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**The Impact of Information Systems Auditor's Training on the Quality of an
Information Systems Audit**

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LIST OF ACRONYMS AND ABBREVIATIONS

CISA	Certified Information Systems Auditor
COBIT®	Control Objectives for Information and Related Technologies
ISACA	Information Systems Audit and Control Association
IT	Information Technology
JSE	Johannesburg Stock Exchange
CIA	Certified Internal Auditor
IIA	Institute of Internal Auditors
IAASB	International Auditing and Assurance Standards Board



DEDICATION

Dedicated to all those who have believed in me.



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I would like to acknowledge all those who have supported me during the entire process of this research undertaking.



ABSTRACT

The significance of information technology (IT) audits in organisations is an area that has received increased focus, and it is increasingly necessary to conduct additional research into the IT audit subject area. As a result of increased dependence and spending on IT, it has effectively become a requirement for organisations to increase their level of assurance about these investments and their ability to deliver as expected. IT audits fulfil this role, and are used to examine the effectiveness of controls, security of important systems and business operations to identify weaknesses and find ways that can be used to improve and mitigate the impact of these weaknesses. However, prior research has not measured the impact that training of auditors has on the quality of IT audits. The findings of this study show that organisations play an integral role in the training programs. However, these organisations do not understand their training programs and cannot properly communicate the training requirements to IT auditors. The research findings have also shown that continuous professional development programs are additional tools in enhancing IT auditor knowledge. This research undertaking has found that generally, internal programs are more effective in delivering content to IT auditors and thus more emphasis can be put on them. Overall, this research undertaking strengthens the idea that resources should be committed to improving training programs, as improving training programs eventually leads to efficiency in all matters related to IT audit quality.

Keywords: Training, IT audit quality, IT audit, IS audit, IT auditor, IS audit.

CHAPTER 1

INTRODUCTION

1.1 Introduction

The significance of information technology (IT) audits in organisations is an area that has received increased focus, and it is increasingly necessary to conduct additional research into the IT audit subject area. The primary motivation for increased research into IT audits is driven by increased reliance on and subsequent spending in IT infrastructure used for business operations as well as professional and regulatory requirements related to auditing IT business operations (Djong, Kamdjoug & Wamba, 2018; Ibrahim & Jebur, 2019). There has been an increased demand for IT services used in business operations, and this reliance on IT has in turn driven spending on IT to higher levels (Maruping, Venkatesh, Thong & Zhang, 2019; Tallon, Queiroz, Coltman & Sharma, 2019). As a result of increased dependence and spending on IT, it has effectively become a requirement for organisations to increase their level of assurance about these investments and their ability to deliver as expected (Abou-El-Sood, Kotb & Allam, 2015; Anomah & Aduamoah, 2018). IT audits fulfil this role, and are used to examine the effectiveness of controls, security of important systems and business operations to identify weaknesses and find ways that can be used to improve and mitigate the impact of these weaknesses (Aditya, Hartanto & Nugroho, 2018). IT audits add value to an organisation as they support the judgement of the IT auditor on the quality, reliability and integrity of the information from IT systems.

Increased reliance on IT in conducting business operations and various regulations and legislative requirements have highlighted the importance of IT auditing (Gregory, Kaganer, Henfridsson & Ruch, 2018). Previous studies on IT auditing have suggested multiple frameworks and factors that may impact the quality of IT audits (Abdirahman, 2017; Aditya, Ferdiana & Santosa, 2018). However, prior research has not measured the impact that training of auditors has on the quality

of IT audits (Yeghaneh, Zangiabadi & Firozabadi, 2016; Siew, Yeow, Tan & Grigoriou, 2017). Based on previous studies, this research undertaking identifies and examines various constructs related to the training of auditors and the impact that these constructs have on IT audit quality. These constructs are drawn from both financial auditing literature and IT auditing literature.

The aim of this study is to provide a better understanding of the relationship between training and the proficiency of an IT auditor in enhancing audit quality. The aim of this research undertaking is to extend prior research by developing a practical, broader questionnaire that can be used to understand the impact of training, which is one of the factors thought to have an effect on IT audit quality. This study analyses one of the attributes that have been identified in prior research as having an impact on audit quality and contextualise it to the IT audit quality discipline within the South African environment. Previous research has identified various attributes that negatively and positively impact audit quality and these range from attributes of the system or process being audited, the process used to conduct an audit, characteristics of the audit personnel, environment, and organisational conditions. However, to date, there has not been a comprehensive research undertaking that assesses the impact that training has on IT audit quality.

1.2 Background

Many organisations rely on IT and use this as leverage for business success and to survive in the competitive business environment. IT plays an integral role in helping organisations to improve their business processes and to become efficient in their operations, thus assisting them to increase their competitive advantage (De Oliveira, 2017). According to Van Grembergen and De Haes (2017), IT enables organisations to become innovative by enabling organisations to solve complex problems, make better and informed decisions, and improve on resource management. While IT is an enabler, which has many benefits in an organisation,

it also presents risks that may negatively impact the organisation. Zhao, Xue and Whinston (2013) argue that these risks are even more prominent in organisations that are dependent on third-party IT service providers and add complexity to an operational business model that expects exceptional performance from IT systems. Organisations that are heavily dependent on IT face serious consequences if IT systems fail.

According to Schermann, Wiesche, Hoermann and Krcmar (2014), the adoption of IT brings related high-impact risks, which require organisations to intensify and focus on the governance of IT risks. Governance of IT risk has become critical, since it has reputational, regulatory, operational and financial implications. Some of the significant IT risks include cybersecurity risk, business continuity risk, strategic IT alignment risk, operational IT risk, and vendor and third-party risks. To manage IT risks, organisations need effective governance of IT. According to Ferguson, Green, Vaswani and Wu (2013), IT governance ensures that organisations integrate available IT best practices, which align and support business objectives, measure performance, manage IT resources effectively and efficiently, and ultimately manage risks associated with IT.

The IT threat and the risk landscape are constantly changing with the changes and advances in IT. As a result, managing risk has become a challenge that puts pressure on organisations to comply with regulatory and compliance requirements (Lam, 2014). For example, in South Africa, the King IV requirements mandate all organisations that are listed on the Johannesburg Stock Exchange (JSE) to set up and maintain proper governance structures, including IT governance (Institute of Directors, 2016). COBIT, an IT governance framework from the Information Systems Audit and Control Association (ISACA), provides procedures and guidelines for governance of IT in an organisation (De Haes, Van Grembergen & Debreceeny, 2013). As a result, Wagner, Beimborn and Weitzel (2014) assert that

IT is a critical component in modern business and that the increased reliance on and the complexity of evolving IT systems have necessitated organisations to implement some controls to protect critical organisational IT systems and commercial information.

IT governance, therefore, ensures that organisations examine, evaluate and manage all IT-related risks. IT audits and risk assessments help organisations to have proper IT governance structures and programs. To qualify as an IT auditor, the evaluation of the evidence must involve IT, as a means to either conduct and complete an audit engagement or be the specific focus of the audit directly or indirectly (Chong & Tan, 2012; Haislip, Peters & Richardson, 2016). IT audits examine and evaluate an organisation's IT policies, operations, and infrastructure (Mazza, Azzali & Brooks, 2016). An IT audit determines whether controls put in place minimise business risks and can protect and ensure confidentiality, integrity, and availability of IT systems and data. It is the role of IT auditors not only to examine IT controls, but also include financial and business controls related to IT (Havelka & Merhout, 2013). IT auditors evaluate security controls; determine and help minimise IT risks; ensure compliance with IT standards, procedures and policies; and identify inefficiencies in IT operations (Spears, Barki & Barton, 2013; Drljača & Latinović, 2017). IT auditors need certain skills, qualifications and expertise to perform their duties efficiently and effectively.

According to Cannon (2016), a combination of formal education, relevant work experience, and professional credentials or certification is required to become an IT auditor. IT auditors are also expected to complete formal education or qualification in IT or related fields, such as auditing and accounting (Desai, Desai, Libby & Srivastava, 2017; Axelsen, Green & Ridley, 2017). Voluntary professional certifications, such as the Certified Information Systems Auditor (CISA) credential offered by ISACA and the Certified Internal Auditor (CIA) credential from the

Institute of Internal Auditors (hereafter, IIA), are some of the credentials that are generally acceptable for IT auditors. The CISA credential, according to Krahel and Vasarhelyi (2014), is a gold standard for IT auditors and has different requirements. In general, the CISA credential requires a degree and relevant professional information systems auditing experience. In addition to the above requirements, credential holders are required to stay current with IT advances through continuing education.

1.2.1 Information Technology audit

Definitions of what entails an IT audit vary depending on the objectives of the audit. Dimitrova, Andonovski, Temjanovski and Dimitrova (2016) define an IT audit as a process of collecting and examining evidence to ascertain whether IT systems safeguard IT assets, maintain data integrity, efficiently consume resources, and achieve the goals of the organisation effectively. Though the definitions may vary and encompass the concepts of completeness, efficiency and effectiveness, the common theme in most of these definitions is that IT audits provide assurance to management that IT systems or IT-dependent processes meet their objectives. The demand for IT audits emphasises the significance of conducting these audits in an effective and efficient way.

There are various resources within the IT audit literature that may be used as guidelines and frameworks to improve the quality of IT audits. COBIT outlines some of the checklists and controls that can be evaluated during an IT audit. In addition to the COBIT framework, there are other publications that provide guidelines on conducting IT audits and give direction when conducting specific audit tasks. As a result, Stoel, Havelka and Merhout (2012) call for additional research in the IT audit field to understand critical success factors that have an impact on the overall quality of any IT audit. However, from the literature surveyed, there has been limited and little academic research that has been done on the

influence that training has on the quality of audits and on the relative importance of training on improving IT audit quality.

1.2.2 Previous research on training and IT audit quality

Previous research on IT audits has primarily focused on particular characteristics of assurance and audits tasks with regard to the significance of knowledge as a critical element of successful IT audit engagements. Stoel *et al.* (2012) argue that prior research has attempted to examine IT audit quality, and further note that these studies developed constructs through a combination of constructs from financial audit quality research and IT audit research. The aim of this research is to extend existing research and understand how the training of IT auditors impacts IT audit quality.

Research on IT audit has focused on the need for IT audits and how they are conducted. These studies have researched the effectiveness of these audits, the types of IT audits, the audit process, the role of IT auditors, the training of auditors (Gwilliam & Marnet, 2015) and factors affecting the quality of audits (Havelka & Merhout, 2013; Mazza *et al.*, 2016). However, according to Mazza *et al.* (2016), the IT audit quality area has not been given enough attention, which is not expected because of the critical role that IT has in any organisation. As a result, there is a need to understand what entails a quality IT audit.

According to Stoel *et al.* (2012), there is no clear definition of IT audit quality. IT audits have different purposes, and there may be varying definitions of IT audit quality, depending on the objective of the audit. Mazza *et al.* (2016) argue that although there is no explicit definition of IT audit quality, the definition can be implied from the goals of an IT audit. Kilgore (2014) states that quality can be measured and thus, using previous research, it can be measured by using the effectiveness, reliability, and efficiency of the audit. Stoel *et al.* (2012) further note

that it is very difficult to measure IT audit quality, since there are so many variables that have an impact on audit quality. Vahdani and Rezaei (2015) state that IT audit quality can be defined by using the extent of compliance with existing IT auditing standards.

IT audit quality can be measured by various outputs and one of them is the knowledge and competency of the audit team. Siew, Yeow, Tan and Grigoriou (2017) argue that IT audit quality is a function of factors that are related to performance, which involve the capabilities of auditors (experience, knowledge, efficiency, adaptability) and professional competencies (judgement, objectivity, independence). In their study, Havelka and Merhout (2013) find that professional certifications and qualifications enhance specialised knowledge and competencies needed to conduct complex audits. This specialised knowledge can be obtained either through experience and specialised training or by following a particular training program.

The IT audit profession has changed and evolved from the time IT systems were first introduced into the profession and it is a challenge to determine the extent to which training has kept pace based on the literature reviewed. Ferguson *et al.* (2013) note that auditors-in-training are required to obtain comprehensive knowledge, training and understanding of the information systems they will be auditing or systems they will be using to conduct IT audits. The speed of IT development usually outstrips the preparedness of many training curriculums and development programs. There have been proposals to reform the curriculum of IT auditors based on the legislative requirements (Pan & Seow, 2016; Kim, Teo, Bhattacharjee & Nam, 2017), but these have not dealt with how training of auditors should be conducted. While most professional bodies emphasise the need for training, they do not outline how the training is to be implemented; instead, they give broad expected outputs/outcomes that are difficult to measure and subject to

interpretation. Plumlee, Rixom and Rosman (2012) argue that for any training program to be effective, the education and training program should focus on the usefulness, applicability and impact of that training program. While there is considerable research related to IT audit quality, there is limited research related to the training and development programs used to prepare would-be IT auditors. For practising IT auditors, there is minimal research regarding how training can assist in the maintenance of their knowledge and competencies.

Based on the above discussion and the reviewed literature, it is evident that the role and impact of effective training on the quality of an IT audit has received little attention and the scholarly attention it has received is outdated (Curtis, Jenkins, Bedard & Deis, 2009), old and not relevant to the current settings and environment, which have changed significantly. Additionally, since the last study (a research synthesis) was conducted by Curtis *et al.* (2009), there has been no follow up to the proposed areas that needed further research. It is surprising that there are no current studies related to this, given the critical role played by IT in organisations.

1.3 Problem statement

Research into the role and impact of effective training on audit quality is limited to financial auditors using IT. Recognising the gap that exists in literature, additional research is required to investigate and comprehend the role that training has on proficiency and IT audit quality. This research undertaking is motivated by the need to understand IT audit and the factors that impact the IT audit process. This consideration has been motivated by increased dependence and spending on IT, and the legislative and professional requirements when conducting audits (Kleinman, Lin & Palmon, 2014). Heavy reliance on IT and increased spending on IT investments have resulted in increased levels of assurance requirements. However, the demand for IT audit services requires that these audits be performed in an effective and efficient manner. Consequently, further research is necessary

to recognise possible issues when carrying out IT audits and critical issues that may impact the overall IT audit quality. There has been limited research on the factors that have an impact on IT audit quality and the importance of these factors.

1.3.1 Research objective and question

For the purpose of addressing the research gap identified above, this study particularly seeks to obtain answers to the following research question:

- What is the effect of IT auditors' training on the quality of IT audits?

The sub-questions that will assist in gaining a deeper and better understanding of the answers to the above research question are:

- What effect does training have on audit quality when auditing complex IT systems and environment?
- What role does training play in enhancing competence, expertise and IT audit quality?
- What is the effective and optimal training method that enhances the proficiency of an IT auditor?

1.4 Purpose and objective of the study

The aim of this study is to provide a better understanding of the relationship between training and the proficiency of an IT auditor in enhancing audit quality. The focus of this study is to examine the influence of training on the IT auditor's expertise and proficiency when dealing with IT audits. This study particularly examines the role of training on the quality of IT audits, bearing in mind the dynamic nature of the IT environment and the changing expectations from business that expects IT investments to enable and add value to the business. The goal of the research is to improve and validate the impact of training, as suggested by prior research, on the quality of IT audits. Further to this, the aim is to gain an

understanding of the perceived significance of training received by aspiring and practising IT auditors on the quality of their IT audits.

1.5 Ethical considerations

There are various ethical considerations to consider in the current research from the research design phase until the presentation of findings. These ethical challenges are involved in all stages of the research undertaking. The aim of the research is to impart authentic knowledge and prevent errors, and avoid falsifying and misrepresentation of findings (Marshall & Rossman, 2014). This also requires accountability and fairness to those involved in the study, which includes avoiding plagiarism and acknowledging other researchers' work where required (Flick, 2014).

Since the research undertaking is qualitative in nature, it is imperative for the researcher to be accountable towards the human subjects who are involved in the study. Ethical clearance was obtained from the University of Johannesburg before dealing with human subjects. Participants were protected and the researcher ensured that the participants were not harmed in whatever way during this research. Ethical challenges related to participants include confidentiality, informed consent and the potential effect of the researcher's relationships with participants (Padgett, 2016). It was necessary to clarify to the participants and highlight how information was going to be collected and used. Informed consent is critical for a qualitative research undertaking such as this one.

