Impact of Continuous Auditing and Centralising the Purchasing Functions for Higher Internal Audit Effectiveness: A Study of Saudi Arabia Companies

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Thesis submitted for the fulfilment of the requirements for the degree of
Doctor of Philosophy

Victoria University, Australia
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August 2024

Abstract

This research examines internal audit effectiveness and the factors influencing internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia. Specifically, employing the resource-based theory, this study explores the effects of continuous auditing and the centralisation of purchasing functions on the effectiveness of internal audit. Additionally, utilising the unified theory of acceptance and use of technology, this research investigates how performance expectancy, facilitating conditions, effort expectancy and social influence affect internal auditors' intentions to adopt continuous auditing.

The data for this research were gathered utilising a questionnaire method. Questionnaires were distributed to internal auditors in non-financial companies in Saudi Arabia, resulting in 152 completed and useable questionnaires. The data were analysed using the Statistical Package for the Social Sciences. This study employed two multiple regression analyses, estimated using ordinary least squares methods. The findings from the first multiple regression model indicated that both continuous auditing and the centralisation of purchasing functions were significant factors influencing internal audit effectiveness in non-financial companies in Saudi Arabia. Specifically, in the first regression model, continuous auditing and the centralisation of purchasing functions accounted for 20.2% of the variance in internal audit effectiveness. Moreover, continuous auditing was the most important factor affecting the effectiveness of internal audit. The findings from the second multiple regression model revealed that performance expectancy was the sole significant factor influencing internal auditors' intentions to use continuous auditing. In the second regression model, performance expectancy accounted for 33% of the variance in the internal auditors' intentions to use continuous auditing.

According to the resource-based theory, non-financial companies in Saudi Arabia enhance their internal audit effectiveness and gain a competitive advantage by implementing continuous auditing and centralising purchasing functions. These functions are important for ensuring more efficient and effective audit processes, which can lead to better decision-making and overall organisational performance. Moreover, with respect to the unified theory of acceptance and use of technology, there is a need for non-financial companies in Saudi Arabia to develop training programs to enhance their internal

auditors' understanding of the benefits of continuous auditing and its potential for improving internal auditors' performance. These training courses should focus on demonstrating to internal auditors how implementing continuous auditing can increase their performance efficiency and effectiveness.

Declaration

I, Hamad Hmooad Altowaijri, declare that the PhD thesis entitled *Impact of Continuous Auditing and Centralising the Purchasing Functions for Higher Internal Audit Effectiveness: A Study of Saudi Arabia Companies*, is no more than 80,000 words in length, including quotes and exclusive of tables, figures, appendix, bibliography and references. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

I have conducted my research in alignment with the Australian Code for the Responsible Conduct of Research and Victoria University's Higher Degree by Research Policy and Procedures.

Ethics Declaration

All research procedures reported in the thesis were approved by the Human Research Ethics Committee at Victoria University ID: HRE22-152 on 17 November 2022.

Signature: 

Date: 12/11/2024

Acknowledgements

First and foremost, I am profoundly grateful to Allah for granting me the strength, patience and wisdom to undertake and complete this journey. Allah's blessings and guidance have been my source of inspiration and perseverance throughout this endeavour.

I would like to thank the government of the Kingdom of Saudi Arabia for supporting me academically and financially. I would like to thank Qassim University for supporting me. I would like to express my deepest gratitude to my supervisors, Professor Sophia Everett and Dr Chitra DeSilva, for their invaluable guidance, support and encouragement throughout my research. I would also like to thank the committees of my Confirmation of Candidature and my Towards Submission Milestone Review, Dr Riccardo Natoli, Professor Peter Sheeha, Professor Colin Clark, Associate Professor Randall Robinson and Associate Professor Himanshu Shee for their help and support.

I am profoundly grateful to my family whose unwavering support has been the cornerstone of my academic journey. To my father, Hmooad, and my mother, Sharifah, I owe everything. Their love, sacrifice and belief in my potential have provided me with the strength and determination to pursue my dreams.

To my wife, Sarah, words cannot adequately express my gratitude for your patience, understanding and constant encouragement. Your unwavering support and belief in me have been my greatest source of strength during the most challenging times of this journey. Thank you for being my rock and my inspiration.

To my daughter, Taraf, and my son, Hmood, you both have been my source of joy and motivation. Your smiles and laughter have been a constant reminder of what truly matters in life. Thank you for your patience and for giving me the strength to persevere.

I would like to acknowledge that this thesis was edited by Elite Editing, and editorial intervention was restricted to Standards D and E of the Australian Standards for Editing Practice.

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List of Abbreviations

ACL	Audit Command Language
AICPA	American Institute of Certified Public Accountants
CAAT	Computer-assisted auditing technique
CoCAF	Continuous compliance awareness framework
EAM	Embedded audit module
ERP	Enterprise resource planning
GAS	Generalised audit software
IAE	Internal audit effectiveness
IDEA	Interactive Data Extraction and Analysis (Caseware)
IT	Information technology
KSAIIA	Saudi Institute of Internal Auditors
NAATI	National Accreditation Authority for Translators and Interpreters
Nupco	National Company for Unified Procurement of Medicines, Devices and Medical Supplies
OLS	Ordinary least squares
RPA	Robotics process automation
SAS	Statement on Auditing Standard
SOCPA	Saudi Organisation for Certified Public Accountants
SPSS	Statistical Package for the Social Sciences
TAM	Technology acceptance model

TPB	Theory of planned behaviour
TRA	Theory of reasoned action
UAEIAA	United Arab Emirates Internal Auditors Association
USA	United States of America
UTAUT	Unified theory of acceptance and use of technology
VIF	Variance inflation factor
WMS	Warehouse management system

Chapter 1: Introduction

1.1 Introduction

Internal audit is an objective assurance and consulting activity that aims to enhance an organisation's operations and provide added value (Institute of Internal Auditors 2006). The internal auditing role involves a diverse array of responsibilities to ensure a company's operations are efficient, effective and performed with integrity. Because the credibility of audit firms has significantly diminished in response to the collapse of major corporations such as WorldCom and Enron, there has been an increased focus on the significance of internal audit functions for identifying and assessing risks and ensuring accurate financial reporting to management (Ebaid 2011).

Traditional auditing methods are insufficient for dealing with the complexities of modern business processes (Hazar 2021). Technological advancements are significantly transforming the corporate landscape by restructuring commercial operations through integration processes and reshaping various elements of accounting and auditing. According to Alkebsi and Aziz (2017), technology has also significantly improved the internal auditing process, particularly in the stages of preparation, appraisal and review. The development of advanced audit procedures is essential for adaptation to the transforming business environment and to enhance the quality of internal audits. The integration of business processes is essential for enhancing the effectiveness of auditing procedures (Vasarhelyi, Alles & Kogan 2004). According to David (2022), internal auditing plays a vital role in ensuring the efficiency of procurement processes.

Technological developments have created a need for real-time reporting, which enhances the effectiveness of business decision-making (Wiegerinck 2019). These advancements have established continuous auditing as a crucial component of internal auditing (Alles, Brennan et al. 2006). Indeed, implementing continuous auditing and centralising purchasing functions can enhance the effectiveness of internal audits. Continuous auditing is defined as:

> Continuous auditing is [a] comprehensive electronic audit process that enables auditors to provide some degree of assurance on continuous information simultaneously with, or shortly after, the disclosure of the information (Rezaee et al. 2002, p. 150).

Research indicates that the adoption of continuous auditing has increased significantly within organisations (Vasarhelyi et al. 2012). According to Gonzalez and Hoffman (2018), implementing continuous auditing methods has the potential to substantially reduce the occurrence of fraudulent activities. Internal audit departments and internal auditors face numerous challenges, including the demand for real-time operations and the rapid advancements in information technology (IT). Indeed, two critical factors that influence the implementation of continuous auditing in companies are the IT skills of internal auditors and management support (Vasarhelyi et al. 2012). Overcoming these challenges is essential for creating efficient business environments that facilitate the effective adoption of continuous auditing, thereby enhancing the effectiveness of internal audits.

This study investigates the influence of continuous auditing and the centralisation of purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia, using resource-based theory. Additionally, in accordance with the unified theory of acceptance and use of technology (UTAUT), this research examines the impact of four factors performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to adopt continuous auditing. This research provides recommendations for non-financial companies in Saudi Arabia to enhance their internal audit effectiveness.

1.2 Research Gaps

There is a shortage of empirical evidence regarding the effects of continuous auditing and the centralisation of purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. Additionally, there is insufficient research on the influence of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to adopt continuous auditing in these companies. This research aims to address this gap by examining (i) how continuous auditing and the centralisation of purchasing functions affect the effectiveness of internal audits and (ii) how performance expectancy, facilitating conditions, effort expectancy and social influence affect internal auditors' intentions to adopt continuous auditing in non-financial companies in Saudi Arabia.

Vasarhelyi et al. (2012) have suggested that studies should employ the questionnaire approach to investigate the adoption of continuous auditing by internal auditors, because this method permits a larger sample size and facilitates generalisations. In addition, according to Siew, Rosli and Yeow (2020), the implementation of computer-assisted auditing techniques (CAATs) remains minimal in developing countries, highlighting the need for increased focus from both practitioners and academics. Furthermore, past studies have identified a significant gap in research concerning individual behavioural intentions towards the usage of CAATs by the internal auditors in developing countries (see, e.g., Al-Hiyari, Hattab & Al Said 2019; Awuah, Onumah & Duho 2022).

1.3 Research Objectives

The objective of this study is to examine the effects of continuous auditing and the centralisation of purchasing functions on internal auditing effectiveness in non-financial companies in Saudi Arabia, using resource-based theory. Additionally, this research aims to investigate the effects of performance expectancy, facilitating conditions, effort expectancy and social influences on internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia, utilising UTAUT. Specific research objectives are:

1. To investigate the effects of continuous auditing and centralising purchasing functions on the internal audit effectiveness in non-financial companies in Saudi Arabia.
2. To investigate the relationship between the independent variables (i.e., continuous auditing and centralising the purchasing functions) and the dependent variable (i.e., internal audit effectiveness) in non-financial companies in Saudi Arabia.
3. To examine the influence of performance expectancy, facilitating conditions, effort expectancy and social influences on internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia.
4. To investigate the relationship between the independent variables (i.e., performance expectancy, facilitating conditions, effort expectancy and social influences) and the dependent variable (i.e., internal auditors' intentions to use continuous auditing) in non-financial companies in Saudi Arabia.
5. To offer recommendations for non-financial companies in Saudi Arabia.

1.4 Research Questions

To accomplish the objectives of this study, the research questions were developed as follows:

> **Research question 1:** How do continuous auditing and centralising purchasing functions affect the effectiveness of internal audits in non-financial companies in Saudi Arabia?
>
> **Research question 2:** How do performance expectations, facilitating conditions, effort expectations and social factors influence internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia?

1.5 Contribution to Knowledge and Significance of the Study

This research contributes vital insights on both the effectiveness of internal audits and the determinants affecting the use of continuous auditing by internal auditors in non-financial companies in Saudi Arabia. Both practical and theoretical knowledge are enhanced by this research. Practically, this study illustrates the use two frameworks. The first framework, grounded in resource-based theory, examines the influence of continuous auditing and centralising purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. No previous research has investigated this impact within Saudi Arabian companies. The second framework, informed by UTAUT, explores the factors affecting internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia. There is a scarcity of studies addressing these factors with regard to internal auditors' practices within non-financial companies in Saudi Arabia.

In addition, this study contributes to theoretical knowledge by being the first study to use resource-based theory to investigate the influence of continuous auditing and centralising purchasing functions on the internal audit effectiveness in non-financial companies in Saudi Arabia. Therefore, this research is significant because it offers a theoretical foundation for future researchers to build upon. This study extends the literature on the factors influencing internal audit effectiveness in non-financial companies in Saudi Arabia.

Similarly, this research extends the literature by utilising UTAUT to examine the factors influencing internal auditors' intentions to adopt continuous auditing in non-financial companies in Saudi Arabia. The findings of this study are valuable not only for companies in Saudi Arabia but also for those in developing countries. Insufficient research has been conducted on the effects of continuous auditing and centralising purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. Additionally, there is insufficient research on the influence of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to adopt continuous auditing in these companies.

1.5.1 Theoretical Frameworks

As has been noted, this research engages resource-based theory to investigate the influence of continuous auditing and centralising purchasing functions on the internal audit effectiveness in non-financial companies in Saudi Arabia. Previous research has employed resource-based theory to examine various aspects of internal auditing. For instance, whereas Nasibah (2015) and Alkebsi and Aziz (2017) explored the application of resource-based theory in the context of internal auditing, Alqudah, Amran and Hassan (2019) examined the effectiveness of internal auditors through the lens of this theory. Prior studies in the strategic management literature have extensively adopted resource-based theory to evaluate performance (Newbert 2007). Indeed, resource-based theory is often regarded as an essential tool for assessing organisational performance (Newbert 2007), given that companies can achieve long-term competitive advantages by implementing strategies that successfully align their internal resources and capabilities (Barney 1991). Resource-based theory posits that an organisation's internal resources and capabilities are the primary drivers of its competitive advantage. According to this theory, a company's distinctive resources and capabilities are the principal determinants of its performance and competitive position within the market.

Additionally, this study builds on UTAUT, a theory developed by Venkatesh et al. (2003). UTAUT has been extensively utilised across various contexts to comprehend the acceptance and behaviours of technology usage. In the realms of internal auditing and continuous auditing, several researchers including Al-Hiyari, Hattab and Al Said (2019), Almagrashi et al. (2023), Gonzalez, Sharma and Galletta (2012), Mahzan and Lymer (2014) and Mokhitli and Kyobe (2019) have employed UTAUT. The UTAUT is an

encompassing theoretical framework developed to explain the determinants of user acceptance and usage behaviour towards IT. The theory posits that effort expectancy, social influence, performance expectancy and facilitating conditions are the primary constructs influencing behavioural intentions and use behaviours.

1.5.2 Ethics Approval

As per university regulations, an application ID: HRE22-152 for the ethical research involved people was sent to the Human Research Ethics Committee at Victoria University before data were collected. The Human Research Ethics Committee at Victoria University approved the application ID: HRE22-152 on 17 November 2022. This approval necessitates adherence in the study to the standards of confidentiality and informed consent.

1.6 Outline of the Thesis

This chapter has highlighted the significant role of internal auditing functions in companies, further outlining the research gap. Five research objectives were detailed in response to this gap. To achieve these aims of this research, two main questions were created. The contribution to knowledge and significance of this research were also outlined. An overview of the theoretical framework was provided and ethics approval was discussed.

Chapter 2 provides an overview for Saudi Arabia. Specifically, it details Saudi Arabia's location, formal language, population and economy. Additionally, it discusses how internal auditing has developed and the development and implementation of internal auditing in Saudi Arabia. In particular, it focuses on the role of the Saudi Organisation for Certified Public Accountants (SOCPA) in establishing accounting and auditing standards in Saudi Arabia, as well as outlining the establishment of the Institute of Internal Auditors in Saudi Arabia.

Chapter 3 provides a comprehensive review of pertinent literature. Factors that will be considered include accounting information systems, internal controls, CAATs, embedded audit modules (EAMs), generalised audit software (GAS), continuous auditing, performance expectancy, facilitating conditions, effort expectancy, social influence, internal audit effectiveness and centralising purchasing functions. Specifically, this

chapter outlines both how the implementations of accounting information systems are essential for organisations and the effects of such systems on continuous auditing. Also highlighted are the significance of strengthening internal controls in an IT environment and the role of internal auditors with regard to internal controls. Finally, it outlines the effects of internal controls on the adoption of continuous auditing as well as the factors that influences the adoption of continuous auditing.

Chapter 4 outlines the quantitative approach and theoretical frameworks of this study. It discusses the research conceptual frameworks used in the study, which are grounded in resource-based theory and the UTAUT developed by Venkatesh et al. (2003). Additionally, it discusses the strategy of this research, the research procedures and techniques, the sample size, procedures and data analysis as well as validity, reliability and ethics approval.

Chapter 5 provides the analysis of the primary data collected through an online questionnaire completed by 152 internal auditors and discusses the implementations of two multiple regression analyses, estimated using ordinary least squares (OLS) methods. The main objective of the analysis of the primary data of this study is to answer the main research questions. Additionally, it details the descriptive analysis and multivariate analysis of the research data.

Finally, Chapter 6 presents and discusses the findings of the analysis of this study data and Chapter 7 presents the conclusion of this research. These include the major findings on continuous auditing and centralising purchasing functions as well as the major findings on performance expectancy, facilitating conditions, efforts expectancy and social influence. Chapter 7 also outlines the contribution to knowledge of this study, research recommendations, research constraints and suggestions for future research.

1.7 Conclusion

There is a significant gap in empirical evidence regarding the effects of continuous auditing and centralising purchasing functions on the effectiveness of internal audits in non-financial companies in Saudi Arabia. Additionally, there is insufficient research on the influence of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to adopt continuous auditing in these companies. Specifically, this chapter has outlined pertinent research gaps, as well as the

research objectives, research questions, contribution to knowledge and significance of the study. Additionally, it described the main theoretical frameworks informing this study and ethics approval. The next chapter will provide an overview of the Kingdom of Saudi Arabia and the development of auditing, as well as the development of internal auditing in Saudi Arabia.

Chapter 2: Overview of the Kingdom of Saudi Arabia and the Development of Internal Audit in Saudi Arabia

2.1 Introduction

This chapter will focus on three main areas: an overview of the Kingdom of Saudi Arabia, the development of internal auditing and the development of internal auditing in Saudi Arabia. Specifically, it will provide an overview of the country's location, formal language, population and economy. Additionally, this chapter will discuss the development of internal auditing and explore the development of internal auditing in Saudi Arabia. This chapter will also outline the roles of SOCPA in establishing accounting and auditing standards in Saudi Arabia, as well as the Institute of Internal Auditors in Saudi Arabia.

2.2 The Kingdom of Saudi Arabia

The formal name of the country is the Kingdom of Saudi Arabia, although it is most commonly known simply as Saudi Arabia. With an area of about two million square kilometres, Saudi Arabia is located in southwestern Asia. Riyadh is the capital city of Saudi Arabia, boasting a population of over 7.82 million. Jeddah, on the other hand, is the second largest city with a population of over 4.94 million. According to the Worldometer elaboration of the latest United Nations data, the current population of Saudi Arabia is 36,194,112. Although the formal language is Arabic, some people in Saudi Arabia speak English well because English is taught at primary, middle and high schools and universities. Saudi Arabia accounts for around 20% of the global oil supply and is the largest producer and exporter of petroleum-based liquids worldwide (Shaahid, Alhems, & Rahman 2024). Saudi Arabia has the largest economy in the Middle East and the eighteenth largest in the world. Saudi Arabia's economy is based on oil; however, the Saudi Arabia government has decided to diversify the economy in Saudi Arabia. As a result, the Kingdom of Saudi Arabia has developed its Vision 2030 in April 2016 to develop the public services sectors such as the economy, health, education, infrastructure, recreation and tourism (Vision 2030 2016). Vision 2030 has three major principles: a vibrant society, a thriving economy and an ambitious nation (Vision 2030 2016).

2.3 The Development of Internal Auditing

In the business environment, auditors must comprehensively examine financial and non-financial data to provide assurance that a company's financial and non-financial statements are correct and not misleading. According to Higson (1997), the initial evolution of IT in auditing practice was in the 1970s and 1980s. Although companies may have considered the costs of IT and the effects of the usage of IT on the audit as preventing the implementation of IT systems within companies, the impact of IT on the audit can also raise the issue of a lack of auditors' skills to use the IT systems within companies. Nevertheless, researching the development of auditing, Porter, Simon and Hatherly (2008) have proposed that it was because of the use of IT within companies and its capacity to capture real-time data, that audits have shifted to continuous auditing. As Gasparotti and Gasparotti (2023) have put this, the use of IT has allowed internal auditing functions to transition from being a traditional compliance-based approach to a value-added audit strategy, particularly as concerns the capacity of auditing to mitigate risk, achieve targets and enhance efficiency in operations. That is, the use of IT has permitted accounting systems and processes to transition, resulting in the transformation of traditional auditing methods to continuous auditing (Wiegerinck 2019). As a result, both internal auditing and continuous auditing have emerged as key strategic components within firms (Gasparotti & Gasparotti 2023).

There are many different aspects of the auditing process and two classifications of the audit: the external audit (for external purposes) and the internal audit (for internal purposes). The external audit typically specified by external parties is carried by an independent specialist who is external to the company. External auditors do, however, generally conduct the audits of financial statements with the support of internal auditors (Christensen, L 2022). With regard to the law, the audit can be conducted by law or private and the private audit is required by the management or stockholders; the law audit is wanted for the external exporter (Millichamp 2002). In contrast, internal audits are typically conducted either by internal auditors who are working within the company to assess the company' internal controls or by someone who is external to the company and identified by management to complete the audit process (Porter, Simon & Hatherly 2008). There is a need for auditors to gain knowledge about the internal control operations within

the firm. Moreover, implementing independent affirmation of financial statements is provided by the external auditors (Simunic 1984).

According to Egbea et al. (2020), the purpose of internal auditing is to serve as a mechanism for verifying that all transactions, including financial as well as non-financial ones, are conducted in accordance with the established norms of the organisation. According to Al Zobi and Jarah (2023), internal audit is a process that protects resources from being misused, verifies the accuracy of business data and ensures compliance with relevant rules and regulations. Thus, the internal audit function is the part of the firm that assesses and examines the layout and process efficiency internal controls (Doyle et al. 2007; Krishnan 2005). As Al Zobi and Jarah (2023) put this, internal audit is a specific task that offers unbiased assurance and advisory services to enhance the functioning of an organisation. Internal audit is, thus, a deliberate and structured activity aimed at enhancing the operations of an organisation and providing added value through a methodical strategy (Institute of Internal Auditors 2017). It is a precautionary audit method that allows management to fix shortcomings in operations before deficiencies influence financial statements and weaken internal controls (Adams 1994).

Collier and Gregory (1996) have further stated that external auditors would have decreased work when internal controls have been appropriately reinforced by the internal auditors. That is, the implementation of internal auditing within a firm would reinforce the internal control operations, minimising the costs of external auditors. Overall, according to Jarah, Jarrah and Al-Zaqeba (2022), internal audits are a highly effective and efficient way to reduce the costs associated with operations and provide competitive advantages to the organisation. However, as Gasparotti and Gasparotti (2023) note, whereas top leadership aspires for internal auditors to enhance internal controls and risk management by adopting more responsibilities, those responsible for the internal audit function desire increased support from management to effectively complete their obligations.

Conversely, the growing usage of internal audit encourages external auditors to depend on the efforts of internal auditors to minimise their audit tasks (Schneider 1985). Internal auditors provide a great collaboration with the external audit. Goodwin and Yeo (2001) have, however, stated that the independence of the internal auditors is reliant on company structure. Some firms create an independent internal audit department within the firm that

completes audit tasks independently; in other firms, the internal audit is not independent and works as a management task. Internal audit has three major performances: ensuring corporate accountability, performing risk management and establishing internal controls. In contrast, external auditors are independent. The overall efficiency of the audit is enhanced by the amalgamation of the power of the internal and external audit. High audit efficiency is important because it enhances the efficiency of audit reports and minimises the danger of creating incorrect auditors' views (Goodwin-Stewart & Kent 2006).

According to Wiegerinck (2019), both internal and external audits carry the common objective of providing confidence regarding the accuracy and reliability of a company's financial statements and IT systems. The traditional audit provides confirmations of the financial statements of the organisation. Providing a confirmation of the organisation's financial statements requires knowledge about the continuous changes in how the organisation plans its operations. Auditors in traditional audit cannot, however, examine all transactions, meaning that the traditional audit is conducted by sampling. This can mean that mistakes and fraud remain undetected (Chan & Vasarhelyi 2011). The auditing process can be classified into three categories based on the objectives of the audit: audit of financial statement, operational audits and compliance audits (Arens & Loebbecke 2000; Porter, Simon & Hatherly 2008).

2.4 Development of Internal Auditing in Saudi Arabia

In the past, in Saudi Arabia, there was a little improvement in internal audit; however, lately, internal audit has evolved in Saudi Arabia. The first legislation in Saudi Arabia that required companies to prepare an audited financial statement for their shareholders was the *Companies Act 1965*. The *Certified Public Accountants Regulation 1974* was the first legislation to organise the profession of auditing in Saudi Arabia (Al-Twaijry et al. 2003). The rapid growth in both the number and size of companies in Saudi Arabia, together with the widespread adoption of IT, has led to an increased need for internal controls and monitoring (Al-Twaijry et al. 2003). The recent development of internal auditing in Saudi was the founding of the Institute of Internal Auditors, which facilitated the promotion of initiatives to foster internal audit (Al-Twaijry et al. 2003). These included the establishing of Institute of Internal Auditors chapters in Dhahran in 1982, in Jeddah in 1992 and Riyadh in 2000 (Al-Twaijry et al. 2003). In 1992, the SOCPA was founded. The SOCPA works for and is overseen by the Ministry of Commerce and

Investment in Saudi Arabia. The establishment and setting of the accounting and auditing standards in Saudi Arabia is the responsibility of the SOCPA. However, the SOCPA was not tasked with enhancing the internal audit process.

With reference to the establishing of Institute of Internal Auditors chapters, the Dhahran branch was established within the Aramco corporation, which are a government-owned entity in Saudi Arabia. The aims were to enhance the capacities of associates of the Institute of Internal Auditors and to oversee internal auditor examinations that would allow internal auditors in Saudi Arabia to be qualified as a certified internal auditor. In addition, the chapter supported good practice and distributed information to the public through newsletters (Al-Twaijry et al. 2003). A lack of resources and limitations on its working were seen as the main problems faced by the Dhahran chapter (Alzeban & Gwilliam 2014). Certified internal auditor examinations are, however, provided twice a year and have been since the Dhahran chapter was founded. These examinations are regarded as the primary advancement of internal auditing in Saudi Arabia.

The internal audit of the Saudi Arabia Airlines company, which the Saudi Arabia government owns, established the Institute of Internal Auditors chapter in Jeddah. Although the major objective of the Jeddah chapter is to improve the internal audit of Saudi Arabia Airlines, the chapter has extended its works to involve other corporations in its region. In 1994, the Jeddah chapter established links with King Abdulaziz University to increase Jeddah chapter members to include academics and students. As a result, the Jeddah chapter received an award for the biggest increase in worldwide Institute of Internal Auditors chapter membership (Al-Twaijry et al. 2003). The problems faced by the Jeddah chapter included its need for authorisation from the Saudi government to work as an official organisation in Saudi Arabia. The inability to attain this permission from the Saudi government led to the closing of the Jeddah chapter in 1997 (Al-Twaijry et al. 2003; Alzeban & Gwilliam 2014).

Recently, the government of Saudi Arabia agreed on a collaboration between SOCPA and the Institute of Internal Auditors. One aspect of this collaboration was to be the establishment of the Institute of Internal Auditors in Saudi Arabia (rather than the development of chapters of the international organisation). Consequently, the SOCPA established the Internal Audit Committee to assist in establishing the Institute of Internal Auditors in Saudi Arabia. The Internal Audit Committee submitted the proposal to

establish the Institute of Internal Auditors in Saudi Arabia in August 2009. SOCPA agreed to the proposal, which was then transferred to the Saudi government for ratification. In 2011, the Saudi government approved a resolution to create the Institute of Internal Auditors in Saudi Arabia (Alzeban & Gwilliam 2014).

2.5 Conclusion

This chapter has outlined the location, formal language, population and economy of the Kingdom of Saudi Arabia. Also discussed has been the development of internal auditing and the development of internal auditing in Saudi Arabia, the establishment of the SOCPA, its rules for creating the accounting and auditing standards in Saudi Arabia and the establishment of the Institute of Internal Auditors in Saudi Arabia. The next chapter will present the literature review that underpins and informs this research study.

