risk that is audit related and risk of material misstatement as per IFAC (2018c ISA 200 par 13 (n)) which is management related as management is responsible for preparation of financial statements. Peter and Ebimobowei (2013:99) and Dussenbury *et al.* (2000:107), supports the notion that the components of the risk of material misstatement include inherent risk and control risk.

Management prepares financial statements in accordance with applicable financial reporting standards. Management makes assertions about the financial statements with regard to disclosure, presentation and balances. IFAC (2018g ISA 315 par A129) list the assertions and stipulates that all aspects should be covered by the auditor. IFAC (2018g ISA 315 par A130) further states that the auditor may use assertions for the identification of different types of probable material misstatements. The standards therefore imply that the assertions are linked to risk of material misstatement. The conclusion can further be made that the assertions can be used as risks. If an assertion is not covered or a risk identified that an assertion has not been accounted for in the financial statements, then management assertions have not been met and therefore represents a risk.

Elliot and Rogers (1972:49) illustrated that audit risk stem from the basis that audit sampling is applied to achieve audit objectives. As discussed above audit assertions can be used as an audit risk. The auditor needs to cover all the assertions and therefore must obtain his audit objective relevant to each audit assertion. The audit objective is another term previously used in the place of audit assertions. IFAC (2018g ISA 315 par 4(a)) defines assertions as “*Representations by management, explicit or otherwise, that are embodied in the financial statements...*” The conclusion that can be drawn that the audit objectives are similar to management representation regarding the assertions.

Akresh (2010:68) posits that the audit risk model that was used is still evident from IFAC (2018c ISA 200) and is graphically presented in the figure below.

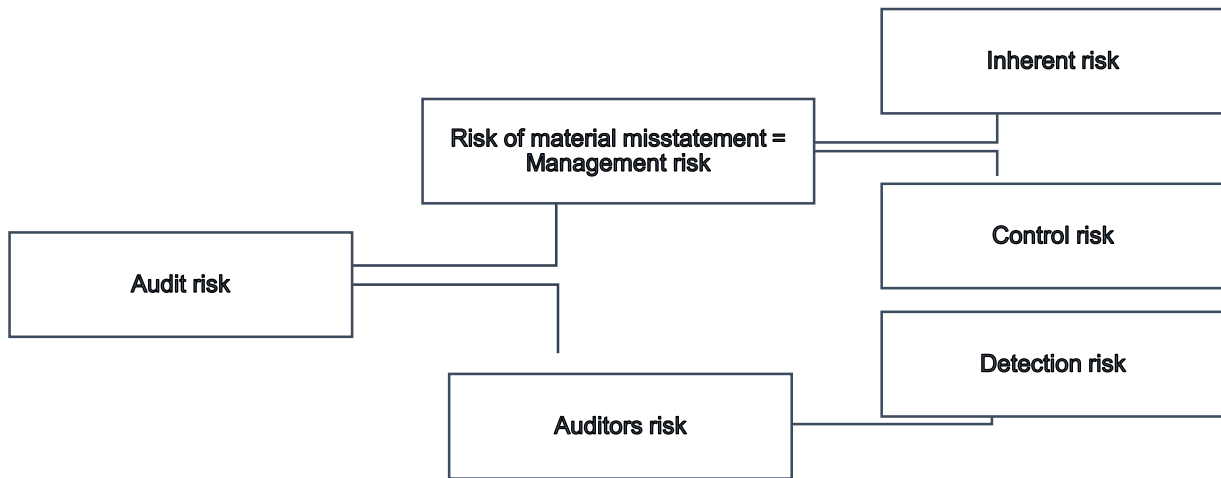


Figure 2-8: Audit risk model

Source: Akresh (2010:68) and IFAC (2018c ISA 200) adapted

IFAC (2018g ISA 315 par A4) states that “*the risks to be assessed include both those due to error and those due to fraud*” and both error and fraud are discussed in the ISA. The risk of fraud is so significant that in IFAC (2018e ISA 240) requires from the auditor to extend the risk identification and assessment procures to include the consideration of risk of material misstatement due to fraud.

IFAC (2018g ISA 315) define the risk constructs in the following paragraphs as:

par 4(b) “*Business risk – A risk resulting from significant conditions, events, circumstances, actions or inactions that could adversely affect an entity’s ability to achieve its objectives and execute its strategies, or from the setting of inappropriate objectives and strategies*”.

par 4 (c) “*Internal control – The process designed, implemented and maintained by those charged with governance, management and other personnel to provide reasonable assurance about the achievement of an entity’s objectives with regard to reliability of financial reporting, effectiveness and efficiency of operations, and compliance with applicable laws and regulations*”. The term “controls” refers to any aspects of one or more of the components of internal control.

Business risk is therefore a risk that the entity may not reach the objectives and strategies to be able to be competitive, profitable and be sustainable in the environment it operates. The business risk approach developed from these assumptions that an auditor should be knowledgeable of the business risk and should assess these risks as a primary objective of the audit.

IFAC (2018f ISA 300) prescribes the audit planning procedures that should be included in an audit. The paragraphs relevant to the research topic forms part of the literature review on the auditing standards. The audit plan is the main emphasis of the research. IFAC (2018f ISA 300 par 8(c), 9(a) and (b)) stipulates that auditor should apply professional judgement on significant factors that may influence the engagements team's effort in the audit strategy and consider the nature, timing and extent of the planned risk assessment procedures and further procedures at assertion level.

IFAC (2018f ISA 300 par A2) posits that the audit entails a continuous process where certain activities should be completed before the next are performed. Analytical procedures as risk assessment, understanding regulatory and legal framework, materiality consideration and the performance of other risk assessment procedures should be performed before the auditor identify and assess risk of material misstatement. The auditor should also allocate team members according to the specific audit areas. The higher the risk the more experienced the team member should be (IFAC: 2018f ISA 300 para. A8). The conclusion can be drawn that even the planning process and risk assessment are complex, which is further supported by the fact the IFAC is in the process of revising IFAC (2018g ISA 315) and plan to issue it in 2019.

The reported research argues that the BRA lead to the development of the new ISA315. Robson *et al.* (2007:419) argue that BRA has stimulated the development of new international auditing standards (ISAs) grounded in the new methodology and more towards other services than audit services.

IFAC (2016:2 par 4 and 5) highlights the fact that practitioners are experiencing challenges with IFAC (2018g ISA 315) with regard to internal control and audit risk. IFAC (2016:3 par 10) asserts that the project will have possible enhancements and

clarifications to audit risk but the intention is not to change the audit risk model. IFAC (2016:3 par 11(a) and (b)) further states that the objectives of the project are to enhance risk assessment activities and effective risk assessment. Both these statements indicate and support the conclusion that the content of IFAC (2018g ISA 315) makes it one of the most complex ISAs as the requirements and application and other explanatory material covers 52 pages excluding the table of content and explanatory page. Flint (2008:146) are of the opinion that IFAC (2018g ISA 315) is a combination of various auditing standards, the topics dealt with in IFAC (2018g ISA 315) is divided into the following headings:

Table 2-7:Headings of ISA 315

Description of topic	Par	Par
Risk assessment procedures and related activities	5–10	A1–A23
The required understanding of the entity and its environment, including the entity's internal control	11–24	A24–A117
Identifying And Assessing The Risks Of Material Misstatement	25–31	A118–A143
Documentation	32	A144–A147

Source: IFAC (2018g ISA 315)

IFAC (2016:18) proves the complexity and relevance of ISA 315 as a research topic. ISA 315 has been revised in 2009 and 2013 and a further revision is planned for approval by the board in the first quarter of 2019. The research excludes the draft proposals that will be issued in 2018.

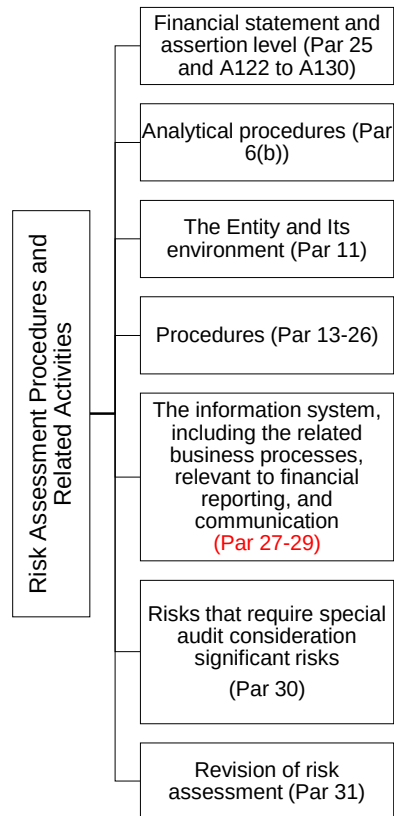


Figure 2-9: Risk assessment procedures and related activities

Source: IFAC (2018g ISA 315)

The figure below is a summary of IFAC (2018g ISA 315) risk assessment and related activities. This illustrates the complexity of the ISA and the risk assessment process.

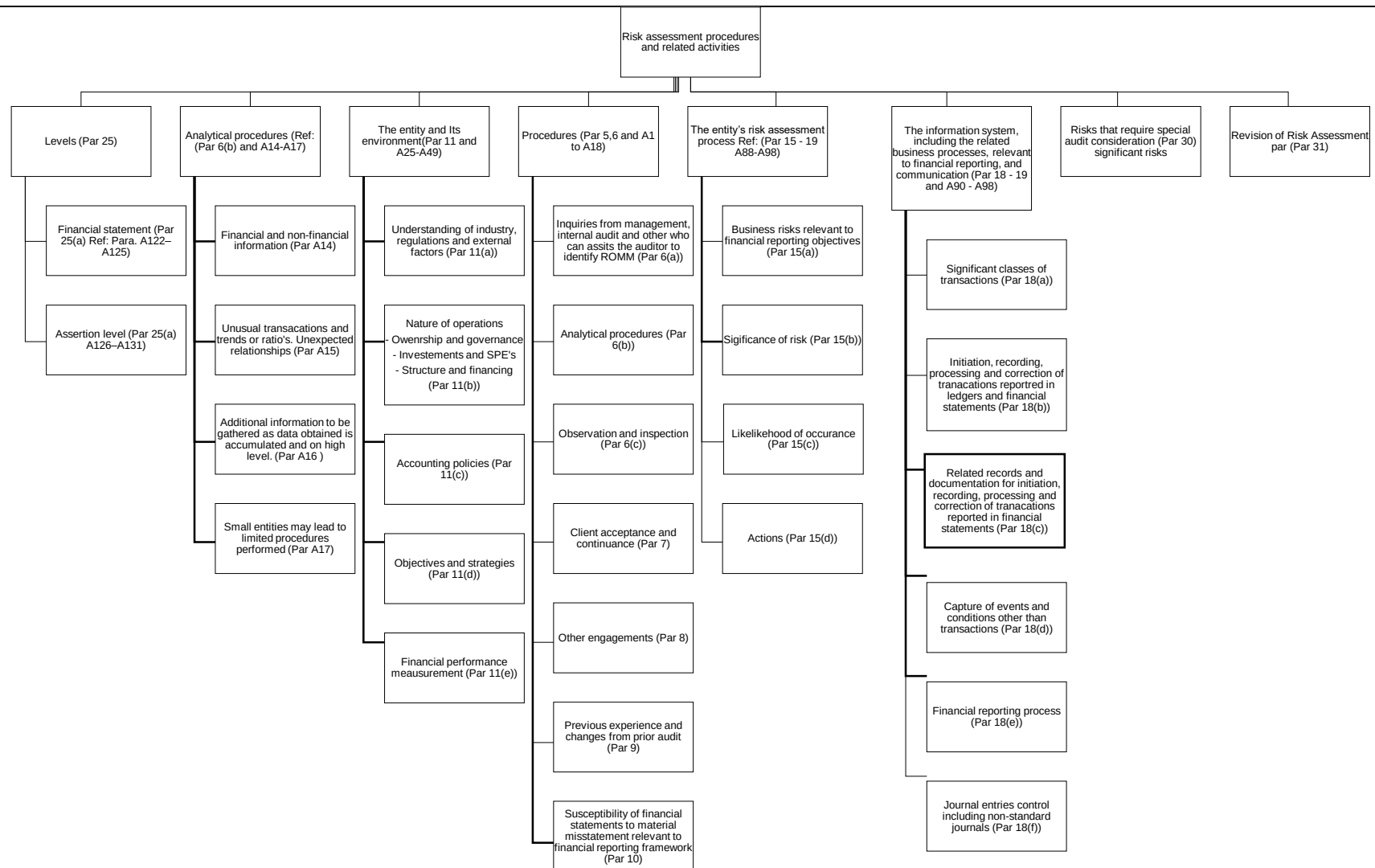


Figure 2-10: Risk assessment and related activities

Source: IFAC (2018g ISA 315)

IFAC (2018e ISA 240 par 16) requires that an auditor should “*identify the risk of material misstatement due to fraud*”. IFAC (2018e ISA 240 para. A25 and Appendix 1) indicate fraud risk factors relevant to misstatements under the three conditions [1] Incentives/Pressures, [2] Opportunities and [3] Attitude / Rationalisation. The relationship between fraud risk and inherent and control risk is clearly identified in IFAC (2018e ISA 240 par A25 and Appendix 1). The audit risk model does not implicitly include the fraud risk as a specific element of the audit risk model. The audit risk model's components (IR x CR), which also forms part of the risk of material misstatements, may indicate that the audit risk model includes the fraud risk factors as part of the consideration. The contrary could also be that the audit risk model excludes the fraud risk factor. Swart (2013:74) state that the audit risk model should include the fraud risk factor as a separate element of the calculation.

$$AR = IR \times CR \times FR \times DR$$

The auditor has to respond, to IFAC (2018i ISA 330 par 5 and 6), to the assessed risk material misstatement (ROMM) at the financial statement and assertion level. The auditor should consider the reasons for the ROMM at assertion level when audit procedures are developed based on the assessed risk IFAC (2018i ISA 330 par 7(a). IFAC (2018i ISA 330 par 7(c)) states that a higher risk requires the auditor to obtain more persuasive evidence. As a result, the higher the risk the more and better quality audit evidence is required. There are different types of audit procedures to obtain audit evidence to respond to the risks assessed. IFAC (2018i ISA 330 par 6 to 23) describes tests of controls and substantive procedures as the main types of audit procedures.

IFAC (2018i ISA 330 par A43) states that substantive procedures consist of corroborative analytical procedures and test of detail. The type of procedures is based on the planning and the audit approach that an auditor will implement. The terms test of controls, substantive procedures and risk responses are also used and referred to in IFAC (2018m ISA 530), which deals with audit sampling. There is therefore a relationship between audit risk identification, assessment, responses to audit risks and audit sampling. This is illustrated in the requirements of IFAC (2018m ISA 530 par 7) that requires from an auditor to select a sample size that will reduce sampling risk to an acceptably low level. The constructs such as low or lower and high or higher are frequently used in the same context as risk and are mostly associated in the literature

with risk. The other risk concept referred to in the ISAs is significant risk. IFAC (2018g ISA 315 para. 4 (e)) defines significant risk as: *“An identified and assessed risk of material misstatement that, in the auditor’s judgement, requires special audit consideration”*.

As special audit consideration is not defined and specific emphasis are placed on significant risk compared to high and low risk the assumption can be made that significant risk is higher than high risk.

The ISAs with regard to audit risk is not forthcoming with explanations on ranking order of risks. IFAC (2016:3) states that the revision of ISA 315 will include more robust requirements and additional guidance will be given through additional publications to supplement ISA 315 in order to assist auditors to perform risk assessment.

There is a risk that the conclusions drawn from the responses to audit risk may be erroneous. The risk is further increased due to the fact that the gathering of audit evidence is subjective to audit sampling and there are risks involved in sampling. IFAC (2018m ISA 530 par 5 (a)) defines sampling 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”*. The risk involved in audit sampling is called sampling risk and is defined by IFAC (2018m ISA 530 par 5 (c)) as: *“The risk that the auditor’s conclusion based on a sample may be different from the conclusion if the entire population were subjected to the same audit procedure”*.

The auditor is therefore also subjected to a sampling risk that places an additional responsibility on the auditor. The audit sample is evaluated on the assertion level that indicates that sufficient attentions should also be placed on risk assessment at assertion level.

2.4 INTEGRATED AUDITING MODELS AND METHODOLOGY

Bell *et al.* (2005:27) indicate that KPMG integrated audit methodology applies a triangulation principle. The integrated audit contains all the elements of the BRA methodology.

Theron (2004:185) writes in his thesis that competency in computers for computer-assisted audit techniques for trainee accountants require more attention and emphasis. He further states that auditors are required to master techniques on an integrated level.

Theron (2004:23 Table 2-1) posits that computer-assisted audit techniques could be done during the consideration of materiality, audit risk analysing of internal control systems and audit samples. Taking all these functions into account and if they are integrated as suggested by Theron (2004:23) more information should be available to perform an effective audit.

Table 2-8: Indication of audit functions where CAATS could be applied as part of the integrated audit

Audit functions	Frequency of items reported	% of findings reported
Planning of audit		
Materiality and audit risk	5	62.5%
Accounting and internal control	3	37.5%
Test of information systems	3	37.5%
Audit programmes and ICQ's	5	67.5%
Audit samples	8	100.0%
Obtaining evidence		
Data analysis	5	67.5%
CAATS		
Access to files and data basis	6	75.0%
Sorting and compiling of files	3	37.5%
Cast and calculations	7	87.5%
Data summary and analytical procedures	8	100.0%
Maintaining audit working papers	5	62.5%
Audit management	1	12.5%
Correspondence reports and graphics	6	75.0%

Source: Theron (2004:23)

The table was analysed to determine if the researchers agree on the elements and what the ratio per functions are.

As indicated in Table 2-8 above there are other researchers that support the notion of the concepts included in CAAT's and integration at all levels. This research forms the basis for the development of a questionnaire and obtain evidence through group assignments of third-year auditing students to evaluate the understanding of risk,

materiality and audit sampling through an integrated computerised model. This questionnaire is discussed in the latter chapters of this research.

The first literature in South Africa that reports on the integrated auditing model at the business and assertion or transaction level is a thesis published by Mentz in 2014. Mentz (2014:167) develops an integrated planning model to quantify audit evidence. The integrated model includes the logical structuring of the combination of audit procedures and the auditors' risk assessment. Mentz (2014:207) integrates the level of assurance numerically with the different types of procedures with the risk assessment. The integration of sampling forms part of the integrated model to obtain the required assurance level (Mentz 2014:234-238).

Mentz (2014:258) proves that the integrated audit evidence model has been incorporated in the Auditor-General South Africa's (AGSA) audit methodology. The report on the compliance of ISQC1 relevant to the engagement performance element of the quality control system the AGSA obtained a satisfactory compliance rating, which indicates that the integrated audit evidence model is compliant with ISAs. The result of the ISQC1 inspection on the AGSA is reported in the AGSA's integrated report (AGSA 2013:57).

2.5 CONCLUSION AND RECOMMENDATION

The traditional audit approaches prior to the era of risk-based auditing consists of transaction-based auditing, development of postulates and systems thinking, publication of auditing standards and formalisation of the audit process. The role of and the responsibility of the auditor with regard to fraud are clarified based on the results of court cases. The traditional approaches lead to the transaction-based auditing and the concept of audit sampling due to the change and challenges in business and the economy.

From the discussion on the ISAs above three prominent concepts are discussed in relation to audit risk and assessment. These are significant, high and low but the ranking of concepts is not clearly indicated in literature. Literature and public auditing firms normally use the assessment of high, medium and low in audit risk. The assessment of risk in other disciplines were used to develop an audit risk quantification model in the following chapter.

The audit risk model illustrates weaknesses and different interpretations in the research discussed above. Variations and the critique against the model are not effective for the audit of internal controls. The critics report on the shortcomings of the reference to the elements of the audit risk model are found in the ISAs. Literature suggests the application of a quantitative assessment of the audit risk model but no clear guidance exist in the auditing field.

A number of researchers agree that the auditing standards were revised due to the change in business and technology and were influenced by the entities. The ISAs were adjusted according to clients' needs. Views on the BRA methodology are contradictory and the main topics can be summarised as a method to obtain more assurance work from business risk consulting and less traditional transaction auditing. The literature is limited with regard to the elements of the BRM and the integration of those risk with the audit risks on assertion level. IFAC (2016) acknowledges that further guidance is required for the auditor to perform appropriate audit risk procedures. The report of IFIAR and IRBA further the complexity of ISA315 as it is relevant to the application of audit risk identification and assessment and the responses thereto. Knechel (2007:402) asserts that the BRA methodology obtained a bad reputation due to the Enron scandal, World Trade Centre attack in 2001, due to timing and was not afforded the opportunity to prove itself.

Zabel (2002:1) and Swart (2013:71) stress the auditor's liability for unsuccessful audits and concluded that one significant error may result to a failed audit. The importance of the integrated model is therefore proven as risks should be assessed for each level and an electronic integrated audit model may assist to reduce the audit risk.

The integrated audit model is proven to be compliant with the ISAs and the gathering of audit evidence is important to support the audit opinion. The concept of the integrated audit model is not clearly defined in the auditing environment. The PCAOB interprets the integrated audit as the audit of financial statements and the effectiveness of internal controls on the financial statements. KMPG's methodology in 2005 discusses the integrated model by integrating the business risks at the business and financial statements level. The integrated model reported on by Mentz (2014) integrates risk assessment, assurance levels and sampling at assertion level and combines various concepts to obtain audit evidence to support the audit opinion.

Literature or guidance combining the integration of audit methodologies at the financial statement and assertion level is limited and research on the integrated audit models should be undertaken.

The ISAs are based on the risk model and the BRA is developed from risk management theories. The identification and assessment of risk is a complex process as there is no clarity in auditing literature on the methods for assessment.

The research in the next chapter includes the search and analysis of various risk identification and assessment theories and models available in literature and in other disciplines outside the auditing domain. The elements identified in the business risk model and the audit risk model is the link between this chapter and Chapter 3.

The aim of the following chapter is to continue the research on risk identification and assessment and the possible contribution towards a qualification and quantification auditing risk model.

CHAPTER 3

BUSINESS RISK AND AUDIT RISK IDENTIFICATION AND ASSESSMENT

3.1 INTRODUCTION

Chapter 2 reported on the various audit methodologies or audit approaches of which the last two developed approaches are all risk-based. The comparison between King IV (IoDSA:2016) principle 11 and ISA 315 with regard to risk management indicate significant similarities, which layout the ISAs incorporated risk management practices as previously stated by Knechel (2007:393).

The theoretical objectives of the chapter are to perform research on audit risk identification and assessment based on current literature and theories in the auditing and business risk management field. The empirical objective of this chapter is to formulate and develop a quantitative and quantitative risk assessment model based on the literature and theory available as well the comparison with the ISAs requirements. The chapter includes analysis and interpretation and development of models along with responses to audit risk. The results forms part of the integration of audit risk into the integrated model.

Business risk auditing contains elements of risk management and therefore interdisciplinary research is required and needs to be performed to analyse the principles applied in other disciplines that is also relevant to auditing. The ISAs itself do not give clear guidelines on the practical identification and assessment of risk while the following references as quoted in the ISAs below indicate that risk should be identified and assessed.

Research indicated that there is a relationship between the business risk management and the business risk auditing (BRA). The enterprise risk management (ERM) theories and principles are embedded in the development of the BRA. Mikes and Kaplan (2013:3-4, 10) discuss business risk management (BRM) and enterprise risk management (ERM) in the same context and

interchange between the concepts. This may imply that ERM is the same as BRM or ERM is part of BRM.

The chapter addresses the following concepts:

- The compliance of auditors with regard to IFAC requirements.
- Comparison of ISAs and content of ISAs relevant to risk management theory.
- King IV and risk management relevant to auditing.
- Definitions of ERM and BRM.
- Risk identification.
- Qualitative and Quantitative risk assessment and examples of risk models and matrixes.
- Comparison of the matrixes and the development of the sextant risk assessment approach.
- Audit risk quantification.
- Relationship of audit risk and materiality.

The following part of the introduction analyses the requirements related to audit risk identification and assessment as stipulated by IFAC in the ISAs that an auditor needs to comply with. IFAC (2018g ISA 315 par 14) refers to the control environment while IFAC (2018g ISA 315 par 15 to 19) refers to the entity's risk assessment procedures that can be related to ERM. IFAC (2018g ISA 315 par 26) refers to various elements of business risk such as (a) identification of risk and controls related to risk, (b) assessing the “*affect*” of risk on financial statements and various assertions, (c) relationship and (d) to the likelihood and possibility of multiple misstatements. The auditor should also assess the likelihood of the risk occurring during the understanding of the entity's risk assessment process (IFAC: 2018g ISA 315 par 15(c)). The constructs such as affect, likelihood, possibility and occurrence as listed in the paragraph above is also relevant to other disciplines in business risk and management, which is discussed later in the chapter.

IFAC (2018g ISA 315 par 5) requires the auditor to assess risks at “financial statement and assertion level”. The concern is that limited guidance is given on

how to assess these risks. Merriam-Webster (2016) defines assessment as follows: “an amount that a person is officially required to pay” and “the act of making a judgement about something”. The meaning of assessment according to the dictionary does not give concise clarity on how assessment should be done. Elliott and Rogers (1972:47) state that there are no clear guidelines in literature to guide the auditor on assessing the risks. The statement is supported by Swart (2013:144) that concludes that based on responses from South African auditing firms (which include international firms) there is not sufficient guidance on the audit risk standards for risk assessment.

IFAC (2018g ISA 315 par 4 (d)) defines risk assessment procedures as: “*The audit procedures performed to obtain an understanding of the entity and its environment, including the entity’s internal control, to identify and assess the risks of material misstatement, whether due to fraud or error, at the financial statement and assertion levels*”. Therefore, guidance on the method of assessment is not clear and left to the auditor’s judgement.

IFAC (2018a Glossary) does not define any high risk or significant risk in such a manner to determine whether high risk is ranked higher than significant risk. IFAC (2018g ISA 315 par 27 to 28) and specifically par 28 draws attention and discuss significant risk more extensively, which indicates that significant risk is ranked higher than a high risk.

The guidance on risk assessment, the ranking and the levels are limited but the ISAs refer to three distinct terms related to risk assessment namely [1] significant, [2] high and [3] low. Based on the previous discussion the research supports the consideration that the ranking is as listed in the previous sentence. The auditing field needs to borrow principles of risk assessment from other disciplines as is discussed in the following sections.

3.2 BUSINESS RISK

The purpose of this literature review in this chapter is limited to the quantitative and qualitative risk identification, assessment and response as far as it is relevant and

contribute towards the auditing environment. The research does not address the full scope of the strategic, business, enterprise, project and operational and related risk management disciplines. BRA is formed from the basis of business risk management theories and models and the content and models of business risk are analysed in the following section of the chapter.

3.2.1 King IV's relations to risk management elements

Le Roux (2016:2) and Mikes and Kaplan (2013:6) state that proponents for corporate governance suggest that ERM adds value to the companies if the ERM process is properly implemented. It is therefore of importance to analyse the relationship between King IV and risk management elements.

Deloitte (2016) and KPMG (2016) refer to the King IV report on Corporate Governance for South Africa 2016 (King IV) as King IV, King IV code or the King IV report. The firm further states that King IV is effective for financial years starting after 1 April 2017. The King IV report is issued by the Institute of Directors Southern Africa (IoDSA) and the reference convention that is used in this research is IoDSA (2016). JSE (2017a, b) requires the mandatory disclosure and implementation of specific principles of the King IV in the JSE amendment schedules according to the following sections of the JSE regulations: Continuing obligations (Sec 3.84), Listing requirements: Directors (Sec 4.8(c)) and Financial information (Sec 8.63). The application of the King IV is important for all JSE-listed companies and is discussed further in the next paragraph.

IoDSA (2016:40-41) lists the 11 principles of corporate governance and illustrate similarities between business risk and the 11 principles. As part of the research an interpretative comparison between the principles and business literature study is done to determine the principles that are directly and indirectly linked to risk. The table below is a summary and assessment of the principles that is directly linked to business risk, which indicate that King IV includes elements of the business risk model. The analysis of principles is based on the title of the principle and classified as direct and indirect link to risk management. The table below represents the summarised analysis.

Table 3-1: King IV principles related to business risk

Principle	Direct link	Indirect link
1. Ethical leadership	☐	☒
2. Implement ethical culture	☐	☒
3. Corporate citizenship	☐	☒
4. Strategy, performance and business models and performance of organisation	☒	☐
5. Assessment of performance based on organisations reports	☒	☐
6. Custodian	☐	☒
7. Knowledge, experience and independence	☒	☐
8. Balance of power and independent judgement	☒	☐
9. Performance management	☒	☐
10. Authority and responsibilities	☒	☐
11. Risk management	☒	☐
12. Technology and information	☒	☐
13. Compliance with laws	☒	☐

Source: IoDSA (2016:40-41) and Own emphasis

The assessment of the table above indicates that 9 out of 13 principles directly relates to risk and risk management. This interpretation further indicates that King IV and ISA 315 have similar requirements and form part of risk management and therefore the business risk audit methodology.

3.2.2 King IV fundamental concepts

Risk is an integral part of a business and becomes more prominent as the pace in the markets with regard to competition and profitability is ever-increasing. IoDSA (2016) includes various references to risk in the fundamental concepts. The relationship between assurance and risk is also evident in the King IV report and amplifies the business risk elements in the current auditing field. IoDSA (2016:28, 30-31) highlights the fundamental concepts associated with audit and risk as discussed in the following section.

The relevant concepts of risk and King IV are the following:

3.2.2.1 Integrated reporting

IoDSA (2016:28) states that integrated reporting is a combination of numerous leadership responsibilities for those charged with governance. Their duties include organisational direction, approval of policies and planning, management oversight and accountability for performance. The duties are all listed by Messier Jr. (2014:278) that is included in the BRA model and therefore forms part of risk management.

3.2.2.2 Risk and opportunity

Risk is defined in three parts namely [1] uncertainty, [2] likelihood of occurring and [3] the positive or negative effect of such events. The King IV further states that the organisational objectives can be influenced by a potential positive risk occurrence. It is further stated that risk is becoming more complex and therefore recommends that *“the risk committee comprises a majority of non-executive members of the governing body”* (IoDSA 2016:30). This further suggests that the risk committee is an integral part of strategic objectives of the business and that highly knowledgeable members are required to assist in the risk committee.

The recommendations as stipulated above indicate that risk include uncertainty, likelihood and effect as elements that are included in various literature and ISAs throughout the research. The complexity of risk is highlighted again in King IV that supports the research as discussed in Chapter 2.

3.2.2.3 Technology and information

IoDSA (2016:30) states that the advances in technology and information is rapidly changing and may *“cause significant disruption, opportunities and risks”*. The organisation should improve processes to predict change and respond to new opportunities to obtain a competitive edge over industries in the same line of business. The report also states that information and technology have the potential to add value to the company but individual risk and opportunities are created with the development of new technology and information. The concepts significant, opportunity and risk are again highlighted in this paragraph as a recurring topic. A

SWOT analysis contains four elements that are [1] strengths, [2] weaknesses, [3] opportunity and [4] threats of which two of them, opportunities and strengths, are referred to in the technology and information fundamental principle paragraph. It can be concluded that various concepts are interrelated between risk management and this section of the fundamental principles and that King IV is strongly related to risk management and auditing.

3.2.2.4 Assurance and internal audit

King IV states that a combined assurance model should be used but the design is not prescribed. The report further states that all assurance services include services and functions that will “enable an effective control environment to support the integrity of information used for internal decision-making by management, the governing body and its committees; and support the integrity of the organisation’s external reports”. King IV further posits that internal audit plays a pivotal role in the corporate governance domain (IoDSA 2016:31). The relationship between King IV and risk management is evident from the recommendations as listed in the previous paragraph. Assurance and internal audit therefore forms part of the building blocks of the BRA model.

3.2.2.5 Auditor and audit requirements

Francis (2011:128) contests that an audit failure may be a result of an auditor not being independent and where the auditor did not comply with the ISAs and may issue an inappropriate opinion based on the risk level assessed for the financial statements. It is further stated that 1% of auditing firms of public listed companies is involved in litigation. Audit quality is determined by the audit failure or the non-audit failure of accounting firms and independence and gathering of sufficient evidence to support the audit opinion are the building blocks that determine the success or quality of an audit. The independence and audit quality of audit firms lead to the requirement for mandatory audit firm rotation and for inclusion of such requirements in the King IV as emphasised in the following discussion.

IoDSA (2016:32) states that the decision and consideration regarding mandatory firm rotation and tendering is left to the audit committee and the governing body subject to legal requirements. The code recommends that the tenure of the auditor and the audit committee views on audit quality should be disclosed. These requirements are based on the conclusion that auditor independence and the audit quality needs to be reinforced through mandatory firm rotation.

IoDSA (2016:32) further recommends that the significant matters, relative to the financial statements, be considered and, how the audit committee dealt with it, be disclosed. This disclosure will provide users with three perspectives relevant to the financial statements, namely:

- Perspective of governing body in the preparation of financial statements with specific reference to significant assumptions made.
- Significant areas considered and how it is addressed by the auditor.
- Significant matters and how the audit committee discharged their responsibilities.

The King IV code emphasises the importance of business risk management and the relationship between auditing and business risk management. The similarities between the ISAs and King IV also indicate that the current audits contain various elements of business risk management and contains concepts such as opportunities and significant that can be applied in the auditing environment.

Reference to significant and not to high and low is evident in the discussion of the principle. It is evident from the previous discussion that whenever literature refers to important matters they refer to significant and not high and therefore significant is also described in the ISAs when emphasis should be placed on such items. Significant should therefore be the highest risk and ranked as such.

3.2.3 Business risk and enterprise risk management (ERM)

The analysis of the various definitions of business risk management and enterprise management illustrates that literature and standard setting bodies each proposes seven different definitions (Bromiley *et al.* 2014:2-3; Le Roux 2016:11-14). Le

Roux: (2016:15-16) summarises and defines the literature conducted Mikes and Kaplan (2013) as follows:

Enterprise risk management “*consists of a framework of active and intrusive methods and processes that (1) are capable of challenging existing assumptions about the world within and outside the organisation; (2) communicate risk information with the use of distinct tools (such as risk maps, stress tests, and scenarios); (3) collectively address gaps in the control of risks that other control functions (such as internal audit and other boundary controls) leave unaddressed; and, in doing so, (4) complement — but do not displace — existing management control practices*”.

Bromiley *et al.* (2014:265) and Le Roux (2016:8) state that the firm should manage risks in a “*comprehensive and coherent*” manner and not on an individual basis. The risk management process is therefore an all-inclusive system and are also referred to as ERM.

3.3 RISK IDENTIFICATION

3.3.1 Introduction to risk identification

The identification of risks is the primary and important stage in the risk process. Clarke and Varma (1999:416) describe the elements of risk as stake and uncertainty. The study refers to the risk assessment and directions but no clear guidance are given on how to identify risk. Eilifsen *et al.* (2001:201) identify six significant business risks with short definitions and only addresses the political and social risk in the example.

IFAC (2018g ISA 315 Appendix 2) lists 30 examples of “*conditions and events that may indicate risk of material misstatement*” for the financial statements. The examples referred to in the Appendix 2 are not a complete list of all circumstances that are all related to risk identification at the financial statement level. The list does not specifically include risk assessment at the assertion level for classes of transactions and balances and disclosure. This is a weakness of the ISA in that guidance on audit risk identification at assertion level is not evident.

The different risk identification techniques currently available as stated by Bangsgaard (2010:29) include brainstorming, group workshops, cause-and-effect diagrams and risk breakdown structure (RBS) that serve as examples.

The RBS presented by Bangsgaard (2010:35) is a formal and structured method to involve participants at different levels and the workgroup can develop a risk identification checklist from the notes that may assist to assess the risks at all levels. The example illustrates the various levels that starts at level 0 with the project risk and ends at level 3. The illustration is a hierarchy that split at each level into more detail. The illustration below is the example to explain the different levels in the hierarchy. The figure below is a graphical illustration of the risk breakdown structure (RBS).

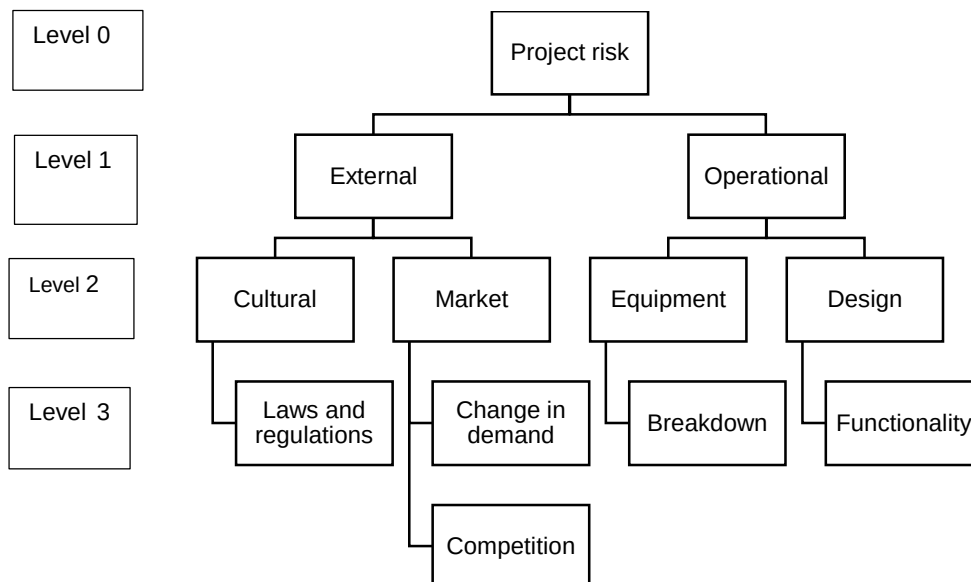


Figure 3-1: Risk breakdown structure (RBS) example

Source: Bangsgaard (2010:35)

The figure is a visual presentation that will lead to more effective risk identification and assessment, which is supported by Clarke and Varma (1999:422) where the dashboard approach provides a visual and holistic picture of all risks. This overall view of risks from various sources can assist the board to scrutinise all risks and opportunities in a two-hour timeframe.

This part of the study indicate that more research should be published on the aspect of strategic risk, risk management, enterprise risk management, project risk management and audit risk related specifically to risk identification.

3.3.2 Education responsibilities

The origin of the deficiencies in risk identification, assessment and responses is further investigated in this chapter. Professional chartered accountants are acclimated during their academic studies and traineeship to become financial or auditing specialists. De Villiers (2015:7) posits that the requirement for chartered accountants to be equipped for the new demands placed by the business environment, requires skills that the South African Institute of Chartered Accountants (SAICA) established in 2010 and is called competencies. He further concludes that all the skills will not all be attained during their studies at the university and additional training during their traineeship will equip them with the required competencies. The relationship between the academic environment and the entry into the profession forms part of this research and the following indicates that there is a causal relationship between the academic and professional landscapes.

SAICA (2016:5) continues to highlight the concept that the conceptual framework is the final step of the academic programme for a chartered accountant to enter the profession. SAICA (2016:48,56) states that the academic programme of 2018 should provide the prospective chartered accountants with specific skills relevant to risk as highlighted in the strategy, risk and governance section of the paper. SAICA (2016:85,94) further requires, in the auditing and assurance section, that the prospective chartered accountants should obtain skills relevant to risk identification, assessment and responses thereto.

The conclusion can be drawn that risk is the combined responsibility of both the university and the auditing profession.

3.3.3 Public practice responsibility

The responsibility of the university includes the teaching and testing the skills and competence to identify, assessment and responding to risks. SAICA examines the students on the competency on the ITC and APC level and risk is a topic throughout the framework that candidates need to master as discussed in the previous part of the chapter.

The deficiencies of audit engagement files as published by IFIAR (2016:1) and IRBA (2016) highlight the fact that audit risk identification, assessment and responses thereto are one of most the prominent points in oversight and inspection reports.

The auditor in public practice has to comply with ISAs and IFAC (2018g ISA 315) requires from the auditor to identify and assess risk while IFAC (2018i ISA 330) stipulates that the audit needs to respond or address those risk. SAICA (2015:7) requires from the trainee to gain auditing competencies relevant to the understanding of the entity and its environment and the evaluation of risk of material misstatement. SAICA (2015:7) competency AA(E)2 and AA(E)3 require from the trainee to become competent and obtain the skill to perform business risk audit as part of their training. The auditing firm and specifically the engagement partner are responsible for the audit and audit risk in all its spheres. As part of a trainee accountant's requirements after completing the professional examinations set by SAICA is to complete a trainee programme at an accredited SAICA training office. The trainee accountant can only register as a Chartered Accountant after the completion of the traineeship and sign off by the training partner the trainee is allocated to.

APA (2005:37(2)) states that an auditor may only register after the individual completed their studies, "*training and competency requirements*". The public audit firm's responsibility is therefore to provide practical experience to prospective new auditors before they enter the auditing profession as a registered auditor in South Africa.

The responsibility of the public auditing profession is to train the prospective auditor to obtain the skill and competencies required to perform an audit according to the business risk auditing methodology before the individual may register. Part of those skill and competencies are to identify, assess and respond to risk and therefore the registered auditor should be able to perform a BRA.

As part of the auditor's responsibility is to comply with ISAs the auditor should perform analytical procedures as part of the risk identification and assessment in the planning stage of an audit. The literature review below indicates the auditor's responsibility and methods that analytical procedures can be relevant and applicable to the audit planning.

3.3.4 Analytical review procedures

IFAC (2018f ISA 300 para. A2) posit that the audit entails a continuous process where certain activities should be completed before the next are performed. Analytical procedures as risk assessment, understanding regulatory and legal framework, materiality consideration and the performance of other risk assessment procedures should be performed before the auditor identify and assess risk of material misstatement.

The auditor should also allocate team members according to the specific audit areas therefore the higher the risk the more experienced team members should be allocated to those specific audit areas (IFAC: 2018f ISA 300 para. A8).

Analytical procedures are an analysis and comparison between operating and non-financial data and financial information (Koskivaara 2007:334 and Mentz 2014:119). This is further supported by Lucouw (2013:70) and Swanepoel (2017: 53) which illustrates that although financial ratio analysis is a comparison of performance it only provides numerical data in instances where all other data are not taken into account in the decision-making process. Trend and ratio analysis and reasonableness tests are some methods used in analytical procedures (Colbert 1994:3; Samaha & Hegazy 2010:899; Mentz 2014:119; Moolman 2017:174).

Blocher and Patterson (1996: 53); Colbert (1994: 5) and Mentz (2014:119) state that ratio analysis is [1] the relationship between variables, [2] financial ratio calculation and [3] comparisons of budgets, industry norms, prior year balances and ratio's. They further state that trend analysis is the comparison between the current and the prior year amounts and analysis of the trends to identify significant fluctuations, which in itself may be pointing to a specific risk during the planning process. Colbert (1994:3,7), Koskivaara (2007:337) and Mentz (2014:119) state that the reasonableness test entails to predict the recorded amount by using independent non-financial data to obtain a predicted result and comparison with the actual amount. These methods can all be applied as part of the risk identification process.

Moolman (2017:174) evaluates the analytical procedures reported on in 11 academic articles and found that 10 out of the 11 applied ratio analysis and trend analysis while 6 out of 11 instances applied reasonableness tests. Mentz (2014:118) states that substantive analytical procedures include reasonable tests. Moolman (2017:175) suggests that the advantages of the ratio and trend analysis for the auditors are that it is not complex but cost-effective and the information for interpretation and calculation is available to the auditor. Moolman (2017:176-178) further states that the DuPont model, economic value added (EVA), Altman's Z-score and Benford's law are additional analytical procedures that are available to the auditor. There are therefore various methods that an auditor may apply analytical procedures to identify risks at the planning stage of an audit.

However, Simon (1982:170) and Swanepoel (2017:62) state that decision-making using historical information, on its own, does not contribute much towards future decision-making. They further state that the information can be more useful if the information is adapted and realistic estimates made for financial decision-making and therefore reasonableness tests should be performed. The contrary is therefore true in the auditing environment due to the fact that adaption of financial information, which may represent a more normal trend, will mislead the auditor to identify risks that were previously relevant and now normalised. Mentz (2014:117) and Moolman (2017:172) states that analytical procedures shift the focus to the high-risk areas, while significant fluctuations are also an indicator of audit focus

areas. Moolman (2017:172) further states that the significant manipulation of figures, by management, to the normal expectation caused the concealment of fraud during the WorldCom scandal.

Analytical procedures are therefore the analysis of trends and ratios and the identification of items that do not comply with the norm to assist the auditor to identify deviations and possible risk and to place more audit emphasis on those classes of transactions or balances and obtain supporting explanation for deviations.

The following section discusses the complexity of risk assessment based on the guidance supplied by the ISAs and literature available on audit risk and risk management disciplines.

3.4 QUALITATIVE COMPARED TO QUANTITATIVE RISK ASSESSMENT

While risk quantification is an acceptable practice outside the auditing profession, it is not an established practice within the auditing profession.