1.6 Limitations

The current research undertaking, just like any other limited scope research, has limitations inherent to qualitative research. These weaknesses, circumstances, and influences are out of the control of the researcher and place restrictions on the methodology and findings (Silverman, 2013). The limitations are grouped into potential methodological limitations and potential limitations of the researcher.

These limitations are due to the design and methodology used, and have an impact on and influence the interpretation of research findings. These limitations have constraints on generalising the findings, applying the findings to practice, and on the usefulness of research findings as a result of the initial research design and methods used to establish validity. Below are some of the limitations identified:

- With a small sample size of respondents, caution must be applied, as the findings might not be transferable to the general population of IT auditors in South Africa.
- Another limitation of this study is that the scope of the study was limited to training in general and did not explore further the impact and role of different types of training and what impact each of these types of training has on the IT audit quality variables (input, process and output).
- Another limitation of this study is that the study did not evaluate the impact of initial training programs and assumed that IT auditors already had experience.

1.7 Research methodology

According to Miles, Huberman and Saldana (2014), a research design lays the foundation and context for the study and assists in finding answers to the suggested research questions. Qualitative research has been chosen as the primary method of study because it allows the researcher to enquire and describe individual experiences “about a phenomenon as described by participants”. The approach used in this research followed methods used by prior research to evaluate audit quality in financial audits. The research utilised a questionnaire that included items adopted from prior research. The questionnaires were sent to the identified sample population to examine the impact of IT auditors’ training on IT audit quality. The results were compared with findings from prior research findings on financial audits.

The purpose of this research undertaking is to validate and refine the IT audit quality attribute suggested by previous studies and apply it to the South African context. The approach to achieve this outcome followed an exploratory process that identified attributes of IT audit quality based on both previous studies and some adapted and developed from related studies to measure the identified constructs. The questionnaire was developed from attributes that had been used in prior IT audit, general audit and financial audit quality studies. The next step was to send the questionnaire to experienced and knowledgeable IT auditors to evaluate identified attributes and their impact on IT audit quality. The final step in the process was to compare the results of the research undertaking with results from previous studies for any similarities and differences.

To obtain feedback from a broad set of IT auditors, the questionnaire focused on two sets of respondents: financial auditors involved in IT audits and IT audit practitioners. The South African chapter of ISACA was utilised to solicit respondents. ISACA was chosen because its local chapters focus on the advocacy, education and professional development of IT auditing, governance, controls and risk management. The researcher believes that these respondents are a true and complete representative sample of professionals who are experienced and qualified to provide the perspective of professionals responsible for the execution and management of IT audits. A non-probability purposive sampling method was implemented when distributing questionnaires to obtain a representative sample of the population.

An online questionnaire was utilised as a primary tool to collect data. The questionnaire was sent to potential participants via an email sent by the identified professional body. The email indicated the purpose of the research and asked the participants to reflect on their perspective regarding the influence that their training had had on their audit work quality.

1.8 Chapter layout

The dissertation follows the generic five-chapter outline given below. The five-chapter layout is based on the qualitative research methodology as indicated above and each chapter begins with an introduction and end with a conclusion. Below is the general outline of the dissertation and the sub-topics under each chapter:

Chapter 1: Introduction

This chapter gives the background to the identified problem. The purpose and goal of this research undertaking are also discussed. Once the gap and the research question are identified, the motivation, significance, and contribution of the current research and study are discussed. The chapter also briefly discusses ethical considerations and limitations of the research undertaking. The chapter concludes by giving an overview of research contributions.

Chapter 2: Literature Review

The chapter discusses previous studies that have been conducted and are related to IT audit quality and training. The chapter reviews prior and ongoing studies (organised by themes).

Chapter 3: Research Methodology

This chapter discusses the method used to conduct the research process. This section discusses the research design, the sampling technique, data collection and the data analysis method. The chapter concludes by discussing the ethical consideration in the research process.

Chapter 4: Analysis and Research Findings

This chapter discusses the findings of the research (organised and arranged per research questions).

Chapter 5: Conclusion, Discussion, and Recommendations

This chapter summarises the research findings, gives a conclusion (organised and arranged per research question) and discusses the scope, challenges, and limitations encountered. The chapter puts forward suggestions and recommendations for future work and research. The chapter ends with a general conclusion to the whole research undertaking.

1.9 Conclusion

Due to reliance of IT and increased spending on IT, it has become necessary for organisations to obtain assurance that their investments in IT are delivering value and are enablers. This assurance can be achieved through conducting IT audits. However, reliance on the findings of these IT audits is dependent on the quality of the whole process. While there has been research on factors affecting general audit and IT audit quality, there has been no research on the impact of training on IT auditor proficiency and IT audit quality. The goal of this research is to address the research gap identified in the above sections and answer the research questions outlined. The findings of this study may benefit various groups involved in the IT audit process. Although the focus of this study is on the influence of training on the quality of IT audits, the researcher believes that the results may be applied to other types of audits and can be used to identify and improve on factors and attributes of training that affect the quality of IT audits.

The next chapter reviews the literature relevant to this study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

There have been significant changes in the IT audit profession, which have affected the way auditors conduct IT audits. Legislative changes and legislative requirements, coupled with changes and advances in IT, have significantly impacted on the way IT audits are conducted (Gantz, 2013; Chou, 2015). As a result, various approaches to IT auditing and the need for IT audit quality provide an opportunity of study that can help transform the way IT auditors are trained and gain practical skills needed for producing quality audits. The impartiality and the accuracy of an audit are greatly influenced by the quality of the audit being conducted (Havelka & Merhout, 2013). On the other hand, the quality of an audit is the degree and extent to which it fulfils standards and legal requirements (Hingarh & Ahmed, 2013).

An IT audit has been recognised as an important aspect in organisations and this has led to calls for additional research in the field of IT audit (Curtis *et al.*, 2009). The calls for additional research are driven by both increased dependence and spending on IT in many organisations, and legal and professional requirements.

The following sections review the literature associated with audit quality and training to find the influence that training of IT auditors has on the quality of an IT audit.

2.2 IT audit

According to Wright and Capps (2012), in an IT audit, the examination or review involves IT either as a means to complete an audit or as the specific focus of the audit. In most cases, both aspects of the examination are involved. In most cases,

IT audits are risk-based and follow the approach that identifies and prioritises potential risks, assesses control mechanisms and tests the controls.

De Haes and Van Grembergen (2015) recognise IT auditing as an integral and critical process of IT governance. IT governance frameworks, like COBIT®, include IT auditing as a critical component that is used to ensure that the IT strategy is aligned with the business strategy and provide the assurance that existing policies are adequate and are being followed.

IT audits can be used by organisations to reduce risks associated with deploying and investing in IT (Chen, Smith, Cao & Xia, 2014). Management can use IT audits to ensure that IT-related activities are planned and executed according to acceptable business practices and that IT projects are controlled and implemented properly. At the operational level of any organisation, IT audits can be used to ensure that day-to-day IT activities are adequate for the proper operation of efficient IT operations. Just like at management level, IT audits help to identify risks and controls related to particular business processes and application and to test if the identified controls are working properly as designed or not (Debreceeny, 2013).

There are numerous resources within the IT audit literature that are used to guide auditors. COBIT® provides comprehensive guides and checklists of potential controls. In addition, there are numerous publications that give guidance on certain IT audit processes and give direction concerning specific audit tasks (Gantz, 2013; Wu, Huang, Huang & Yen, 2017).

2.2.1 Importance of an IT audit

There are direct benefits of IT auditing and the primary purpose of an IT audit is to assess and examine whether or not IT investments meet the expected organisational goals/objectives and to also ensure that IT investments do not

create business risks that are not acceptable (Havelka & Merhout, 2013). IT audits ascertain with a specific level of confidence that IT systems are working as expected. Gantz (2013), however, notes that although IT audits are potentially resource-intensive, they offer many benefits that come as a result of the confidence in IT investments.

High dependence on IT investments requires increased levels of assurance that these IT investments deliver the expected value. According to Vincent (2016), IT audits are used by organisations to evaluate the controls, effectiveness, operations, and security, among others, to identify weaknesses and opportunities that can be improved. However, in order to rely on the findings/output of an IT audit, the whole IT audit process should be effective and reliable, a measure that is generally referred to as IT audit quality and this will be discussed below.

2.3 IT audit quality

2.3.1 Definition of audit quality

IT audits serve different purposes and may have different objectives within organisations and as a result of various expectations, the definition of IT audit quality may differ based on the aim of the audit. However, according to Ratih, Bayupati and Sukarsa (2014), various definitions incorporate the concept of completeness related to specific guidelines or standards, cost, effectiveness and efficiency. In the literature reviewed, the common theme observed is that IT audits aim to provide a certain level of assurance that IT systems or processes meet their objectives (Shihab & Misdianti, 2014; Mahzan & Lymer, 2014).

According to Ziaee (2014), there are a number of different definitions of what audit quality is and none of them has been accepted globally as a recognised definition. As a result, Bing, Huang, Li and Zhu (2014) argue that it is very complex to deal with this subject and it can even be more challenging to assess the quality of an

audit. From the literature reviewed, there are many suggestions about IT audit quality attributes, but these have been observed to overlap in terms of definitions and some are semantically similar. The overlap in definitions may be due to different audit skills, technical understanding and competence of auditors, and communication skills of auditors. There is, therefore, a need to refine these definitions and group these attributes based on audit quality themes.

More consideration is given to the meaning, the definition of quality of an IT audit and how IT audit quality can be measured. According to Havelka and Merhout (2013), auditing firms, professional bodies, oversight bodies and regulators place more emphasis on measuring IT audit quality. There is no common and generally agreed upon method to measure IT audit quality; however, various scholars and professional bodies have suggested numerous proposals and initiatives. These initiatives use audit quality indicators to accurately measure IT audit quality.

2.3.2 IT audit quality indicators

Every IT audit is unique and factors that affect the success of each audit (quality) vary depending on the circumstances surrounding the audit and the auditee (Chou, 2015). Despite varying circumstances, it is still possible to identify critical success factors that are regarded as key to a successful audit regardless of the unique features of each IT audit. The ability to identify factors that influence IT audit quality could help identify opportunistic and problematic areas.

From the literature reviewed, the most comprehensive framework that can be used to measure audit quality is the Framework for Audit Quality published by the International Auditing and Assurance Standards Board (IAASB) in 2014. The publication highlights the audit quality factors at various levels with the objective of raising awareness of such factors and encouraging stakeholders to find ways to

improve the quality of audits and initiate research and dialogue about the factors (IAASB, 2014). The framework describes elements of audit quality as:

- a) Inputs: These factors are concerned with attitude, ethics and values that are greatly influenced by organisational culture. Skills, knowledge and experience of an auditor and the time given to complete an audit are also considered as inputs.
- b) Process: These are factors covering the processes and procedures used during an audit. Controls used to ensure quality are also covered under this category.
- c) Outputs: These are the final results and the findings of an audit and include reports prepared formally for audit purposes.
- d) Interaction within the audit reporting supply chain, including all communication (formal or informal) between various stakeholders and the background that may have an influence on communication and interactions.
- e) Contextual factors: These are environmental factors and background issues that may affect the quality of an audit.

In addition to the elements above, the Public Accounting Oversight Board (PCAOB) provides information regarding audit quality through inspection reports that highlight audit quality indicators categorised broadly as a function of features of the auditor, the task, and the audit environment (PCAOB, 2015). While these quality indicators are general audits, Mazza *et al.* (2016) mention that these indicators are also applicable to IT audit quality. Christensen, Glover, Omer and Shelley (2016) argue that the indicators or factors used to measure IT audit quality differ significantly across various bodies and geographical regions. They note that some indicators or factors are offered as suggestions that are flexible, while some are based on principles, and others are published as a mandatory list that is based on specific audit quality indicators.

Summative findings:

While there is no universally accepted definition of what IT audit quality is, there are some indicators of what constitutes a quality audit. IT audit quality can be measured using various indicators. These indicators, according to the reviewed literature, are inputs, process, outputs, interaction within the audit reporting supply chain, and contextual factors, such as environment and background.

2.4 Prior research on IT audit quality

As previously discussed in Chapter 1, various studies have been conducted that attempt to define and measure factors that affect audit quality. These research studies have adopted different approaches to examine audit quality and have no universally accepted definition of what entails an audit quality. One definition that is broadly used in defining audit quality is the definition proposed by DeAngelo in 1981 (Dunakhir, 2016). From that definition, Dunakhir (2016) argues that two significant factors can be derived, namely capabilities of an auditor to conduct an audit and the independence of the auditor.

This literature review focused on closely related subjects and areas such as accounting, auditing, data quality and information technology, which are a basis for this review. It is equally important to have a look at other disciplines, such as quality management, critical success factors and general accounting auditing data, as these disciplines may help in understanding some concepts and help in shaping this research undertaking.

The aim of this research undertaking is to analyse an audit quality attribute that has been identified in prior research and is believed to have an impact on the quality of IT audits. Previous studies have identified and argued about numerous

attributes that have a negative and positive impact on the quality of IT audits. These identified attributes include characteristics of the system and process under consideration, the procedures used to perform the audit, behavioural traits of the auditors, and environmental and organisational conditions. In addition to the above attributes, financial auditing literature provides other attributes that may provide insight into IT audit quality.

Another study to examine the determinants of audit quality found that the reputation, salary, competency, independence and qualifications of an auditor had an impact on audit quality (Al-khadash, Al-Nawas & Ramadan, 2013). In addition, Baharuddin, Shokiyah and Ibrahim (2014) conducted a study that highlighted the importance of management support, independence and objectivity in enhancing audit quality. A study conducted by Adeyemi, Okpala and Dabor (2012) found that length of tenure and the level of education for auditors had an effect on the quality of an audit. These findings support general literature findings on employee performance and work output found in the other literature (Mathur & Gupta, 2012). Further to this, the work environment has also been found to be a good predictor of internal auditor effectiveness (Pitaloka & Sofia, 2014).

Maroun (2015) analysed audit regularities in the South African context and found that many factors affected the audit quality. The study added the following factors as having an impact on the quality of an audit: financial influence of the auditee, ethics of the auditor towards reporting findings, whistle-blowing, sense of responsibility, and awareness of the significance of the audit. Audit quality can also be improved by higher audit fees (Cahan & Sun, 2015). The study found that the higher the audit fees the better the quality. Firms which hire better quality auditors are more likely to get better audits.

According to Yahya, Mostafa, and Seyed (2015), the quality of an audit is dependent on various critical factors, such as the audit firm and its processes, the client and its corporate governance structures, and people and the training they receive. They also noted that there are many factors that contribute to audit quality and these include ethical values, technical competence, experienced judgement, good leadership and effective quality controls.

According to Yahya *et al.* (2015), quality is a determinant of an audit and is influenced by various factors that can be classified and categorised as:

- Audit capabilities: these include technical proficiency, the capability to adapt, experience and knowledge.
- Professional performance: this includes judgement, conflict of interest, professional care, objectivity and independence.

In addition to the above categories, there are also other features that affect audit quality, and these are generally related to economic incentives, such as costs, legal claims and audit fees (Mat, Zaman & Mohamed, 2015). Further to this, market structure factors, such as economies of scale, competition and industry concentration, also have an impact on the quality of an audit. Other factors that influence the quality of an audit are legislation, audit mechanisms and the employment status of the auditor (Yahya *et al.*, 2015).

The nature of audit quality is multidimensional and invisible, thereby making it difficult to measure due to a number of factors that are involved. Yahya *et al.* (2015) note that audit quality is often measured by the extent to which audits comply with auditing standards. However, compliance is not also easy to measure as it is also multidimensional and subjective in nature. The dimensions that are

often used to measure audit quality may be viewed differently by anyone attempting to measure these dimensions.

A study by Stoel *et al.* (2012) examined the factors that influence the quality of an IT audit. They found that independence, knowledge of IT and business processes, and IT audit frameworks and standards have an influence on the quality of an IT audit. Audit experience and awareness of IT controls were also found to affect IT audit quality. In addition, having access to the resources of the entity being audited and the business environment have also been identified as some of the factors that have an influence on the quality of an IT audit (Yahya *et al.*, 2015).