Chapter 3: Literature Review

3.1 Introduction

As has been outlined, this study examines the effects of continuous auditing and centralising purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia, employing resource-based theory. Additionally, using the UTAUT, this research explores how performance expectancy, facilitating conditions, effort expectancy and social influences inform internal auditors' intentions to adopt continuous auditing. This chapter provides a comprehensive review of the literature encompassing accounting information systems, internal controls, CAATs, EAMs, GAS, continuous auditing, the UTAUT factors (i.e., performance expectancy, facilitating conditions, effort expectancy and social influence), internal audit effectiveness and the centralising of purchasing functions.

3.2 Accounting Information Systems

Because many businesses are growing increasingly reliant on the use of technology, digital document management systems and integrations and information systems have become more widespread (Abu-Musa 2008). IT plays a crucial role in designing, implementing and maintaining various controls that support and oversee the business operations of an organisation (Abu-Musa 2008). Whereas, in the past, companies would record, collect and report financial data on a paper basis, many companies now utilise accounting information systems (Ariwa & Eseimokumoh 2008). Accounting information systems are a mechanism that companies use to record and collect data and report financial information; they provide unique data to the users of financial statements (Ariwa & Eseimokumoh 2008).

The utilisation of real-time accounting allows for the establishment of real-time assurance (Flowerday et al. 2006). That is, accounting information systems and processes have transitioned, resulting in the transformation of traditional auditing methods to continuous auditing (Wiegerinck 2019). Because, as noted, IT integrates all business processes (Alali, Grant & Miller 2008), and because of the increased usage of IT within the companies (Bierstaker, Burnaby & Thibodeau 2001), companies are moving from paper to IT for recording and collecting data.

The International Standard on Auditing 401 (2002) states that the auditing procedures for both internal and external auditors have undergone significant transformations in response to the use of IT systems. Al Zobi and Jarah (2023) have also found a positive relationship between accounting information systems and internal audit. In turn, a study conducted by Abu-Musa (2008) has found that internal auditors must improve their proficiency in computerised information systems to strategise, oversee, manage and evaluate jobs. Abu-Musa (2008) have argued that the capacity of internal auditors to conduct IT assessments is influenced by various aspects, such as the audit aims, the type of industry, the total number of IT audit professionals in the internal auditing function and the presence of new computer information systems.

According to Al Zobi and Jarah (2023), implementing an accounting information system is crucial for the effective functioning of an organisation, given that such a system improves the gathering and organisation of significant volumes of organisational data. Indeed, according to Abu-Musa (2008), the internal audit function has broadened its focus from assessing and appraising the efficiency of internal controls to offering advisory services in the field of IT and systems advancements. As Al-Taee and Flayyih (2023) have explained, the internal audit function of an organisation additionally needs to confirm that the accounting information system collects all relevant economic transactions and ensures the accurate transformation and translation of financial data. A study conducted in the public sector in Indonesia by Wibowo et al. (2023) has found that accounting information systems have a positive influence on accountability and the performance of businesses. As they describe in this study, accounting information systems are utilised to gather, analyse and present information pertaining to the financial aspects of a business event. According to Abu-Musa (2008), IT enhances the precision and swiftness of transactions processed and can result in competitive benefits for several businesses with regard to operations effectiveness, decreases in expenses and the mitigation of human mistakes.

The increased use of IT within companies is primarily driven by the rapid evolution of IT capabilities and the readiness of companies to adopt and implement software that enhances the efficiency of audit processes (AI-Fehaid 2003). There are, however, significant differences between IT-based accounting information systems and manual accounting systems. Auditors must remain aware of these differences when performing their audit tasks, even though the audit objectives remain the same. The differences

between IT-based accounting information systems and manual accounting systems are outlined as follows.

There are several risks associated with the usage of IT, including misleading data processing, insufficient data processing and a lack of data saving (Beard & Wen 2007). Although errors in manual accounting systems are more frequent compared with those in computerised accounting systems (Gray & Manson 2008), systematic mistakes can be found in accounting information systems (Rezaee & Reinstein 1998). Bell et al. (1998) have, for instance, argued that computerised systems have a greater incidence of fraud and mistakes than manual systems. Abu-Musa (2008) has supported this view, noting that accounting information systems could increase certain risks. In some respects, manual accounting systems are more flexible than their computerised counterparts (Ariwa & Eseimokumoh 2008). That is, because accounting information systems operate strictly in accordance with their programming, manual accounting systems offer employees more control over data (Gray & Manson 2008). Furthermore, the lack of documentation in many computerised processes can pose challenges for auditors tracking specific transactions (Ariwa & Eseimokumoh 2008).

Cosserat (1999) has also noted that fraud or mistakes are less likely to be detected in accounting information systems compared with manual accounting systems. This is because of the potential for information within accounting information systems to be altered without detection (Bierstaker, Burnaby & Thibodeau 2001). However, Al Zobi and Jarah (2023) have argued that implementing an accounting information system can assist internal audit in preventing errors and fraud. Accounting information systems generate unique and extensive data, surpassing the capabilities of manual accounting systems (AI-Fehaid 2003). According to this view, accounting information systems provide efficient oversight of company operations, adding significant value to companies (AI-Fehaid 2003).

The International Standard on Auditing (ISA) 315 (2009) states that auditors need to gain an understanding of the information systems related to financial reporting, including the processing of both manual and IT systems. This understanding should encompass recording transactions in accounting books (International Auditing and Assurance Standards Board 2018). However, because accounting information systems provide real-time data, this can make it challenging for auditors to rely on traditional manual audit

methods in a real-time information environment (Cosserat 1999). Abu-Musa (2008) has, therefore, noted that auditors must possess adequate expertise in IT to effectively organise, oversee, manage and evaluate their tasks. The increasing use of IT within companies has pushed auditors to perform continuous audits and real-time reporting to improve the credibility and reliability of the auditing process in an IT environment (Alles, Kogan & Vasarhelyi 2002).

The structure of authorisation within accounting information systems must be well-prepared and appropriate to reduce errors and eliminate conflicts of interest among employees. In addition, an effective authorisation structure can prevent unlawful changes by employees (Romney & Steinbart 2009). Auditors require full authorisation to access enterprise data to perform their audit tasks effectively. Al Zobi and Jarah (2023) have argued that internal audits have access to the organisational structure and all procedures followed.

3.3 Internal Controls

A great deal of literature has been published on internal controls and the audit process within organisations. There is also an increasing demand for organisations to enhance their internal controls, with this trend driven by a variety of factors and stakeholders (Christensen, L 2022). Some researchers have focused on the impact of IT on the accounting process and the internal controls within companies (AI-Fehaid 2003; Gasparotti & Gasparotti 2023; Rezaee et al. 2002; Wibowo et al. 2023). In particular, it has been identified that auditors need to develop significant skills to effectively evaluate internal controls within an IT environment (AI-Fehaid 2003).

In response to a series of significant business scandals, such as WorldCom and the Enron instances in the USA, the *Sarbanes-Oxley Act 2002* was established. Section 404 of the *Sarbanes-Oxley Act* outlined the processes for evaluating internal auditing and for implementing internal auditing systems that are efficient and effective (Lin & Wang 2011). According to Stoel, Havelka and Merhout (2012), companies with weaknesses in their IT internal controls tend to show lower incomes and profits compared with companies with strong IT internal controls. A lack of internal controls can result from deficiencies in accounting information systems, including inadequate system security, access controls, application controls and maintenance, as well as conflicts of

responsibility (Alali, Grant & Miller 2008). According to Gasparotti and Gasparotti (2023), internal auditors and company leadership believe that internal auditing provides value in two crucial ways: by (i) objectively assuring that important risks are adequately handled and (ii) guaranteeing the successful operation of both internal controls and risk management. Thus, as Wibowo et al. (2023) point out, internal control systems and accounting information systems positively influence the performance of businesses. According to Gasparotti and Gasparotti (2023), internal auditing creates value for companies by guaranteeing their efficient internal control systems are well-functioning.

A 2007 study carried out in the United Kingdom and Ireland by the Institute of Internal Auditors and PricewaterhouseCoopers found significant concerns regarding IT risks among chief managers and internal audit chiefs. According to this study, 74% of chief managers identified IT risks as a major concern, perceiving them to be higher than before, and 68% of internal audit chiefs believed that their boards did not fully understand the IT risks they faced. This study further identified business systems risk, such as poor change control over enterprise resource planning (ERP) systems, as one of the top six IT risks, as cited by 59% of respondents. Additionally, the highest-ranked IT risk was related to IT projects, with 79% of respondents indicating concerns about the failure to deliver benefits or stay within budget. Other IT risks identified included data security and privacy (60%), IT governance (63%), IT resilience and continuity (69%) and data quality (49%). These concerns reflect the growing complexity of managing IT environments and the critical need for robust controls to protect against potential vulnerabilities. A study conducted by Grant, Miller and Alali (2008) also found that companies with IT control deficiencies are prone to broader internal control issues. They argued that ineffective IT controls affect the entire internal control framework of the company.

A study conducted by AI-Fehaid (2003) investigated the influence of IT on audit risks in Saudi Arabia and found several weaknesses in organisations using accounting information systems. These weaknesses included the use of inappropriate software, insufficient staff skills to operate in an IT environment and deficiencies in internal controls within the companies. The escalating use of IT in enterprises has heightened concerns over IT-related risks, making it essential for auditors to understand the influence of these systems on internal controls within organisations. The internal control procedures utilised in accounting information systems differ significantly from those employed in manual accounting systems (Auditing Standards Executive Committee 1974).

Fadzil et al. (2005) have noted that internal auditing has experienced significant changes that have broadened its range of activities, allowing internal auditing to provide more substantial benefits to the organisation. According to Egbea et al. (2020), conformity with internal control and internal auditing are essential prerequisites for the successful functioning of companies. According to Masharipov et al. (2023), there are external and internal factors that affect the internal controls systems. They argued, for example, that the ongoing monitoring is facilitated by well-structured internal control systems, thus regarding internal controls as significant for internal audit. Implementing accounting information systems in firms has also been seen to improve the reliability of internal controls (AI-Fehaid 2003). There is significant emphasis on the effectiveness of internal controls within companies and a strong relationship appears between the usage of IT and these controls effectiveness. It is, therefore, unsurprising that audit standards require auditors to evaluate both the IT used by organisations and the efficiency of their internal controls.

As has been noted, the main function of internal auditing is to enhance the effectiveness of a business's risk management, governance procedures and internal controls (Institute of Internal Auditors 2017). However, Arena and Sarens (2015) have argued that, despite the perception of internal audit department being a significant contributor, internal auditing typically lacks a clearly defined position in connection to internal control. According to Egbea et al. (2020), the primary advantage of an efficient internal audit function is its ability to prevent individuals responsible for managing a company's resources from engaged in unethical activities that have a detrimental influence on the success of the business.

The audit committee depends on internal audit efforts to establish strong internal controls and ensure an improved standard of financial reporting, as well as to uphold compliance with regulations (Eulerich, Kremin & Wood 2019). Gasparotti and Gasparotti (2023) have stated that the upper levels of management depend on internal audit efforts to enhance internal controls, mitigate risk and optimise processes. They have argued that by assessing and identifying areas of weakness within the internal control systems, internal auditors can support the company's management by facilitating improved interactions. Thus, internal auditors play a crucial role in providing support to management in maintaining the efficiency of a firm's internal control system. A study conducted by Oussii and Boulila Taktak (2018) also found that the effectiveness of internal controls has

a positive influence on the follow-up process and effectiveness of internal auditing. Furthermore, the increased use of IT by organisations requires internal auditors to continuously examine controls and assess the extent of their own reliance on internal controls within the enterprise. Auditors must also determine whether they need IT audit experts to assist in understanding these controls.

To achieve performance efficiency, according to Egbea et al. (2020), it is essential to establish a well-structured internal audit department that plays a pivotal role in ensuring the efficient use of resources. Egbea et al. (2020) have thus argued that it is essential to monitor performance indicators to assess the attainment of aims against actual results. Although the internal audit is a crucial aspect in assessing internal control, there is limited research on its effects (Christensen, L 2022). A study conducted in Malaysia by Fadzil et al. (2005) found that the impartiality of internal auditors has a significant effect on the internal control system effectiveness. They further argued that the professional competency of internal auditors has a major effect on the oversight of the internal control system.

According to the International Standard on Auditing 401 (2002), the use of computer information systems may affect audit procedures, specifically in (i) obtaining a comprehensive comprehension of the internal controls and accounting systems, (ii) evaluating the inherent risk and control risk for the risk assessment and (iii) designing and implementing tests of control and substantive processes. Oussii and Boulila Taktak (2018) found that the efficacy of internal audits is a pivotal factor for determining the quality of internal controls and the reliability of financial data reporting. They have argued that improving the effectiveness of internal audits by providing the necessary technical proficiency would enhance internal control efficiency. This improvement in the internal controls would arguably increase the effectiveness of financial reports (Oussii & Boulila Taktak 2018).

A study conducted by Egbea et al. (2020) in Nigeria found a positive correlation between the viability of organisations and their compliance with internal controls. They argued that the increased need to adhere to regulations and conduct internal audits is the result of the growing number of company failures from inadequate internal controls and refusal to comply with ethical standards.

Researchers have been increasingly advocating for the crucial importance of internal controls in guaranteeing the dependability of the procedure for reporting financial information (Oussii & Boulila Taktak 2018). According to L. Christensen (2022), firms have typically sought the help of an external auditor for guidance on internal controls. However, Arena and Sarens (2015) have argued that the internal controls and managerial reports are roles of the internal audit department. It has also been noted that organisations construct computer systems that are becoming more intricate (Abu-Musa 2008). The increased usage of IT within companies is also enhancing the significance of the internal controls (Rezaee & Reinstein 1998). This increased significance, in turn, requires auditors to understand the internal controls well enough to design auditing tasks and identify weaknesses to reduce the risks of fraud or providing misleading information, as well as strengthen the internal controls. Thus, a significant portion of the audit is focused on evaluating the layout and workable efficiency of the internal controls in the enterprise (Doyle, Ge & McVay 2007; Krishnan 2005).

> Internal control is a process effected by plan management and other personnel, and those charged with governance, and designed to provide reasonable assurance regarding the achievement of objectives in the reliability of financial reporting. Your plan's policies, procedures, organizational design and physical security all are part of the internal control process. (American Institute of Certified Public Accountants [AICPA] 2014, p. 4)

Instances of noncompliance with continuous audit tools and procedures must be promptly communicated to internal auditors, management or external auditors as appropriate for the organisational circumstances through alarms or error notifications (Alles et al. 2008). According to the Public Company Accounting Oversight Board (PCAOB 2007a), there are five elements of internal controls: control environment, oversight, risk evaluation, information and communication and, finally, monitoring activities. The management is responsible for designing the internal controls (Porter, Simon & Hatherly 2008) and the evaluating their effectiveness over the financial statements (PCAOB 2007a). Auditors are tasked with monitoring whether the management has established appropriate internal controls over the financial statements (Flowerday & Von Solms 2005). The efficiency of the internal controls can enhance the audit process (Porter, Simon & Hatherly 2008). ISA 315 (2009, p. 283) has defined the value of the internal controls to auditors (para. 12 & A42) and proposed that:

> An understanding of internal control assists the auditor in identifying types of potential misstatements and factors that affect the risks of material misstatement, and in designing the nature, timing and extent of further audit procedures.

Overall, the Auditing Standards require auditors to obtain a substantial comprehension of the internal controls to both evaluate the risks of errors or providing misleading information and design the audit tasks. There is a need for the auditors to understand the internal controls of their companies to increase the efficiency of the audit procedures (Beard & Wen 2007). International Standard on Auditing 620 (2007, p. 735) proposes that an auditor's expert can assist (para. 7 & A4) 'in obtaining an understanding of the entity and its environment, including its internal controls'. The standard 620 further clarifies that 'an auditor's expert may be either an auditor's internal expert (who is a partner3 or staff, including temporary staff, of the auditor's firm or a network firm), or an auditor's external expert' (International Standard on Auditing 2007, p. 732).

The primary reason for business failure is the weakness of internal controls. Audit standards mandate that auditors must render an assessment regarding the effectiveness of the internal controls inside the organisation (Hoitash, Hoitash & Bedard 2009). For general companies, auditors need to gain substantial evidence regarding the efficiency of the internal controls and to identify whether there are weaknesses within the internal controls or not. Internal controls have the objective of preventing, identifying, and rectifying errors and irregularities, ensuring the reliability and accuracy of financial reporting and enhancing operational efficiency (Rezaee, Elam & Sharbatoghlie 2001). When internal controls operate efficiently, auditors can be reasonably assured that errors and irregularities will be detected and prevented by the system. Consequently, both management and auditors can have confidence that the financial statements are devoid of significant errors or fraudulent. In other words, according to Wiegerinck (2019), internal control is a mechanism that enhances the resilience of organisations.

When an enterprise has efficient internal controls, the likelihood of risk is reduced. There are two groups of internal controls in the accounting information systems: comprehensive controls and implementation controls. Auditors are required to perform compliance examinations, which include thorough assessment of both of these groups of controls (Porter, Simon & Hatherly 2008). PCAOB Auditing Standard No. 5 states that auditors must conduct two examinations of internal controls: an assessment of the design

effectiveness and an evaluation of the operational effectiveness of the internal controls (PCAOB 2007b, paras. 42–45). Insufficiency in either the design or the operational effectiveness of internal controls can impair their effectiveness (Porter, Simon & Hatherly 2008).

The primary purpose of examining the design effectiveness of internal controls is to evaluate the ability of internal control systems in preventing and detecting errors. In contrast, examining the operating effectiveness of internal control systems assesses whether the controls are functioning as intended (Wolfe, Mauldin & Diaz 2009). When there is a lack of internal controls, auditors must conduct extended examinations and ensure the absence of errors or fraud in the financial statements (Porter, Simon & Hatherly 2008).

In the USA, AICPA (1974) has noted in its Statement on Auditing Standards (SAS) No. 300 that auditors must have a comprehensive comprehension of internal control systems to design audit tasks efficiently. Once auditors have acquired this comprehension, they must evaluate the internal controls and subsequently evaluate the risk of material misstatements or errors in the financial data (Millichamp 2002). In addition, they are required to plan and execute control tests (Millichamp 2002). Once auditors determine the level of reliance on internal controls, they can plan the audit tasks and define the scope of audit procedures (Porter, Simon & Hatherly 2008).

Both internal and external auditors, as well as accountants within enterprises, can assist with internal control systems. The PCAOB Auditing Standard No. 5 (PCAOB 2007b) also states that Chief Financial Officers and Chief Executive Officers are required to evaluate the efficiency of internal control procedures in relation to financial reporting. For large companies, external auditors must assess management's evaluation of internal controls (Norman, Payne & Vendrzyk 2009). This assessment helps external auditors identify and mitigate the risk of errors or fraudulent activities and informs management and the auditing committee about the strengths and weaknesses of the internal controls within the company. Understanding the internal controls within companies can help auditors detect weaknesses and inform management about them (Porter, Simon & Hatherly 2008). Whether companies use manual accounting systems or accounting information systems, auditors need to gain sufficient understanding of these systems to perform their audit tasks effectively (Cosserat 1999).

3.4 Computer-Assisted Auditing Techniques

CAATs use computer technology to facilitate and enhance the auditing process and implement various audit methodologies (Debreceny, Lee et al. 2005). The CAAT concept was first mentioned in 1974 by AICPA in their publications (Awuah, Onumah & Duho 2022). As has been noted, CAATs refer to a variety of techniques and software that aid auditors to execute control and confirmation tests, analyse and validate financial statements and perform ongoing monitoring and auditing (Lin & Wang 2011).

Even though auditors fully understand the advantages of using CAATs, past studies have found that their implementation in internal audits has not increased as expected (Li et al. 2018). CAATs can enhance the auditing quality and assist auditors in overcoming the challenges posed by companies' use of IT (Curtis & Payne 2008; Janvrin, Bierstaker & Lowe 2008; Lin & Wang 2011; Pedrosa, Costa & Aparicio 2020; Samagaio & Diogo 2022; Vinten 2000). Some literature refers to the CAATs as continuous auditing tools and techniques (Flowerday, Blundell & Von Solms 2006). Test data, parallel simulations, integrated test facilities, EAMs and GAS are commonly used forms of CAATs (Braun & Davis 2003; Coderre 2015).

Even though the cost of implementing CAATs is high, it reduces the overall cost of audit work within a company by enhancing productivity and minimising errors in the audit process (Serpeninova, Makarenko & Litvinova 2020). One of the most significant advantages of using CAATs is the reduced time needed for auditing, which increases audit efficiency. A study conducted by Awuah, Onumah and Duho (2022) in the internal audit departments of private and state-owned enterprises in Ghana found, for instance, that the implementation rate of CAATs among internal audit departments was relatively high. They found that the complexity of CAATs is not perceived as a hindrance to using them. This was despite these tools necessitating specific expertise and knowledge before they can be used successfully.

According to Smidt et al. (2019), internal auditors could utilise CAATs to focus on transactions that may involve fraudulent activities. Samagaio and Diogo (2022) also conducted a study with Portuguese internal auditors in private and public organisations to investigate the impact of CAATs. They found that the utilisation of CAATs by internal auditors has a significant and favourable effect on the detection of fraudulent activities.

They argued that the use of CAATs by internal auditors increases the efficiency of the internal audit performance, noting that using these techniques enhanced internal audits by reducing fraud risks. They found that internal auditors in Portuguese private and public organisations use CAATs at a moderate level. In contrast, the Institute of Internal Auditors Research Foundation (see, e.g., Araj 2015) found that larger internal audit departments typically assume greater responsibilities in preventing and detecting fraud compared with smaller units.

Another study conducted in Portugal by Pedrosa, Costa and Aparicio (2020) found that the usage of CAATs was primarily determined by their perceived usefulness, facilitating conditions, effort expectancy and numbers of auditors. Mahzan and Lymer (2014) found that GAS was the prevailing CAAT utilised by internal auditors in selected companies in the United Kingdom and Malaysia. Because many companies use IT to support their business processes and enhance their operations, this increases the demand for CAATs (Serpeninova, Makarenko & Litvinova 2020).

According to Al-Hiyari, Hattab and Al Said (2019), CAATs offer numerous benefits to internal auditors. Awuah, Onumah and Duho (2022) have noted that CAATs assist auditors in performing tests and analytic processes efficiently, increasing the accuracy of audit tests and providing cost efficiency. The Institute of Internal Auditors (2017, p. 24) describes technology-based techniques as 'any automated audit tool, such as generalised audit software, test data generators, computerised audit programs, specialised audit utilities, and computer-assisted audit techniques'.

CAATs provide automated tests for audit tasks, decreasing the time required for audit processes and increasing the accuracy of CAATs' processing results (Auditing Standards Board 2001). SAS No. 94 declared that auditors must employ CAATs when examining the automation of internal controls in specific types of IT systems (Cerullo & Cerullo 2003). According to Samagaio and Diogo (2022), internal auditors' performance improves when they use CAATs. Prior research has, however, discovered that the size of the organisation determines the adoption of CAATs (Daoud et al. 2021; Meredith et al. 2020). Daoud et al. (2021) argue, for instance, that there was an important association between the usage of CAATs and organisational size, insofar as using these techniques in small organisations is often seen as not economically valuable (Meredith et al. 2020).

There are some disadvantages to implementing CAATs. These include the high cost of implementation, the time required to download systems and obtain client permission, inadequate employee skills and issues with the compatibility of different software (Awuah, Onumah & Duho 2022). In general, auditors possess low-level IT skills (Salijeni, Samsonova-Taddei & Turley 2019) and many studies indicate that there is a need for further development in IT training for auditors (Shihab et al. 2017). Indeed, according to Serpeninova, Makarenko and Litvinova (2020), one of the most significant hurdles to implementing CAATs is understanding the complicated technology, a need that requires the development of IT skills among auditors. The Institute of Internal Auditors Standards (2017, p. 7), Standard 1230: Continuing Professional Development, has emphasised that 'internal auditors must enhance their knowledge, skills, and other competencies through continuing professional development'.

Samagaio and Diogo (2022) have suggested that for efficient internal audits, internal auditors must possess sufficient skills and have available audit instruments, such as CAATs. Technology is viewed as a powerful tool for decision support (Meredith et al., 2020). Serpeninova, Makarenko and Litvinova (2020) have argued that auditors cannot perform their work manually because of the rapid growth of IT. According to Samagaio and Diogo (2022), technology can improve the effectiveness of organisations and help them become more sustainable.

ISA 300 states that auditors must review the influence of IT on auditing approaches, the availability of data and the potential use of CAATs when designing and planning the audit (International Auditing and Assurance Standards Board 2012). CAATs assist auditors in performing monitoring and affirmation exams, investigating and validating financial statements and conducting ongoing control and auditing (Lin & Wang 2011). Lin and Wang (2011) have also stated that using CAATs in auditing can enable auditors to be more autonomous and less dependent on others.

Internal auditors face numerous challenges, including a high incidence of fraud. Studies estimate that organisations globally lose about 5% of their annual revenues from fraud, resulting in a significant economic burden worldwide (Association of Certified Fraud Examiners 2020). According to questionnaires conducted among executives from 459 public companies and state and government agencies, '75 percent of the organisations experienced fraud in the prior 12 months' (Smith & Warren 2006, p. 1). According to Yu

and Rha (2021), accounting fraud has a profoundly negative effect on shareholders and can threaten an organisation's long-term sustainability. Consequently, 'regulatory requirements in auditing are increasing with the rate of fraud to boost investor confidence' (Hazar 2021) and organisations plan to implement new methodologies to address and overcome incidences of fraud (Smith & Warren 2006). The efficient use of CAATs can help reduce the incidence of fraud (Samagaio & Diogo 2022).

3.5 Embedded Audit Modules

According to Ni (2021), confronted with the effects of fast-paced advancements in IT and globalisation as well as the increasing demands of stakeholders, internal auditing in businesses is presented with problems. The significant component for the efficient implementation of continuous auditing is the EAM (Shiue, Liu & Li 2021).

According to Groomer and Murthy (2018), EAMs are an oversight mechanism integrated within software and supported by the system for managing databases that offer continuous auditing of a specific accounting system. According to Debreceny, Gray et al. (2005), the effective utilisation of EAMs requires a thorough examination of auditing, technical expertise and business operations. Owning and controlling the EAM code are significant issues in this context and auditors may require the assistance of the client's technical personnel to implement the EAM (Debreceny, Gray et al. 2005). Further, EAMs had limited adoption in the past as a result of insufficient maintenance and improvement (Debreceny, Gray et al. 2005).

By incorporating ERP-compatible software and enhancing the advantages of users' systems, EAMs have emerged as an increasingly common continuous auditing tool for companies (Shiue, Liu & Li 2021). Groomer and Murthy (2018) support this, noting that EAMs are examples of continuous auditing tools that provide ongoing oversight of the processing of transactions. EAMs are CAATs that enable ongoing monitoring of accounting information systems (Debreceny, Gray et al. 2005). According to Ni (2021), however, prior planning is necessary at the outset of the computer system architecture to incorporate an EAM. It is imperative for the audit department to actively participate in the comprehensive planning and design of the system, namely by explicitly delineating the audit prerequisites throughout the auditing stage of the system (Ni 2021).

EAMs are integrated into software programs specifically developed to continuously collect audit-related data, providing a comprehensive test for every transaction completed throughout the year (Groomer & Murthy 2018). According to Debreceny, Gray et al. (2005), EAMs inside an ERP setting have the capability to oversee a diverse array of controls, operations and transactions. According to Handoko, Lindawati and Mustapha (2020), EAMs involve examining an application's internal logic directly.

According to Groomer and Murthy (2018), the utilisation of EAMs in programs may have a negative effect on system efficiency. Mohrweis (1987), however, conducted a study and found that EAMs are effective techniques for conducting ongoing audits of sophisticated computer-based systems. A study conducted by Reeve (1984) in Australia found that extensive utilisation of EAMs was not observed across systems of varying sizes. However, participants in Reeve' study anticipated an increase in the utilisation of EAMs, especially for extensive systems.