Elder and Allen (2003:985) reveals that the three firms used in their research applied a non-numeric risk assessment. Guidance with regard to assessment thereof is limited and the constructs used are significant, high and lower risk. Risks are deemed to have different meanings for different disciplines and different applications. The risk management (RM) discipline applies quantification to the risk measurement that is different from researchers in the field of auditing that suggest that the risk assessment should be classified as low to high.

The audit risk model includes the concept that the three elements of audit risk should be multiplied to determine the audit risk. Audit materiality is quantified and has an inverse relationship with audit risk. It can therefore be implied that risks should be quantified to achieve the assessment goal of risk. The purpose of this study is to determine the understanding of audit risk and implementation of risk by applying risk management principles to an integrated audit risk model.

3.5 QUALITATIVE AND QUANTITATIVE MATRIXES AND ASSESSMENT MODELS

3.5.1 Mendelow

3.5.1.1 Qualitative

Mendelow (1981:412) concludes that the power and dynamism matrix consists of a square of the scale of two levels high by two wide and resulting in four alternatives that can also be referred to as quadrants. The matrix includes the assessment or plotting of the X-axis to be high and low power while the Y-axis to be dynamic and static dynamism. The low power and static dynamism result in the “NIL” scanning of the environment in the right hand bottom corner and continue to the top left top corner with high power assessment and dynamic dynamism result in “Continuous scanning”. The Mendelow matrix start at the right hand bottom quadrant and moves to the top left corner while Olsson’s model is the mirror image of the model starting at the left bottom and working towards the top right column. The four squares can also be classified as quadrants. Swanepoel (2017:47) adjusts the matrix to consist of the combination of Lo and Hi on the X- and Y-axis from the bottom left to the top right corner, which is more consistent with the current matrixes and models in literature.

3.5.1.2 Quantitative

Mendelow (1981:412) and Swanepoel (2017:47) propose that the matrix assists the stakeholders [1] to analyse the impact of, [2] in determining their likely resistance and inhibitions on the success and [3] acceptance policies of decisions. The figure below represents a graphical explanation of the Mendelow's matrix.

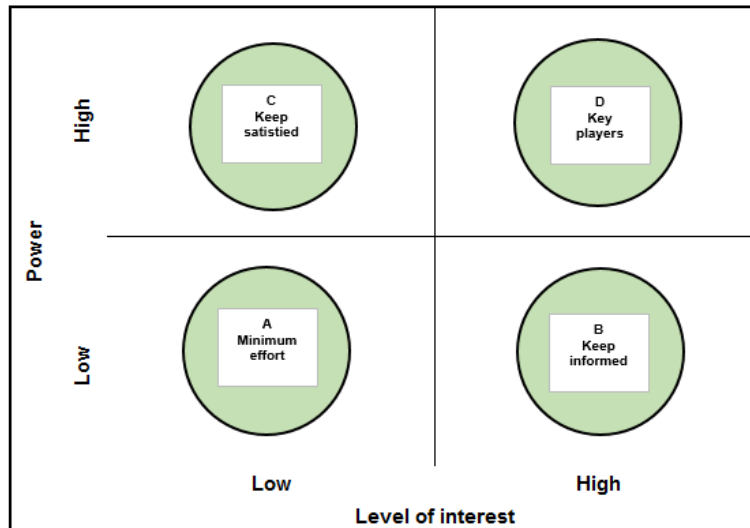


Figure 3-2: Mendelow's matrix

Source: Mendelow (1981:412) and Swanepoel (2017:47) adjusted

The figure above indicates that the lower level of interest and power in Block A the less effort will be expended by the stakeholders. The key players in Block D will exercise a high level of interest and power over the company. By converting this conclusion to be relevant to auditing the same can be said for audit effort. The conclusion is therefore that the less impact (interest) and likelihood (power) the less audit effort will be and the contrary will be that while more effort will be exercised on the material classes of transactions and balances (interest) and risk (power). By further replacing the letters A to D with numbers the quadrants can be numbered as with [1] A, [2] B, [3] C and [4] D a numerical value is allocated to the letters based on the sequence of importance as ranked in the table above.

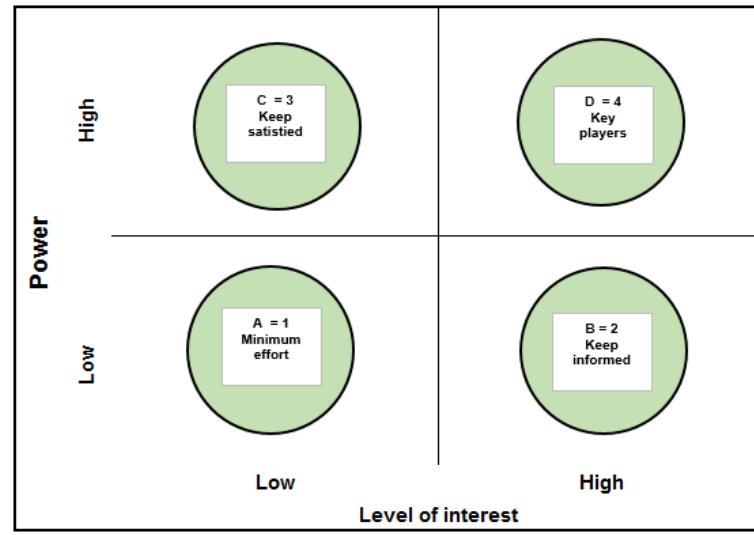


Figure 3-3: Quantified Mendelow's matrix

Source: Mendelow (1981:412) and Swanepoel (2017:47) adjusted

The figure above indicates that quantitative values can be allocated to qualitative risk assessments in the ranking of the risk and impact combinations where a higher number is allocated to a higher letter in the alphabet (D = 4) for the higher risk compared to a lower risk or the lowest risk (Low x Low) at a ranking of 1.

3.5.2 Olsson and other four squares models

3.5.2.1 Qualitative

The assessment of risk as high and low is a classification or qualitative assessment of pointing at a specific risk combination. Olsson (2002:19) classifies risk as high or low, which can be seen as a qualitative risk assessment. Swart (2013:83) states that the four block risk model is used by companies to perform the SWOT analysis, which consists of strenght, weaknesses, opportunities and threats that should be identified. The analysis divides a square into four equal blocks thst are called quadrants. Olsson (2002:19) and Swart (2013:83) adjusted the model to include the probablity and likelihood combinations at various risk models, which is illustrated in the figure below.

		High		High	
Probability	High	High impact Low likelihood		High impact High likelihood	
	Low	Low impact Low likelihood		Low impact High likelihood	
		Low		Low	
		Impact			

Figure 3-4: Probability/Impact matrix

Source: Janse van Vuuren (2008: 37), Olsson (2002:19) and Swart (2013:83)

The conclusion that can be drawn from above is that there is a positive relationship between likelihood and probability and the combination or intersection of risks indicate that a higher probability results in a higher impact. By adjusting the table by substituting materiality (material balance) for impact on the X-axis and risk for probability on the Y-axis and the matrix can be used to plot account balances and classes of transactions. Olsson (2002:20) and Swart (2013:84) illustrates that by

converting the model above into risk strategies and responses to risk it can be graphically represented in the following table below.

		High		High	
Probability	High	Put in place controls to minimise exposure		Priority for action	
	Low	No action required		Put in place a contingent plan	
		Low		Impact	
				Low	

Figure 3-5: Probability/Impact matrix: Risk strategies

Source: Janse van Vuuren (2008: 37), Olsson (2002:20) and Swart (2013:84)

Explanation of keys used in the explanation below:

HP = High probability 4

HI = High impact 3

LP = Low probability 2

LI = Low impact 1

The illustration above indicates that the positive is on the right and the negative is on the left side of a graph. The middle line represents medium or moderate or the zero line. Therefore, it can be illustrated that medium is the average between high and low.

3.5.2.2 Quantitative

Sheehan (2010:31) explains that the risks should be ranked in the risk assessment process depending on the likelihood of occurrence and financial impact. The paper further illustrates that the responses to risk can be “assigned into one of four generic responses” or quadrants as indicated in the table below.

Table 3-2: Risk response matrix

Likelihood	Impact		
		Lo	Hi
	Hi	Mitigate	Avoid
	Lo	Accept	Transfer

Source: Sheehan (2010:31)

Sheehan's (2010:31) responses to risk indicates that there are four different risk responses that can be summarised as:

1. Accept with a low risk and impact.
2. Transfer with a low likelihood and high impact.
3. Mitigate risk with a Hi likelihood and low impact.
4. Avoid risk with a Hi likelihood and impact.

The four square risk matrix suggested by Clarke and Varma (2010: 422) indicates a different approach to the traditional matrix presented by Olsson in that the risk matrix's X-axis consists of low and high-risk levels while the Y-axis contains medium and high stakes. The combination of medium and high with low and medium results that low and high only appears once in the blocks while medium appears twice. The assessment moves in the traditional method from low in the bottom left to high in the top right corner of the matrix. The matrix is further extended to include low, medium and high on the X (Risk) and Y (Return/ stakes) axis. The figure indicates the mapping or plotting of the risk through the intersection of the risk with its corresponding assessment on the other axis. The following figure is a graphical example of the combination of low to medium risk on the X- and Y-axis.

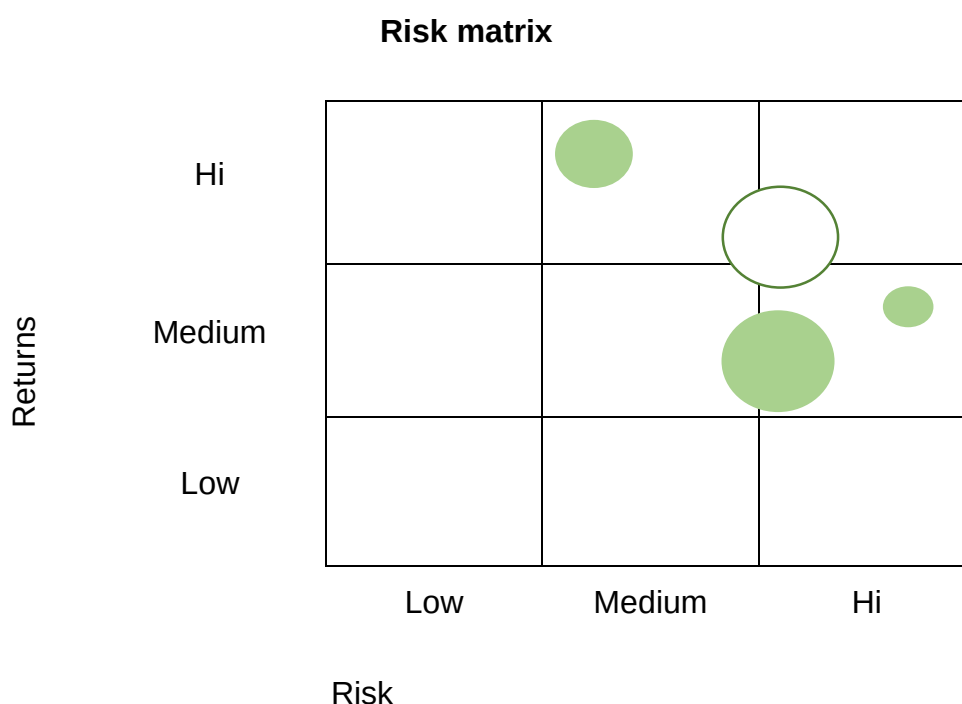


Figure 3-6: Clarke and Varna risk matrix

Source: Clarke and Varna (2010:422)

The figure above is a deviation from the standard four squares model and the combination of three impacts with three risk levels result in a nine block risk assessment.

It can be concluded from the literature above that various combinations of risk assessment methods are available and the consistency between the models is not evident in literature.

3.5.3 Business and enterprise risk management

3.5.3.1 Qualitative

The research of the corporate governance part of this chapter is supported by Coetzee and Lubbe (2011:30) who state that there is a relationship between auditing risk management and corporate governance. The key areas for operational risk matrixes can be used in the measuring and auditing domain

(Higgins 2003:1). The conclusion that can be drawn is that BRA and risks management is relevant for the internal and external auditors.

Norton's (2005:1) "4D" "approach to managing operational risk provides the initial framework for creating a strategic enterprise risk management initiative in the company". The "4D" approach contains the following four actions:

- "Deter
- Detect
- Defend
- Document"

The relationship between the risk-based auditing and operational risk management can be seen in the discussions above. The conclusion is that in all processes and models risk are identified, prioritised and assessed.

Kelly (2012:54) states that the risk matrixes as prescribed by the International Organisation of Standardisation (ISO) 31000 can result in numerical values. Kelly (2012:56) proves that through the Monte Carlo Methodology that numerical risks can be calculated. Committee of Sponsoring Organizations of the Treadway Commission (COSO) (2008:28) quantifies the risks for impact and likelihood on the X- and Y-axis and further allocated a risk descriptor from low, medium and high against each value. The risk is then classified as an alphanumeric character in the nine different fields in the figure, which is actually a square of three by three fields combined. COSO (2012:4-6) continues with the five-point scale relevant to impact, likelihood and vulnerability and a qualitative assessment of the different points. Risk management Society (RIMS 2012:6) applies the risk assessment and quantifies the risk based on impact (percentage and values) and likelihood (percentages) on the following risk classifications viz. very high, high, medium, low and very low. Sheehan (2010:25) explains that risk management on a strategic level can be integrated into a control system.

The above indicates that quantification or combined numerical and non-numeric assessments are used in the risk management discipline.

Literature is available from various disciplines that suggest and illustrates a combined qualitative and quantitative risk assessment matrixes and models that are discussed in the next part of the chapter.

3.5.3.2 Quantitative

Risks are classified and ranked by different disciplines and researchers. INETBFA (2018) applies a risk matrix for JSE companies with 10 categories and the main components are combinations of descriptors and the following main elements compared to other risk assessments.

1. High
2. Significant
3. Medium
4. Moderate
5. Low

The five main elements consist of the following variations that is further divided into the following 10 different descriptors in the table below. The first two columns indicate the number and risk assessment as it appears on the INETBFA (2017) IRESS research website. The third column represents the ranking in numbers from high to low where the numbers are allocated to the levels from the highest to the lowest assessment. The percentages of risk are calculated based on dividing the value of the original risk number through 100 (Own interpretation).

The information as discussed above combined with the INETBFA (2017) categories of risk assessment of JSE companies on the IRESS research domain into 10 different descriptors are represented in the table below.

Table 3-3: JSE risk assessment level

No	Risk assessment	Reversed ranking	Calculation	Percentage of risk
1.	Extremely high risk	10	=100/1	100.0%
2.	Very high risk	9	=100/2	50.0%
3.	High risk	8	=100/3	33.3%
4.	Significant risk	7	=100/4	25.0%
5.	Medium high risk	6	=100/5	20.0%
6.	Average acceptable risk	5	=100/6	16.7%
7.	Moderate risk	4	=100/7	14.3%
8.	Low risk	3	=100/8	12.5%
9.	Very low risk	2	=100/9	11.1%
10.	Extremely low risk	1	=100/10	10.0%

Source: INETBFA (2018)

The classification of the various levels is complex and as a qualitative measure not a clear indication of the classification and assessment of risk. The ranking as significant as number four with three different high-risk levels ranked number one to three above and a medium high risk ranked as five just below significant is not consistent with the ISAs. IFAC (2018a Glossary) defines significant risk as a risk that “requires special audit consideration” and significance as a “relative magnitude” and the conclusion is that significant can be ranked higher than a high risk from an auditing perspective. Reference is also made in IFAC (2018g par 15b, 27, 28 and A69) to significant risk and special audit attention while no indication that special audit attention should be given for high risk areas.

The table further illustrates in the reverse ranking that the highest value can be allocated to the highest assessment to rank them in numerical value according to probability from high to low. The discrepancy that can be found in the current ranking from 1 to 10 is that if the ranking is divided by 100 the percentage between number 1 and number 2 risks would decrease by 50% and thereafter the percentages appear to decrease more consistent. As in this example the quantification of so many risk levels would indicate a skew distribution of

percentages and the relevance of the numbers can be questioned. The assessment between extreme and very high is also judgemental and various answers will be obtained from auditors if so many choices regarding high, medium and low risk are given to assess risk.

The principle that can be used as a basis is that risk can be assessed at quantitative and quantitative level and in this case there are ten different levels. The complexity of qualitative assessment alone can be further supported by the example reported on by MITRE (2007) in the following discussion.

MITRE (2007:41-42) states that the information required is a consideration to obtain the best risk assessment approach. The probability of occurrence risk assessment scale example used in MITRE's (2007) Systems Engineering involvement with government sponsors and clients is graphically illustrated in the table below.

Table 3-4: MITRE probability of occurrence example

Risk level	Probability		Certainty	
1	1	Issue	1	Certain to occur
2	0.95-0.99	High	$> 0.95 < 1$	Extremely sure to occur
3	0.85-0.95	High	$> 0.85 \leq 0.95$	Almost sure to occur
4	0.75-0.85	High	$> 0.75 \leq 0.85$	Very likely to occur
5	0.65-0.75	High	$> 0.65 \leq 0.75$	Likely to occur
6	0.55-0.65	Medium	$> 0.55 \leq 0.65$	Somewhat greater than an even chance
7	0.45-0.55	Medium	$> 0.45 \leq 0.55$	An even chance to occur
8	0.35-0.45	Medium	$> 0.35 \leq 0.45$	Somewhat less than an even chance
9	0.25-0.35	Low	$> 0.25 \leq 0.35$	Not very likely to occur
10	0.15-0.25	Low	$> 0.15 \leq 0.25$	Not likely to occur
11	0.00-0.15	Low	$> 0.00 \leq 0.15$	Almost sure not to occur

Source: MITRE (2007:41-42)

The ranking from number 1 with the highest probability and uncertainty value and assessment scale up to 11 with the lowest probability and uncertainty assessment indicate that each assessment at least is linked to a numeric value that will simplify the risk assessment and consistency between auditors significantly. A further conclusion that can be drawn from the table above is that each risk assessment level probability and uncertainty decrease by 10%, which is a consistent reduction between each risk level. In the table above, the qualitative and quantitative assessment is illustrated. Based on the number of choices between high and low the auditor may still not be able to decide on a consistent audit risk level. Compared to the qualitative risk assessment in Table 3-3 with no numerical values the risk in Table 3-4 is more simplified and a more accurate assessment could be made. Table 3-4 illustrates progress in risk assessment compared to Table 3-3.

PMI (2008:281) uses a quantitative and qualitative numerical scales to assess risks. The cost and impact is also both qualitative and quantitative. The scales of risks combined with the cost impact can also be plotted to identify risk at specific levels. The table below indicates that risks can be assessed by multiplying the number of items on the horizontal and the vertical axis or rows and columns of the squares. In this example there are five rows and four columns and has a size of 5x4.

Table 3-5: Impact scales of a risk

Defined conditions for impact scales of a risk on major project objectives (Examples are shown for negative impacts only)					
Project objective	Relative or numerical scales are shown				
	Very low /.05	Low /.10	Moderate /.20	High /.40	Very high /.80
Cost	Insignificant cost increase	<10% cost increase	10-20% cost increase	20-40% cost increase	>40% cost increase
Time	Insignificant time increase	<5% time increase	5-10% time increase	10-20% time increase	>20% time increase
Scope	Scope decrease barely noticeable	Minor areas of scope affected	Major areas of scope affected	Scope reduction unacceptable to sponsor	Project end item is effectively useless
Quality	Quality degradation barely noticeable	Only very demanding applications are affected	Quality reduction requires sponsor	Quality reduction unacceptable to sponsor	Project end item is effectively useless
This table presents examples of risk impact definitions for four different project objectives. They should be tailored in the risk management planning process to the individual project and to the organisation's risk thresholds. Impact definitions can be developed for opportunities in a similar way.					

Source: PMBOK (2008:281)

The table above further supports the notion that a combined qualitative and quantitative risk matrix will assist in a more logical risk assessment that can be explained and supported.

The study critiques and analyses the risk model levels and the associated literature that indicates best principles that can be used in the auditing field. Credit is given to the publishers of the reports and literature on risk level and quantification due to commitment and bravery to experiment and obtain results through their efforts and

research. The risk management community over all disciplines benefit from their contributions.

MITRE (2007:41-42) indicates in the “Programme risk management assessment scale example” table that the impact cost are factors that needs to be considered during the risk assessment process. The following is a summary of the aforementioned example to illustrate the risk level, performance and cost relationship.

Table 3-6: Programme risk management assessment scale example

Risk and ranking	Performance	Cost
5 Severe	Unacceptable	Budget impact > \$20 million
4 Significant	Unacceptable at threshold level	Budget impact > \$10 and > \$20 million
3 Moderate	Below goal	Budget impact > \$2 and > \$10 million
4 Minor	Below goal and objective not met	Budget impact > \$2
1 Minimal	Minor performance within threshold and objective	Budget impact not affected

Source: MITRE (2007:41-42)

The table above illustrates that risk can be combined and different terms are used at each level. The risk is ranked according to numbers from the highest to the lowest risk and value. The monetary value in a South African context, even if the dollar value is not converted to the current exchange rate and the “\$” sign is replaced by “R”, may not be acceptable or be too high. Judgement and experience from managers and auditors are required to integrate and reduce the values above appropriately and proportional in relation to the client’s operations and financial performance results. Guidance are provided but careful consideration should be made about the amounts used in the example and reduced accordingly.

Bangsgaard (2010:37) states that the risks identified can be ranked by the combination of impact and probability of risk. The statement is further supported by the following equation and table (the probability on the table is highlighted in green for probability and blue for impact) below:

Risk rating = risk probability * risk impact

Equation 3-1: Risk rating

Risk ranking = Probability multiplied by risk impact or risk ranking = probability x impact

Table 3-7: Probability and impact matrix

Probability					
0,9	0,09 Low	0,27 Medium	0,45 High	0,63 High	0,81 High
0,7	0,07 Low	0,21 Medium	0,35 Medium	0,49 High	0,63 High
0,5	0,05 Low	0,15 Medium	0,25 Medium	0,35 Medium	0,45 High
0,3	0,03 Low	0,09 Low	0,15 Medium	0,21 Medium	0,27 Medium
0,1	0,01 Low	0,03 Low	0,05 Medium	0,07 Medium	0,09 Medium
Impact	0,1	0,3	0,5	0,7	0,9

Source: Bangsgaard (2010:37)

Bangsgaard (2010:37) applies decimals to the calculation of the combined points where probability and impact intersects and only three qualitative risk assessments are shown on the table. These risks are high, medium and low which is also used in the auditing firms.

The same comments can be made on the example above as with the INETBFA (2018) and MITRE (2007:41-42) “*Probability of Occurrence Example*” in that the levels of risks are few and then further extended with different levels. Three risks are assessed in 25 different entries or blocks. The Bangsgaard (2010:37 Table 1) and MITRE (2007:41-42) “*Probability of Occurrence Example*” complexities are offset against the associated numerical value and assessment value of the associated blocks relevant to the probability that may result in a more simplified and consistent risk assessment.

The equation used in the table above is supported by Haeusler *et al.* (2008:228) that posits that the matrix of 3 x 3 squares with 9 entries or fields is a square and the product of the square is the length multiplied by height. The surface of the square can therefore be calculated by the square of the length of the sides or $A=a^2$.

Geelong (2014:2) developed a risk ranking matrix that represents the likelihood on the Y-axis and the consequences on the X-axis. The only deviation normally expected from an auditor is that the risk ranking for significant (4) compared to high (5) attracts a lower value. The higher the risk ranking matrix moves upwards and to the right the higher value is allocated to each risk. The risks increase by one (1) for each different level.

The table below indicates how the risk values and levels increase along with the logic for the value of each combination. The risk level of the likelihood is multiplied by the consequences depending on the location of the block on each matrix.

Table 3-8: Risk ranking matrix

Likelihood	Risk ranking matrix				
High	5	$5 \times 2 = 10$	$5 \times 3 = 15$	$5 \times 4 = 20$	$5 \times 5 = 25$
Significant	4	$4 \times 2 = 8$	$4 \times 3 = 12$	$4 \times 4 = 16$	$4 \times 5 = 20$
Moderate	3	$3 \times 2 = 6$	$3 \times 3 = 9$	$3 \times 4 = 12$	$3 \times 5 = 15$
Low	2	$2 \times 2 = 4$	$2 \times 3 = 6$	$2 \times 4 = 8$	$2 \times 5 = 10$
Negligible	1	2	3	4	5
Consequence	Negligible	Low	Moderate	Major	Catastrophic

Source: Geelong (2014:2)

The table above indicates significant is ranked lower than high. Auditing literature indicates that significant should be ranked higher and an adjustment is made to the current matrix. The adjustment to the table above is that significant has a higher emphasis and ranking than a high risk as indicated by Swart (2013:101) and is presented as follows.

Table 3-9: Risk ranking matrix reordered

Likelihood	Risk ranking matrix				
Significant	5	$5 \times 2 = 10$	$5 \times 3 = 15$	$5 \times 4 = 20$	$5 \times 5 = 25$
High	4	$4 \times 2 = 8$	$4 \times 3 = 12$	$4 \times 4 = 16$	$4 \times 5 = 20$
Moderate	3	$3 \times 2 = 6$	$3 \times 3 = 9$	$3 \times 4 = 12$	$3 \times 5 = 15$
Low	2	$2 \times 2 = 4$	$2 \times 3 = 6$	$2 \times 4 = 8$	$2 \times 5 = 10$
Negligible	1	2	3	4	5
Consequence	Negligible	Low	Moderate	Major	Catastrophic

Source: Geelong (2014:2) and Own research adjusted

The blue diagonal line underneath the squares of numbers 1 to 5 in the table above supports the theories and equations used by Bangsgaard (2010:37) and Haeusler *et al.* (2008:228) stating that each number allocated to the likelihood and consequence multiplied results in a numerical value higher than the previous block below or left of it. The square of each number moves in a diagonal line from bottom left upwards to top right.

Orica (2011:3) reported on the risk matrix and prepared the table in accordance with International Standardisation Organisation (ISO 31000-2009) requirements. Each level or block is allocated a number greater than the previous number. It is a five-by-five matrix and the top right hand value is the square of the number of horizontal table namely five. The results is graphically illustrated in the table below.

Table 3-10: Orica Kurri risk matrix

	Maximum reasonable consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
A. Almost certain	11 High	16 High	20 Extreme	23 Extreme	25 Extreme
B. Likely	7 Moderate	12 High	17 High	23 Extreme	24 Extreme
C. Occasionally	4 Low	8 Moderate	13 High	21 Extreme	22 Extreme
D. Unlikely	2 Low	5 Low	9 Moderate	14 High	19 Extreme
E. Rare	1 Low	3 Low	6 Moderate	10 High	15 High

Source: Orica (2011:3)

The conclusion can be made that low, moderate, high and extreme consequences and the different likelihood on the Y-axis with the numerical combination will contribute to a more precise and logical risk assessment.

The table above also indicates that materiality cannot be ignored in the determination of the impact in the table above. Other factors that should be considered includes reputation of the company such as the media release in 2018 on brands such as Enterprise and Renown that may have an impact on the sales and profitability of the company. The South African Civil Society Information Service (2014) states that strikes such as the Marikana strike of 2012 may have an impact on the reputation of the company, the economy and human capital. PWC (2013) indicates that technology and the management thereof also have an impact on the risk. All these other risks listed above also have an influence on the risk assessment.

3.5.4 Heat map

3.5.4.1 Qualitative

The cluster heat map is a graphical display that illustrates a combination of data in rows and columns. The information on the data matrix represents observations in different colours. Wilkinson and Friendly (2009:179) explain the origin of the heat map and its complexities. The preparation of the heat map is currently being done by computer software. The combination and coding of the heat map is, however, too complex for the use by accounting professionals for the purposes of risk identification and assessment and auditing.

The principle of the data matrix through the use of presentation in colours and on rows and columns is the best practice that can be applied in the audit risk assessment as well. This principle can be adapted for the auditing environment for visualisation and responding to the appropriate risks.

3.5.4.2 Quantitative

The alternative to the data matrix plotting per level is to use consequences and likelihood and occurrence impact where numbers and levels are allocated to each level on the X- and Y-axis. Berg (2010:17) uses the illustration of five-by-five blocks to assess risk at various levels. There are therefore 25 combinations and the higher the risk the more the colour approaches red on the bottom right hand

corner. The table below represent a heat map for risk assessment at various values and levels combined.

Table 3-11: Berg Consequence and likelihood matrix

Consequence							
	Significance		1 Insignificant impact	2 Minor impact to small population	3 Moderate - Minor impact large population	4 Major impact small population	5 Catastrophic to major impact large population
Likelihood	1	Rare	Low	Low	Moderate	High	High
	2	Unlikely	Low	Low	Moderate	High	Very High
	3	Moderate/ Possible	Low	Moderate	High	Very High	Very High
	4	Likely	Moderate	High	High	Very High	Extreme
	5	Almost certain	Moderate	High	Very High	Extreme	Extreme

Source: Berg (2010:17)

The colour coding for risk are:

Extreme	Very High	High	Moderate	Low
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The higher the risk, the more the coding tends to move towards yellow and then orange and the highest risk is therefore red.

3.5.5 Audit models

3.5.5.1 Qualitative

Olson (2002:19-20 and 30-33), Sheehan (2010:27-36) and Swart (2013:90) identified in their research that “medium” is not used as auditing terminology in the ISAs. Based on the search in the ISAs significant, high and low are the only

constructs to describe risk while high or low are used to assess or consider materiality.

Elder and Allen (2003:994) outlines that the classification of audit risk on a quantitative basis is high, medium and low. Elder and Allen (2003:985) states that the audit model can also be called a multiplication equation. Marx *et al.* (2016:8-26) illustrate a generally accepted fact that audit materiality and risk are inversely related and Marx *et al.* (2016:8-27) further states that auditing materiality is assessed on a qualitative and quantitative basis. This is an accepted fact in practice that materiality and risk have an inverse relationship, and although materiality is based on a calculation, the risk assessment is normally done on a qualitative basis. There is therefore a contradiction between the methods of risk assessment and materiality calculation. Risk and materiality should both be calculated for an inverse relationship to exist.

Table 3-12: Relationship between audit risk components

		Auditors assessment of control risk		
		High	Medium	Low
Auditors assessment of inherent risk	High	Very low	Low	Medium
	Medium	Low	Medium	High
	Low	Medium	High	Very high

Source: SAS 300 (2004: Appendix)

The table above assess the inherent and control risk at three levels namely: high, medium and low. The detection risk is, however, assessed at five levels namely: [1] very low, [2] low, [3] medium, [4] high and [5] very high. The comparison between the levels for the inherent and control risk compared to the five levels for the detection risk is not consistent with inherent and control risk levels. The table consists of three by three blocks, which is nine entries or fields and five different combinations are highlighted in the table above.

The assumption that can be made from the ISAs and literature discussed in this research indicate that there are three risk levels stated and the ranking order is as follows:

1. Significant risk
2. High risk
3. Low risk

Moderate risks are commonly used by auditors as a risk that rates in between low and high risk. Evidence of moderate or medium risk can, however, not currently be found in the ISAs.

As significant risk is the highest ranked and low risk is lowest ranked the audit risks can be quantified as follows:

Significant	3
High	2
Low	1

Since 1981 researchers and statutory bodies such as the AICPA discussed the issue of quantification or non-quantification of audit risk. The discussion below evaluates the views of different researchers that published literature on the quantification and non-quantification of audit risk.

Mentz (2014:193) illustrates that various descriptors exist to rank and associate assurance levels on a quantitative basis. Own interpretation is that the descriptors can also be used to relate the assurance levels to risk levels. Elder and Allen (2003:985) stated that there are four levels of risk assessment relevant to the risk of material misstatement compared to Mentz (2014:193) that suggested three levels.

Elder and Allen (2003:985) and Houston (1999(a)) indicate that the audit risk model includes numerical values as multiplication is applied. Mentz (2014:193) reasons that descriptors quantify assurance levels as three levels while Elder and Allen (2003:985) state that risks are assessed at four levels.

The conclusion can be drawn that there is still no clear guidance based on the risk assessment on a numerical and non-numeric basis in the field of auditing.

3.5.5.2 Quantitative

Elder and Allen (2003:985) indicated that the three firms that were used in their research used non-numeric risk assessments. This contradicts the notion as both Houston (1999(a)) and Elder and Allen (2003:985) quoted the audit risk model and which included mathematical equations that suggest the numerical values should be allocated to such risks based on the calculation required. Messier Jr and Austen (2000:120) supported by Peter and Ebimobowei (2013:99) and Von Wielligh and Prinsloo (2014:505) illustrated that the conventional audit risk model as follows:

$$AR = IR \times CR \times DR$$

where;

AR = Audit risk, IR = Inherent risk, CR = Control risk and DR = Detection risk

Equation 3-1

The equation quoted by Elder and Allen (2003:985) is as follows:

$$AR = IR \times CR \times AP \times TD$$

where;

AR = Audit risk, IR = Inherent risk, CR = Control risk, AP = Analytical procedure

Equation 3-2

AICPA (2008: par 4.41), Elder and Allen (2003:985), Kachelmeier and Messier 1991: 55) assign the descriptors for the level of assurance as slight, standard and significant. Mentz (2014:193) states that the qualitative concepts such as “high, moderate and low” and “substantial, moderate and little” are similar expressions used to describe the descriptors listed above.

Mentz (2014:194) combines the risk levels denominators with the following three levels of assurance:

- “Slight (63%) level of assurance = 1:

If the class of transactions, account balance or disclosure is not material by value or nature and does not require special audit consideration to respond to the assessed risk of material misstatement at the assertion level, this is the level of audit evidence that should be obtained.

- Standard (86%) level of assurance = 2:

A standard level of audit evidence is needed if the class of transactions, account balance or disclosure is material by value and/or nature and does not require special audit consideration to respond to the assessed risk of material misstatement at the assertion level.

- Significant (95%) level of assurance = 3:

This is the level of audit evidence that is required if the class of transactions, account balance or disclosure is material by value and/or nature and, in the auditor’s judgement, requires special audit consideration to respond to the assessed risk of material misstatement at the assertion level.

The conclusion can be that qualitative and quantitative risk assessment can be appropriate in the auditing environment. The further conclusion is that the risk levels are just as important to gather of evidence and risk assessment at the assertion level. The following tables are prepared from the following sources as indicated and summarised in the table below.

Table 3-13: Levels of assurance vs. audit risk

Level of assurance (Risk of material misstatement)	Level of audit risk (%)	Level of assurance (%)	Assurance factor
<i>“Slight level of assurance (Slight risk of material misstatement)”</i>	37%	63%	1
<i>“Standard level of assurance (Standard risk of material misstatement)”</i>	14%	86%	2
<i>“Significant level of assurance (Significant risk of material misstatement)”</i>	5%	95%	3

Source: Adapted from Mentz (2014:193) and adjusted

The level of audit risk and assurance adds up to 100% and the assurance factor is quantified. In the table above the level of audit risk decrease as follows from the following levels.

Table 3-14: Level of assurance movements

Level of assurance (Risk of material misstatement)	Level of audit risk (%)	Movement	Level of assurance (%)	Movement	Assurance factor
<i>“Slight level of assurance (Slight risk of material misstatement)”</i>	37%		63%		1
<i>“Standard level of assurance (Standard risk of material misstatement)”</i>	14%	37.8% (Slight to standard)	86%	136.5% (Slight to standard)	2
<i>“Significant level of assurance (Significant risk of material misstatement)”</i>	5%	35.7% (Standard to significant)	95%	110.5% (Standard to significant)	3

Source: Adapted from Mentz (2014:193) and adjusted

Audit risk is assessed at different levels and literature research on the levels of risk indicate that there are different opinions on specifically how many levels are relevant. The following table is a summary of risk levels from the following sources as indicated and summarised in the table below.

Table 3-15: Risk levels

Author	Mentz 2014:(193-196)	Durning (2005:17-3)	Elder and Allen (2003:985)	ISA implied requirement	PMBOK (2008:281)
Assurance level 1	Slight (63%)	High	Maximum	Significant	Very high 0.80 or 80%
Assurance level 2	Standard (86%)	Medium	Slightly low	High	High at 0.40 or 40%
Assurance level 3	Significant (95%)	Low	Moderate	Low	Moderate at 0.20 or 20%
Assurance level 4			Low	No mention is made of moderate risk.	Low at 0.10 or 10%
Assurance level 5					Very low at 0.05 or 5%

Source: Authors listed above

The risk levels in the summary above illustrate that various levels of risk ranking exists and some are only quantitative while the other levels guide with a combined qualitative and quantitative level.

Prior research on the quantification of audit risk and risk models relevant to quadrant and sextants is limited. Mentz (2014) and Swart (2013) are the only recent audit literature in a South African perspective available relevant to the quantification of assurance models and audit risks. This is the reason for references Mentz (2014) and Swart (2013) on a frequent basis.

The risk assessment models show a sign of movement towards a combined risk assessment and the risk matrixes as indicated in the first part of this chapter. The following table is a combination of a risk response matrix and numbers in each sector according to the risk level increase.

Table 3-16: Risk response matrix adjusted for auditing

High	Financial impact		High
Likelihood/Risks/ Material balance	(2) Mitigate risk – Sufficient procedures to reduce risk	(4) Avoid risk – More audit procedures	Likelihood/Risks/ Material balance
	(1) Accept risk – Less audit evidence to reduce risk	(3) Transfer risk – Caution and more audit procedures than in quadrant (2)	
Low	Financial impact		Low

Source: Olsson (2002:20) adjusted, Swart (2013:92,101), Table 3-13, 3-14 and Figure 3-3

The table above indicates that a combined risk and materiality assessment can result in different figures and risks being plotted in different quadrants. There is an inverse relationship between audit risk and materiality. This means that when the audit risk is high the materiality level will be set at low and vice versa. Marx *et al.* (2016:8-27) state that the quantitative benchmarks are different percentages for various classes of transactions and balances. The high divided by the low level materiality benchmark results in a multiplier of 2 in 4 of the 5 instances, which is illustrated in the table below.

Table 3-17: Risk multiplier

Class of account	Low	High	Multiplier
Turnover (Gross Revenue)	½ %	1%	2
Gross profit	1%	2%	2
Net income	5%	10%	2
Total assets	1%	2%	2
Equity	2%	5%	2.5
Average			2.1

Source: Marx *et al.* (2016:8-27 adjusted) and Swart (2013:98)

The table above illustrates that the average for all 5 multipliers are 2. The theory can be extended that if a XY graph is drawn that the risk and materiality impact can be allocated and calculated as follows:

z = Quadrant, m = Multiplier, x = Horizontal risk and y = Vertical materiality

The table below is an illustration of how risk can be allocated and calculated to be represented in an XY graph. The graph is illustrated in the figure following the table below.

Table 3-18: Risk and materiality data

Quadrant	Multiplier = 2	Horizontal = Risk	Vertical = Materiality	Reason: HM = High Material balance and LM = Low material balance
Z	$m = z/2$	x	y	R= Risk, M = Material balance
4 HR/HM	2.0	2.0	2.0	R and M High
3 HR/LM	1.5	2.0	-1.5	R High and M Low and therefore M negative
2 LR/HM	1.0	-1.0	2.0	R Low and therefore R negative and M High
1 LR/LM	0.5	-0.5	-0.5	Low R and M and therefore both negative

Source: Swart (2013:109) and Table 3-15

As previously stated in this chapter the table above does not include any reference to significant risk and should also form part of the risk assessment. As indicated in Table 3-9 the highest risk were significant with a value of five and the table below is adjusted to include significant in and adjusted four square matrix. With the inclusion of significant risk in the risk matrix as Quadrant 5, the risk matrix and responses can be represented as in the table below.

Table 3-19: Adopted for audit risk assessment including significant risk

Probability	High		Impact	High	
	High			Significant risk High value (HM) Significant impact (SR) $X = 5$	Significant
		High value (HM) Low impact (LR) Test controls to minimise exposure $C = 2$		High impact (HR) Priority for action $A = 4$	High
		Material		Balance	Low
	Low	Low value (LM) Low impact (LR) Less or little action required $D = 1$	Risk	Low value (LM) High impact (HR) Careful evaluation and verification $B = 3$	High
		Low		Low/High	

Source: Olsson (2002:19-20) adjusted, Swart (2013:101), Figure 3-7 to 3-9 and Table 3-18 adjusted

The table above indicate that significant risk is higher ranked as high risk and therefore should be allocated and higher value. The following part of the research deals with the sextant audit approach where the risk matrix is converted into six different risk and materiality (material balances) values.

3.5.6 Sextant models

3.5.6.1 Qualitative

Literature indicates that the standard four quadrant matrix can also include different variations such as three by three, five-by-five and up to eleven by matrixes. Swart (2013:111,113) suggests that the sextant audit approach is an acceptable method based on the ISA requirements.

3.5.6.2 Quantitative

Swart (2013:106) posit that a sextant approach for auditing risk assessment is in compliance with ISAs and therefore an acceptable matrix. The table above included five different quadrants, which is actually called a pentagon and the only element missing in the table above is the significant risk and the low materiality balance. The theory is to allocate the value of six to the risk assessment consideration

The Mendelow (1981:412) and Olsson (2002:19-20) matrix was adjusted and resulted in a three by two level matrix with six alternatives or transactions as illustrated in the sextant matrix below.

Table 3-20: Risk response matrix (Adjusted for auditing and sextant approach)

High	Financial impact			High
Likelihood/Risk/ Material balance	Significant	Investigate further and mitigate risk	Investigate further and avoid risk	Likelihood/Risk/ Material balance
	High	Mitigate risk	Avoid risk	
	Low	Accept risk	Transfer risk	
Low	Financial Impact			Low

Source: Olsson (2002:19) adjusted, Swart (2013:93), Table 3-14 and 3-17 adjusted

Budesco *et al.* (2013:33) states that audit risk is influenced by the movement in materiality. This statement can be tested by dividing the high materiality benchmark, which results in a risk multiplier of two. In order to test the theory further a table combining the risk sextant value by the multiplier to obtain a risk factor is presented below. Dividing the quadrant or sextant (Q) by the multiplier (M) resulted in the following equation:

r-factor multiplier

$$Q \div M = \text{r-factor}$$

The table below was compiled based on the above-mentioned formula for each sextant and the r factor to multiply risks. This practice is also standard in one of the large firms by multiplying the r factor with the risk level in the sextant.

Table 3-21: r-factor

Quadrant/Sextant	Multiplier	r-factor
6	$\div 2$	3.0
5	$\div 2$	2.5
4	$\div 2$	2.0
3	$\div 2$	1.5
2	$\div 2$	1.0
1	$\div 2$	0.5

Source: Swart (2013:107) and Table 3-16 to 3-20

The quadrant/sextant multiplied by the probability resulted in the following equation and the results are summarised below to explain the 'r' factor per sextant:

r-factor probability

$$Q \times P = \text{r-factor}$$

Table 3-22: r-factor

Quadrant/Sextant (Q)	Probability (P)	r-factor
6	x 0.5	3.0
5	x 0.5	2.5
4	x 0.5	2.0
3	x 0.5	1.5
2	x 0.5	1.0
1	x 0.5	0.5

Source: Swart (2013:107) and Table 3-17 adjusted

The table above indicates that the risk factor is between 0.5 and 3 that can also be used to calculate sample sizes. Firm X (2007) uses the values of .07, 1.4 and 2.1 as a multiplier for audit sampling based on the results of the test of controls. The more reliance placed on test of controls the lower the multiplier figure would be. Due to confidentiality the firms name will not be disclosed.

Based on the information above a combined table between risk and materiality are compiled to indicate the different values and blocks in the sextant and an explanation or reason for each risk combination that should be applied in the sextant approach.

Table 3-23: Risk and materiality data

Sextant	Multiplier = M	Horizontal = Risk	Vertical = Materiality	Reason
Z	m = z	X	Y	R = Risk, M = Material balance
6 = SR/LM	3	3	3	R significant and M low
5 = SR/HM	2.5	2.5	2.5	R and M significant
4 = HR/HM	2	2	2	R and M high
3 = HR/LM	1.5	2	-1.5	R high and M low and therefore M negative
2 = LR/HM	1	-1	-1	R low and therefore R negative and M high
1 = LR/LM	0.5	-0.5	-0.5	Low R and M and therefore both negative

Source: Swart (2013:111)

3.5.6.3 Advantages of the sextant model

Table 3-3 indicates that there are 11 different levels of assessment, which are all qualitative and therefore a less consistent and accurate risk assessment should be obtained. Table 3-4 indicates 11 levels of risk assessment and although the risk assessment is both quantified and consist of 2 qualitative levels the consistency and accuracy of the assessment is still reliant on 3 different risk levels spread over 10 different options.

Compared to the risk assessment levels in Table 3-3 and 3-4 the sextant audit model consists of less choices, each choice has a different qualitative description and would therefore be more accurate. The options or levels of risk assessment is also easier to distinguish between and in compliance with the ISA terminology.