Using general frameworks that were proposed by previous researchers, Stoel *et al.* (2012) integrated their proposed model with other attributes used in the financial and general audit literature to come up with measurable constructs for IT audit quality. They identified 13 factors that can be used to measure IT audit quality and these can be generalised to planning and methodology; business scale and audit scope; business environment; availability of resources; independence; relationship with the auditee; experience of the auditor; auditability; IT and controls knowledge; business process knowledge; knowledge and audit skills; responsiveness; and fieldwork and audit procedures. They identified independence coupled with knowledge and audit skills as the most important factors in IT audit quality. These factors are still relevant (Yeghaneh *et al.*, 2016; Siew *et al.*, 2017).

There are various approaches to conducting specific audits and these depend on the objective of the audit. As a result of inconsistencies in the implementation of most methodologies, timeliness, adequacy, reliability and accuracy are some of the issues lacking in some audits, thereby raising questions about the approach adopted by the IT auditor. Hussein and Hanefah (2013) argue that it is almost impossible to measure the actual quality of an audit because it is an invisible

element that can only be measured after an audit has been performed. From the above-mentioned research studies, there is a fundamental challenge that exists in the reviewed literature: the difference between the definition of auditor quality and audit quality.

Training and expertise are consistently recognised as the basis for identifying and examining IT risks and controls regardless of the underlying technology used and the processes being used. It is thus important for IT auditors to get a good appreciation and understanding of the purpose of an IT audit, business processes or activities, and the technical aspect of the audit. The study by Xu (2015) recommends that comprehensive training is necessary for an auditor to gain sufficient knowledge about information technology. Hassanzadeh, Jahangiri and Brewster (2014) identified education and training as being important ingredients for auditors to gain necessary skills for IT specialities, such as conducting quality audits. This training comes in two forms: initial training and ongoing training (continual training).

There has been rapid development in the IT field that has created challenges and also provided opportunities in the IT auditing field. Taking into consideration the widespread use and adoption of IT, and the dynamic nature of the field, there have been concerns about the effectiveness of the education and training received by IT auditors and the ability of the training to efficiently equip the IT auditors and help them meet auditing challenges. Byrne (2014) states that if IT auditors are not up to date with IT, they may not be able to accurately conduct IT audits and this, in turn, affects the quality of an audit. It is therefore important for IT auditors to get proper training and also continuously upskill themselves through ongoing training or professional development.

According to Accountancy Europe (2016) – a body that unites 51 professional organisations from 37 nations representing more than a million professional financial accountants, auditors and advisors – some audit quality indicators are public knowledge and can be accessed by everyone who needs to measure audit quality. It is, however, difficult to know about some of the audit quality indicators because some of them are considered to be sensitive as they are based on particular audit engagements and are meant for private use only. These audit quality indicators can be extended and applied to IT auditing. Accountancy Europe (2016) also observes that there are different approaches to formulating audit quality indicators. Some approaches are quantitative, others are qualitative, while others are a mixture of both types. However, the paper found that the most popular audit quality indicator is the number of hours or amount of time spent on training individual auditors.

There are, however, no research studies that have attempted to identify and examine one of the most important audit quality factors in detail. Given the significance of audit quality, there is a need for additional research into the influence that training has on audit quality.

Summative findings:

Prior research on IT audit has primarily dwelt on IT audit from a financial auditing perspective. The field of financial auditing has been extensively explored and many of the research undertakings on IT audit quality have taken the same approach as when conducting financial auditing. From the literature that has been reviewed, there are many factors and variables that affect audit quality. These variables were found to influence the quality of an IT audit. However, from the literature reviewed, no research undertaking was found to have attempted to investigate the role that training has on IT audit quality.

2.5 Training of IT auditors

Organisations are faced with the challenge of how to train their IT auditors to keep pace with IT auditing knowledge (Wongpinunwatana & Panchoo, 2014). Organisations increasingly recognise that formal training is critical, not only to the success of safeguarding IT auditors' work, but also to the organisations' competitive position in the marketplace (Wongpinunwatana *et al.*, 2014). One strategy is to deliver effective training programs to IT auditors. To align training with departmental/organisational needs, IT audit managers must understand appropriate types of high-quality training (Zhang & Le, 2013; Janvrin & Wood, 2016).

According to Siriwardane, Kin Hoi Hu and Low (2014), the audit profession is built on knowledge of IT and relevant training. This validates a previous study done by Marriott, Telford, Davies and Evans (2011), which states that competencies of an auditor are developed through learning (examination-based formal education) and work-based training (learning gained through in-house training programs, courses) and from experience gained through feedback and practice. Auditing firms have the responsibility of developing adequate training programs that are capable of enhancing auditor competencies.

Westermann, Bedard and Earley (2015) define training as a level of learning continuum that aims to develop audit skills that are necessary and relevant to auditing. These skills enhance competencies that enable auditors to deal with other specialities that are related to auditing. Korpela (2015) highlights the difference between awareness and training, by pointing out that awareness helps an individual to focus their attention on a particular issue or issues, while training teaches skills an individual needs to perform a particular function. Skills that are

gained through a training program are founded and built on an awareness program. As a result, the curriculum of a training program does not necessarily need to be equivalent to a formal qualification offered by an academic institution, but can contain some material from such formal qualifications. The aim of a training program is to produce skills and competencies that are needed by and relevant to an organisation (Kulkarni, 2013). Training integrates all forms of learning auditing and competencies that are needed to perform various audits that require specific functional specialities.

Training (both internal and external) is a factor that usually depends on management control, which has been found to improve the knowledge of auditors (Plumlee, Rixom & Rosman, 2014). The topic of training of IT auditors is an important one due to resources and investments that are made by organisations to ensure that auditors get the necessary skills and knowledge. However, research on the link between training and IT audit quality is relatively rare, limited and outdated. Studies that are closely related to training and IT audit quality have examined the effect of training on perceptions about proficiency when using certain IT systems for auditing (Stoel, Havelka & Merhout, 2012; Marshall, Curry & Kawalek, 2015).

Wongpinunwatana (2013) examined the effect of training towards the adoption of certain technology. While training is most likely to impact an auditor's conceptual and procedural knowledge to perform an audit, it may also have an effect on an auditor in terms of what they know and their capability to perform an audit task (Westermann *et al.*, 2015). This is in agreement with a study conducted by Abou-El-Sood, Kotb and Allam (2015), which concludes that knowledge and the capacity to perform a task, as a result of training, are closely related to how one efficiently performs that task.

According to Svanström (2016), training is an effective way of changing the behaviour of auditors and strengthening new attributes and audit skills. Training can provide ways to develop and implement the changes necessary for enhancing audit quality. In addition, training can expose auditors to various interpersonal relationships that are found in live audits. Being able to develop professional relationships is one of the ways of enhancing audit quality. The challenges related to roles, sources of conflict and tension are addressed during training programs.

A study by Plumlee *et al.* (2012) found that training significantly improved comprehension and the knowledge of participants, thereby creating skills that are needed for effective and successful audits. These skills are in the form of convergent and divergent thinking skills. Training aimed at divergent thinking increases the quality and number of explanations when faced with an unusual situation. They further argued that most auditor training programs are designed to assist auditors in solving problems. As such, they propose that each audit training program have the following characteristics that are critical for problem solving.

The training program should ensure auditors have a sound and better understanding of underlying and core activities and should also challenge auditors and include strategies that allow auditors to use professional and sound processes when exercising their scepticism (Peytcheva, 2013). In addition, training programs should include practical and real-world examples that are encountered every day in the auditing environment (Wongpinunwatana *et al.*, 2014). Finally, the training program should engage audit trainees to practise their strategies in a realistic audit situation.

Wongpinunwatana *et al.* (2014) state that complete training is needed for the success of an audit function in any business in the existing fast-paced audit environment, which is constantly changing. With several training options,

organisations and individual auditors can develop training programs that cater for particular strengths, needs and goals. Different training methods are discussed in the following section.

2.5.1 Types of training

According to Van Twist, Van der Steen, De Korte and Nuijten (2015), the success of an organisation and its auditing functions is dependent on the training of its auditors. Owing to auditors coming from different backgrounds and taking different career paths, the diversity in backgrounds increases the need for training to ensure uniformity. Training involves improving the skills, knowledge, and attitudes of employees, so they become more efficient and productive (Wongpinunwatana *et al.*, 2014). Training can be done in many forms and these include internal training, external training and on-site training.

1. On-the-job training

On-the-job training is done by watching a skilled employee doing the job (Wongpinunwatana *et al.*, 2014). The more experienced employee passes his/her expertise to another employee. Thus, employees are performing their regular work while they learn. This training is usually conducted for operational level employees. On-the-job training is suitable for unskilled and semi-skilled jobs. Research has shown that employees who have undergone this training enjoy and respond better to this method because of their familiarity with the surroundings (Vuran & Olcay Gul, 2012).

When training larger groups, it may be more cost-effective to develop proprietary IT auditor training. To accomplish this, the organisation identifies a “champion” who attends formal training, using that training as a platform to develop customised training for the organisation, integrating systems and procedures into the course (Wongpinunwatana *et al.*, 2014). Once an organisation develops its own training course or material, it can train as

many IT auditors as necessary, as well as conduct the training as often as needed.

A further benefit of conducting IT auditor training within the organisation is the practical element. Classroom exercises can be quite beneficial but are also very academic (Wongpinunwatana *et al.*, 2014). Newly trained auditors often stumble when it comes to conducting IT audits on their own after classroom training (Westermann *et al.*, 2015; Wongpinunwatana *et al.*, 2014). When the training is performed in-house, trainees can witness the trainer conducting an actual audit, observing interviewing techniques in practice and the audit trails that are followed. The trainer can then observe the trainees performing their first audits and review their performance (Wongpinunwatana *et al.*, 2014). An organisation can even add a degree of difficulty to those training audits by coordinating with audited departments to “plant” non-conformances. This also helps take some of the fear of audits away from those departments.

To ensure the effectiveness of the internal training program, the material used for self-study must be kept current and maintained properly (Lombardi, Bloch & Vasarhelyi, 2014). Keeping the material current allows the auditors to make decisions based on accurate information.

In-house or on-site training is gaining popularity due to its affordability and cost-effectiveness. Auditing firms conduct training internally, either through an external expert or an expert within an organisation. The modules and the approach can be the same as the one used in the external training method. Professional bodies, like ISACA and IIA, also sponsor programs aimed at training members at the organisational level. Organisations can also develop their own programs and modules that are specific to their needs. If

organisations have the expertise and resources, this training method can be the most cost-effective option. Internal training programs are normally based on programs that encourage auditors to study on their own through workbooks and exercises (Wongpinunwatana *et al.*, 2014).

2. Off-the-job training

Off-the-job training is where an employee goes away from the workplace to attend a classroom, seminar, or workshop (Wongpinunwatana *et al.*, 2014). The objective of off-the-job training is to prepare trainees to have fundamental knowledge for on-the-job training. Wongpinunwatana *et al.* (2014) further argue that although trainers may be qualified in their area of expertise, the content of the training may not be directly relevant to an employee's work situation. Off-the-job training is normally employed at the managerial level to provide fundamental concepts of new knowledge (Kulkarni, 2013).

Several different training strategies have worked well for various organisations. A combination of those strategies would work for most organisations. The success of training to develop employee skills depends on the effective and proper use of appropriate training methods (Vuran & Olcay Gul, 2012).

A combination of the above training approaches is probably the best way of ensuring that auditor training is effective, as each method has its own advantages and disadvantages. External training programs increase the opportunity for interaction, while also offering fewer distractions; however, they are generally considered to be expensive. With on-site training programs, there is reduced interaction while there are possible distractions. On-site training programs are generally cheaper than external training

programs. Internal training programs are based on self-study, but they do not allow effective interaction and exchange of ideas for participants although they are the most cost-effective training method compared to the other programs (Kulkarni, 2013; Wongpinunwatana *et al.*, 2014).

According to Svanström (2016), the most widely used training method for smaller organisations is the external training option where auditors are sent off-site and go through sessions facilitated by professional training organisations or bodies. These sessions offer training modules or courses that range from technical training to areas related to audit skills. The training courses may be generic or specific to certain areas. The advantage of this training option is that trainees have less distraction, and trainees have the opportunity to interact and network with peers who are in the same or different industry.

The benefit of sending employees to external auditor training programs is that the training typically covers essential audit methods as well as provides exercises that help hone auditor skills (Wongpinunwatana *et al.*, 2014). The disadvantage is that the training is usually generic and may not relate well to a specific industry or organisation. To overcome this, some organisations may ask the outside trainers to tailor the program to their organisation and conduct it internally. The trainers can also integrate the organisation's audit system and specific procedures into the course.

Glover and Prawitt (2014) also recognised the need for auditors to be part of an audit plan and suggested that the training and qualifications of auditors should be expanded so that it focuses on quality procedures. These audit quality skills are related to knowledge of auditing and skills related to dealing with other people. Training can be further categorised to the approaches below:

3. Training by participation

Formal training sessions or courses for auditors are typically short and these courses are highly unlikely to impart profound knowledge due to their length. As a result, such training methods should include minimum teaching and maximum participation so that the program is interesting to participants so that they may easily remember and also use the acquired knowledge. Participative training helps auditors to remember because it instils confidence.

4. Conducting live audits

Participating in a live audit is the most realistic training to benefit participants. Participating in a live audit is the most powerful learning activity as there is no substitute for conducting an audit except in being involved in an audit. The other benefit of doing a live audit is that during an audit, discrepancies may be discovered and opportunities for improvement may be realised, thereby benefitting the organisation.

IT audit modelling enhances the understanding of how to conduct IT auditing. On-the-job training is similar to having a mentor guide the trainee. If the trainee encounters problems, he/she will be able to solve problems via suggestions learned from the role model. In summary, observational learning or vicarious experience from a proficient role model builds the learner's knowledge and understanding. During on-the-job training, learners observe the IT auditing model verbally and visually, explaining how to conduct an IT audit. On-the-job training takes more time than other training methods. Furthermore, it may not be suitable for training a large number of staff members.

2.5.2 Training of IT auditors

Professional development ensures that auditors, either at the beginning of their career or experienced auditors, have the required and expected level of

competence and knowledge needed for their role. Professional development or continuing education validates the skills that are needed for certification. Most professional certifications require continuous professional development so that auditors can remain current and relevant to the changing professional environment. Certifications are usually through the study of a technical curriculum or a prescribed body of knowledge and these are supplemented by practical experience on the job. Professional development and training are needed to help auditors adapt to the changing environment and prepare them for emerging challenges. Westermann *et al.* (2015) argue that ongoing training is necessary for the growth of auditors, otherwise auditors cease to grow. They also state that training helps auditors maximise their contribution to an organisation.

From the previously mentioned studies, it can be concluded that the quality of the output is a good measure of the quality of inputs. Auditor training is also part of these inputs. Cindori and Petrović (2017) highlight the importance of training in audit firms as a means to advance and improve skills and knowledge in order to achieve high-quality audits.

2.5.3 The path to professional development

The career path taken by auditors and IT auditors varies depending on the background. IT auditors typically obtain a professional qualification in order to practise. According to Kwock, Ho and James (2016), audit firms and companies have, over the time, attempted to identify the career development route most effective to a successful IT audit career. However, a previous publication by Parker and Graham (2008) states that many competent and highly qualified IT auditors did not follow the traditional route to be an IT auditor and that it is almost impossible to conclude which method and route are the best. They also note that many audit career directions exist, but the most common one is for the general financial auditor to transition to an IT auditor or to develop a speciality, while being a financial

auditor. Training to be an IT auditor or to be a specialist IT auditor requires a structured program that will make one proficient in a specific field of IT (Minutti-Meza, 2013; Wongpinunwatana *et al.*, 2014).