There is little data within the accounting and dealer sectors regarding the precise level of demand for EAMs (Debreceny, Gray et al. 2005). The broad adoption of EAMs depends on the characteristics of advanced EAMs (Debreceny, Gray et al. 2005). According to Shiue, Liu and Li (2021), EAMs are among the most widely used continuous audit systems for many companies; they found that EAMs are considered an ideal solution for continuous auditing. An efficient continuous auditing strategy can include the use of EAMs, which can increase the efficiency of audit processes (Groomer & Murthy 2018). EAMs provide a comprehensive monitoring system. According to Groomer and Murthy (2018), EAMs are auditing instruments designed to provide compliance testing and substantive testing.

Handoko, Lindawati and Mustapha (2020, p. 227) defined EAMs as 'a technique in which one or more specific program modules are embedded in an application to record separately a series of transactions that have been determined into a file that will be read by the auditor'. According to Ni (2021), EAMs consistently track and archive crucial audit data. They enable the real-time monitoring of all transactions and facilitate the implementation of either weekly or monthly tracking protocols. According to Ni (2021), internal auditors need to improve their expertise and proficiency and prioritise the utilisation of IT in the auditing process.

According to Groomer and Murthy (2018), advancements in software and hardware can greatly enhance the use of EAMs on an ongoing basis, even in huge systems. According to Debreceny, Gray et al. (2005), clients must be willing to incur substantial expenses for the development of EAM solutions in their organisations. EAMs are included in the program that implements an audit task. EAMs transfer exam outcomes to the auditors. The main reason auditors use EAMs is to identify unusual transactions for substantive examination and to monitor operations (Debreceny, Gray et al. 2005).

There are visible benefits to using EAMs. Unlike integrated test facilities and test data, EAMs allow auditors to continually test and determine uncommon transactions in their assessments (Arens & Loebbecke 2000). Additionally, EAMs include reporting operations that inform auditors through various methods such as emails and program reports (Kuhn & Sutton 2010). One of the key benefits of using EAMs is that they capture and report control infringements and material errors in real-time, which minimises the scope of compliance testing (Groomer & Murthy 2018). Furthermore, EAM systems are capable of detecting and recording all transaction failures, providing significant testability (Groomer & Murthy 2018). According to Groomer and Murthy (2018), the use of EAMs in a database environment is significant because they describe how control infringements and security issues can be handled.

In contrast, some problems related to the use of EAMs have been recognised in the literature. As noted, the implementation of EAMs requires extensive participation by auditors with program designers during the creation stage of the corporation's program. However, information systems are usually developed before the auditing firm begins its tasks, so auditors infrequently participate in the program design stage (Chou, Du & Lai 2007).

There are also some disadvantages to implementing EAMs. These include the need for knowledge in software, applications and control environments to use them efficiently (Groomer & Murthy 2018). In addition, the collaboration of clients is essential for implementing EAMs (Groomer & Murthy 2018). The participation of the auditing department in the entire planning and design process for incorporating an EAM system into the system is of utmost importance (Ni 2021). Additionally, EAMs are not feasible in situations when the client system being targeted is unreliable (Groomer & Murthy 2018). The need for auditors to participate extensively with program designers in building

EAMs may also conflict with the desired independence of external auditors (Alles et al. 2002; Chou, Du & Lai 2007; Kuhn & Sutton 2010). External auditors can also have design and maintenance difficulties when dealing with EAMs (Kuhn & Sutton 2010).

EAMs may require significant changes to the corporate system, which may lead to organisational resistance (Kuhn & Sutton 2010; Murthy & Groomer 2004). Implementing EAMs can affect the processing speed of the corporate system (Braun & Davis 2003; Debreceny, Gray et al. 2005; Murthy & Groomer 2004). This can require auditors to operate the modules intermittently, reducing their online efficiency (Groomer & Murthy 2018. Debreceny, Gray et al. (2005) have noted that although this barrier can be mitigated by adding suitable software, this entails additional costs. They have also found that auditors need extensive technological skills to effectively use EAMs, which is another disadvantage.

Although the corporation may be concerned about auditors accessing their systems and making changes to systems or the performance of EAMs, auditors also have fears about the risks of making such changes (Kuhn & Sutton 2010). The danger to corporate systems is significant given the high costs associated with system damages (Kuhn & Sutton 2010). For instance, Wal-Mart has a damage responsibility agreement with their partners, holding them liable for all costs and damages to Wal-Mart's systems in their ecommerce interactions (Kuhn & Sutton 2010). To address these concerns, options such as EAMs ghosting and monitoring control layer have been proposed (Kuhn & Sutton 2010).

Implementing EAMs ghosting allows for the utilisation of EAM benefits while maintaining the audit functions distinct from the organisation's live system, enabling easier implementation, operation and maintenance (Kuhn & Sutton 2010). Ghosting encompasses the duplicate of the whole system on a different apparatus, covering its information and systems setting on a real-time basis; because there is a ghosted duplicate, there are no dangers of affecting transactions happening within the systems (Kuhn & Sutton 2010). Flowerday and Von Solms (2005) have advised that these instruments are particularly appropriate for large corporations and high-rate applications with complicated IT systems, such as banks and financial service companies.

3.6 Generalised Audit Software

GAS is consistently found by internal auditors to be the preferred and most commonly utilised CAAT, as indicated by multiple research studies (Coderre 2015; Mahzan & Lymer 2014; Smidt et al. 2019). According to Smidt et al. (2019), GAS is a commonly utilised form of CAAT that internal audit functions employ to assess controls. GAS has the ability to browse, analyse, sort, summarise, stratify, sample and do computations (Mujalli & Almgrashi 2020). Using technology-based tools in auditing techniques will enhance the level of accuracy of the auditing (Smidt et al. 2019). GAS enables auditors to analyse and audit data from multiple applications (Bradford et al. 2020) and retrieve data from many sources, including documents and data bases (Coderre 2015).

GAS is specifically tailored for auditors and is easily navigable within Windows operating systems (Arens & Loebbecke 2000). It aids in data analysis to support audit tasks (Ahmi & Kent 2013), allowing auditors to efficiently organise and arrange data and perform targeted procedures, such as analysis, sorting, summarising, stratifying, estimating and conversion. It further enables the audit of entire data populations rather than just samples (Ahmi & Kent 2013). Stakeholders are interested in innovative approaches, such as GAS (Awuah, Onumah & Duho 2022). The operations conducted by specialised audit software encompass data classification, data requests, sample extraction, statistical analysis, pivot table generation, identifying missing sequences and duplicate transactions, crossover and computations, among other tasks (Awuah, Onumah & Duho 2022).

Given current research, the commonly used forms of CAATs are test data, parallel simulations, integrated test facilities and EAMs and GAS (Braun & Davis 2003; Coderre 2015). GAS is a widely utilised tool (Braun & Davis 2003; Debreceny, Lee et al. 2005; Smidt et al. 2019), with its use maximising the effectiveness of auditing processes (Mujalli & Almgrashi 2020). As noted, auditors can use GAS to examine a combination of data and system applications, facilitating the investigation and verification of existing data. Furthermore, auditors can implement a range of tests on corporate electronic data using GAS (Arens & Loebbecke 2000). GAS is employed to scrutinise the financial operations and used in several other forms of audits (Mujalli & Almgrashi 2020).

Researchers have investigated the extent of usage of GAS by auditors. For instance, Mahzan and Lymer (2014) studied factors influencing the adoption of GAS in selected companies in the United Kingdom and Malaysia. They found that factors of performance expectancy and facilitating conditions significantly affected the adoption of GAS by internal auditors. According to Smidt et al. (2019), despite the rise of the usage of IT and the production of big data in enterprises, the global usage of GAS by internal audit functions remains low. Normahazan, Mohamed and Rozzani (2020) found that the lower acceptance of software contributes to the reduced usage of GAS.

Despite this, the Institute of Internal Auditors (2017) Standard 1220 on Due Professional Care emphasises that internal auditors are required to utilise technology-based tools in their work. Research on accounting information systems has found that auditors' usage of GAS is below the anticipated level (Bradford et al. 2020; Debreceny, Lee et al. 2005). A study by Smidt et al. (2019) investigated the maturity of internal auditors' use of GAS in Australia. They found a low standard of GAS usage among internal audit functions, with only 23 out of 50 respondents using GAS for data analytics. Of these 23 respondents, 22 believed GAS could be used more continuously than currently (Smidt et al. 2019). They also found that Tableau, Caseware Interactive Data Extraction and Analysis (IDEA) and Audit Command Language (ACL) were the most commonly used forms of GAS by internal auditing functions in Australia (Smidt et al. 2019). Coderre (2015, p. 40) emphasised that 'study after study has shown that the data analytics capabilities of internal audit functions consistently fall below what is desired and even what is required'.

Mujalli and Almgrashi (2020) argued that GAS helps internal auditors automate tasks and evaluate risks. Using GAS increases the efficiency and effectiveness of audits (Mujalli & Almgrashi 2020; Normahazan, Mohamed & Rozzani 2020). GAS has been extensively utilised for substantive examination and compliance testing (Vasarhely & Lin 1985). It helps auditors identify errors in financial statements and achieve auditing aims related to accuracy, completeness, precision and transparency (Ahmi & Kent 2013). GAS extracts data from various software, with its operations including data analysis, statistical tools and sampling procedures.

Excel is the most accessible instrument for conducting testing of samples and performing fundamental data analysis procedures (Lin & Wang 2011). As noted, GAS also includes such systems as IDEA and ACL (Arens & Loebbecke 2000; Braun & Davis 2003; Lin &

Wang 2011; Lungu & Vatuiu 2007; Smidt et al. 2019), Panaudit Plus (Debreceny, Lee et al. 2005), ProAudit Advisor and AutoAudit (Lungu & Vatuiu 2007) and Tableau (Smidt et al. 2019). These all have public modules that can read the living folders in the system to manage the data to implement the audit jobs.

GAS provides auditors with tools for data analysis and auditing tasks, including user interfaces that allow auditors to specify their audit needs (Debreceny, Lee et al. 2005; Sayana 2003). These interfaces use built-in functionalities to analyse a corporation's data and execute the necessary audit procedures, enabling auditors to perform queries, data extraction and analysis directly on data files (Debreceny, Lee et al. 2005; Sayana 2003). GAS can, therefore, conduct audit examinations more quickly and with greater detail than standard manual methods.

Given its ease of use, GAS is practical for a wide range of companies (Arens & Loebbecke 2000; Braun & Davis 2003). Indeed, Braun and Davis (2003) have mentioned that the ease of use of GAS contributes to it being one of the most widely used tools among all CAATs. GAS can investigate all company transactions, identify any potentially incorrect transactions and analyse extensive databases. Most GAS also maintain records of completed audits for assessment purposes (Sayana 2003).

One example of GAS is ACL, which offers a range of capabilities, including confirmation of information integrity, fraud detection, data categorisation, identification of gaps and repetitions, sampling and the ability to generate reports (Lungu & Vatuiu 2007). According to Lungu and Vatuiu (2007), ACL is a widely recognised audit software known for its ease of use, flexibility and the confidence it provides to auditors. ACL automates the process of extracting, analysing and reporting data, enabling the ongoing monitoring of controls and transactions.

In contrast, external auditors utilise GAS less frequently. A study conducted by Ahmi and Kent (2013) on the use of GAS by external auditors in the United Kingdom revealed that 73% of external auditors did not use such software. The primary reasons cited were low anticipated achievement, high-performance costs, the need for extensive training and a lack of ease of use.

3.7 Continuous Auditing

The emergence of computer uses in accounting procedures in the 1970s has led to the evolution of electronic data processing and continuous auditing (Vasarhelyi, Kogan & Alles 2002). Having transitioned from a theoretical concept to practical implementation in audit practices, continuous auditing is seen as the future of audit operations (Alles et al. 2008). Continuous auditing has also gained in significance given the increased alteration of business processes. Real-time accounting systems have transitioned auditing operations from paper-based methods to data-driven approaches (Rezaee et al. 2002). Consequently, internal audit leaderships have considered both transformational and technological aspects when deciding on the most effective approach for adopting technological tools into continuous auditing (de Andrade et al. 2023). Many researchers believe that continuous auditing is the new approach to internal auditing (Kiesow, Schomaker & Thomas, 2016). Therefore, there is a need for a comprehensive understanding of continuous auditing's definition and its fundamental principles.

> Continuous auditing is [a] comprehensive electronic audit process that enables auditors to provide some degree of assurance on continuous information simultaneously with, or shortly after, the disclosure of the information. (Rezaee et al. 2002, p. 150)

The growing focus on continuous auditing in practice has highlighted its importance as a significant area of academic investigation (Shiue, Liu & Li 2021). Continuous auditing is employed by companies to achieve real-time monitoring, greater compliance, effective risk management, enhanced operational efficiency, cost reduction and transparency. Continuous auditing technologies enhances the accuracy of accounting systems, hence enhancing the decision-making procedures (Goncalves & Imoniana 2022). Continuous auditing is a method and a technological approach. The primary technological component of significance is the provision of continuous audit application that is designed to examine data movements within audit trails and compare them against established criteria or benchmarks to identify any abnormal occurrences (Kogan et al. 2010). The fundamental tiers of continuous auditing derive advantages from the ongoing surveillance of company processes controls, which serves as a significant component of continuous auditing and is directly linked with the avoidance of internal mistakes (Alles, Brennan et al. 2006).

A study conducted by PricewaterhouseCoopers (2019) found that because organisations undergo digital transformation, internal audit departments that are more technologically adept to assist their stakeholders in making informed decisions regarding evolving risk profiles enable them to become more astute risk takers. According to PricewaterhouseCoopers (2019), the absence of technology utilisation as a means of assisting in auditing processes could negatively impact the field and, thus, the operations undertaken by the internal audit department.

The tools and techniques used for continuous auditing are systems that provide data extractions, mining and analyses (de Andrade et al. 2023; Vasarhelyi et al. 2012). These elements are essential for the automation of auditing procedures and are foundational to continuous auditing (de Andrade et al. 2023; Vasarhelyi et al. 2012). Robotics process automation (RPA) is one technological solution that automates routine and rule-driven tasks through the use of scripts (Gotthardt et al. 2020). RPA has gained extensive popularity since the 2000s and serves as a valuable tool for various company managerial tasks (Gotthardt et al. 2020). During the continuous auditing process, any discovered inconsistencies will trigger alarms and these notifications will be sent to the individuals responsible for internal control (Goncalves & Imoniana 2022). To fulfil the demands of continuous auditing, the whole continuous auditing model must encompass both transactions tests and internal controls tests (Flowerday, Blundell & Von Solms, 2006). Continuous monitoring, often known as continuous auditing, allows internal auditor to reduce operational risks (Goncalves & Imoniana 2022).

Some researchers have investigated the use and implementation of continuous auditing practices by internal auditors. According to Samagaio and Diogo (2022), utilising IT enhances the analytical capabilities of internal auditors, resulting in anticipated improvements in identifying abnormalities in accounting data, asset misappropriation or ineffective processes. A study conducted by Vasarhelyi et al. (2012) to investigate the adoption and development of continuous auditing in nine leading internal audit organisations in the USA found that employee knowledge and management support are key factors affecting the implementation of continuous auditing. They found that the implementation of continuous auditing by most companies is still in the initiation phase. Vasarhelyi et al. (2012) stated that implementing continuous auditing requires support from management, particularly to gain access to data through enterprise systems. They found that some companies do not allow internal auditors to directly access the

organisation's data without approval from management or the data owner, such as the IT department. In contrast, companies that have implemented some level of continuous auditing collect most data electronically without human involvement, allowing internal auditors to analyse it (Vasarhelyi et al. 2012). This approach ensures the preservation of data integrity and security (Vasarhelyi et al. 2012). Vasarhelyi et al. (2012) also noted that employees need specific skills to work with technical systems, and that companies must provide training for their employees to effectively use these systems. In contrast, a study conducted by Gonzalez, Sharma and Galletta (2012) investigated the factors that affect internal auditors' intentions to use continuous auditing in companies worldwide and found that effort expectancy and social influence are the main factors that influence internal auditors' intentions.

According to Hazar (2021), traditional approaches to auditing and annual audits are inadequate for addressing the complexities of contemporary business processes. The solution is the idea of continuous auditing (Hazar 2021). Hence, traditional auditing appears to be a reactive approach, whereas continuous auditing is seen as a proactive approach. According to Vasarhelyi and Halper (1991), advanced technology has influenced traditional auditing practices. Continuous auditing procedures involve the monitoring and testing all transactions, which increases the credibility and effectiveness of the audit. In contrast, traditional auditing relies on sampling. Rikhardson and Dull (2016) define continuous auditing as an approach to analysing data that operates in near real-time, utilising a predefined set of standards. According to de Andrade et al. (2023), continuous audit projects primarily utilise technical means to accomplish their objectives. Vasarhelyi et al. (2012) state that continuous auditing assists auditors to perform audit tasks more efficiently by automating several business processes.

> As business processes become increasingly more interlinked through the use of information technology and web-based applications, continuous auditing will become a more important monitoring and assurance device. (Brown, Wong & Baldwin 2007, p. 10)

Some literature refers to the CAATs as continuous auditing tools and techniques (Flowerday, Blundell & Von Solms 2006; Wu et al. 2017). According to Flowerday, Blundell and Von Solms (2006), IT tools and techniques facilitate continuous auditing. CAATs are used to implement the audit procedures and can be utilised by internal

auditors to conduct continuous auditing (Wu et al. 2017). The need for a continuous audit is because of the increased usage of IT within organisations, which changes the business environment (Mokhitli & Kyobe 2019). According to Li et al. (2018), internal auditors' usage of CAATs is lower than expected. However, Samagaio and Diogo (2022), in their study to investigate the adoption of CAATs by internal auditors in Portuguese private and public organisations, found that internal auditors moderately utilise CAATs in the execution of their job responsibilities. They also found that the usage of CAATs by internal auditors had a strong and positive effect on fraud detections.

According to Rikhardsson, Singh and Best (2019), the number of vendors offering software that supports continuous auditing is rapidly increasing. It is becoming increasingly important for companies to perform continuous audits efficiently (Shiue, Liu & Li 2021). However, implementing continuous auditing remains a challenge for many enterprises and the proficiency in IT usage is still lacking (Mokhitli & Kyobe 2019). Despite the numerous advantages of continuous audit systems, their adoption remains limited to a small number of organisations (Hassan et al. 2023). Nevertheless, Rikhardsson, Singh and Best (2019) have noted that there is a growing acceptance and investment in continuous auditing.

The usage of IT for continuous auditing remains low by internal auditors (Mokhitli & Kyobe 2019; Wiegerinck 2019). According to Mokhitli and Kyobe (2019), the primary factors preventing internal auditors from using IT for continuous auditing include their own capabilities, the auditing environment and the available technological auditing tools. Samagaio and Diogo (2022) found that the usage of CAATs enhances internal auditors' abilities to detect fraud. A study conducted by Wiegerinck (2019) found that continuous auditing provides advantages that enhance the capacity of internal controls and the efficiency of company operations.

KPMG (2012) conducted a study to investigate the awareness and the statutes of continuous auditing and continuous monitoring across Europe, the Middle East and Africa. They gathered employees' perceptions from 718 organisations across 32 countries. They found that only 9% of the participants had adopted continuous auditing and continuous monitoring in their organisations. However, 83% of participants were considering adopting continuous auditing and continuous monitoring in their organisations. Additionally, 69% of the participants identified the limited insight of

continuous auditing tools in the market as the main barrier to implementing continuous auditing and continuous monitoring. Notably, 89% of the participants were aware of the advantages and benefits of continuous auditing and continuous monitoring.

According to Hassan et al. (2023), many companies have initiatives to apply continuous audit systems to enhance their audit tasks. However, there is a need to improve the competency of internal auditors to use IT efficiently for continuous auditing (Mokhitli & Kyobe 2019). The Institute of Internal Auditors (2017) Standard 1210: Proficiency emphasises that internal auditors need to have a sufficient comprehension of controls, crucial IT risks and audit procedures using technology. Additionally, Standard 1230 from the Institute of Internal Auditors (2017) states that internal auditors are required to improve their expertise, skills and other abilities through ongoing professional development. Standard 1230 (Institute of Internal Auditors 2017) also stresses the significance of considering the adoption of technology-driven auditing techniques and other instruments for data analytics.

According to Wiegerinck (2019), continuous auditing is an approach that seeks to enhance the proximity between the auditing procedure and the operational procedure by leveraging technology. Auditors employ continuous audit techniques to oversee crucial controls, risks and regulations within a company (Hazar 2021). A computer-assisted system, such as continuous auditing, can be used to prevent fraud and errors (Huh, Lee & Kim 2021). Continuous auditing can reduce the time required for the audit process and cover all business transactions within a company's database at lower costs. According to Hazar (2021), the essential steps of continuous auditing include the evolution of the audit paradigm, the automation of audit processes and the usage of data analysis and reporting.

According to Yoon et al. (2021), a continuous audit system can enable auditors to recognise unusual transactions, which may indicate potential errors or fraud risks. When implementing a continuous audit system, it is essential to identify suitable data aggregation methods, as a high level of alerts in the continuous auditing system can decrease audit efficiency (Yoon et al. 2021). Nevertheless, the utilisation of aggregated data can decrease the likelihood of identifying problems at a granular level (Yoon et al. 2021). The factors determining the efficiency of continuous auditing cannot be generalised across companies or industries because each company has its unique characteristics (Papazafeiropoulou & Spanaki 2016).

Continuous assurance, continuous monitoring, real-time auditing and automated online auditing are concepts used in both practice and theory to describe various aspects of continuous auditing (Yoon et al. 2021). Continuous monitoring, continuous assurance and continuous auditing involve the real-time status of business transactions. The request for continuous assurance arises because business operations are implemented in real-time (Alles et al. 2008; Chan & Vasarhelyi 2011). According to de Andrade et al. (2023), the link between continuous auditing and businesses lies in the development of IT infrastructure, technological tools, data structures and other digital resources.

It is essential to gain continuous assurance on financial statements for stakeholders and administration. Continuous auditing is a primary step in providing continuous assurance. According to Rezaee et al. (2002), continuous auditing produces continuous assurance of the financial statements' accuracy and reliability. Moreover, Chan and Vasarhelyi (2011) have stated that continuous auditing aids and supports continuous assurance. Continuous monitoring ensures that approaches, business operations and internal controls are working efficiently and automatically (Chiu et al. 2014; Vasarhelyi, Alles & Kogan 2004).

According to Yoon et al. (2021), continuous control monitoring is typically a component of continuous auditing designs. Continuous monitoring includes automated data investigations conducted continuously against a set of predefined rules (Kuhn & Sutton 2010). Vasarhelyi, Alles and Kogan (2004) developed a theoretical framework for continuous auditing that emphasises the automation and the integration of business processes to facilitate real-time monitoring and assessment of business activities. They linked the four levels of continuous auditing with audit objectives, procedures and automation levels (Vasarhelyi, Alles & Kogan 2004). Continuous auditing is strongly dependent on the automation and integration of business operations (Vasarhelyi, Alles & Kogan 2004). Vasarhelyi, Alles and Kogan's (2004) four levels of continuous auditing are as follows:

1. *Transaction Evaluation*: All the transactions through corporate information system can be analysed by the automated continuous auditing system. The degree of automations is high at this level.
2. *Measurement Rule Assurance*: The degree of conformity of the transaction can be located with relegation. Because there are some relegations in the generally accepted accounting principles that involve human expertise, automated

continuous auditing procedure may not implement the transactions. The degree of automations is mixed at this level.

3. *Estimate Assurance and Consistency of Aggregate Measures:* Estimate accounts can be integrated into the continuous auditing system. The degree of automations is mixed at this level.
4. *Judgement Assurance*: The degree of automations is low at this level.

The continuous auditing structure comprises the monitoring layer (Yoon et al. 2021). Moreover, continuous monitoring involves surveillance of the business operations and controls and disclosure of exceptions of the controls (Vasarhelyi et al. 2012). Internal auditors and administration often request continuous monitoring to evaluate the efficiency of the internal controls (Alles et al. 2008; Chiu et al. 2014). Moreover, Brown et al. (2007) have stated that continuous monitoring helps not only internal auditors and the administration but also external auditors to reveal mistakes and breaches of the internal control processes. Continuous monitoring confirms that internal control procedures are working effectively, resulting in continuous assurance.

The demand for continuous auditing has been increasing because it provides real-time processing of business operations, enhancing the credibility and integrity of business processes. Consequently, there is a need to provide financial statements on a real-time basis. According to Goncalves and Imoniana (2022), continuous auditing is regarded as an essential real-time monitoring instrument for transactions, with administrations and stakeholders requiring the detection of financial statements in real time. Indeed, according to Alles, Tostes et al. (2006), the integration of value chains has resulted in the demand for continuous auditing. Continuous auditing represents an evolution in auditing practices, providing a more dynamic and real-time approach to monitoring and assessing an organisation's financial activities and internal controls.

According to Gonzalez and Hoffman (2018), implementing continuous auditing procedures has the potential to decrease the incidence of fraud significantly. By enabling auditors to examine 100% of an organisation's transactions, continuous auditing decreases the costs associated with audit tasks and allows for more frequent and effective testing. According Vasarhelyi et al. (2012), the integrations and the automation of technologies will improve the effectiveness of audit procedures. According to Deloitte (2010), continuous monitoring can enhance the value chain. As Alles et al. (2008) have

described, continuous auditing has evolved from an academic concept to a widely adopted practice in the field of auditing. Rikhardsson and Dull (2016) have stated that continuous auditing allows for more efficient risk management, leading to continuous assurance.

To confirm financial statements of reliability and credibility to shareholders, it is imperative to have oversight from internal auditors or external auditors (Wiegerinck 2019). Internal auditing procedures are employed to ensure adherence to rules and regulations and to accomplish specific goals, such as ensuring the accuracy of financial statements (Goncalves & Imoniana 2022). The evolution of these procedures has increased the demand for continuous assurance of financial data. Yoon et al. (2021) have proposed implementing a continuous auditing system to ensure the accuracy of financial statement accounts through the examination of journal entry data. They found that a continuous auditing system utilising weekly journal entry data in conjunction with predetermined rules is more efficient in detecting errors than relying solely on financial statement data. Financial data must be trustworthy and dependable, meaning it must be free from misleading information, mistakes and fraud (Chan & Vasarhelyi 2011; Rezaee et al. 2001). Moreover, credible and dependable financial data are essential and valuable for firms requiring near real-time reporting (Chiu et al. 2014; Vasarhelyi et al. 2012). Kogan et al. (1999) have stated that the evolutions have increased the demand for continuous assurance of financial data.

Continuous auditing diverges from conventional auditing methods (Hassan et al. 2023; Yoon et al. 2021). Traditional auditing is unable to offer continuous assurance. Rezaee et al. (2001) have stated that auditors understand that the traditional audit is not effective in the current organisational environment. Moreover, the evolution of technology has affected internal controls, enhancing their ability to operate in real-time (Goncalves & Imoniana 2022). Consequently, the necessity for continuous assurance of data through continuous auditing has become more apparent (Vasarhelyi et al. 2012). According to Hassan et al. (2023), during the implementation of continuous auditing processes, an organisation's internal controls are closely monitored regularly to maintain a comprehensive understanding of the systems. A study conducted by the Institute of Internal Auditors Research Foundation (2003) found that internal auditors are interested in using continuous auditing. However, internal auditors have acknowledged a shortage of the training, funds and expertise required to adopt continuous auditing, identifying cost

as the main factor preventing the adoption of continuous auditing (Institute of Internal Auditors Research Foundation 2003).

Internal control encompasses the organisational framework and processes used to confirm financial reporting's reliability and accuracy (Wiegerinck 2019). To eliminate waste, fraud and abuse, it is crucial to develop an efficient internal control system that will, in turn, enhance the effectiveness of continuous auditing. The effectiveness of adopting continuous auditing depends highly on the strength of an organisation's internal control systems (Wiegerinck 2019). Implementing continuous auditing enables for the ongoing examination of internal controls, thereby increasing confidence in their operation (Vasarhelyi et al. 2012).

The United Arab Emirates Internal Auditors Association (UAEIAA) and the Saudi Institute of Internal Auditors (KSAIIA) have investigated how internal audit functions can be made more efficient and effective for adding value to organisations. As noted by the UAEIAA and KSAIIA (2016, p. 22), 'the top risk in the 2015 audit plan was operational risk, with an average of 28'. Additionally, 'providing assurance on the efficiency and effectiveness of the internal control system was selected as the top area where internal audit adds value to the organisation' (UAEIAA & KSAIIA 2016, p. 16). A further 52% of surveyed companies in Saudi Arabia have informal risk management processes, the highest percentage compared with the global average of 37% (UAEIAA & KSAIIA 2016).