3.5.6.4 Calculation of 'r' and r^2 factor

The calculation and justification of the 'r' factor was developed in the tables above. The 'r' factor is the next concept that assisted in the progress of the development of the integrated model. The table above illustrates that SR/HM assessment should be allocated to Quadrant 5 and SR/LM to Quadrant 6. The reason for allocating SR/LM to Quadrant 6 is due to the fact that balances such as Cash and Cash Equivalents

and Share Capital may have a low balance but the shareholders and Directors names could be changed fraudulently. Thus assessing such a balance as “significant” and balance below materiality may constitute the highest risk for an auditor. This proposal was also supported by interviews with a technical partner of an audit firm during discussions of the questionnaire. As illustrated in the table below and above, the two significant risks are plotted outside the normal quadrant and therefore a sextant graph may be more appropriate. This observation leads to the consideration of another visual representation and the solution was to develop a sextant graph.

The principle of six-by-six squares results in the square of any figure is the highest value for each risk and therefore the R^2 squared values as calculated in the table below.

Table 3-24: Risk and r and R^2 factor table.

Risk	Balance - Quantitative materiality.	Quadrant /Sextant (“z”)	‘r’ factor (Table 4-10) “m”	R^2 squared
SR	LM	6	3.0	36
SR	HM	5	2.5	25
HR	HM	4	2.0	16
HR	LM	3	1.5	9
LR	HM	2	1.0	4
LR	LM	1	0.5	1

Source: Swart (2013:113) adjusted with R^2 factor

The keys for the abbreviations in the table above are: SR = significant risk, HR = high risk, LR = low risk, HM = high material balance and LM = low material balance. The table above is a summary of the previous tables to illustrate the relationship between the sextants, materiality and risk. The risk sextant can be graphically illustrated in the following figure below.

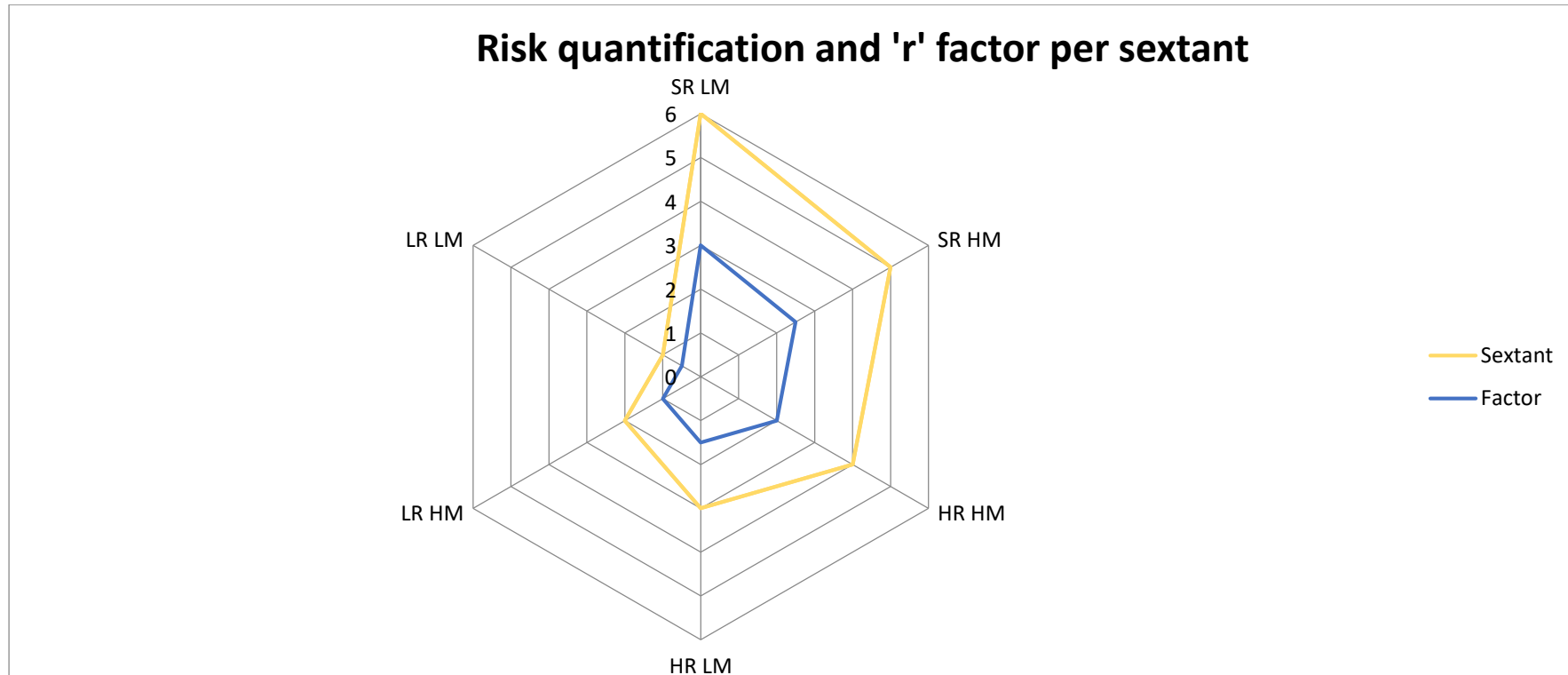


Figure 3-7: Risk quantification and 'r' factor per sextant

Source: Swart (2013:114) and Table 3-23 adjusted

The further the risk move away from the "0" or centre point the more audit effort is required to reduce the overall audit risk to a lower level.

3.5.6.5 Squared models

The sextant model above indicates that there are six different risk and materiality levels. The principle applied in literature therefore suggests that a table with 6 values on the X- and Y-axis respectively would result in 36 squares with each a unique value based on the block multiplied by the numbers that intersects that block. The following block illustrates the principle of X-axis multiplied by the Y-axis.

Table 3-25: Sextant squares

Likelihood/Risk	6	6	12	18	24	30	36
	5	5	10	15	20	25	30
	4	4	8	12	16	20	24
	3	3	6	9	12	15	18
	2	2	4	6	8	10	12
	1	1	2	3	4	5	6
		1	2	3	4	5	6
	Impact/Materiality of balance						

Source: Own interpretation, Table 3-6, 3-7, 3-8, 3-9, 3-10 and 3-23 adjusted

The table above is used to illustrate the combination of the heat mapping principle in the auditing environment. The higher the amount the more the values tend towards a red colour. The combination of the different balances and risk assessment according to Table 3.23 and 3.24 from the higher risk value to the lower risk value were combined as follows:

SR/LMB = 6
 SR/HMB = 5
 HR/HMB = 4
 HR/LMB = 3
 LR/HMB = 2
 LR/LMB = 1

The following table is the illustration of the colours that issued for heat mapping of the sextant matrix.

Table 3-26: Sextant squares heat mapped

Likelihood/Risk	6						36
	5					25	
	4				16		
	3			9			
	2		4				
	1	1					
		1	2	3	4	5	6
Impact/Materiality of balance							

Source: Own interpretation, Figure 3-10, Table 3-6, 3-7, 3-8, 3-9, 3-10 and 3-24 adjusted

As indicated above there is a diagonal line moving upwards towards the top right hand corner of the table for each value. The following table is a replacement of the qualitative risk levels of the sextant with the quantitative values above. The B after each of the materiality assessments indicate that the Low material balance = LMB while high material balance = HMB in the following two tables below.

Table 3-27: Sextant squares heat mapped per risk level

Likelihood / Risk	SR						SR LMB
	SR					SR HMB	
	HR				HR HMB		
	HR			HR LMB			
	LR		HR HMB				
	LR	LR LMB					
		LMB	HMB	LMB	HMB	HMB	LMB
Impact / Materiality of balance							

Source: Own interpretation, Figure 3-10 and Table 3-23 adjusted and tables and figures discussed above

Based on the figure above the following heat map principle is applied to present the risk levels that need more audit effort (in red) and the other where less audit effort should be focused.

Table 3-28: Sextant squares heat mapped in total

Likelihood/Risk	6	6	12	18	24	30	36
	5	5	10	15	20	25	30
	4	4	8	12	16	20	24
	3	3	6	9	12	15	18
	2	2	4	6	8	10	12
	1	1	2	3	4	5	6
		1	2	3	4	5	6
Impact/Materiality of balance							

Source: Own interpretation, Figure 3-10, Table 3-6, 3-7, 3-8, 3-9, 3-10, 3-23, 3-24, 3-25 and 3-26 adjusted

The conclusion that can be drawn from the table as well as the other tables before is that it is possible to combine quantitative and qualitative risk assessment and that the sextant audit risk models is in compliance with the ISAs.

3.5.7 Quantitative Mendelow inverse model

Swanepoel (2017:131) illustrates that the Mendelow matrix is useful to determine “stakeholders’ impact on decisions”. The author further states that by applying the inverse of the Mendelow matrix the stakeholder may determine the acceptability of the resulted score. The figure below is a graphical illustration of the stakeholder decision.

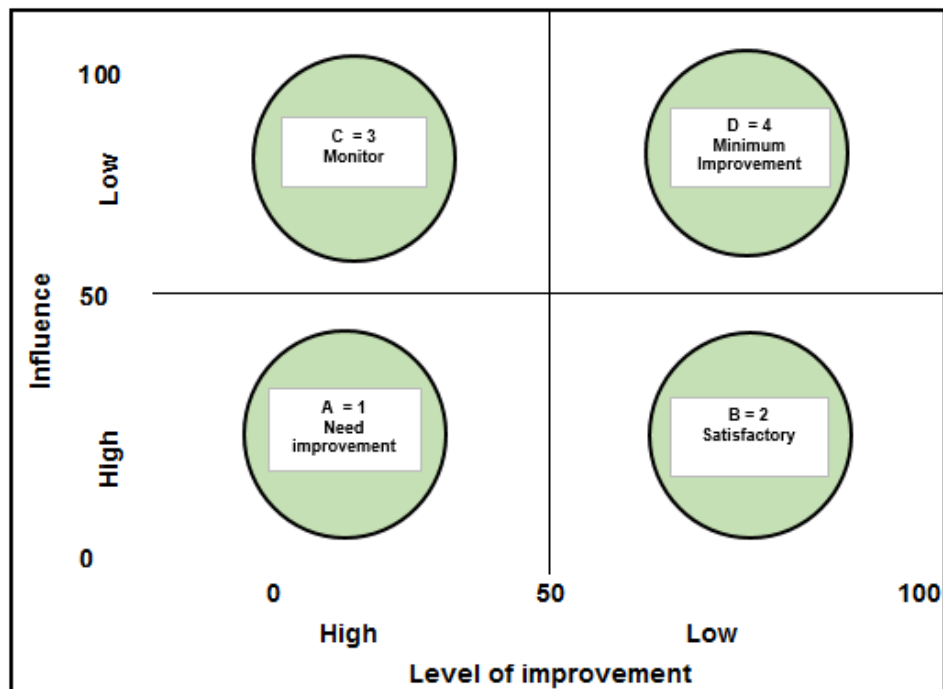


Figure 3-8: Contrawise Mendelow matrix

Source: Swanepoel (2017:241)

In this table above the lower the letter in the alphabet the number or value allocated to the number. This illustrate the closer the number moves towards 0% the more improvement and attention should be given.

3.5.8 Inverse sextant audit model

Swanepoel (2017:241) illustrates in the inverse Mendelow matrix that the bottom left hand corner is the critical area for the investor to focus and base decisions on. The description or responses indicate that the area needs improvement and therefore in auditing terms the most attention should be placed on the area. The same principle

is applied by inverting the sextant heat map to an inverse sextant heat map to illustrate the sample can be applied in financial decision-making and auditing.

Table 3-29: Inverse sextant squared heat map

Likelihood/Risk	1	6	5	4	3	2	1
	2	12	10	8	6	4	2
	3	18	15	12	9	6	3
	4	24	20	16	12	8	4
	5	30	25	20	15	10	5
	6	36	30	24	18	12	6
		6	5	4	3	2	1
Impact/Materiality of balance							

Source: Own interpretation, Figure 3-11, Table 3-25 and 3-27 adjusted

Dunn (1996:124) states one of the formulas of the audit risk model is as follows:

$$AR = IR \times CR \times DR \text{ (AR x SR).}$$

Equation 3-3

The conventional audit risk model is the following:

$$\begin{aligned}
 & AR = IR \times CR \times DR \\
 & \frac{AR}{DR} = \frac{IR \times CR \times DR}{DR} \\
 & \frac{AR}{DR} = IR \times CR \\
 & \frac{AR}{AR \times DR} = \frac{IR \times CR}{AR} \\
 & \frac{1}{DR} = \frac{IR \times CR}{AR} \\
 & DR = \frac{AR}{IR \times CR}
 \end{aligned}$$

Equation 3-4

The equation above therefore suggests that if the detection risk is calculated on the same method that the lower the detection risk is, the higher the audit risk will be. Therefore, the auditor should concentrate on the inverse detection risk models with specific attention to the lower figures. The factors indicated below is the values of the table above multiplied by 1/x as applied to the formula calculated above based on the values of Table 3-29 above.

Table 3-30: Detection risk based on the inverse of the risk number

Likelihood/Risk	1	0.167	0.200	0.250	0.333	0.500	1.000
	2	0.083	0.100	0.125	0.167	0.250	0.500
	3	0.056	0.067	0.083	0.111	0.167	0.333
	4	0.042	0.050	0.063	0.083	0.125	0.250
	5	0.033	0.040	0.050	0.067	0.100	0.200
	6	0.028	0.033	0.042	0.056	0.083	0.167
		6	5	4	3	2	1
Impact/Materiality of balance							

Source: Own interpretation, Figure 3-11, Table 3-27 and 3-28 adjusted

The graphical representation of the table above directs the auditor's attention to the left bottom corner of the matrix, which is consistent with the matrix suggested by Swanepoel (2017:241) that indicates that the stakeholders (investors, regulators, business leaders and the global accountancy profession) should focus more on the lower values. The stakeholders in this contexts refers to investors, regulators, business leaders and the global accountancy profession (Swanepoel 2017:19).

3.6 CONCLUSION AND RECOMMENDATION

The overall conclusion that can be drawn from the literature review above is that there are different models and levels available that can be tailored to fit each situation. The benefit of these models is that a model relevant to auditing can assist in the further development of the audit methodologies.

Literature is available for risk identification at financial statement level and the guidance is limited except for ISAs that explains the classes of transactions at the assertion level.

The auditing profession can adopt the principles from other risk management disciplines which will assist in alleviating the complexity of risk as a topic for auditors.

The combined qualification and quantification of risk is a more accurate but not precise method to plot risk and financial impact on a visual method that may be illustrated on one page.

The combination of the sextant model combined with the audit heat map matrix and the inverse detection risk model will guide the auditor to concentrate the audit effort appropriate between the different risk levels. This will assist the auditor to assess the risk appropriately. This is possible due to the fact that the higher the value of the combined risk and materiality assessment, except for low balances with a significant risk, the more audit attention should be given to that area.

The valuable information available in literature assists with the development of the sextant risk, inverse detection risk, “R²” model for audit risk assessment and the r-factor for sampling. These models are used to develop the integrated planning model. The advantages as discussed in Section 3.5.7.3 in the chapter above indicate that the sextant models are easier to apply and more consistent and accurate results are obtained. The model is in compliance with the ISAs as far as terminology is concerned. The models used in Table 3-3 and 3-4 have too many elements and uncertainties compared to the sextant model.

Further research should be published on risk identification at the classes of transactions level and balances and the assertion level. The guidance on risk assessment for auditors should be expanded to include a more concise model for different ratings and assessments.

The audit risk assessment should also be quantified to give validity to the statement that audit risk and materiality are inversely related. Materiality and risk should be considered in conjunction and materiality is determined quantitatively therefore risk should also be assessed the same way.

The next chapter addresses materiality consideration, benchmarks and comparison of JSE annual financial figures and materiality determinations and drives used to calculate materiality. The relationship between materiality and risk as part of the development of the audit risk model is part of the research in Chapter 4.

CHAPTER 4

AUDIT MATERIALITY AND SAMPLING

4.1 INTRODUCTION

In Chapter 3 the consideration of quantification of audit risk indicates that audit risk can be quantified due to the fact that materiality is also quantified. This chapter investigates the theoretical and empirical objectives stated in Chapter 1 which is to recommend, based on literature and theory, sample sizes to be used, linked to materiality and audit risk assessment. The inverse relationship between audit risk and materiality is discussed in Chapter 3 and the importance of audit materiality and sampling are discussed in this chapter.

The chapter discusses the following main topics:

- Defining and ISA requirements for audit materiality
- Materiality benchmarks used and available in literature
- Shareholder and investor expectations from investments and how materiality is related to the JSE-published information
- Comparison and statistical analysis and ratios between benchmarks and JSE-listed information
- Relationship of materiality and audit risk
- Materiality drivers
- Audit sampling
- ISA requirements for sampling
- Sampling benchmarks and methods used
- Steps in audit sampling process
- Sample sizes
- Statistical versus non-statistical sampling
- Sampling methods
- Relationship between audit materiality, risk and sampling
- Materiality and sampling as part of the integrated model
- Conclusion and recommendations

The items listed above are discussed below and the importance of this chapter is relevant for the development of the integrated planning model.

The importance of Mentz's (2014) research is also highlighted in this research as the integrated model on audit evidence, implemented by the Auditor-General South Africa's (AGSA) office, can be seen as a basis for linking audit planning and gathering audit evidence. The AGSA is the largest Auditing firm in South Africa, as large, medium and small audit firms, are contracted out to perform audits and other assurance services on the AGSA's behalf.

4.2 AUDIT MATERIALITY

The objective of this part of the research is to determine whether more current and appropriate numerical materiality benchmarks guidelines are available in literature.

Swart (2013:133) illustrates that, based on responses received on questionnaires to audit firms, that there is a lack of guidance on materiality and associated concepts. The results and conclusion are discussed further in Chapter 6, which is the analysis and interpretation of data chapter. Acito *et al.* (2009:680) and Keune and Johnstone (2012:1641) concur that the guidance relevant to materiality consideration is lacking. This lead to the statement that materiality consideration is complex and that audit firms make different interpretations to determine materiality.

Azzopardi and Baldacchino (2009:15-16) and Swart (2013:31) posit that materiality is a complex construct and is also significant to the audit process. Von Wielligh (2001:190) agrees with the abovementioned statement that materiality is complex though an important part of the audit process.

Researchers discuss and provide numerical guidance for materiality benchmarks since 1952, which is highlighted in Appendix 1 to 8 of the thesis. The discussion paper 6 (DP6), issued by SAICA in July 1984, suggests numerical benchmarks for materiality. Auditing textbooks published by academics such as Marx *et al.* (2016:8-27) still suggest these benchmarks. Literature since DP6 in 1984 suggest no new appropriate benchmarks for the determination of materiality.

Recent literature published by Edgley (2013:258-260), Edgley *et al.* (2014:5), Eilifsen and Messier Jr (2015:4,13), Jacoby and Levy (2016:14-18) Lo (2010:134) and Mentz (2014:94-99) discuss the issues regarding the history, definitions, importance and application of materiality and only one paper published by Eilifsen and Messier Jr (2015:4,13) discuss the quantitative materiality benchmarks applied. The conclusion that can be drawn is that limited research is available. The internet search (Google Scholar) includes the periods from 2014 to 2018 and the above-mentioned research were the only relevant topics published on audit materiality.

Edgley (2014: 257) state that the seminal research on audit and accounting materiality indicates that researchers deem materiality to be flexible and not properly defined or codified. Eilifsen and Messier Jr. (2015:4) and Keune and Johnstone (2009:20) support the statement that the quantitative materiality is assessed at various levels. Eilifsen and Messier Jnr. (2015:4 and 13) posit that the results, relevant to materiality, represents the benchmarks used by eight firms in the United States of America and is summarised in the table below.

Table 4-1: Conclusions on materiality application

Description	Element	No of firms	Range from	Range to
Quantitative benchmarks	Income before taxes	7 out of 8	3.00% to 5.00%	6% to 10%
	Income after taxes	1 out of 8	20.00%	20%
	Total assets	8 out of 8	0.25% to 0.50%	0.50% to 2.00%
	Total revenue	8 out of 8	0.50% to 1.00%	1.00% to 5.00%
	Net assets	6 out of 8	0.50% to 3.00%	1.00% to 5.00%
	Profit and loss before tax	4 out of 8	3.00% to 5.00%	6% to 10.00%
	Gross margin	1 out of 8	1.00%	2.00%
	Total equity	5 out of 8	1.00% to 3.00%	2.00% to 10.00%
	Cash flow from operations	1 out of 8	3.00%	5.00%
	Total expenses	1 out of 8	0.50%	2.00%
Qualitative factors		8 out of 8	N/A	N/A

Source: Eilifsen and Messier Jr. (2015:13)

The comments based on the table will be limited to the materiality benchmarks and the application of the quantitative figures applied above. The table above indicates inconsistencies between the number of firms that apply various benchmarks and further various ranges being used. The unexpected benchmarks were the high percentage for income after tax at 20% and the unexpected inclusion of cash flow from operations that are normally not a benchmark being used. The comparison between the benchmarks in the table above and the DP6 (1984) are discussed later in this chapter.

The relationship between DP6 (1984) guidelines and the published financial and ratios of JSE-listed companies for the periods from June 2012 to June 2017 is part of the secondary data analysed. The possibility of recommending possible adjustments to benchmarks is investigated.

Azzopardi and Baldacchino (2009:15-16) and Swart (2013:31) further state that the inverse relationship between audit materiality and risk complicates the materiality consideration. The audit materiality consideration has an influence on the nature, timing and extent of audit procedures.

Hanks (2012:18-20) states that materiality is of importance for integrated reporting and therefore forms part of financial reporting. It can be concluded from the above that materiality forms an integral part of the audit process and influences the audit procedures and financial reporting. The users of financial statements therefore also deem materiality to be an important issue as the audit report includes the phrase: *“free from material misstatement”*. It is therefore inferred that the users and investors can rely on the financial statements as there is no material misstatement. However, exceptions are made in so far as the economic decisions of the users are concerned, which is addressed in Section 4.2.1 below.

Keune (2010:21-31) and Swart (2013:34) further state that audit materiality should be considered as a quantitative as well as a qualitative measure, which complicates the materiality consideration further. The following part of the chapter discusses the definitions and requirement placed on the auditor to determine materiality.

4.2.1 Definitions and ISA requirements for materiality

Fisher (2002:385) and Garner (2004:1) define materiality relevant to evidence to be: *“an item of evidence is said to be material if it has some logical correlation to a fact of consequence to the outcome of a case. Materiality, along with probative value, is one of the two characteristics that make a given item of evidence relevant”*. The definition highlights the concepts of correlation, consequence and probability, which also relates to the risk assessment model discussed in Chapter 3. This further supports the relationship between audit risk and materiality.

The materiality concept is discussed in IFAC (2018h: ISA 320) and IFAC (2018j: ISA 450) and deals with the planning and performing of the audit and evaluation and identification of misstatements during the audit. The scope of this research is relevant to the planning of the audit and does therefore not include the misstatement at the conclusion of the audit. The research as far as IFAC (2018j: ISA 450) is concerned will be limited to only trivial errors as it is related to IFAC (2018h: ISA 320 par 10), which states that *“the circumstances related to some misstatements may cause the auditor to evaluate them as material even if they are below materiality, when evaluating their effect on the financial statements”*.

Materiality is a concept that is widely accepted to result in different interpretations and results. The results may be due to the fact that clear guidelines are not publically available in the ISAs. IFAC (2018h: ISA 320 par 2) and Marx (2016:8-26) define materiality in relation to the accounting framework as: *“misstatements, including omissions, are considered to be material if they, individually or in the aggregate, could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements. Judgments about materiality are made in light of surrounding circumstances, and are affected by the size or nature of a misstatement, or a combination of both, and Judgments about matters that are material to users of the financial statements are based on a consideration of the common financial information needs of users as a group”*.

IFAC (2018h: ISA 320 par 3) states that the auditor needs to apply professional judgement. The auditor therefore need to consider the error relevant to the financial statements and the user’s economic decisions should be taken into account. IFAC (2018h ISA 320 par 4) further states that the user should have knowledge of the business, make decisions based on the financial statements and are aware of the uncertainties involved in estimates made to present the financial statements. The user must therefore have a good understanding of the financial statements to base their economic decisions on.

The auditor may encounter classes of transactions that according to his/her judgement may be of a higher risk and therefore require more audit effort. In such instances the audit may apply a lower materiality, therefore a figure lower than the overall materiality. This lower materiality is referred to as performance materiality

and IFAC (2018h: ISA 320 par 9) defines it as: *“the amount or amounts set by the auditor at less than materiality for the financial statements as a whole to reduce to an appropriate low level the probability that the aggregate of uncorrected and undetected misstatements exceeds materiality for the financial statements as a whole.”*

IFAC (2018h: ISA 320 par 14) states that the auditor should document the following information relevant to materiality. The information should include [1] overall materiality, [2] materiality levels for different transactions and balances, [3] performance materiality and [4] any revisions to numbers [1] to [3]. Materiality for various classes of transactions are also referred to as performance materiality and are discussed in the following paragraph.

IFAC (2018g: ISA 315 par 9) defines performance materiality as: *“the amount or amounts set by the auditor at less than materiality for the financial statements as a whole to reduce to an appropriately low level the probability that the aggregate of uncorrected and undetected misstatements exceeds materiality for the financial statements as a whole. If applicable, performance materiality also refers to the amount or amounts set by the auditor at less than the materiality level or levels for particular classes of transactions, account balances or disclosures”*.

Christensen *et al.* (2015(a):) and Christensen *et al.* (2015(b):9) state that all respondents indicate performance materiality are set at the same or lesser level of the tolerable error level.

Guidance on the levels and benchmarks varies according to the literature. IFAC (2018h: ISA 320 par 14) suggests specific examples of benchmarks such as: *“categories of income, such as profit before tax, total revenue, gross profit, total expenses, total equity or net asset value”*. These examples are in line with the benchmarks suggested by Marx *et al.* (2016:8-27) and Rotaru (2006:2), which are discussed later as quantitative benchmarks.

4.2.2 Materiality at types of assertion level

The literature relevant to the business risk audit (BRA) indicates that audit at the assertion level should be reduced. Christensen (2015:62) and Public Company

Accounting Oversight Board (PCAOB 2014:4) reports on the deficiencies of the verification of revenue at the assertion level. PCAOB (2014:6) further reports that instances occur where insufficient evidence is gathered in respect of revenue. As previously indicated in Chapter 2 and 3 the management assertions are also applied by the auditor to evaluate the audit assertions and assertions can be seen as audit objectives. The definitions of the assertions also relate to audit risk as a risk is that the assertions are not correctly addressed.

IFAC (2018g: ISA 315 par A129) discusses the “*assertions about classes of transactions, account balances and related disclosures*” as two types of audit assertions and they are:

“Classes of transactions and events, and related disclosures, (par A129(a)) and Account balances, and related disclosures, at the period end (par A129(b))”.

PCOAB (2014:1) states that revenue is one of the significant drivers for the company’s operating results and that audit evidence gathered through audit sampling is not sufficient. The implication is therefore that the auditor should perform more test of control, substantive analytical procedures and tests of detail.

4.2.3 Materiality benchmarks used and available in literature

Libby and Brown (2013:649) and Del Corte (2010:463) conclude in their studies that the most frequently used benchmark is 5% of net profit before taxation. One of these firms in the research above applies 5% to 10% of income before taxes as a benchmark for public companies (Eilifsen and Messier Jr. 2015:13). The conclusion and validity for the use of net profit before tax as reported by Libby and Brown, Del Corte and Eilifsen and Messier Jr. (2015) are accepted as it best practice applied in almost all large audit firms that will be discussed in Chapter 6. These statements above are supported by the researcher’s experience in the review of more than one thousand engagement audits files since 2001. The observations are kept confidential as the past eleven years’ engagement file reviews were conducted on an external consultant basis that forms part of these observations.

The relevance of the benchmarks is discussed and compared later in this chapter. The comparison is based on secondary data of JSE-listed companies published

financial statement figures from June 2012 to June 2017 and the reasons for the use of net profit before tax as a benchmark forms part of the research. These figures are the most current available data at the time of the research.

Rotaru (2006:2) and Swart (2013:171-172) illustrates and concludes that the benchmarks, as represented and described by Marx *et al.* (2016:8-27) in the table below, are the most conservative and applicable benchmarks currently available. The high benchmark per indicator percentage for all, except for equity, divided by the lower benchmark results in a multiplier of two. The following table is a representation of materiality benchmarks with the adjustment of the multiplier in the last column.

Table 4-2: Quantitative indicators of materiality

Indicator	Benchmark			Multiplier
	Low		High	
Revenue	0.5 %	-	1 %	2
Gross profit	1 %	-	2 %	2
Net income	5 %	-	10 %	2
Total assets	1 %	-	2 %	2
Equity	2 %	-	5 %	2.5

Source: Marx et al: (2016:8-27), Rotaru (2006:2) adjusted by Swart (2013:36) with multiplier

The multiplier in the table above illustrates that the audit risk for a low versus a higher risk client is twice as much, which indicates that more audit effort should be invested in the higher risk and lower materiality benchmarks. This conclusion directly relates to the sample sizes that would be selected based on the risk level and materiality size. There is therefore an indication that audit materiality, risk and sampling are related and the relationship is discussed later in this chapter.

The literature published in DP6 (1984) and Eilifsen and Messier Jr. (2015:13) is separated by more than thirty years and the differences between the publications may give an indication whether the materiality benchmarks should be revisited. The information in Table 4-1 and 4.2 indicates different interpretations and levels and are

compared based on the number of instances that agrees to DP6 (1984) and is represented in the table below.

Keys: No agree = Number of firms that apply the same benchmarks as DP6 (1984)

No disagree = Number of firms that apply different benchmarks than DP6 (1984)

Table 4-3: DP6 (1984) benchmarks compared to Eilifsen and Messier Jr.

Indicator	Low			High		
Benchmark						
Balance	DP6	No agree	No disagree	DP6	No agree	No disagree
Revenue	0.50 %	5	2 = 1.00%, 1 = 0.80%	1.00 %	4	2 = 2.00%, 1 = 1.50%, 1 = 5.00%
Gross profit	1.00 %	1	N/A	2.00 %	1	N/A
Net income	5.00 %	5	2 = 3.00%	10.00%	6	1 = 6.00%
Total assets	1 .00%	0	1 = 0.25%, 3 = 0.50%	2.00 %	4	1 = 0.50%, 1 = 1.00%, 1 = 1.50%
Equity	2.00 %	2	2 = 1.00%, 2 = 3.00%	5.00 %	2	1 = 2.00%, 1 = 3.00%, 1 = 10%

Source: Table 4-1 and 4.2 above and Eilifsen and Messier Jr. (2015:13)

The conclusion that can be drawn from the above table is that the majority of firms selected in the 2015 research agree with the revenue benchmarks of 0.5% (5 out of 8) to 1% (4 out of 8), net income of 5% (5 out of 8) to 10% (6 out of 8), and total assets of 2% (4 out of 8). The application of gross profit as a benchmark is low at 1 out of 8 firms and no real consistency for equity as various observations are recorded in research. This supports the continued use of benchmarks as published by Marx *et al.* (2016:8-27) in auditing textbooks.

From the literature it is evident that various authors, listed in the table below, suggests various benchmarks and the following table serves as a summary of literature relevant to benchmarks suggested before the implementation of the Sarbanes-Oxley Act (SOX) (2002). The inconsistency between lower and the higher benchmarks is evident from the different percentages suggested since the first publication by Plumhoff (1952) as quoted by Rotaru (2006:2).

Table 4-4: Benchmarks suggested in literature before 2002

Author	0.2% to 10% of revenue	0.5% to 5% of gross profit	0.5% to 36% of net profits	3.3% to 36% of net profit	0.1% to 5% of total assets	0.1% to 10% of total assets	10% of total liabilities	10% of equity
Anderson [1977]	☑							
Bernstein [1967,1970]			☑					
Copeland and Frederick [1968]			☑					
Neumann [1968]			☑					
Thomas [1978];			☑					
Turley and Cooper [1991]	☑		☑	☑	☑	☑		
Plumhoff [1952];	☑							
Mitchell [1972];						☑	☑	☑
Towers [1986]	☑							
Carmichael [1969]		☑						
Woolf [1994]	☑			☑	☑	☑		

Source: Authors listed above

The benchmarks in Table 4-1, although very important, are excluded from the summary above as Table 4-1 is empirical research and a final conclusion on the benchmarks are not published.

The benchmarks in the table above indicate significant high percentages, such as 10% for Revenue and 36% for net profit, which may cause the auditor to obtain insufficient audit evidence. Literature published by various authors, as represented in Appendixs 1 to 8 attached to the thesis, indicates various benchmarks and multipliers that ranges from 1.5 to 500, which is a significant scope to select benchmarks from. The summary of the benchmarks is represented in the table below.

Table 4-5: Benchmarks in literature

Benchmark	Period	Lowest	Highest	Lowest multiplier	Highest multiplier	Total per period	Total
Total assets	Before SOX	0.1%	20.0%	2.0	100.0	11	
	After SOX	1.0%	10.0%	1.5	2.0	9	20
Net profit before tax	Before SOX	0.5%	36.0%	2.0	72.0	6	
	After SOX	0.0%	10.0%	1.0	500.0	12	18
Revenue	Before SOX	0.2%	10.0%	50.0	50.0	5	
	After SOX	0.5%	2.0%	1.5	4.0	9	14
Equity	Before SOX	0.0%	10.0%	100.0	100.0	1	
	After SOX	0.5%	5.0%	1.5	10.0	5	6
Gross profit	Before SOX	0.0%	10.0%	100.0	100.0	1	
	After SOX	0.5%	5.0%	1.5	10.0	5	6
Expenditure	After SOX	0.5%	2.0%	2.0	4.0	3	3
Current liabilities	After SOX	5.0 %	10.0%	2.0	2.0	1	1
Total liabilities	Before SOX	0.0%	10.0%	100.0	100.0	1	1

Source: Swart (2013:188 -190) and authors listed in Appendixes 1 to 8

The conclusion that can be drawn from the table above is that too many different benchmarks exist and the ranges between low and high multipliers are not consistent. The table above indicates and supports the conclusion that the benchmarks suggested

by DP6 (1984) Marx *et al.* (2016:8-27) and Rotaru (2006:2) are currently the most appropriate materiality benchmarks available.

The first three benchmarks suggested by DP6 (1984) and Marx *et al.* (2013:8-27) are a result or factors of revenue. Gross profit and net income are derivatives from revenue after expenses are taken into account. Too much reliance may be placed on the Statement of Comprehensive Income (SOI) elements and not enough on the Statement of Financial Performance (SFP) elements.

The following example illustrates that the indicators can also be expressed as a percentage of revenue as PCAOB (2014) indicates that revenue is a significant balance in most businesses. For the illustration a revenue of R1 million is used. The benchmarks per indicator were divided by the materiality indicator for revenue and expressed as a percentage of revenue. The percentage of revenue is then expressed as a materiality benchmark per indicator and are used as an example.

Table 4-6: Materiality indicators and calculation as a percentage of revenue

Indicator	Description	% of Revenue	% of Revenue	Materiality low	Materiality high
Revenue				5000	10000
Gross profit	Gross profit as % of revenue	50%	50%	2500	5000
Net income	Net income as % of gross profit	20%	20%	500	1000
Total assets	Total assets as % of revenue	50%	50%	2500	5000
Equity	Equity as % of revenue	25%	20%	1250	2000

Source: Own assumption

From Table 4-6 above it is evident that gross profit, Net profit, Total assets and equity represents at least 50%, 10%, 50% and 25% (for low and 20% for high materiality), respectively, of the indicators above. The example is used to compare and determine

the benchmarks and their relationships with the JSE-listed companies later in this chapter. The validity of the assumptions used in the table above are used to test the validity thereof in comparison with the JSE-listed companies' information.

4.2.4 Shareholder and investor expectations

This part of the chapter discusses the shareholder and investor expectations relevant to the JSE-listed company's published financial statements and which ratios are important for investors and shareholders. This research does not deal with the mathematical calculation of the different equations and models but is limited to the constructs or balances applied in these models. The importance of these ratios are then compared to the current materiality benchmarks to determine the relevance of the benchmarks.

Swanepoel (2017:140 and 188) posits that shareholders invest in a company to obtain growth in the company's value, profits, share prices and dividend yields. Investors invest in JSE-listed companies to grow their investment value and income by buying shares. Any negative fluctuation in the markets can cause the investor's investment value and income to decrease. Ahmad (2010:3) and Cassim (2014:12) state that the 2007 global economic crisis caused a significant negative impact on economic and social development of various countries. Stakeholders, customers and creditors were also affected by the crisis and lost value and income on their investments (Ahmad: 2010:1; Cassim: 2014:12).

Tuvadaratragool (2013:78) reasons that the financial statements are one of the main sources that assist the user or investor to analyse trends and financial ratios. The financial trends and ratios are useful to determine the performance and progress of the entity. The user or investor makes economic decisions based on the financial statements. IFAC (2018 IAS 1 par 9) states that the financial statements serve "*to provide useful information to a wide range of users in making economic decisions*". The items that are disclosed separately lead to the calculation of financial ratios to determine trends and performance of specific items. The published financial statements of the JSE-listed companies are therefore an indication of the benchmarks currently available

in the market and the auditor is also responsible for the audit opinions that is included in the financial statements of those entities.

The analysis of financial statements and the elements of the materiality benchmarks as part of the ratios are discussed in this part of the chapter. The objective of the comparison is to determine in which categories of financial statement analyses the elements of the materiality benchmarks are relevant and possibly propose other benchmarks that should be considered as part of the quantitative materiality benchmarks or as qualitative factors before materiality is calculated.

Moolman (2017:174) illustrates that the following models are applied as analytical procedures by the auditor since 2000. These models are “Du Pont analysis, economic value added (EVA), and Altman’s Z-score. Cassim (2014:69-71), Correia *et al.* (2010:5-21, 5-22, 5.23, 5.26) and Swanepoel (2017:254) list various financial ratios that are used to analyse and interpret financial statements. Correia *et al.* (2010:5-21) describes the Du Pont analysis as a “Structured ratio analysis” and the following main concepts and materiality benchmarks are covered.

Return on equity	(ROE)	Net profit/ Total assets	x	Total assets/Equity
		Net profit	/	Equity
Return on assets	(ROA)	Net profit/ Sales	x	Sales
		Net profit	/	Total assets

The equation above indicates that all materiality factors except for gross profit is included in above. The Du Pont model can therefore be seen as a measure of profitability and wealth creation (Correia *et al.* 2010:5-21).

Moolman (2017:177) describes the elements of EVA to be $ATOI - [WACC \times TA-CL]$, which is explained below:

ATOI = After tax operating income

WACC = Weighted average cost of capital

TA = Total assets

CL = Current liabilities

Swanepoel (2017:325) describes the elements of EVA to be $\text{NOPAT} - (\text{WACC} \times \text{CL})$, which is explained below:

NOPAT = Net operating profit after tax

WACC = Weighted average cost of capital

CL = Current liabilities

Although the models' equations differ the constant elements in both equations are [1] Net profit after tax, [2] weighted average cost of capital and [3] current liabilities of which only net profit after tax and equity which is part of WACC are elements of the standard materiality benchmarks.

A google scholar search on the "Altman Z-score" indicates the publication of nine current scholarly articles from 2017 to 2018 that indicates that the model is still as relevant as it was in 1968. Altman (1968:594) and Correia *et al.* (2010:5-23) state that the Altman model consist of the following formula that includes elements or balances listed below.

$Z = .012X1 + .014X2 + .033X3 + .006X4 + .999X5$ where

$X1 = \text{Working capital/Total assets}$

$X2 = \text{Retained earnings/Total assets}$

$X3 = \text{Earnings before interest and taxes/Total assets}$

$X4 = \text{Market value equity/Book value of total debt}$

$X5 = \text{Sales/Total assets}$

$Z = \text{Overall index}$

The only two new elements found in the model above is the working capital and book value of total debt and gross profit is not an element in the models above. Cassim (2014:32) and Moolman (2017:178) state that the model is to determine the company's failure or distress factors. It is therefore also important to consider the debt

management ratios of the companies as part of materiality to determine the company's future success.

Cassim (2014:228) lists the debt management ratios, which are debt/assets, debt/equity, cash flow/total debt as financial ratios that were investigated as part of the financial ratios that forms part of the ratio's to determine a company's success or failure. The cash flow and debt ratio forms a significant part of the business cash flow management and these balances or classes of balances do not form part of the current materiality benchmarks in research. The relevance between materiality benchmarks and JSE-published financial information forms part of the following discussion to investigate the relevance of the current benchmarks.

The ratios listed above do not form part of the materiality benchmarks that are used to audit financial statements and the consideration of materiality excluded the financial ratios on the success of companies as explained above. The expectation of the users of financial statements is on the wealth creation and growth of the company and therefore the future viability of the company. Cho *et al.* (2003:75) and Swart (2013:64) argue that the shareholder's materiality expectation would be a lower amount than what an auditor would consider. Based on the above the shareholders do expect a lower materiality level than what an auditor is applying in the audit. The auditor evaluates the variability of the company for the foreseeable future through the going concern assessment, which is not the same than the trends analysis discussed above. Swart (2013:66) states that materiality is not disclosed in the financial statement while the interviewees indicated that the materiality should be disclosed in the financial statements. The user of the financial statements and prospective investors would have a clear indication of what is seen as material. Currently the user of the financial statements may have a different opinion of materiality due to it not being disclosed and the expectation gap can be reduced if materiality is disclosed.

The purpose of the materiality benchmarks is limited to the study of the most used benchmarks and their relationship between current published information. The

investigation of materiality on the shareholder's investment decision and investment based on materiality is excluded from the research.

4.2.5 Relationship between materiality benchmarks and JSE-published information

The companies in South Africa are listed on the JSE and the published financial data and ratios are publicly accessible via the internet. Such data are known as secondary data and are public knowledge and not confidential. According to Cassim (2014:46) supported by Kumar (2014:196) and Struwig and Stead (2001:80) secondary data are publically available and various methods exist to obtain and apply this data. Data are exported or copied from the original source, the researchers analyse and communicate or report on such data.

The main board of the JSE lists the companies per sector. The information on Inetbfa (2017) indicate that there are 384 different company shares listed on the JSE. The financial statement information of listed companies for the years ending 30 June and 31 December are available on Inetbfa (2017) JSE financial statements ratios are also published for JSE companies. The table below is a summary of the information available on Inetbfa (2017) per sector.

Table 4-7: All FTSE/JSE shares

Basic materials			68
Basic resources (Total)		60	
Forestry and paper	4		
Industrial metals and mining	7		
Mining	49		
Chemicals		8	
Consumer goods			26
Consumer services			50
Financials			135
Health care			11
Industrials			69
Oil and gas			4
Technology			14
Telecommunications			6
Utilities			1
Total			384

Source: INETBFA (2017)

The financial sector is excluded from the population and does not form part of the sample and the information extracted as it is a specialised area. The total population of 1172 lines of data over a five-year period are extracted and analysed.

The data from the sectors form a basis for the analysis and comparison of the current benchmarks with publically available financial information over the past five years. The purpose of the research is to determine whether there are any trends or relationships between the standard theoretical benchmarks and the actual figures in the public listed companies in South Africa. Barac and Moloi (2010:20) evaluated a sample of the top 40 listed companies in their research. The sample size of 1172 lines of financial data for listed companies, in comparison to 40 companies is therefore more than sufficient to

draw conclusions from. The next part of the chapter explains the comparison and statistical analysis of the 1172 listed companies published information from June 2012 to June 2017 and the comparison between the materiality benchmarks and the current published financial information of listed companies.

4.2.6 Comparison and statistical analysis of the benchmarks and ratios between benchmarks

The SPSS 25 descriptive analysis is used to obtain a frequency table for the sample selected from the total population excluding the financial sector. The frequency table of available information indicates that the financial information for the remainder of the target population selected, the number of companies, varies between June and December year-ends. Consequently, a sample of 1172 items were selected for the five-year period as illustrated in the table below.

Table 4-8: Frequency table of listed companies year-ends

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	30-Jun-12	129	11.0	11.0	11.0
	31-Dec-12	73	6.2	6.2	17.2
	30-Jun-13	133	11.3	11.3	28.6
	31-Dec-13	70	6.0	6.0	34.6
	30-Jun-14	133	11.3	11.3	45.9
	31-Dec-14	74	6.3	6.3	52.2
	30-Jun-15	137	11.7	11.7	63.9
	31-Dec-15	73	6.2	6.2	70.1
	30-Jun-16	138	11.8	11.8	81.9
	31-Dec-16	73	6.2	6.2	88.1
	30-Jun-17	139	11.9	11.9	100.0
	Total	1172	100.0	100.0	

Source: SPSS 25 based on JSE-published information (INETBFA 2017)

The table below is a summary of the different balances for the past five years where the different benchmarks are compared to each other and combined to determine the positive relationship between various benchmarks. The coding consists of using abbreviations for the description of their relevant materiality benchmarks and are represented in the table below as follows:

Table 4-9: Abbreviations for benchmarks

Detail of code	Coding
No of companies reported on	No
Turnover and PL for year > 0	TOPL>0
Turnover and total assets > 0	TOTA>0
Turnover and equity > 0	TOE>0
Turnover and GP > 0	TOGP>0
PL for year and total assets > 0	PLTA>0
PL for year and equity > 0	PLE>0
PL for year and GP > 0	PLOGP>0
Total assets and equity > 0	TAE>0
Total assets for year and GP > 0	TAGP>0
Equity and GP > 0	EGP>0
TOTETAIPATGP Profit and loss for year > 0	TOTETAIPATGP > 0
TOTETAIPBTGP Inclusive profit and loss before tax > 0	TOTETAIPBTGP > 0

Source: Own emphasis

From the available information the data are filtered and all fluctuations and volatile information are excluded. The volatile information included all benchmarks with a zero or negative balance compared to another benchmark and a summary of the positive ratios between benchmark is represented below.