Henderson, Davis and Lapke (2013) state that it is important that IT auditors receive specialised skills and training. However, it should be noted that IT auditors whose career path is from financial auditing may be disadvantaged, because it is difficult to determine the extent to which the financial auditing specialisation has kept pace with the IT auditing profession due to evolution and changes in the IT field (Senft, Gallegos & Davis, 2014). The speed at which the IT field has developed outstrips the preparedness of various constituents, like the audit firms, the education system and the regulators (Curtis *et al.*, 2009). As a result, it is important for organisations to invest in continuing professional education programs.

Henderson *et al.* (2013) argue that well-organised training programs are required for the continued professional development of any organisation. An effective training program combines formal and informal training courses, external training, seminars, and on-the-job training. The training program should be managed and designed to meet the needs of the organisation and IT auditors. In addition, the program should match the pace of emerging and evolving technologies.

The research paper by Gallegos and Loocho (2001) can be used as a baseline that for finding training needs for IT auditors in different geographic areas. A paper exploring the training needs of IT auditors by Rezaee, Sharbatoghlie, Elam and McMickle (2018) explores the level and IT audit areas that need to be considered. Proposals from past research undertakings can also assist professional bodies, organisations and academic institutions to identify training needs and thus offer

training and educational programs that can prepare IT audit professionals for challenging audit engagements.

Any opportunity to get sufficient, adequate and relevant training has generally been the greatest concern for any employee. For employees who work in environments that are aligned with technology, such as IT, training is a vital and integral component of professional development (Elefterie & Badea, 2016). An observation of advertised IT audit positions suggests that knowledge of specified applications/platforms is a requirement in most positions. However, it is inevitable for the organisation to provide additional training, even though organisations prefer to recruit IT auditors who already have experience and particular knowledge. The *Training Magazine* (2017) found that, in 2017, employees on average received 46.7 hours of training per year.

Henderson *et al.* (2013) assert that survival in the IT field, in general, depends on training that is up-to-date and current. Without competent employees, organisations are not going to survive. Training, therefore, needs to keep pace with changes in IT. Selected training programs should be carefully evaluated so that both employees and the organisations can benefit.

Understanding how an organisation can effectively train and develop a training program for IT audit trainees and experienced IT auditors is essential for IT auditors to improve the quality of IT audits. As a result, the amount of time and the amount of funding allocated to various IT auditors in different levels, hierarchies, and positions, as well as the methods used have an impact on the effectiveness of the training needed to help IT auditors become proficient and improve the quality of IT audits.

Summative findings:

Training comes in various forms and this is true with auditors. There are generally two categories of training, namely on-the-job training and off-the-job training. On-the-job training involves all activities that are done within the confines of the workplace and may involve mentorship or classroom type of training. Off-the-job training involves all training activities that are done externally. IT auditors are also required to obtain the necessary training, but there are many paths that are recommended to achieve this. Once IT auditors are qualified and certified to work as auditors, they are required to stay current through continuous professional development.

2.6 Development of an effective IT auditor training program

According to Wongpinunwatana *et al.* (2014), there are four phases in selecting an effective training program for IT auditors and these phases are described below.

Phase 1 searches for and compares training methods – the starting point of training. During this phase, an IT audit manager selects suitable training methods for IT auditing from various training methods (i.e. off-the-job and on-the-job training). During the search, an audit manager considers training methods that are suitable for the characteristics of the organisation's IT audit staff and for the organisation's environment, with the aim of developing appropriate behaviour and skillsets. Therefore, this study posits that an audit manager will consider three factors from social cognitive theory (personal, behavioural, and environmental factors) in searching for an effective training method.

Phase 2 creates a process for the selected training. Apart from adjusting the training style to make it consistent with an IT audit (i.e. training content, objective

and goal of training, and training processes), the IT audit manager has to determine suitable motivational factors.

Phase 3 launches the selected training process. During a practice IT audit, trainees will observe how to conduct an IT audit from an experienced role model. They will also practise how to audit in a real-world situation under close supervision from the model. Observation and practice will encourage trainees to adjust their behaviour by imitating the model's behaviour. An audit manager will introduce IT auditing mastery experiences in this phase.

Phase 4 evaluates the performance of the training. After completing the training, the audit manager will evaluate the effectiveness of training on trainee performance. This is done by measuring trainee efficacy in IT audits.

2.7 Effectiveness of training

To develop an effective audit program and to satisfy standard requirements, IT auditors must be trained to conduct quality audits (Wongpinunwatana *et al.*, 2014). Effective IT auditor training is probably one of the value-added opportunities organisations have with regard to their management systems (Ferguson *et al.*, 2013; Wongpinunwatana *et al.*, 2014). The training should be appropriate for the complexity of the areas to be audited and include training on the organisation's IT audit process and systems.

In general, the effectiveness of a training program is usually measured by the ability of the trainer to conduct a training course, program or module, and any observed improvements (Wongpinunwatana *et al.*, 2014; Endaya & Hanefah, 2016). The methods used to measure effectiveness, however, are subjective and can be misleading at times (Wongpinunwatana *et al.*, 2014). The focus should rather be on discovering whether these training courses and training programs

provide any benefit to the organisation and if they actually contribute to the wellbeing of the organisation.

According to Bell, Tannenbaum, Ford, Noe and Kraiger (2017), definitions of what entails training differ in detail but these definitions generally agree on three core elements. Most definitions agree that:

1. Training is a process that is carried out systematically and follows procedures.
2. Training is associated with changing attitudes, skills and concepts of people (individuals or a group).
3. Training improves job performance, thereby improving the efficiency of organisational processes.

In light of the above elements, it can be concluded that the first two elements define education, while training is defined by all three elements. This implies that training can only be evaluated using the contribution it makes to the effectiveness of an organisation. As such, it is prudent to investigate the influence that training systems have on the effectiveness of IT audits (audit quality) and the extent of the effectiveness of training. It is important to first focus on the goal of an organisation when reviewing specific training activities. If the link between training and the organisational objective cannot be established, then the process of examining the quality of an audit cannot be conducted. Similarly, when examining the influence of training on audit quality, it is important to first link the objective of training with the goal of an IT audit.

According to Wongpinunwatana *et al.*, (2014), Landers and Armstrong (2017), for any training program to be an effective agent of change that can be used to improve the quality of a process, various aspects should be taken into consideration:

1. There should be a pre-training selection program that ensures that participants who will attend the training program are proper and fit for the program.
2. The training program should be designed and developed as a set of activities that continuously complement other activities in facilitating learning and continuous improvement.
3. There should be a learning support program after the formal training program has elapsed to ensure that the momentum gained during the training period is extended and methods learnt during the program are established and even improved using newer methods.

2.7.1 Training of auditors in South Africa

Various audit professional bodies have invested a lot of resources developing training courses for their members. Both on-the-job training and formal education programs are considered to be important elements of a life-long commitment to learning that auditors make. According to Cannon (2016), a combination of formal education, relevant work experience, and professional credential/certification is required to become an IT auditor. IT auditors are expected to complete formal education or qualification in IT or related fields, such as auditing and accounting. Voluntary professional certifications, such as the Certified Information Systems Auditor (CISA) credential offered by ISACA, are some of the credentials that are generally acceptable for IT auditors.

2.7.2 Challenges of training programs

Concerns exist about the value that organisations get from training (Phillips, 2012a; Phillips, 2012b). Organisations are under pressure to change their culture as they transform to learning organisations that empower their employees. However, Anis, Nasir and Safwan (2011) argue that training is rarely an effective method to achieve desired goals. There is a lot of research on how good training can be achieved. These research studies provide the foundation for best practices

in training and development for IT auditing. This, effectively, helps organisations to successfully identify challenges and opportunities for improvement.

A challenge with most training programmes is the struggle that many practitioners have with transferring knowledge (Abd Rahman, Imm Ng, Sambasivan & Wong, 2013). Consideration should also be given to the ability or willingness of the trainee to apply what they have learned during the on-the-job training. There is a need for numerous post-event activities to facilitate the exchange of knowledge after training and these are crucial in influencing this process (Diamantidis & Chatzoglou, 2014). The organisational environment sets the tone for learning outside the job (off-the-job learning). The attitude and the role of immediate managers and participants in the event also have an influence on the transfer of knowledge after the training.

As a result of the above analysis, it can be observed that effective delivery of learning methods should be focused on not only what happens during the learning period, but also on what happens in the workplace. The organisation should also utilise a variety of on-the-job and off-the-job learning delivery methods for effective and efficient delivery of training. There is a need to involve organisational management in the training and development programs so that these programs meet the expected objectives.

To train IT audit staff effectively and efficiently, an IT audit manager should allocate a sufficient training budget. The manager should define a training plan for IT audit staff every year. However, with limited staffing and extended workloads, the audit department also needs to consider the time used for training. Attending training may affect IT auditors' normal workload. Therefore, an IT audit manager should carefully consider time for training. A sufficient budget is one of the factors

necessary for IT audit training. Auditors may not have enough time to attend formal training.

Summative findings:

The development of an effective IT auditor training program requires careful planning so that the process itself is effective and efficient. The program should cater for all forms of training and all aspects that need to be addressed. In South Africa, the training of auditors generally follows paths recommended by professional bodies and there are no clearly defined training programs that organisations and individuals need to follow. There are challenges, however, with training programs and these need to be carefully managed in order for organisations to develop and implement effective training programs.

2.8 Research gap

Previous studies on IT audit have primarily focused on particular characteristics of IT audit tasks. Of particular interest are studies that explore the proficiency of IT auditors and the significance of IT knowledge when conducting IT audits. Some studies have identified potential concerns and areas of opportunity that can be used to improve IT audits. Some researchers have investigated the influence that IT has on general financial audits. Validation questionnaires and literature reviews have been the primary approach used by previous researchers within the financial auditing field to identify audit quality factors. Alternative approaches use direct solicitation from professionals and practitioners in the auditing field to identify and measure audit quality attributes. However, there are limitations related to how perceived quality can be differentiated from actual audit quality.

From the limited literature reviewed, it can be observed there is no generally agreed-upon definition of the term audit quality and as a result, different definitions

exist and are generally applicable to varying contexts and environments. While there are numerous factors that have a direct effect on the quality of an audit, these factors exist in any environment and can be applied to different types of audits, IT audits included. Therefore, constructs related to enhancing the skill set of auditors become an important area of consideration that may affect the quality of auditors. Thus, additional research into the effect of training on IT audit quality is an important area of interest both theoretically and practically.

Based on the literature that the researcher has reviewed, there has not been adequate research to ascertain the link between training and IT audit quality. There appears to be very little research done on how training impacts IT audit quality. This research undertaking is intended to close the gap that exists in the literature regarding the impact that this variable has on audit quality. Consequently, it becomes a necessity to determine the extent of the relationship, if any, between the quality of an IT audit and the approach taken during the training of an IT auditor.

Critical links to empirical study:

The reviewed literature has shown that there is no clearly defined way of training IT auditors and this study attempts to determine whether training programs exist in organisations and whether these training programs are adequate for IT auditors. Prior research has also shown the effectiveness of training on general auditing and this study aims to find whether this also applies to the training of IT auditors. The questionnaire addresses the efficiency and effectiveness of training programs in various organisations and seeks to understand if there are any gaps between what IT auditors expect and what is done by organisations. Literature pointed out the differences in training programs (internal and external) and the study attempts to identify the types of programs they are implementing and their impact. Continuous professional development has been found to assist professionals in staying up to date and the questionnaire attempts to get the

views regarding the impact of continuous training. Finally, from the above literature, it can be seen that there is a relationship between the quality of audits and training. The study attempts to explore and understand the role of training on IT audit quality.

The ongoing growth of the scope and domain of the IT audit profession has fuelled the need for IT auditors to exhibit a wide range of competencies, skills and attributes. These variables can be obtained through proper training whose aim is to produce auditors who can conduct audits efficiently and effectively and produce findings whose quality is not compromised. There is a heightened expectation for auditors in general to have a greater role in improving IT governance as a result of recommendations in the King IV Report on Governance (Du Plessis & Low, 2017).

2.9 Conclusion

Based on the discussion above, there is a general consensus among various research studies that the knowledge and skills of IT auditors can be improved through training. In South Africa, it has been identified that the content of courses and formal qualifications, and the process used to educate audit students need to catch up with changing organisational and business environments in which the audit profession operates.

There are technical competencies and skills that auditors gain through the formal and informal training they receive in an organisation. The investigation of training, development and education programs for auditors could help identify needs that will lead to a revision of auditor training models and methods used in South Africa and globally. The findings and revised guidelines could help organisations and audit professional bodies to maintain relevance and raise awareness on the side of employers regarding improving the capabilities of auditors through training.

The findings of this research undertaking can make contributions to numerous auditing constituencies in various ways. The findings could be used by professional bodies and auditing firms to develop training programs that can enhance and develop IT auditors in areas that have significant gaps and can address audit quality issues. The results of this study can also benefit the general public through improved quality of IT audits when all audit constituents work towards improving the training that IT auditors receive.



CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research design process, the research approach, research philosophy taken by the researcher to fulfil the requirements and the objectives of this research undertaking. The chapter also outlines the data collection and data analysis techniques that were implemented during the research. Ethical considerations taken to conduct the research are also discussed.

3.1.1 Background to the research design process

The research methodology refers to the science that describes how an investigation is to be conducted. It outlines the procedures needed and used by researchers to carry out the tasks, carry out the research process, and give descriptions and explanations (Taylor, Bogdan & DeVault, 2015). The research methodology provides the researcher with a work plan. It is essential for a researcher to choose the appropriate method for the given problem and it ensures that the researcher understands the process (Flick, 2015).

According to Marshall and Rossman (2014), one of the benefits of a research methodology is that it provides active participation and involvement throughout the process. The research methodology generally maps out the entire research process. The research process as a whole and the findings of the research process are influenced by using the correct and applicable research methodology. Results from this research add to the body of knowledge and help future researchers to obtain a deeper understanding of the influence and role of auditor training on the quality of audits.

To conduct the research in an organised manner, a seven-step process was adopted and implemented as follows:

- Conducting the preliminary literature review;
- Identifying the research problem;
- Formulating the research question and sub-questions;
- Conducting an in-depth literature review to support the research question and sub-questions;
- Collecting evidence from respondents;
- Analysing findings and results;
- Making conclusions and recommendations.

The research design process adopted for this research undertaking follows the method proposed by Saunders, Lewis and Thornhill (2012). The “onion ring” shown in Figure 3.1: Research Process “onion” (Source: Saunders *et al.*, 2012)., describes the stages through which a researcher must pass when developing an effective methodology and it is a flexible approach which can adapt to any context.

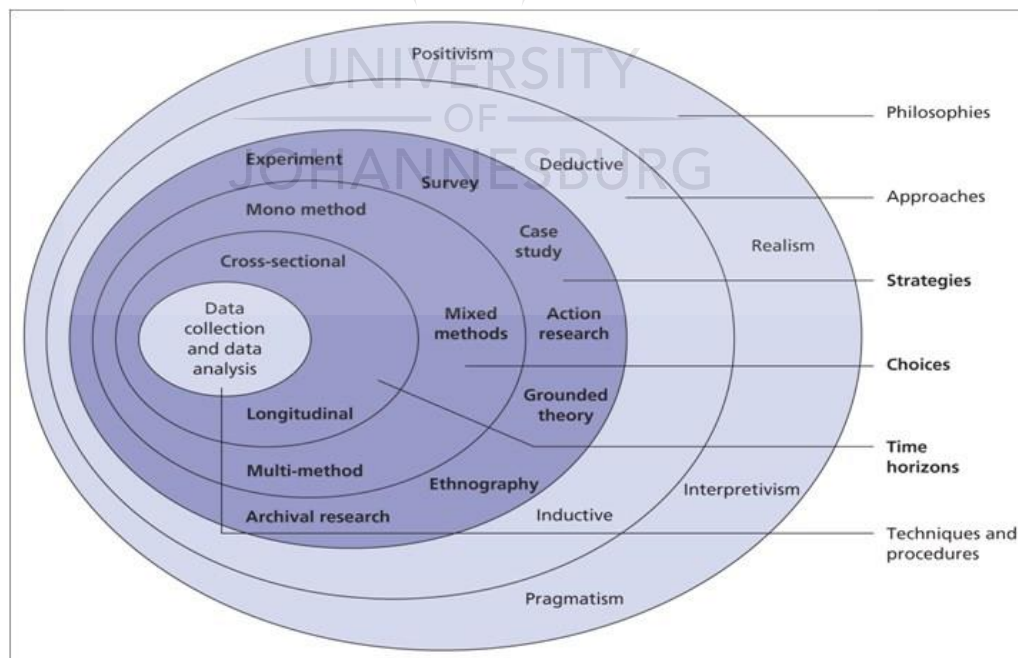


Figure 3.1: Research Process “onion” (Source: Saunders *et al.*, 2012).