Past research has suggested that continuous auditing technologies affect controls, such as increasing transparency in internal controls and influencing decision-making behaviour (Rikhardsson & Dull 2016). According to Goncalves and Imoniana (2022), continuous auditing has the potential to decrease the costs associated with internal control. Alles, Brennan et al. (2006) have found, for instance, that Siemens' implementation of continuous auditing led to significant cost savings and enhanced the effectiveness of audit procedures, primarily as a result of the automation of these procedures. Vasarhelyi et al. (2012) have also noted that continuous auditing reduces audit costs. However, de Andrade et al. (2023) have argued that the costs of continuous auditing project are a significant factor in its adoption. Zhang, Yang and Appelbaum (2015) have identified gaps between the requirements of big data and the current audit analytics in a continuous audit context, citing challenges related to the velocity, volume, variety and veracity of data.

According to Gonzalez and Hoffman (2018), there is a need for companies to strengthen their monitoring systems when implementing continuous auditing procedures. Kuhn and Sutton (2010) have emphasised that continuous auditing procedures are becoming significant tools of corporate governance. Rezaee et al. (2002) also noted that continuous auditing procedures can decrease the cost of audit tasks. Brown, Wong and Baldwin (2007) have highlighted that continuous auditing allows for a larger sample size in testing, which increases the quality of audit evidence. In continuous auditing environment, audit software identifies and sends irregularities or exceptions to the audit team. The audit team is responsible for investigating these irregularities or exceptions to determine the reasons behind them. According to Vasarhelyi et al. (2012), to provide efficient data analytics and audit procedures, internal auditors need sufficient access to enterprise data and a specific degree of information system. A study conducted by Wiegerinck (2019) found that a restriction on accessing organisational data for auditing purposes.

Some researchers mention the disadvantages of adopting continuous auditing in practice. Implementing an efficient continuous audit relies on the maturity of internal controls within the organisation (Vasarhelyi et al. 2012; Wiegerinck 2019). Continuous auditing allows for examining the internal control system (Vasarhelyi et al. 2012). Rikhardsson and Dull (2016) have stated that the maturity level of internal controls affects the implementation of continuous auditing. Therefore, an organisation must have an acceptable level of internal control maturity to implement continuous auditing effectively. Wiegerinck (2019) identified several drawbacks of continuous auditing, such as the need for well-established internal controls, high costs, significant human resources and advanced IT infrastructure. Alles et al. (2002) have stated that many organisations are not implementing continuous auditing because of its high costs. Continuous auditing requires specialised software and devices (Kogan et al. 1999).

De Andrade et al. (2023) have found that continuous auditing requires individuals with expertise in IT and technological instruments. They also found that determining the most efficient tools for continuous auditing is a challenge. Previous literature highlights many constraints regarding the adoption of continuous auditing instruments and procedures. To implement effective continuous auditing, an organisation must have an adequate level of IT infrastructure, including data systems and access to information (Vasarhelyi et al. 2012). Vasarhelyi, Alles and Kogan (2004) have stated that the implementation of continuous auditing needs advanced technology that operate continuously. Additionally,

Chiu et al. (2014) have noted that a robust automation infrastructure is necessary for organisations to implement continuous auditing. Alles et al. (2008) further stated that performing continuous auditing is impossible if the IT base consists of outdated systems. Therefore, to perform continuous auditing effectively, organisations must have an adequate level of IT infrastructure, including a significant degree of automation.

Vasarhelyi et al. (2012) have stated that implementing continuous auditing requires employees to possess skills and knowledge related to audit operations and technology. Additionally, Rezaee et al. (2002) have noted that employees working with continuous auditing face pressure as a result of its continuous evolution. A study conducted by Wiegerinck (2019) also found that continuous auditing incurs high costs relative to the potential added value, leading some companies to seek alternative internal audit options that are less costly.

3.8 Unified Theory of Acceptance and Use of Technology

This study uses the UTAUT to investigate the factors that affect internal auditors' intentions to use continuous auditing. Developed by Venkatesh et al. (2003), UTAUT consists of four primary constructs: performance expectancy, facilitating conditions, effort expectancy and social influence. These constructs can be compared to determine the factors influencing user intentions to adopt technology. UTAUT can investigate both user intentions to use an information system and subsequent usage behaviours. Thus, UTAUT will aid in identifying the factors that may influence internal auditors' intentions to adopt continuous auditing in non-financial companies in Saudi Arabia. This will enable companies in Saudi Arabia to recognise and address these factors, thereby effectively embracing continuous auditing.

> UTAUT provides a useful tool for managers needing to assess the likelihood of success for new technology introductions and helps them understand the drivers of acceptance in order to proactively design interventions (including training, marketing, etc.) targeted at populations of users that may be less inclined to adopt and use new systems. (Venkatesh et al. 2003, p. 426)

3.8.1 Performance Expectancy

According to UTAUT, performance expectancy is 'the degree to which an individual believes that using the system will help him or her to attain gains in job performance' (Venkatesh et al. 2003, p. 447). Much research has used UTAUT to investigate the factors impacting internal auditors' intentions to adopt continuous auditing, CAATs and GAS (Al-Hiyari, Hattab & Al Said 2019; Almagrashi et al. 2023; Gonzalez et al. 2012; Mahzan & Lymer 2014).

Hassan et al. (2023) have stated that numerous corporations are implementing continuous audit systems as part of their efforts to improve their audit procedures. As explained in the preceding subsection, continuous auditing is expected to yield numerous advantages, including the ongoing identification of errors and fraud, as well as the utilisation of data analysis and modelled capabilities (Vasarhelyi, Alles & Kogan 2004). According to Venkatesh et al. (2003), individuals' adoption of new technology is influenced by their performance expectations. Indeed, a study conducted by Al-Gahtani, Hubona and Wang (2007) investigating the factors impacting knowledge workers' intentions to use desktop computer applications in Saudi Arabia has found that performance expectancy had a positive effect on knowledge workers' intentions to use computers. In contrast, a study conducted by Gonzalez et al. (2012) that examined the factors influencing internal auditors' intentions to adopt continuous auditing in worldwide companies has found that performance expectancy did not affect internal auditors' intentions to use continuous auditing in their companies.

Almagrashi et al. (2023) conducted a study using UTAUT to investigate the factors that affect internal auditors' intentions to adopt CAATs in the Saudi public sector. They found that performance expectancy significantly influenced internal auditors' intentions concerning the usage of CAATs. Similarly, a study conducted in Jordan by Al-Hiyari, Hattab and Al Said (2019) to investigate the factors that affect internal auditors' intentions to use CAATs found that performance expectancy positively affected internal auditors' intentions re the use of CAATs. In turn, a study conducted by Mahzan and Lymer (2014) in eight organisations in the United Kingdom and two different organisations in Malaysia to examine the factors impacting the usage of GAS by internal auditors found that performance expectancy was an important factor for the successful usage of GAS by internal auditors.

3.8.2 Facilitating Conditions

According to the UTAUT developed by Venkatesh et al. (2003, p. 453), facilitating conditions refer to 'the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system'. With reference to such infrastructure, Wiegerinck (2019) has noted that the drawbacks of continuous auditing include challenges associated with internal control, the necessity for a robust IT infrastructure, significant implementation costs and the requirement for skilled human resources. The primary obstacles to internal auditors utilising IT for continuous auditing are the technological audit tools, the skill level of internal auditors and the auditing environments (Mokhitli & Kyobe 2019). Internal auditors' capabilities and management support are the main indicators that prevent companies from using continuous auditing (Vasarhelyi et al. 2012).

Previous studies used UTAUT to investigate the factors impacting internal auditors' intentions to adopt continuous auditing, CAATs and GAS (Al-Hiyari, Hattab & Al Said 2019; Almagrashi et al. 2023; Gonzalez et al. 2012; Mahzan & Lymer 2014). For instance, a study conducted by Gonzalez et al. (2012) found that facilitating conditions did not increase internal auditors' intentions to continuous auditing. Conversely, a study conducted by Almagrashi et al. (2023) in the public sector in Saudi Arabia found that facilitating conditions had a significant influence on the use of CAATs by internal auditors. In their study conducted in Saudi Arabia, Al-Gahtani, Hubona and Wang (2007) found that facilitating conditions had no influence on computer usage behaviour. In contrast, a study conducted in Jordan by Al-Hiyari, Hattab and Al Said (2019) found that facilitating conditions had a positive effect on internal auditors' intentions to use CAATs. Similarly, Mahzan and Lymer (2014) conducted a study that found facilitating conditions to be a significant factor in the successful usage of GAS by internal auditors.

3.8.3 Effort Expectancy

According to the UTAUT developed by Venkatesh et al. (2003, p. 450), effort expectancy is 'the degree of ease associated with the use of the system'. The requirement for proficient staff is a substantial barrier for organisations aiming to effectively execute continuous auditing (Wiegerinck 2019). The efficiency of the auditing processes is a crucial consideration for internal auditors when evaluating the adoption of new

technology, rather than focusing just on the effort needed for its implementation (Bierstaker et al. 2014). A study conducted by Vasarhelyi et al. (2012) found that the proficiency of staff members is an essential factor that influences the successful execution of continuous auditing.

Past studies used UTAUT (Venkatesh et al. 2003) to examine the factors influencing internal auditors' intentions to use continuous auditing, CAATs and GAS (Al-Hiyari, Hattab & Al Said 2019; Almagrashi et al. 2023; Gonzalez et al. 2012; Mahzan & Lymer 2014). A study conducted in the Saudi Arabian public sector by Almagrashi et al. (2023) found that effort expectancy significantly affected internal auditors' intentions to use GAS. Similarly, a study by Gonzalez et al. (2012) found that effort expectancy increased internal auditors' intentions to use continuous auditing. In contrast, a study by Al-Gahtani, Hubona and Wang (2007) in Saudi Arabia found that effort expectancy had no impact on knowledge workers' intentions to use computers. Additionally, Al-Hiyari, Hattab and Al Said (2019) found that effort expectancy had no negative effects on internal auditors' intentions to use CAATs. Mahzan and Lymer (2014) found that effort expectancy had no impact on the successful adoption of GAS by internal auditors.

3.8.4 Social Influence

Social influence is 'the degree to which an individual perceives that important others believe he or she should use the new system' (Venkatesh et al. 2003, p. 451). A study conducted by Vasarhelyi et al. (2012) found that management support is an essential factor that affects the successful usage of continuous auditing by internal auditors. Implementing continuous auditing requires not only IT investment but also the capacity to resolve audit issues, management concerns and organisational changes (Hardy 2014). According to Sun (2012), the effectiveness of continuous auditing is affected by the organisational culture. A study conducted by Hardy (2014) found that to effectively execute continuous auditing, it is essential to possess a comprehensive comprehension of the distinct responsibilities of each stakeholder and their contributions to its success.

Previous studies used UTAUT to investigate the factors affecting internal auditors' intentions to use continuous auditing, CAATs and GAS (Al-Hiyari, Hattab & Al Said 2019; Almagrashi et al. 2023; Gonzalez et al. 2012; Mahzan & Lymer 2014). For example, Almagrashi et al. (2023) conducted a study in Saudi Arabia and found that social

influence had a significant influence on internal auditors' intentions to the usage of CAATs. Similarly, a study conducted by Gonzalez et al. (2012) found that social influence increased internal auditors' intentions to adopt continuous auditing. In contrast, Al-Hiyari, Hattab and Al Said (2019) found that social influence had no influence on internal auditors' intentions to use CAATs. Similarly, Mahzan and Lymer (2014) found that social influence had no impact on the successful adoption of GAS by internal auditors. However, Al-Gahtani, Hubona and Wang (2007), in a study conducted in Saudi Arabia, found that subjective norms had a positive influence on knowledge workers' intentions to use computers.

3.9 Internal Audit Effectiveness

According to Popescu-Grădișteanu and Mocuța (2023), the significance of internal auditing for corporate governance is widely acknowledged worldwide, because it enhances transparency, organisational effectiveness and accountability. The internal audit is seen as an important component of a company to provide reports on the financial operations (Prentice 2000). There are three internal audit objectives: integrity assurance, adding value and enhancing the company's operations. Ebaid (2011) has, however, stated that internal auditing tasks changed before and after the financial scandals in 2008. He has added that the internal audit was to preserve the assets of the company and assist in providing credible financial data to the management. Because the confidence in audit companies had reduced because of the loss of companies such as WorldCom and Enron, significance is attributed to internal audit functions that identify and assess risks and ensure accurate financial reporting to management (Ebaid 2011). Therefore, auditors identify and prophesy the risk areas within a company to enhance risk management within that company (Goodwin & Yeo 2001).

It is significant for companies to implement an efficient approach to increase and enhance the effectiveness of internal control systems and risks management within the companies. According to Yoon et al. (2021), the data aggregation during the audit processes significantly affects the audit's effectiveness and efficiency. A high level of alarms within the systems can decrease audit efficiency and, therefore, past studies point out there is a need for suitable levels of data aggregation (Yoon et al. 2021). That is, the number and extent of suspicious activities discovered within the company affects audit efficiency (Li, Kogan & Chan 2016). According to Yoon et al. (2021), WorldCom's journal entries had

many suspicious entries hidden by adjustments. The auditing standards recently boosted the auditors to implement CAATs to enhance the effectiveness of the audit (Serpeninova, Makarenko & Litvinova 2020).

As Alkebsi and Aziz (2017) have noted, previous studies have shown that technology is crucial for improving the internal audit process, particularly in the stages of preparation, appraisal and review. In turn, as Smidt et al. (2019) have noted, it is impossible now to implement effective audits without using IT in control circumstances, which are overwhelmed by big data and the increased size of electronic audit evidence. Therefore, to provide an efficient internal audit, there is a need to implement continuous analysis and assess the organisation's operations and financial data. The audit processes' effectiveness and efficiency are increased by the usage of IT in continuous auditing to create high-quality data (Chiu, Chan & Vasarhelyi 2018).

According to the resource-based theory, the usage of IT significantly influences the effectiveness of internal audits (Alkebsi & Aziz 2017). According to Mokhitli and Kyobe (2019), the implementation of continuous audit enhances the efficacy of the internal audit functions and the accuracy of the organisational data for decision-making. Samagaio and Diogo (2022) have further argued that combining more technological tools in internal audit procedures to enhance sustainability is a common difficulty faced by public and private organisations.

CAATs increase audit effectiveness and efficiency (Serpeninova, Makarenko & Litvinova 2020). Thus, Pedrosa, Costa and Aparicio (2020) have argued that the use of IT in auditing processes is a significant factor for enhancing the efficacy of auditing activities. Samagaio and Diogo (2022) have also found that the use of IT enhances the analytical capabilities for internal auditors. According to Smidt et al. (2019), because of the development of IT, internal audit functions will have more compression from their several stakeholders to effectively create efficient audit outcomes. Samagaio and Diogo (2022) have argued that, because of the increased use of IT and the automation of the processes in organisations, the efficacy of internal auditing performance depends upon the adoption of information technology.

Vadasi, Bekiaris and Andrikopoulos (2021) have stated that internal audits are significant for preserving the transparency of an organisation's financial status and performance.

There is a need to set clearly set out the responsibilities of internal auditors in the enterprises; internal auditors require to achieve their responsibilities efficiently and effectively (Mokhitli & Kyobe 2019). The financial data's reliability and accuracy are the internal audit's responsibility. Therefore, the internal audit creates value for the organisations. Evaluation of the efficiency of a firm's internal controls is important for internal audit to provide assurance that company operations are functioning well (Kaplan & Schultz 2007). According to Tackie et al. (2016), the effectiveness of internal audit is seen as the end outcome or accomplishment of the internal audit.

There are some factors that affect internal audit effectiveness, including sustainable procurement and the usage of IT by auditors, as well as the objectivity, skills, training and independence of auditors (Alkebsi & Aziz 2017; Alzeban 2015; David & Ntegwa 2024; Karikari et al. 2022; Karikari Appiah et al. 2023; Vasarhelyi, Alles & Kogan 2004). Karikari et al. (2022) conducted a study in Ghana's public agencies and found that there is a positive correlation between the effectiveness of internal audit and sustainable public procurement. Specifically, they found a direct relationship between the effectiveness of internal audits and the promotion of sustainable public procurement in Ghana's public agencies. They argued that the internal audit effectiveness drives both sustainable public procurement and the value for money. A study conducted by David and Ntegwa (2024) also demonstrated a correlation between the features of public procurement and the effectiveness of internal audits in Tanzania.

Vasarhelyi, Alles and Kogan (2004) affirmed this, showing that integrating business processes improves the effectiveness and efficiency of audits. They have argued that the efficiency and effectiveness of auditing greatly depend on the automation and the integration of corporate operations; that is, integrating corporate processes is a crucial element in enhancing auditing efficiency (Vasarhelyi, Alles & Kogan 2004). A study conducted in the public sector in Ghana by Karikari Appiah et al. (2023) found that internal audit effectiveness positively affects procurement performance. Specifically, they argued that the potential of internal audit effectiveness to foster robust organisational resilience can facilitate improved effectiveness in public procurement.

According to Safi Pour Afshar, Soltaninejad and Soltani Nejad (2023), the internal audit manager's leadership style is directly related to the effectiveness of internal audit. They argued that internal audit managers could increase the effectiveness of internal audits.

According to Alkebsi and Aziz (2017), and in accordance with the principles of resource-based theory, the success of a corporation is dependent on its internal resources and the effectiveness of using IT is an essential aspect in this regard. Alkebsi and Aziz (2017) found that the usage of IT has a substantial influence on the efficiency of internal auditing in the public sector of Yemen. It appears that the usage of IT by auditors and the objectivity, skills, training and independence of auditors do affect the effectiveness of internal audit.

There is little research on the effectiveness of internal audit in Saudi Arabia companies. Alzeban (2015) conducted a study to investigate the effects of cultural factors for instance, individualism, power distance and uncertainty avoidance on the quality of the internal audit for listed Saudi Arabia companies. He found that the efficiency of the internal audit relies upon the internal auditors' accomplishments and professionalism related to the procedure. He also found a correlation between individuality and the effectiveness of internal auditing within organisations in Saudi Arabia. More specifically, more authority distance and greater uncertainty avoidance are associated with a lower quality of internal auditing.

Alzeban and Gwilliam (2014) conducted a study in the Saudi public sector to investigate the factors that influence the effectiveness of internal audit. They found that management support for internal audit and internal audit department's proficiency, the relationship between internal and external audit, the independence of internal audit and the size of the internal audit department were all significant factors with regard to the effectiveness of internal audit. One of the issues that internal auditing faces is tribal dependency, meaning that auditors have a mutual respect for each other, which can lead to a lack of proper performance in work (Alzeban & Gwilliam 2014).

Alzeban (2020) conducted a study to examine firm performance, internal audit and the audit committee from listed companies in Saudi Arabia and United Arab Emirates. He found that the independence of the audit committee mediates the influence of internal audit independence, as well as size, on firm performance. Furthermore, internal audit enhances companies' performance and assists them in accomplishing their aims. He argued that internal auditing and auditing committees play an essential role in corporate governance.

A study conducted by Al-Shetwi et al. (2011) to investigate the influence of internal audit processes on financial reporting quality for listed Saudi Arabia companies found that there was low association between the financial reporting quality and internal audit function. They argued that capital market authority should implement more regulations regarding the role of the internal auditing within companies to increase the efficiency of internal auditing functions. Hazaea et al. (2023) argued that most Arab countries do not have regulations that promote independent internal audits. They argued that although most Arab countries adhere to the processes established by Institute of Internal Auditors, they have not effectively implemented them. They suggested establishing new regulations for internal audit independence (Hazaea et al. 2023).

Another study conducted by Al-Twaijry, Brierley and Gwilliam (2003) in Saudi Arabia corporate sector found that internal audit functions of Saudi Arabia companies were undeveloped. They also identified a lack of staff, skills and resources in internal audit functions, with functions focusing on compliance audit rather than auditing performance. There were also limitations to the independence of the internal audit (Al-Twaijry, Brierley & Gwilliam 2003). Al-Twaijry, Brierley and Gwilliam (2004) found that the internal audit departments in many companies in Saudi Arabia had deficiencies in expertise and autonomy. In Saudi Arabia, the Saudi Arabian Capital Market Authority, the Saudi Arabian Monetary Authority and the KSAIIA are all institutions tasked with monitoring and promoting awareness of the significance of adhering to requirements for auditing and corporate governance (Hazaea et al. 2023). The Institute of Internal Auditors is also making attempts to ensure adherence to auditing norms and regulations by both the private and public sectors in Saudi Arabia (Alzeban 2019).

3.10 Centralising the Purchasing Functions

Centralising purchasing in an organisation means consolidating the purchasing activities and decisions into a single, central department rather than allowing individual departments or locations to make their own purchasing decisions (Keshavamurthy & Narsipur Venkatesh 2020). According to Arnold (1999), implementing centralised purchasing models can strengthen the company's competitive advantage. According to Alles, Tostes et al. (2006), value chain integrations have increased the demand for continuous auditing.

According to the Directorate of Health Affairs (2017) in Jeddah, Saudi Arabia, the value of damaged medicines, as reported by the relevant ministerial committee after being seized in a hospital, amounted to more than 20 million riyals (approximately AUD 6,944,444). Notably, the value of damaged drugs in Saudi Arabia is estimated at 350 thousand riyals per day (approximately AUD 121,527).

The lack of efficient internal control procedures within warehouse operations can lead to significant duplication of responsibilities and surplus capacity. These issues necessitate the development of policies by internal auditors and management to mitigate associated risks. Centralising purchasing functions appears to be a solution that can enhance the effectiveness and efficiency of internal controls within organisation warehouses.

Centralising purchasing functions is one option for addressing waste in the supply chain. This solution involves transferring some functions currently handled by individual departments or warehouse operators to a central department, thereby enabling greater oversight. Purchasing goods and inventory is significant for a company; these costs are included in the net income statement, impacting a company's income and profit from its operations. In 2009, the Saudi Arabian government's Public Investment Fund created the National Company for Unified Procurement of Medicines, Devices and Medical Supplies (Nupco), a national firm responsible for the centralised procurement of medications, equipment and medical supplies (Nupco n.d.).

Nupco is the major centralised firm in Saudi Arabia that offers healthcare purchasing, preservation and delivery services for medications, equipment and medical supplies (Nupco n.d.). To enhance value and generate significant savings, Nupco leverages group procurement and effective negotiation as Saudi Arabia's primary supplier of standardised healthcare purchasing (Nupco n.d.). Nupco effectively oversees the purchase of medical supply, utilising its national purchasing power to secure competitive prices and meet health needs, thereby creating substantial savings (Nupco n.d.). As the leading provider in its field, Nupco aims to enhance the efficiency level of operations in the government healthcare sector across Saudi Arabia by enhancing spending efficiency on medical supplies (Nupco n.d.).

Similarly, according to Al-Jadaan (2018), the Ministry of Finance in Saudi Arabia is developing a department called the 'Strategic Purchasing Unit'. This unit will be

responsible for purchasing all supplies required by various government agencies, with the aim of significantly rationalising government spending in the long term. Al-Jadaan (2018) added that the unit will independently consolidate government procurement needs, such as cars, computers and software. By purchasing these needs in bulk, the unit will enhance its ability to negotiate lower prices, thereby achieving the goal of reducing government expenditure (Al-Jadaan 2018). It appears that centralising the purchasing functions leads to an increase in value chain integrations. In total, the Saudi Arabian government proposes to centralise the purchasing functions of 22 ministries' warehouses and transfer them to the Ministry of Finance (Al-Jadaan 2018). This centralising of the purchasing functions creates an efficient integration process within the Saudi Arabia government ministries.

A warehouse consolidation study by the Department of General Services (2013) in the USA found that 9,000 cubic feet of items were unnecessarily stored. The removal of these items would save state agencies approximately $125,000 (Department of General Services 2013). The research identified $125,000 worth of excess inventory (Department of General Services 2013). The study also explored the opportunity to consolidate 65 warehouses utilised by 22 state agencies with the goal of reducing leasing costs (Department of General Services 2013). Of these warehouses, 57 were leased and eight were state-owned (Department of General Services 2013).

Accorsi, Manzini and Maranesi (2014) have argued that warehousing systems are essential for ensuring operational efficiency and enhancing client satisfaction. These systems contribute to the operational efficiency of the supply chain by optimising inventory management, improving order accuracy, reducing costs and enhancing communication (Accorsi, Manzini & Maranesi 2014). A warehouse management system (WMS) enables the sharing of information and monitoring of inventory, facilitating collaboration between internal auditors and warehouse management within a company. This collaboration can lead to increased efficiency in both internal audits and warehouse operations.

According to David (2022), internal auditing provides a crucial role in assuring the effectiveness of procurement. The internal audit must efficiently carry out its tasks to identify errors and fraud (David 2022). A WMS assists internal auditors in conducting effective and efficient monitoring of goods and inventory within a company.

Additionally, a WMS can identify whether goods and inventory are being appropriately used and within prescribed guidelines. Adopting a WMS also enables internal auditors to assess annual waste of goods and inventory.

The effect of centralising purchasing functions on internal audit effectiveness has not received significant attention. There is limited evidence regarding the contributions of centralising purchasing functions to enhancing internal audit effectiveness. Karikari et al. (2022) found that the effectiveness of internal auditing drives the sustainability of public procurement in Ghana. Some researchers have investigated the role of internal audit in the procurement process. According to David (2022), the internal audit function has the responsibility of assuring compliance with procurement regulations and must have a thorough understanding of the procurement procedures within the organisation. Yussuf, Tonya and Mohamed (2021) have noted that the internal audit function is vital in organisations because it helps prevent waste and abuse, particularly in procurement processes. They found that although internal audit independence and management support significantly affect procurement performance, employee capabilities do not affect procurement performance. Additionally, Suyono and Hariyanto (2012) have found that internal audit influences the efficiency of controls within organisations.

According to Karikari et al. (2022), a procurement audit involves auditing and investigating procurement procedures to enhance compliance with internal control systems and risk management. Wang et al. (2020) proposed a continuous compliance awareness framework (CoCAF), an artificial intelligence-based approach to implementing procurement compliance audits. CoCAF is used to conduct automatic and timely audits of a company's procurement processes. Wang et al. (2020) found that CoCAF can provide continuous audit services, offering high assurance and efficiency in procurement internal audits. A study by David (2022) has also revealed that the independence, competency and processes of internal audits can significantly and positively affect the effectiveness of procurement tasks. Gomes and Colaço (2022) have argued that effective audit processes require grading the bills released for purchasing. Furthermore, David (2022) has emphasised that internal auditors must assess the efficiency of internal controls in the procurement procedure. A significant cause of waste in goods and inventory is over-purchasing and the duplication of responsibilities in warehouse operations. Over-purchasing and inefficient purchasing strategies are global issues that concern both governments and companies.

The World Bank has identified an untapped source of funds, noting that governments currently allocate around $13 trillion US dollars each year for government contracts involving the procurement of commodities, services and public works (Alriyadh 2022). Up to a quarter of that money is wasted because of inefficient and short-sighted procurement and contracting practices (Alriyadh 2022). Eliminating this waste could save at least $1 trillion annually, which could then be redirected to support green, resilient and inclusive development (Alriyadh 2022).

The World Bank is proposing to create a global procurement partnership aimed solely at this purpose (Alriyadh 2022). The main aim of this partnership is to make a global network that encourages the strategic use of public procurement as a critical tool for economic planning and development (Alriyadh 2022). Over-purchasing and inefficient purchasing strategies can create waste within companies' supply chains. Dubolazov et al. (2020) have argued, for instance, that consolidating procurement can provide significant savings for companies and foster the development of other areas within the organisation.