Table 4-10: Positive benchmarks per period

Date	No	TOPL >0	TOTA >0	TOE >0	TOGP >0	PLTA >0	PLE >0	PLOGP >0	TAE >0	TAGP >0	EGP >0	TOTET AIPAT GP > 0	TOTET AIPBT GP > 0
2012/06/30	129	108	123	121	116	110	109	108	127	129	116	106	108
2012/12/31	73	55	67	65	60	57	56	56	70	73	60	54	54
2013/06/30	133	101	126	123	114	102	102	101	130	133	113	100	100
2013/12/31	70	50	64	63	54	52	52	52	69	70	56	50	52
2014/06/30	133	102	126	125	114	103	103	100	132	133	114	100	102
2014/12/31	74	52	68	67	57	55	55	55	73	74	60	52	53
2015/06/30	137	108	129	129	117	110	110	108	135	137	119	107	108
2015/12/31	73	51	68	63	56	53	52	51	68	73	55	50	52
2016/06/30	138	110	136	135	119	111	111	108	137	138	119	108	110
2016/12/31	73	52	70	66	60	54	54	54	69	73	61	52	54
2017/06/30	139	107	136	135	119	108	108	105	138	139	118	105	106
Total for periods	1172	896	1113	1092	986	915	912	898	1148	1172	991	884	899

Source: INETBFA (2017)

The conclusion can be drawn that $TOPL > 0$, $PLOGP > 0$, $TOTETAIPATGP > 0$ and $TOTETAIPBTGP > 0$ indicate a lower frequency of positive balances than the other ratios. JSE-published company financial information includes negative balances such as profit and loss, gross profit and these figures should be excluded from the analysis of benchmarks.

The objective of this analysis is to determine whether correlations exist between the relevant benchmarks applied in practice as per DP6 (1984). The correlation between benchmarks for the period was determined by using SPSS 25 under analyse, correlate, bivariate option and the table below indicates the results of benchmarks including profit before tax and the following benchmarks relevant to the JSE information.

Table 4-11: Correlations between benchmarks including profit before tax

		TO	GP	PBT	TAII	TE
TO	Pearson Correlation	1	.440**	.156**	.839**	.711**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	1172	1172	1172	1172	1172
GP	Pearson Correlation	.440**	1	.866**	.748**	.813**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	1172	1172	1172	1172	1172
PBT	Pearson Correlation	.156**	.866**	1	.420**	.488**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	1172	1172	1172	1172	1172
TAII	Pearson Correlation	.839**	.748**	.420**	1	.965**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	1172	1172	1172	1172	1172
TE	Pearson Correlation	.711**	.813**	.488**	.965**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	1172	1172	1172	1172	1172

** . Correlation is significant at the 0.01 level (2-tailed)

Source: INETBFA (2018) and SPSS25

Keys used in Table 4-11 above

TO	Turnover
GP	Gross profit
PBT	Profit and loss before interest and tax
TAII	Total assets including intangible assets
TE	Total equity

The conclusion drawn from the table above indicate that there is a significant correlation between TO, GP, PBT, TAIL and TE at the 0.01 level (2-tailed) and therefore indicate that the materiality benchmarks are relevant compared to the JSE-published financial information.

The correlation between benchmarks for the period was determined by using SPSS 25 under analyse, correlate, bivariate option and the table below indicates the results of benchmarks including profit before tax and the following benchmarks relevant to the JSE information.

Table 4-12: Correlations between benchmarks including profit after tax

		TO	GP	PAIT	TAIL	TE
TO	Pearson Correlation	1	.440**	.050	.839**	.711**
	Sig. (2-tailed)		.000	.084	.000	.000
	N	1172	1172	1172	1172	1172
GP	Pearson Correlation	.440**	1	.787**	.748**	.813**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	1172	1172	1172	1172	1172
PAIT	Pearson Correlation	.050	.787**	1	.288**	.360**
	Sig. (2-tailed)	.084	.000		.000	.000
	N	1172	1172	1172	1172	1172
TAIL	Pearson Correlation	.839**	.748**	.288**	1	.965**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	1172	1172	1172	1172	1172
TE	Pearson Correlation	.711**	.813**	.360**	.965**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	1172	1172	1172	1172	1172

** . Correlation is significant at the 0.01 level (2-tailed).

Source: INETBFA (2018) and SPSS25

Keys used in Table 4-12 above

TO	Turnover
GP	Gross profit
PAIT	Profit after tax
TAIT	Total assets including Intangible assets
TE	Total equity

The conclusion drawn from the table above indicates that there is a significant correlation between TO, GP, TAIL and TE at the 0.01 level (2-tailed) and therefore indicate that all but one materiality benchmark are relevant compared to the JSE-published financial information. The exception to the conclusion above is that there is no relationship between the four benchmarks listed above and the profit after tax indicator.

The assumption as stated in Table 4-6 relevant to the percentages of materiality benchmarks will be compared to the relationship between the values or balances on the JSE-published information as a percentage of turnover. The relationship for all balances per period are summarised and represented in the following two tables below. The keys used in the table are listed below.

Keys used in Table 4-13 and 4.14 below

GP	Gross profit
PLFY	Profit and loss for the year
PLBT	Profit and loss before interest and tax
TAECIT	Total assets excluding Intangible assets
TAINCIT	Total assets including Intangible assets
EQ	Total equity

The reasons such as economic factors that influence the profit and losses between periods and the cyclical type of business and individual company's performance are excluded from this research. The qualitative reasons for the differences indicated in the tables below between the highest to lowest and average benchmarks for the relevant periods do not form part of the research as the objective is to determine the different and average ratio's between different benchmarks over the different financial periods.

Table 4-13: Values as a percentage of turnover for all balances per period

Date	GP	PLFY	PLBT	TAECIT	TAINCIT	EQ
2012/06/30	25%	12%	18%	114%	125%	68%
2012/12/31	10%	4%	5%	87%	97%	41%
2013/06/30	23%	10%	15%	128%	139%	75%
2013/12/31	8%	2%	3%	97%	108%	45%
2014/06/30	25%	12%	17%	132%	144%	80%
2014/12/31	11%	4%	6%	97%	108%	43%
2015/06/30	21%	7%	11%	154%	170%	97%
2015/12/31	7%	-2%	-1%	118%	132%	46%
2016/06/30	17%	1%	2%	144%	158%	85%
2016/12/31	13%	4%	6%	98%	114%	45%
2017/06/30	26%	10%	14%	147%	162%	92%
Average	15%	5%	8%	116%	129%	61%

Source: Own research based on Inetbfa (2017)

The following conclusions can be made on the JSE-listed information expressed as a percentage of turnover.

The GP percentage range from 7% to 26% with an average of 15%.

The PLFY percentage range from -2% to 12% with an average of 5%.

The PLBT percentage range from -1% to 18% with an average of 8%.

The TAECIT percentage range from 87% to 154% with an average of 116%.

The TAINCIT percentage range from 97% to 170% with an average of 129%.

The EQ percentage range from 41% to 97% with an average of 61%.

Table 4-14: Values as a percentage of turnover for positive balances per period

Date	GP	PLFY	PLBT	TAECIT	TAINCIT	EQ
2012/06/30	25%	12%	18%	114%	125%	68%
2012/12/31	10%	5%	6%	87%	97%	41%
2013/06/30	24%	11%	16%	128%	139%	75%
2013/12/31	9%	4%	6%	97%	108%	45%
2014/06/30	25%	13%	17%	132%	144%	80%
2014/12/31	12%	4%	6%	97%	108%	43%
2015/06/30	21%	8%	12%	154%	170%	97%
2015/12/31	9%	4%	5%	118%	132%	46%
2016/06/30	17%	5%	7%	144%	158%	85%
2016/12/31	13%	5%	7%	98%	114%	45%
2017/06/30	27%	10%	14%	147%	162%	92%
Average	16%	7%	9%	116%	129%	61%

Source: Own research based on Inetbfa (2017)

The following conclusions can be made on the JSE-listed information expressed as a percentage of turnover.

The GP percentage range from 9% to 27% with an average of 16%.

The PLFY percentage range from 4% to 13% with an average of 7%.

The PLBT percentage range from 5% to 18% with an average of 9%.

The TAECIT percentage range from 87% to 154% with an average of 116%.

The TAINCIT percentage range from 97% to 170% with an average of 129%.

The EQ percentage range from 41% to 97% with an average of 61%.

The conclusion drawn from the table above is that the percentages for TAECIT, TAINCIT and EQ are not influenced by negative figures and the ratio as a percentage of turnover do not differ. The differences are relevant between the GP, PLFY and PLBT expressed as a percentage of turnover due to negative balances disclosed in the published financial statements. This again illustrates that the volatile amounts should be ignored as part of the audit materiality consideration.

Furthermore, the assumption made in Table 4-6, 4-12 and 4-13 indicate that the correlation as a percentage of turnover varies and the assumption made in Table 4.6 is not valid as the predicted amounts set is higher than the actual ratios found in Table 4.13 regarding the different elements as a percentage of turnover for each six month period.

4.2.7 Materiality drivers

Swart (2013:57) concludes that the materiality driver should be based on the type of industry. The theory to support this conclusion was developed based on judgement sampling and a summary of qualitative factors of listed companies' key features and directors' report on one JSE company per sector. The qualitative data were applied to a case study for each sector and the results differentiate between the materiality drivers that are applicable for each type of industry and therefore the sector in which it operates (Swart 2013:56-61).

Swart (2013:57) suggests the following examples of, as represented in Table 4-15, materiality drivers based on the type of industry and the nature and size of the company. Cassim (2014:56, 96) applied the principle of the materiality driver and converted the materiality driver to a business driver in the research to determine the failure and non-failure of companies based on their financial results. The materiality driver was therefore successfully applied in disciplines other than auditing and the conclusion can therefore be drawn that materiality drivers are important when selecting audit materiality. The qualitative factors as indicated in the example below should also be considered and not only the quantitative benchmark.

Table 4-15: Materiality drivers

Industry	Primary driver	Secondary driver
Wholesaler/Retailer Refer Appendix 1	Cash sales and therefore revenue	Inventory gross profit margin or working capital
Transport company refer to Appendix 2	Assets	Revenue and expenses
Construction company refer to Appendix 3	Income	Total assets
Consulting and service company refer to Appendix 4	Income and quality of staff	
Property Companies refer to Appendix 5	Property	Revenue and expenditure

Source: Swart (2013:57-60) adjusted

IFAC (2018h ISA 320 par A3) suggests that the determination of materiality involves *“the exercise of professional judgement. A percentage is often applied to a chosen benchmark as a starting point to determine materiality for the financial statements as a whole”*. Factors that may affect the identification of an appropriate benchmark include the following:

- Elements of the financial statements
- Whether there are items on which the attention of the users of the particular entity’s financial statements tend to be focused.
- The nature, life cycle, industry and economic environment of the entity
- Ownership and financing structure including debt
- The relative volatility of the benchmark

IFAC (2018h ISA 320 par 10, A7) states that the auditor should apply professional judgement when determining the appropriate materiality percentage. It is further stated that the higher or lower percentages should be applied based on relevant circumstances. Auditor should therefore focus their minds to determine the materiality benchmark and the high benchmark should be used for lower risk clients and vice versa for higher risk clients.

4.2.8 Other materiality considerations

The qualitative aspects of materiality should also be considered. Del Corte *et al.* (2010:460) state that IFAC (2018j ISA 450) includes qualitative materiality factors (QMF) that should be considered during the audit. Del Corte *et al.* (2010:463) quotes

seven other researchers that also conclude that where there is a trend or fluctuation in earnings or earnings per share that it is considered material or should be considered. Further indicators of QMF is ratios such as economic factors, financial position of the company such as working capital and leverage.

Del Corte *et al.* (2010:463) conclude that there are conflicting opinions regarding the qualitative benchmarks and states that prior literature is vague with regard to materiality. It is further suggested that the release of IFAC (2018j ISA 450 par A16) assisted with the identification of QMF's. It can therefore be suggested that auditors should consider the QMF's listed as a qualitative materiality factor during the planning process as well.

The responses from the research performed by Eilifsen and Messier Jr. (2015:13) indicate that tolerable error and trivial materiality were consistent between seven of the eight firms. The weighted average of the benchmarks is calculated based on the number of responses multiplied by the percentage ((Example (7 x range from) + (1 x range to)/ number of firms = 8)).

Table 4-16: Weighted average responses

Description	No of firms	Range from	Range to
Tolerable misstatement	7 out of 8	50.00%	70.00%
	1 out of 8	70.00%	90.00%
Weighted average	8 out of 8	52.50%	72.50%
Clearly trivial	7 out of 8	3.00%	5.00%
	1 out of 8	5.00%	8.00%
Weighted average	8 out of 8	3.25%	5.38%

Source: Eilifsen and Messier Jr. (2015:13)

The conclusion that can be drawn from above is the acceptable percentages are between 52.50% to 72.50% and 3.25% to 5.38% for tolerable misstatement and trivial materiality, respectively. This conclusion is compared to the results of the questionnaire administered and the interpretation of the data in Chapter 6.

4.2.9 Conclusion on audit materiality

Materiality is a complex process as it is not as easy to choose the amount based on experience. Various factors such as the performance of the company, the volatility of the financial statement balances and qualitative factors should be considered.

The most appropriate benchmarks found in literature is currently DP 6 (1984) as supported by various other research listed above. The following part of this chapter forms part of the planning of audit sampling stage as part of the theoretical and empirical objectives as listed in Chapter 1.

4.3 AUDIT SAMPLING AND AUDIT PLANNING

4.3.1 Introduction

Zuca (2013:193) posits that audit sampling is based on the level of audit risk. The sampling methods should be considered during the planning process and based on the materiality level. It is therefore important to determine the type and size of audit sampling during the planning process. Mentz (2014:19) states that there is a direct relation between materiality and the extent of audit evidence. Audit planning should therefore include sampling as part of planning. Contrary to these statements the ISAs are classified into various categories or stages of the audit and IFAC (2018n ISA 530) classifies the audit sampling ISA under the audit evidence category and therefore form part of gathering of audit evidence, part of the audit. Mentz (2014: 192) supports the fact that audit sampling forms part of the gathering of audit evidence stage of the audit but due to the assurance model is also related to risk, which is part of the planning process.

The objective of this part of the chapter is to determine the relationship between audit risk, materiality and audit sampling as elements of the planning stage of an audit. The research relevant to audit sampling is to indicate provisional sample sizes during the planning process and not be prescriptive on gathering audit evidence. Dunn (1996) is a source that is frequently used based on the fact that the risk-based audit approach and the sample size equations are integrated in the text book. Further research, where available, will be included in this chapter to compare Dunn's (1996) equations applied to other literature. The research is not extended to the

detail of audit sampling methods and conclusion on audit differences as it does not form part of the planning process. Reference is made to the sampling methods but detail discussions is outside the scope of the research.

The literature and empirical research also include the definitions and ISA requirements relevant to audit sampling. An auditor should comply with ISAs and a comparison between ISAs and literature should be performed to test the compliance of literature with ISAs. An analytical review can be used as an effective sampling tool, which is discussed below.

Analytical review procedures are performed at the planning, gathering of audit evidence and completion stage of an audit (IFAC 2018g ISA 315 par A14; IFAC 2018l ISA 520 par 5, 6). The importance of analytical review procedures are limited to the planning stage and the test of controls and substantive procedures in the gathering of evidence stage are limited to the audit sampling principles. The objective of the research is to determine the sample sizes for planning purposes to indicate to the auditor, the expected sample based on materiality level and sample sizes. The sample sizes of test of controls and substantive procedures, specifically, test of detail will form part of the research.

Seminal research published by Stringer (1975:1) states that the statistical methodology is a research topic and Tatum (1986) identifies the problems with audit sampling. The research indicates that the audit sampling issues are not resolved over the past thirty to forty years. Audit sampling is therefore a contentious topic since 1975 and papers are still currently published in journals. This indicates that the interpretation and guidance on ISAs still requires further clarification.

The results from the figure below indicate that the research on audit sampling is a continuous research topic and supports the statement made in the previous discussion. A Google search and Hazing's Publish and Perish Version 4 is employed to determine the number of articles published in the decades ending 1979 to 2018 and the results are represented in the figure below.

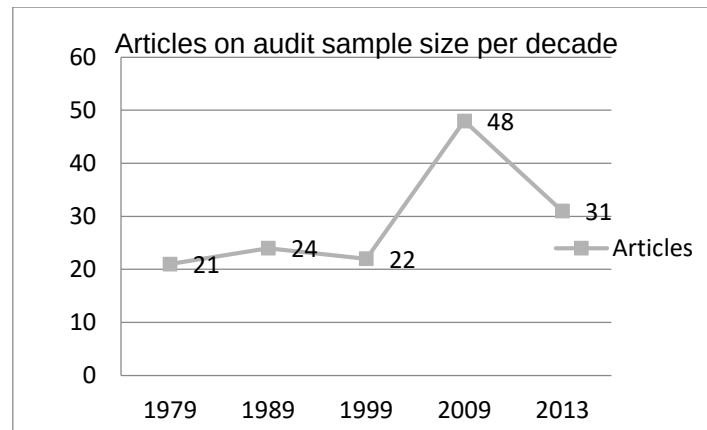


Figure 4-1: Articles on audit sample size per decade

Source: Harzing Publish or Perish Google scholar

According to the illustration below there is a relationship between risk and sample size. The illustration in Figure 4-2 according to Dunn (1996:198) also suggests that tolerable error should also be taken into account in the consideration of sample parameters.

Sample size

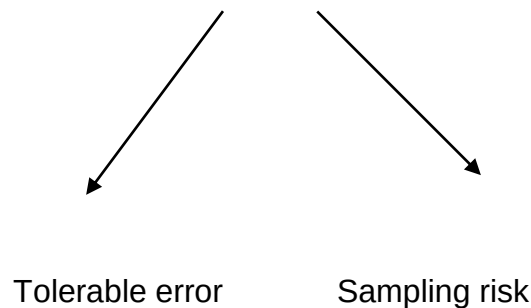


Figure 4-2: Sample parameters

Source: Dunn (1996:198)

It can be concluded from the figure above that the risk that an error may occur and the risk that the sample may not achieve the audit objective are part of the auditor's risk management process as discussed in Chapter 3.

Kinney (1972:407) commented on the evaluation made by Ijiri and Kaplan (1972) on his suggestion that the protective and corrective sampling are invalid regarding the auditors' behaviour. He further suggested that auditors have a tendency to sample

more in the control areas where high value and high error items are found. A further statement is made that the samples also cover the areas with “*little potential significance*”. The term referred to currently refers to “*trivial materiality*” in ISA 450 and is also widely used in public practice for clearly insignificant items.

4.3.2 Definitions and ISA requirements for sampling

As indicated in Chapter 3 and 4 above, materiality and audit risk are interrelated. Probability relates to risk, audit procedures and audit sampling. It is suggested that materiality, risk and sampling should be considered simultaneously as all of them individually has an impact on the other. Zuca (2013:193) states that statistical sampling is based on probability and therefore links with audit risk and materiality.

IFAC (2018m ISA 530 par 4) states that “the objective of the auditor when using audit sampling is to provide a reasonable basis for the auditor to draw conclusions about the population from which the sample is selected”. The auditor’s objective for sampling is therefore to determine that the sample represents the total population and each items has the same chance of being selected (Zuca 2013:193; Christensen 2015:62).

IFAC (2018n ISA 530 par 5(a-b)) defines audit sampling and population as:

“Application of audit procedures

- *on less than 100% of the population;*
- *such that all sampling units have a chance of selection;*
- *in order to provide the auditor with a reasonable basis and*
- *on which to draw conclusions about the entire population”.*

b) Population *“The entire set of data from which the sample is selected and about which the auditor makes a conclusion as the entire set of data”.*

As the auditor does not test the full population there is a risk that the items selected through the sampling process is not representative of the population, which may result in audit sampling risk, which is defined below.

IFAC (2018n ISA 530 par 5(c)) defines sampling risk as:

“The risk that the auditor’s conclusion based on a sample may be different from the conclusion if the entire population were subjected to the same audit procedure. Sampling risk can lead to two types of erroneous conclusions:

(i) In the case of a test of controls, that controls are more effective than they actually are, or in the case of a test of details, that a material misstatement does not exist when in fact it does. The auditor is primarily concerned with this type of erroneous conclusion because it affects audit effectiveness and is more likely to lead to an inappropriate audit opinion.

(ii) In the case of a test of controls, that controls are less effective than they actually are, or in the case of a test of details, that a material misstatement exists when in fact it does not. This type of erroneous conclusion affects audit efficiency as it would usually lead to additional work to establish that initial conclusions were incorrect”.

The definitions above indicate that the sample should be representative of the population and even then the sample selection has a risk that with a test of controls and test of detail an incorrect conclusion can be drawn. The highlights test of controls and test of detail as prominent sampling tests. The sample sizes of the different audit tests are discussed later in this chapter.

4.3.3 Statistical versus non-statistical sampling

Munteanu, Zamfir and Florea (2018:125) pose the question whether statistical or non-statistical sampling should be applied during the audit of financial statements. Elder *et al.* (2013:111) state that international auditing standards issued by AICPA (2012a:14 par 2.24) allow the auditors to apply both sampling methods. Elder *et al.* (2013:111) further state that both methods require judgement during planning. AICPA (2012a:14 par 2.24) and Christensen *et al.* (2015a:66) state that the results based on a proper designed non-statistical sample can be as effective as a statistical sample and the sample sizes should be almost equal. Elder (2013:111) concludes that legal damages are larger where non-statistical sampling is used.

Munteanu *et al.* (2018:125) defines statistical sampling as *“the selection method based on probability, whereby each unit of the total population has equal chances of being included in the sample. The results of applying this method are statistically*

assessable, the auditor can determine whether the evidence obtained is sufficient and the sampling risk can be quantified". Munteanu et al. (2018:125) further define non-statistical sampling as "the auditor uses simple professional reasoning to select sample items. Although sample units with representative characteristics for the population concerned are chosen, the results of the sampling test cannot be extrapolated to the whole population but are only applicable to the units tested".

Guy et al. (2002:36) support Munteanu et al. (2018:125) by stating that non-sampling cannot be measured. They conclude that sampling risk based on statistical sampling can be measured and controlled. Reasoning for either sampling methods are required.

Statistical sampling requires from auditors to indicate their judgements and the sample size is based on statistical methods and therefore more time intensive and costly. The staff does not need to understand the theory of calculating samples for statistical sampling. The UK places larger emphasis on qualitative judgements while the USA tends to apply more scientific methods (Zuca 2013:195). Hall, Hunton and Pierce (2002:128-129) conclude that 85% of their 223 respondents indicated that non-statistical sampling methods are applied in audits.

The conclusion can be made from literature that no matter which methods are applied the need for effective and same type of audit procedures will be the same (Christensen et al. (2015a:66); Elder et al. (2013:111-113); Munteanu et al. (2018:125); Zuca 2013:195). The literature above does not provide preference for either methods and it appears that non-statistical sampling are applied as AICPA (2012a) allows the method.

Due to the conclusion above, the calculation of the mathematics of the sample size or formulas used does include complex statistical formulas as non-statistical sampling are commonly used as a sampling method.

4.3.4 Sample size consideration or formula used

Standard auditing practices or guidelines are still applied in practice. Hoogduin et al. (2010:137) and Mentz (2014:193) state that practitioners apply the American Institute of Certified Public Accountants, Inc. (AICPA 2012b) levels of assurance. AICPA

(2012b) and Christensen *et al.* (2015(a):64), Da Silva and Carreira (2013:54, 57, 59), Rossner and Glynn (2011:647-650) and Stringer (1975:3) indicate that complex algorithms and formulas are used to calculate sample sizes, tolerable error and expected error rates. Christensen (2015:63) administered a questionnaire to the leading sampling experts of the firms that formed part of his research that also supports the complexity of the sample sizes that are currently being used.

Mentz (2014:293) reasons that computer software such as ACL can be applied to calculate sample sizes based on the confidence level. Christensen *et al.* (2015(a):65) and Da Silva and Carreira (2013:6) assert that firms use computerised audit sampling models. The constructs included in these models and manual models are [1] tolerable misstatement (tolerable error), [2] trivial misstatement, [3] confidence level, [4] confidence interval and [5] precision interval (Christensen *et al.* (2015(b):8-11; Mentz 2014:293).

Eilifsen *et al.* (2010: 269,297) and Mentz (2014:239) define tolerable misstatement or deviation rate as: *“the maximum error in a population that the auditor is willing to accept. More specifically, tolerable misstatement is the maximum amount by which a class of transactions, account balance or disclosure can be misstated and still be acceptable to the auditor as being fairly stated. Tolerable misstatement is the application of and equates to materiality for sampling applications”*.

Literature indicates, that according to the authors listed in the table below, that there are consistent use and relationships between audit materiality risk and audit sampling. The following table represents a summary and comparison between the constructs that are related.

Table 4-17: Related constructs

Construct			
Author	Audit risk	Audit materiality	Audit sampling
Tolerable misstatement (tolerable error)			
Christensen et al. (2015:70)	☐	☒	☒
Dunn (1996:212)	☐	☐	☒
Eilifsen and Messier Jr. (2015:4,8)	☐	☒	☒
Elder et al. (2013:119)	☒	☒	☒
Mentz (2014:239)	☐	☒	☒
Ruhnke and Schmidt (2014:251)	☒	☒	☐
Zuca (2013:196-197)	☒	☒	☒
Trivial misstatement			
Eilifsen and Messier Jr. (2015:4,8)	☐	☒	☒
Confidence level			
Elder et al. (2013:119)	☒	☐	☒
Dunn (1996:213)	☒	☐	☒
Mentz (2014:245)	☒	☐	☒
Confidence interval			
Christensen et al. (2015:70)	☐	☒	☒
Precision interval			
Glover et al. (2005: 200)	☐	☐	☒
Mentz (2014:116,215,217-227)	☐	☐	☒
Sample size/Planning sample			
Budescu et al. (2012:27)	☒	☒	☒
Hall et al. (2002:125)	☐	☐	☒
Mentz (2014:250)	☒	☒	☒

Source: Authors listed above

Dunn (1996:212) and Zuca (2013:194) suggest that the Poisson distribution should be used “to calculate a series of reliability factors (R-factors)” resulting in a table for estimating the true distribution conditionally on the following being present:

- Large population
- Low error rate

The following equation is suggested for the determination of the R-factor by Dunn (2016:212) and Zuca (2013:194):

$R = \text{Sample size} \times \text{tolerable error}$, where;

R = Reliability factor

Equation 4-1

Literature on sampling as discussed later in the chapter indicates that tolerable error and confidence level influence the sample sizes. The sample size is further influenced by the expected sampling error that may arise during the audit (Christensen *et al.* (2015a:66, 70; Christensen *et al.* 2015b:9, 11; Dunn 1996:213-214; Elder *et al.* 2013:111). Dunn (1996:213) suggests the following error rates based on the confidence levels and number of sampling errors as represented in the table below.

Table 4-18: Tolerable error

Number of sample errors	Confidence levels		
	80%	90%	95%
0	1.61	2.31	3.00
1	3.00	3.89	4.75
2	4.28	5.33	6.30
3	5.52	6.69	7.76
4	6.73	8.00	9.16

Source: Dunn (1996:213)

The conclusion can be drawn from the table above is that the auditor can state with confidence that the rate of non-compliance based on sample errors in Table 4-18 above is therefore less as the compliance deviation rate decreases as illustrated in the following table.

Table 4-19: Compliance deviation percentage

Confidence levels						
Number of sample errors	80%		90%		95%	
		% Compliance deviations		% Compliance deviations		% Compliance deviations
0	1.61	5.37%	2.31	7.70%	3.00	10.00%
1	3.00	10.00%	3.89	12.97%	4.75	15.83%
2	4.28	14.27%	5.33	17.77%	6.30	21.00%
3	5.52	18.40%	6.69	22.30%	7.76	25.87%
4	6.73	22.43%	8.00	26.67%	9.16	30.53%

% Compliance deviations = Tolerable error/ sample size

Source: Table 4-17 adjusted

In this example as discussed earlier in Chapter 4, the sample size is determined to be 30 items as it is the common factor in all calculations and conclusions. This sample size is mostly used for tests of control and statement of comprehensive income items. Dunn (1996:215) and Mentz (2014:250) suggest that the sample size can be calculated as follows:

$$\text{Sample size} = \frac{\text{population value}}{\text{Materiality}} \times r$$

Equation 4-2

Table 3-19 to 3-21 indicate that the sextant approach forms part of audit sampling and therefore the following formulas are relevant as discussed in Chapter 3.

Dividing the quadrant or sextant (Q) by the multiplier (M) resulted in the following equation:

$$Q \div M = r\text{-factor}$$

Equation 4-3

Multiplying the quadrant or sextant (Q) by the Probability (P) result in the following equation:

$$Q \times P = r\text{-factor}$$

Equation 4-4

Various methods are applied to determine the sample size for a method of gathering audit evidence to perform audit procedures. The types of audit procedures are discussed below.

$$\text{Tolerable error} = \frac{R}{\text{Sample size}}$$

Equation 4-5

Source: Zuca (2013:194)

As identified in the problem statement in Chapter 1, there are no guidelines for the calculation of materiality. Dunn (1996:199) argues that there is no guideline to determine the materiality benchmark relevant to the level of testing or sample selections. The auditing firms will therefore apply different materiality and the number (extent) of items will be tested. Turley and Cooper (1991) as quoted by Dunn (1996:199) conclude that the research performed on 21 auditing firms indicate that the influence of the tolerable error on reporting materiality were only observed in 9 out of the 21 firms (43%). The nine firms differentiate between materiality for testing and reporting materiality. The following seven approaches to materiality relevant to the quantification of tolerable error are listed by Dunn (1996:199):

- a. *“Five per cent to 10 per cent of income before tax;*
- b. *a variable percentage of gross profit, with the percentage rate decreasing as gross profit percentage increases;*
- c. *percentage of assets;*
- d. *one per cent of equity;*
- e. *one half per cent of turnover;*

- f. the average of items (a) to (e) and
- g. a variable percentage of turnover. This approach is similar to Grant Thornton's manual used in (1985)".

The most firms apply net profit as a benchmark but in a year that the company results indicate a low profit the materiality figure may be extraordinarily low (Dunn 1996:199). It is therefore suggested that a primary and secondary benchmark should be considered in extreme circumstances to counteract the extreme low materiality figure as discussed above.

The conclusion can be drawn that professional judgement significantly influences the quantification of the tolerable error, which is acceptable as no accepted benchmarks for materiality and this tolerable error exist.

The tolerable error is therefore expressed as a reliance factor or level of assurance as a percentage of sample size. As discussed previously the confidence level may have an impact on the conclusion of the acceptance of the error that is known as the tolerable error. The following table is prepared on the basis that 30 items were selected for tests of controls and no deviation found:

Table 4-20: Errors found and tolerable error percentage

Number of errors in sample	Tolerable error %	Extent of reliance on control
0	7	High
1	11	Medium
2	14	Medium
3	17	Medium
4	20	Medium

Source: Dunn (1996:214)

The table above indicates that only one error reduces the reliance from High to Medium when conducting test of controls.

Christensen *et al.* (2015a:67-68) indicate that there are four methods of sample selection that is prescribed by the eight firms that forms part of their empirical

research. These methods are [1] random by using Microsoft Excel (MS Excel), [2] haphazard, [3] stratified and [4] systematic sampling. IFAC (2018n ISA 530 Appendix 4), Jackson and Stent (2016:5/33) and Zuca (2013:194) illustrate the following five sample selection methods as summarised in the table below.

Table 4-21: Sample selection methods

Random selection	Applied through random number generators e.g. computer.	Substantive and test of controls
Systematic selection	The number of items in the population is divided by the sample size where the results is known as a sampling interval. The population divided by the sampling interval indicate which n th items should be systematically selected.	Substantive and test of controls
Monetary unit sampling (MUS)	Every transaction has a chance of being selected but the more the value the higher chance of being selected as the unit may be selected multiple times.	Substantive
Selecting haphazardly	Selecting through non-statistical methods where the judgement and selection can be biased as there is no structure or logic.	Substantive and test of controls
Selection of block transactions	Selecting a specific number of consecutive items in a population for e.g. a specific month or period. The sample is not representative of the total population and therefore no conclusions can be drawn from such a population.	Substantive and test of controls

Source: Jackson and Stent (2016:5-33) and ISA 530 Appendix 4 and Zuca (2013:194)

As indicated above the block selection methods are onerous and the large auditing firms do not apply the sampling method. Another disadvantage of block testing is that the sample is not representative of the entire population and does not cover the full financial period under audit and do not comply with the requirement of the ISAs (Own emphasis). Christensen *et al.* (2015a:70) state that firms use stratified sampling and remove and test 100% of the individual significant transactions and then test the remainder of the population through sampling. This method is applied for test of controls and test of detail to reduce the audit sample and sampling risk as the higher values will reduce the risk of material misstatement as a larger component

of the balance was tested. Hall *et al.* (2002:129) report that 74% of the respondents indicate that they use haphazard sampling while 12% preferred monetary unit sampling. These conclusions were unexpected as the expectation was stratified sampling and systematic sampling and monetary unit sampling to be among the most common sampling procedures.

Elder *et al.* (2013:118-120) and IFAC (2018g ISA 315) distinguish between the following types of audit tests that can be performed to reduce the auditor's risk as well as the detection risk to a level that would be acceptable for the auditor:

- Test of controls
- Substantive tests
- Analytical procedures that form part of substantive procedures.

Christensen (2015a:64) state that the firms apply various sampling guidance for test of controls and tests of detail. The research further argues that the test of detail should be reduced according to the appropriateness of the analytical procedures performed. The sample sizes are dependent on the confidence level and expected deviation rate and the percentages differs significantly as are discussed in the following section (Christensen *et al.* 2015a:66-70; Christensen *et al.* 2015b:9, 11).

4.3.5 Test of controls

In the application of the integrated planning risk model that is discussed further in Chapter 6, the r-factor is used and multiplied by the number of months as tests of controls should normally function throughout the period under review, which in a normal audit would equate to 12 months to determine the sample size. The principle that the higher the sextant or r - value is, the larger the sample size should be related to the assessment of audit risk and detection risk. The lower the detection risk the lower the chance that an auditor's procedure would detect an error and therefore the more audit work should be performed. The risk of material misstatement is higher in the audit risk model when the detection risk is low as the inherent and control risk is high and more audit work needs to be performed to reduce the audit risk to an acceptable low level.

Tables 3-19, 3-20 and 3.22 above indicate that there are between four and six different risk and materiality combinations and through the application of the sextant risk model discussed in Chapter 3, the principle will be applied to audit sampling. The risk quadrant and factor multiplied the number of months is an indication of sample sizes for tests of controls (TOC). The following table is therefore a representation of audit sample sizes based on the sextant model.

Table 4-22: Risk and sample sizes TOC

Risk	Balance - Quantitative materiality	Quadrant /Sextant ("z")	'r' factor "m"	Number of months	Sample size for TOC
SR	LM	6	3.0	12	36
SR	HM	5	2.5	12	30
HR	HM	4	2.0	12	24
HR	LM	3	1.5	12	18
LR	HM	2	1.0	12	12
LR	LM	1	0.5	12	6

Source: Table 3-19, 3-20 and 3.22

Observations and own research have indicated that the sample size is calculated based on the number of items based on risk assessment and risk category multiplied by the number of months as illustrated on the equations above. The relationship between the standard 30 items and the method suggested is evident when the risk and balance is assessed as significant risk. The sample size is smaller when the risk and balance is assessed as low and the inverse for higher risk assessment. In the suggested calculation the risk assessment and risk category is replaced by the r-factor based on the sextant in which the risk and materiality factor has been determined. The norm applied for the sample size for test of controls and statement of comprehensive income items is 30 items without taking the risk level into consideration.

Elder *et al.* (2013:111) state that the higher degree of confidence at 90% to 95% are required in statistical sampling. However, they further state that a lower or moderate level of assurance between 50% and 80% are required by the auditor. Christensen

et al. (2015a:66) and Christensen *et al.* (2015b:9) scribe that the results from their research indicate that the confidence level applied by eight larger firms in the United States of America. The results of their empirical sample sizes including confidence level (CL) are summarised below.

Table 4-23: Sample sizes empirical

Confidence level (CL)	Tolerable deviation rate (TDR)	Expected deviation (ED)
2 = 90.0%	1 = 6.0%-9.5% 1 = 10.0%	0
1 = 60.0%-90.0%	1 = 10.0%	0
2 = 90.0%-95.0%	1 = 5.0% - 10.0% 1 = 6.0% - 10.0%	0 0-1

Source: Christensen *et al.* (2015a:66), Christensen *et al.* (2015b:9)

The table above indicates that the empirical research performed by Christensen *et al.* (2015a:66), Christensen *et al.* (2015b:9) and Elder *et al.* (2013:111) are in line and that a high confidence level is not always applied in audit sampling. The sample size for TOC varies between 22 and 59 based on the following assumptions (CL=90%, TDR = 10% and ED = 0) and (CL=95%, TDR = 5% and ED = 0), respectively (Christensen *et al.* 2015a:67).

The final comparison between the calculation of the sample size for TOC in Table 4-20 the firms' responses from the eight firms above and the responses in the questionnaire from the audit firms in South Africa are discussed in Chapter 6.

The different approaches or calculations on sample sizes between test of controls and tests of detail require the discussion of substantive procedures in the section below.

4.3.6 Substantive procedures

Firm X (2010) and mid-tier auditing firm Y and Z (2010) apply the norm of reducing the sample size by 50% from low reliability to high reliability. This translates to the fact that test of controls indicating the systems functions as it is supposed to function

can reduce the substantive tests by between 50 to 66.6%. Probe (2011) is the audit tool that is generally being used by mid-tier and smaller auditing firms.

Table 4-24: Sample sizes empirical TOD

Confidence level (CL)	Expected misstatement (WM)	Tolerable misstatement (TM)
30.0% - 95.0%	Specific error rate x expansion factor	= Performance materiality
63.0% - 95.0%	20.0% of tolerable misstatement	= Performance materiality
50.0% - 96.0%	= Audit threshold	= Performance materiality
40.0% - 95.0%	0	= or less than performance materiality
33.0% - 95.0%	0.25% - 0.75% of account balance	= or less than performance materiality
50.0% - 95.0%	0	= Performance materiality

Source: Christensen *et al.* (2015a:70), Christensen *et al.* (2015b:11)

Firm X (2010) applies the following formula to apply the following “R” for reduction of the substantive tests based on reliance on test of controls:

- High reliance: R-factor of 0.7 to 1
- Medium reliance: R-factor of 0.8 to 1.4
- Low reliance: R-factor of 1.4 to 2.1

As illustrated above the following reductions can be made, which is also acceptable auditing practice in certain South African audit firms:

Table 4-25: Impact of reliance on tests of controls on substantive tests

Reliance	High	Medium	Low
Control risk after audit tests performed	Low	Medium	High
Low r-factor	0.1	0.8	1.4
High r-factor	0.7	1.4	2.1
Difference	0.6	0.7	0.7
% diff high/low reliance	0.7/2.1		
Reduction in sample size	33.3% M to H 66.6% L to H	33.3% L to M	
r-factor	1	2	3

Source: Firm X (2010)

Probe (2011) states that the typical confidence levels and confidence factors are applied as illustrated in the following table:

Table 4-26: Selection of confidence factors

Risk reduction required	Confidence level	Confidence factor
High	95%	3.0
Moderate	80–90%	1.6–2.3
Low	65–75%	1.1–1.4

Source: Probe (2011)

In the model above the risk reduction required did include moderate and should be replaced by significant and then again it will be three levels of risk assessment.

In practice and from own experience the following is one of the formulas used to determine sample size for substantive procedures and more on statement of financial position items than on statement of comprehensive income items.

Where r = the risk factor as calculated in Chapter 3, it is the same value used by Dunn (1996) for the calculation of the R-factor in Table 4-27 below. It must be stated that the same value for the risk factor as illustrated in this chapter and Dunn's R-

factor is a coincidence, as the methods and reasoning arriving at the same result is not even the same. In order to obtain a more acceptable method as applied in practice an equation as discussed below has been developed.

The quadrant/sextant multiplied by the probability resulted in the following equation and the results are summarised in Table 4-27 below to explain the r-factor per sextant:

In order to apply the quadrant/sextant approach it is suggested that the higher the quadrant/sextant is, the higher the number of sampling items to be selected based on the higher number of the quadrant/sextant to create a relationship between risk level and sample size. A higher risk requires more audit attention than a lower risk item and therefore larger sample sizes. Dunn (1996:212-213) illustrates the following example as indicated in Table 4-27 regarding the R-factor "Reliance"-factor and the level of assurance that needs to be obtained that also indicate six levels and can be interpreted as sextants. The quadrant approach was extended to a sextant approach, which will be discussed in Chapter 6.

Table 4-27: Reliance factor

R-factor	Level of assurance (%)
0.5	39
1.0	63
1.5	78
2.0	86
2.5	92
3.0	95

Source: Dunn (1996:204)

From the above it is suggested that for the gathering of audit evidence, the audit effort should be directed more at the higher levels than the lower levels of assurance. The conclusion that can be drawn from the above is that the risk assessment, the r-factor and audit sample size are directly related. The higher the risk assessment, the higher the sample size selected and the confidence level

should be and vice versa. It is suggested that the r-factor 0.5 to 1.5 should not be discarded as the auditor needs to obtain lower levels of assurance due to the risk assessment and materiality of balances or classes of transaction.

The coverage of transactions mostly applied to statement of financial position balances and the calculation thereof are discussed in detail in Chapter 7. In order to establish whether there is any correlation between the Reliance factor and the r-factor for as far as audit coverage is concerned, a comparison was made between the levels of assurance and the audit coverage that should be obtained. The table above indicates the relationship between the risk and reliability factor and is represented in Table 4-28 below. The R-factor is the reliance factor as discussed by Dunn (1996:212) while the r-factor was independently calculated as indicated in Chapter 3 based on the sextant model. The r-factor as discussed in Chapter 3 is based on the sextant model divided by the multiplier. The values of the “R” and r-factors are the same value but no relationship exists between the factors as indicated in the Table 4-28 below as the percentage of coverage was independently calculated.

Table 4-28: Comparison of R vs r-factor

R-factor	Level of assurance (%)	Quadrant / Sextant	r-factor	Coverage (%)
0.5	39	1	0.5	16
1.0	63	2	1.0	33
1.5	78	3	1.5	49
2.0	86	4	2.0	66
2.5	92	5	2.5	83
3.0	95	6	3.0	99

Source: Dunn (1996:204) and Chapter 3

The items in Table 4-28 are plotted on a line graph and the lower and higher percentage within each sextant and the next were used as illustrated in Figure 4-3 below. The trend line in black below indicates that there is a correlation in

percentage between the highest coverage and the lowest level of assurance in each sextant.

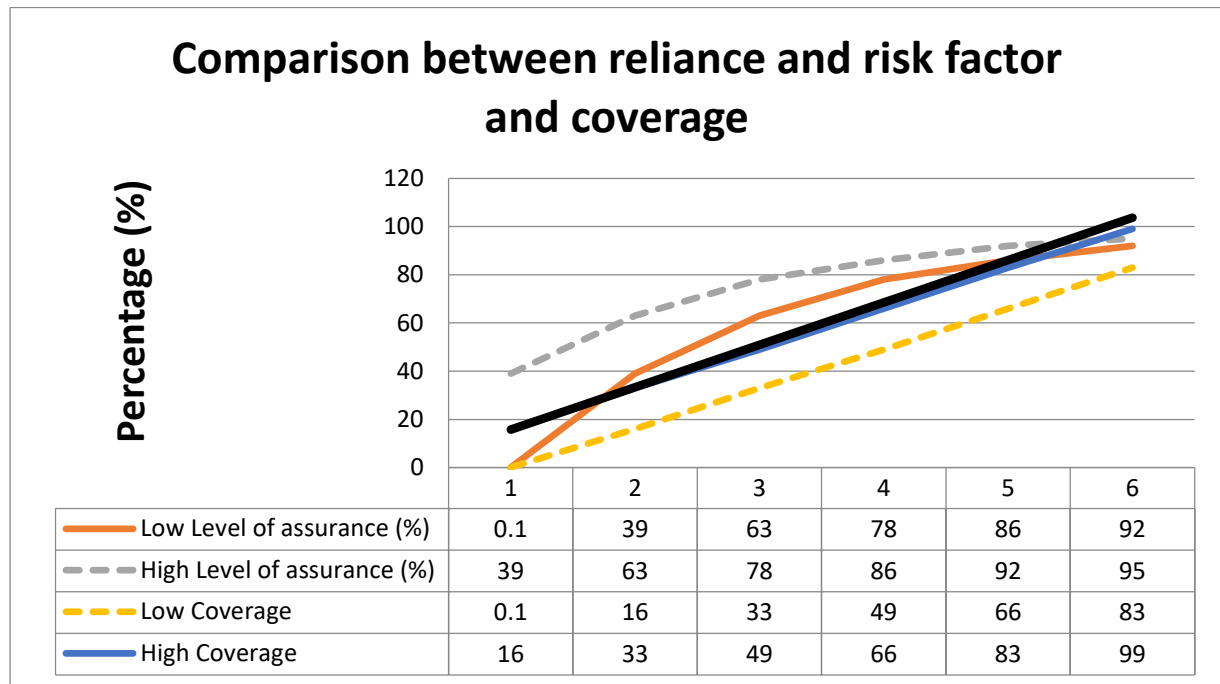


Figure 4-3: Comparison between reliance and risk factor and coverage

Source: Table 4-28 above

Factors that should be taken into account are the following:

- The Poison position does not take the principle of cost versus benefit into account as well as the fact that the audit should not be so expensive that no one would be able to afford it.
- The highest coverage percentage is a generally applied method in the auditing profession.
- The auditor may also make use of test of controls that in turn will reduce the audit sample significantly.
- Analytical review procedures applied correctly will also influence the magnitude of substantive work.
- Computer-assisted audit techniques are used to perform tests of controls and substantive procedures.