3.2 Research design

According to Maxwell (2012), the research design provides the structural framework that can be used to collect and analyse data. In this research undertaking, a questionnaire was used as a primary data collection tool to help to answer the research questions. The research questions are addressed through an online questionnaire. The research design is explained in detail in the following paragraphs.

Analysis of qualitative content is an accepted approach to investigate and identify the themes, patterns, or occurrences in specific contexts (Creswell & Creswell, 2017). There are several key differences between qualitative and quantitative approaches, and these will be briefly analysed to advance the justification for choosing the qualitative approach. Qualitative content analysis aims to understand the underlying meaning and is inductive in nature involving discovering themes, topics and patterns from the data (Elo, Kääriäinen, Kanste, Pölkki, Utriainen & Kyngäs, 2014). The qualitative approach produces descriptions coupled with expressions that reflect how the social world is viewed.

This research undertaking utilises an interpretive approach, which is mainly concerned with understanding the social meaning of training and IT audit quality. The research undertaking uses a symbolic interaction to understand the deeper meaning of training and IT audit quality as social objects formed by the interactions of employees in an auditing environment. The approach also offers the flexibility and rich description to help understand the role and influence of training on IT audit quality.

The research uses an interpretive approach and qualitative methods to help understand the topic under consideration (Creswell & Poth, 2016). The interpretive approach gives the researcher an opportunity to study the impact and role of training in IT audit quality within the institutional, organisational and social context and in a flexible and open way (Thanh & Thanh, 2015). Qualitative methods are most suitable for this research undertaking, as the issue of IT audit quality and training needs to be fully explored from the view, perception and belief of participants (Taylor *et al.*, 2015). Furthermore, the variables and concepts of this research are difficult to quantify, and understanding the subject under consideration might not be achieved through more structured research approaches.

According to Ritchie, Lewis, Nicholls and Ormston (2013), qualitative research methods allow investigation of social issues in a comprehensive and open way, which does not have any predetermined categories. Qualitative research methods also enable the researcher to collect rich information and improve the understanding of a social phenomenon by using a small set of cases or a small number of human subjects (Creswell *et al.*, 2016). Consistent with one of the data collection types, this research undertaking uses questionnaires.

3.3 Research approach

The research approach refers to the procedures and plans that are followed in conducting the research (Sekaran & Bougie, 2016). The research approach involves steps ranging from broad topical assumptions within research to the steps involved in the collection, analysis and interpretation of data. This research undertaking takes a qualitative approach, which is mostly associated with the social constructivist paradigm and is the primary method for data collection and analysis. The qualitative approach emphasises reality, which is socially constructed.

The approach to theory development in this research undertaking is inductive. In the inductive approach, the researcher anticipates to collect data and take an overall view of the data to make observations (Ormston, Spencer, Barnard & Snape, 2014). In an inductive approach, the researcher makes observations from data and proceeds until theories are formulated at the end of the research. The researcher aims to find patterns from the data collected and then develop an opinion based on the data collected. According to Woiceshyn and Daellenbach (2018), an inductive approach begins with observations and changes to more general propositions.

3.4 Research strategy

This research undertaking utilises a case study. A case study is defined as an empirical investigation in a real-life context, mainly when boundaries between the phenomenon and background are not observed (Yin, 2015). Saunders *et al.* (2012) also define a case study as a study of a real-world setting in a given environment. A case study enables researchers to provide a full interpretation of the subjects under examination (Fisher, Buglear, Lowry, Mutch & Tansley, 2010). Case studies help to focus on the interrelationship between all the factors that make up the case study.

Research using case studies is useful in helping researchers to understand complex phenomena, while adding value to similar previous research. The research questions are the guiding principle in a case study as they provide the focus and are used as a point of reference during the research process (Yin, 2015). A case study also considers the fact that data is collected from multiple sources, which may be at different levels of the organisation. During data analysis, a case study allows the researcher to investigate the raw information collected and enable

multiple interpretations that may help to find existing linkages between the research problem and the research questions.

According to Ritchie *et al.* (2013), case studies allow researchers to conduct in-depth studies of specific scenarios and situations instead of performing a general survey laden with statistics. Case studies allow researchers to narrow down the research area and gain focus on a particular matter. However, according to Yin (2015), case studies rely on opinions and perception of the subjects under consideration. Data is, however, collated in a manageable form and an informed narrative can be constructed from such data to form conclusions and explanations.

3.4.1 Unit of analysis

The unit of analysis determines the scope of the research size and ensures the research takes place in a bounded context. The unit of analysis is established through various questions, which are developed with the aim of reducing the broadness of the study and narrowing the topic under investigation to a more specific area. This results in particular data and information being collected. In this research undertaking, IT auditors are the unit of analysis. The sample of IT auditors is selected using non-probability sampling. In non-probability sampling not all members of the population have a chance of participating in the study (Vehovar, Toepoel & Steinmetz, 2016). Non-probability sampling was chosen because for some studies such as this one, it is not feasible to draw a random probability-based sample of the population due to various constraints. In this case, the sample group was selected on the basis of accessibility or personal judgment of the researcher.

3.5 Data collection

According to Wilson (2014), there are three ways in which data can be collected while carrying out qualitative research, namely questionnaires, interviews and observation. This qualitative research uses questionnaires as a method for collecting data. Questionnaires were selected because Questionnaires can be an

effective means of measuring the behaviour, attitudes, preferences, opinions and, intentions of relatively large numbers of subjects (Myers, 2019).

3.5.1 Sample

As mentioned in Section 1.7, to obtain a broad set of IT auditors, the questionnaire focused on two sets of respondents: financial auditors involved in IT audits and IT audit practitioners. To recruit these respondents, the South African chapter of ISACA was approached to solicit respondents. ISACA was chosen because its local chapters focus on the advocacy, education and professional development of IT auditing, governance, controls and risk management. According to the 2018 ISACA South Africa Chapter Annual Report, the number of CISAs belonging to the South African Chapter of ISACA stood at 1251 (ISACA SA, 2018). However, only 113 people viewed the link sent by ISACA. Of those 113 people who viewed the link, 58 people started the questionnaire, but only 37 finished the whole questionnaire. The researcher believes that these respondents are a true and complete representative sample of professionals who are experienced and qualified to provide the perspective of professionals responsible for executing and managing IT audits. The non-probability purposive sampling method was implemented when distributing questionnaires in order to obtain a representative sample of the population.

3.6 Data analysis

The analysis of qualitative data often deals with huge amounts of data and can be timeconsuming (Creswell & Creswell, 2017). For this research, four steps were used for analysis (Castleberry & Nolen, 2018) and these can be summarised as:

- Reading and generating categories;
- Creating themes and patterns;
- Interpreting the findings;
- Writing the report.

3.6.1 Ethical considerations

Ethics can be defined as the norms for conduct that can be used to differentiate what is good and acceptable behaviour from behaviour that is not acceptable (Östman & Turtiainen, 2016). The most important reason why ethical considerations are essential in research is that they promote the general objectives of research by searching for the truth, and promoting values needed to work with others by being trustworthy and ensuring that researchers can be held accountable for their conduct (Cacciattolo, 2015).

During this research undertaking, the researcher was honest when communicating with participants and in dealing with data collected. The researcher made every effort to remain unbiased during the data analysis phase and in all other aspects where this was needed. The researcher was cautious during the research process to avoid errors and carelessness. The researcher was sincere in procedures used when obtaining data. For participants who asked to have access to the results, the researcher indicated that he would share all findings with anyone concerned and would strive to remain transparent.

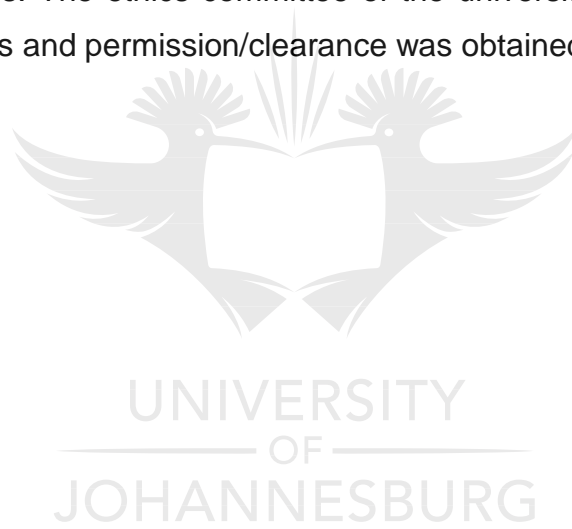
The researcher took note of intellectual property implications by giving credit and acknowledging any inputs made to this research by others. The researcher also obtained voluntary consent from all willing participants and indicated that they had the right to stop their participation at any time they felt required to do so. The data and information that was collected was not used to harm any organisation or participant. The researcher strove at all times to avoid acts that would hurt the trust of participants and treated all information as confidential.

Participants were also given respect during the process, and every participant had a choice to refrain from participating at any time during the research. The researcher avoided discrimination at all times.

Ethical clearance was obtained from the University of Johannesburg prior to sending the questionnaire to the prospective participants.

3.7 Summary

In summary, this research undertaking used a qualitative approach in the form of a questionnaire. The research approach was inductive, and a case study was used as a research strategy. Data was collected using questionnaires, which consisted of Likert-type of questions. Data was analysed using summaries, categorising and thematic analysis. The ethics committee of the university guided the ethics and research process and permission/clearance was obtained.



CHAPTER 4

ANALYSIS AND RESEARCH FINDINGS

4.1 Introduction

This chapter presents an analysis of the responses that were captured and also discuss the findings. The introduction in Chapter 1 and the Literature Review in Chapter 2 highlighted the significance of IT audit quality and the need for auditors to ensure that IT audits could be relied on and be trusted. The literature review highlighted the factors that had been found to influence the quality of an IT audit and identified that the impact of auditor training on the quality of IT audits had not been explored, and this research gap needed to be explored.

This chapter discusses the empirical study and presents the research findings, which evaluate the effect that the training of auditors has on the quality of the IT audits they conduct. The analysis and the research findings presented below were obtained through a questionnaire that was sent to IT auditors by ISACA.

4.2 Background and the objective of the study

As previously mentioned in Section 1.4 , the aim of this study is to provide a better understanding of the relationship between the training and the proficiency of an IT auditor to enhance audit quality. The focus of this study is to examine the influence of training on the IT auditor's expertise and proficiency when dealing with IT audits. The study particularly examined the role of training on the quality of IT audits, while bearing in mind the dynamic nature of the IT environment and the changing expectations from IT. The goal of this research undertaking was to improve and validate the impact of training, as suggested by prior research, on the quality of IT audits. Further to this, the aim was to gain an understanding of the perceived significance of training received by aspiring and practising IT auditors on the quality of their IT audits.

In the literature reviewed, research into the role and the impact of effective training on audit quality was found to be limited to financial auditors using IT. Recognising the gap that exists in literature, additional research was required to investigate and comprehend the role of training on proficiency and IT audit quality. This study was motivated by the need to understand the IT audit and the factors that impact the IT audit process. This consideration has been motivated by increased dependence and spending on IT, and legislative and professional requirements when conducting audits (Kleinman *et al.*, 2014).

Prior studies noted the dependence on IT and the resulting investments requiring increased levels of assurance. However, the demand for IT audit services requires that these audits be performed in an effective and efficient manner. Consequently, further research is necessary to recognise possible issues when carrying out IT audits and critical issues that may impact the overall IT audit quality. There has been limited research on the factors that have an impact on IT audit quality and the importance of these factors.

To address the research gap identified above, this study sought to obtain answers to the following research question as highlighted in Section 1.3.1:

- What is the effect of IT auditors' training on the quality of IT audits?

Further to the above research question, the following sub-questions were also developed to assist in gaining a deeper and better understanding of the research question:

- What effect does training have on audit quality when auditing complex IT?
- What role does training play in enhancing competence, expertise and audit quality?

- What is the effective and optimal training method that enhances the proficiency of an IT auditor?

The following sections are dedicated to answering the above research questions.

4.3 Summary of research methodology

The research methodology was discussed in detail in previous sections, and below is a summary of what was discussed in Chapter 3. The research methodology refers to the science that describes how an investigation is to be conducted. It outlines the procedures needed and used by researchers to carry out the tasks, carry out the research process, and give descriptions and explanations (Taylor *et al.*, 2015). The research methodology provides the researcher with a work plan. It is essential for a researcher to choose the appropriate method for the given problem. It is further important that the researcher understands the process (Flick, 2015). The research methodology generally maps out the entire research process. The research process as a whole and the findings of the research process are influenced by using the correct and applicable research methodology.

To conduct the research in an organised manner, a seven-step process was adopted and implemented as follows: a preliminary literature review was conducted to establish and identify the research problem. Doing this led to the formulation of the research question and sub-questions. After that, an in-depth literature review was conducted to support the research question and sub-questions. Following a research methodology, evidence was collected from respondents, and this evidence was analysed, which resulted in findings that answered the research question. The research undertaking concludes with a discussion and recommendations.

In this research undertaking, IT auditors are the unit of analysis. The sample of IT auditors was selected using non-probability sampling. The unit of analysis determines the scope of the research size and ensures the research takes place in a bounded context. The unit of analysis is established through various questions, which are developed with the aim of reducing the broadness of the study and narrowing the topic under investigation to a more specific area.

For this research, four steps were used for analysis and these can be summarised as:

- Reading and generating categories;
- Creating themes and patterns;
- Interpreting the findings;
- Writing the report.

4.4 Demographics

ISACA sent the questionnaire to its members via email and 113 people clicked on the link and viewed the questionnaire. Of the 113 people that viewed the link sent by ISACA, 58 people started the questionnaire, 37 completed the questionnaire and 21 dropped out during the process. As a result, the responses from incomplete questionnaires were not considered in this research undertaking. The completion rate was 63.79%. The overall response to the questionnaire that was sent out was very positive.

Table 4.1 and Table 4.2 below show the general statistics about the respondents.