Some researchers have investigated the benefits of centralising purchasing functions. For instance, as Keshavamurthy and Narsipur Venkatesh (2020, p. 37) state, 'A centralised purchasing structure entails greater transparency, proper recording, and reporting of transactions'. In contrast, decentralised purchasing leads to weakened internal controls, a lack of a clear audit trail and inefficiencies in recording and reporting transactions (Organisation for Economic Co-operation and Development [OECD] 2000). There is often a shift from decentralised to centralised purchasing methods to achieve savings through consolidation, because centralisation creates economies of scale and reduces costs (Monczka 2021). Keshavamurthy and Narsipur Venkatesh (2020) have also argued that the decentralised purchasing system adopted by the healthcare sector in Sweden is inefficient and highly complicated. In some companies, each department manages its own purchasing functions, leading to duplication of responsibilities and surplus capacity. Despite being funded by a central finance department, there is limited oversight on purchasing activities or how allocated funds are utilised.

As has been noted, one reason for implementing a centralised purchasing method is to minimise duplication (Monczka 2021). Implementing centralised procurement policies through the consolidation of requests also significantly decreases the cost of public purchasing (Aboelazm & Afandy 2019). In addition, according to Keshavamurthy and

Narsipur Venkatesh (2020), centralising purchasing functions ensures that all departments within a supply chain follow procedures through a unified system, thereby reducing unnecessary efforts and inventory demands. Aboelazm and Afandy (2019) have argued that centralised purchasing has the potential to significantly decrease total costs. In contrast, decentralised purchasing can sometimes lead to a lack of efficient controls and audit trails (OECD, 2000). Decentralised purchasing, in general, has a negative effect on public procurement (Aboelazm & Afandy 2019).

There is a difference between the terms 'procurement' and 'purchasing' (Keshavamurthy & Narsipur Venkatesh 2020; Mazoyer 2020). Mazoyer (2020) has argued that with the pre-purchase, the procurement process includes determining company requirements, identifying possible suppliers and assessing the choices available for the company. In contrast, during the purchase, the procurement process consists of dealing with the selected supplier and establishing the purchase order. Procurement is seen as a technique that companies use to negotiate deals of obtaining inventory and services for payment; in contrast, purchasing is the buying process (Keshavamurthy & Narsipur Venkatesh 2020). It seems that purchasing is a part of the procurement process.

In recent decades, researchers have focused on developing efficient supply chains, as well as outlining the value derived from these efficiencies. For example, Porter (1990) examined the competitive advantage of nations, Robinson (2002) evaluated ports as elements in value-driven chains and as part of an integrated intermodal freight system, and Cox et al. (2002) assessed supply chains, markets and power. Waste significantly affects supply chains and their efficiency, which is widely recognised as a result of chain integration (Robinson 2009). According to Robinson (2009), each delay in the movement of goods and services between firms reduces the value of the supply chain. Efficient, integrated supply chains reduce transaction costs.

According to Robinson (2002), the integration of supply chains can be achieved through collaboration between firms, information sharing and efficient structuring of chains. Supply chain efficiency necessitates a high level of process integration, given that the degree of integration directly influences the efficiency of value chains (Robinson 2002). According to Taylor, Taylor and Brunt (2001), there are seven common sources of waste: overproduction, waiting and delays in the system, unnecessary motion, defects and faulty goods, transportation, inappropriate processing and unnecessary stocks. Robinson (2002)

has argued that the integration process enhances efficiency across the entire supply chain, thereby reducing waste and costs. Over-purchasing goods, equipment and inventory is considered wasteful in the supply chain, given that it often leads to excess inventory within companies. To mitigate waste, it is essential to establish efficient integration processes among supply chain participants (Robinson 2009). These integration processes not only enhance supply chain efficiency (Robinson 2009), but also improve internal audit effectiveness (Vasarhelyi, Alles & Kogan 2004). Centralising purchasing functions appears to facilitate the creation of efficient integration processes within the company, thereby enhancing internal control procedures within the business unit.

3.11 Conclusion

There is a shortage of empirical evidence regarding the effects of continuous auditing and the centralisation of purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. Additionally, there is insufficient research on the influence of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to adopt continuous auditing in these companies. This chapter has outlined and discussed the literature considering the effects of continuous auditing and centralising purchasing functions on the effectiveness of internal audits, as well as the influence of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to use continuous auditing. Additionally, this chapter investigated the literature on accounting information systems, internal controls, CAATs, EAMs, GAS, continuous auditing, performance expectancy, facilitating conditions, effort expectancy, social influence, internal audit effectiveness and centralising purchasing functions.

Chapter 4: Methodology

4.1 Introduction

As has been noted, this study's primary purpose is to examine the effects of continuous auditing and centralising the purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. Additionally, this study investigates the influence of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to use continuous auditing in these companies. This research adopted a quantitative method using a questionnaire with a large sample size. Also, this research builds on two conceptual frameworks. Whereas the first conceptual framework is grounded in resource-based theory, the second conceptual framework is informed by the UTAUT developed by Venkatesh et al. (2003). The aim of using these two conceptual frameworks is to investigate the influence of continuous auditing and centralising purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia as well as to examine the impact of performance expectancy, facilitating conditions, effort expectancy and social influence on internal auditors' intentions to use continuous auditing in these companies. The participants of this study are internal auditors working in the internal audit departments of non-financial companies in Saudi Arabia. This chapter will outline the research method, theoretical frameworks, the proposed conceptual frameworks of the research and the research strategy.

4.2 Research Approach

Employing an appropriate methodology is essential for achieving success in research (Creswell 2013). A quantitative approach is a research method used to examine objective theory. A quantitative approach was adopted in this research, grounded in the philosophy of positivism. Positivism relies heavily on deductive reasoning, which begins with a theory and hypotheses that are then tested through empirical observations. The quantitative approach possesses scientific objectivity because its outcomes are expressed in numerical form and can be rigorously assessed using statistical methods (Creswell 2013). This ensures that analyses are rational, relying on meaning derived from data rather than an investigator's interpretation. Furthermore, scientific objectivity means that different examiners can obtain similar results, provided they use identical scientific

procedures. Therefore, the outcomes acquired through quantitative studies tend to be reliable and consistent. Creswell (2013) argued that it is possible to replicate study findings across a range of different research samples.

Because quantitative approaches are valuable for drawing statistical conclusions about the relationships between items (Creswell 2013), quantitative procedures are designed to provide a reliable means of analysis through standardisation, objectivity, statistical rigor, replicability and the use of large sample sizes. These investigations involve large volumes of data, which can be analysed using sophisticated computer programs such as the Statistical Package for the Social Sciences (SPSS). This study uses SPSS to analyse the quantitative data, providing both analysis and descriptive statistics. One of the main advantages of quantitative research is its ability to generalise findings from a sample to a larger population (Creswell 2013). Therefore, the findings of a quantitative study can be generalised to larger populations with a high degree of accuracy.

Quantitative research primarily emphasises the logical features of data, where individuals' ideas are conveyed via numerical values and statistical measures (Creswell 2013). Because it requires adherence to rigorous methodological standards, including representative sampling, adequate sample sizes and valid and reliable measurement instruments (Creswell 2013), study outcomes can be generalised to other populations with similar characteristics. Additionally, quantitative research is grounded in theoretical frameworks that guide the formulation of hypotheses and the interpretation of data.

4.2.1 Theoretical Frameworks

As has been outlined, this research utilises two theories: resource-based theory and the UTAUT developed by Venkatesh et al. (2003). The following discussion will delve into each of these in turn.

4.2.1.1 Resource-Based Theory

In recent decades, researchers have focused on evaluating organisational performance and identifying the key factors that contribute to the gaining of competitive advantages. These studies explore how organisational strategies can achieve competitive advantage through the effective utilisation of internal resources and capabilities. For example, Barney (1991) notes that each company possesses a unique set of resources, which can vary significantly

between organisations. In the 1990s, the resource-based theory emerged, shifting the focus from exploring the external factors that might influence organisations to an emphasis on internal factors that might facilitate the gaining of competitive advantages (Nasibah 2015). Resource-based theory posits that an organisation's internal resources and capabilities are the primary drivers of its competitive advantage. According to this theory, a firm's distinctive resources and capabilities are the principal determinants of its performance and competitive position within the market.

This study utilises resource-based theory to investigate the influence of continuous auditing and centralising purchasing functions on the effectiveness of internal audit. The application of resource-based theory to assess performance has been widely embraced in prior studies and has become significant in strategic management literature (Newbert 2007). Additionally, resource-based theory is considered an important indicator for identifying organisational performance (Newbert 2007). Companies can attain sustained competitive advantages through the implementation of strategies that effectively align their internal resources and capabilities (Barney 1991). This perspective shifts the focus from external market dynamics to the unique internal attributes that a company possesses.

There is limited research that applies resource-based theory within the internal audit context. According to Barney (1991), resource-based theory assumes that companies are unique and possess a variety of resources and capabilities. These resources can include internal corporate procedures, skills, assets and capabilities developed internally to facilitate operational processes. These resources are considered essential for a company's success (Alkebsi & Aziz 2017). Resource-based theory highlights how a company's capabilities and resources affect its performance. Therefore, companies must identify their unique features to enhance performance and gain competitive advantages (Nasibah 2015). Barney (1991) also noted that resource-based theory assumes that companies possess heterogeneous resources.

Researchers have identified and categorised various characteristics of organisational resources within resource-based theory. Barney (1991), for instance, has noted that organisational resources can be classified into human capital, physical resources and organisational resources. A company's competitive advantage depends on its unique resources (Barney 1991). Wernerfelt (1984) categorised a company's resources into physical assets, intangible assets and capabilities. Intangible assets include formal

reporting structures, procedures and company databases, whereas capabilities encompass purchasing strategy, integrated logistics and technology development (Kapelko 2005). Tangible assets are commonly perceived as fixed assets with clear ownership and the potential for duplication (Nasibah 2015).

There is a divergence in perspectives among researchers regarding the primary indicators for the capacity to gain competitive advantages. Some researchers, such as Grant (1991) and Barney (1991), have identified tangible assets as significant indicators for gaining competitive advantages, noting that these assets can be duplicated between companies. Conversely, other researchers, such as Bakar and Ahmad (2010), view intangible assets as the major factors for gaining competitive advantages. A company's resources form the basis of its capabilities, and these capabilities are a major indicator of its competitive advantages (Grant 1991).

Alkebsi and Aziz (2017) have noted that whereas the usage of IT is classified as a tangible asset, internal auditors are classified as intangible assets. They conducted a study on the influence of IT usage and top management support on internal audit effectiveness in private companies in Yemen, using resource-based theory. Their findings revealed a positive relationship among the use of IT and the effectiveness of internal audits.

In this study, the primary determinant of competitive advantage is identified as internal corporate resources and capabilities. Resource-based theory provides a significant and in-depth understanding of how these internal resources and capabilities can contribute to gaining competitive advantages (Alkebsi & Aziz 2017; Nasibah 2015). This study utilises resource-based theory to investigate how continuous auditing and centralising purchasing functions can enhance internal audit effectiveness and contribute to competitive advantages within companies. Resource-based theory emphasises how a company's resources affect its performance (Nasibah 2015).

In light of the above discussion, it can be deduced that the application of resource-based theory offers valuable insights into enhancing internal audit effectiveness within companies through the implementation of continuous auditing and the centralisation of purchasing functions. This strategic approach fosters a comprehensive understanding of how a company's internal resources and capabilities can facilitate the establishment of sustainable competitive advantages.

Resource-based theory asserts that companies can gain competitive advantages by aligning their strategies with their internal resources and capabilities (Grant 1991). Using resource-based theory in this study is particularly appropriate and valuable for investigating how the effectiveness of internal audit is affected by continuous auditing and the centralisation of purchasing functions in Saudi Arabian companies. Resource-based theory focuses exclusively on a company's resources and their effects with regard to establishing sustainable competitive advantages (Nasibah 2015).

The resource-based theory posits that there is an immediate connection between a company's resources and its capacity to achieve sustainable competitive advantages, thereby aligning with the company's overarching objectives (Barney 1991). Consequently, the first conceptual framework of this research incorporates resource-based theory to investigate the influence of continuous auditing and the centralisation of purchasing functions on internal audit effectiveness. Resource-based theory has been employed in previous studies to investigate internal auditing (Alkebsi & Aziz 2017; Nasibah 2015) and internal auditors' effectiveness (Alqudah, Amran & Hassan 2019).

Ultimately, using resource-based theory, companies' internal resources namely, the implementation of continuous auditing and the centralisation of purchasing functions are considered able to influence internal audit effectiveness and contribute to gaining competitive advantages by enhancing performance. Therefore, this study investigates the effects of continuous auditing and centralising purchasing functions on internal audit effectiveness using resource-based theory.

4.2.1.2 Unified Theory of Acceptance and Use of Technology

In recent decades, numerous researchers have dedicated their efforts to studying the factors influencing the acceptance and usage of IT. Among the prominent theories in this domain are the technology acceptance model (TAM) developed by Davis (1985, 1989), the theory of reasoned action (TRA) developed by Fishbein and Ajzen in 1975 and the theory of planned behaviour (TPB) introduced by Ajzen (1985, 1988). Additionally, the UTAUT developed by Venkatesh et al. in 2003 has garnered significant attention. These theories collectively aim to elucidate individual intentions regarding the adoption and utilisation of technology.

The TAM, developed by Davis (1985, 1989), proposes that the acceptance of new technology depends on users' behaviours, which are influenced by their perceptions of the technology's usefulness and ease of use. Davis (1989) defines perceived usefulness as 'the degree to which a person believes that using a particular system would enhance his or her job performance' and perceived ease of use as 'the degree to which a person believes that using a particular system would be free of effort'. Conversely, the TRA considers that individual intentions are influenced by attitudes and subjective norms and the TPB adds the concept of perceived behavioural control to TRA.

Tsai et al. (2018) and Šumak et al. (2017) have noted that TAM has several weaknesses, including insufficiently capturing individuals' viewpoints on new systems (Almagrashi et al. 2023). To address limitations in previous models, Venkatesh et al. (2003) developed the UTAUT, which integrates elements from various earlier models. UTAUT has been widely applied in diverse contexts, including internal auditing, to identify the factors impacting the implementation of technology (Almagrashi et al. 2023).

The UTAUT is a theoretical framework developed to explain the determinants of user acceptance and usage behaviour towards IT. UTAUT provides a comprehensive understanding of the factors influencing technology adoption. In the context of internal and continuous auditing, the UTAUT has been employed by several researchers, including Al-Hiyari, Hattab and Al Said (2019), Almagrashi et al. (2023), Gonzalez, Sharma and Galletta (2012), Mahzan and Lymer (2014) and Mokhitli and Kyobe (2019). Previous studies suggest that the adoption and utilisation of CAATs within the internal audit function are widely used in data analysis because of their ability to enhance audit procedures (Al-Hiyari, Hattab & Al Said 2019; Almagrashi et al. 2023).

To examine the factors that influence user intentions to adopt technology, the UTAUT compares four main constructs: facilitating conditions, social influence, effort expectancy and performance expectancy. Because these constructs encompass a variety of determining factors for behavioural intention and usage, UTAUT can help identify the factors affecting internal auditors' intentions to use continuous auditing in Saudi Arabian companies. This understanding allows companies to address these factors effectively. Consequently, the second conceptual framework of this research is grounded in UTAUT to investigate the factors influencing internal auditors' intentions to use continuous auditing in Saudi Arabian companies.

The main three constructs that determine behavioural intention in the UTAUT are social influence, effort expectancy and performance expectancy. Facilitating conditions and behavioural intention determine usage behaviour. It is appropriate to assume that effort expectancy, social influence, performance expectancy and facilitating conditions collectively affect behavioural intention. This approach was adopted by Al-Hiyari, Hattab and Al Said (2019), Bierstaker, Janvrin and Lowe (2014), Gonzalez, Sharma and Galletta (2012) and Mahzan and Lymer (2014). This assumption aligns with the UTAUT framework, which aims to investigate behavioural intention to use technology. According to Venkatesh et al. (2003), anxiety and self-efficacy do not directly affect behavioural intention in UTAUT.

> UTAUT provides a useful tool for managers needing to assess the likelihood of success for new technology introductions and helps them understand the drivers of acceptance in order to proactively design interventions (including training, marketing, etc.) targeted at populations of users that may be less inclined to adopt and use new systems. (Venkatesh et al. 2003, p. 426)

UTAUT is a useful theoretical framework for assessing the factors that affect user intentions to adopt technology within organisations. It helps in understanding and addressing the factors that may lead to lower utilisation and acceptance of technology. Next, this discussion will further describe the four main constructs in the UTAUT: facilitating conditions, social influence, effort expectancy and performance expectancy.

Facilitating conditions refer to 'the degree to which an individual believes that an organisational and technical infrastructure exists to support use of the system' (Venkatesh et al. 2003, p. 453). Social influence is 'the degree to which an individual perceives that important others believe he or she should use the new system' (Venkatesh et al. 2003, p. 451). Effort expectancy is 'the degree of ease associated with the use of the system' (Venkatesh et al. 2003, p. 450). Performance expectancy is 'the degree to which an individual believes that using the system will help him or her to attain gains in job performance' (Venkatesh et al. 2003, p. 447). User intentions refer to an individual's motivation or plan to engage in a specific behaviour, specifically the use of technology (Venkatesh et al. 2003).

Finally, this study will examine the influence of social factors, effort expectations, performance expectations and facilitating conditions on the intentions of internal auditors

to use continuous auditing. Grounded in the UTAUT, this investigation aims to determine the factors that drive internal auditors' intentions to use continuous auditing in companies in Saudi Arabia.

4.2.2 Proposed Conceptual Frameworks

Figure 1, the first conceptual framework of the research, contributes to resource-based theory by providing support and broadening its usage in the research of internal audit effectiveness.

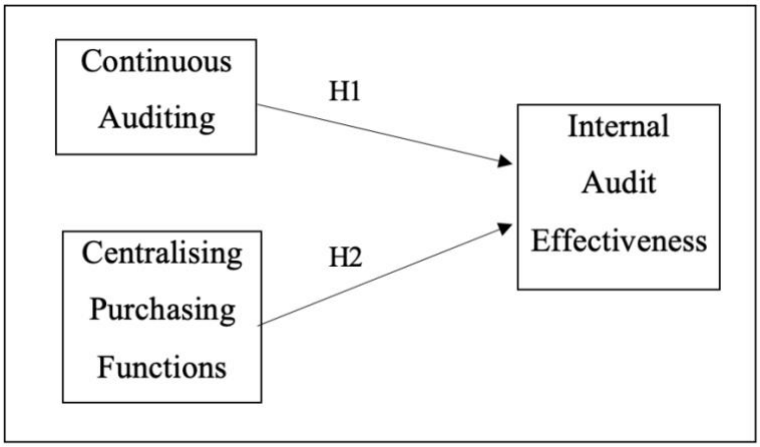

Figure 1: First Conceptual Framework of the Research

Using the resource-based theory, the first conceptual framework of this research proposes that implementing continuous auditing and centralising purchasing functions positively affects the effectiveness of internal auditing in non-financial companies in Saudi Arabia. The integration of business processes and the implementation of continuous auditing enhance the effectiveness of audit processes (Vasarhelyi, Alles & Kogan 2004). Continuous auditing offers benefits in fortifying internal control capabilities and optimising the efficiency of company operations (Wiegerinck 2019). Specifically, implementing continuous auditing and centralising purchasing functions are expected to improve internal audit effectiveness, reduce the risk of fraud and errors and facilitate the identification and management of key risks and controls.

According to Mokhitli and Kyobe (2019), the adoption of continuous auditing increases the effectiveness of internal auditing. Similarly, the integration of business processes is essential for the efficiency of audit processes (Vasarhelyi, Alles & Kogan 2004). Furthermore, integrating business processes gives auditing its full power (Vasarhelyi,

Alles & Kogan 2004). As Kuhn and Sutton (2010) have noted, integrating the internal controls process is considered a best practice when developing a system for continuous auditing. Keshavamurthy and Narsipur Venkatesh (2020, p. 37) state that 'a centralised purchasing structure entails greater transparency, proper recording, and reporting of transactions'. The application of resource-based theory in this conceptual framework provides valuable insights into improving internal audit effectiveness in non-financial companies through the implementation of continuous auditing and centralised purchasing functions. Consequently, the following hypotheses are presented:

Hypothesis 1: Continuous auditing is significantly associated with internal audit effectiveness.

Hypothesis 2: Centralising purchasing functions is significantly associated with internal audit effectiveness.

Figure 2 illustrates how the second conceptual framework of the research accords with the UTAUT.

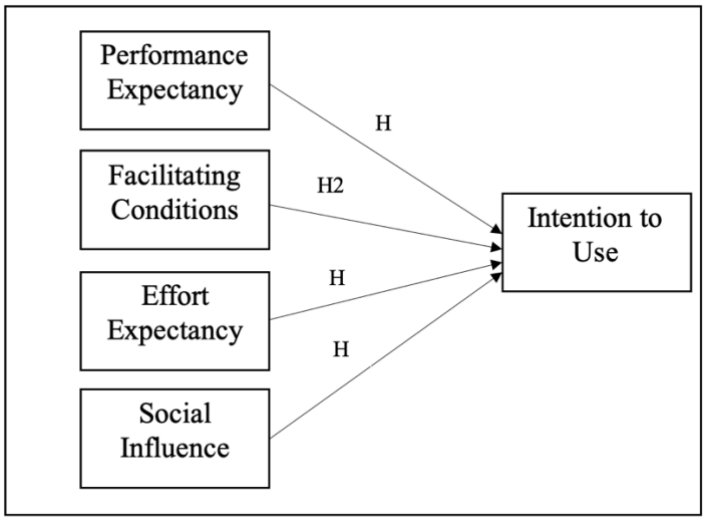

Figure 2: Second Conceptual Framework of the Research

Using the UTAUT, the second conceptual framework of the research assumes that four factors performance expectations, facilitating conditions, effort expectations and social factors have the ability to affect internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia. This approach has been adopted by Al-Hiyari, Hattab and Al Said (2019), Bierstaker, Janvrin and Lowe (2014), Gonzalez, Sharma and Galletta (2012) and Mahzan and Lymer (2014). Therefore, this conceptual

framework will investigate these four factors and their influence on internal auditors' intentions to use continuous auditing, aiming to provide a deep understanding of the main drivers behind the adoption of continuous auditing. This framework was utilised by Gonzalez, Sharma and Galletta (2012) in the context of continuous auditing.

In recent decades, significant researchers have dedicated their efforts to investigating the performance expectations of using continuous auditing. Audit standards have recently boosted the importance of auditors using CAATs to enhance the effectiveness of the audit (Serpeninova, Makarenko & Litvinova 2020). CAATs are used by internal auditors to conduct continuous auditing (Wu et al. 2017). According to Samagaio and Diogo (2022), internal auditors' performance is better when they use CAATs. A study conducted in Jordan by Al-Hiyari, Hattab and Al Said (2019) has found that performance expectancy significantly affected internal auditors' intentions to use CAATs. Performance expectations are seen as the extent to which individuals believe that using a system would contribute to increase a job performance (Venkatesh et al. 2003).

Previous studies have found that the anticipation of internal auditors re the performance of continuous auditing has a substantial effect on their motivation to adopt continuous auditing. There are many features of continuous auditing such as analytic capabilities, enhance internal controls, continuous monitoring, errors and fraud detections (Vasarhelyi, Alles & Kogan 2004). Because of these features, there are positive internal auditors' perceptions toward using continuous auditing (Gonzalez, Sharma & Galletta 2012). The perceived usefulness of technology has a positive effect on auditors' propensity to utilise it (Pedrosa, Costa & Aparicio 2020). Samagaio and Diogo (2022) have found that the usage of IT increases the analytical proficiency of internal auditors. According to Venkatesh et al. (2003), performance expectations are seen as highly crucial indicators for whether individuals adopt the new technology. Therefore, the expectations of internal auditors regarding the performance of continuous auditing are a critical indicator for its adoption and utilisation. Given the findings from prior studies, the following hypotheses is presented:

> **Hypothesis 3:** Performance expectancy has a positive impact on internal auditors' intentions to use continuous auditing.

Unlike the majority of past studies, this study investigates both positive and negative factors that affect internal auditors' intentions to use continuous auditing. Prior studies

show that there is a lack of facilitating conditions and negative effort expectancy and social influence toward implementing continuous auditing (Mokhitli & Kyobe 2019; Sun 2012; Wiegerinck 2019). Facilitating conditions are the beliefs of individuals that infrastructure is available to support the utilisation of technology, whereas effort expectancy concerns the beliefs of individuals about the ease of the use of technology (Venkatesh et al. 2003). In contrast, social influence concerns the influence of other people on a person re the use of a technology (Venkatesh et al. 2003).

The technological audit tools, internal auditors' capability and auditing environment have been identified as the main factors that prevent internal auditors from using IT for continuous auditing (Mokhitli & Kyobe 2019). According to Mokhitli and Kyobe (2019), facilitating conditions include the organisational IT infrastructure and its availability to enable internal auditors to implement continuous auditing successfully. Additionally, lack of IT infrastructure is an obstacle for using IT (Omoteso 2006). A study conducted by Wiegerinck (2019) found that continuous audit has high costs concerning the potential added worth and some companies look for another choice for internal audit that has fewer costs.

Prior studies have found that internal auditors' capabilities and the auditing environment they work in are the main indicators that prevent them from using continuous auditing (Mokhitli & Kyobe 2019; Vasarhelyi et al. 2012). Sun (2012), for instance, notes that organisational culture affects continuous auditing, contributing to whether it is successful or unsuccessful. Additionally, technical skills and technology abilities are extremely important for continuous auditing (Hardy 2014). A study conducted by Vasarhelyi et al. (2012) to investigate the adoption of continuous auditing by internal auditors found that many companies encounter challenges with utilising IT and keeping up with the necessary skills. This is because technology evolves over time. To adapt to changes in IT, it can be necessary for individuals to acquire new sets of skills so that they can comprehend and effectively interact with the changing technology (Vasarhelyi et al. 2012).

According to Wiegerinck (2019), the disadvantages of continuous auditing include challenges related to internal control, the necessity of a robust IT infrastructure, high implementation costs and the demand for skilled human resources. Hardy's (2014) study found that the successful implementation of continuous auditing requires a thorough comprehension of the unique responsibilities of each stakeholder and how their combined

efforts contribute to its effectiveness; this necessitates a nuanced understanding of the responsibilities inherent to each party involved, fostering effective collaboration and ensuring a coordinated effort among stakeholders. There is a need to enhance the competency of internal auditors to use IT for efficient continuous auditing (Mokhitli & Kyobe 2019). Additionally, the application of continuous auditing is affected by its users' capabilities (Wiegerinck 2019).

Given the findings of prior studies, this study defines facilitating conditions as the lack of necessary instruments and high costs, which are hypothesised to negatively affect internal auditors' intentions to use continuous auditing. Additionally, perceived complexity is measured as a negative aspect of effort expectancy, which is expected to reduce internal auditors' intentions to adopt continuous auditing. This approach follows the method used in a study by Al-Hiyari, Hattab and Al Said (2019). Furthermore, this study posits that negative social influence, characterised by organisational beliefs that continuous auditing will not enhance internal auditors' performance or audit quality, significantly lowers internal auditors' intentions to adopt continuous auditing. Consequently, the following hypotheses are presented:

> **Hypothesis 4:** Facilitating conditions have a negative impact on internal auditors' intentions to use continuous auditing.
>
> **Hypothesis 5:** Effort expectancy has a negative impact on internal auditors' intentions to use continuous auditing.
>
> **Hypothesis 6:** Social influence has a negative impact on internal auditors' intentions to use continuous auditing.

Using resource-based theory, this study aims to investigate the impact of continuous auditing and centralising purchasing functions on the internal audit effectiveness in non-financial companies of Saudi Arabia. Informed by UTAUT, the study also examines the factors that affect internal auditors' intentions to use continuous auditing in their companies. All the questions in this study were formulated in accordance with existing literature reviews from past studies. The measuring items in both conceptual frameworks of this study are presented in Table 4.1, as well as the outcomes of the reliability tests by Cronbach's alpha values. These measurement items of this study were adopted from prior

studies (AI-Fehaid 2003; ALshbiel 2017; Alzeban & Gwilliam 2014; Mohammad, Afza & Haslinda 2019; Omoteso 2006; Salehi 2016; Tackie et al. 2016; Vicente 2008).