4.3.7 Conclusion

The relationship between the higher and the lower level of assurance percentage is not totally in line but the trend line indicates a reliable though not perfect correlation. There is a decreasing difference between Sextant 3 to 6 as the percentage difference decreases as illustrated in Table 4-29 below:

Table 4-29: Coverage vs reliance differences

Risk/Materiality	HR/LM	HR/HM	SR/HM	SR/LM
Sextant	3	4	5	6
High reliance %	63	78	93	95
High coverage %	49	66	83	99
Difference %	26	18	9	-1

Source: Figure 4-3 above

These decreases of percentage differences appear to be acceptable as an auditor would obtain sufficient reliance from audit evidence due to the factors discussed above. The risk of material misstatement is more important from sextant three to sextant six due to the high risk identified and the type of balances involved. In sextant, three more emphases will be placed on a combination of tests, which will compensate for the reliance difference of 26%.

One such an example will be the bank balance where the year-end balance may not be material from a quantitative perspective. The consideration of the movement of amounts in the specific bank account should be material in aggregate and therefore the risk assessment of high while the balance may not be material. Performance of the balance confirmation is done by verifying external bank statements, bank confirmations and bank reconciliations. The material movements processed through the bank account will be verified in the following sections that compensate for the 26% difference between reliance and coverage percentage:

- Revenue
- Trade receivables (Receipts)

- Purchases
- Expenses
- Account payable
- Completion
- Support understanding of financial statements

Various methods are applied to determine sample size for test of controls and test of detail. Effective test of controls and the application of substantive analytical procedures may reduce the sample size for test of detail.

Due to PCAOB inspection the tendency is to increase the sample size, especially for revenue. Statistically a complex statistical method or computer programs are used to calculate the sample size taking different confidence levels and error projection into account.

Literature indicates that non-statistical sampling are applied and no projection of the error can be made for a population as it was not statistically selected. The performance materiality is also related to the tolerable error and the audit should take that into account. The sample sizes as suggested in the formulas and tables for the sextant model will be used to develop the model further. The final correlation between sample sizes and the responses from the questionnaire on audit sampling will be discussed in Chapter 6.

4.3.8 Relationship between materiality, risk and sample size

The previous section illustrates that the norm is to fit all risk models into four different quadrants and the above-mentioned figure illustrates that risk management can be modified to include the different science categories.

Risk management models should be flexible enough to adjust the processes of the four square principle to adjust and fit into different shapes.

According to NASA research (Durning:2005) that was published, the author believes that risk and probability can be measured on a five-point scale and not the normal four-point scale or four risk squares, which is discussed in the literature study above.

This assessment correlated with the application and rules of risks on the determination of reliance on the internal control systems when the decision is made to perform test of controls to reduce the sample sizes of substantive tests.

Mentz (2014:141) states that there is a relationship between materiality, audit risk and audit sampling. Materiality considerations have a direct impact on level of audit evidence and therefore on the sample sizes and risk identified. The following figure indicates the relationship between materiality and risk based on Figure 4-3 and Equations 5.1 to 5.3. This relationship is further supported by Christensen *et al.* (2015a:70) and Christensen *et al.* (2015b:11) as indicated in Table 4-22 where the confidence level and tolerable misstatement are discussed in the same contexts as well as the fact that tolerable misstatement is equal to or less than performance materiality.

Each combination of risk and materiality indicators were plotted on a graph and therefore indicate per quadrant how the sample size would increase or decrease based on the positive risk and materiality or lower than zero risk and materiality on the horizontal and vertical lines. This does not imply that risk is less than zero and only used as an example to differentiate between higher and lower assessment. Higher assessments were taken as positive. Lower assessments were taken as negative to be able to create XY lines.

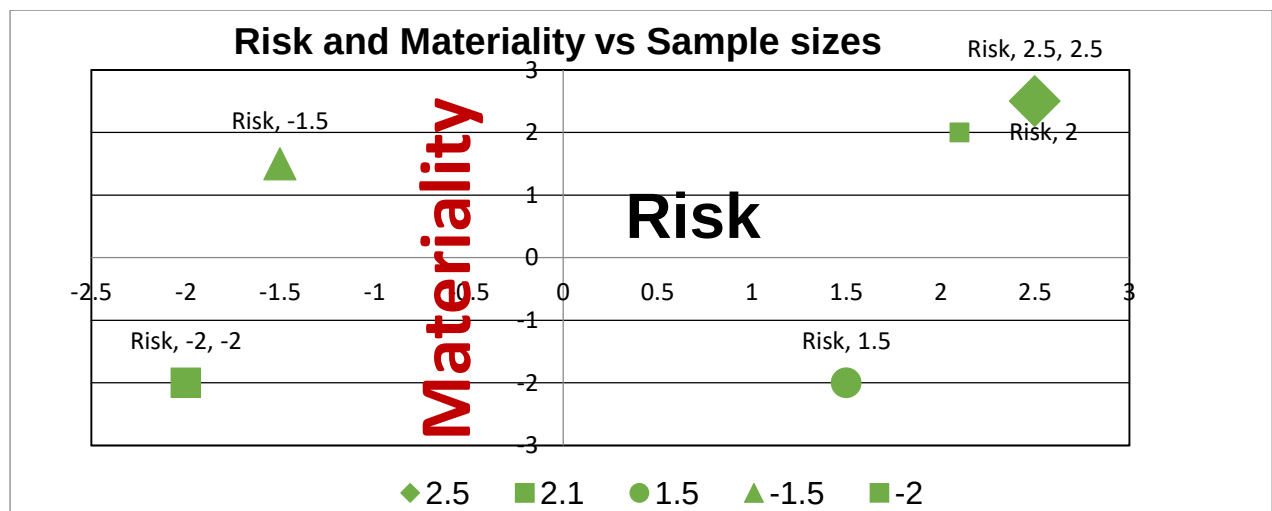


Figure 4-4: Risk, materiality vs sample size

Source: Own research

It is suggested that risk materiality and sample size elements that should not be used in isolation but rather as a unit as shown in figure above.

4.4 CONCLUSION AND RECOMMENDATION

The materiality benchmarks and sample sizes as discussed in the chapter should be applied as it complies with the ISAs and standard practices applied by global auditing firms. Due care should be taken when materiality is considered and the financial statements and qualitative factors should be considered. Volatility of the economy may influence the benchmark selected and therefore proper consideration should be given to select the appropriate benchmark for each financial period. Literature above indicates that net profit before tax is frequently applied while the JSE financial statements indicate that there are instances where the balances are negative and the benchmark is therefore applicable.

The results of Table 4-10, 4-13 and 4-14 above indicate that the profit as a percentage of revenue is not consistent and fluctuate from period to period. Due care should therefore be taken to consider the materiality benchmark for every auditing period and not just to follow standard practices based on past experience. Materiality benchmarks should therefore be thoroughly considered.

Materiality, risk and audit sample sizes are interdependent and the auditor should apply professional judgement when considering all the elements individually and simultaneously. The above-mentioned concepts are of utmost importance in the audit process as a misstatement that is not identified may have a materially impact on the audit report and the type of report issued. Audit sampling and sample sizes may have an impact on the evaluation of the population, audit evidence, audit differences and has an indirect influence on the risk of material misstatement. The correct sampling method and sample size will reduce the audit risk to an acceptable level. The benchmarks for audit materiality and sampling as discussed in this chapter are applied in the development of the integrated model, which are discussed in Chapter 7.

Further research should be conducted on the elements of the benchmarks being used for materiality. The elements are related only to turnover and underlying balances such as gross profit and net profit before tax and then assets and equity.

Literature indicates that more consideration should be given to working capital, cash flow and debt management due to the world economic climate at this stage.

There are various ratios that also consider the cash flow and debt cover and ratio that indicates whether the company is a going concern that does not form part of the materiality benchmarks that may be more useful in the current risk-based auditing environment and economic challenges the world is facing.

The inclusion of the sextant model and the r-factor in calculation should be investigated further. Further research should be performed on sample sizes and the relevance of materiality, audit sampling on the audit process.

The research methodology and design relevant to the literature and empirical research are discussed in Chapter 5. The analysis of literature results, documentary analysis, data analysis and responses to the questionnaires relevant to audit materiality, risk and sampling from Chapter 2 to 5 are discussed in Chapter 6.

CHAPTER 5

RESEARCH METHODOLOGY

5.1 INTRODUCTION

The objective of this chapter is to discuss the various research methods applied in the current research to obtain results from literature, secondary data, questionnaires and empirical data. The research includes collecting secondary data available on the internet, documentary analysis, grounded theory and questionnaires.

The next part of the chapter discusses the various research methods adapted and the relevance of the methods applied to develop the integrated audit planning model.

The following main points are discussed in the chapter:

- Prior research in accountancy for the current decade
- Research design and methodology
- Grounded theory
- Documentary analysis
- Data measurement instruments
- Target populations
- Sampling frame and sampling method
- Sample sizes
- Analysis of secondary data
- Development of the IAPM model
- Conclusions and recommendations

As part of the research design and methodology chapter the importance of prior research is highlighted, which indicates the methods applied in the past to obtain results for integrated models and simulations. The next part of the chapter differentiates between different methods applied.

5.2 PRIOR RESEARCH IN ACCOUNTANCY IN THE CURRENT DECADE

Prior research indicates that various combined methods are used to analyse, collect, interpret, code and summarise data and information. A combination of methods is applied to develop models or simulations. This statement is supported by the

research in the current decade by De Villiers (2015), Mentz (2014) and Swanepoel (2017) who apply various research designs and methodologies to develop integrated or simulation models in accountancy and accountancy education. The research methodologies as applied in their research are summarised and the classification according to their research design and methodology chapters. The following summary with page references to the research is examples of methodologies applied by the authors indicated below in their thesis in the research design and methodology chapters.

Table 5-1: Research methodologies applied in South African Accountancy PhDs in the last decade since 2010

Methodology	Author		
	De Villiers (2015) page	Mentz (2014) page	Swanepoel (2017) page
Inductive and deductive		145-146	
Qualitative and quantitative also referred to as mixed methodology	50-52	149-143	101-104
Quantitative research	33-35		101
Qualitative research	39-40		100
Literature review	Part of the thesis	153	Part of the thesis
Grounded theory	40-41	156-159	104-108
Philosophical paradigms	31-33		96-98
Questionnaires as quantitative research	35-39		
Qualitative data analysis strategies	48-50		

Source: Authors listed above

The conclusion for the summarised information indicates the methodologies applied in the research chapter and literature review and the building of models are not specifically referred to in the research chapter and discussed in another part of their thesis. Various combined methodologies are applied to obtain the required result and various methods and the applications are discussed in this chapter.

5.3 RESEARCH DESIGN AND METHODOLOGY

The research design and methodology serve different purposes and the combination of the two concepts is of utmost importance to complete a research project. Creswell (2014:3) states that research design is the assumptions made by the researcher while research method is the analysing of collected data and interpretation of the results. NYU (2018:8-9) argues that the research design is the logical plan to complete the project including the workflow. Mouton (2011:56-57) explains that the research design is the logic of the research while the research methodology is the process and types of individual procedures that need to be followed.

Creswell (2014:12), Stumke (2014:66) and Welman et al. (2005:56) argue that the research design is the plan *“to select participants and obtain information from them”* and therefore concur with the authors listed above. Stumke (2014:66) further concludes that the mixed method approach is a method that is applied to obtain the required data from participants.

Stumke (2014:66-68) and Welman et al. (2005:6-8) differentiate between the two types of techniques used in mixed methods approach. The philosophical arguments between the positivists and anti-positivists in human behavioural sciences continues. The positivists view the quantitative approach as the *“natural-scientific method”* and norm while the anti-positivists propose that the qualitative method can be applied to collect and interpret data. However, the researcher is of the opinion that both approaches and therefore the mixed method combining both approaches are successful in accountancy research as already indicated in the previous chapters.

5.3.1. Research methodology

Mentz (2014:146) and Ryan et al. (2002:36) explain that research methodology is the overall process and procedures employed while the research methods are the individual techniques applied. Kirk and van Staden (2001:77) and Mentz (2014:14) argue that auditing and accounting form part of the social sciences. Leedy and Omrod (2002:9) defines research as a *“systematic process of collecting, analysing and interpreting information in order to increase the understanding of a phenomenon about which we are interested”*. Research is therefore done to

contribute towards an existing body of knowledge and this is the purpose of this research to develop an integrated audit planning model.

Mentz (2014:144-145) explains that the research process for the development of the integrated audit evidence planning model for gathering consists of three phases as indicated below.

Phase 1: Literature review for understanding of constructs, theory and principles.

Phase 2: Interpretation of Phase 1 results applied to the integrated audit evidence planning model based on research methodology applied.

Phase 3: Evaluation of the integrated audit evidence model for compliance to ISAs and literature.

The development of the current audit planning model in this research excludes audit evidence and incorporates audit materiality, risk and sampling and consist of four phases.

Phase 1: Literature review and quantitative research based on comparison between literature, requirements and ISAs for interpreting and selecting the best practices in the auditing field.

Phase 2: Analysis of Phase 1 results and development of benchmarks per construct based on literature and integrating and application of the qualitative and quantitative results into the integrated audit planning model based on research methodology applied.

Phase 3: Evaluation of the results and testing the preliminary integrated audit evidence model.

Phase 4: Integration of literature, benchmarks and results from questionnaires and secondary data from different sources into the final audit planning model for testing of the model and for compliance to ISAs and literature.

In the research process inductive, deductive, mixed, qualitative, quantitative and grounded theory approaches were combined to achieve the research objective to develop an integrated planning model, which is discussed in detail below.

Spector and Rogelberg (2014:502) argue that inductive research allows researchers the opportunity to report on exploratory research. Fouché and Visser (2008:590-591) suggest exploratory research for the evaluation of an integrated board game through surveys and experimental research as data collection tools. This research follows the same process as mentioned above.

The idea for the development of the model started in 2001. While in the employment of the former PAAB and later the IRBA training were given by various practice reviewers on various concepts of different firms audit methodology from where the best practices were combined as part of the starting point of the integrated planning model development.

Interviews and discussions during 2001 to 2008 with Paul van Helden, former Director Practice review (now Inspections Department), IRBA, are summarised as the conclusion that the best method to explain the audit methodology to small and medium size practitioners is to use a four square method that integrates the planning and improve practitioners' planning and therefore gathering of audit evidence. The views expressed in this research are own interpretations and is not the formal view of the IRBA and can therefore not be construed to be correct or used in any way or matter relating to any individual and practice review or the inspections department.

This model was experimented upon and explained to practitioners as an example of how the planning elements fit into an audit methodology and guide towards audit evidence. This method applied can also be classified as an experimental research and a pre-test as it was later applied at Firm W after 2008 with success based on the positive IRBA review results obtained. The arrows in the table below indicate the direction of thought and documentation to be followed. The summary of the explanations is graphically presented in the table below.

Knowledge of the business	Materiality
Type of business	Balances
Management	Management
Public interest	Control system
Type of balances expected	Test of controls
Business risk	Test of detail
Control systems	
Risk identification	Sample sizes
Assertions	Sample sizes based on materiality and risk
Risk	Working papers ref where sample is selected
Risk assessment	

Figure 5-1: Abridged planning square

Source: Own interpretation

The figure above illustrates the relationship between the understanding of the business, audit risk, materiality and sampling from observations to theory and forms the basis of the final development of the integrated planning model, which is discussed in Chapter 7.

Mentz (2014:46) argues that the different research approaches consist of inductive, deductive, quantitative and qualitative research. Swanepoel (2017:100) and Williams (2007:65) further explain that research methodology includes mixed, qualitative and quantitative research methodologies. The different research approaches discussed above including inductive, deductive, mixed, quantitative and qualitative research forms part of the current research and are discussed below.

5.3.2. Inductive and deductive research

Eisenhardt, Graebner and Sonenshein (2016:1114) and Swanepoel (2017:7) conclude that inductive and deductive research are successful when grounded theory and case studies are combined as a research method. Babbie 2010(23, 28) and Eriksson and Kovalainen (2008:22) explain that research that starts from theory or general statements and leading to predicted observations are classified as deductive research. Mentz (2014:146) further concludes that deductive research is the process of discussing theory and through observations test the theory. The constructs relevant to the current research are grounded theory and deductive research.

Mentz (2014:147) differentiates between deductive and inductive research by explaining that the direction is the other way around as inductive research seeks to create theories from the observations (Babbie 2010:22; Eriksson and Kovalainen 2008:22; Grix 2010:164; Spector & Rogelberg 2014:299). De Vaus (2001:5) explains the difference between deductive and inductive research, as the evaluation or testing of theory and the building of theory respectively. The differences between the two theories are illustrated in the figure below.

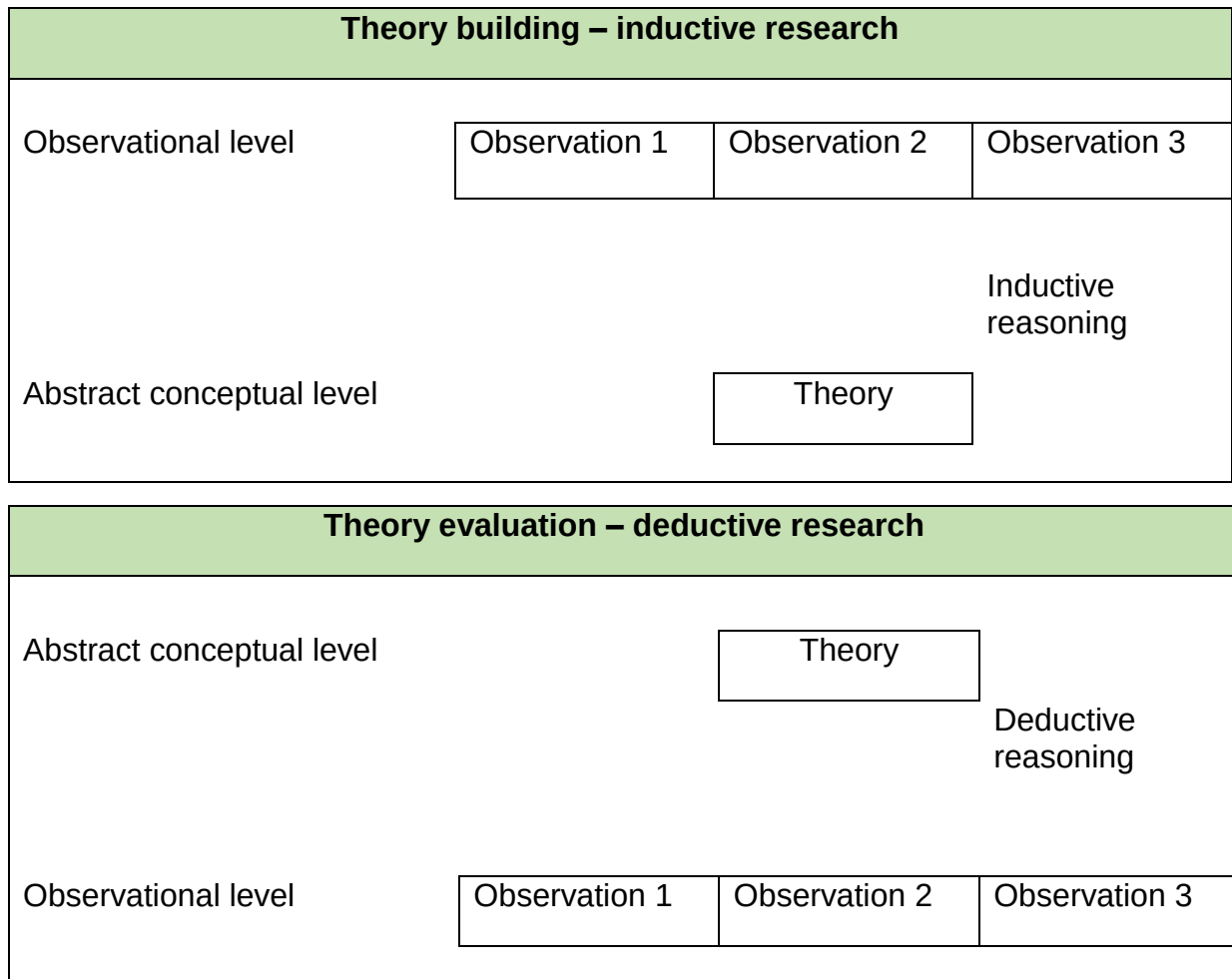


Figure 5-2: Theory building (inductive) and theory evaluation (deductive) research

Source: Adapted from De Vaus (2001:5); Leedy and Ormrod (2010:33); and Mentz (2014:148); NYU (2018:6)

The research includes the combination of both the inductive and deductive research as the models are based on the requirements of the ISAs and literature available. This part of the literature studies in prior chapters can be classified as deductive research. The development of the risk model elements, risk quantification and materiality benchmarks were also based on observations and is therefore inductive research to support the theory. The theory had to be analysed at an abstract theory level and various experiments were conducted to conclude on the best practices for the planning models. Mentz (2014:148) argues that the deductive research method should be applied to develop the model and not the inductive research method. Siggelkow (2007:22) and Swanepoel (2017:11) conclude that the new theory is

tested through a case study and therefore that the deductive theory should be applied. Mentz (2014:149) asserts that the testing of theory and therefore the deductive method should be applied to ensure compliance of the methodology to ISAs and therefore also to IRBA's practice review criteria. Both methods described above should therefore be applied. Mentz (2014:149) illustrates the results of the IRBA review on the AGSA based on the authors thesis were relevant and produced positive results. .

The results discussed below is relevant to the medium and small size auditing firms in the private sector consulted by this researcher and totally independent from Mentz's research since 2008 .The current research encapsulates the development and implementation of developing audit methodologies, policies and procedures based on the materiality guidelines and the risk identification and audit sample sizes as discussed in Chapters 2 to 4. The method and IAPM principles applied in the firms illustrate that positive review results for 100 independent internal reviews for Firm W and 25 of the same reviews performed by IRBA for the Firm review (ISQC1) and engagement file reviews for that review cycle was obtained. The results were based on consultation by this researcher on the principles and policies applied in Firm W and the IAPM. The methodology and integrated model for planning is therefore accepted by IRBA as all partners' results indicated satisfactory results without any re-reviews for the period.

The integrated model can therefore be implemented as it also serves as a partner and manager review tool to ensure that all risk identified refers to a valid audit working papers and all balances and related risks are addressed. The requirements of working papers and the quality control component are discussed in Chapter 7 as part of the development of the model chapter.

The integration of the inductive and deductive methods is combined by Mentz (2014:149) and can be illustrated in the figure below.

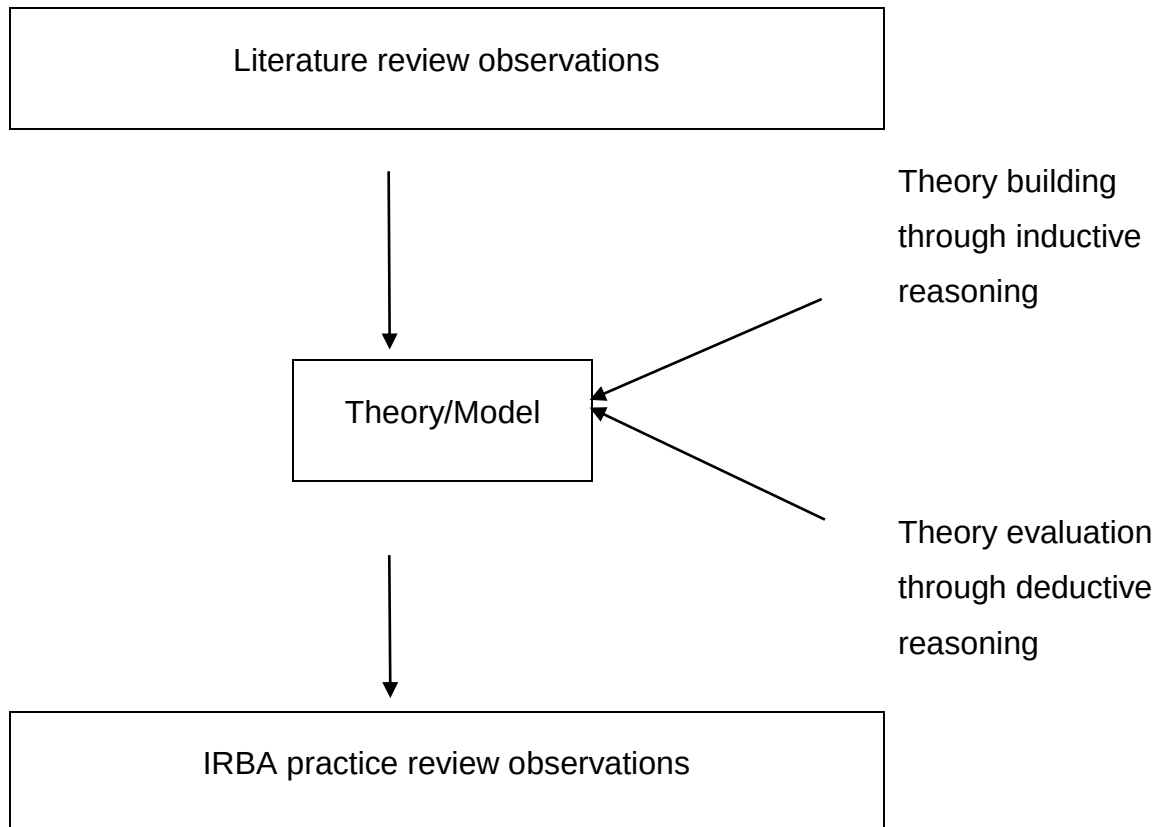


Figure 5-3: Theory building and theory evaluation research applied

Source: Mentz (2014:149) adjusted

5.3.3. Mixed method

Mixed method research includes qualitative and quantitative research and is classified as pragmatic worldviews where different data collection and analysis methods can be performed (Creswell 2014:11; Morgan 2014:1045). This indicates that a pure quantitative research method should be integrated with a qualitative approach to develop an integrated model as supported by Mentz (2014:152).

Harwell (2011:151) and Kumar (2014:20) explain that the mixed method explores strengths and weaknesses of both qualitative and quantitative methods that influences the results of the findings.

Stainback and Stainback (1984:400) and Welman *et al.* (2014:8-9) differentiate between the qualitative and quantitative approaches and the differences are summarised in the table below.

Table 5-2: Differences between quantitative and qualitative approaches

Quantitative	Qualitative
Objective data based on numbers	Subjective data based on language
Complex structured methods with limited flexibility	Flexibility and explorative methods
Abstraction of reality	Constraints of events
Outsiders perspective	Insiders perspective
Reliability of research and data	Validity of research
Used for larger numbers	Small samples
Stable process	Dynamic and changeable
Control investigation and structure and therefore a particularistic approach	Data collected from documents, records and case studies and therefore a holistic approach
Controlling the situation	Observation process

Source: Stainback and Stainback (1984:400) and Welman *et al.* (2014:8-9)

The approaches are different in nature and the different approaches are discussed in the following part of the chapter.

5.3.4. Qualitative research

Creswell *et al.* (2010:110) argue that qualitative analysis attempt to systematically analyse words or text to interpret themes, patterns and concepts while Welman *et al.* (2005:188) elaborate this explanation by adding that qualitative research is a “descriptive form of research”. They further explain that data should be reduced to such an extent that the text should be manageable.

Data collection such as document analysis, questionnaires, observations and interviews are methods to study the issues (Greener 2008:73; Kumar 2014:96; Swanepoel 2017:100). Qualitative research includes literature comparisons, and summaries of similar text and discussion of the combined results and therefore it is relevant for the development and integrating the planning model. Qualitative research is based on language and therefore qualitative research were performed in

Chapter 2 by comparing and combining different literature and journal articles and develop another theory or observations. Tables 2-4, 2-5, 2-6, 2-8, 3-1, 3-3, 3-4, 3-13, Figures 2-10, 3-2 and Appendix 9 and 10 serve as examples of qualitative literature research applied in this study.

5.3.5. Quantitative research

Qualitative research is the method to evaluate and identify trends, relationships and ratios using structured methods, which is also referred to as empirical reviews (Creswell et al 2010:257; Denzin and Lincoln 1994:4; Stumke 2014:67).

De Villiers (2015:35) and Van der Merwe (2013:94) point out that questionnaires can also be applied to a quantitative research methodology as relationships are investigated and the cause-and-effect of the study may be observed through the responses. The questionnaire in Appendix 10 of this thesis is structured in such a manner that the first three questions are targeted on their perceptions prior to the assignment while questions five to seven are based on their experience after completing the assignment. The participants' perceptions changed from before and after the assignment to a more positive perception and therefore indicate a cause-and-effect relationship being achieved through the assignment. The results of the questionnaire are discussed in Chapter 6.

Swanepoel (2017:102-103) differentiate between mixed, qualitative and quantitative research methodology, which includes the philosophical perspectives, types, purpose of research and data collection and analysis. The conclusion that can be drawn from this comparison is that each method has its strengths and the combination of these research methodologies result in a more comprehensive conclusion and results from different perspectives.

The comparison can be summarised and graphically presented as follows as indicated in the table below.

Table 5-3: Research methodology comparison

Description	Mixed method	Qualitative	Quantitative
Philosophical perspective	Positivistic or interpretivist (De Villiers 2015:50)	Naturalistic and reality (Catelllan 2010:4)	Positivist (Welman <i>et al.</i> 2005:7) Independent research (Catelllan 2010:4)
Types of research	Cross sectional (Leedy & Ormrod 2010:144)	Ethnography, grounded theory, content analysis (Catelllan 2010:4)	Experimental, comparative (Catelllan 2010:4)
Purpose of research	Understanding and explaining results (Swanepoel 2017:102)	Exploring and comparing (Russel & Ryan 2010:8)	Relationships between variables (Catelllan 2010:5)
Data collection	Content analysis (Leedy and Ormrod 2010:144)	Observation, interviews and documents (Creswell 2014:234)	Questionnaires and statistical tests (Catelllan 2010:4)
Data analysis	Use of statistical software and analysing qualitative and quantitative data.	Inductive process (Harwell 2011:149)	Deductive process testing theory and causality between data (De Villiers 2015:30)

Source: Swanepoel (2017:102-103) and authors listed above in the table

The conclusion that can be drawn from the table above is that all the methods described above are included in this research and therefore various methods are applied to obtain the desired results to implement in the development of the integrated audit planning model. The table above indicates that grounded theory forms part of qualitative research and the following section discusses grounded theory.

5.3.6. Grounded theory

Maree *et al.* (1997:99) state that the grounded theory can be applied on a methodical and philosophical approach. Ellharidy, Nicolson and Scapens (2008:142) argue that the grounded theory is applicable for integration of findings and accumulation of

knowledge. The purpose of this part of the chapter is to interpret the ISAs and integrate it with standard theories and create new knowledge on audit risk identification, assessment, and responses, materiality and sampling.

Strauss and Corbin (1998:12) argue that the grounded theory is a tool to widen understanding of data, gives insight and directs the action to be taken. Delport *et al.* (2013:318) and De Villiers (2015:40) explain that grounded theory is an “*intangible theory*” formulation and process that is grounded in theories or opinions of the authors of literature and the participants in the questionnaires. Grounded theory is a constant comparison and secondly an investigation between similarities and differences in data. De Villiers (2015:41) explains that grounded theory can be defined as the continuous reflection or analysis of data against additional empirical data for the refining of the theory about a specific phenomenon.

As part of the grounded theory process the constructs identified in Chapter 1 to 4 are integrated into an integrated audit planning model for the planning process in the auditing environment. The audit risk model is compared to the standard practice therefore the risk management model. Knechel *et al.* (2007:317) state that the business risk-based audit methods or business risk auditing (BRA) is a new development in the audit methodology. Messier (2014:279-281) is one of the first researchers to compile a RBA questionnaire that is similar to the business risk models being used in business risk management. A comparison between King IV (2016) and ISA 315 (2018) revealed similarities as far as risk is concerned. This statement is supported by Flint (2008:143), Houston (1999:282) in that the BRA was a method for the auditors to enter the risk management profession.

Maree *et al.* (1997:99) states that three types of coding forms part of the grounded theory and they are [1] open, [2] axial and [3] selective coding. Open coding is the interrogation of data to analyse and to find recurrences and exceptions that may lead to different discoveries (Maree 1997:99). Axial coding analyses and combine open coding results in different methods to conclude on connections between the data. Relationships between subcategories are tested. Selective coding is the process of determining the relationship between different categories (Maree 1997:100).

5.3.7. Documentary analysis

Swart, Swanepoel, and Surujlal (2014:254-255) applied documentary analysis to analyse and interpret literature and secondary data as quantitative and qualitative methods. The same principle as above applies to this research as information was obtained from literature and reports to summarise, analyse and identify differences between the disciplines of risk management and auditing. The documentary or content analysis is less prone to bias as there are no responses and the facts published are analysed. This is contrary to qualitative research as there are no flexibility built into the interpretation of the results.

5.4 QUESTIONNAIRES

Two separate questionnaires were administered to the following groups:

- Technical professionals at the large, medium and small size auditing firm that participated and
- Third-year auditing students.

Stumke (2014:67-70) illustrates that questionnaires are used as a quantitative research tool. Stumke (2014:67) and Welman *et al.* (2005:52) argue that the population is important for the researcher to conclude on the sample selected and to reach conclusions about the questionnaire. Creswell *et al.* (2010:155) and Mouton (2012:103) argue that questionnaires are the widely accepted methods to gather data but also points out that the design of the questionnaire is important. Stumke (2014:70) and Welman *et al.* (2005:174) explain that the questionnaire should be designed in such a manner that it addresses the research question. Stumke (2014:70-71) states that a questionnaire consists out of the following five areas namely: [1] Instructions to be simple and concise and the scale should have a maximum of five points, [2] appearance should be user-friendly and neat, [3] the completion time should not be too long, [4] question sequence and [5] non-threatening questions should be asked and the questions of the similar type should be grouped together. The questionnaire for the audit firms consisted of 93 lines while the third-year students consisted only out of 29 lines and the requirement for the completion time for the questionnaire may have been exceeded due to the number

of lines. The topics were grouped together, the instructions were simple, and all questionnaires had five- and four-point scales respectively.

The different questionnaires and the process of development are discussed in the following sections.

5.5 QUESTIONNAIRE TO TECHNICAL DEPARTMENTS OF AUDITING FIRMS

The participants that completed the questionnaires consist of: technical partners, directors and managers of auditing firms with listed company portfolios as well as university lecturers of SAICA approved universities.

5.5.1. Qualitative sample approach

Discussions with a statistical expert supported by McNeish and Harring (2017: 867) concluded that quantitative research on small sample sizes cannot be upheld and Pallant (2010:204) argues that a sample of less than 30 items would not result in a meaningful quantitative approach. The research is therefore based on a qualitative research due to the sample size being less than 30 firms available to respond to the questionnaire. The data from the Johannesburg Stock Exchange collected indicated that only 27 are involved with the audit of listed companies and a judgemental sample was selected based on willingness to participate by specific auditing firms.

5.5.2. Sample size and selection

Eight out of 27 firms are included in the sample that represents 30% of the number of firms but represents 75% (323 out of a total of 429) of auditors with listed clients. The responses received are therefore a high percentage of auditors with listed client audit responsibilities.

5.5.3. Data collection method used

The final questionnaire was prepared from interpretation of the literature and the ISAs. The first stage in the administering of surveys is to develop the questionnaire and enquire from a statistical expert to evaluate the questionnaire. The outcomes and the statements are evaluated and then the questionnaire was administered during a quality control review training session to 30 trainee accountants of Firm W to critique

and ask questions about the statements made in the questionnaire. The questionnaire was completed as part of the pilot test and adjustments were made to the questionnaire for clarification purposes. The participants' responses were not taken into account in any of the analysis and interpretation of the results. The purpose of the pilot test was to test the content and understanding of the statements and to adjust to clarify any iconised statements.

The data collection comprised two phases. For the first phase an interview was conducted with the technical department of one of the firms where the questionnaire was discussed and completed afterwards by the firm.

For the second phase the technical partners of the relevant firms were contacted telephonically or via e-mail and permission were asked to participate to complete the questionnaire. Judgement sampling was applied as the questionnaires were only sent to the participants willing to complete the questionnaire. The questionnaires were sent to participating audit firms' technical audit departments and the firms supplied their responses via per e-mail. Outstanding firm questionnaires were followed up for completion with the relevant firms and e-mailed back. The undertaking was that all information will be kept confidential and that the aggregated and not individual responses will be published. The participants consisted of a number of Big 4 firms, medium and small size firms with listed client portfolios.

5.5.4. Analysis of data obtained and comments from participants

The results are analysed later in Chapter 6 and accumulated as explained below and is attached as Appendix 9 to the dissertation.

The responses on the questionnaires were combined to form the aggregate for:

Responses	Aggregate
"Strongly agree" and "Agree"	"Yes"
"Neutral"	"Neutral"
"Disagree" and "Strongly disagree"	"No"

5.6 QUESTIONNAIRE ADMINISTERED TO THIRD-YEAR STUDENTS

5.6.1. Measuring instrument and design

The questionnaire for the students was based on the premise that the result should be tested based on variables before and after completion of the projects. The main objective was to evaluate the understanding or improvement of their understanding of the model before and after the assignment was completed. The elements included in the integrated model for the purpose of the questionnaire were materiality, risk, the impact on sample sizes and risk assessment per assertion level. The third year students did not have any negative comments that required any adjustment to the model.

The questions in the questionnaire were based on how to measure the impact of the integrated model before and after the assignment. The topics in the planning model were chosen based on the understanding of the elements in the planning phase that caused the most confusion in the theory and application of the concepts in practice as well as at university level.

Swart (2013:117) reasons that the Likert scale, based on four classifications, is the most relevant for the audit profession. The responses were aggregated by question number and individual responses. The responses were recorded on SPSS25 and the analysis of data analysed is represented later in the research.

5.6.2. Sample size and selection

Pallant (2010:204) concludes that a sample size of 30+ is sufficient in a normal distribution. Pallant (2010:209) argues that the number of cases and the dependent variables are determinants for the sample size. The population consisted of all third-year students registered at a medium university in 2015 and the questionnaires had to be completed anonymously as individuals on a group sheet for each member in the group. Names and student numbers were not required and each sheet contained a tab in Excel only known as M1 to M10 (Member 1 to Member 10.). The requirement was that the model and the questionnaire are submitted as part of a group assignment to maintain the confidentiality of the respondents. The response

rate for voluntarily completed usable questionnaires at 44% consisted of 49 out of the total population of 112 participants.

5.7 CONCLUSIONS AND RECOMMENDATIONS

The conclusion that can be drawn from the literature discussed above is that in social sciences the research methodology can include deductive, inductive, mixed, qualitative and quantitative methods to obtain results to support the research problem and objectives.

The literature quoted above indicates that questionnaires can contribute towards the statistical sampling methods to support conclusions on the interpretation of results. Various authors as listed in the discussions above identified that the combination of methods can assist the researcher to develop models from various sources.

A combination of the research methodologies are applied in the research and conclusive results are available that the integrated audit planning model can be developed based on literature, documentary analysis combined with mixed research methodology.

5.8 ETHICAL CONSIDERATIONS

The literature is available in online sources and text books and the only requirement is to acknowledge the sources used as indicated in text and the list of references, which forms part of this dissertation. The information of the secondary data are also publically available and the ethical requirement is to acknowledge the source in the text and in the list of reference, which indicate ethical compliance to the requirements.

The Faculty Ethics committee requires that an ethical clearance should be obtained for all questionnaire where students are involved. The application for ethical clearance was approved by the NWU Vaal (North-West University) Faculty of Economic Sciences and Information Technology Ethics committee on 3 September 2015 (ECONIT-2015-053). The ethical consideration includes the treatment of participants. Students were asked to complete a questionnaire on a voluntary basis. No personal information was required from students and as a result an abridged

ethics clearance application was completed. The students who participated in this questionnaire implicitly gave permission by completing the questionnaire. The students had to complete the questionnaire anonymously on a group basis. The information of the individual groups is combined and the aggregated results are published for all the participants as a group. The information is kept confidential as no personal information is published and therefore also complies with the confidentiality principle.

The questionnaire administered to the audit firms is also published on an aggregate basis and no individual information and firm names are mentioned in the results and is therefore kept confidential. The firms and participants gave permission before they completed the questionnaire and therefore the ethical requirements are met.

CHAPTER 6

OVERVIEW OF THE DATA GATHERING AND ANALYSIS PROCESS

6.1 INTRODUCTION

This chapter consists of the discussion and analysis of the data obtained from responses from auditing firms in South Africa, questionnaires administered to third-year auditing students. The coding and interpretation of the JSE information was done in Chapter 4.2.6. The chapter discusses the comparison of results found in the literature chapters two to four and the application of the various research design and methodologies.

6.2 RESULTS AND FINDINGS FROM AUDITING FIRMS

The questionnaire with the responses appear as Appendix 9 at the end of the thesis. This section contains the discussion and analysis of the responses. The following is a summary of the benchmarks, found in literature and empirical research, which is prominent and applicable in the auditing environment.

6.2.1 Summary of benchmarks summarised from research and responses

The scale for the questionnaire as used in Appendix 9 attached is divided into five Likert scales, which are [5] strongly agree, [4] agree, [3] neutral, [2] disagree and [1] strongly disagree. The number of responses for strongly agree and agree are accumulated and combined as the total “Yes” responses and the same were done with strongly disagree agree to calculate the “No” responses while the “neutral” response were kept separate. The number of the responses per statement are expressed as a percentage of the overall and is represented in the following graph.

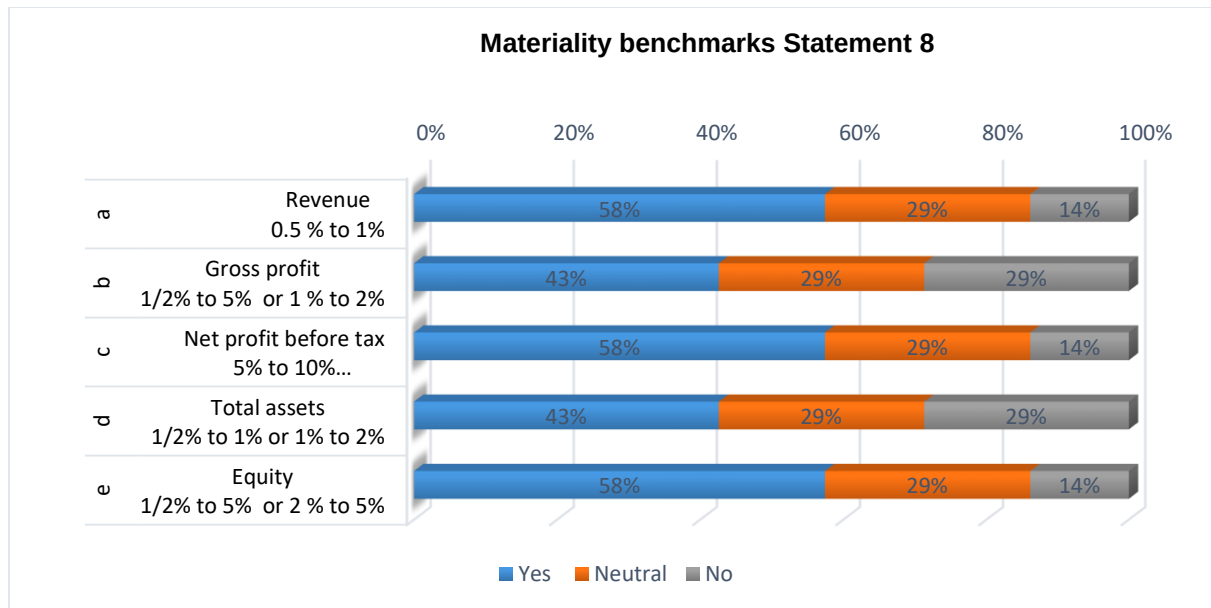


Figure 6-1: Materiality benchmarks from responses

Source: Appendix 9 - Statement 8a to 8e

The conclusion that can be drawn from the above is that the results agree with the results as discussed in Section 4.2.3 and Table 4-2 and therefore the benchmarks are the most appropriate materiality benchmarks that can be applied in the integrated planning model and in practice. The argument can be made that the constant neutral response of 29% for all the statements and benchmarks indicate that the neutral scale of the questionnaire does not serve a purpose in auditing research and that a four-point Likert scale would be more appropriate. The four-point Likert scale was used in the second questionnaire administered to the third-year auditing students and more concise responses were obtained. The results of the second questionnaire are discussed later in the chapter.