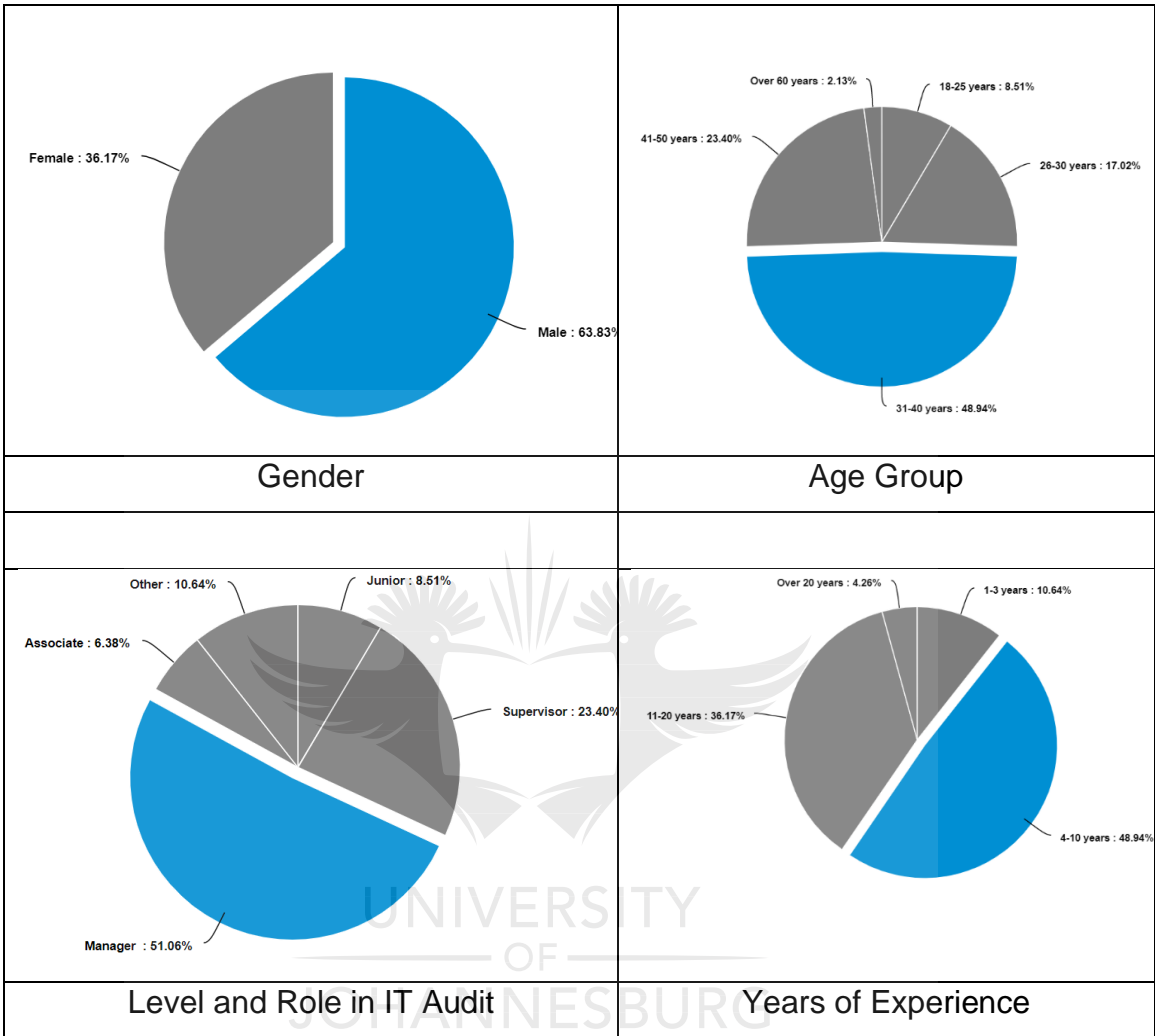


Table 4.1: Demographics (Source: synthesised by researcher)

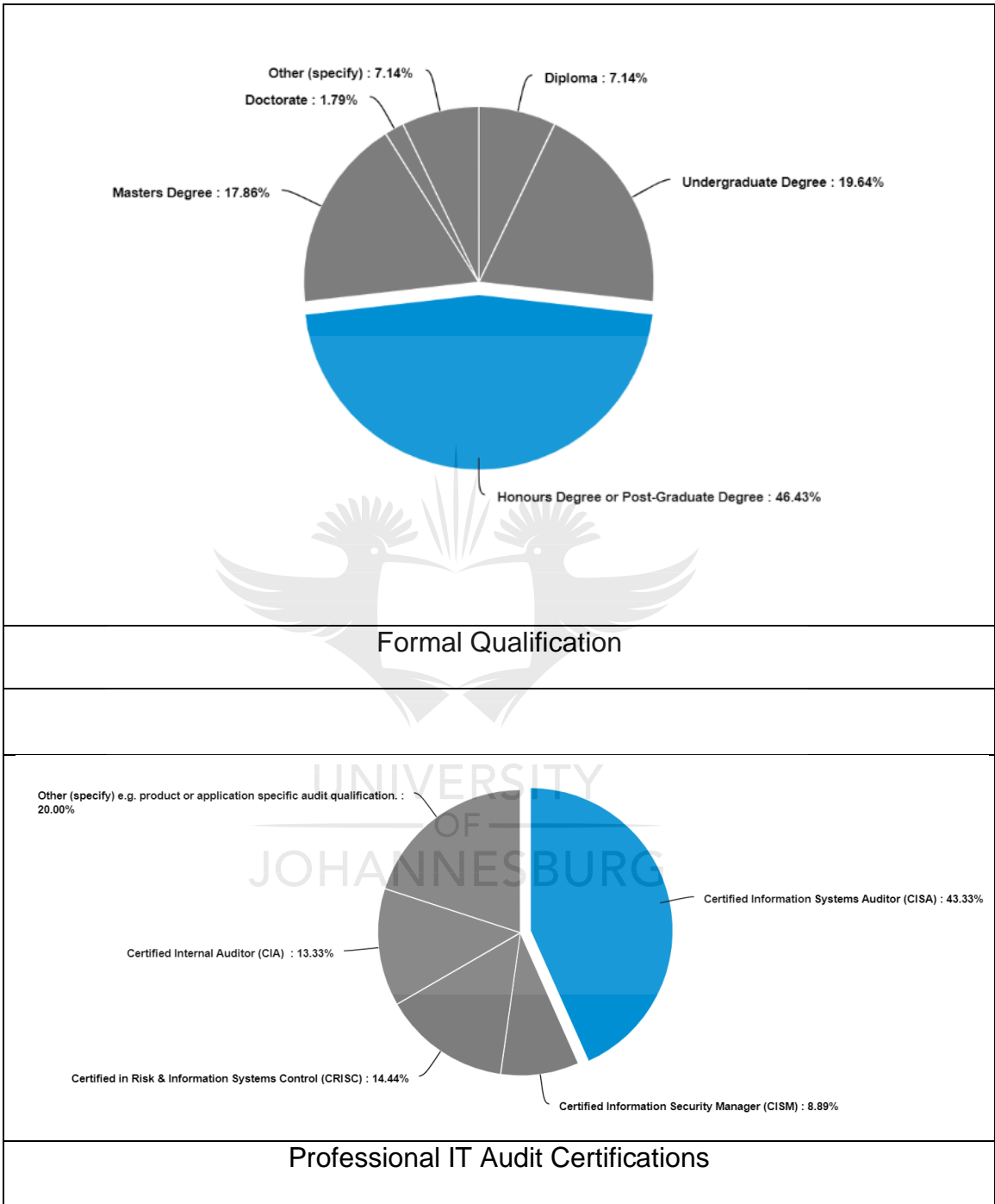


Table 4.2: Qualifications (Source: synthesised by researcher)

While the statistical information above was not used in the analysis, it gives some interesting insights that are valuable to this research undertaking. Table 4.3 below highlights the entries captured for the questions where there was the option “other” and respondents were asked to specify the option.

Item	“Other” Options as given by respondents
Level and Role in IT Audit	Director, Middle Management, Senior Manager/Senior management
Formal Qualification	Industry Certifications, IT Degree, BTech
Professional IT Audit Certifications	Chartered Accountant (CA), CISSP-ISSAP, CGEIT

Table 4.3: “Other” option (Source: synthesised by researcher)

On the questionnaire, the respondents were asked to indicate whether they agreed with the stated questions, which were grouped under various themes with each theme containing at least four questions. Respondents were asked, based on their own experience in IT auditing, to indicate the strength of their agreement with each statement on the scale from where they strongly disagree to where they strongly agree with a given statement. The responses and their analysis are given below.

4.5 Research findings

The questions were grouped into the following six themes or sub-sections that will be analysed and discussed in the following sub-topics below:

- The Existence of Training and Development Programs;
- Sufficiency of Training and Development Programs;
- On-the-Job Training Programs;
- Internal and External Training Programs;
- Continuous Professional Development;
- IT Audit Quality.

In the results section, there is a mathematical variable labelled as Score. The formula below shows how the score is calculated. The formula used to calculate a mean is as follows:

X_n	=	number of responses per option
W_n	=	Weight (1 for Strongly Agree , 2 for Agree , 3 for Neutral , 4 for Disagree and 5 for Strongly Disagree)
n	=	total number of responses obtained for the question.
MEAN	=	$[(X_1 * W_1) + (X_2 * W_2) + (X_3 * W_3) + \dots (X_n * W_n)]/n$

4.5.1 The existence of training and development programs

4.5.1.1 The objective of statements

The objective of the statements asked under this section was to determine the existence of IT auditor training programs and the general understanding about such programs if they were in existence. The statements are as follows:

1. Training is mandatory for all IT auditors at my organisation.
2. IT auditors undergo frequent training programs to improve their skills and expertise.
3. Training programs for IT auditors are budgeted for, and there are resources and funds for such programs.
4. The organisation understands the training requirements for IT auditors well.
5. There is enough communication regarding the training requirements for IT auditors.

Figure 4.2 shows the responses to the statements that measured the existence of IT audit training programs.

Question	Count	Score	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training is mandatory for all IT auditors at my organisation.	37	2.32					
IT auditors undergo frequent training programs to improve their skills and expertise.	37	1.73					
Training programs for IT auditors are budgeted for, and there are resources and funds for such programs.	37	2.16					
The organisation understands well the training requirements for IT auditors.	37	2.41					
There is enough communication regarding the training requirements for IT auditors.	37	2.76					
Average		2.28					

Figure 4.2: The existence of training and development programs (Source: synthesised by researcher)

4.5.1.2 Discussion and findings

The first step involved in this research undertaking was to establish the perceptions about IT audit training in various organisations. As expected, the majority of the respondents were in agreement that training and development programs aimed at IT auditors existed. However, there is a concern, as there was a significant number of respondents (27%) who indicated that there were no training programs in their organisations. The response to the existence of training programs is, however, in contrast to the response about IT auditors undergoing frequent training to improve their skills. The responses indicate that many IT auditors get training frequently, but this may be done at individual level, not at organisational level. There may, however, be other possible explanations that the researcher may not be aware of.

Respondents were, however, almost neutral when it came to the existence of training budgets. The responses indicated that, while there may be a budget and resources allocated to such initiatives, organisations may still be reluctant to spend and commit resources to such initiatives. This may be because these organisations have not realised the value of training IT auditors. The score of 2.7 on the last statement highlights that many feel that organisations still do not understand the role of training and thus are unable to communicate the requirements. This may also be contributing to the poorly structured organisational training programs that are not current and do not address the changing IT environment.

4.5.1.3 Summary

The analysis of the statements above found that while many organisations have training programs, there are still some issues that need to be addressed. The most important issues that need to be addressed are understanding the training requirements for IT auditors and being able to communicate these requirements to IT auditors well.

4.5.2 Sufficiency of training and development programs

4.5.2.1 The objective of the statements

The objective of the statements asked in this section was to determine the sufficiency of IT auditor training programs and whether these training programs were adequate to ensure that all issues are addressed by training programs. To a certain extent, the sufficiency of a training program could be used to measure the maturity of an organisation's training and development programs. The following statements were used to evaluate the perceptions about the sufficiency of IT auditor training programs:

6. IT auditors at my organisation need further training to enhance their IT audit skills.
7. Existing training programs address specific attributes that are needed to improve the quality of IT audits.
8. A gap exists between existing training programs and what is needed to improve the quality of IT audits.
9. The training programs at my organisation are tailored for various target groups and address IT audit quality issues.
10. There is insufficient or ineffective training at my organisation.
11. The IT audit profession endeavours to ensure that IT auditors have the necessary technical skills practical training to enhance IT audit quality.

Figure 4.3 shows the responses to the statements used to measure the perceptions about the adequacy and sufficiency of training and development programs.

Question	Count	Score	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
IT auditors at my organisation need further training to enhance their IT audit skills.	37	1.46					
Existing training programs address specific attributes that are needed to improve the quality of IT audits.	37	2.43					
A gap exists between existing training programs and what is needed to improve the quality of IT audits.	37	1.86					
The training programs at my organisation are tailored for various target groups and address IT audit quality issues.	37	2.38					
There is insufficient or ineffective training at my organisation.	37	2.24					
The IT audit profession endeavours to ensure that IT auditors have the necessary technical skills practical training to enhance IT audit quality.	37	1.78					
Average		2.02					

Figure 4.3: Sufficiency of training and development programs (Source: synthesised by researcher)

4.5.2.2 Analysis, discussion and findings

An analysis of all the scores indicates that the general consensus among respondents was that IT auditors needed further training and that the current training programs were not adequate. Respondents indicated that IT auditors at their respective organisations needed further training and recognised that existing programs were somewhat not adequate to address IT audit quality issues. The responses to the statement about the adequacy of existing programs in addressing quality issues indicated that respondents were almost neutral.

The highest score of 2.43 indicates that the majority of respondents somewhat agree or are neutral. However, respondents recognised that there was a gap between training programs and what was needed to improve the quality of IT audits. There are numerous likely explanations for this result. One possible explanation for this gap may be that there is a real gap and another could be that, while auditors are receiving adequate training, they may at times feel inadequate due to them not knowing what is and what is not appropriate IT auditor training.

Unfortunately, the respondents indicated that while the training programs were somewhat tailored to various target groups, the training at their organisations was ineffective. This appears to be contradictory and inconsistent with the fact that training is tailored for various groups. The inconsistency and discrepancy may be attributed to the wording of the statement. While the reason for this seeming inconsistency may not be clear, it may be related to the fact that training may be tailored to one's level but may still not address the issues that they want to be addressed. Unfortunately, this finding is difficult to interpret because of different perceptions of what an effective training program should entail. The respondents, however, agreed that in general, the IT audit profession endeavours to improve the skills and capabilities of IT auditors as a profession.

4.5.2.3 Summary

The objective of this sub-section was to determine the adequacy of IT auditor training programs, and the results indicate that there exists a gap between training programs and what is needed to ensure that IT auditors conduct and produce quality IT audits. There is a need to improve existing training programs.

4.5.3 On-the-job training programs

4.5.3.1 The objective of statements

The objective of the statements asked under this section was to determine the effectiveness of on-the-job training programs. On-the-job training programs are conducted while the auditors are doing their daily tasks and the training is usually done by someone with experience who acts as a mentor. The mentor provides guidance and direction to the trainee until the trainee reaches a certain stage that satisfies the mentor. The feedback in this type of training is instant and can assist the trainee in learning of their mistakes and weaknesses instantly. The statements are as follows:

12. IT audit training programs are conducted in-house.

13. IT audit training programs are conducted by external parties.

14. Those with more IT audit experience provide mentoring and 'on-the-job' training.

15. The training given to IT audit personnel needs to be appropriately coordinated with audit work.

Figure 4.4 shows the responses to the statements used to measure the perceptions about on-the-job training programs.

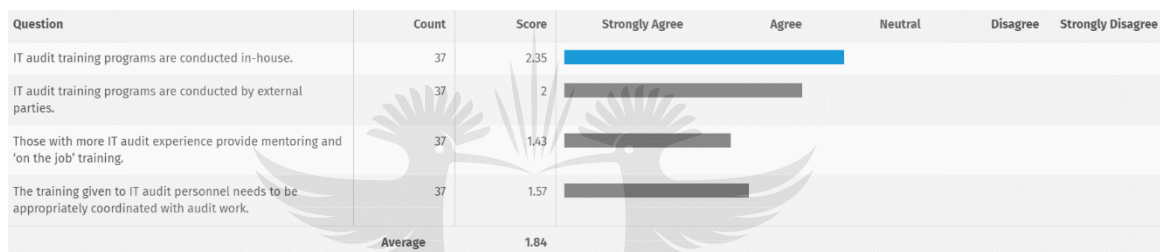


Figure 4.4: On-the-job training programs (Source: synthesised by researcher)

4.5.3.2 Findings

The statement asking about IT audit training programs being conducted in-house indicated that respondents were almost neutral in providing an answer to the statement. The statement does not, however, indicate who may be conducting the training, but the assumption is that the training is provided by an internal resource. The next statement indicates that IT audit training programs are conducted mainly by external parties. This could be the reason why the programs are not adequate, as identified in Section 4.5.2 above. External parties may not be aware of the internal environment and may generalise their training programs without really addressing the issues that are known to internal parties.

The respondents also indicated that the more experienced auditors provided mentorship and on-the-job training. The score for this statement indicates that respondents generally strongly agreed with the statement. The respondents also

concurred with the fact that IT audit training should be aligned with the audit work that is conducted. This could imply that conducting general training without tying it to specific audit work could lead to ineffectiveness or not address the gap that has been identified during this research undertaking. In other words, generic IT auditor training will not improve any efficiency unless specific IT audit requirements are identified and addressed.