Table 4.1: Indicators of Independent and Dependent Variables for the Conceptual Frameworks of the Study

Variables	Measurement Items	Kind of Question	Reliability (Cronbach's Alpha Values)
Continuous auditing (independent variable in the first conceptual framework of the study)	To what extent does your company use the continuous auditing? Continuous auditing helps internal auditors in fraud detection. Continuous auditing helps internal auditors in fraud investigation. Continuous auditing enhances the decisions usefulness of financial information for users. Continuous auditing increases the efficiency of the internal audit process. Continuous auditing reduces the waste and abuse of the warehouses inventory in the company. Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company. Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company. Your company plans to increase the implementation of continuous auditing in the future. How often do you use computers for your internal audit tasks in your company? How often do you use IT tools and techniques in planning of your internal audit assignments? How often do you use IT tools and techniques in assessment of internal control system? How often do you use IT tools and techniques in recording your internal audit tasks? How often do you use IT tools and techniques in data analysis of your internal audit tasks? How often do you use IT tools and techniques in performing substantive tests? How often do you use IT tools and techniques in Fraud detection and investigation? How often do you use IT tools and techniques in Reporting your internal audit tasks? The refusal of your company to use IT tools and techniques could lead to low-quality internal audits. The use of IT tools and techniques has made your performance more satisfactory to you as an auditor. The use of IT tools and techniques has enhanced your commitment to your firm's goals. The increased adoption of IT in the internal audit process has aided your professional career development.	Frequency scale Five-point Likert scale	0.911

Variables	Measurement Items	Kind of Question	Reliability (Cronbach's Alpha Values)
	The use of IT for internal audit tasks by your firm gives it a comparative advantage over its competitors who do not use IT.		
	The use of IT tools and techniques for your internal audit tasks gives you an advantage over your colleagues who use IT tools lesser or do not use them.		
	The use of IT tools and techniques ..... your professional competence.		
	The use of IT tools and techniques ..... the scope of your professional expertise.		
	The use of IT tools and techniques ..... your fairness and sense of justice.		
	Audit automation ..... the internal audit efficiency.		
	IT tools and techniques are important instruments for risk assessment.		
	IT tools and techniques are important instruments for fraud detection.		
	IT tools and techniques are important instruments for fraud investigation.		
	The use of IT tools and techniques saves time and effort devoted to controlling testing.		
	The use of IT tools and techniques saves time and effort devoted to substantive testing.		
Centralising purchasing functions (independent variable in the first conceptual framework of the study)	Your company is adopting the centralising purchasing functions of the materials.	Five-point Likert scale	0.917
	Your company is adopting the centralising purchasing functions of the inventories of the warehouses.		
	Your company is adopting the centralising purchasing functions of the equipment.		
	The centralising purchasing functions increases the efficiency of the warehouses' operations in your company.		
	The centralising purchasing functions reduces the inventory costs in your company.		
	The centralising purchasing functions reduce the materials costs in your company.		
	The centralising purchasing functions reduces the equipment costs in your company.		
	The centralising purchasing functions in your company enhances the supply chain efficiency.		
	The centralising purchasing functions reduces the surplus inventories in your company warehouses.		
	The centralising purchasing functions increases the internal auditing process efficiency in your company.		
	The centralising purchasing functions enhances the efficiency of the internal control in your company.		
	There is a procurement audit in your company.		

Variables	Measurement Items	Kind of Question	Reliability (Cronbach's Alpha Values)
	Implementing centralising purchasing functions in your company requires implementing a continuous auditing approach in your company. The centralising purchasing functions reduces the potential for fraud, waste and abuse in the company.		
Internal audit effectiveness (dependent variable in the first conceptual framework of the study)	Internal audit improves the organisation's productivity. Internal audit improves organisational performance. Internal audit evaluates the internal control system. Internal audit makes recommendations for improving the internal control system when appropriate. Internal audit determines the adequacy and effectiveness of the organisation's systems of internal accounting and operating controls. Internal audit reviews the economic, effective and efficient use of resources. Internal audit reviews operations and programmers to ascertain whether results are consistent with established objectives and goals. Internal audit provides adequate follow-up to ensure that appropriate corrective action is taken and that it is effective. Internal audit reviews the accuracy and reliability of financial reports.	Five-point Likert scale	0.924
Performance expectancy (independent variable in the second conceptual framework of the study)	Continuous auditing helps internal auditors in fraud detection. Continuous auditing helps internal auditors in fraud investigation. Continuous auditing enhances the decisions usefulness of financial information for users. Continuous auditing increases the efficiency of the internal audit process. Continuous auditing reduces the waste and abuse of the warehouses inventory in the company. Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company. Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company.	Five-point Likert scale	0.879
Facilitating conditions (independent variable in	Continuous auditing is too costly. There is not enough infrastructure in your firm to support the implementation of continuous auditing. There is a lack of efficient internal control systems in your company.	Five-point Likert scale	0.777

Variables	Measurement Items	Kind of Question	Reliability (Cronbach's Alpha Values)
the second conceptual framework of the study)			
Effort expectancy (independent variable in the second conceptual framework of the study)	Continuous auditing is too complex.	Five-point Likert scale	
Social influence (Independent variable in the second conceptual framework of the study)	Your firm thinks that continuous auditing will not improve the internal auditors' performance and the quality of internal audit.	Five-point Likert scale	
Intention to use (Dependent variable in the second conceptual framework of the study)	Your company plans to increase the implementation of continuous auditing in the future.	Five-point Likert scale	

4.2.3 Research Strategy

A research strategy is the overall plan to address a specific research problem (Robson 2011). Saunders, Lewis and Thornhill (2009) have stated that no research strategy is inherently superior or inferior to others; what matters is that the chosen research strategy effectively guides researchers in addressing their research questions and achieving their research objectives. It is beneficial to describe the research strategy to ensure it aligns with the research questions and meets the research objectives.

4.2.3.1 Survey Research

There are two types of survey research methods: questionnaires and interviews. This research adopted a survey research design using a questionnaire method to collect data. The primary data were gathered from internal auditors in non-financial companies in Saudi Arabia. Survey research aims to gather primary data from a sample with the main goal of analysing the data and generalising the findings to the larger population (Collis & Hussey 2009). Survey research is a research strategy that utilises a consistent format and gathers data in a standardised manner from a significant number of individuals, selecting samples from a specific population (Robson 2011).

Ghauri and Gronhaug (2010) have defined surveys as a data-gathering strategy that involves the use of questionnaires or interview methods to record the responses and attitudes of participants. There are many reasons for utilising survey research, such as establishing data for examining hypotheses, characterising phenomena, analysing conditions and offering clarifications (Remenyi et al. 1998). Zikmund et al. (2010) have described the survey as a process that collects data from a sample of individuals. The most common data-gathering method in business research is the survey. Survey research provides an economical and effective means of evaluating data about a population.

Survey research methods are considered accurate and scientific because of their systematic approach (Zikmund et al. 2010). The main objective of most survey research is to describe a population's characteristics or choices by utilising a sample (May 2011). Survey methods can facilitate the gathering of quantitative data that can be analysed using explanatory statistics, allowing for explanations about the relationships between variables (Saunders, Lewis & Thornhill 2009). Robson (2011) has stated that surveys provide a

straightforward approach to investigate situations, values, beliefs and motivations, and that they allow data to be gathered from a sample to generalise the outcomes to the larger population.

There are many ways to conduct surveys, such as face-to-face, online or by mail. This research adopted an online questionnaire method to collect data. There are weaknesses associated with surveys, including low response rates, ambiguities and response biases related to questionnaires. Despite the weaknesses of surveys, there are numerous benefits, as have been highlighted. Therefore, given these advantages, using a survey with a questionnaire method is a suitable strategy for this research.

4.2.4 Research Procedures and Techniques

After determining the study strategy, it is crucial to discuss the design of the data-gathering method. As has been outlined, the primary data collection procedure for this research is the questionnaire method, which gathers quantitative data. The following section will discuss the design of the questionnaire

4.2.4.1 Questionnaire

As noted, a questionnaire is a prevalent data-gathering method in business studies. As mentioned above, the main data collection technique for this study is an online questionnaire, which is considered an effective and suitable technique for gathering data. According to Bell, Bryman and Harley (2019), questionnaires provide valuable data. The primary reason for choosing a questionnaire as the data collection method for this study is its usefulness and effectiveness. A questionnaire enhances the generalisability of the outcomes and provides high accuracy in participants' responses.

According to Bell, Bryman and Harley (2019), if the research sample is widely dispersed, an online questionnaire is an efficient method because it requires less time and cost. There is potential to distribute the online questionnaire to a considerable number of people simultaneously. In addition, the online questionnaire method has minimal costs for gathering a large quantity of data from many participants. An online questionnaire is considered more appropriate for participants because they can complete it at their convenience (Bell, Bryman & Harley 2019). There are some disadvantages associated with using questionnaires. One of them is that participants may misunderstand certain

questions, leading to incorrect answers. Additionally, there is a need to follow-up with participants to ensure they complete the online questionnaire (Bell, Bryman & Harley 2019).

Another disadvantage of the questionnaire is that some participants may provide biased responses, leading to incorrect answers. Moreover, researchers may experience a low response rate to the questionnaire. Therefore, questionnaire questions should be carefully constructed. The wording of questions has to be carefully considered to increase the response rate to the surveys. Although, as has been noted, one significant drawback of the online questionnaire is the lower response rate (Bell, Bryman & Harley 2019), there are several strategies to improve the response rate of online questionnaires. These include following up with participants, keeping the questionnaire short and clearly explaining the purpose of the research (Bell, Bryman & Harley 2019).

A well-designed questionnaire increases the response rate (Bell, Bryman & Harley 2019). Significant attention was given to the meaning and design of the questions during preparation. The questions in this study's questionnaire were adopted from prior studies, including Al-Fehaid (2003), ALshbiel (2017), Alzeban and Gwilliam (2014), Mohammad, Afza and Haslinda (2019), Omoteso (2006), Salehi (2016), Tackie et al. (2016) and Vicente (2008). The responses to the questionnaires will provide valuable data to assess the relationships between the research variables, answer the research questions and achieve the research objectives. The questions in the questionnaire reflect the principal matters in continuous auditing, including centralising purchasing functions, internal audit efficiency, performance expectations, facilitating conditions, effort expectations, social factors and internal auditors' intentions to use continuous auditing as addressed in the literature review (see Chapter 3).

The questionnaire in this study includes 134 close-ended questions (see Appendix A, B). The closed-ended questions in the questionnaire are formulated using a Likert scale format and a frequency scale. One disadvantage of close-ended questions is that they may introduce bias by only offering a limited set of choices.

4.2.4.2 Pre-Testing and Pilot Study of the Questionnaire

Conducting the questionnaire's pre-testing and piloting is crucial to gather input regarding its layout and the validity of the measuring items included in the study.

Furthermore, these assessments attempt to identify and address any challenges that participants may encounter in comprehending and answering the questions, assuring their suitability. According to De Vaus (2013), the questionnaire needs to be pre-tested and a pilot study before it is formally distributed in a study. Therefore, pre-testing and piloting the questionnaire were conducted in this study to detect any potential weaknesses in the layout, uncover hidden issues, assess the administration of the questionnaire and ensure the suitability and validity of the measurement items.

Before the pilot study commenced, the questionnaire had several pre-testing procedures. Initially, it was examined by the supervisory team, which advised adding certain questions regarding the company size, the scale of the internal audit department and whether respondents worked as internal auditors within the internal audit department. These suggestions were incorporated into the questionnaire as per the supervisory team's guidance. To ensure that participants who were not proficient in English could still participate, the questionnaire was translated from English to Arabic by the researcher. This step was intended to make the study more accessible. Following this, the researcher sent both the English and Arabic versions to a certified translator at the National Accreditation Authority for Translators and Interpreters (NAATI) in Australia for additional revisions. The NAATI-certified translator recommended further modifications to improve the precision of the Arabic translation, which the researcher then applied. After implementing these changes, the revised Arabic version was once again sent to the NAATI-certified translator, who gave their approval of the final version.

After translating the questionnaire into English and Arabic, it was distributed to a group of ten individuals who hold a PhD degree and another group of ten individuals who were pursuing a PhD degree, all of whom have expertise in the fields of accounting and auditing, along with a certified public accountant and five internal auditors in Saudi Arabia companies. This review was intended to gather additional feedback on the design of the questionnaire, identify any underlying issues, evaluate the administration process and confirm the suitability and validity of the measurement items. The response received was affirming, validating the questionnaire's validity and clarity; however, it contained suggestions for modifications. After consulting with the supervision team, the researcher decided to implement certain modifications to enhance the questionnaire. After that, the revised Arabic version was sent to a NAATI-certified translator for approval.

Following the pre-testing of the questionnaire, a pilot study was conducted with a sample of 20 internal auditors employed in non-financial companies in Saudi Arabia. This sample represented the target population for the main study. These participants were asked to provide their feedback regarding the questionnaire, making particular reference to layout, identifying any concealed problems, evaluating the reliability and validity of the questions and clarifying the wording. The questionnaire was distributed using the Victoria University Qualtrics Survey Software. The participants provided favourable comments and stated that the questionnaire was clear and easily understandable. Given the insufficient sample size, the data collected from the pilot study was not subjected to analysis using SPSS.

4.2.4.3 Sample Size, Procedures and Data Analysis

Sampling is a useful tool for gaining information about the topic under investigation. Additionally, sampling allows researchers to obtain study data from a subset of the population (Zikmund et al. 2012). Sampling is a common method in business research for data collection. The aim of sampling is to evaluate and estimate the characteristics of a target population. This helps to generalise the sample's results to the entire population. To achieve effective sampling in a study, it is necessary to identify participants with reference to specific characteristics. The participants in this research are internal auditors employed by non-financial companies in Saudi Arabia. These non-financial companies include both public and private sector organisations.

There are many studies concerned with determining the appropriate sample size (see, e.g., Coakes 2013; Field 2018; Hair et al. 2013; Miles & Shevlin 2001; Pallant 2020; Stevens 1994; Tabachnick & Fidell 1996). Miles and Shevlin (2001) have proposed that the following heuristic approach can be used to determine sample size. If a significant impact is expected, then a sample size of 80 will be adequate with up to 20 per predictor; if a medium impact is expected, then a sample size of 200 will be sufficient; and if a small impact is expected, then a sample size of 600 will be appropriate. Hair et al. (2013) proposed that a sample size needs to be at least five times the number of independent variables in the model. Coakes (2013) recommended at least five cases per variable. In contrast, Tabachnick and Fidell (1996) have suggested ten cases for each predictor.

Previous studies provided several ways to estimate the suitable sample size for the regression model. According to Field (2018), the most popular methods for the appropriate sample size would require ten or 15 cases for each independent variable in the linear model. Additionally, there would be a need for 15 cases for each of the independent variables for efficient equation (Stevens 1994). Similarity, 15 cases would be efficient for each of the independent variables in the model (Pallant 2020). With six or less independent variables in the linear model, a sample size of 100 would be appropriate (Field 2018).

Tabachnick and Fidell (2013) also proposed a formula to calculate an appropriate sample size according to the number of independent variables: $N > 50 + 8m$, where m is the number of total independent variables in the model used in the study. Accordingly, for the first conceptual framework comprising two independent variables, the minimum sample size required would be 67 participants. For the second conceptual framework involving four independent variables, the minimum sample size required would be 83 participants. This study sample size included 160 participants, exceeding the size of the sample needed for both frameworks. Therefore, this study sample size is appropriate for conducting a linear regression model.

According to the literature, this study has met the requirements concerning an appropriate sample size. Therefore, the appropriate sample size of this study is 160 internal auditors. The participants of this research are internal auditors from non-financial companies in Saudi Arabia because they will provide valuable data about the research phenomena. Because it would be hard to cover the whole internal auditors of non-financial companies in Saudi Arabia, this research focuses on 160 internal auditors from non-financial companies. The sample size of 160 participants provides relevant and reliable insight into the phenomenon of this research.

In comparison, Samagaio and Diogo (2022) conducted a study to investigate the adoption of CAATs by internal auditors in Portuguese private and public organisations with a sample size of 60 internal auditors. An empirical study in the Nigerian financial sector conducted by Adejumo (2019) to examine the power of the internal audit function had a sample size of 88 internal auditors. A study conducted by AI-Fehaid (2003) to investigate the influence of IT on the audit risks in Saudi Arabia had a sample size of 71. Al-Twaijry

et al. (2003) conducted a study to investigate the devolvement of internal audit in Saudi Arabia and their sample size was 78 directors of internal audit departments.

In the instance of this study, the questionnaire was distributed to many internal auditors in non-financial companies in Saudi Arabia to increase the research participation rate. The distribution of the questionnaires commenced in February 2023 and continued until July 2023. The online questionnaire used in this research was distributed using Victoria University Qualtrics Survey Software, which would enable to increase in the research participation rate. The online questionnaire and this research confirmed the participants' anonymity and privacy. The questionnaire used in the study has 134 questions. Specifically, this study used an online questionnaire distributed via a link sent to internal auditors in non-financial companies in Saudi Arabia. The researcher contacted many internal auditors in these companies and invited them to participate in the study. The methods of communication with participants included emails, text messages and phone calls. The questionnaire provided detailed explanations of the nature and objectives of the study, as well as the researcher's contact information for any questions. Many of the internal auditors who participated in this study asked the researcher questions regarding the study and the questionnaire, which the researcher answered.

Throughout these preliminary contacts with the targeted participants, the researcher received strong support from both his past colleagues in the non-financial companies' sector in Saudi Arabia and his professional colleagues who are members of the KSAIIA and Saudi-certified public accountants and certified public accountants. It is significant to make preliminary contacts with the targeted participants because this will increase the questionnaire response (Al-Twaijry et al. 2003). Although the researcher also contacted the KSAIIA to help to distribute the online questionnaire to their members, the KSAIIA were not able to provide this service. The contact with target participants was by email, text messages, phone calls and through the social network, LinkedIn. This latter method was adopted by Samagaio and Diogo (2022), who used the social network LinkedIn to contact the internal auditors and obtain data in their study.

Finally, as has been noted, collected data were analysed using the SPSS latest version. SPSS software is widely used in research. This study employed two multiple regression analyses, estimated using OLS methods.

4.2.5 Validity

The validity of items in a study is paramount for accurately measuring and collecting data. Validity of a scale ensures that measurement tools accurately capture what they are supposed to measure (Pallant 2020). Two types of validity evaluation were conducted during both the pre-testing and pilot study phases.

The first type was content validity, which involved reviewing the items in the questionnaire to ensure that they accurately covered the domain of interest. This content validity assessment was conducted and evaluated through the judgement of experts who were PhD holders and students in the field of accounting and auditing, as well as a certified public accountant and several internal auditors in Saudi Arabia companies.

The second type of validity assessment conducted was face validity, which evaluated whether the measurement tools of this study appeared to measure what they were intended to measure. The face validity assessment was carried out through the pre-testing study aimed at assessing the suitability of the questions and items. The outcome indicated that the measurement tools used in this study demonstrated both content and face validity.

4.2.6 Reliability

Reliability refers to the internal consistency and the appropriateness of the measurements and the outcomes. The most used measure to determine reliability is Cronbach's coefficient alpha using SPSS (Pallant 2020). If a study is reliable, it would provide consistent and repeatable outcomes when it is repeated. Cronbach's coefficient alpha provides average correlations between the items within a scale (Pallant 2020).

Cronbach's coefficient alpha using SPSS tests was conducted to investigate the reliability of this research variables. Cronbach's coefficient alpha aims to evaluate the extent to which the items within the scale are correlated with each other. According to Pallant (2020), the range of Cronbach's coefficient alpha is 0 to 1, with greater scores meaning greater reliability. Table 4.2 shows that Cronbach's coefficient alpha scores were high and in acceptable range.

The Cronbach's coefficient alpha values for continuous auditing, centralising purchasing functions, internal audit effectiveness and performance expectancy were high. In contrast,

it was not high in facilitating conditions because there were only three items in this variable. If there are a few items in a variable, Cronbach's coefficient alpha score would be a small (Pallant 2020).

Table 4.2: Researcher Construction

Variables	Cronbach's Alpha Values	Number of Items
Continuous auditing	0.911	32
Centralising purchasing functions	0.917	14
Internal audit effectiveness	0.924	9
Performance expectancy	0.879	7
Facilitating conditions	0.777	3

4.2.7 Ethics Approval

To gather the data for this research, it was necessary to gain Ethics Committee approval at Victoria University. Therefore, an application for ethical research involving people was sent to the Human Research Ethics Committee at Victoria University, which approved the application. This research confirmed the participants' anonymity and privacy. There is a consent form for the participants included at the beginning of the online questionnaire (see Appendix A, B).

4.3 Conclusion

A quantitative methodology was adopted in this research because it is appropriate for answering the research questions. This chapter has described the research approach, theoretical frameworks, the proposed conceptual framework of the study, the research strategy, survey research, research procedures and techniques, questionnaire, pre-testing and pilot study of the questionnaire, sample size and procedures and data analysis and ethics approval. The next chapter will discuss the analysis of the data collected by the questionnaires. The method of data analysis will be the descriptive analysis and two multiple regression analyses estimated using OLS methods.

Chapter 5: Analysis of the Research Data

5.1 Introduction

This chapter will outline the analysis of the primary data collected through an online questionnaire completed by 152 internal auditors. The main objective of the analysis of the primary data of this study is to answer the main research questions, which are addressed by six hypothesises (described in Chapter 4). The main research questions are:

- How do continuous auditing and centralising purchasing functions influence the effectiveness of internal audits in non-financial companies in Saudi Arabia?
- How do performance expectations, facilitating conditions, effort expectations and social factors influence internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia?

The methods used for data analysis include descriptive analysis, an outliers test, normality tests, multicollinearity tests, a multiple linear regression test and correlation test statistics using the latest version of the SPSS. This approach aims to comprehensively understand the relationships between the variables under investigation.

Having a data-cleaning process before analysing the primary data is very important. Some data may include some invalid responses, errors and missing values. Data cleaning aims to avoid these issues and increase the reliability of the analysis. The data-cleaning process for this study is presented in Table 5.1.

Table 5.1: Data-Cleaning Process

Category	Response Tally	Decision	Reason for Decision
Total number of responses received	217		
Incomplete responses	63	Deleted	Not valid
Outliers	2	Deleted	These two cases have standardised residuals more than above +3.3 (see section. 5.4.4.1.2)
Valid responses	152	Used in analysis	Useful responses

Table 5.1 shows that 217 questionnaires were received, but only 152 valid responses were included in the data analysis for this study. Sixty-three responses were deemed incomplete and invalid and two additional responses were identified as outliers (see section 5.4.4.1.2). Because they could potentially affect the study's results, these outliers were excluded from the data analysis, along with the 63 incomplete responses.

5.2 Respondents' Rate

Table 5.2 presents the response rate of 95% for this study. As described in section 4.2.4.3, although the initial sample size was 160, only 152 responses were deemed useful and valid. This study's 95% response rate is effective, providing efficient and effective data.

Table 5.2: Respondents' Rate

Participants	Sample Size	Useable Responses	Response Rate
Internal auditors	160	152	
Total	160	152	95%

Source: Survey (Appendix A).

5.3 Descriptive Analysis

The main aim of the descriptive analysis within this chapter is to comprehensively present the detailed features and characteristics of the respondents and their companies. Frequency, mean, mode and standard deviation methods have been used to describe the data. According to Cronk (2019), the frequencies method is a useful method for descriptive analysis and provides more information than a mean. All 152 participants in this study consented to participate and are internal auditors and internal audit employees in non-financial companies in Saudi Arabia. To provide broader context and supplementary insights, several additional questions are analysed. Although these questions are not directly tied to the primary models of this research, their analysis helps deepen the understanding of the broader context of the study.

5.3.1 Gender

Table 5.3 presents the participants' gender. Out of the 152 participants in this study, 80.3% were male and 19.7% were female. This rate shows that there are more males than females in non-financial companies in Saudi Arabia.

Table 5.3: Participants' Gender

Gender	Frequency	Percentage	Cumulative Percentage
Male	122	80.3	80.3
Female	30	19.7	100.0
Total	152	100.0	

Source: Survey (Appendix A).

5.3.2 Age

Table 5.4 shows that approximately half of the participants in this study are in the age group of 30 to 39 years old. Additionally, more than a quarter of the participants, specifically 26.3%, fall into the age group of 20 to 29 years old. The remaining 7.9% belong to the age group of 50 to 59 years old. These data emphasise that most internal auditors in Saudi Arabia's non-financial companies are young.

Table 5.4: Participants' Ages

Age Groups	Frequency	Percentage	Cumulative Percentage
20–29 years old	40	26.3	26.3
30–39 years old	70	46.1	72.4
40–49 years old	30	19.7	92.1
50–59 years old	12	7.9	100.0
60 and above years old	0	0	
Total	152	100.0	

Source: Survey (Appendix A).

5.3.3 Work Experience

Table 5.5 shows the internal auditors' work experience in the internal audit function. More than a quarter of the participants, specifically 25.7%, possessed 12 years or more of experience in the internal audit function. In contrast, around a quarter of the respondents, specifically 24.3%, had less than three years of experience in the internal audit function, and another 21.1% of the participants had experience ranging from three to less than six years in the internal audit function. This is expected because most internal auditors in non-financial companies in Saudi Arabia are young and have limited experience in internal audit functions. The remaining 19.7% of participants had experience ranging from six to less than nine years in the internal audit function. These

data indicate a notable lack of experience among internal auditors in the internal audit function within this sector of Saudi Arabia.

Table 5.5: Participants' Work Experience

Work Experience	Frequency	Percentage	Cumulative Percentage
12 years or more	39	25.7	25.7
9 to less than 12 years	14	9.2	34.9
6 to less than 9 years	30	19.7	54.6
3 to less than 6 years	32	21.1	75.7
Less than 3 years	37	24.3	100.0

Source: Survey (Appendix A).

5.3.4 Academic Qualifications

Table 5.6 presents the participants' work experience. The majority of the participants, specifically 67.1%, held Bachelor's degrees, although more than a quarter, accounting for 30.9%, possessed master's degrees. Only two participants held diplomas and one held a PhD. This data suggests that internal auditors in non-financial companies in Saudi Arabia possess a high level of education.

Table 5.6: Participants' Academic Qualifications

Academic Qualifications	Frequency	Percentage	Cumulative Percentage
PhD	1	0.7	0.7
Master's degree	47	30.9	31.6
Bachelor's degree	102	67.1	98.7
Diploma	2	1.3	100.0
High school or less	0	0	
Total	152	100.0	

Source: Survey (Appendix A).

5.3.5 Professional Qualifications

Table 5.7 presents the participants' professional qualifications, with 63.8% of the participants possessing no professional qualifications. Among the participants, 25% were certified internal auditors, 4.6% were Saudi-certified public accountants and 2% were certified public accountants. Additionally, 2.6% of participants were both certified internal auditors and Saudi-certified public accountants and 1.3% were both certified

public accountants and certified internal auditors. The remaining 0.7% were both certified public accountants and Saudi-certified public accountants. This data suggests that a significant number of internal auditors in non-financial companies in Saudi Arabia lack professional qualifications, potentially impacting their skills.

Table 5.7: Participants' Professional Qualifications

Professional Qualifications	Frequency	Percentage
None	97	63.8
Certified public accountant	3	2
Certified internal auditor	38	25
Saudi-certified public accountant	7	4.6
Certified internal auditor and Saudi-certified public accountant	4	2.6
Certified public accountant and certified internal auditor	2	1.3
Certified public accountant and Saudi-certified public accountant	1	0.7
Total	152	100.0

Source: Survey (Appendix A).

5.3.6 Company Size

Table 5.8 presents the participants' company size. Out of the 152 participants included in this analysis, 56.6% were from large companies, 25% were from medium-sized companies, 13.8% were from small companies and 4.6% were from tiny companies. These companies are from the non-financial sector within both the public and private sectors in Saudi Arabia. According to the Ministry of Commerce in Saudi Arabia, a large company is defined as having an income of 200 million Saudi riyal or more, a medium company has an income of more than 3 million and less than 200 million Saudi riyal, a small company has an income of more than 3 million and less than 40 million Saudi riyal and a tiny company has an income of 3 million Saudi riyal or less.