The positive responses from the first questionnaire relevant to the materiality benchmarks and own interpretations with the percentage of positive responses are summarised in the table below.

Table 6-1: Materiality benchmarks and conclusions

Description	Own interpretation	Percentage positive response
Different materiality drivers	No guidance	90%
Materiality drivers	Element of materiality consideration	67%
Trivial errors may add up to be material	Interpretation in the context of the standard.	78%
Materiality benchmarks	Revenue 0.5% to 1%	58%
	Gross profit 1% to 2%	43%
	Net profit 5% to 10%	58 %
Total assets	1/2% to 1% or 1% to 2%	43%
Equity	1/2% to 5% or 2% to 5%	58 %
“Significant” benchmark	1% to 2% of total assets or turnover	66%
“Pervasive” benchmark	The percentage of positive responses increased from 12% for twice materiality to 33% for four times materiality. From the analysis of responses for Statement 38a – 38c, the benchmark of materiality of between five and six times appears to be appropriate. This benchmark appears to be higher than expected. It can be concluded below in statement 38c – that the benchmark of two or three time’s materiality and all other factors that need to be taken into account appear to be more appropriate from a risk management point of view.	

Source: Appendix 9 Statement 8a to 8e, 36, 37a to 37d, 38a to 38c

As indicated in Chapter 2 there is a confusion between significant and pervasive benchmarks. Significant is defined in par 2.2.7.1 according to IFAC (2018 ISA 315 par 28 (a-f)) highlights items or risks that requires special consideration while pervasive refers to the impact of a material audit misstatement which may result in a disclaimer or adverse audit opinion. The auditor needs to consider whether the impact of an audit

difference is material or material and pervasive. IFAC (2018r ISA 705) defines pervasive as “A term used, in the context of misstatements, to describe the effects on the financial statements of misstatements or the possible effects on the financial statements of misstatements, if any, that are undetected due to an inability to obtain sufficient appropriate audit evidence. Pervasive effects on the financial statements are those that, in the auditor’s judgment: (i) Are not confined to specific elements, accounts or items of the financial statements; (ii) If so confined, represent or could represent a substantial proportion of the financial statements”. A total of 90% of the respondents agree that different materiality drivers should be considered based on the type of entity. These benchmarks above illustrate that the materiality benchmark and the firms’ responses are in line with the literature research on materiality benchmarks after implementation of SOX. The responses are in line with literature as indicated in Tables 4-1, 4-3, 4-4, 4-5 and 4-11 as discussed in Chapter 4. Table 4-1 indicated that most firms used the benchmarks for income before taxes, total assets, total revenue and net assets as benchmarks. Table 4-5 indicated that literature mostly refers to total assets, net profit and revenue as benchmarks in 20, 18 and 14 articles, respectively.

The benchmarks as discussed in Chapter 4 is therefore relevant for the integrated planning model and will form part of the integrated model. The correlation between the JSE information and the materiality benchmarks from June 2012 to June 2017 are discussed in Chapter 4 and a brief discussion on the benchmarks as part of the analysis of data chapter is discussed in the following section.

6.2.2 Materiality benchmarks based on JSE-listed financial information

The information of the published financial information of the JSE companies was downloaded from the website and the sectors selected as indicated in Table 4-7. Descriptive analytics such as frequencies of listed companies with financial year-ends on June and December for the periods between periods 2012 to 2017 forms part of the analysis of information in Chapter 4 in Table 4-8. The materiality benchmarks were coded in Table 4-9 for the benchmarks where all financial statement information included positive balances and the analysis of the balances as a percentage of revenue are analysed in Table 4-10.

The correlations between the benchmarks applied in theory and the published JSE information indicated that there is a positive significant relationship between the materiality benchmarks as illustrated in Table 4-1 and 4-12. The only exception is that profit after taxation and interest do not correlate to any of the other benchmarks as indicated in Table 4-12.

The value of balances as a percentage of turnover in Tables 4-13 and 4-14 indicate that the percentages fluctuate from period to period. Therefore, materiality cannot be assumed to be consistent and that proper thought and consideration should be given before deciding on a benchmark.

The questionnaire included trivial benchmarks as part of materiality and planning and the conclusions are discussed in the following section.

6.2.3 Trivial benchmarks

IFAC (2018j ISA 450 par 5, A2-A3) requires from the auditor to document and accumulate all errors unless they are clearly trivial. However, IFAC (2018j ISA 450 par 15) stipulates that all clearly trivial errors should be included in the audit documentation. IFAC (2018j ISA 450 par A2) differentiates between clearly trivial and not material and further argues that trivial should be at a lessor amount than not material. Not material is any amount below materiality while clearly trivial is an amount that even if accumulated with other trivial amounts will not have an impact on the financial statements. The responses in Statement 5 of the questionnaire indicate that 78% of the respondents indicate that the accumulation of many trivial errors may add up to be material. This response is contrary to statement made in ISA 450 that indicated that trivial error should not be accumulated. The best practice would be to accumulate all trivial errors and then conclude on the aggregate and their impact on material misstatement. The trivial error benchmark is therefore included in the integrated planning models so that the audit engagement team may have an indication of trivial errors during the planning stage of the audit.

The ISA do not give guidance on how clearly trivial can be determined and therefore the questionnaire to the auditing firms included the concept of clearly trivial although the conclusion on accumulation and consideration of audit differences is not part of

the scope of this research. Due to a lack of numerical guidance in the ISAs the following responses indicate a possible threshold for trivial errors

Table 6-2: Statement 37: “Trivial benchmarks”

37	Trivial amounts or trivial materiality can be quantified as any amount below	Yes	Neutral	No
a	Any amount between 1 to 2% of materiality	34%	0%	66%
b	Any amount between 2 to 5% of materiality	33%	0%	67%
c	Any amount between 5 to 10% of materiality	29%	0%	71%
d	Any amount between 10 to 20% of materiality	0%	0%	100%

Source: Appendix 9 Statement 37a to 37d

The table above indicates that trivial materiality should be lower than 1% of materiality as the majority of respondents (67%) reacted negatively towards such a high benchmark. The trend for the positive responses decrease at an average of 2.5% for each two to 2.5% decrease in the benchmark for trivial misstatement. The percentage increase of responses based on the decrease in responses at the same rate indicates that to obtain a 99% positive response rate at the same assumption trivial materiality would be 0.00000003% (Calculated in Excel by increasing the response rate with 2.5% and dividing the benchmark by two every line it took 26 lines of the same calculation to obtain a 99% positive response rate). The result to obtain a 60% positive response rate on the same calculation used trivial materiality would be 0.0019531% (rounded up to 0.002%). The benchmark would therefore be a very low percentage of materiality to be classified as clearly trivial.

Eilifsen and Eilifsen and Messier Jr. (2015:13) state in their responses from auditing firms used in their research that seven out of eight firms indicate that trivial would be between 3% to 5%, which appears to be more reasonable and in line with expectation. The responses from the eight firms are represented in the table below.

Table 6-3: Conclusions on trivial materiality application

Description	Element	No of firms	Range from	Range to
Clearly trivial		7 out of 8	3%	5%
		1 out of 8	5%	8%

Source: Eilifsen and Messier Jr. (2015:13)

The audit planning model includes sample sizes and the following paragraphs deal with the results obtained from the questionnaire relevant to tests of controls and substantive procedures.

6.3 SAMPLE SIZES FOR TEST OF CONTROLS

Chapter four differentiates between the sample sizes of implementation controls and tests of controls. Implementation controls are applied to test the efficiency of the internal control systems and is also referred to as a walkthrough test.

6.3.1 Implementation controls to be performed

80% of the respondents agree in Statement 30a-e that the most popular sample size for implementation controls are limited to one transaction per cycle or balance. 78% of the respondents disagree with the statement that no implementation controls should be performed when no reliance is placed on internal control. Only 22% of the respondents are of the opinion that more than three implementation controls should be tested. Contrary to expectation the consensus is therefore that one transaction per cycle or balance is sufficient to test implementation controls as illustrated on the table below.

Table 6-4: Implementation controls

30	Implementation of controls	Yes	Neutral	No
a	1 per cycle or balance	86%	0%	14%
b	2 per cycle or balance	0%	17%	83%
c	3 per cycle or balance	0%	33%	67%
d	None at all when no reliance are placed on internal control	34%	0%	66%
e	More than three per cycle or balance	17%	17%	66%

Source: Appendix 9 Statement 30a to 30e

IFAC (2018g ISA 315 par 13) requires that only relevant controls in the audit are applied to evaluate the design of those complemented controls. A total of 66% of the respondents indicate the contrary response to the requirements of the ISA. The statement is that no implementation controls should be performed and the negative response for Statement 30a indicates that implementation controls should be performed even if reliance is not placed on internal controls. The statement may have been interpreted incorrectly and therefore the conclusion is that no implementation controls should be tested if no reliance are placed on the internal controls, which is in line with ISA315 as discussed above.

6.3.2 Tests of controls

Probe (2015:59) differentiates between the daily, transactional and non-frequent controls and the sample sizes differ. Probe (2015:59) indicates the minimum sample sizes for controls that is not done on a daily basis, which are [1] ten for weekly, [2] two for monthly and quarterly controls (one at year-end plus any other period) and [3] one control for an annual control. The policy is normally that the minimum sample size is based on a 5% tolerable error with no deviations, which would vary between [1] 10 for moderate risk, [2] 30 for high risk and [3] 60 items for high risk with one deviation. Probe (2015:59) further argues that two deviations would result in no reliance or risk reduction in test of controls.

Table 4-21 illustrates that the sample size for tests of controls can vary between 6 items for a low risk to 36 items for a significant risk items based on materiality. This conclusion is based on the application of the sextant model in Chapter 4 where the

sextant number multiplied by the number of months multiplied with r-factor indicates the sample size. This conclusion is further illustrated in Tables 3-19, 3-20, 3-22 to 3-26. Chapter 4.3.5 also argues that the sample size applied in practice range between twenty-two and fifty-nine items based on the tolerable deviation. The responses from the questionnaire regarding sample sizes of tests of controls are represented in the table below.

Table 6-5: Statement 31– Sample size for tests of controls

31	Sample size should be used for test of controls	Yes	Neutral	No
a	1 item per month	17%	33%	50%
b	2 items per month	33%	33%	34%
c	20 items per annum	17%	33%	50%
d	25 items per annum	17%	33%	50%
e	20 items per annum covering the full period	0%	33%	67%
f	25 items per annum covering the full period	50%	33%	17%
g	More than 25 items	17%	33%	50%
32	The sample size for substantive tests should be reduced when tests of controls were performed satisfactorily.	100%	0%	0%

Source: Appendix 9 Statement 31a to 31g and 32

The questionnaire did not include the risk assessment level in the statements relevant to the sample sizes in the table above. These responses are contrary to the response in Statement 28 where 86% of respondents indicated that materiality, audit/fraud risk influences the sample size. The conclusion that can be drawn from this contradiction is that the sample size for tests of controls will be influenced by risk assessment and should not be a fixed amount but rather lower than 25 items as indicated in at 50% positive response in statement 31f.

Refer the conclusion on Statement 31f above as the benchmark appear to be 25 items per year covering the full period. The sample sizes as developed in the sextant model

are therefore in the range of sample sizes based on the information above and the sample sizes according to the sextant approach are used in the integrated planning model. The argument is made that the results of tests of controls can influence the substantive procedures sample size. The impact on the number of tests of detail that should be selected as discussed in the following section.

6.3.3 Reliance on effective tests of controls reduces substantive sample sizes

A total of 100% of the respondents in Statement 32 indicated that reliance on effective tests of controls reduces substantive sample sizes. Refer to Chapter 7 for a discussion and support for this conclusion.

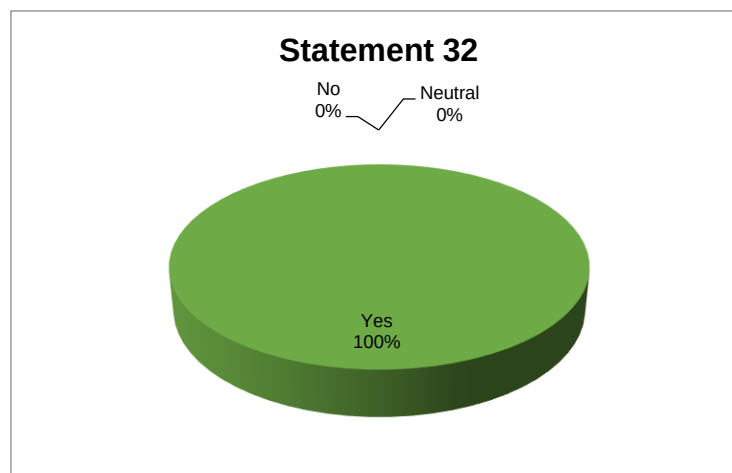


Figure 6-2:Statement 32: “Reliance on test of control reduces substantive sample size”

Source: Appendix 9 Statement 32

The sentiment of 100% was that tests of controls performed reduce sample sizes. This is also in line with best practices as observed in the past 11 years in quality control reviews.

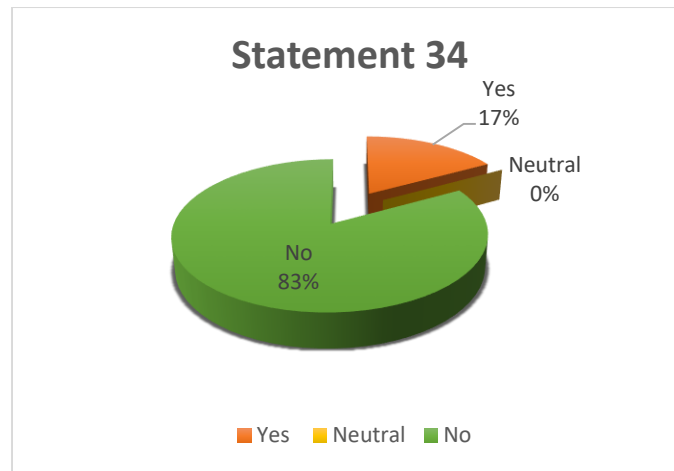


Figure 6-3: Statement 34: Sample size is reduced when no reliance can be placed on test of controls.

Source: Appendix 9 Statement 34

This response is contrary to Statement 32, which indicated that 100% of the respondents agreed with the statement that reliable test of control will reduce substantive procedures. Only 17% of the respondents changed their responses and therefore indicate that stating a statement differently may lead to different interpretations.

The higher the reliance on tests of controls and therefore on the internal control of the company the lower the sample size required for tests of detail. This statement is supported by the literature in Chapter 4.3.6 after Table 4-24 and 4-26, which both indicate that the sample size for test of details decrease as the confidence level increases.

6.4 SUBSTANTIVE PROCEDURES

6.4.1 Analytical procedures

Chapter 4.3.6 and 4.37 argue that the extent of test of detail can be reduced through the performance of appropriate analytical procedures. This argument is supported by the responses in Statements 33 I-n that indicate that [1] 33% agree that analytical procedures with corroborative evidence is sufficient, [2] 87% disagree that analytical review with discussion with management is sufficient and [3] 67% agree that that

analytical review with discussion with management and detail testing to corroborate management explanations are sufficient.

Table 6-6: Analytical procedures

33	The sample size for substantive tests should be the following:	Yes	Neutral	No
l	Analytical review with corroborative explanations	33%	50%	17%
m	No detail testing and analytical reviews by discussions with management	0%	17%	83%
n	Analytical reviews supported by explanations by management and detail testing to corroborate the explanations	67%	33%	0%

Source: Appendix 9 statement 33l to n

However, literature do not indicate with what percentage the analytical procedures can reduce the sample size of the tests of detail. The sample sizes for tests of details (TOD) do exclude the influence analytical procedures may have on the reduction of TOD.

6.4.2 Sample sizes for substantive tests of detail

The responses relevant to substantive procedures are represented in the table below.

Table 6-7: Statement 33: Sample size for substantive tests

33	The sample size for substantive tests should be the following:	Yes	Neutral	No
a	1 item per month	0%	17%	83%
b	2 items per month	0%	17%	83%
c	20 items per annum	0%	17%	83%
d	25 items per annum	0%	17%	83%
e	20 items per annum covering the full period	0%	17%	83%
f	25 items per annum covering the full period	17%	17%	66%
g	More than 25 items	0%	34%	66%
h	Percentage of coverage for balance sheet	34%	16%	50%
i	Percentage of coverage for income statement	17%	17%	66%
j	Percentage of coverage for balance sheet and income statement	0%	33%	67%
k	Stratified sample based on all material transactions and balances	66%	17%	17%
o	Based on account balance, materiality and risk	86%	14%	0%
p	Combination of all based on risk, knowledge of client and auditor's professional judgement	83%	17%	0%

Source: Appendix 9 Statement 33a-k and 33o-p

The respondents disagree with the Statements 33 a-e in that substantive procedures should be performed on a monthly basis or 20 to 25 items to be selected at a rate of 83%. The responses rate increased from 0% to 17% for the Statement 33f in that they agree that a sample size of 25 items per annum covering the full period is acceptable.

Statement 33h indicates that 34% of respondents agree with the percentage of coverage for balance sheet while only 17% of the respondents in Statement 33i agree with the percentage coverage for income statement. None of the responses indicated that coverage of balance sheet and income statement are acceptable. As a result, coverage for income statement is not an acceptable method as also indicated in Section 6.3.2 and Table 6-7 above.

Interviews during this study indicated that some experts suggest that percentage coverage should be the result of sampling and not the driver and that may be the reason for the neutral responses at 16% and 17% respectively.

The implication from these responses is that the sample size for substantive tests are selected and calculated on another basis than test of controls.

A total of 66% of the respondents agree in Statement 33k that stratification should be used for substantive sampling selections. Conclusions drawn from above based on responses are that stratified sampling can therefore be seen as a benchmark. A total of 86% of the respondents in Statement 33o that sample size is based on account balance materiality and risk while 83% in Statement 33p agree that substantive samples should be based on risk, knowledge and judgement. In Chapter 4.3.4 research performed by Hall *et al.* (2002:129) indicates that 74% of the respondents applied haphazard as a sample selection method, which is contrary to the responses from Statement 33k, which state that 66% of the respondents indicated that a stratified sample is a method applied in sampling. The difference between the study performed in 2002 and the current study is that the current study made no reference to the different sampling methods and therefore no comparison could be made about the method that is mostly applied.

The relationship between the responses in the current study between Statements 33a-e and 33f indicate that a specific number of transactions is not appropriate for test of detail sample sizes. In Statement 33f, although low, 17% of the respondents would prefer 25 items selected over the full period to be acceptable as substantive procedures. The responses for Statement 33h indicate that 34% agree on coverage for balance sheet items while 66% would perform a stratified sample. The responses in 33k and 33k are contradictory as stratified sampling is based on selecting all

material items and then selecting further items from the remainder of the population. The results are therefore that by selecting material items the percentage of the balance tested is the same as coverage of the balance for balance sheet items. The coverage of balance sheet items indicate that the risk of material misstatement is reduced while Firm W, X, Y and Z applied the principle of number of items for income statement and coverage for balance sheet and their audit sample size were judged to be sufficient. The combination of tests of controls and stratified sampling were also applied to reduce the risk of material misstatement and Firm W, X, Y and Z applied it in their audit methodology. Consultations were held with Firm W, X, Y and Z and policies prepared by the researcher, for Firm W and X, were implemented on that basis. The arrangement was that both the consultant and the Firm holds a 50% share in the methodology and no confidentiality breaches are perpetrated through the disclosure of the policy.

The literature review and development of the sextant risk models in Chapter 3 and 4 form part of the analysis of data. The development of the sextant model for substantive procedures based on coverage of balances to support the conclusions on substantive procedures and coverage on balance sheet items and number of items for test of controls are supported by Tables 3-15 to 3-28, 4-27 to 4-28, Figures 3-8 to 3-10 4-3 to 4.4.

6.4.3 Confidence level for sampling

A total of 86% of the respondents indicates in Statement 35 that the benchmark for confidence level appear to be between 90% and 95% as indicated in the figure below.

Statement 35: Sampling confidence is between 90% and 95%

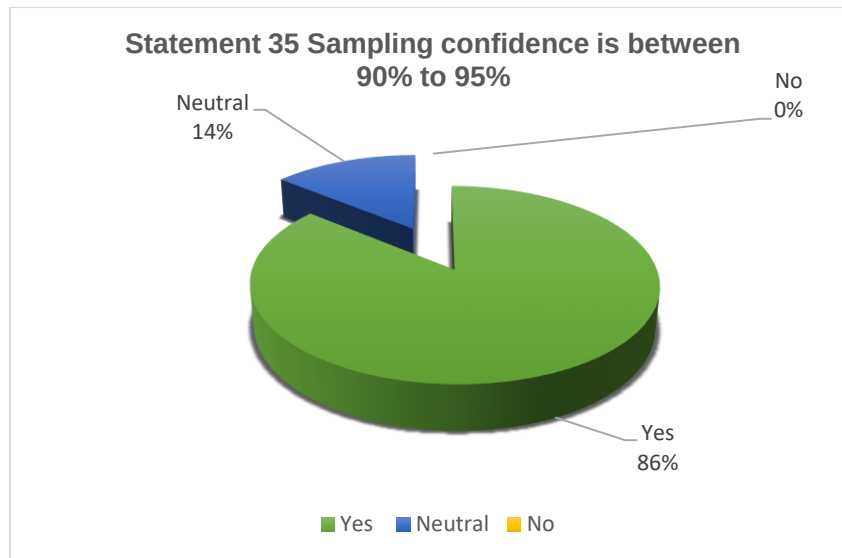


Figure 6-4: Statement 35

Source: Appendix 9 Statement 35

A total of 86% of the respondents indicated that the confidence level for sampling should be 90% to 95%. The conclusion is based on best practices and interpretation of auditors while there is no guidance in the ISAs. The results of research performed by Eilifsen and Messier Jr, (2015:13) differs from the statement above as the weighted average responses in Table 4-16 indicate that tolerable misstatement ranges between 52.5% and 72.5% while Table 4-18 indicates a range of between 80% and 95%. Christensen *et al.* (2015a:66) argue that the confidence level found in their research appears to be between 90 and 90 to 95%, which appears to be in line with the findings as illustrated in Table 4-25 and 4-26. The most relevant benchmark on tolerable error is therefore 95% due to the fact that PCAOB (2014:4-6) reports on the deficiencies on audit sampling with specific reference to testing of revenue. The report argues that the sample sizes should be increased and therefore indirectly that the confidence level should increase. The auditors are not auditing sufficient transactions, which is due to the BRA as less transactions are audited and focus is on the risk and risk management of the client and less on the test of controls and details.

6.5 DATA ANALYSIS RESPONSES FROM THIRD-YEAR AUDITING STUDENTS

Based on the results obtained in the previous questionnaire from the auditing firms and as indicated by Swart (2013:120) the five-point Likert scale used in the previous questionnaire yielded insufficient results for the “neutral scale”. The neutral scale is

removed from the questionnaire as used in Appendix 11 attached and the dimensions are divided into four-point Likert scales, which are [4] strongly agree, [3] agree, [2] disagree and [1] strongly disagree. The number of responses for strongly agree and agree are accumulated and combined as the total “Yes” responses and the same were done with strongly disagree agree to calculate the “No “responses. The number of the responses per statement are expressed as a percentage of the overall responses and is represented in the next part of the Chapter.

Pallant (2010:98) states that the reliability of the scale can be measured through the Cronbach’s alpha and a score of above .800 is very good, while a scale of above .700 is acceptable. The following represents the results of the Cronbach's alpha reliability statistics.

Table 6-8: Reliability statistics

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardised items	N of items
.774	.811	23

Source: Annexure 10

The 23 statements in the questionnaire are all included in the reliability statistics and therefore the scale based on SPSS reliability statistics as indicated in the table above appear to be reliable with a score of between .774 and .811.

6.5.1 Results

The following table as extracted through data analysis of SPSS is applied on the following variables to determine whether there is a correlation between the students’ understanding before the group assignment and whether the understanding improved after the group assignment. The correlation between the third-year students’ understanding of the risk assessment, response and integration after the group assignment are also indicated in the table below. The explanation of the keys and questions are further explained and illustrated in the paragraphs following the table below.

Table 6-9: Correlations

		Low before	Much more after	Assessment AR	Risk response	Integration
Low before	Pearson correlation	1	-.287*	-.121	-.079	-.162
	Sig. (2-tailed)		.046	.407	.592	.267
	N	49	49	49	49	49
Much more after	Pearson correlation	-.287*	1	.101	.352*	.179
	Sig. (2-tailed)	.046		.489	.013	.218
	N	49	49	49	49	49
Assessment AR	Pearson correlation	-.121	.101	1	.724**	.687**
	Sig. (2-tailed)	.407	.489		.000	.000
	N	49	49	49	49	49
Risk response	Pearson correlation	-.079	.352*	.724**	1	.522**
	Sig. (2-tailed)	.592	.013	.000		.000
	N	49	49	49	49	49
Integration	Pearson correlation	-.162	.179	.687**	.522**	1
	Sig. (2-tailed)	.267	.218	.000	.000	
	N	49	49	49	49	49

*. Correlation is significant at the 0.05 level (2-tailed).

Source: INETBFA 2018 and SPSS25

Pallant (2016:137) indicates that the interpretation of strength of large correlations can be a value of $r \geq .5$ up to 1. The Pearson correlation in the table above indicates a strong positive relationship between integration and assessment (AR) at 0.687, risk response and assessment (RA) 0.724 and risk response and integration at 0.522, $n=49$ and $p < .001$.

The purpose of the first three statements in the questionnaire was to determine the students' understanding of the audit planning process and rate their understanding accordingly. The three classifications of high, limited and low were used for the students to understand the categorisation of their knowledge. These general concepts were used in their discussions with audit lecturers. The terminology used was their own language used at university to express themselves.

6.5.2 Interpretation of results on the integrated audit risk model application

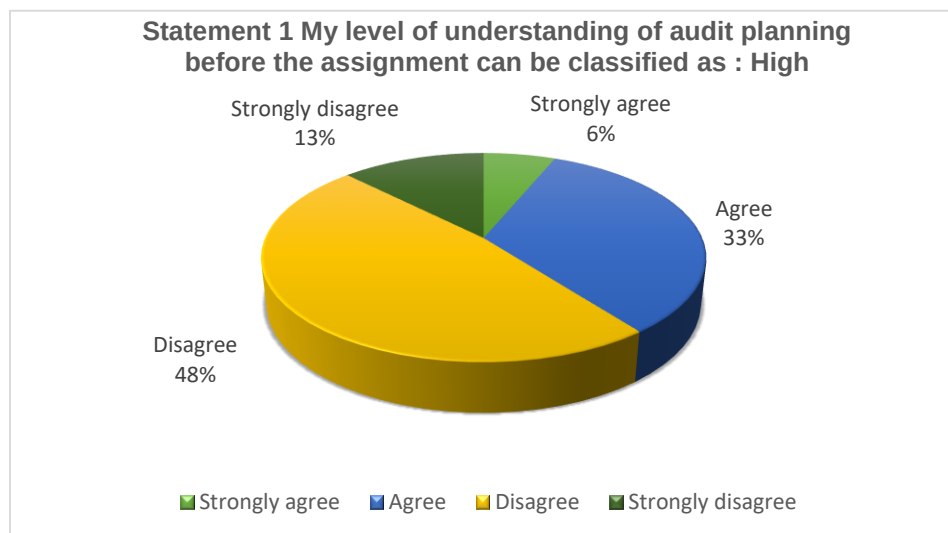


Figure 6-5: High understanding of planning

Source: Appendix 10 Statement 1

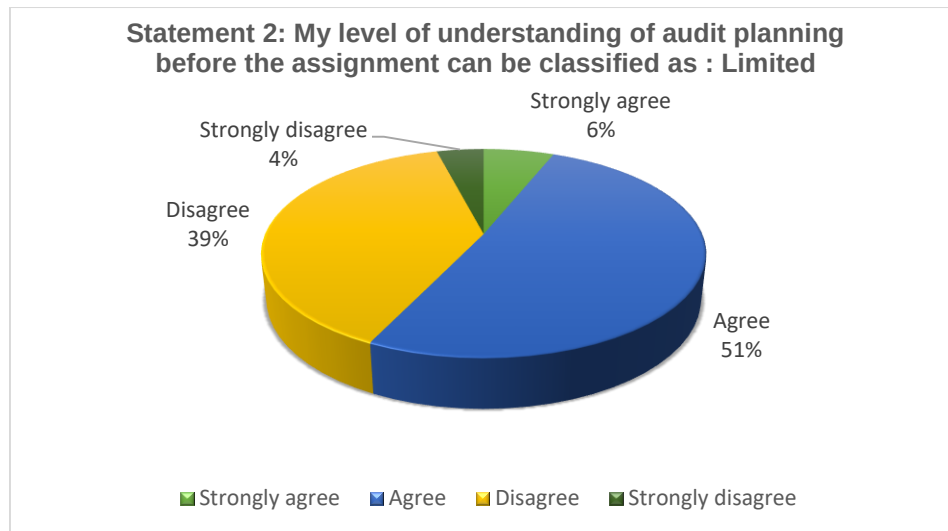


Figure 6-6: Limited understanding of planning

Source: Appendix 10 Statement 2

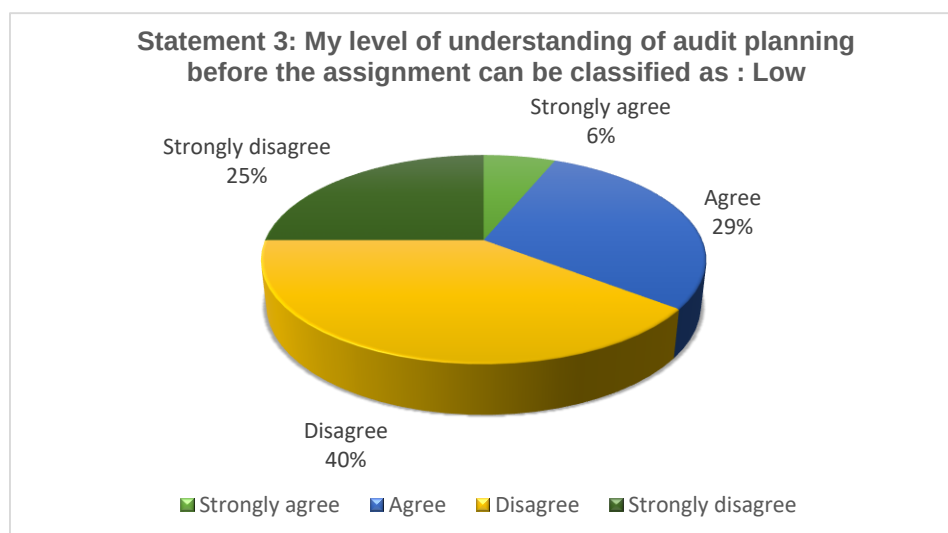


Figure 6-7: Low understanding of planning

Source: Appendix 10 Statement 3

The table below is prepared from the information of the three figures above based on accumulating the positive responses (Strongly agree% + Agree) and negative responses based on (Strongly disagree% + Disagree).

Table 6-10: Knowledge at start of assignment

No	Understanding level before assignment	Agree and strongly agree	Disagree and strongly disagree
1	My level of understanding of audit planning before the assignment can be classified as : High	39.6%	60.4%
2	My level of understanding of audit planning before the assignment can be classified as : Limited	57.1%	42.9%
3	My level of understanding of audit planning before the assignment can be classified as : Low	35.4%	64.6%

Source: Appendix 10: Statement 1 to 3

The table above indicates that the respondents' indicated that 39.6% had a high level compared to a 57.1% with a limited understanding and 35.4% with a low level of understanding of audit planning before the assignment, which was the integrated planning model. The figures therefore indicate that the respondents' understanding are limited as the highest percentage respondents responded positively to Statement 2 with a response rate of 57.1%.

Table 6-11: Knowledge after assignment

No	Understanding level after assignment	Agree and strongly agree	Disagree and strongly disagree
5	My level of understanding of audit planning after the assignment can be classified as: Much more	60.4%	39.6%
6	My level of understanding of audit planning after the assignment can be classified as: Improved	89.4%	10.6%
7	My level of understanding of audit planning after the assignment can be classified as: Same level	29.8%	70.2%

Source: Appendix 10: Statement 5 to 7

The responses for Statement 5 and 6 indicate an increase from 60.4% to 89.4% (29%) relevant to their understanding of audit planning from much more to improved, respectively. The responses in Statement 7 were used as a control question and the concern is that the responses between Statement 6, positive and 7 negative responses should be at least in line with the inverse response. The difference between the responses are 19.2% (89.4%–70.2%) and (10.6%–29.8%). The response for Statement 7 is therefore not reliable and should not be included in the evaluation and conclusion.

Responses in Statement 8 indicated that 89.2% of students would prefer that auditing should be integrated in their learning environment with practical application. The responses for Question 9 on the planning and coordination of the group assignment was 64.6% was of the opinion that meetings and coordination took more time to complete. The concern with this response is that part of SAICA's pervasive skills include leadership and working in a group. A total of 69.4% of the respondents indicated in Statement 12 that they are not in agreement that they would have learnt more from doing the assignment on their own.

The responses of Statement 10 indicate that 98% agreed that it took time and effort to complete the assignment but 83.7% indicated, contrary to Statement 9 and 12, in

Statement 11 that the assignment should be done on a group level. The discrepancy between the 83.7% for group work and 73.5% negative responses on individual work, is a concern. The inverse responses of Statement 11 and 13, respectively, may be interpreted that respondents were overwhelmed by the time to coordinate the work. A limitation to this questionnaire is that the computer skills based on work allocated to them was not measured or included.

Statement 14 of the questionnaire was used to determine whether the integrated model as a group assignment could contribute to an improved understanding of audit planning and the associated constructs as listed in the table below.

Table 6-12: Understanding of integrated concepts

	The assignment introduced a better understanding of the following topics	Agree and Strongly agree	Disagree and Strongly disagree
14.1	Audit planning	81.6%	18.4%
14.2	Planning materiality	81.6%	18.4%
14.3	Performance materiality	83.7%	16.3%
14.4	Trivial materiality	87.8%	12.2%
14.5	Assertions	87.8%	12.2%
14.6	Audit risk assessment	89.8%	10.2%
14.7	Responses to risks identified	89.8%	10.2%
14.8	Working paper references	79.6%	20.4%
14.9	Overall sampling	77.6%	22.4%
14.10	Integration of the topics above	89.8%	10.2%
	Average	84.9%	15.1%

Source: Appendix 10: Statement 14 to 14.10

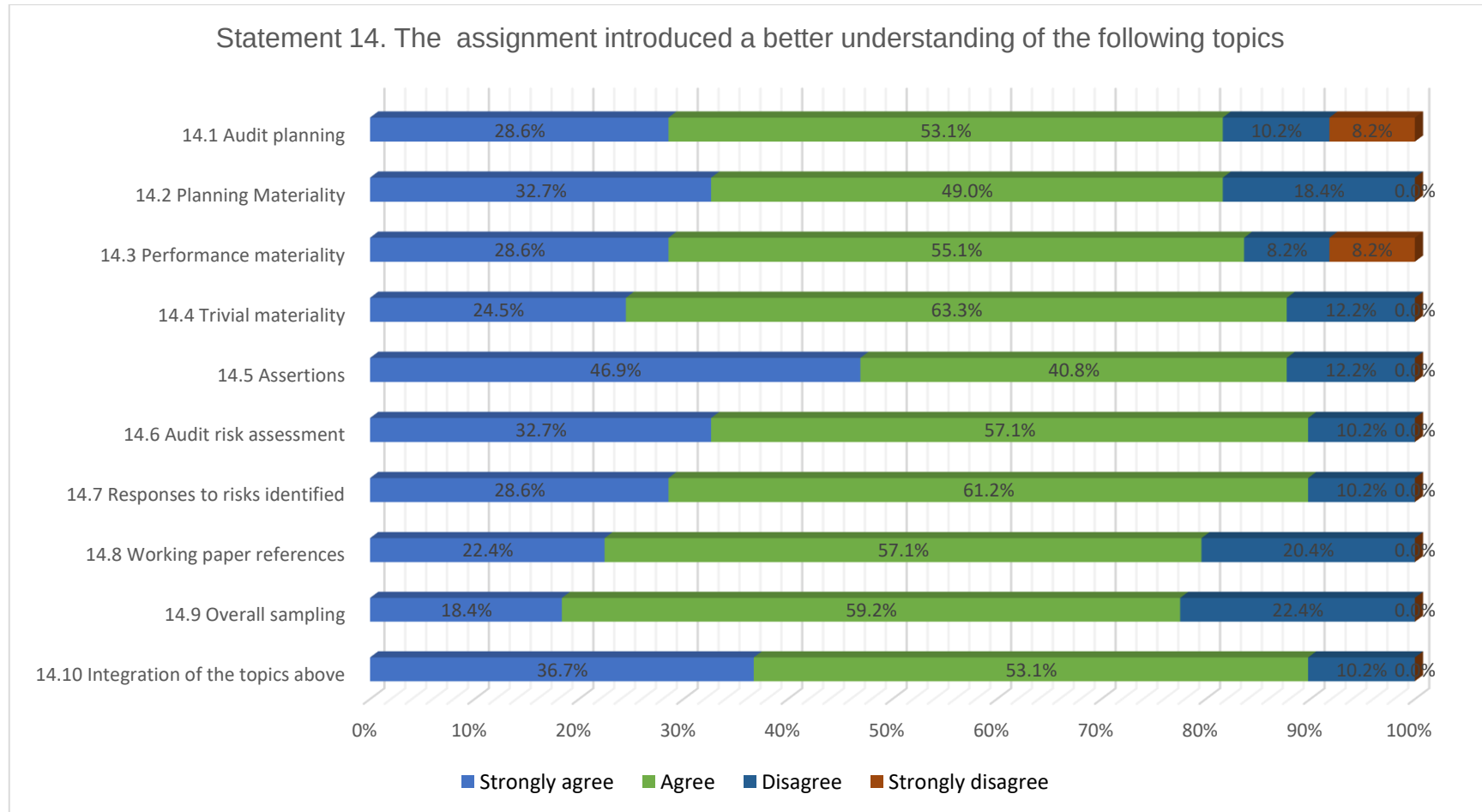


Figure 6-8: Understanding of model

Source: Appendix 10: Statement 14 to 14.10

The average positive response rate was 84.9%, which was more than expected. The statements required the respondents to indicate their understanding of specific constructs and terminology that is applied in the auditing profession. A comparison between the response rates of the students' understanding before and after using the integrated auditing planning model proves that there is a significant higher percentage that indicate that their understanding increased from a limited understanding of the audit process of 57.1% to a higher average understanding of 84.9%.

The overall concern is that Statement 14.8 on working paper references and 14.9 overall sampling had a negative response rate of above 20%. Statement 14.1 audit planning, 14.2 planning materiality and 14.3 performance materiality highlight concerns as a higher percentage of negative responses than the average negative response rate of 15.1% were found.

Statement 14 indicates that 83.3% of the respondents indicated that the assignment on the integrated model assist the students to better understand the integration of theory into practice.

6.6 BUSINESS RISK AND AUDIT RISK

6.6.1 Business risk approach (BRA)

The development of the audit models or methodologies differentiate between the various approaches, the BRA and integrated models are the only existing models that literature currently deals with.

The elements in the BRA as discussed in Tables 2-3, 2-4 and 2-5 were developed by comparison, analysis and combination of the elements discussed in the literature review Section 2.2.7.1. The documentary review consisted of journal articles, IFAC, King IV requirements and other available literature.

Table 2-6 (Comments on BRA) differentiates between the proponents for and against the BRA and 25 out of 37 are against the model due to its complexities.

The combined elements as discussed in Chapter 2 forms part of the risk identification, assessment and responses part of the integrated model at the financial

statement and assertion level. The development of the model and how the risks elements are included forms part of the development of the model section in Chapter 7.

6.6.2 Audit risk identification, assessment and responses

In Chapter 3.3 the literature analysis of the risk identification indicated that literature and sample of proper risk identification does not exist in auditing literature. The literature for risk quantification in the auditing environment is limited. Literature in the other risk management fields indicates that audit risk can be assessed through quantification as illustrated in Tables 3-2 to 3-10 and Table 3-14 and Figures 3-2 to 3-7. The audit literature indicates limited guidance on audit risk quantification as represented in Tables 3-11 to 3-13. The development of the audit risk quantification from business risk management is illustrated in Tables 3-15 to 3-28 and Figures 3-9 to 3-11.

The audit risk quantification and responses to audit risk identification and assessment are combined in the integrated model in Chapter 7.

The data analysis for materiality and the comparison between the JSE-listed companies' financial information are discussed in Chapter 4 and the following main points are discussed below as part of the data analysis chapter.

6.7 RELATIONSHIP BETWEEN AUDIT MATERIALITY, RISK AND SAMPLING

The questionnaire administered to the auditing firms is divided into different constructs in auditing, which include audit materiality, differences, risk, significant, pervasive, trivial, sampling and the relationship between materiality, risk and audit sampling. The relationships between the constructs are also illustrated in the literature as illustrated in Table 4-18.

The following statements in the questionnaire include statements directed at the audit firms' perceptions on the relationship between specific constructs. The constructs and their responses are represented in the table below.

Keys to abbreviations used in table below:

MR = Materiality and risk

MS = Materiality and sampling

MRS = Materiality, risk and sampling

Table 6-13: Relationship between materiality risk and sampling

No	Statement	MR	MS	MRS	Yes %	Neutral %	No %
3	Type of company and materiality drivers	☒	☐	☐	90%	0%	10%
8f	Materiality driver and types of entities	☒	☐	☐	67%	0%	33%
9	Materiality and risk no impact	☒	☐	☐	14%	14%	72%
11	Inverse relationship materiality and risk	☒	☐	☐	43%	14%	43%
22	All material balances should be audited	☐	☒	☒	86%	0%	14%
23	Non-material balances not to be verified	☐	☒	☒	57%	14%	29%
24	Risk of material misstatement over and understatement	☒	☐	☐	72%	0%	28%
28	Materiality, audit and fraud risk impacts on sample size	☐	☐	☒	86%	0%	14%
33 p	Substantive procedures based on risk and professional judgement	☒	☒	☒	83%	17%	0%

Source: Appendix 9 and statements included in the table above

The responses in the table above indicate that there is a relationship between audit materiality, risk and sampling as one elements directly or indirectly influences the other.

6.8 CONCLUSION AND RECOMMENDATION

There is a relationship between the responses in the questionnaire from the audit firms and the literature that is available. The integration of audit risk, materiality and audit sampling is therefore important as the auditing environment appears to be lacking direction. The responses from the questionnaire administered to the auditing firms combined with literature indicate that guidance is lacking as far as the extent and nature of materiality benchmarks, risk identification, assessment, sample sizes for tests of control, analytical procedures and test of details are concerned. The question that can be asked is whether the lack of guidance may be a symptom of the current South African auditing profession.

The benchmarks and methods described in the chapter are elaborated upon in Chapter 7, which is the discussion of the development of the integrated audit planning model. Research is also directed at current information and therefore it is important to briefly discuss the current reputation of the audit profession in South Africa.

The reputation of the South African (SA) auditing firms has been tainted by the current media releases on Deloitte, KPMG and Nkonki due to press releases related to their clients.

The formal investigations and reports are not yet released and as far back as 1994 the reliability of audit sources are questioned (Hirst 1994:114,117). The current media reports indicate that various investigations are in process but although the information is current the reliability of media reports without any concrete report issued by an authoritative body should be treated the same way as the audit evidence as required suggested by Hirsch (1994:117). The judgements should be withheld until formal reports are issued and due to the duty of an auditor to act with professional care are upheld in this research. The damage has been done although the firms were not formally found guilty or not guilty. The research will not express an opinion on the unresolved investigations.

The following table is an example of a synopsis of the media coverage that the firms do receive and do not include all firms.