4.5.3.3 Summary

The above responses indicate that, while it does not matter whether the training is conducted internally or externally, the training provided by those with more experience plays an important role in the training of IT auditors. Important to note is the fact that linking or aligning IT training to audit work plays a big role in understanding audit work. This process ensures that there is a proper understanding of IT audit to a specific task unlike generalising the training which may end up being irrelevant or inapplicable to future IT audits.

4.5.4 Internal and external training programs

4.5.4.1 The objective of statements

The objective of the statements asked under this section was to determine the effectiveness and the perceptions of IT auditors about internal and external IT auditor training programs. The aim was to measure and compare the effectiveness of both internal and external IT auditor training programs. Another goal was to measure the value and perceived obstacles of such programs. The statements under this section are as follows:

16. There is internal validation about IT audit training and development programs, and their impact on audit quality.
17. The training program is validated against external on-the-job criteria to ensure IT audit quality is adequately covered.

18. There are some barriers and constraints that prevent training programme participants from putting into practice what they have learned when addressing quality issues.
19. There is value derived from training programs for IT auditors when dealing with quality issues.
20. The training experience has had an effect on the trainee's on-the-job performance/behaviour related to quality issues.
21. The training and development program seeks feedback about the trainee's perception and perception about audit quality.

Figure 4.5 shows the responses to the statements used to measure the perceptions about internal and external training programs.

Question	Count	Score	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
There is internal validation about IT audit training and development programs, and their impact on audit quality.	37	2,84					
The training program is validated against external on-the-job criteria to ensure IT audit quality is adequately covered.	37	2,46					
There are some barriers and constraints that prevent training programme participants from putting into practice what they have learned when addressing quality issues.	37	2					
There is value derived from training programs for IT auditors when dealing with quality issues.	37	1,73					
The training experience has had an effect on the trainee's on-the-job performance/behaviour related to quality issues.	37	1,78					
The training and development program seeks feedback about the trainee and perception about audit quality.	37	2					
Average		2,14					

Figure 4.5: Internal and external training programs (Source: synthesised by researcher)

4.5.4.2 Analysis, discussion and findings

The responses indicate that the participants generally felt that there was little or no internal validation of the IT auditor training programs. In other words, these training programs were in no way measured for their effectiveness in achieving their goals. The responses indicate that organisations do not do proper evaluation regarding the impact that these programs have on the IT audit quality.

While the respondents indicated that training programs were evaluated or benchmarked against external requirements of the job, so that they would cover all the requirements for an effective and quality IT audit, they indicated that there were some issues that were preventing them from implementing whatever they had learnt. One of the reasons why there are barriers and obstacles that prevent the trainees from putting into practice what they had learnt is that change is a process that may take time and at times adopting new methods is not well received at the top. Another reason could be that there may be resistance from the top, thereby making it difficult for those at the bottom to implement something that is not fully understood.

The respondents also indicated that there was value derived from both training methods. The training has an impact on the performance of IT auditors in their daily jobs and on the behaviour and perception towards IT audit quality issues. However, as expected, the respondents indicated that all training programs sought feedback from the trainees. The assumption about such programs is that these feedback mechanisms are for self-assessment of the trainers so that they could improve on both the delivery and the development of future programs.

4.5.4.3 Summary

The responses under this section indicate that while organisations have both internal and external training programs that add value, they do not necessarily validate these programs with external requirements. This could be because there are no enforceable standards in IT auditing, but there are generally widely accepted standards that are enacted and advocated by professional bodies. However, these standards generally act only as guidelines and recommendations, which can be ignored. These requirements also change due to rapid changes in the IT landscape.

4.5.5 Continuous professional development

4.5.5.1 The objective of statements

The objective of the statements asked under this section was to determine the existence and effectiveness of continuous professional development programs. Continuous development programs are normally used to keep professionals up to date and current with emerging trends and technologies. These programs come in many forms but may include self-paced training programs (such as online training, online webinars, and volunteering programs) and formal training programs (where professionals attend classroom style of training programs, trade shows, and vendor training programs, among others). The statements under this section are as follows:

22. The organisation emphasises the importance of training and development to improve the competence and skills of IT auditors and IT audit quality.
23. Relative to other IT auditors, I have received more combined informal and formal training during my career to understand quality issues.
24. There should be a fundamental review of the training requirements for IT auditors with specific reference to IT audit quality.
25. Post-qualification training focuses on IT audit quality-related issues.

Figure 4.6 shows the responses to the statements used to measure the perceptions about continuous professional development programs.

Question	Count	Score	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
The organisation emphasizes the importance of training and development to improve the competence, skills of IT auditors and IT audit quality.	37	1.92					
Relative to other IT auditors, I have received more combined informal and formal training during my career to understand quality issues.	37	1.89					
There should be a fundamental review of the training requirements for IT auditors with specific reference to IT audit quality.	37	1.68					
Post-qualification training focuses on IT audit quality related issues.	37	2.14					
Average		1.91					

Figure 4.6: Continuous professional development (Source: synthesised by researcher)

4.5.5.2 Analysis, discussion and findings

Regarding continuous professional development, respondents indicated that their organisations encouraged them to continuously upskill themselves using various ways. The results are not surprising, given the fact that the respondents belonged to ISACA (an organisation which requires certificate holders to earn a certain number of hours under their continuous professional development: certification holders are required to recertify every three years and need one hundred and twenty hours of continuous professional development during that period). Therefore, since ISACA certifications are the de facto IT audit certifications in most IT audit organisations, it is expected that these organisations would require their auditors to comply with the requirements of the certifying body.

The respondents also indicated that relative to other IT auditors, they had received more formal and informal training combined. This is a very subjective statement, which indicates that IT auditors generally felt that they had better training compared to their peers. The respondents also felt that there was a huge need to review the continuous development training programs so that they could focus on quality issues. This may be because the aim of most continuous development programs is to stay current and update the community of new methods and as a result do not focus on improving quality but rather on new developments. This is validated by the responses for the statement about perceptions regarding the post-

qualification training focusing on IT audit quality issues. The response to this statement was almost neutral.

4.5.5.3 Summary

Continuous professional development plays an important role in improving and ensuring that professionals are current and up to date with the latest developments. In IT auditing, continuous professional development ensures that IT auditors are informed and updated about rapid changes in IT and some legislative changes that are introduced as a result.

4.5.6 IT audit quality

4.5.6.1 The objective of statements

The objective of the statements asked under this section was to measure and determine the effect of training and all the above variables on the quality of IT audits. This section used the above sections as the context and dealt with the perceptions of training and the enhancement of IT audit quality. The statements under this section are as follows:

26. Training at all levels addresses IT audit quality issues.
27. Training within the organisation enhances the delivery of an effective and efficient audit.
28. Training within the organisation enhances an IT auditor's technical expertise.
29. Training within the organisation improves an IT auditor's ability to enhance the quality of IT audits.
30. IT audit quality can be enhanced through domain-specific experience and domain-specific training.
31. There is a relationship between the training of IT auditors and their effectiveness in conducting their audit functions.
32. Technical skills, personal qualities and practical experience are key drivers of IT audit quality.

Figure 4.7 shows the responses to the statements used to measure the perceptions about IT audit quality.

Question	Count	Score	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Training at all levels addresses IT audit quality issues.	37	2.35					
Training within the organisation enhances the delivery of an effective and efficient audit.	37	1.76					
Training within the organisation enhances an IT auditor's technical expertise.	37	1.59					
Training within the organisation improves an IT auditor's ability to enhance the quality of IT audits.	37	1.68					
IT audit quality can be enhanced through domain-specific experience and domain-specific training.	37	1.54					
There is a relationship between the training of IT auditors and their effectiveness in conducting their audit functions.	37	1.62					
Technical skills, personal qualities and practical experience are key drivers of IT audit quality.	37	1.49					
Average		1.72					

Figure 4.7: IT audit quality (Source: synthesised by researcher)

4.5.6.2 Analysis, discussion and findings

The response to the statement about training at all levels, which addresses IT audit quality issues, indicated that the perception was almost neutral. The responses were in between neutral and agreeing with the statement. This may indicate that at different levels, IT audit quality is viewed in different ways because those at the highest level of the organisational structure may be concerned about high-level issues, whereas those at the bottom of the organisation may be concerned about the day-to-day issues (operational and procedural). Training within an organisation was found to enhance the delivery of an effective audit. While efficiency and effectiveness are difficult to measure, efficiency and effectiveness have a positive impact on the quality of an audit.

The respondents also strongly indicated that training within the organisation enhanced an IT auditor's technical expertise. This agrees with the statements in Section 4.5.4 that the training of auditors has an effect on the performance of IT auditors regarding IT audit quality issues. Training IT auditors within an organisation was also found to improve an IT auditor's capabilities to enhance the

quality of an IT audit. From this statement, it can be deduced that internal training is most likely more effective in enhancing the perceptions and skillset of auditors as the trainer or mentor could have knowledge that is internal to the organisation. This could imply that personalised training or mentorship is more effective than generic training, which is usually provided by external parties who may not understand the internal issues within an organisation, which could be hindering IT auditors from conducting quality audits.

Further to the above, the respondents also indicated that IT audit quality could be improved through training auditors in a specific domain or through gaining experience in a specific domain. Training someone about a specific process, technology or domain enhances their knowledge about that subject matter and consequently leads them to be thorough and know what to look for and what not to concentrate on based on the scope of the audit. General training may help make auditors understand certain concepts about a process, technology or domain, but going deeper into the subject makes IT auditors understand even that which will be missed by general IT auditors.

As expected, respondents also indicated that there was a positive relationship between the training of IT auditors and their effectiveness in conducting IT audits. As discussed previously, effectiveness can be improved by obtaining domain-specific training and doing so ensures that IT auditors can be efficient in the whole audit process. While training is an important aspect in enhancing IT audit quality, respondents indicated that personal skills, qualities, experience and technical skills also played an important role in the quality of an IT audit. The statement got the lowest score in this section (meaning that the majority of responses were “Strongly Agree”).

4.5.6.3 Summary

In summary, this section determined that training plays a significant role in enhancing IT audit quality. The findings indicate that not all training programs are effective in improving IT audit quality and there is a need for organisations to pay more attention to internal/mentorship programs as these were found to have the most impact on improving the ability of IT auditors in conducting their functions.

4.6 Discussion about findings

This section will discuss the above findings and link them to the research question. The discussion of these results begins with the research question in the context of the background information. The following paragraphs will answer the research questions outlined in Section 1.3.1:

4.6.1 What is the effect of IT auditors' training on the quality of IT audits?

The findings of this study highlight the important role that training of IT auditors has on the quality of IT audits. They highlight and suggest that training is key to the quality of IT audits. The study also suggests that, in addition to other factors that affect the quality of an IT audit, without training (whether ongoing or at fixed intervals), it is difficult for IT auditors to understand the requirements of audits in light of the changing landscape. The most plausible explanation is that IT is dynamic, and therefore, IT auditors need to stay up to date with any changes. The most striking finding to come out of the analysis is that the most effective training is internal training. One would have expected that external training would assist, as external individuals who are familiar with new technologies or developed new technologies would be in a better position to train those who are new to that technology than those who are internal to an organisation.

4.6.1.1 What effect does training have on audit quality when auditing complex IT systems?

Training was found to enhance the skillset and capabilities of auditors. While the

questions asked during the data collection phase were not directed at auditing complex IT environments, it can be inferred from the answers that training enhances the capabilities and skillset of IT auditors. This ensures that they can understand complex environments and are able to audit such without having any challenges. Understanding something complex could make it easier to perform an audit efficiently.

4.6.1.2 What role does training play in enhancing competence, expertise and audit quality?

The findings above, consistent with previous research findings, indicate that training enhances the competence, expertise and audit quality.

4.6.1.3 What is the effective and optimal training method that enhances the proficiency of an IT auditor?

The results above clearly indicate that internal training is the most optimal and effective method to enhance the proficiency of IT auditors. While the internal approaches to training were not fully considered and explored, the findings pointed out that on-the-job training under mentorship was the most effective way to assist IT auditors to be proficient in their work. This could be because on-the-job training programs are normally crafted to specific job functions, and there may be personal attention given to those who may be struggling compared to generic external training programs that cater for everyone. Mentors can even go beyond traditional work and identify other challenges that may affect an IT auditor performing their work.

4.6.2 Comparison of results with previous findings

The findings of this research undertaking are consistent with the findings of past research, such as the one conducted by Drogalas, Pazarskis, Anagnostopoulou and Papachristou (2017). The research by Drogalas *et al.* (2017), although not related to IT auditing but to general financial auditing, found that training along with other variables influences the quality of the audit. This study's findings are also in

line with earlier literature, which also found that general auditors needed training to be prepared for the world of auditing, carry out their duties and also be diligent, effective and efficient in their audits (Simha & Satyanarayan, 2016; Drogalas *et al.*, 2017; Tang, Yang & Gan, 2017; Nehme, AlKhoury & Al Mutawa, 2019).

4.6.3 Conclusion

In conclusion, the findings of this study have also shown that organisations play an integral role in the training programs. However, these organisations do not understand their training programs and cannot properly communicate the training requirements to IT auditors. The research findings have also shown that continuous professional development programs are additional tools in enhancing IT auditor knowledge. This research undertaking has found that generally, internal programs are more effective in delivering content to IT auditors and thus more emphasis can be put on them. Taken together, these research findings suggest that quality IT audits are a result of continuous training, which cannot be achieved all at once. The use of various methods of training could also be an important factor in enhancing the training programs and ultimately the quality of audits. Overall, this research undertaking strengthens the idea that resources should be committed to improving training programs, as improving training programs eventually leads to efficiency in all matters related to audit quality.

4.7 Chapter summary

This research undertaking set out to determine the relationship between and the role of training IT auditors in IT audit quality. The study was designed to understand and determine the effect of training on the quality of IT audits. A questionnaire was sent out to IT auditors who responded to give their perceptions about various issues related to training and the quality of IT audits. A careful analysis was conducted to get meaning from the responses that had been obtained. During the analysis and investigation phase, it was determined that training played an integral

role whose impact had a bearing on the quality of IT audits. Training of IT auditors advances the skills, capabilities and competence of auditors, and this, in turn, has an effect on the quality of the IT audits they conduct. This chapter also discussed the reasons for some of the notable items and certain variances that were discovered during the analysis phase.

The aim was to answer the research question: What role does IT auditor training have on the quality of IT audits? After this study, it is now possible to answer the question and state that auditor training plays a significant role in equipping auditors with all the knowledge and skillset needed to produce quality IT audits in spite of the complexity of the IT environment being audited.

The next chapter will summarise the whole research undertaking, discuss the contributions and implications of the research, make recommendations for future research and conclude the subject under consideration.



CHAPTER 5

CONCLUSION

5.1 Introduction

This chapter gives a summary of the whole study. The chapter discusses the findings, the significance, strengths, weaknesses and limitations of this study and concludes by suggesting recommendations for future studies and implications for practice.

5.2 Background of the study and approach

As discussed in previous chapters, the use of IT gives many organisations a competitive advantage; however, this also comes with many risks and challenges. To ensure that risk brought about by the use of IT is managed, organisations conduct audits to obtain assurance that they are using IT in an efficient and effective manner. The IT audits give organisations confidence that their information systems are doing the job they are supposed to do and that the outputs can be relied upon in making decisions. As a result, the quality of IT audits has become an important subject that needs attention, as failing to conduct this process that provides this assurance effectively could result in bad decisions being made.

From the literature reviewed, it was evident that there are many factors and variables that influence audit quality and extensive research has been conducted, especially on financial auditing. However, the role of the training of IT auditors on audit quality had not been explored in the literature that was reviewed. The research conducted on the training of auditors has largely focused on the performance and the capabilities of financial auditors and there was limited research on the link between training auditors (in general) and audit quality. Taking into consideration that the research is limited to financial auditors, a research gap was identified and this study sought to address that gap by extending the research

to determine the effect of the training of IT auditors on the audit quality of an IT audit.

To address the research gap highlighted above, this research undertaking set out to investigate the impact that the training of IT auditors has on the quality of the IT audits conducted. The aim was to gain an understanding of the role of training to improve IT audit quality, a variable that is difficult to measure, as it is a result of inputs, processes and outputs. The study sought answers to the following research question:

- What is the effect of IT auditors' training on the quality of IT audits?