Table 5.8: Participants' Company Size

The Participants' Company Size	Frequency	Percentage	Cumulative Percentage
Large	86	56.6	56.6
Medium	38	25.0	81.6
Small	21	13.8	95.4
Tiny	7	4.6	100.0
Total	152	100.0	

Source: Survey (Appendix A).

5.3.7 Numbers of Employees in Companies

Table 5.9 presents the number of employees in participants' companies. As this table shows, 67.1% of the participants indicated that their companies have more than 249 employees, and 22.4% of participants reported that their companies have between 50 to 249 employees. Additionally, 9.2% of participants stated that their companies have between 6 to 49 employees, and the remaining 1.3% of participants mentioned that their companies have between 1 to 5 employees. This data indicates that there are high numbers of employees in non-financial companies in Saudi Arabia.

Table 5.9: Number of Employees in Companies

Number of Employees in Participants' Companies	Frequency	Percentage	Cumulative Percentage
The company's employees are more than 249 employees	102	67.1	67.1
The company's employees are between 50 to 249 employees	34	22.4	89.5
The company's employees are between 6 to 49 employees	14	9.2	98.7
The company's employees are between 1 to 5 employees	2	1.3	100.0
Total	152	100.0	

Source: Survey (Appendix A).

5.3.8 Numbers of Internal Auditors in Internal Audit Departments

Table 5.10 shows the numbers of internal auditors in the participants' companies' internal audit departments. Of these numbers, 46.7% of the participants indicated that their companies have fewer than five internal auditors, with another 25.7% mentioning that

they have 5 to 15 internal auditors. In contrast, 17.8% of the participants mentioned having more than 25 internal auditors and the remaining 9.9% stated having 16 to 25 internal auditors.

Table 5.10: Numbers of Internal Auditors in the Participants' Companies' Internal Audit Departments

Number of Internal Auditors in Internal Audit Department	Frequency	Percentage	Cumulative Percentage
More than 25 internal auditors	27	17.8	17.8
16–25 Internal auditors	15	9.9	27.6
5–15 Internal auditors	39	25.7	53.3
Fewer than 5 internal auditors	71	46.7	100.0
Total	152	100.0	

Source: Survey (Appendix A).

Table 5.11 presents the mode test for large, medium, small and tiny companies regarding the numbers of internal auditors in the participants' companies' internal audit departments. The mode score for large companies regarding the numbers of internal auditors in the participants companies' internal audit departments is '1 (more than 25 internal auditors)'. This means that significant numbers of large companies in Saudi Arabia have high numbers of internal auditors in the internal audit department, with numbers exceeding 25 internal auditors. In contrast, the mode score for medium, small and tiny companies regarding the numbers of internal auditors in the participants' companies' internal audit departments is '4 (fewer than five internal auditors)'. This means that significant numbers of medium, small and tiny companies have small numbers of internal auditors fewer than five internal auditors in the internal audit department.

Table 5.11: The Mode Test for Large, Medium, Small and Tiny Companies

Size of the Company	The Mode Test
Large company	1 (more than 25 internal auditors)
Medium company	4 (fewer than 5 internal auditors)
Small company	4 (fewer than 5 internal auditors)
Tiny company	4 (fewer than 5 internal auditors)

Source: Survey (Appendix A).

5.3.9 Participants' IT Skills

Table 5.12 details the participants' IT skills. Most internal auditors, 43.4%, possess good IT skills, with another 34.9% of the internal auditors having adequate IT skills. A further 10.5% indicated that they have basic IT skills, with 6.6% of internal auditors stating that they possess very basic IT skills. In contrast, the remaining 4.6% possess very good IT skills. These data suggest that most internal auditors in non-financial companies in Saudi Arabia possess a high level of IT skills.

Table 5.12: Participants' IT Skills

Participants' IT Skills	Frequency	Percentage	Cumulative Percentage
Very good (programmer)	7	4.6	4.6
Good	66	43.4	48.0
Adequate	53	34.9	82.9
Basic	16	10.5	93.4
Very basic (Windows, Word etc.)	10	6.6	100.0
Total	152	100.0	

Source: Survey (Appendix A).

5.3.10 Companies' Use of IT-Based Accounting Systems

Respondents were requested to indicate approximately the proportion of their company's use of IT-based accounting systems. This encompasses the proportion of transactions initiated, processed, saved and reported electronically to all transactions. Respondents were asked to select from five approximate proportions: 100%, 75%, 50%, 25% and 0%. Table 5.13 shows their responses.

Table 5.13: Companies' Approximate Use of IT-Based Accounting System

Approximate Use of IT-Based Accounting Systems	Frequency	Percentage	Cumulative Percentage
100%	50	32.9	32.9
75%	78	51.3	84.2
50%	17	11.2	95.4
25%	7	4.6	100.0
0	0	0	
Total	152	100.0	

Source: Survey (Appendix A).

As presented, 52% of participants stated that their companies rely on IT-based accounting systems for approximately 75% of their functions, and 33% of participants mentioned that their companies fully use IT-based accounting systems with 100% of their functions. A further 12% of participants indicated that their companies use IT-based accounting systems for only 50% of their functions. In contrast, 4.6% of participants stated that their companies use IT-based accounting systems for only approximately a quarter of their functions. This data indicates that most non-financial companies use IT-based accounting systems widely for their functions.

5.3.10.1 Companies' Use of Integrated Accounting Systems and Stand-Alone Accounting Systems

Respondents were requested to indicate approximately the proportion of their company's uses of an integrated accounting system and a stand-alone accounting system by selecting from five approximate proportion: 100%, 75%, 50%, 25% and 0%. Tables 5.14 and 5.15 present their responses.

Table 5.14: Companies Approximate Use of Integrated Accounting System

Name of the Systems	Approximate Use	Frequency	Percentage	Cumulative Percentage
Integrated Accounting System	100%	79	52.0	28.9
	75%	48	31.6	53.9
	50%	13	8.6	64.5
	25%	5	3.3	73.7
	0	7	4.6	100.0
Total		152	100.0	

Source: Survey (Appendix A).

Table 5.14 shows that a majority of the participants, specifically 52%, stated that their companies exclusively use a fully integrated accounting system, covering 100% of their functions. Additionally, 32% of the participants noted that their companies rely on an integrated accounting system for approximately 75% of their functions. A smaller portion, 9%, mentioned that their companies use an integrated accounting system for only 50% of their functions. Furthermore, 5% of participants indicated that their companies utilise an integrated accounting system for only approximately a quarter of their

functions. These data suggest the widespread use of comprehensive, integrated accounting systems among the companies.

Table 5.15 shows that 29% of participants have indicated that their companies use a fully stand-alone accounting system for their functions, covering approximately 100% of their functions. In contrast, approximately more than a quarter of participants, specifically 26.3%, have stated that their companies do not use a stand-alone accounting system for their functions. A quarter of participants, 25%, have mentioned that their companies rely on stand-alone accounting systems for approximately 75% of their functions, and 11% of participants have noted that their companies use stand-alone accounting systems for half of their functions, approximately 50%. The remaining 9% of participants have stated that their companies use stand-alone accounting systems for only approximately a quarter of their functions. These data suggest that most companies are not using stand-alone accounting systems as their primary method for recording; in contrast, most companies use an integrated accounting system.

Table 5.15: Companies Approximate Use of Stand-Alone Accounting System

Name of the System	Approximate Use	Frequency	Percentage	Cumulative Percentage
Stand-alone accounting system	100%	44	28.9	28.9
	75%	38	25.0	53.9
	50%	16	10.5	64.5
	25%	14	9.2	73.7
	0	40	26.3	100.0
Total		152	100.0	

Source: Survey (Appendix A).

5.3.10.2 Companies' Use of Ready-Made v. Customised Accounting Software

Respondents were requested to indicate approximately the proportion of their company's use of ready-made accounting software versus specific accounting software designed for their business. They were asked to select from five approximate proportions: 100%, 75%, 50%, 25% and 0%. Tables 5.16 and 5.17 present their responses.

Table 5.16: Companies' Approximate Use of Ready-Made Accounting System

Name of the System	Approximate Proportion of Use	Frequency	Percentage	Cumulative Percentage
Ready-made accounting software	100%	47	30.9	30.9
	75%	47	30.9	61.8
	50%	12	7.9	69.7
	25%	13	8.6	78.3
	0	33	21.7	100.0
Total		152	100.0	

Source: Survey (Appendix A).

Table 5.16 showed that whereas 30.9 % of participants identified that their companies use fully ready-made accounting systems for approximately 100% of their processes, 30.9% of participants stated that their companies use ready-made accounting systems for approximately 75% of their processes. In contrast, 21.7% of participants mentioned that their companies do not use ready-made accounting systems and 8.6 % of participants have companies that use ready-made accounting systems for only approximately a quarter of their functions. The remaining 7.9% of participants indicated that their company use ready-made accounting systems for 50% of their functions. These data suggest that most companies use ready-made accounting systems for their processes.

Table 5.17 shows that although 31.6 % of participants indicated that their companies use customised accounting software for approximately 100% of their processes, a quarter of the participants (25%) stated that their companies rely on such accounting software for approximately 75% of their processes. In contrast, 19.7% of participants noted that their companies do not use specific accounting software designed for their business and 14.5% of participants mentioned that their companies use customised accounting software for only approximately 50% of their functions. The remaining 9.2% of participants stated that their companies use specific accounting software designed for their business for only approximately a quarter of their functions. These data suggest that some companies rely on specific accounting software designed for their business for their processes.

Table 5.17: Companies' Approximate Use of Customised Accounting Software

Name of the System	Approximate Proportion of Use	Frequency	Percentage	Cumulative Percentage
Customised accounting software	100%	48	31.6	31.6
	75%	38	25.0	56.6
	50%	22	14.5	71.1
	25%	14	9.2	80.3
	0	30	19.7	100.0
Total		152	100.0	

Source: Survey (Appendix A).

5.3.10.3 Companies' Use of Batch Mode Processing Accounting Systems and Real-Time Mode Processing Accounting Systems

Respondents were requested to indicate approximately what proportion of their company's uses of batch mode processing accounting system and real-time (online) mode processing accounting system. They were asked to select from five approximate proportion: 100%, 75%, 50%, 25% and 0%. Tables 5.18 and 5.19 present their responses.

Table 5.18: Companies' Approximate Use of Batch Mode Processing Accounting System

Name of the System	Approximate Proportion of Use	Frequency	Percentage	Cumulative Percentage
Batch mode processing accounting system	100%	40	26.3	26.3
	75%	49	32.2	58.6
	50%	27	17.8	76.3
	25%	12	7.9	84.2
	0%	24	15.8	100.0
Total		152	100.0	

Source: Survey (Appendix A).

In turn, Table 5.18 shows that 32.2% of participants indicated that their companies primarily use batch mode processing accounting system for approximate 75% of their processes, with another 26.3% participants stating that their companies fully use batch mode processing accounting system with 100% of their functions. In contrast, 15.8% of participants noted that their companies do not use batch mode processing accounting system and 17.8% of participants mentioned that their companies use batch mode

processing accounting systems for only approximately 50% of their functions. The remaining 7.9% of participants responded that their companies use batch mode processing accounting system for only approximately a quarter of their functions. These data suggest that some of non-financial companies in Saudi Arabia relay on batch mode processing accounting system.

Table 5.19 shows that whereas 29.6% of participants indicated that their companies primarily use real-time (online) mode processing accounting system for approximately 75% of their functions, 27.6% participants noted that their companies fully use real-time (online) mode processing accounting system with 100% of their processes. In contrast, 15.1% of participants mentioned that their companies do not use real-time (online) mode processing accounting system and 17.1% of participants reported that their companies use real-time (online) mode processing accounting system for only approximately 50% of their functions. The remaining 10.5% mentioned that their companies use real-time (online) mode processing accounting system for only approximately a quarter of their functions. These data suggest that using real-time (online) mode processing accounting systems is widely adopted among companies.

Table 5.19: Companies' Approximate Use of Real-Time (Online) Mode Processing Accounting System

Name of the System	Approximate Proportion of Use	Frequency	Percentage	Cumulative Percentage
Real-time (online) mode processing accounting system.	100%	42	27.6	27.6
	75%	45	29.6	57.2
	50%	26	17.1	74.3
	25%	16	10.5	84.9
	0%	23	15.1	100.0
Total		152	100.0	

Source: Survey (Appendix A).

5.3.10.4 Companies' Use of Centralised v. Decentralised or Distributed Data Processing Accounting Systems

Participants were requested to indicate approximately what proportion of their company's uses of centralised data processing accounting system versus decentralised or distributed

data processing accounting system by selecting from five approximate proportion: 100%, 75%, 50%, 25% and 0%. Tables 5.20 and 5.21 show their responses.

Table 5.20: Companies' Approximate Use of Centralised Data Processing Accounting System

Name of the System	Approximate Proportion of Use	Frequency	Percentage	Cumulative Percentage
Centralised data processing accounting system	100%	47	27.6	27.6
	75%	47	29.6	57.2
	50%	30	17.1	74.3
	25%	11	10.5	84.9
	0%	17	15.1	100.0
Total		152	100.0	

Source: Survey (Appendix A).

Table 5.20 shows that whereas 29.6% of participants have indicated that their companies primarily use centralised data processing accounting system with approximately 75% of their functions, 27.6 of participants stated that their companies fully use centralised data processing accounting system with 100% of their functions. A further 17.1% of participants noted that their companies use centralised data processing accounting system for approximately only 50% of their functions. In contrast, 15.1% of participants mentioned that their companies do not use a centralised data processing accounting system. The remaining 10.5% of participants stated that their companies use centralised data processing accounting system for only approximately a quarter of their functions. These data suggest that most companies primarily rely on a centralised data processing accounting system.

Table 5.21 shows that a quarter of participants have indicated that their companies use a decentralised data processing accounting system for approximately 75% of their functions; in contrast, 23% of participants mentioned that their companies do not use a decentralised data processing accounting system. A further 23% of participants have stated that their companies use a decentralised data processing accounting system for only half of their functions, and 15.8% of participants mentioned that their companies use decentralised data processing accounting systems for 100% of their functions. The remaining 13.2% of participants have noted that their companies use decentralised data processing accounting systems for a quarter of their functions. These data suggest that

only some companies use a decentralised data processing accounting system for their functions.

Table 5.21: Companies' Approximate Use of Decentralised or Distributed Data Processing Accounting System

Name of the System	Approximate Proportion of Use	Frequency	Percentage	Cumulative Percentage
Decentralised or distributed data processing accounting system	100%	24	15.8	15.8
	75%	38	25.0	40.8
	50%	35	23.0	63.8
	25%	20	13.2	77.0
	0%	35	23.0	100.0
Total		152	100.0	

Source: Survey (Appendix A).

5.3.11 Internal Auditors' Perspectives on Weaknesses in Internal Control Systems, the Reasons Behind Them and Factors Contributing to Increased Internal Audit Risks in IT-Based Accounting Systems

Some questions in this study's questionnaire aimed to assess the perspectives of internal auditors regarding the weaknesses in the internal control systems of the IT-based accounting environment within their respective companies. Participants were also asked about the reasons behind these weaknesses and the factors that might elevate the overall level of internal audit risks within IT-based accounting environment.

Therefore, participants were requested to indicate the frequency with which their companies have experienced four weaknesses regarding the internal control systems in the IT-based accounting environment within their companies by selecting from five options: always, often, sometimes, rarely and never. Table 5.22 shows their responses.

Table 5.22: Weaknesses in the Internal Control Systems of IT-Based Accounting Systems within Respective Companies

Weaknesses in the Internal Control Systems	Frequency and Percentage	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5	Total	The Mode Test
Lack of data security and access controls	Frequency	18	39	41	34	20	152	3 Some times
	Percentage	11.8	25.7	27	22.4	13.2	100	
Concerns regarding data integrity	Frequency	32	38	44	22	16	152	3 Some times
	Percentage	21.1	25	28.9	14.5	10.5	100	
Lack of competence among	Frequency	9	31	51	25	36	152	3 Some times
Internal auditors	Percentage	5.9	20.4	33.6	16.4	23.7	100	
Disappearance of internal audit trail	Frequency	13	30	46	26	37	152	3 Some times
	Percentage	8.6	19.7	30.3	17.1	24.3	100	

Source: Survey (Appendix A).

Table 5.22 shows that whereas 21.1% of participants indicated that their companies have always experienced weakness of concerns regarding data integrity, just 11.8% of participants reported that their companies constantly suffered weakness of lack of data security and access controls. Only 8.6% of participants reported that their companies have persistently experienced weakness of disappearance of internal audit trail and only 5.9% of participants indicated that their companies have always experienced weakness of lack of competence among internal auditors. In contrast, 24.3% of participants reported that their companies never experienced an absence of internal audit trail, and 23.7% of participants noted a lack of weakness in internal auditors' competence of their companies. Additionally, 13.2% of participants stated no issues with lack of data security and access controls in their companies, and just 10.5% of participants indicated no concerns regarding data integrity in their companies.

The mode score for each of the four weaknesses in the internal control systems is '3 (sometimes)' for the mode test. This data suggests that most of the participants indicated

that their companies have sometimes (mode) experienced four weaknesses: lack of data security and access controls, concerns regarding data integrity, lack of competence among internal auditors and the disappearance of an internal audit trail in the internal control systems. This suggests that these weaknesses are not constant but rather occur intermittently and in specific situations.

Additionally, participants were requested to indicate the extent to which they agree or disagree with the reasons behind the weaknesses in the internal control systems within their companies. They were asked to select from five options: strongly agree, mildly agree, neural, mildly disagree and strongly disagree. Table 5.23 shows their responses.

Table 5.23: Reasons Behind Weaknesses in Internal Control Systems

Reasons for Weaknesses Within Internal Control Systems	Frequency and Percentage	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree	Total
High cost associated with tight internal controls	Frequency	25	54	45	20	8	152
	Percentage	16.4	35.5	29.6	13.2	5.3	100
Management lacks understanding of IT (management is unaware of the nature of the IT-based accounting environment)	Frequency	25	55	41	18	13	152
	Percentage	16.4	36.2	27	11.8	8.6	100

Source: Survey (Appendix A).

Table 5.23 indicates that the majority of participants 36.2% and 16.4% in mild and strong agreement, respectively identify ‘Management lacking understanding of IT (management is unaware of the nature of the IT-based accounting environment)’ as a significant reason for weaknesses in their company’s internal control systems. In contrast, over half of the participants 35.5% mildly and 16.4% strongly in agreement attribute the weakness of internal control systems to ‘The high cost associated with stringent internal controls’. These data suggest that, within respective companies, both the lack of IT understanding within management and the high costs linked to stringent internal controls are the primary

reasons for weaknesses in the internal control systems. Participants were also requested to indicate the extent to which all five factors would contribute to an increase in the overall internal audit risks in the IT-based accounting environment within their respective companies. They were asked to select from six options: very high, high, medium, low, very low and no contribution. Table 5.24 shows their answers.

Table 5.24: Factors Contributing to an Overall Increase in Internal Audit Risks in the IT-Based Accounting Environment

Source: Survey (Appendix A).

Factors Contributing to an Overall Increase in Internal Audit Risks	Frequency and Percentage	Very High 1	High 2	Medium 3	Low 4	Very Low 5	No Contribution 6	Total	The Mode Test
Using unsuitable accounting software by the company in terms of its unsuitability to the company's activity, poor or faulty programming, providing a minimum level of information, and making the tracing of transactions difficult	Frequency	43	55	33	10	4	7	152	2 High
	Percentage	28.3	36.2	21.7	6.6	2.6	4.6	100	
Lack of competence of company's staff in dealing with IT-based accounting systems, for example, their inability to harness the advantages of IT systems and to avoid mistakes	Frequency	35	52	33	19	7	6	152	2 High
	Percentage	23.0	34.2	21.7	12.5	4.6	3.9	100	
The weakness of the company's internal control systems in an IT-based accounting environment in terms of, for example, no passwords and lack of access and changing data logs	Frequency	40	46	36	10	11	9	152	2 High
	Percentage	26.3	30.3	23.7	6.6	7.2	5.9	100	
Using auditing around the computer approach where internal auditors examine input and output only and where the detailed processing within the computer is ignored	Frequency	29	50	42	18	8	5	152	2 High
	Percentage	19.1	32.9	27.6	11.8	5.3	3.3	100	
Lack of competence of internal auditors in auditing IT-based accounting systems, for example, their inability to use CAATs and their lack of awareness of the problems and risks associated with such systems	Frequency	31	55	35	17	10	4	152	2 High
	Percentage	20.4	36.2	23.0	11.2	6.6	2.6	100	

Table 5.24 shows the mode is high among the participants, which means that most of participants specifically 36.2%, 34.2%, 30.3%, 32.9% and 36.2%, respectively have indicated that the use of unsuitable accounting software, a lack of competence among company staff, weaknesses in internal control systems, the auditing around the computer approach (i.e., where internal auditors examine only the input and output, ignoring detailed processing within the computer) and a lack of competence among internal auditors were the factors considered to contribute highly to an increase in the overall internal audit risks in the IT-based accounting environment. The mode score for each of the five factors contribution to increase in the overall internal audit risks in the IT-based accounting environment is '2 (high)'.

5.3.12 Internal Audit Approaches

Participants were requested to indicate the extent to which their companies use internal audit approaches, including auditing through the computer, auditing around a computer, year-end auditing, auditing by cycles, auditing by process, adopting substantive tests and adopting risk-based methods. They were asked to choose from five options: always, often, sometimes, rarely and never. Table 5.25 shows their responses.

Table 5.25: Implementation of Continuous Auditing

Internal Audit Approaches	Frequency and Percentage	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5	Total	The Mode Test
Auditing through the computer	Frequency	61	58	26	4	3	152	1 Always
	Percentage	40.1	38.2	17.1	2.6	2.0	100	
Auditing around a computer	Frequency	43	62	32	12	3	152	2 Often
	Percentage	28.3	40.8	21.1	7.9	2.0	100	
Year-end auditing	Frequency	70	36	25	16	5	152	1 Always
	Percentage	46.1	23.7	16.4	10.5	3.3	100	
Auditing by cycles	Frequency	82	49	17	3	1	152	1 Always
	Percentage	53.9	32.2	11.2	2.0	0.7	100	
Auditing by process	Frequency	73	55	16	8	0	152	1 Always
	Percentage	48.0	36.2	10.5	5.3	0	100	
Adopting substantive tests approach	Frequency	59	53	30	8	2	152	1 Always
	Percentage	38.8	34.9	19.7	5.3	1.3	100	
Adopting risk-based approach	Frequency	99	33	14	5	1	152	1 Always
	Percentage	65.1	21.7	9.2	3.3	0.7	100	

Source: Survey (Appendix A).

Table 5.25 reveals that although 40.1% of participants have indicated that their companies always use the auditing through the computer approach, 38.2% reported that their companies often use this approach. In contrast, 28.3% noted that their companies always use the auditing around the computer approach, with another 40.8% indicating that their companies often use auditing around a computer approach. Additionally, 46.1% of internal auditors stated that their companies always use year-end auditing, whereas 23.7% reported that their companies often used this approach. With regard to the approach of auditing by cycles, 53.9% of participants mentioned their companies always use it and 32.2% reported their companies often use it. For the approach of auditing by process, 48% indicated that their companies always use this method, and another 36.2% reported that their companies often use it. Furthermore, 38.8% of participants noted their companies always use the adopting substantive tests approach, with another 34.9% reporting that their companies often use it. Finally, 65.1% of participants stated that their

companies always use the adopting risk-based approach, with 21.7% indicating their companies often use it.

5.3.12.1 Use of Computer-Assisted Audit Techniques

Participants were asked to indicate the extent to which their companies use test data, integrated test facilities, EAMs, parallel simulation, GAS, IDEA, ACL, TeamMate Audit Management System, RPA and Tableau. They were asked to choose from five options: always, often, sometimes, rarely and never. Table 5.26 shows their responses.

Table 5.26: Use of Computer-Assisted Audit Techniques

Computer-Assisted Audit Techniques	Frequency and Percentage	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5	Total	The Mode Test
Test data	Frequency	57	52	27	6	10	152	1 Always
	Percentage	37.5	34.2	17.8	3.9	6.6	100	
Integrated test facilities	Frequency	37	48	39	14	14	152	2 Often
	Percentage	24.3	31.6	25.7	9.2	9.2	100	
EAMs	Frequency	27	49	33	23	20	152	2 Often
	Percentage	17.8	32.2	21.7	15.1	13.2	100	
Parallel simulation	Frequency	25	38	42	20	27	152	3 Sometimes
	Percentage	16.4	25	27.6	13.2	17.8	100	
GAS	Frequency	28	52	28	12	32	152	2 Often
	Percentage	18.4	34.2	18.4	7.9	21.1	100	
IDEA	Frequency	26	39	39	15	33	152	2 Often
	Percentage	17.1	25.7	25.7	9.9	21.7	100	
ACL	Frequency	24	32	30	21	45	152	5 Never
	Percentage	15.8	21.1	19.7	13.8	29.6	100	
TeamMate Audit Management System	Frequency	42	35	20	9	46	152	5 Never
	Percentage	27.6	23	13.2	5.9	30.3	100	
RPA	Frequency	13	32	36	11	60	152	5 Never
	Percentage	8.6	21.1	23.7	7.2	39.5	100	
Tableau	Frequency	21	27	31	7	66	152	5 Never
	Percentage	13.8	17.8	20.4	4.6	43.4	100	

Source: Survey (Appendix A).

Table 5.26 illustrates that although 37.5% of participants have indicated that their companies always use test data, another 24.3% of participants have stated that their companies always use integrated test facilities. In addition, 17.8% of participants reported that their companies always use EAMs and 16.4% of participants noted that their companies always use parallel simulation. A further 18.4% of participants stated that their companies always use GAS and 17.1% of participants indicated that their companies always use IDEA. In contrast, 29.6%, 30.3%, 39.5% and 43.4% of participants, respectively, stated that their companies never use ACL, TeamMate Audit Management System, RPA or Tableau.

The mode score for using a test data approach is '1 (Always)' among the companies for the mode test. Whereas the consistent occurrence of the 'always' response reflects a strong dedication among companies to adopting a test data approach, the mode score for using integrated test facilities, EAMs, GAS and IDEA is '2 (Often)' among companies in the mode test. In addition, the mode score for using parallel simulation is '3 (Sometimes)' among companies in the mode test, in contrast, the mode score for using ACL, TeamMate Audit Management System, RPA and Tableau is '5 (Never)' among companies in the mode test. This data suggests a prevalent and substantial adoption of test data approach, integrated test facilities, EAMs, GAS and IDEA among the companies. These findings suggest that the prevailing practice among a substantial majority of companies is the consistent use of the test data approach, integrated test facilities, EAMs, GAS and IDEA.

5.3.12.2 Internal Auditors' Testing Procedures

Participants were asked to indicate how frequently they implement tests of controls and substantive test procedures as part of their internal audit tasks in their companies. They were requested to choose from five options: always, often, sometimes, rarely and never. Table 5.27 presents the responses of the participants.

Table 5.27: Internal Auditors Testing Procedures

Internal Auditors Testing Procedures	Frequency and Percent	Always	Often	Sometimes	Rarely	Never	Total
Perform test of controls to assess control risk below the maximum	Frequency	50	54	36	8	4	152
	Percentage	32.9	35.5	23.7	5.3	2.6	100
Perform only substantive tests to reduce detection risk to an acceptable level	Frequency	42	61	41	4	4	152
	Percentage	27.6	40.1	27	2.6	2.6	100
Perform tests of both the design and operation of controls to reduce the assessed level of control risk	Frequency	49	58	35	10	0	152
	Percentage	32.2	38.2	23	6.6	0	100

Source: Survey (Appendix A).

Table 5.27 shows that 32.9% and 35.5% of the participants, respectively, consistently and frequently implement controls tests to evaluate control risk below the maximum. Additionally, 27.6% and 40.1% of participants, respectively, reported consistently and frequently conducting substantive tests to mitigate detection risk to an acceptable level. In contrast, 32.2% and 38.2% of participants stated that they consistently and frequently implement tests of both the design and operation of controls to reduce the assessed level of control risk. These findings suggest that the prevailing practice among the majority of participants is the consistent and frequent implementation of control tests to evaluate control risk below the maximum, substantive tests alone to mitigate detection risk to an acceptable level and tests of both the design and operation of controls to reduce the assessed level of control risk.