Table 6-14: Media coverage on some auditing firms in SA

Firm	Client	Issue	News release and link
Deloitte	Steinhoff	<i>"SA auditors body to probe Deloitte's contribution to Steinhoff scandal"</i>	Citizen. 2017. SA auditor's body to probe Deloitte's contribution to Steinhoff scandal. https://citizen.co.za/news/south-africa/1760544/sa-auditors-body-to-probe-deloittes-contribution-to-steinhoff-scandal/ Date of access: 15 January 2018.
Deloitte	Steinhoff	<i>"PwC looking to complete Steinhoff probe by end-2018"</i>	Moneyweb. 2018. PwC looking to complete Steinhoff probe by end-2018. https://www.moneyweb.co.za/in-depth/investigations/pwc-looking-to-complete-steinhoff-probe-by-end-2018/ Date of access: 28 Mar. 2018.
KPMG	Gupta companies	<i>"Named: KPMG executives axed over Gupta scandal"</i>	Times live. 2017. Named: KPMG executives axed over Gupta scandal https://www.timeslive.co.za/news/south-africa/2017-09-15-named-kpmg-executives-axed-over-gupta-scandal/ Date of access: 11 Nov. 2017.
KPMG	Auditor-General contracts	<i>"AG cancel public sector contracts with KPMG and Nkonki"</i>	Fin 24. 2018. AG cancel public sector contracts with KPMG and Nkonki. http://www.fin24.com/Companies/financial – Services/ Government-cancels-auditing-contracts-with-kpmg-and-nkonki-inc-2018-04-17 Date of access 20 Apr. 2018.
Nkonki	Guptas	<i>"The Nkonki Pact Part 1 – How the Guptas bought themselves and auditor"</i>	Fin 24 City press. 2018. The Nkonki Pact Part 1: How the Guptas bought themselves an auditor. https://www.fin24.com/Economy/the-nkonki-pact-part-1-how-the-guptas-bought-themselves-an-auditor-20180328 Date of access: 3 Apr. 2018.
Nkonki	Auditor-General contracts	<i>"AG cancel public sector contracts with KPMG and Nkonki"</i>	Fin 24. 2018. AG cancel public sector contracts with KPMG and Nkonki. http://www.fin24.com/Companies/financial – Services/ Government-cancels-auditing-contracts-with-kpmg-and-nkonki-inc-2018-04-17 Date of access 20 Apr. 2018.

Source: Links to media releases as indicated above

The implementation of the results of the responses on the integrated audit planning model will contribute towards a more comprehensive audit tool that will simplify the audit planning and direct the audit to the appropriate risky balances that requires audit attention. Further research is required to extend the integrated audit planning model into an integrated audit evidence and completion model. The integrated audit planning model is suggested in this research and the integrated planning model for gathering audit evidence already exist.

Further research is required on the impact that analytical procedures may have on the extent of test of details and what the reduction in sample sizes should be.

CHAPTER 7

DEVELOPMENT OF AN INTEGRATED AUDIT PLANNING MODEL

7.1 INTRODUCTION

Prior research indicates that various integrated models were developed by researchers such as Fouché and Visser (2008), Mentz (2014) and Swanepoel (2017). The research investigated in the above-mentioned literature, theory and empirical results adopted research methodologies to assist them to build an integrated model. The integrated model is a combination of various concepts into one executable model that can be practically applied in the accountancy environment.

The objective of this chapter is to discuss the stages of the development of the integrated methodology to standardise auditor's planning with regard to BRA elements, audit risk identification, assessment and responses, materiality and sample sizes. The chapter illustrates the building of the model, which is a combination of quantitative and qualitative results in literature, grounded theory, responses from questionnaires, adjusted models found in other disciplines and observations in public practice. The inductive and deductive approaches indicate that observations are a valid research methodology. Chapters 6 and 7 also include the testing of the model and the development of policies and procedures for materiality, sample sizes based on the quadrant and sextant audit quantification. The model was developed and compared to the ISA's, literature and then tested and auditors and accountants' responses used to develop the model further. The students had to complete an assignment in groups as indicated in Appendix 11 after which they had to complete the questionnaire which is attached as Appendix 11. The final testing of the model were done with students in their third year in 2015 and after the literature research and empirical testing with accountants and auditors in 2018.

The chapter is divided into the following sections:

- Audit documentation
- Business risk audit elements
- Risk identification
- Audit risk model, risk quantification, sextant and inverse detection risk model
- Responses to risk
- Materiality
- Sample sizes
- Integrating concepts and building the model
- Conclusion and recommendations

7.2 PLATFORM USED TO DEVELOP MODEL

The integrated planning model is an electronic working paper and Microsoft Excel (hereafter referred to as Excel) was used in the development of the integrated audit planning model (IAPM). Excel is also referred to as a spreadsheet program and is the basis or platform used in the development of the model. Excel has various built-in functions and formulas that assist in the integration of the model. The functionalities and formulas as discussed in the next sections are applied in the IAPM. The reason why Excel was used in the development and application of the model, is because it allows for a logical presentation for the relevant information.

The starting point of the IAPM is to complete the client and year-end information, which is illustrated in Figure 7-2 in Chapter 7.3.1 below. Thereafter the recoding of the trail balance part for account numbers, account descriptions text, debit and credit balances in separate and consecutive cells and the selection of the type of balance (SOCl and SOFP) through a dropdown menu that should be completed as illustrated in the Figure 7-1 below. These balances can be recorded manually or the “Vlookup” function can be applied if the clients supplies an Excel Trial Balance to import the data from. The “Vlookup” function reduces the possibility of incorrect entry of data and is a more economical and time-saving method to apply than manual entry. The figure below is a representation of the relevant cells as discussed above.

	A	B	C	D	E
	Account number	Account Description	Debit	Credit	Account type
14					
15					

Figure 7-1: Trial balance and account type entry

Source: Own research (IAPM)

Nested ifs were used as formulas for the automatic indication of the materiality of the balance, risk level and calculations based on materiality selected, the risk level for risk levels and sample size calculations. Data validation was used to select assertions linked to the risks, risk assessment levels, reasons for risk or the BRA risks identified through a dropdown menu and to prevent incorrect entry of the data in the IAPM.

The next part of the chapter is the discussion of the relevance of documentation as part of the IAPM.

7.3 AUDIT DOCUMENTATION

The integrated audit planning model is based on an electronic working paper in Excel and audit documentation is the cornerstone for auditing. As indicated in the problem statement and objective discussed in Chapter 1. The problem statement, primary, theoretical and empirical objectives and the extent to which it is achieved in this research are discussed in the following paragraphs.

Reports on external engagement file monitoring reviews indicated that documentation of the audit process contains various weaknesses which are addressed in the following paragraph. This statement above is supported by IRBA's (2011:28) annual report that stated that 10% of 658 engagement inspections performed in a financial year indicated documentation weaknesses. IFAC (2018d ISA 230 par 6(a)) defines audit documentation as "the record of audit procedures performed, relevant audit evidence obtained, and conclusions the auditor reached (terms such as "working papers" or "work papers" are also sometimes used)". IFAC (2018d ISA 230 par 3) further states that the purpose of

documentation is to assist the auditor during planning and performance of the audit. The documentation serves further purposes such as to assist the supervisors to review the work as required by IFAC (2018q ISA 220), accountability of engagement team for work performed, ensure that quality control reviews and inspections can be performed in accordance with IFAC (2018p ISQC1) and also for external inspections to be performed. Limited improvements were made in the documentation issues reported since the 2011 monitoring report was issued. The IRBA (2016:11) report still indicates that 1482 significant inspection findings were raised during the 2015/2016 year and therefore indicate that there are documentation deficiencies in the documentation prepared by the auditing firms.

7.3.1 Weaknesses identified in workings in working papers

The first issue identified over the past seventeen years on audit working papers was that conclusions on audit working papers are not, in certain instances, even relevant to the risk, objectives and assertions that were indicated during the planning, as well as the evidence gathering stage as being the audit objectives. IRBA (2016:14) listed specific areas of concern with regard to weaknesses in documentation. The concerns of documentation weaknesses include Property plant and equipment (294), risk and responses (147), revenue and income (130), financial assets and liabilities (121) and internal control testing (94) that serve as examples of the highest occurrence of significant inspection findings.

Since 2001 the following are examples of conclusions that were found on auditing working papers:

“All sales are complete, accurate and did occur.”

By using the word “all” it may imply that 100% of the population was selected as indicated in the conclusion. The working paper may indicate a sample size of 20 to 30 or more items and the conclusion should therefore be drawn based on the sample selected from the population.

The above-mentioned issue is a risk management issue from an auditing firm’s perspective as the population was selected based on the discussion in the previous paragraph, which contradicts the sample size documented. Certain auditing firms keep

their clients' records in their audit file and can be used as audit evidence when the file is subpoenaed for any inspection or litigation purposes. The conclusion and the evidence documented can be seen to be contradictory as explained above.

From a risk management perspective, the following conclusion would appear to attract the least risk:

Based on the sample selected:

It appears that the above-mentioned objective has been /

IFAC (2018d ISA 230 par 8) argues that an auditor should record evidence of his procedures in such a manner that any knowledgeable auditor may re-perform the same steps and come to the same conclusion. The risk that an auditor may express an inappropriate audit opinion is less than the risk that an audit opinion can be contradicted by the evidence on working papers and inappropriate conclusions documented on working papers. IFAC (2018d ISA 230 par 9) requires from the auditor to record the nature timing and extent of procedures, results thereof, significant matters, the identification of the complier and reviewer and date of performance. All these matters should also be recorded during the planning process as stipulated in IFAC (2018d ISA 230 Appendix), which lists additional ISAs with additional requirements relevant to documentation. The example of the top part of the audit documentation to comply with the requirements are represented in the figure below and should be completed as soon as the audit planning commences.

IFAC (2018d ISA 230) par 3 to 11 requires from an auditor to prepare and record their judgements on a working paper. The following should be included, the identification of the member performing and supervising the work, record of work performed, timeous recording of work and results of the audit work performed as well as a conclusion. The name of the preparer, date and details of reviewer and date should also be recorded.

The working paper below is prepared on the requirements of ISA 230 and prior experience and the figure below is the example of the top part of the planning model as it is classified as a working paper.

Firm			WP Ref:	
Client		Prepared by:	Date:	
Year-end		Reviewed by:	Date:	

Knowledge of business

Type of industry		
Engagement risk		
New client		
Management and shareholders		
Public interest score		

Figure 7-2: Top part of planning document

Source: Own research (IAPM)

The following paragraphs are the building blocks for the integrated planning models, which are based on the literature in Chapters 1 to 6. The individual concepts form part of the integrated models and are discussed before the integration of all the concepts into the IAPM.

7.4 BUSINESS RISK AUDIT ELEMENTS

Van Buuren *et al.* (2014:110) argue that the BRA focuses more on the “primary indirect evidence” based on the results of the auditor’s risk assessment at financial statement or entity level and less on direct and account-level evidence, which indicates that less attention is placed on account balances and classes of transactions for audit purposes. The figure below differentiates between the emphasis placed on various models on the direct and indirect methods and its impact on the account and entity level evidence.

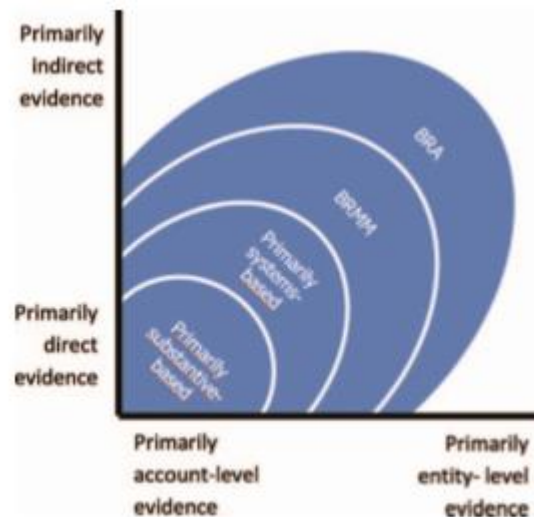


Figure 7-3: Audit planning and the relation between the nature of evidence and the continuum of audit approaches

Source: Van Buuren *et al.* (2014:110)

The figure above illustrates that the BRA moved from the account balances and classes of transactions level to the indirect entity level evidence and less transactions are therefore verified and the risk of fraud may increase. The move away from transactions audit is also contrary to the requirements of PCAOB (2014:6) as discussed in Section 4.2.2. that more audit evidence should be gathered and sample sizes should be increased.

The elements as identified in Chapter 2.2.7.1 that were developed from a literature analysis in Table 2-5 between the BRA project published by Messier Jr. (2014:278) Exhibit 1 (RBA questionnaire), IFAC (2018g ISA 315) , IFAC (2018n ISA 570) and KING IV (2016) indicate similarities between the literature and the BRA elements and the IAPM included in those elements, which can be selected based on a dropdown menu as reasons to support the assessment of the risk and the specific assertion that is addressed by that risk. The following figure is an example of BRA elements and risk identifiers used in the IAPM.

**Table 7-1: BRA and risk identifiers, Inherent risk factors/fraud risk factors/reasons
ISA 330**

Complexity of transactions
Judgement required with account balances
Non-routine transactions
Unusual transactions after year-end
Large volume of transactions
Cash transactions
Judgement required
Non-related expenses
Not within guidelines
Non-compliance of laws
Susceptibility to fraud, loss and theft
Origin of transactions
Management override
Objectives, strategies, and business risks
Risk assessment process including significance, likelihood of occurrence and appropriate actions
Business risk monitoring
Performance measures and monitoring
Key performance measure indicators
Reporting of any suspicious behaviour

Source: Messier Jr. (2014:278), IAPM and Table 2-5

The table above is an extract from the list and does not represent all the risk identifiers and the IAPM makes it possible for the auditor to select the relevant risk against the specific assertion selected through a dropdown menu. The auditor therefore identifies the risks, assesses the risks and supply reasons for the risk selected and respond to the risk with the sample size selected based on the risk level and the reworking paper reference as required by the ISAs.

7.5 MATERIALITY, RISK AND SAMPLING AS PART OF THE INTEGRATED MODEL

7.5.1 Ethical and moral considerations and Spirit of the standards

The auditor should consider the intention of the standard setters and should not form their own conclusion that best suits the auditor's situation or circumstances.

It is suggested that amounts lower than materiality should be considered as the tolerable threshold. This percentage was previously applied as amounts approaching 75% to 80% of materiality. The spirit in which an audit is performed should be that any difference approaching the tolerable threshold should be reinvestigated. Sample sizes should then be extended, if possible, or the client should adjust misstatement or errors to an acceptable level.

It is further suggested that classes of transaction should be evaluated in total and then considered to be material and no netting off of assets and liabilities was intended as it is not even commonly allowed in the accounting standards except for a few exceptions.

The suggestion above would further indicate that in aggregate should be based on classes of transactions in total. This theory was tested in Chapter 6 as part of the empirical research. If the auditor committed to a materiality figure the commitment should be from an ethical as well as a moral point of view not to deviate from the figure documented on the audit file. If good and valid reasons can be given and documented, and it stays the exception rather than the rule, deviation from the final materiality figure should be allowed.

It is suggested that there is a relationship between materiality and risk, these two concepts cannot be separated.

As a result, the auditor should respond to the audit risk identified to perform the audit procedure to reduce audit risk to an acceptable level. It is suggested that there is a relationship between materiality risk and audit procedures (IFAC 2018 g ISA 315 par 9; IFAC 2018i ISA 330 par 5, 6).

IFAC (2018g ISA 315 par 10) illustrates that *"there is an inverse relationship between materiality and the level of audit risk, that is, the higher the materiality level, the lower the audit risk and vice versa"*. The ISA continues to explain that the relationship between "materiality and audit risk" should be taken "into account when determining the nature,

timing and extent of audit procedures”.

From the discussions above it is argued that the following inverse relationship or relationship may significantly influence the audit approach and audit process.

Table 7-2: Inverse relationship between materiality and audit sample size

Materiality figure	Low	High
Audit sample sizes or coverage	High	Low

Source: ISA 315 and ISA 330

The probability and risk matrix and risk strategies were adjusted for the application in the auditing environment and the result is shown in Figure 4-10. The same principle was applied and the significant risk was included and the result is Figure 4-12, which indicated that with five quadrants a pentagram instead of a square should be applied.

During discussions a suggestion was made that a significant risk but low materiality figure may occur when specific accounts are taken into account such as Share Capital Revenue recognition and related party transactions serve as examples as the following risks and characteristics can be allocated to the specific balance:

- Compliance of the Companies Act
- Changes in shareholders
 - Authorised
 - Unauthorised

The balance of Share Capital may be disclosed at a low value but can have a significant influence on the ownership of the company if fraudulent share transfers are made. Related parties can also be classified as a significant risk as their related party's transactions and off balances sheet transactions were reported as being part of Enron and Arthur Anderson's demise during 2001 and 2002.

7.6 DEVELOPMENT OF THE INTEGRATED MODEL

Following the problems mentioned in paragraph 7.5 above, the integrated model

whereby risk, materiality and sampling are combined in a single model, is proposed. The first step in the integrated model was to determine the benchmark for materiality and materiality drivers for specific industries.

7.6.1 Materiality benchmarks

Section 3.5.5.1, 4.2, 4.2.1, 2, 6.2.1, 6.2.2, 6.5.1 and Table 3-18, 3-23, 4-2, 4-11, 4-12, 6-1, 6-12 and Figure 6-1 all conclude that the current benchmarks as used in the IAPM are the most appropriate benchmarks. The standard materiality benchmarks as shown in Table 7-4 serve as a basis for quantification and are discussed below. The following paragraphs deal with concepts related to materiality such as materiality, trivial, performance materiality, audit differences, aggregate and pervasive.

Table 7-3 : Quantitative indicators of materiality

Materiality quantitative	Benchmarks	
Account type	Low	High
Turnover	½ %	1%
Gross profit	1%	2%
Net income	5%	10%
Total assets	1%	2%
Equity	2%	5%

Source: Marx et al: (2016:8-27)

The results from literature in Appendices 1 to 8 and responses as indicated in Chapter 4 and 6 indicate that turnover and net income are the most appropriate and mentioned benchmarks. The research in Chapter 2 indicated that materiality drivers may differ from the traditional appropriate benchmarks when type of industry is also considered.

The following benchmarks, as discussed below, are related to materiality, as the conclusion of the audit differences in IFAC (2018j ISA 450) and the audit report IFAC (2018r ISA 705) and 706 (2018), include the consideration of materiality at various levels. The level defaults to higher percentage if no percentage selected.

Table 7-4: Materiality Selection in IAPM

Materiality quantitative	Benchmarks		Selected	
Account type	Low	High	Low	High
Turnover	½ %	1%		
Gross Profit	1%	2%		
Net income	5%	10%		
Total assets	1%	2%		
Equity	2%	5%		

Source: Own research, IAPM

The consideration of materiality is included in the IAPM as illustrated in Figure 7-4 to 7-6 below. The auditor needs to enter the value of the balance selected and choose one materiality benchmark as indicated in the last two columns as indicated in Table 7-4 above, which then calculates the materiality value. The percentage is displayed as illustrated in the figure below. The value of materiality displayed are the selected percentage selected above multiplied by value of the materiality benchmark selected.

	K	L	M
4	3 Materiality		
5			
6			
7	Balance of selected account	Overall Yes	
8		R	-
9	Performance %		
10			
11	Justify most appropriate method		
12	Turnover		

Figure 7-4: Materiality selection and calculation

Source: IAPM

The value entered in the trial balance is compared to the calculated materiality value and

indicates if the balance is material. The option to indicate a balance that is qualitatively material can be selected from the dropdown menu. The option to select the overall or performance materiality per line item exist and by either selecting with a dropdown menu the overall materiality (OM) or (PM), which changes the value of materiality calculated in that specific line. The materiality figure per line item influences the sample size used for planning purposes for each assertion based on the risk level selected. The risk level and sample sizes are discussed later in the chapter.

The figure below illustrates the cells relevant to the discussion above while the calculation and selection of PM are discussed in the next paragraph.

	K	L	M	N
14	Material Value / Quantitative	Material Nature / Qualitative	Overall (OM) or performance materiality (PM)	Materiality selected
15				0

Figure 7-5: Overall and performance materiality

Source: Own research (IAPM)

The following figure is an illustration of overall, performance and trivial materiality to represent the integration and calculation of the concepts as discussed above and in the paragraphs below.

Enter value of selected account				0.0%			Calculation	Defaults to higher percentage if no % selected
3 Materiality	Balance of selected account	Overall Yes	Performance Yes	Trivial Yes				
	R	-	R	-	R	-	Calculation	
Performance %			70%	80%	1%	2%		
Choice type in "a"							Benchmark indicate 0.5% to 1% which appear to be too low and expected used.	
Justify most appropriate method								
Turnover			Choose an account from the list menu.					

Figure 7-6: Materiality elements in IAPM

Source: Own research (IAPM)

7.6.2 Performance materiality

One of the limitations in the questionnaire was that PM was not included. Based on observations experienced through the review of audit engagement files the PM benchmarks were set between 70% and 80% of materiality, which is at the same level as the tolerable error was set at previously. The consideration of PM is included in the IAPM as illustrated in Figures 7-4 to 7.6 above and the auditor needs to enter an "a" in the cell to select the relevant benchmark and the amount is calculated and displayed.

The option to select the performance materiality per line item exist and by either selecting with a dropdown menu the OM or PM per cell which changes the value of materiality calculated. The calculation of the sample size per assertion per line items will be influenced by the PM selected and if no performance materiality is selected the default will be overall materiality. The calculation of trivial errors or materiality is included in the IAPM and is discussed below.

7.6.3 Trivial errors relative to audit differences

The guidance on trivial errors consists only of a definition and it is left to auditors to form their opinion. A total of 83% of the positive responses concluded that trivial errors may add up to be material. The consideration of trivial errors is included in the IAPM as illustrated in Figure 7-4 to 7-6 above and the auditor needs to enter an "a" to select the relevant benchmark and the amount is calculated and displayed.

The conclusions in Chapters 4 and 6 indicated that the expected benchmark for trivial, of 5% to 10%, commonly used in practice, appears to be too high. A total of 67% of the respondents disagreed with a benchmarks of 1% to 2%. While 100% of the respondents disagreed with a benchmark of 10% to 20%. The higher the percentage for trivial materiality indicated in the questionnaire, the higher the percentage of respondents that disagreed. The conclusion is that an acceptable benchmark for trivial errors appears to be between 0.01% and 0.5% of materiality.

The auditor should combine the definition of trivial, according to IFAC (2018j ISA 450), and professional judgement when considering trivial errors. The trivial materiality is included in the planning stage for the auditor to consider during the audit and not only at the reporting, conclusion and finalisation stage of the audit.

While 100% of the respondents disagreed with a benchmark of 10% to 20%. The higher the percentage for trivial materiality indicated in the questionnaire, the higher the percentage of respondents that disagreed. The conclusion is that an acceptable benchmark for trivial errors appears to be between 0.01% and 0.5% of materiality. The auditor should combine the definition of trivial, according to IFAC (2018j ISA 450), and professional judgement when considering trivial errors. The trivial materiality is included in the planning stage for the auditor to consider during the audit and not only at the reporting, conclusion and finalisation stage of the audit.

The assessment and quantification of risk forms the next part of the chapter and the integration thereof into the IAPM.

7.6.4 Audit risk quantification and sextant model

The combination of materiality and risk due to the interrelationship between these concepts as discussed in Chapter 3 was the second step in the development of the integrated model.

The quadrant names based on the combined risk and material balance axis resulted in the assessments as indicated in Table 7-6 below. The calculation of the values of column “z” and “m” below is explained as follows. The numbers per quadrant ranging from high to low were allocated to each quadrant as shown in column “z”. The numbers per

quadrant divided by the multiplier as indicated in Chapter 3 returned the value of column “m”. The value of “m” multiplied by 1 or -1 resulted in the “x” and “y” columns as explained in the reasons column below.

The keys for the abbreviations in Table 7-5 column one (z) below is:

HR = High risk, LR = Low risk, HM = High material balance and LM = Low material balance.

Table 7-5: Risk and materiality data

Quadrant	Multiplier = 2	Horizontal = Risk	Vertical = Materiality	Reason - HM = High Material balance and LM = Low material balance
z	m = z/2	x	y	R= Risk, M = Material balance
4 HR/HM	2	2	2	R and M High
3 HR/LM	1.5	2	-1.5	R High and M Low and thus M negative
2 LR/HM	1	-1	2	R Low and thus R negative and M High
1 LR/LM	0.5	-0.5	-0.5	Low R and M and thus both negative

Source: Own research (IAPM)

The conclusion from the above experiment is that the traditional quadrant model can only accommodate four different levels. This model is as a result insufficient as significance should be included as a fifth and sixth level. The proposal is that a sextant approach be implemented based on the above discussions. The development of the sextant approach compared to the quadrant approach was the next step in the integrated model development.

7.6.5 Development of the sextant approach

The conclusions in Chapter 6 indicated that 66% chose the benchmark for significant as 1% to 2% of total assets or turnover. Due to the importance of significant based on the

responses the audit risk model should include it as a risk level. The sextant approach is the combination of audit risk assessment and classification of balances as material and not material.

7.6.6 Audit risk model

Olson (2002) mentions that the risk model only consists of four quadrants, which is a shortcoming as an auditing risk management model requires that “significant” should be included in the model. Additional quadrants are thus required and resulted in the sextant approach. The conclusion that can be drawn from above is that the auditing risk matrix should include significant, high and low as risk levels as implied in the ISAs discussed above that illustrates the development from the traditional risk and responses matrix, to the sextant model. The categories as suggested in Chapter 3 can be interpreted as levels of risks and equates to the suggestion that risks should be a three-tier category:

- Significant instead of fundamental (SR = Significant risk)
- High instead of significant (HR = High risk)
- Low instead of merits attention (LR = Low risk)

The elements in quadrants of Table 7-5 were extended to include quadrant 5 and 6 as well as the combined significant risk and material balances assessment and resulted in the adjustment to a sextant model as illustrated in Table 7-6 below. The keys for the abbreviations in Table 7-6 Column 1 (z) below is:

SR = Significant risk, HR = High risk, LR = Low risk, HM = High material balance and LM= Low Material balance.

Table 7-6: Risk and materiality data

Sextant	Multiplier = 2	Horizontal = Risk	Vertical = Materiality	Reason
z	m = z/2	x	y	R = Risk, M = Material balance
6 = SR/LM	3	3	3	R Significant and M Low
5 = SR/HM	2.5	2.5	2.5	R and M Significant
4 = HR/HM	2	2	2	R and M High
3 = HR/LM	1.5	2	-1.5	R High and M Low and thus M negative
2 = LR/HM	1	-1	2	R Low and thus R negative and M High
1 = LR/LM	0.5	-0.5	-0.5	Low R and M and thus both negative

Source: Table 7-5 adjusted

Section 3.5.8 and Table 3-25 to 3-29 explain the development of the sextant quantification and risk model per level and is included in the IAPM as part of the risk identification, assessment and quantification as illustrated in the figure below. Table 7-6 above illustrates the calculation of the sextant and the calculation of the r-value based on the most common found multiplier as discussed in Section 4.2.3 and Table 3-17, 3-18 and 3-20. Section 3.5.8 and Table 3-30 illustrate the calculation of the inverse detection risk model and concludes that the lower the detection risk the higher the audit risk will be.

The calculation of the detection risk value is explained in Equation 3-4. The assertion is selected, the reason for the assertion is selected in the next cell, the risk level is selected in the following cell and the value of the risk and detection risk is calculated in the cells following the risk level, respectively, by multiplying the risk sextant value with itself for the answer displayed in the first cell and dividing the risk value in the next cell with 1 (1/risk value) to display the detection risk value. The higher the risk value the lower the detection risk value will be and the closer to zero the higher the audit risk will be.

	S	T	U	W	X
14	Assertion risk	Fraud risk / Reason	Assessment	Risk value	Detection risk
15	(ii) Completeness	Large volume of transactions	SR/LM	36	0.0278

Figure 7-7: Risk assessment, value and detection risk

Source: Own research (IAPM)

The integration between the materiality, audit risk quantification and the impact on sample sizes as combined in the IAPM is discussed in the next sections.

7.6.7 Audit sampling

7.6.7.1 Calculation of r-factor

The calculation and justification of the r-factor was developed in and discussed in Sections 3.5.6.2, 3.5.6.4, 4.3.5 and 4.3.6 and Table 3-21 to 3-24, 4-28. The r-factor is the next concept that assists in the progress of the development of the integrated model. Section 3.5.6.4, 4.3.5 and 4.3.6 and Table 3-18, 3-19, 3-23, 3-24, 3-27, 4-22 and 4-29 indicate that the SR/HM assessment should be allocated to Quadrant 5 and SR/LM to Quadrant 6. This proposal for allocating SR/LM to Quadrant 6 is due to assessing such a balance as significant and balance below materiality may constitute the highest risk for the auditor. This proposal was also supported by interviews during discussions of the questionnaire with a technical partner of an audit firm. Table 7-7 is the result of the discussions and conclusion above.

As illustrated in Table 7-7 below and referred to in the previous discussion, the two significant risks are plotted outside the normal quadrant and therefore a sextant graph may be more appropriate. This observation lead to the consideration of another visual representation and the solution was to develop a sextant graph as illustrated in Figures 7-9 and 7-11 below.

Table 7-7: Risk and r-factor table.

Risk Refer to Sec. 6.2	Balance - Quantitative materiality Refer to Table 6-1	Quadrant/Sextant	r-factor
SR	LM	6	3.0
SR	HM	5	2.5
HR	HM	4	2.0
HR	LM	3	1.5
LR	HM	2	1.0
LR	LM	1	0.5

Source: Sections and table listed in the paragraph above

The keys for the abbreviations in Table 7-7 above is: SR = Significant risk, HR = High risk, LR = Low Risk, HM = High Material balance and LM = Low Material balance.

7.6.7.2 Application of r-factor to income statement and test of controls sample sizes

Section 4.3.5 and Table 4-22 conclude that the norm for sample sizes for tests of control and income statement items are 30 items, which “Sample per month” multiplied by the “number of months” based on risk assessment and risk category. As already indicated in Section 4.3.5 and illustrated in Table 4-26 the suggestion is that tests of controls reduce substantive work by up to 50%. This is also supported by Appendix 9 (Statement 32), which was identified as one of the benchmarks in the questionnaire.

Section 3.5.6.2 and 4.3.6 and Table 3-21, 4-25 explain the calculation and reasons for applying the r-factor. Table 7-7 above included the risk/materiality assessment, the quadrant number and the r-factor per quadrant. After the sextant model risks, the sample sizes based on the quadrant was developed. For the sample sizes for income statement and tests of controls, the sextant number was multiplied by the number of months in the year to derive at the various sample sizes per sextant as shown in Table 7-8 below.

The suggestions in Appendix 9 indicated that for the conclusions of the following statements:

- 31f - 50% of respondents agreed that the sample of 25 should be spread over the full year and therefore supports the sample size per month “r” multiplied by the number of months in a year.
- 31g - 50% of respondents agreed that the sample should be more than 25 items.

It can therefore be concluded that the approach suggested above is in line with the benchmark, which serves as a guideline and can be accepted.

Table 7-8: Sample sizes for income statement and test of controls

Sextant	Sample size per month = r-factor	No of months	r-factor x 12= Sample sizes
6	3.0	12	36
5	2.5	12	30
4	2.0	12	24
3	1.5	12	18
2	1.0	12	12
1	0.5	12	6

Source: Chapter 6.3.2.

The cells as indicated in the figure below indicate how the risk levels and r-factors are included to calculate the sample size for tests of controls.

BC	BF	BG
14	Risk / Mat Bal	r factor and transactions per month
15	SR/LM	3
16	SR/HM	2.5
17	HR/HM	2
18	HR/LM	1.5
19	LR/HM	1
20	LR/LM	0.5

Figure 7-8: Risk and r-factors for TOC

Source: Own research (IAPM)

The figure below is a representation of the plotting of the sextant model and the integrating with the IAPM for tests of controls.

Transactions per year per sextant

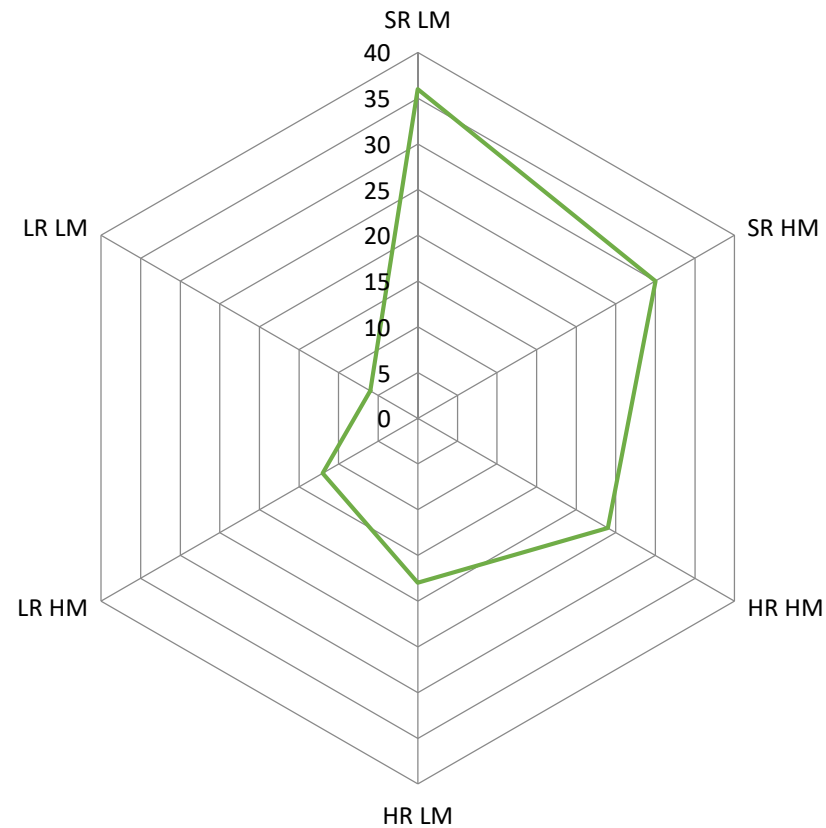


Figure 7-9: Transactions per year per sextant

Source: Own research

7.6.8 Substantive sampling

Section 4.3.6 and Table 4-28 and Figure 4-3 illustrate that substantive sampling should be based on coverage per balance sheet items. Figure 4-3 illustrates the relationship between reliance and coverage percentage per sextant.

Table 6-7 concludes on the coverage of items and although the responses indicate a low positive percentage, the statement on the application of stratified sampling indicate a high positive response rate at 67% as indicated in Section 6.3.2. The conclusion is that that the result of a stratified sample is that material items are selected and that a high value or coverage of the balances are obtained. The calculation of the coverage was the result of dividing the sextant into ranges and dividing the lower and upper boundaries using the formula as shown above. There is no “zero” or no risk as even a low risk has risk associated with it. The next assumption is that no auditor can document that “all items were verified” and thus achieved sample coverage of 100%.

In order to support this statement above the completeness assertion will serve as an example. If all delivery notes and invoices were selected the conclusion that can be drawn is that all deliveries were invoiced. It is not to conclude that all products that left the premises had a delivery note. The direction of testing for completeness of income verification is not as straightforward as the definition of the assertion indicates.

From the above the proposal is that the coverage less 0.01 is applicable, as the upper level of the coverage should give a 90% to 95% confidence level. As previously discussed the “R” (reliance factor) and the r-factor (risk factor) indicate that the ranges coincide with Table 7-8 Column 4. The suggestion is made that the r-factor (risk factor) replaces the “R” (reliance factor) and that the auditor obtains sufficient confidence from the sample sizes as indicated in Table 7-8.

In order to determine the coverage for each sextant, ranges were set. The set principle is that the high and low value of each sextant could not overlap with the values of the previous or next sextant. The result of the value of the previous sextant (QF) divided by the current sextant (QT) resulted in the lower range of the coverage (CF). The explanation above resulted in the development of Equation 7-1 and 7-2 below:

Example: sextant 5/sextant 6 = 83% (Lowest range in sextant 6)

$$CF = QF \div QT$$

Equation 7-1

The result of the value of the current sextant (QT) divided by the total sextant (TQ) current sextant (QT) resulted in the higher range of the coverage (CT). The answer of CT would overlap with the value of the next sextant and the answer of CT less 1% resulted in the value of the highest range in the sextant. The explanation above resulted in the development of Equation 7-2 below:

Example excluding the 1% deduction: (sextant 5 / sextant 6) = 83% (Highest range in sextant 5). The lowest value of sextant five and the highest in six would overlap if the 1% is not subtracted.

Example: (sextant 5 / sextant 6) - 1 % = 82% (Highest range in sextant 5)

$$CT = (QT \div TQ) - 0.01$$

Equation 7-2

The calculation of the coverage per sextant is to determine the percentage of balances that needs to be verified in each sextant based on the risk assessment level. The calculation of the coverage that is used in the IAMP to indicate the sample sizes are explained by the equations above. The percentage of coverage required for each sextant is illustrated in the table below and the following keys form part of the understanding and interpretation of the table below.

Keys for the calculations of the coverage percentages for Table 7-10 is as follows:

QF =	QT =	TQ =	CF =	CT =
From sextant	To sextant	Total sextant	Coverage from	Coverage to quadrant

The summary below indicates the upper and lower range used in each sextant.

Sextant	1	2	3	4	5	6
Range	0.01 to 1	1 to 2	2 to 3	3 to 4	4 to 5	5 to 6

Table 7-9 below illustrates the formulas and results for the calculated coverage within the ranges based on Equations 7.1 and 7.2 above

Table 7-9: Substantive sample size calculation:

Quadrant / Sextant					Coverage			
Risk	Materiality of balance	From =QF	To = QT	Factor / Total No of quadrants = TQ	Formula from CF= QF ÷ QT	Formula to CT =(QT ÷ TQ) -0.01	From CF	To CT
SR	LM	5.00	6	6	$QF \div QT$	$CT = (QT \div TQ) - 0.01$	83%	99%
SR	HM	4.00	5	6	$QF \div QT$	$CT = (QT \div TQ) - 0.01$	67%	82%
HR	HM	3.00	4	6	$QF \div QT$	$CT = (QT \div TQ) - 0.01$	50%	66%
HR	LM	2.00	3	6	$QF \div QT$	$CT = (QT \div TQ) - 0.01$	33%	49%
LR	HM	1.00	2	6	$QF \div QT$	$CT = (QT \div TQ) - 0.01$	17%	32%
LR	LM	0.01	1	6	$QF \div QT$	$CT = (QT \div TQ) - 0.01$	0.17%	16%

Source: Table 4-28 and Figure 4-3

The figure below represents the mapping of the coverage per risk level as well as the ranges for coverage as included in the IAPM.

	BF	BH	BI
14	Risk / Mat Bal	Coverage SOFP lowest range	Coverage SOFP highest range
15	SR/LM	83%	99%
16	SR/HM	67%	83%
17	HR/HM	50%	67%
18	HR/LM	33%	50%
19	LR/HM	17%	33%
20	LR/LM	0.1%	17%

Figure 7-10: Coverage for TOD

Source: Own research (IAPM)

The sample size per assertion is calculated based on the population divided by materiality multiplied by the risk r-factor in each assertion and line item.

The figure below is an illustration of the sextant model and the percentage of coverage that should be obtained at each sextant level based on the information and calculations in the table above.

Percentage coverage for balance sheet accounts

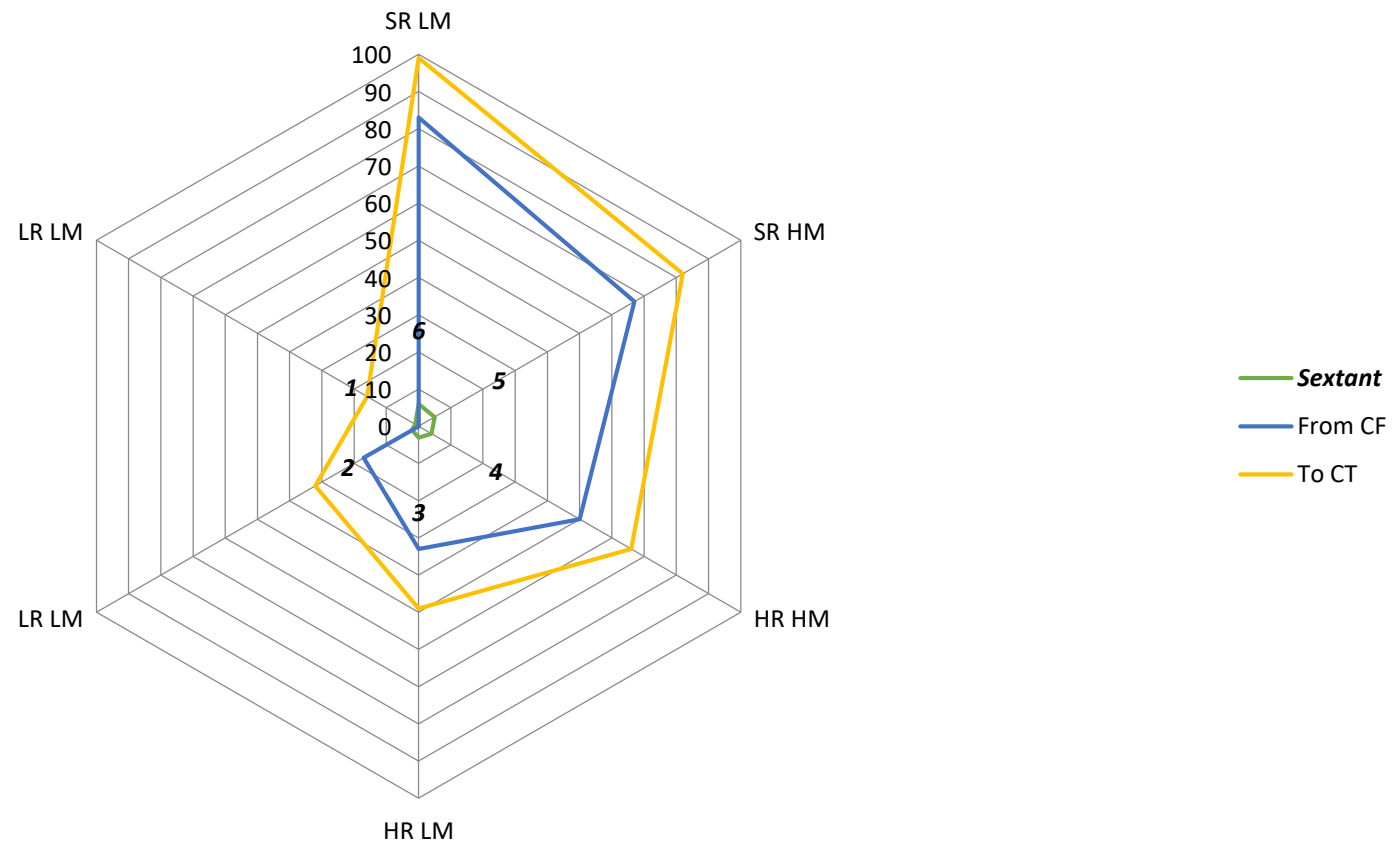


Figure 7-11: Coverage per balance sheet (statement of financial position) account balance

Source: Table 7-9

An audit firm used the integrated model for a period of more than three years since 2008 as part of their planning process. The model were further tested and successfully used on an audit of group companies in 2014. During consultation (own observations from 2008 onwards) with the firms, the following exceptions were proposed:

- The completeness assertion is not a substantive test in the sense that the characteristics (attributes) rather than values are tested. Based on observation the proposal is that the sample sizes for income statement and tests of controls are applied.
- In instances where the material account balance consists of significant number of individual low balances, the attempt to obtain coverage would not be cost-effective and add little value to the audit. Based on observation the proposal is that the sample sizes for income statement and tests of controls are applied. The suggestion is that additional audit procedures and possible tests of control and substantive analytical procedures would also assist in reducing the risk to an acceptable level.

The conclusion drawn from above is that the model can assist the auditor to perform a risk-based approach and that planning can influence the auditors' audit procedures, effective planning can therefore assist the auditors to focus their effort on the risk balances and reduce risk of material misstatement to an acceptable level. The testing of the model for three years from 2008 to 2011 also indicates that the model is applicable in the auditing environment and is therefore reliable. The model was tested with third year students in 2015 and with Auditors in 2014 and 2018. The discussion of the development process of the integrated model follows in Section 7.7 below.

7.7 INTEGRATED AUDIT PLANNING MODEL

The information, logic, benchmarks and explanation of the calculations of specific factors as discussed in the preceding chapters and finally in Chapter 6 and Section 7.4 to 7.6 above are the cornerstone of the proposal below. All these principles and figures are used in the proposed integrated model. The information was recorded on a spreadsheet and various formulas were used to calculate materiality, risks and

sample sizes based on information recorded. The automation of the model also limited the values and text recorded in specific cells through data validation.

7.7.1 Layout of methodology

The benchmarks, r-factors, sextants and sample sizes discussed in Section 7.3 above have been combined into a spreadsheet. The description of the functions in the columns and the repeat of descriptions and columns serve as an explanation for the inputs and formulas applied to derive at the final integrated model.

7.7.2 All elements of the integrated model

The IAPM contains all the information that is required in the methodology to record information, the types of formulas as well as the cell references for the benchmarks. The IAPM document excludes the benchmarks recorded in columns on the spreadsheet. The formulas utilise these benchmarks to calculate or transfer specific benchmarks based on the inputs of other columns in that specific row. The following formulas were used to populate or calculate specific values or answers data validation, “Vlookups” and if formulas.

The example is that the risk selection cell limits the user to record risk by selecting the values and can only have one answer. Based on the value of the selection of the risk level selected the formula will look up the value of the risk and return an r-factor value. A CD containing a spreadsheet of the IAPM is included with this thesis.