In addition to the above research question, the following sub-questions were also developed to assist in gaining a deeper and better understanding of the subject:

- What effect does training have on audit quality when auditing complex IT?
- What role does training play in enhancing competence, expertise and audit quality?
- What is the effective and optimal training method that enhances the proficiency of an IT auditor?

A qualitative approach was taken and questionnaires were distributed to IT auditors through ISACA (a non-profit, independent association that advocates for professionals involved in information assurance, security, risk management and governance). Responses were collected and analysed and the summary of key significant findings is discussed below in Section 5.3.

5.3 Summary and discussion of findings

In this study, it has been shown that the training of IT auditors plays a significant role in enhancing the quality of IT audits. In general, the findings indicated that in order to improve the quality of an IT audit, IT auditors need to learn how to conduct IT audits efficiently. This can be achieved, among other ways, through proper training whose aim is to improve the quality of IT audits. One significant finding was that many organisations do have training programs for IT auditors (formal or non-formal), but the maturity and effectiveness of these programs were questionable as organisations did not appear to fully understand the training programs. The results and findings are summarised under the following sub-themes or topics for ease of reference:

- **The existence of training and development programs**

The study found that, in general, many organisations have training programs in place (and these were mandatory), but the organisational commitment could not be determined as this was not reflected in the budget and resource allocation towards such initiatives. The study also found that organisations do not fully understand training requirements and, thus, cannot properly develop and properly communicate training requirements.

- **Sufficiency of training and development programs**

One significant finding to emerge was that there was a gap between the required IT audit skills and what exactly was required and, therefore, there is a need to train IT auditors further to address the gap. The study also showed that existing training programs did not fully address issues related to IT audit quality. This suggests that while training programs exist, they are probably focused on enhancing knowledge, but are rarely focused on improving quality issues. As a result, a gap was identified for programs that address IT audit quality issues. The findings also show that, while organisations may have training programs

for various target groups, these programs are not focused on IT audit quality and are not sufficient for addressing quality issues.

- **On-the-job training programs**

The results of this study show that most training programs were not conducted in-house and that these were conducted mostly by external parties. This refers to formal training programs. However, the study found that on-the-job training programs conducted by those with more experience existed in most organisations. The second major finding was that the training needed to be coordinated with audit work, in other words, it can be deduced that training needs to be aligned with the work that IT auditors do.

- **Internal and external training programs**

Another important finding is that training programs are not being validated against any benchmark to verify their effectiveness. The study found that the training programs were not validated against requirements for ensuring that quality is addressed. Another significant finding was that besides the issues of validation, there were some constraints that made it difficult for IT auditors to implement what they learnt via training. However, the study found that even though the training programs were not sufficient, there was value obtained from training when addressing IT audit quality issues. The training programs also sought feedback from participants, probably to find ways and means of improving those programs.

- **Continuous professional development**

While initial development programs are critical in the early phases of an IT auditor's career, there is a need to stay current and learn new and developing trends. Continuous learning and professional development are therefore critical for enhancing this knowledge. This study found that organisations emphasise

continuous professional development, which this is not surprising, considering that professional auditing bodies require their members to do so. However, the study also found that IT auditors felt that there was a need to review these continuous development programs as they did not adequately address quality issues.

- **IT audit quality**

Regarding the theme of IT audit quality, the study found that continuous training programs at all levels did not address IT audit quality issues. This is in correlation with the findings under the theme above of “sufficiency of training and development programs”. The most significant finding was that internal training was the most effective method and that this method enhanced the capabilities of an IT auditor. The other major finding, which is directly related to the research question, was that training within an organisation improved the ability of an IT auditor by enhancing the quality of an IT audit and this was achieved through domain-specific training. In other words, specialist training enhances the quality of IT audits. The study also found that training definitely had an impact on the effectiveness of conducting audits, which is a key ingredient of IT audit quality.

In summary, the findings above assist in answering the research question and the sub-questions outlined in Chapter 1. Taken together, the following conclusions can be drawn from the findings of the present study, thus answering the research question and the sub-questions, which are the driving elements of this research undertaking:

- IT auditor training has a positive impact on the quality of IT audits. The impact is on both the IT auditor and the IT audit process itself.

- Training improves the capabilities of IT auditors when they have to audit complex IT environments, as the programs enhance the competence, skills and knowledge of such environments. Internal training through mentorship and practical cases that are related to the job tasks is the optimal training method for its effectiveness of enhancing the proficiency of IT auditors.

The following sections will discuss the relevance of this study as supported by the findings above.

5.4 Significance of the findings and contributions of the study

This study has shown that internal training of IT auditors has a positive impact on the quality of IT audits and the competency of IT auditors. In summary, the findings are just the tip of the iceberg and reveal the importance of training for improving both IT audit quality and IT auditor quality (something that was not fully researched in this undertaking). These findings enhance the understanding of the role of training on the quality of IT audits. This research adds to a growing body of literature on the quality of IT audits and serves as a base for future studies that are suggested in Section 5.5 below.

The findings from this study make several contributions to existing literature. First, the role of internal training is established as being critical in enhancing the capabilities of an IT auditor. Secondly, the gap identified between what is expected and what exists is another finding that should help organisations and researchers alike to find ways of understanding what needs to be done in order to address this deficiency.

This study adds substantially to the rapidly expanding field of IT audit, which is changing fast, as new technologies and methods emerge every day. The study has confirmed that effective training programs improve the competence and quality

of IT audits conducted by IT auditors. Before this study, the evidence to support this was based on distantly related research on financial audits.

5.4.1 Limitations and weaknesses of the current study

This research has limitations that have an impact on how the results should be interpreted. Although this study has successfully demonstrated that training of IT auditors has an effect on the quality of IT audits, it has certain limitations that have an impact on the findings. With a small sample size of 37 respondents, caution must be applied, as the findings might not be transferable to the general population of IT auditors in South Africa. The sample was also limited to ISACA members of which only 37 members responded out of a total of 1 251 members with the CISA designation in SA (as indicated in the 2018 ISACA SA Annual Report). The small percentage may not be a general representation of ISACA members. The results may not be representative of general IT auditors, as some IT auditors do not go the ISACA route of certification, but go through other routes. An arguable weakness is the arbitrariness in the definition of IT audit quality. There is no universally accepted definition of what a quality audit is.

Another limitation of this study is that the scope of the study was limited to training in general and did not explore further the impact and role of different types of training and what impact each of these types of training has on the IT audit quality variables (input, process and output). Being limited to just internal and external training programs, the study generalised the training programs such that the interpretation of results and generalisability of the current findings are limited to just saying that internal programs are effectively compared to external programs. The study lacks detail, which was beyond the scope of this study.

Another limitation of this study is that the study did not evaluate the impact of initial training programs and assumed that IT auditors already had experience. The study

focused on IT auditors with over a year's experience and the lack of information about the group that has just finished a formal qualification means that the effectiveness of such programs is not evaluated and therefore the impact of such training programs could not be established.

Finally, a number of important general limitations when conducting qualitative research need to be taken into consideration. Some limitations need to be acknowledged with regard to the research approach. Firstly, the present study was subject to a number of potential methodological weaknesses. Qualitative research has a built-in bias and the quality of the research is dependent on the researcher. As such, the researcher took care not to be biased when designing the questions so as not to influence the results. Secondly, it is a challenge to repeat qualitative research and this makes it hard to deny or confirm the results of the original study. Lastly, there is a perceived lack of rigour when conducting qualitative research. Rigour is difficult to demonstrate, because the process involves qualitative analysis of qualitative data. These limitations mean that the findings of this study need to be cautiously interpreted, while bearing in mind the limitations identified above.

Notwithstanding these methodological limitations and relatively limited sample size, the study demonstrated and offered valuable insights into the role that the training of IT auditors has on IT audit quality. The study has its own strengths, which will be discussed below.

5.4.2 The strengths of the current study

Although the findings of this study should be interpreted with caution, the study has several strengths. The strength of the study lies in the in-depth analysis of the results and responses. The questionnaire covered a wide range of issues and, although not detailed, these questions covered a wide range of issues that help in the general understanding of the topic at hand. The key strength is that this study

covers and represents a comprehensive examination of a wide range of training and audit quality issues such that a meaningful conclusion can be reached.

5.5 Recommendations for further research work

The research question for this study sought to get answers about the influence that the training of IT auditors has on the quality of audits conducted. This study obtained the answer to the question, but in the process also highlighted a number of questions that may need to be investigated further.

- More broadly, as indicated in Section 5.4.1, research is needed to determine the level of influence that each variable of training has on the elements of IT audit quality.
- Further studies are needed to establish the impact that different training methods have on IT audit quality and how these differences (if any) can be used to optimise the training methods. The other area that needs further exploration is the assessment of the long-term effects of initial training programs for IT auditors on the quality of IT auditors and this can be compared to the impact of continuous professional development training programs.
- It would also be interesting to repeat this study with a bigger sample, which is not limited only to ISACA members but also to members who belong to other professional bodies, like the Institute of Internal Auditors (IIA) in South Africa and beyond.

5.6 Implications and recommendations for practice or policy

There are a number of practical implications for this study as a result of the findings. The findings suggest several courses of action for organisations and professional bodies alike. Greater efforts are needed by organisations to ensure

that training programs are well understood, well resourced, supported and developed to cater for different levels and competencies. A one-size-fits-all approach is not the best, and understanding the organisation and its dynamics is key to delivering effective training programs that address all issues related to quality. There is, therefore, a definite need for organisations to prioritise internal programs that are aimed at mentoring IT auditors, as these are directly linked to their job outputs.

Another important practical implication is that organisations need to take audit quality issues seriously, as many critical decisions are made based on the assurance or findings of IT audits. If the findings of these IT audits are questionable, then the main objective of the audit is not achieved and cannot be relied upon. Unless organisations emphasise training that addresses all aspects, including quality issues, then this assurance and reliance upon audit findings will not be achieved.

There are a number of significant changes that need to be made by both organisations and professional IT auditing bodies. A key priority in policy development should, therefore, be for professional bodies to also emphasise quality issues when developing their requirements for IT auditors. The findings can be used to develop targeted programs aimed at addressing various groups based on experience, level and understanding. The biggest implication of this study and its findings is that IT auditor training should be taken into account when organisations and professional bodies want to enhance IT audit quality metrics.

5.7 Chapter summary

This chapter discussed and gave a summary of the findings and discussed the strengths and weaknesses of this research undertaking. The significance of this study and the contributions to the existing body of knowledge were also

highlighted, culminating in the suggestions and recommendations for future research and implementation in organisations.



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APPENDIX A
Questionnaire

Questionnaire Cover letter

Date:

Dear Participant:

My name is Ishmael Dube, and I am a student at the University of Johannesburg. For my Research project, I am examining the role and impact of training on the quality of IT audits. Because you are involved in IT auditing, work for a company that provides IT auditing or provide some IT auditing training services, I am inviting you to participate in this research study by completing the attached questionnaire.

The following questionnaire will require approximately 15 minutes to complete. There is no compensation for responding nor is there any known risk. To ensure that all information will remain confidential, please do not include your name. Copies of the project will be provided to my supervisor. If you choose to participate in this project, please answer all questions as honestly as possible and return the completed questionnaires promptly. Participation is strictly voluntary, and you may refuse to participate at any time.

Thank you for taking the time to assist me in my educational endeavours. The data collected will provide useful information regarding the role of training in enhancing IT audit quality. If you would like a summary copy of this study, please complete the Request for Information Section. Completion and return of the questionnaire will indicate your willingness to participate in this study. If you require additional information or have questions, please contact me at the number listed below.

If you are not satisfied with the manner in which this study is being conducted, you may report (anonymously if you so choose) any complaints to the supervisor.

Sincerely,

Ishmael Dube

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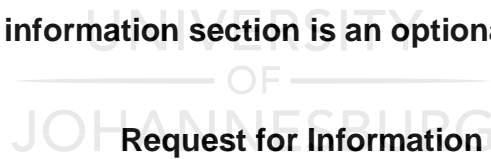
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[This request for information section is an optional part of the cover letter]



Please send a copy of the study results to the address listed below.

Name:

Email address:

Please return to Ishmael Dube (201313441@student.uj.ac.za)

Questionnaire

Section A: Biographic Information

Some questions allow multiple answers. Where this is the case, this is clearly indicated.

Gender	Male		Female	
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Age Group	18-25		26-30		31-40		40-50		Over 60	
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IT Audit Experience	1-3		4-10		10-20		Over 20
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Level and role	Junior		Supervisor		Manager		Associate	
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Formal IT Audit Qualification	
Not Applicable	
Diploma	
Undergraduate degree	
Honours Degree/Post Grad Diploma	
Masters	
Doctorate	
Other (specify)	

IT Audit Professional Qualifications or related general audit qualifications	
Certified Information Systems Auditor (CISA)	
Certified Information Security Manager (CISM)	
Certified in Risk & Information Systems Control (CRISC)	
Certified Internal Auditor (CIA)	
Other (specify) e.g. product or application specific audit qualification.	

Section B:

The following statements refer to aspects of training which could have an impact on IT audit quality. Based on your own experience in IT auditing, indicate the strength of your agreement with each statement on the scale from 1 where you strongly disagree to 5 where you strongly agree with the statement.

- Please select only one response per statement.
- Please mark your answer by placing a cross in the relevant box.
- If you are unsure of the exact answer to some questions, please estimate the answer to the best of your ability.

The existence of training and development programs	1	2	3	4	5
1. Training is mandatory for all IT auditors at my organisation.					
2. IT auditors undergo frequent training programs to improve their skills and expertise.					
3. Training programs for IT auditors are budgeted for, and there are resources and funds for such programs.					
4. The organisation understands well the training requirements for IT auditors.					
5. There is enough communication regarding the training requirements for IT auditors.					

Sufficiency of training and development programs	1	2	3	4	5
6. IT auditors at my organisation need further training to enhance their IT audit skills.					
7. Existing training programs address specific attributes that are needed to improve the quality of IT audits.					
8. A gap exists between existing training programs and what is needed to improve the quality of IT audits.					

9. The training programs at my organisation are tailored for various target groups and address IT audit quality issues.					
10. There is insufficient or ineffective training at my organisation.					
11. The IT audit profession endeavours to ensure that IT auditors have the necessary technical skills practical training to enhance IT audit quality.					

On the job training programs	1	2	3	4	5
12. IT audit training programs are conducted in-house.					
13. IT audit training programs are conducted by external parties.					
14. Those with more IT audit experience provide mentoring and 'on the job' training.					
15. The training given to IT audit personnel needs to be appropriately coordinated with audit work.					

Internal and External Training programs	1	2	3	4	5
16. There is internal validation about IT audit training and development programs, and their impact on audit quality.					
17. The training program is validated against external on-the-job criteria to ensure IT audit quality is adequately covered.					
18. There are some barriers and constraints that prevent training programme participants from putting into practice what they have learned when addressing quality issues.					
19. There is value derived from training programs for IT auditors when dealing with quality issues.					
20. The training experience has had an effect on the trainee's on-the-job performance/behaviour related to quality issues.					

21. The training and development programme seeks feedback about the trainee and perception about audit quality.					
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Continuous Professional Development	1	2	3	4	5
22. The organisation emphasizes the importance of training and development to improve the competence, skills of IT auditors and IT audit quality.					
23. Relative to other IT auditors, I have received more combined informal and formal training during my career to understand quality issues.					
24. There should be a fundamental review of the training requirements for IT auditors with specific reference to IT audit quality.					
25. Post-qualification training focuses on IT audit quality related issues.					

IT Audit Quality	1	2	3	4	5
26. Training at all levels addresses IT audit quality issues.					
27. Training within the organisation enhances the delivery of an effective and efficient audit.					
28. Training within the organisation enhances an IT auditor's technical expertise.					
29. Training within the organisation improves an IT auditor's ability to enhance the quality of IT audits.					
30. IT audit quality can be enhanced through domain-specific experience and domain-specific training.					
31. There is a relationship between the training of IT auditors and their effectiveness in conducting their audit functions.					

32. Technical skills, personal qualities and practical experience are key drivers of IT audit quality.

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