The conclusion from above is that this integrated methodology complies with ISA 230 (documentation), ISA 240 (fraud risk assessment per assertion), ISA 320 (materiality), ISA315 (assessment of risk per assertions) and ISA 330 (responses to risks). The model also includes accepted benchmarks as indicated in this study and complies with the general accepted norms of public practice. This model integrates materiality, risk and sample sizes to assist in relevant decision-making.

The expected sample size will be calculated based on the following equation:

$$\frac{\text{Population}}{\text{Materiality}} \times \text{“r”}$$

Equation 7-3

Refer to Equation 4-2

- Where materiality could be performance or overall materiality and “r” would be the risk multiplier.
- If the reliance on controls column indicated that a “Yes” has been selected the expected sample size will be multiplied by 50%. The reason for that is as follows:
 - Reliance of test of controls reduces the sample size as illustrated by statement 32 – Figure 6-2 as well as Table 4-11 in Chapter 4.
- The starting number and ending number of the documents, transactions, items or number of assets or liabilities should be entered manually.
- The calculation for the number of transactions/balances field is a formula that is based on the inputs of the ending number less starting number field plus one.
- The calculation for the average amount per transactions/balances field is a formula that is based on the inputs of the balance (population) divided by the number of transactions calculated in the previous field.
- The % Coverage columns were calculated based on the sample selection from both groups by way of a formula outlining the following:
 - Number of items
 - Items as percentage of numbers
 - % of balance
- The conclusion on the working paper should not indicate that completeness is acceptable but rather that *“Based on the sample selected it appears that the above-mentioned objective has been met/not been met”*.

7.8 CONCLUSION

The methodology for the integrated model is in line with the results from the literature and empirical research as summarised in Chapter 2 to 6. The following issues should be considered when the model is used:

- Clients are not generic and professional judgement should be applied.

- Benchmarks are for guidance only, but circumstances may warrant an auditor to perform different steps to achieve the objective to reduce the risk of material misstatement to an acceptable level.
- Materiality should be determined based on the best appropriate indicator for the specific client as this will influence the sample size and the audit opinion later in the audit process.
- Risk assessment is the second important step that should be properly performed as the sampling and sample sizes will be influenced by the effectiveness of the risk assessment process.
- The risk assessment will also have an impact on the auditor's response to assessed risks and as a result the gathering of evidence procedures.
- Stratification should be used as a method for sampling. Monetary Unit sampling do not take a risk factor "r" into account as the population is divided by either the materiality or PM to determine the sampling interval or strike rate and material items will be selected in the same manner as stratified sampling.

The integrated model proposed above has taken the relevant ISAs requirements, benchmarks and responses into account and can be successfully applied by auditors. Further research on the integration of this model with sample selection, gathering of audit evidence and finalisation based on the proposed integrated model is required. The further development may assist in the improvement of the documentation standards as identified in Section 7.1 to 7.7 above.

An example of the IAPM is attached for illustrative purposes as Appendix 12.

CHAPTER 8

CONCLUSION AND RECOMMENDATIONS

8.1 INTRODUCTION

The purpose of this chapter is to combine conclusions for all previous chapters and to evaluate whether the problem statement has been addressed. Secondly, this chapter is an evaluation of the achievement of the primary, theoretical and empirical objectives set in Chapter 1. The limitations, contributions and recommendations based on Chapters 2 to 7 are discussed in this chapter.

The secondary and empirical objectives formulated for the study are discussed and the individual relevance of the objectives and in Chapters 1 to 7 are evaluated in this chapter.

The final conclusion on the study includes the measurement of the achievement of the primary, theoretical and empirical objectives. The conclusion provides a synopsis at the end of the study on the relevance on Chapters 2 to 7 on the final integrated audit planning model.

Finally, the recommendations for further research and contribution of the study are discussed.

The following part of the chapter discusses and assimilates the literature and data with the specific objectives for that specific chapter.

8.2 CHAPTER 1

In Chapter 1 the introduction to the problem statement, research objectives and the research methodology are discussed. The problem statement and primary objective are discussed as part of the conclusion on Chapter 7. The theoretical objectives and empirical objectives are individually analysed in the relevant chapter.

The conclusion from Chapter 1 is that various audit approaches were developed and each model has its deficiencies. The auditing standards are revised in line with management and business needs. The auditing profession is therefore not independent and authoritative enough as they are revising auditing standards to

satisfy clients' needs. The change in business environment is a reason to adapt audit approaches but not to move from auditing to more consulting services.

The problem statement in Chapter 1 indicates that the development of audit methodologies was done before the accounting or auditing scandals such as Enron and WorldCom occurred after the development of the business risk audit (BRA). The development of the audit methodologies except for the integrated model as required by the PCAOB stalled since the BRA.

8.2.1 Objectives of the study

Chapter 1 outlined the objectives of the study. Achievement of the objectives are discussed in Section 8.9 below.

8.3 CHAPTER 2

The objective of this chapter is to study literature and theory regarding the development of the audit methodologies and integrated planning models. Publications on integrated audit models are limited to a thesis by Marx (2014) and requirements by the PCOAB. The context of the PCOAB integrated models is directed to the SOX (404) requirements and on the planning models. The elements of the audit risk model and the BRA combined with literature such as ISA 315, ISA 570 and King IV indicate factors and elements that can be effectively applied in the current research. The theoretical objective set in Chapter 1 to review the "literature and theory with regard to the different audit risk models and approaches as well as the integrated audit planning process" in Chapter 2 and the integration of these elements and factors in Chapter 7 were achieved as the elements were included in the integrated audit planning model.

The next part of the integrated model included the review of literature that links the audit risk factors and elements that can be used to identify risks at various levels and to integrate the principle of risk assessment with the quantification of audit risks.

The research differentiates between the number of authors that are proponents for and against the Business risk auditing model. The comparison is discussed in Section 2.2.7.2 and in Table 2-6. Literature indicates that there are only 10

proponents for the BRA while 25 proponents are against it. The information supports the current study to start developing a new audit approach or methodology. The entity's management is responsible for the preparation and in accordance with the relevant financial reporting standards and in those statements management make certain assertions. The ISAs in IFAC (2018g ISA 315 par A129, A130) require from the auditor to use all the assertions in the audit and to apply it to identify possible misstatements. Therefore, assertions form part of the risk identification and risk assessment and form therefore part of the integrated audit planning model.

The links between the assertions and other risk identification elements are described in Chapter 2 and therefore meet the objectives set in Chapter 1. The following part of the integrated models is the risk assessment and quantification chapter that leads to the development of the sextant audit risk model and quantification of risks.

8.4 CHAPTER 3

The chapter consists of a literature review on other risk management disciplines that apply and list and quantify at various levels. The second part of the chapter discusses the audit risk assessment and the quantification of the risks from a quadrant level to a sextant level and a risk heat map based on the multiplication of risk and material balances at various levels. The last part of the chapter discusses the quantification on the inverse detection risk model. The formulas applied is based on the audit risk model formula and adjusted for the sextant model.

The quantification of the risks at various levels will graphically demonstrate the risk areas where more audit attention should be directed and lead to a more consistent risk assessment level. The quantification of the risk, risk multiplier and r-factor are all factors that are combined into the integrated audit risk model.

The implication is that if materiality and sampling are mathematical calculations and the audit risk model is also quantified then the audit risk, materiality and audit sampling should all be quantified. The quantification indicates the relationship between the different concepts and therefore the following chapter illustrates the materiality benchmarks and sample sizes to be applied in practice and supported by responses from questionnaires and literature and theory.

8.5 CHAPTER 4

The materiality benchmarks and the relationship between sample sizes and risk are discussed in the chapter. The impact of the audit risk quantification and application of the risk models form part of the link between Chapter 3 and 4. Literature in Chapter 4 and empirical results in Chapter 6 indicate that there is guidance for sample sizes relevant to test of controls and test of details. The relationship between the reduction of test of details based on successful test of controls is evident from literature but no indication could be found of the impact that analytical procedures may have on the reduction of the sample size for test of details.

The link between audit risk identification, assessment, materiality and sample sizes are all included in the integrated audit planning model and the objectives relevant to risk quantification, audit sample sizes, links between materiality and sample sizes and risk assessment are all addressed in this chapter and the final integration and documentation are addressed in Chapter 6 and 7.

8.6 CHAPTER 5

This chapter addresses the research methodology applied in Chapter 2 to 4 and the analysis of data and the integration of the model in Chapter 6 and 7, respectively. The primary, theoretical and empirical objectives are addressed in this chapter. The research methodology consists of various qualitative, quantitative, grounded theory, document analysis combined methods to achieve the objectives set in Chapter 1.

The integrated model assists the auditor and student to conceptualise the principle of materiality, risk assessment and sample sizes. The integrated model also illustrates that materiality, risk and sampling have a significant impact on the audit planning and further stages in the audit process.

Chapter 6 discusses the analysis and interpretation of the responses obtained from questionnaires as well as the empirical results discussed in Chapters 2 to 4.

8.7 CHAPTER 6

The two empirical objectives set that is relevant to this chapter is to: “Analyse the literature and secondary data available and compare to benchmarks set by auditing

firms in their responses and recommend practices and guidelines to apply this model as a monitoring and review tool for audit supervisors, managers and partners”.

The benchmarks and models developed in Chapter 2 on risk identification and the BRA, Chapter 3 for the risk quantification including the sextant model and the inverse detection risk model and in Chapter 4 on the materiality benchmarks compared with JSE financial information and audit sample sizes based on literature also form part of the constructs evaluated in this chapter. The responses from the auditing firms’ questionnaires support the literature, theory and empirical research performed in Chapters 2 to 4.

The students’ responses from the questionnaire on the integrated audit planning model support the observations made and the results of the IRBA reviews and policies and procedures implemented at Firm X that the integrated planning model is an acceptable model and assist in planning and visualising the planning as it progresses.

The conclusion from the data analysis and the literature support the development of the integrated model and the compliance thereof to the relevant ISAs as discussed in the previous chapters. In Chapter 7 all the primary, theoretical and empirical objectives as well as the findings, models and benchmarks in Chapters 2 to 4 and 6 are combined into the development of the final integrated audit planning model and to illustrate the building of the model throughout the whole process.

8.8 CHAPTER 7

The objective of this chapter is to integrate all the elements, factors, individual risk quantification, response thereto, materiality and sampling into an integrated audit planning model that can be applied in public practice.

The conclusions of the previous chapters all indicate that the individual concepts such as risk identification, assessment and responses, materiality and sample sizes are relevant and appropriate according to literature, ISAs, theories, applications in business risk and enterprise risk management and empirical results based on best practices applied in auditing and perceptions of IRBA and the students.

The integrated audit planning model incorporates all the concepts discussed in such a manner that the audit planning can be visually monitored and the results can be timeously interpreted.

8.9 ACHIEVEMENT OF OBJECTIVES

The achievement of the primary, theoretical and empirical objectives are summarised and cross-referenced to the relevant chapters in Table 8-1 below.

Table 8-1: Achievement of objectives and chapter references

Objective	Theoretical	Empirical	Chapter reference
Literature and theory with regard to the different audit risk models and integrated audit planning process.	☒	☒	Chapter 2, 7.
Research on audit risk quantification and interpretation of these quantification on audit models.	☒	☐	Chapter 3, 7.
Literature, theory and practice clarifications on audit sample sizes.	☒	☐	Chapter 4, 6, 7.
Literature and theory recommend sample sizes, linked to materiality and audit risk assessment. Compliance of the integrated model to ISA 230.	☒	☐	Chapter 3, 4, 7.
Literature and theory to interpret and obtain reasons and methods for assessment of risk	☒	☒	Chapter 7.
Literature and theory to interpret and obtain reasons and methods for	☒	☐	Chapter 7.
Reference to working papers where audit work performed was documented.	☒	☐	Chapter 7.
Analyse the literature and secondary data available and compare to benchmarks set by auditing firms in their responses.	☐	☒	Chapter 4, 6, 7.
Analyse the information from the student group participants and make the model more understandable and “user-friendly”	☐	☒	Chapter 6, 7.
Formulate an audit approach that includes the strengths of all current models as well as prevent the shortcomings identified in literature and theory.	☐	☒	Chapter 7.
Recommend sample sizes, linked to materiality and audit risk assessment. Compliance of the integrated model to ISA 230.	☐	☒	Chapter 2, 3, 4, 7.
Recommend practices and guidelines to apply this model as a monitoring and review tool for audit supervisors, managers and partners.	☐	☒	Chapter 6, 7.

Source: Chapter 1 (Theoretical and empirical objectives)

In Chapter 1, the primary objective was stated as: *“Develop an integrated planning audit methodology where the balances in the financial statements, materiality, risk and audit sampling are combined”*. Table 8-1 indicates that the primary objective has been achieved in Chapter 7.

The secondary theoretical and empirical objectives in Chapter 1 refer to recommending sample sizes to be used, linked to materiality and audit risk assessment and that compliance to IFAC (2018d ISA 230) is achieved. From Table 8-1 above it can be seen that these objectives have been met in Chapters 3, 4, 6 and 7.

The problem statement in Chapter 1 indicates that there is not sufficient literature on the integrated audit planning model. Current models still require that issues identified should be manually carried over to the next section of the audit file. The documentation issues as reported by the audit regulators can be resolved by application of the IAPM. The risks identified, material balances can be verified and attention is given to each line item due to linking materiality, audit risk and audit sampling during the planning stage. The IAPM working paper serves as a review document and all balances can be addressed sufficiently and appropriately. This model serves to solve the problems stated in the problem statement discussed in Chapter 1.

8.10 LIMITATIONS OF THE STUDY

The risks associated with acceptance of new and the retention of clients is not part of this study as the emphasis is on the planning stage of the audit and not the engagement activities stage of the audit.

Literature does not address the impact that the reduction of the sample sizes based on analytical review procedures may have on the extent of tests of details. This should be investigated to justify the reduction in sample sizes as is the case with the reduction of test of detail based on the reliance of the successful performance of test of controls.

The questionnaire administered to audit firms do not include the quantification and levels of risks that could have contributed to a more thorough comparison between the empirical review and the results obtained from literature. Compensating for the limitation literature filled the gap in the questionnaire. The quantification of audit risk leading to the sextant audit risk models is supported by literature in business and enterprise risk management and therefore appropriate results were obtained. The population of number the of audit firms with listed client responsibility is limited and due to confidentiality convenient sampling was applied and the sample was limited.

The questionnaire administered to the third-year auditing students were performed for one year due to a change in the module content and an investigation over a three-year period may have been more comprehensive. The compensating factor is that the model was tested in public practice and the validity of it was confirmed through the positive IRBA inspection reports for firm and audit engagement file reviews. The elements of the integrated planning model were also included in policies and procedures prescribed to medium-sized audit firms relevant to audit risk quantification, materiality and sample sizes were evaluated during the IRBA inspections.

The following section addresses the recommendations that should be implemented based on this study.

8.11 RECOMMENDATIONS FOR FURTHER STUDY

Research should also be extended to expand on the integrated audit planning model and the integrated audit evidence planning model developed by Mentz (2014) to include the integration of engagement activities, planning, audit evidence and completion of the audit process. Further research is required to analyse the impact analytical procedures may have on the extent of test of details and the reduction of sample sizes.

The development of a dashboard to report audit risk should be investigated and research should be published on how to graphically present audit risk to expend more effort on the risk areas. The combined qualitative model with different descriptors such as significant, high and low should be used and not variances of

high and low. The sextant model should be considered for application as the judgement is much more focused. Numerical values will assist with consistency during risk assessment and with the effort that the auditor makes to respond to those risks identified.

The business risk elements, risk quantification, sextant audit, inverse detection risk model, materiality benchmarks and sample sizes as included in this research should be applied. This will ensure that all material balances are verified and the sample sizes have been justified and that appropriate and simplified risk assessment has been performed.

The risk assessment according to the heat map and sextant approach should be elaborated upon to include a dashboard of balances based on risk assessment according to the value and colour of the risks. The risks should be assessed per assertion and all assertions should be addressed per balance and classes of transactions.

8.12 CONTRIBUTION OF THE STUDY

The implementation of the results of the responses on the integrated audit planning model will contribute towards a more comprehensive audit tool that will simplify audit planning and direct the audit to the appropriate risky balances that requires audit attention. The application of this model will assist the auditor to ensure that all material balances are addressed quantitatively and qualitatively and each assertion has been responded to and therefore reduce the risk of material misstatement to an acceptable low level. The visual representation of the integrated audit planning model will present the planning as a summarised version and with the cross-references to where the work was performed it can also serve as an overall supervision and review document.

8.13 CONCLUSION

The problem identified in Chapter 1 is that acceptable, but inadequate audit approaches lead to inadequate planning resulting in an increase in audit risk. In order to address the problem, research objectives have been established. Meeting the objectives, is considered to provide a solution to the problem.

This study consisted of a literature study as well as an empirical study focused on compliance with the primary and secondary objectives established in Chapter 1. The research provided the necessary background for the development of a sextant integrated audit planning model. The integrated planning model provides an auditor with a tool that ensures a structured assessment of risk, materiality and sampling that could reduce audit risk.

This final evaluation of this study indicates that the study complied with its objectives by developing an integrated audit planning methodology.

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APPENDIX 1 – TOTAL ASSETS

Total assets	Low	High	Multiplier	Author
	10.0%	20.0%	2.0	Plumhoff (1952)
	10.0%	20.0%	2.0	Mitchell (1972)
	10.0%	20.0%	2.0	Towers (1986)
	10.0%	20.0%	2.0	Plumhoff (1952)
	10.0%	20.0%	2.0	Mitchell (1972)
	10.0%	20.0%	2.0	Towers (1986)
	0.1%	5.0%	50.0	Turley and Cooper (1991)
	0.1%	5.0%	50.0	Woolf (1994)
	0.1%	10.0%	100.0	Woolf (1994)
	0.1%	10.0%	100.0	Turley and Cooper (1991)
	0.1%	10.0%	100.0	Mitchell (1972)
	0.1%	10.0%	100.0	Woolf (1994)
	5.0%	10.0%	2.0	Azzopardi (2009)
	0.5%	1.0%	2.0	CICA (2005)
	0.1%	1.5%	1.5	Brennan and Gray (2005)
	1.0%	2.0%	2.0	Marx (DP6) (2009), Marx (2016)
	0.5%	1.0%	2.0	Caseware (Probe 2012)
	0.5%	2.0%	4.0	Azzopardi (2009)
	1.0%	2.0%	2.0	Zhou (2012)
	1.0%	2.0%	2.0	ACCA (2007)
	1.0%	1.5%	1.5	Keune (2010)

Source: Swart (2013:187) and authors listed above

APPENDIX 2 – NET PROFIT BEFORE TAX

Net profit before tax	Low	High	Multiplier	Author
	0.5%	36.0%	72.0	Bernstein (1967,1970)
	0.5%	36.0%	72.0	Copeland and Frederick (1968)
	0.5%	36.0%	72.0	Neumann (1968)
	0.5%	36.0%	72.0	Thomas (1978)
	0.5%	36.0%	72.0	Turley and Cooper (1991)
	3.3%	36.0%	10.9	Turley and Cooper (1991)
	5.0%	10.0%	2.0	Marx (DP6) (2009), Marx (2016)
	0.1%	10.0%	100.0	Rotaru (2006)
	0.0%	5.0%	500.0	Zhou (2012)
	0.0%	5.0%	500.0	ACCA (2007)
	0.0%	5.0%	1.0	IFAC (2004 illustrative) Brennan and Gray (2005)
	5.0%	10.0%	2.0	Brody et al (2003)
	5.0%	10.0%	2.0	Caseware (Probe 2012)
	1.0%	10.0%	10.0	Zuca, S, (2012)
	0.0%	5.0%	-	Messier <i>et al.</i> (2005)
	0.0%	5.0%	1.0	Libby and Brown (2013)
	5.0%	10.0%	2.0	Azzopardi (2009)
	5.0%	10.0%	2.0	Keune (2010)

Source: Swart (2013:188) and authors listed above

APPENDIX 3 - REVENUE

Revenue	Low	High	Multiplier	Author
	0.2%	10.0%	50.0	Anderson (1977)
	0.2%	10.0%	50.0	Turley and Cooper (1991)
	0.2%	10.0%	50.0	Plumhoff (1952)
	0.2%	10.0%	50.0	Towers (1986)
	0.2%	10.0%	50.0	Woolf (1994)
	0.5%	1.0%	2.0	Caseware (Probe 2012)
	0.5%	2.0%	4.0	Azzopardi (2009)
	1.0%	1.5%	1.5	Keune (2010)
	0.5%	1.0%	2.0	Marx (DP6) (2009), Marx (2016)
	1.0%	1.5%	1.5	Brennan and Gray (2005)
	0.5%	1.0%	2.0	IFAC (2004 illustrative) Brennan and Gray (2005)
	0.5%	1.0%	2.0	CICA (2005)
	0.5%	1.0%	2.0	Zhou (2012)
	0.5%	1.0%	2.0	ACCA (2007)

Source: Swart (2013:189) and authors listed above

APPENDIX 4 - EQUITY

Equity	Low	High	Multiplier	Author
	0.0%	10.0%	100.0	Mitchell (1972)
	0.5%	5.0%	10.0	CICA (2005)
	2.0%	5.0%	2.5	Marx <i>et al.</i> (DP6) (2009), Marx <i>et al.</i> (2016)
	0.5%	5.0%	10.0	Caseware (Probe 2012)
	1.0%	5.0%	5.0	Azzopardi (2009)
	1.0%	1.5%	1.5	Keune (2010)

Source: Swart (2013:189) and authors listed above

APPENDIX 5 – GROSS PROFIT

Gross profit	Low	High	Multiplier	Author
	0.5%	5.0%	10.0	Carmichael (1969)
	0.5%	5.0%	10.0	CICA (2005)
	1.0%	2.0%	2.0	Marx (DP6) (2009), Marx (2016)
	0.5%	5.0%	10.0	Caseware (Probe 2012)

Source: Swart (2013:189) and authors listed above

APPENDIX 6 - EXPENDITURE

Expenditure	Low	High	Multiplier	Author
	0.5%	1.0%	2.0	Zhou (2012)
	0.5%	1.0%	3.0	ACCA (2007)
	0.5%	2.0%	4.0	CICA (2005)

Source: Swart (2013:190) and authors listed above

APPENDIX 7 – CURRENT LIABILITIES

Current liabilities	Low	High	Multiplier	Author
	5.0%	10.0%	2.0	Azzopardi (2009)

Source: Swart (2013:190) and author listed above

APPENDIX 8 – TOTAL LIABILITIES

Total liabilities	Low	High	Multiplier	Author
	0.0%	10.0%	100.0	Mitchell (1972)

Source: Swart (2013:190) and author listed above

APPENDIX 9 - AUDIT FIRM QUESTIONNAIRE AND RESPONSES

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
1	A threshold or cut off point for materiality implies that materiality should be calculated but no need to document it.	0%	0%	0%	20%	80%	100%
2	Primary qualitative characteristics is an underlying factor for threshold materiality.	20%	40%	10%	20%	10%	100%
3	Different entities should use different materiality considerations based on balances and the most appropriate driver for that specific company.	80%	10%	0%	10%	0%	100%
4	Materiality depends on the size of error or judgement in a particular circumstance of its omission or misstatement. This implies that an auditor should use his professional judgement when determining materiality.	40%	40%	0%	10%	10%	100%
5	The possibility that relative small amounts of errors or misstatements will cumulatively impact on the risk of material misstatement. (The cumulative effect on many trivial errors may add up to be material)	44%	33%	22%	0%	0%	100%
6	Materiality should only be considered at financial statement level .	20%	30%	0%	30%	20%	100%
7	Materiality should be considered through all stages of the audit and should be adjusted accordingly if any other information come to the auditors attention.	70%	30%	0%	0%	0%	100%
8	Benchmarks for materiality may be based on any specific account balance and they are the following:						
a	Revenue 0.5 % to 1%	29%	29%	29%	14%	0%	100%
b	Gross Profit 1/2% to 5% or 1 % to 2%	29%	14%	29%	29%	0%	100%
c	Net profit before tax 5% to 10% In practice the net income figure can be the figure before or after taxation. This will depend on the specific circumstances, trends and conditions.	29%	29%	29%	14%	0%	100%
d	Total assets 1/2% to 1% or 1% to 2%	29%	14%	29%	29%	0%	100%
e	Equity 1/2% to 5% or 2 % to 5%	29%	29%	29%	14%	0%	100%
f	Materiality consideration should include a materiality driver. (Own definition - Materiality driver can be defined as: "The part of the operations which drives the entity to achieve its objective and may differ between different type of entities".)	67%	0%	0%	0%	33%	100%

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
9	Materiality is an absolute amount and risk has a minimal impact on materiality determination.	0%	14%	14%	29%	43%	100%
10	Determination of materiality needs to be considered but there is no requirement to document the amount on audit working papers.	0%	0%	0%	0%	100%	100%
11	There is an inverse relationship between materiality and risk. This implies that materiality for a high risk client should be lower than that determined for a low risk client. No other factors should be taken into account.	29%	14%	14%	43%	0%	100%
12	The effective date for ISA 320 and ISA 450 are for financial periods starting 15 December 2009. This implies that IFAC has shown their intentions and therefore these statements can be early adopted.	43%	57%	0%	0%	0%	100%
13	The auditor should assess whether the aggregate of unrecorded misstatements have been identified during the audit is material. This implies that all errors net or in total should not exceed materiality.	29%	43%	14%	14%	0%	100%
14	When an auditor concludes that the misstatement are material the standard implies that an auditor should use his professional judgement based on qualitative factors and his knowledge of the client and still issue an unqualified opinion based on qualitative considerations	14%	14%	14%	14%	43%	100%
15	Refer to statement 13. The implication is thus that the auditor do not need to document his justification and conclusion for overriding final materiality figure.	0%	0%	0%	0%	100%	100%
16	Refer to statement 13. Any disclosure allocation error above materiality should be adjusted	14%	14%	14%	29%	29%	100%
17	If an adjustment is not material in relation to the Financial statements but material due to disclosure requirements in relation to a specific income statement line item, it should be ignored.	0%	0%	14%	29%	57%	100%
18	Planning materiality based on figures not covering the full current financial reporting period the basis should be grossed up to annualise the figure.	17%	33%	17%	17%	17%	100%
19	According to IAS 1 all material balances should be disclosed in the financial statements. Material misstatement means that all disclosure errors above materiality should be corrected.	29%	14%	29%	14%	14%	100%
20	Reclassification of errors above materiality should be treated on a different basis as they are qualitative and not quantitative	14%	29%	14%	29%	14%	100%

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
21	Qualitative materiality can be assessed on a differential range from planning materiality. Compare the error as a percentage of the total balance and use a different range.	14%	29%	14%	14%	29%	100%
22	Each and every material item on the trial balance and audit working papers be subject to a verification procedure (E.g. all material items on TB or lead schedule).	43%	43%	0%	14%	0%	100%
23	All immaterial items / balances should not be verified	0%	57%	14%	0%	29%	100%
24	Risk of material misstatement can be interpreted as over statement for certain balances and understatement of certain balances.	29%	43%	0%	14%	14%	100%
25	Materiality should be one figure for the audit or differential amounts for balance sheet and income statement	14%	29%	14%	29%	14%	100%
26	Average of various group of balances can be used to calculate materiality for the following reasons.						
a	To reduce risk	0%	50%	0%	17%	33%	100%
b	To be conservative	0%	33%	17%	17%	33%	100%
c	To increase sample and	0%	33%	0%	33%	33%	100%
d	Increase audit fee.	0%	0%	0%	33%	67%	100%
27	In aggregate means:	0%	100%	0%	0%	0%	100%
a	In total per balance	0%	67%	17%	0%	17%	100%
b	In total for assets, liabilities, Income and Expenses	0%	17%	17%	50%	17%	100%
c	The net result of all balances	0%	33%	17%	33%	17%	100%
28	Materiality and audit risk/fraud risk influences sample sizes	57%	29%	0%	0%	14%	100%
29	Prior year errors should be included in the consideration for the effect on the financial figures for the current year	57%	29%	0%	14%	0%	100%
30	Implementation of controls (Walkthrough tests) sample sizes should be limited to						
a	1 per cycle or balance	43%	43%	0%	14%	0%	100%
b	2 per cycle or balance	0%	0%	17%	83%	0%	100%
c	3 per cycle or balance	0%	0%	33%	67%	0%	100%
d	None at all when no reliance are placed on internal control	17%	17%	0%	33%	33%	100%
e	more than three per cycle or balance	0%	17%	17%	50%	16%	100%
31	Sample size should be used for Test of controls						
a	1 item per month	0%	17%	33%	33%	17%	100%
b	2 items per month	0%	33%	33%	17%	17%	100%
c	20 items per annum	0%	17%	33%	33%	17%	100%
d	25 items per annum	0%	17%	33%	33%	17%	100%
e	20 items per annum covering the full period	0%	0%	33%	50%	17%	100%
f	25 items per annum covering the full period	17%	33%	33%	17%	0%	100%
g	more than 25 items	0%	17%	33%	33%	17%	100%

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
32	The sample size for substantive tests should be reduced when tests of controls were performed satisfactorily .	83%	17%	0%	0%	0%	100%
33	The sample size for substantive tests should be the following:						
a	1 item per month	0%	0%	17%	50%	33%	100%
b	2 items per month	0%	0%	17%	50%	33%	100%
c	20 items per annum	0%	0%	17%	50%	33%	100%
d	25 items per annum	0%	0%	17%	50%	33%	100%
e	20 items per annum covering the full period	0%	0%	17%	50%	33%	100%
f	25 items per annum covering the full period	17%	0%	17%	50%	16%	100%
g	more than 25 items	0%	0%	33%	33%	34%	100%
h	Percentage of coverage for balance sheet	17%	17%	17%	50%	0%	100%
i	Percentage of coverage for income statement	0%	17%	17%	50%	16%	100%
j	Percentage of coverage for balance sheet and income statement	0%	0%	33%	50%	17%	100%
k	Stratified sample based on all material transactions and balances	33%	33%	17%	17%	0%	100%
l	Analytical review with corroborative explanations	0%	33%	50%	17%	0%	100%
m	No detail testing and analytical reviews by discussions with management	0%	0%	17%	33%	50%	100%
n	Analytical reviews supported by explanations by management and detail testing to corroborate the explanations	17%	50%	33%	0%	0%	100%
o	Based on account balance, materiality and risk	71%	15%	14%	0%	0%	100%
p	Combination of all based on risk, knowledge of client and auditor's professional judgement	17%	66%	17%	0%	0%	100%
34	The sample size for substantive tests should be reduced when tests of controls were not performed satisfactorily.	17%	0%	0%	50%	33%	100%
35	The confidence level for sampling should be between 90 to 95%.	29%	57%	14%	0%	0%	100%
36	Significant can be quantified as follows:						
a	Any amount between 1 to 2% of total assets or turnover	33%	33%	0%	33%	0%	100%
b	Any amount between 5 to 10% of total assets or turnover	0%	40%	0%	40%	20%	100%
37	Trivial amounts or trivial materiality can be quantified as any amount below						
a	Any amount between 1 to 2% of materiality	17%	17%	0%	50%	16%	100%
b	Any amount between 2 to 5% of materiality	0%	33%	0%	33%	34%	100%
c	Any amount between 5 to 10% of materiality	29%	0%	0%	57%	14%	100%
d	Any amount between 10 to 20% of materiality	0%	0%	0%	50%	50%	100%
38	Pervasive can be quantified as:						
a	Any amount greater than twice final materiality	0%	20%	0%	60%	20%	100%
b	Any amount greater than three times final materiality	20%	0%	20%	60%	0%	100%

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
C	Any amount greater than four times final materiality	17%	17%	17%	33%	17%	100%

APPENDIX 10 – STUDENT QUESTIONNAIRE

This information will be treated as confidential and only the module code will be mentioned. The aggregate results of all the respondents and not the individual results per "group" will be published. Please complete and select the most appropriate statement and mark with an "X" in the appropriate box and return with your assignment

Statement		Strongly agree	Agree	Disagree	Strongly disagree	Total
1	My level of understanding of audit planning before the assignment can be classified as : High	6.3%	33.3%	47.9%	12.5%	100.0%
2	My level of understanding of audit planning before the assignment can be classified as : Limited	6.1%	51.0%	38.8%	4.1%	100.0%
3	My level of understanding of audit planning before the assignment can be classified as : Low	6.3%	29.2%	39.6%	25.0%	100.0%
4	The assignment assisted me to understand how the theory is applied in practice.	58.3%	25.0%	16.7%	0.0%	100.0%
5	My level of understanding of audit planning after the assignment can be classified as : Much more	27.1%	33.3%	29.2%	10.4%	100.0%
6	My level of understanding of audit planning after the assignment can be classified as: Improved	25.5%	63.8%	10.6%	0.0%	100.0%
7	My level of understanding of audit planning after the assignment can be classified as: Same level	2.1%	27.7%	31.9%	38.3%	100.0%
8	Auditing should be presented in a more practical manner e.g. planning model.	31.9%	55.3%	12.8%	0.0%	100.0%
9	Management, coordination and meetings with members required more time than the assignment itself.	25.0%	39.6%	25.0%	10.4%	100.0%
10	It took time and effort to complete the assignment.	42.9%	55.1%	0.0%	2.0%	100.0%
11	Assignment should be done on a group level	55.1%	28.6%	8.2%	8.2%	100.0%
12	I would have learnt more from doing all the sections on my own.	10.2%	20.4%	44.9%	24.5%	100.0%
13	Assignment should be done on an individual basis.	10.2%	16.3%	38.8%	34.7%	100.0%
14	The assignment introduced a better understanding of the following topics:					
14.1	Audit planning	28.6%	53.1%	10.2%	8.2%	100.0%
14.2	Planning materiality	32.7%	49.0%	18.4%	0.0%	100.0%
14.3	Performance materiality	28.6%	55.1%	8.2%	8.2%	100.0%
14.4	Trivial materiality	24.5%	63.3%	12.2%	0.0%	100.0%
14.5	Assertions	46.9%	40.8%	12.2%	0.0%	100.0%

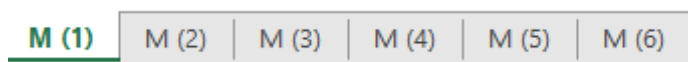
Statement		Strongly agree	Agree	Disagree	Strongly disagree	Total
14.6	Audit risk assessment	32.7%	57.1%	10.2%	0.0%	100.0%
14.7	Responses to risks identified	28.6%	61.2%	10.2%	0.0%	100.0%
14.8	Working paper references	22.4%	57.1%	20.4%	0.0%	100.0%
14.9	Overall sampling	18.4%	59.2%	22.4%	0.0%	100.0%
14.10	Integration of the topics above	36.7%	53.1%	10.2%	0.0%	100.0%

Source: Appendix 10

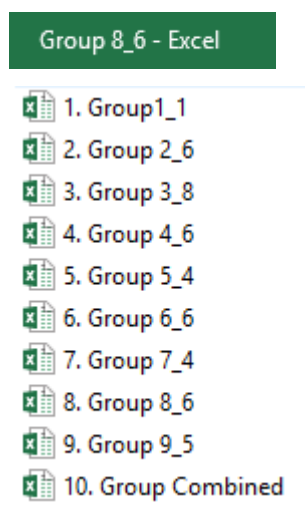
APPENDIX 11 - AUDITING ASSIGNMENT AND THIRD-YEAR AUDIT QUESTIONNAIRE

1. This is a group assignment and the group should select a coordinator among themselves.
2. The group can be as small as one member but not exceed the maximum number of ten members (It is advised that the group should not be less than five students).
3. An electronic file should be kept and the minutes of the first meeting should consist of the following:
 - 3.1. Appointment of the audit senior in the group
 - 3.2. Introduction of members
 - 3.3. Responsibilities of each member in the assignment
4. The assignment should be done as follows:
5. Download the most recent financial statements of any JSE-listed company.
6. Managing the assignment
 - 6.1. Leadership
 - 6.2. Meeting dates should be scheduled
 - 6.3. Due date 15 October 2015
 - 6.4. Excel custodian
 - 6.5. Supervision of the work
7. On the integrated planning model perform the following tasks:
 - 7.1. Recording of the trial balance in this instance the balances of the JSE-listed company's financial statements balances for the group or company. Based on your experience with Pastel use the Pastel reference numbers for account numbers.
 - 7.2. Identify and assess the risk per assertion and select the reasons for each assertion and risk level selected from the dropdown menu.
 - 7.3. Identify the number of transactions per balance line items.
 - 7.4. Select the most appropriate materiality based on the information available (The selection of the benchmark or the column will calculate and populate the materiality cells in Excel).
 - 7.4.1. Consider and select overall materiality

- 7.4.2. Select performance materiality (Type in an “a” in the selected cell)
- 7.4.3. Select trivial materiality (Type in an “a” in the selected cell)
- 7.5. Research the CaseWare references for working papers and record any relevant reference number based on CaseWare references to each balance and line item against each assertion selected next to the reason.
8. On the evaluation tab the participation marks for each member should be recorded and the members should also evaluate the audit senior on the basis of leadership and organisation of the members, tasks assigned and collection of the data.
9. The submission should at least contain minutes of two meetings held.
10. Complete the questionnaire on the tab M1 to M10. Each member should complete a separate tab on the Excel sheet, e.g. Member 1 should complete M1 tab and Member 2 on the M2 tab.



- 10.1. Do not record any personal information on the Questionnaire tab.
- 10.2. As this is voluntary, the students that is not willing to complete the questionnaire should not complete the tab.
- 10.3. The audit senior will submit the Excel workbook with the different Tabs in a group to maintain confidentiality of the students. The aggregated information of the individual groups will be summarised and published for the group in total and no individual information will be published.
- 10.4. The example below indicates the group submission of the confidential questionnaires.



11. The audit senior should submit the assignment and all files such as the JSE-listed company financial statements, minutes of meetings, integrated planning model, report and questionnaire as a group assignment on their "eFundi" profile. No individual submissions are required. (eFundi profile is an electronic module management system for each module including assignments used by North-West University).

12. Example of audit senior submission per group.

Name <	Type
 audf assignment.docx	.docx
 Audit assignment.xlsx	.xlsx
 old mutual-afs-2014.pdf	.pdf
 Own Caseware references.xlsx	.xlsx
 Questionnaire+Phd+model+AUDF321 of ...	.xlsx

13. Example of a completed Excel questionnaire without reference to the students' name.

	A	B	C	D	E	F	G	H
1		This information will be treated as confidential and only the module code will be mentioned.						
2		The aggregate results of all the respondents and not the individual results per "Firm" will be published.						
3		Please complete and select the most appropriate statement and mark with a "X" in the appropriate Box and return via efundi .						
4								
5		Questionnaire			Strongly agree	Agree	Disagree	Strongly disagree
6	1	My level of understanding of audit planning before the assignment can be classified as : High				X		
7	2	My level of understanding of audit planning before the assignment can be classified as : Limited				X		
8	3	My level of understanding of audit planning before the assignment can be classified as : Low					X	
9	4	The assignment assisted me to understand how the theory is applied in practice.			X			
10	5	My level of understanding of audit planning after the assignment can be classified as : Much more			X			
11	6	My level of understanding of audit planning after the assignment can be classified as: Improved			X			
12	7	My level of understanding of audit planning after the assignment can be classified as: Same level					X	
13	8	Auditing should be presented in a more practical manner eg planning model.				X		
14	9	Management, coordination and meetings with members required more time than the assignment itself.				X		
15	10	It took time and effort to complete the assignment.				X		
16	11	Assignment should be done on a group level				X		
17	12	I would have learnt more from doing all the sections on my own.				X		
18	13	Assignment should be done on an individual basis.				X		
19	14	The assignment introduced a better understanding of the following topics						
20	14.1	Audit planning			X			
21	14.2	Planning Materiality			X			
22	14.3	Performance materiality			X			
23	14.4	Trivial materiality			X			
24	14.5	Assertions			X			
25	14.6	Audit risk assessment			X			
26	14.7	Responses to risks identified			X			
27	14.8	Working paper references				X		
28	14.9	Overall sampling				X		
29	14.10	Integration of the topics above				X		

14. Report on student participation. (Group name and student names and number removed for confidentiality reasons).

Report		Name of firm:					
PEER EVALUATION OF GROUP MEMBERS							
		Name of team members					
		Their student numbers					
Criteria							
	Max						
Interest shown in the project	20	20	20	20	20	20	20
Knowledge disclosed by the member	20	20	20	20	20	20	20
Active participation in the project	20	20	20	20	20	20	20
Ability to work in a team	20	20	20	20	20	20	20
Effort with which project was undertaken	20	15	15	15	15	15	15
TOTAL	100	95	95	95	95	95	95
GUIDELINE FOR MARK ALLOCATION							
		0	10	20			
Interest shown in the project		Showed no interest, had a negative effect on the	Showed reasonable interest	Was very interested and provided motivation			
Knowledge disclosed by the member		Had no knowledge of the financial management topics	Had a reasonable knowledge of the topics involved	Had excellent knowledge of the topics involved			
Active participation in the project		Had not done his/her share	Did a reasonable share of the work	Did more than his/her part of the work			
Ability to work in a team		Did not work together with the team	Showed reasonable co-operation with the group	Worked together excellently			
Effort with which project was undertaken		No effort was undertaken	Showed reasonable effort	Much effort was put into the project			

APPENDIX 13 – ARTICLE SUBMITTED

☐ International Journal of Auditing

Submission Confirmation

 Print

Thank you for your submission

Submitted to
International Journal of Auditing

Manuscript ID
IJA-2018-057

Title
Stakeholders and auditor's materiality decision: Understanding of materiality considerations on financial statements

Authors
Swart, Jacobus Johannes
Lucouw, Pierre

Date Submitted
29-May-2018

Author Dashboard

**APPENDIX 14 - LINK BETWEEN LITERATURE AND PARAGRAPHS
WHERE LITERATURE WERE ELABORATED ON AND LINKED TO
THE EMPIRICAL RESEARCH AND THE DEVELOPMENT OF MODEL**

Par	CHAPTER 2: RISK AND AUDIT METHODOLOGY AND MODELS	Empirical and literature review link and reference
2.2	AUDIT MODELS AND METHODOLOGY	6.2, 6.6, 6.7, 7.2, 7.6 and 7.7.
2.2.1	Audit methodology development 1904 to 1940	3.5, 7.4,- 7.6 and 7.7.
2.2.2	System-based audit approach 1940–1972	3.5, 7.4,- 7.6 and 7.8.
2.2.3	Theoretical audit approaches	6.2.
2.2.4	Risk auditing concept	6.2.1.
2.2.5	Audit risk model	6.6 and 7.6.6.
2.2.6	Elements of the audit risk model	6.6 and 6.7.
2.2.6.1	Conclusions of the audit risk model	7.2, 7.4 and 7.5.
2.2.7	Business risk approach (BRA)	6.6.
2.2.7.1	Elements of the business risk model	7.4.
2.3	INTERNATIONAL STANDARDS OF AUDITING	1.4.7, 1.4.7, 3.2.2.5, 3.3.2 and 3.3.3, 4.2.1, 4.3.2 and 6.2 - 6.4, 6.7 and 7.3.
2.4	INTEGRATED AUDITING MODELS AND METHODOLOGY	6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 7, 7.2,-7.7
	CHAPTER 3: BUSINESS RISK AND AUDIT RISK IDENTIFICATION AND ASSESSMENT.....	
3.2	BUSINESS RISK	1.1.3, 2.2.7, 3.3, 3.4, 3.5, 6.5, 6.6, 6.7, 7.4 and 7.7.
3.3	RISK IDENTIFICATION	1.1.1, 1.1.2, 2.2, 2.3, 3.2.2.2.2, 3.3 -3.5, 4.3, 6.5, 6.6, 7.6.4, 7.6.6 and 7.7.
3.3.2	Education responsibilities	6.5.
3.3.3	Public practice responsibility	6.5.
3.4	QUALITATIVE COMPARED TO QUANTITATIVE RISK ASSESSMENT	7.4,- 7.6 and 7.7
3.5	QUALITATIVE AND QUANTITATIVE MATRIXES AND ASSESSMENT MODELS	6.6, 6.7, 7.4, 7.5, 7.6.4 to 7.6.7 and 7.7.2
	CHAPTER 4: AUDIT MATERIALITY AND SAMPLING	
4.2.	AUDIT MATERIALITY	6.2.2, 6.2.3, 6.7, 7.5, 7.6.1, 7.6.2 and 7.7.
4.3	AUDIT SAMPLING AND AUDIT PLANNING	6.3 -6.5, 6.7 and 7.6.7.



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DECLARATION OF LANGUAGE EDITING

29 May 2018

To whom it may concern

This is to confirm that I, the undersigned, have language edited the completed research of JJ Swart for the degree *Doctor of Philosophy in Accountancy* entitled: *Audit Methodologies: Developing an integrated planning model incorporating audit materiality, risk and sampling*.

No changes were permanently affected and were left to the discretion of the student. The responsibility of implementing the recommended language changes rests with the author of the thesis.

Yours truly

A handwritten signature in black ink, appearing to read 'J Müller'.

Jomone Müller