5.3.13 Internal Auditors' Satisfaction with Their Companies' Provisions

Participants were asked to express their opinions on their satisfaction with their companies' provisions with respect to four statements. They were instructed to choose from five options: strongly agree, mildly agree, neutral, mildly disagree and strongly disagree. Table 5.28 displays their responses.

Table 5.28: Internal Auditors' Satisfaction with their Companies' Provisions

Internal Auditors' Satisfaction with Their Companies' Provision	Frequency and Percentage	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree	Total
You are satisfied with your organisation's provision of appropriate knowledge-based expert systems for your internal audit tasks	Frequency	48	52	36	10	6	152
	Percentage	31.6	34.2	23.7	6.6	3.9	100
You are satisfied with your organisation's provision of appropriate decision aids for your internal audit tasks	Frequency	47	58	30	11	6	152
	Percentage	30.9	38.2	19.7	7.2	3.9	100
You are satisfied with your organisation's provision of appropriate general IT packages for your use	Frequency	43	57	32	14	6	152
	Percentage	28.3	37.5	21.1	9.2	3.9	100
You are satisfied with your organisation's provision of appropriate IT training for you as an auditor	Frequency	49	43	28	20	12	152
	Percentage	32.2	28.3	18.4	13.2	7.9	100

Source: Survey (Appendix A).

Table 5.28 shows that 31.6% and 34.2% participants strongly agreed and mildly agreed, respectively, with the statement: 'You are satisfied with your organisation's provision of appropriate knowledge-based expert systems for your internal audit tasks'. Additionally, 30.9% and 38.2% of participants strongly agreed and mildly agreed, respectively, with the statement: 'You are satisfied with your organisation's provision of appropriate decision aids for your internal audit tasks'.

Moreover, 28.3% and 37.5% participants are strongly agreed and mildly agreed, respectively, with the statement: 'You are satisfied with your organisation's provision of appropriate general IT packages for your use'. In contrast, 32.2 % and 28.3% participants are strongly and mildly agreed with the statement: 'You are satisfied with your organisation's provision of appropriate IT training for you as an auditor'.

These findings suggest that most participants expressed satisfaction with their organisations' provisions, including knowledge-based expert systems for internal audit tasks, decision aids, general IT packages and IT training. These findings indicate a positive sentiment among the participants towards the adequacy of the resources provided by their respective organisations.

5.3.14 Level of Training Courses Provided to Internal Auditors

Participants were required to assess the level of training courses provided to internal auditors by their companies in the six IT areas listed in Table 5.29. They were asked to choose from five options: high level, intermediate level, low level, basic level and none. Table 5.29 presents the participants' responses.

Table 5.29: Training Courses Provided to Internal Auditors

Training Courses Provided to Internal Auditors	Frequency and Percentage	High Level	Intermediate Level	Low Level	Basic Level	None	Total
Basic data processing	Frequency	40	56	29	8	19	152
	Percentage	26.3	36.8	19.1	5.3	12.5	100
Online/real-time processing concepts	Frequency	32	60	26	4	30	152
	Percentage	21.1	39.5	17.1	2.6	19.7	100
System and program documentation	Frequency	48	51	23	9	21	152
	Percentage	31.6	33.6	15.1	5.9	13.8	100
Internal controls in an IT-based accounting	Frequency	45	54	24	7	22	152
	Percentage	29.6	35.5	15.8	4.6	14.5	100
Internal auditing in an IT-based accounting environment	Frequency	44	55	19	13	21	152
	Percentage	28.9	36.2	12.5	8.6	13.8	100
The use of specific internal audit software and tools	Frequency	52	51	18	11	20	152
	Percentage	34.2	33.6	11.8	7.2	13.2	100

Source: Survey (Appendix A).

Table 5.29 reveals participants' perceptions regarding the level of training courses provided to internal auditors by their companies. It is noteworthy that 36.8% of participants indicated that the basic data processing training courses provided by their respective companies to the internal auditors were at an intermediate level. Furthermore, 26.3% of participants reported that these courses provided by their companies to the internal auditors were high level.

Similarly, with regard to the level of online/real-time processing concepts courses provided by their respective companies, whereas 39.5% of participants perceived them as being given at intermediate level, 21.1% considered them high level. In contrast, the system and program documentation courses provided by their respective companies to the internal auditors were seen as intermediate level by 33.6% of participants, with another 31.6% categorising them as high level.

Additionally, participants expressed their views on the level of training courses provided them for internal controls in IT-based accounting. Specifically, although 35.5% of participants regarded these courses as being given at an intermediate level, 29.6%

identified them as high level. Similarly, with regard to courses for internal auditing in an IT-based accounting environment, 36.2% of participants perceived them as being given at an intermediate level and 28.9% considered them high level. Notably, with respect to the level of courses for using specific internal audit software and tools, whereas 34.2% of participants characterised them as being given at a high level, 30% of participants percentage perceived them as given at an intermediate level within their respective companies.

These data suggest that a majority of participants found that courses in basic data processing, online/real-time processing concepts, system and program documentation, internal controls and internal auditing in an IT-based accounting environment provided to them by their companies are given at an intermediate level. In contrast, the majority of participants indicated that courses for using specific internal audit software and tools are given at a high level.

5.3.15 Type of Knowledge Required by Internal Auditors

Participants were required to indicate the type of knowledge in IT required from internal auditors in their companies for auditing IT-based accounting systems. They were asked to choose from five options: highly required, often required, sometimes required, rarely required and not required. Table 5.30 shows their responses.

Table 5.30: Type of Knowledge Required by Internal Auditors

Type of Knowledge Needed by Internal Auditors	Frequency and Percentage	Highly Required	Often Required	Sometimes Required	Rarely Required	Not Required	Total
Basic knowledge in dealing with computers (e.g. printing a report)	Frequency	105	35	3	2	7	152
	Percentage	69.1	23	2	1.3	4.6	100
Basic knowledge in auditing the common, ready-made accounting software	Frequency	81	45	11	3	12	152
	Percentage	53.3	29.6	7.2	2	7.9	100
Advanced knowledge in auditing IT-based accounting systems	Frequency	72	46	21	4	9	152
	Percentage	47.4	30.3	13.8	2.6	5.9	100

Source: Survey (Appendix A).

Table 5.30 shows that whereas 69.1% of participants indicated that basic knowledge in dealing with computers was highly required for internal auditors in their companies, 23% of participants consider it as often required. Similarly, regarding the need for basic knowledge in auditing using the common, ready-made accounting software for internal auditors in their companies, 53.3% of participants perceived this knowledge as highly required. A further 21.1% considered such knowledge as often required. Additionally, concerning the need for advanced knowledge in using IT-based accounting systems, 47.4% of participants perceived this as highly required. In contrast, 30.3% of participants consider it as often required.

These data suggest that the majority of participants believed there was a high requirement for basic knowledge in dealing with computers, basic knowledge in using common, ready-made accounting software and advanced knowledge in auditing using IT-based accounting systems.

5.3.16 Reasons for Not Providing IT Training for Internal Auditors

Participants were asked to indicate their opinion on five reasons that might discourage their companies from providing IT training sessions to internal auditors. They could

choose from five options: strongly agree, mildly agree, nature, mildly disagree and strongly disagree. Table 5.31 presents participants' responses.

Table 5.31: Reasons for Not Providing IT Training for Internal Auditors

Reasons for Not Providing IT Training for Internal Auditors	Frequency and Percentage	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree	Total
Your company thinks that IT skills will not improve the staff performance	Frequency	25	33	28	30	36	152
	Percentage	16.4	21.7	18.4	19.7	23.7	100
Internal auditors think that the training programmes contain complex issues that make them difficult to understand	Frequency	29	34	26	41	22	152
	Percentage	19.1	22.4	17.1	27	14.5	100
The adopted auditing standards in Saudi Arabia do not require internal auditors to get any IT-related training	Frequency	23	33	23	40	33	152
	Percentage	15.1	21.7	15.1	26.3	21.7	100
The high cost of training	Frequency	37	51	37	14	13	152
	Percentage	24.3	33.6	24.3	9.2	8.6	100
Lack of courses available	Frequency	25	45	37	29	16	152
	Percentage	16.4	29.6	24.3	19.1	10.5	100

Source: Survey (Appendix A).

Table 5.31 shows participants' perspectives regarding the factors that might influence the provision of IT training to internal auditors within their respective companies. In particular, the table shows that 23.7% of participants strongly disagreed and 19.7% of participants mildly disagreed with the statement: 'Your company thinks that IT skills will not improve the staff performance'. Additionally, 27% of participants mildly disagreed and 14.5% of participants strongly disagreed with the statement: 'Internal auditors think that the training programmes contain complex issues that make them difficult to understand'. Similarly, 26.3% of participants mildly disagreed and 21.7% of participants strongly disagreed with the statement: 'The adopted auditing standards in Saudi Arabia do not require internal auditors to get any IT-related training'. In contrast, 33.6% and 24.3% of participants mildly and strongly agreed, respectively, with the statement': The

high cost of training'. Moreover, 29.6% and 16.4% of participants mildly and strongly agreed, respectively, with the statement 'Lack of courses available'.

These data suggest a trend among participants. More specifically, a majority of participants expressed disagreement towards statements asserting that their respective companies hold the belief that IT skills do not enhance staff performance, that training programs for internal auditors are perceived as overly complex and that auditing standards in Saudi Arabia do not mandate IT-related training for internal auditors. Notably, participants predominantly concurred that the high cost of training and the limited availability of courses would be primary factors influencing their companies' decisions not to provide IT training to internal auditors.

5.3.17 Reasons for Not Implementing Centralising Purchasing Functions

Participants were asked to indicate the reasons preventing their companies from centralising purchasing functions. They asked to choose from five options: strongly agree, mildly agree, neutral, mildly disagree and strongly disagree. Table 5.32 shows participants' responses.

Table 5.32: Reasons for Not Implementing Centralising Purchasing Functions

Reasons for Not Implementing Centralising the Purchasing Functions	Frequency and Percentage	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree	Total
Centralising purchasing functions is too complex	Frequency	24	54	48	20	6	152
	Percentage	15.8	35.5	31.6	13.2	3.9	100
Centralising purchasing functions is too costly as it requires creating a system	Frequency	24	49	47	25	7	152
	Percentage	15.8	32.2	30.9	16.4	4.6	100
There is not enough infrastructure in your firm to support the implementation of the centralising purchasing functions	Frequency	29	38	47	30	8	152
	Percentage	19.1	25	30.9	19.7	5.3	100
Your firm thinks that centralising purchasing functions will not enhance the supply chain efficiency in the company	Frequency	21	39	49	33	10	152
	Percentage	13.8	25.7	32.2	21.7	6.6	100
Your firm thinks that centralising purchasing functions will not enhance the internal audit efficiency in the company	Frequency	27	38	48	34	5	152
	Percentage	17.8	25	31.6	22.4	3.3	100

Source: Survey (Appendix A).

Table 5.32 details participants' responses to statements regarding the reasons for not implementing centralised purchasing functions in their companies. Notably, 35.5% of participants mildly agreed that 'Centralising purchasing functions is too complex', citing this complexity as a hindrance to implementation. Similarly, 32.2% expressed mild agreement with the assertion that 'Centralising purchasing functions is too costly as it requires creating a system', thus identifying cost implications as a key factor preventing

implementation. In contrast, participants exhibited neutrality towards several statements. For example, 30.9% were neutral regarding the statement: 'There is not enough infrastructure in your firm to support the implementation of centralising purchasing functions'. Additionally, 32.2% expressed neutrality towards the statement: 'Your firm thinks that centralising purchasing functions will not enhance the supply chain efficiency in the company', and 31.6% expressed neutrality towards the statement: 'Your firm thinks that centralising purchasing functions will not enhance the internal audit efficiency in the company'.

These data suggest that a significant number of participants agree that complexity and cost serve as primary factors influencing their companies' decisions against implementing centralised purchasing functions. This provides a clear overview of the factors perceived as preventing companies from centralising purchasing functions.

5.3.18 Variables

5.3.18.1 Continuous Auditing (Independent Variable)

Participants were requested to indicate the extent to which their companies use internal audit approaches, including continuous auditing. They were asked to choose from five options: always, often, sometimes, rarely and never. Table 5.33 details participants' responses.

Table 5.33: Implementation of Continuous Auditing

Internal Audit Approaches	Frequency and Percentage	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5	Total	The Mode Test
Continuous auditing	Frequency	54	45	24	17	12	152	1 Always
	Percentage	35.5	29.6	15.8	11.2	7.9	100	

Source: Survey (Appendix A).

Table 5.33 reveals that although 35.5% of participants indicated that their companies always use continuous auditing, 29.6% of participants reported that their companies often use continuous auditing. In addition, 15.8% of participants noted that their companies sometimes use continuous auditing. The mode score for the implementation of continuous auditing is '1 (Always)' among the companies for the mode test. The prevalence of the

‘always’ response indicates a strong commitment to implementing continuous auditing in internal audit processes.

These data suggest a prevalent and substantial adoption of continuous auditing practices among the companies, with a substantial majority of companies consistently employing continuous auditing techniques in their audit procedures and practices. This interpretation aligns with the growing recognition of the benefits that continuous auditing offers in terms of enhanced accuracy, efficiency and real-time monitoring in the realm and internal audits.

Respondents were also requested to indicate the extent to which they agree (1) and disagree (5) with statements regarding the utility and implementation of continuous auditing. Their responses are displayed in Table 5.34.

Table 5.34: Benefits and Impact of Continuous Auditing

Statement	Mean	St. Dev	Rank
Continuous auditing increases the efficiency of the internal audit process	1.55	0.788	1
Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company	1.57	0.687	2
Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company	1.58	0.733	3
Continuous auditing helps internal auditors in fraud detection	1.59	0.775	4
Continuous auditing enhances the decisions usefulness of financial information for users	1.61	0.692	5
Continuous auditing reduces the waste and abuse of the warehouses inventory in the company	1.64	0.768	6
Continuous auditing helps internal auditors in fraud investigation	1.81	0.912	7
Your company plans to increase the implementation of continuous auditing in the future	1.91	0.923	*8*
Overall mean	1.65	0.582	

Source: Survey (Appendix A).

Table 5.34 shows that the overall mean (1.65) reflects a high level of agreement among the participants with the statements on continuous auditing. Therefore, participants had a strongly positive consensus, suggesting favourable perceptions regarding the statements on continuous auditing. The overall standard deviation was 0.582. Statement 1 had the lowest mean value (1.55), indicating that most internal auditors strongly agree that ‘Continuous auditing increases the efficiency of the internal audit process’. The standard

deviation for statement 1 was 0.788. Statement 8: 'Your company plans to increase the implementation of continuous auditing in the future' had the highest mean value (1.91), reflecting a positive perception. The standard deviation for statement 8 was 0.923.

Additionally, the mean score for the statement, 'Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company', was 1.57, with a standard deviation of 0.687. The statement, 'Implementing continuous auditing in your company requires implementing efficient and effective internal control systems', had a mean score of 1.58 and a standard deviation of 0.733. The statement, 'Continuous auditing helps internal auditors in fraud detection', had a mean score of 1.59 and a standard deviation of 0.775. The mean score for the statement, 'Continuous auditing enhances the decision usefulness of financial information for users', was 1.61, with a standard deviation of 0.692. The mean score for the statement, 'Continuous auditing reduces the waste and abuse of the warehouse inventory in the company', was 1.64, with a standard deviation of 0.768. Lastly, the statement, 'Continuous auditing helps internal auditors in fraud investigation', had a mean score of 1.81 and a standard deviation of 0.912.

Participants were also asked to indicate how often they used computers in their companies, with responses ranging from always (1) to never (5). Their responses are displayed in Table 5.35.

Table 5.35: Use of Computers

Statement	Frequency and Percentage	Always	Often	Sometimes	Rarely	Never	Total
The use of computers by the internal auditors for the internal audit tasks in the companies	Frequency	87	47	15	3	0	152
	Percentage	57.2	30.9	9.9	2.0	0	100

Source: Survey (Appendix A).

Table 5.35 showed that whereas most of the internal auditors (57.2%) always use computers for their internal audit tasks, 30.9 % of participants indicated that they often use computers. In contrast, only 9.9% of participants indicated that they only sometimes

use computers. These data suggest that the use of computers among internal auditors were widespread.

Respondents were also requested to indicate how often they used IT tools and techniques in their companies, with responses ranging from always (1) to never (5). These responses are displayed in Table 5.36.

Table 5.36: Use of IT Tools and Techniques

The Use Of IT Tools And Techniques In Their Companies	Frequency and Percentage	Always 1	Often 2	Sometimes 3	Rarely 4	Never 5	Total	The Mode Test
Use of IT tools and techniques in planning of the internal audit assignments	Frequency	63	59	22	6	2	152	Always
	Percentage	41.4	38.8	14.5	3.9	1.3	100	
Use of IT tools and techniques in assessment of internal control system	Frequency	66	49	25	9	3	152	Always
	Percentage	43.4	32.2	16.4	5.9	2	100	
Use of IT tools and techniques in recording the internal audit tasks	Frequency	90	42	14	4	2	152	Always
	Percentage	59.2	27.6	9.2	2.6	1.3	100	
Use of IT tools and techniques in data analysis of the internal audit tasks	Frequency	89	41	17	4	1	152	Always
	Percentage	58.6	27	11.2	2.6	0.7	100	
Use of IT tools and techniques in performing substantive tests	Frequency	67	56	23	4	2	152	Always
	Percentage	44.1	36.8	15.1	2.6	1.3	100	
Use of IT tools and techniques in fraud detection and investigation	Frequency	53	53	26	15	5	152	Always and often
	Percentage	34.9	34.9	17.1	9.9	3.3	100	
Use of IT tools and techniques in reporting the internal audit tasks	Frequency	102	34	11	3	2	152	Always
	Percentage	67.1	22.4	7.2	2	1.3	100	

Source: Survey (Appendix A).

Table 5.36 shows that the mode test for the use of IT tools and techniques in different internal audit processes consistently gave the result of ‘always’. This indicated that

internal auditors consciously use IT tools and techniques in their internal audit processes. For example, 41.4% of participants indicated that they always use the IT tools and techniques in planning of the internal audit assignments, with another 43.4% participants stating that they always use IT tools and techniques in assessment of internal control system. Additionally, 59.2% of participants reported that they always use IT tools and techniques in recording the internal audit tasks. Furthermore, 58.6%, 44.1% 34.9% and 67.1% of participants indicated, respectively, that they always use IT tools and techniques in data analysis, performing substantive tests, fraud detection and investigation and reporting internal audit tasks.

Participants were asked to rate their level of agreement with regard to the use of IT tools and techniques in their respective companies, using a scale ranging from 1 (strongly agree) to 5 (strongly disagree). Their replies are exhibited in Table 5.37.

Table 5.37: Impact of Using IT Tools and Techniques on Internal Auditing

Statement	Mean	St. Dev	Rank
The use of IT tools and techniques for your internal audit tasks gives you an advantage over your colleagues who use IT tools lesser or do not use them	1.70	0.771	1
The use of IT for internal audit tasks by your firm gives it a comparative advantage over its competitors who do not use IT	1.71	0.751	2
The increased adoption of IT in the internal audit process has aided your professional career development	1.73	0.780	3
The use of IT tools and techniques has made your performance more satisfactory to you as an auditor	1.76	0.851	4
The use of IT tools and techniques has enhanced your commitment to your firm's goals	1.79	0.851	5
The refusal of your company to use IT tools and techniques could lead to low-quality internal audits	1.99	1.010	6
Overall mean	1.78	0.655	

Source: Survey (Appendix A).

These data indicate that the participants lean towards a high level of agreement with the statements on using IT tools and techniques, as evidenced by the overall mean of 1.78 shown in Table 5.37. Therefore, the participants had strong and positive perceptions regarding the use of IT tools and techniques. The overall standard deviation was 0.655. The lowest mean value was for statement 1, which indicated that most internal auditors lean towards a high level of agreement with 'The use of IT tools and techniques for your internal audit tasks gives you an advantage over your colleagues who use IT tools lesser

or do not use them', with standard deviation of 0.771. The highest mean value was 1.99 with a standard deviation of 1.010 for statement 6: 'The refusal of your company to use IT tools and techniques could lead to low-quality internal audits', but it was still positive.

Additionally, statement 2: 'The use of IT for internal audit tasks by your firm gives it a comparative advantage over its competitors who do not use IT', had a mean value of 1.71 with a standard deviation of 0.751. The mean score for the statement, 'The increased adoption of IT in the internal audit process has aided your professional career development', was 1.73, with a standard deviation of 0.780. The statement, 'The use of IT tools and techniques has made your performance more satisfactory to you as an auditor', had a mean score of 1.76 with a standard deviation of 0.851. Finally, the statement, 'The use of IT tools and techniques has enhanced your commitment to your firm's goals', had a mean score of 1.79 with a standard deviation of 0.851.

Participants were also asked to indicate the impact of using IT tools and techniques in their companies, using a scale ranging from 1 (greatly increases) to 5 (greatly decreases). Table 5.38 presents their responses.

Table 5.38: Enhancing Competence and Internal Audit Efficiency through IT Tools and Techniques

Statement	Frequency and Percentage	Greatly Increases	Mildly Increases	Neither Increases Nor Decreases	Mildly Decrease	Greatly Decreases	Total	The Mode Test
The use of IT tools and techniques ..... your professional competence	Frequency	101	45	5	0	1	152	Greatly increases
	Percentage	66.4	29.6	3.3	0	0.7	100	
The use of IT tools and techniques ..... the scope of your professional expertise	Frequency	87	55	8	2	0	152	Greatly increases
	Percentage	57.2	36.2	5.3	1.3	0	100	
The use of IT tools and techniques ..... your fairness and sense of justice	Frequency	61	59	32	0	0	152	Greatly increases
	Percentage	40.1	38.8	21.1	0	0	100	
Audit automation ..... the internal audit efficiency	Frequency	79	59	12	2	0	152	Greatly increases
	Percentage	52	38.8	7.9	1.3	0	100	

Source: Survey (Appendix A).

Table 5.38 shows that the mode test for the four statements was ‘greatly increases’. This indicates that most internal auditors held strong and positive perceptions regarding the use of IT tools and techniques in their companies. For example, 66.4%, 57.2% and 40.1% of participants, respectively, indicated that the use of IT tools and techniques greatly increases their professional competence, the scope of their professional expertise and their fairness and sense of justice. Additionally, 52% of participants stated that audit automation greatly increases internal audit efficiency.

Respondents were also requested to indicate the extent to which they agree (1) or disagree (5) with the use of IT tools and techniques in their companies. Their responses are displayed in Table 5.39.

Table 5.39: Efficiency of Using IT tools and Techniques

Statement	Mean	St. Dev	Rank
The use of IT tools and techniques saves time and effort devoted to controlling testing	1.44	0.572	1
The use of IT tools and techniques saves time and effort devoted to substantive testing	1.48	0.619	2
IT tools and techniques are important instruments for risk assessment	1.64	0.777	3
IT tools and techniques are important instruments for fraud detection	1.66	0.756	4
IT tools and techniques are important instruments for fraud investigation	1.69	0.774	5
Overall mean	1.58	0.577	

Source: Survey (Appendix A).

Table 5.39 presents rank, standard deviation and mean values. The lowest mean value was 1.44 for statement 1, indicating that most internal auditors lean towards strongly agreement with the statement 'The use of IT tools and techniques saves time and effort devoted to controlling testing'. This statement returned a standard deviation of 0.572. In contrast, the highest mean value was 1.69 with a standard deviation of 0.774 for statement 5: 'IT tools and techniques are important instruments for fraud investigation'. The overall mean value was 1.58, which reflects a strong positive consensus among the participants regarding the five statements. The overall standard deviation was 0.577. These findings indicate a high level of agreement among the participants. This aligns with the overall mean of responses to other questions measuring various aspects of continuous auditing, indicating participants generally had strong positive perceptions concerning continuous auditing. In accordance with resource-based theory, Alkebsi and Aziz (2017) contend that successful firms rely on their internal resources and that their utilisation of IT is a key factor. According to resource-based theory, the implementation of continuous auditing can be considered a strategic asset that enhances and secures a competitive advantage.

5.3.18.2 Centralising Purchasing Functions (Independent Variable)

Participants were asked to indicate the extent to which they strongly agree (1) or strongly disagree (5) with seven statements regarding the centralising of purchasing functions. Their responses are displayed in Table 5.40.

Table 5.40: Impact of Centralising Purchasing Functions

Statement	Mean	St. Dev	Rank
Your company is adopting the centralising purchasing functions of the materials	2.14	0.977	1
Your company is adopting the centralising purchasing functions of the inventories of the warehouses	2.16	1.024	2
Your company is adopting the centralising purchasing functions of the equipment	2.20	1.036	3
The centralising purchasing functions reduce the materials costs in your company	2.20	0.928	4
The centralising purchasing functions reduces the equipment costs in your company	2.21	0.918	5
The centralising purchasing functions increases the efficiency of the warehouses' operations in your company	2.23	0.945	6
The centralising purchasing functions reduces the inventory costs in your company	2.28	0.938	7
Overall	2.20	0.761	

Source: Survey (Appendix A).

Table 5.40 shows that the overall mean value was 2.20, which suggested a moderate level of agreement among the respondents regarding statements on centralising purchasing functions. The overall standard deviation value was 0.761. These findings indicate that participants had a moderate positive perception regarding the seven statements on centralising purchasing functions. The lowest mean value was 2.14 for statement 1, indicating that participants generally lean toward agreement with 'Your company is adopting the centralising purchasing functions of the materials'. Its standard deviation value was 0.977. The highest mean value was 2.28 for statement 7: 'The centralising purchasing functions reduces the inventory costs in your company'. Its standard deviation value was 0.938.

Additionally, statement 2: 'Your company is adopting the centralising purchasing functions of the inventories of the warehouses', had a mean value of 2.16 with a standard deviation of 1.024. Statement 3: 'Your company is adopting the centralising purchasing functions of the equipment', had a mean value of 2.20 and a standard deviation of 1.036. Statement 4: 'The centralising purchasing functions reduce the materials costs in your company', had a mean of 2.20 and a standard deviation of 0.928. For statement 5, 'The centralising purchasing functions reduce the equipment costs in your company', the mean value was 2.21 with a standard deviation of 0.918. Lastly, statement 6: 'The centralising

purchasing functions increase the efficiency of the warehouses' operations in your company', had a mean value of 2.23 and a standard deviation of 0.945.

Respondents were also asked to indicate the extent to which they strongly agree (1) or strongly disagree (5) with seven statements regarding the centralising purchasing functions. Their responses are displayed in Table 5.41.

Table 5.41: Benefits of Centralising Purchasing Functions

Statement	Mean	St. Dev	Rank
There is a procurement audit in your company	1.79	0.803	1
The centralising purchasing functions enhances the efficiency of the internal control in your company	2.05	0.812	2
The centralising purchasing functions in your company enhances the supply chain efficiency	2.09	0.856	3
The centralising purchasing functions reduces the potential for fraud, waste and abuse in the company	2.10	0.836	4
The centralising purchasing functions increases the internal auditing process efficiency in your company	2.17	0.860	5
The centralising purchasing functions reduces the surplus inventories in your company warehouses	2.18	0.892	6
Implementing centralising purchasing functions in your company requires implementing a continuous auditing approach in your company	2.24	0.820	7
Overall	2.08	0.638	

Source: Survey (Appendix A).

Table 5.41 showed rank, standard deviation and mean values. The lowest mean value was 1.79 for statement 1, which suggests that most participants strongly agree with 'There is a procurement audit in your company'. Its standard deviation value was 0.803. In contrast, the highest mean value was 2.24 for statement 7, 'Implementing centralising purchasing functions in your company requires implementing a continuous auditing approach in your company', which still reflect positive perceptions. Its standard deviation value was 0.820. The overall standard deviation value was 0.638. The overall mean value was 2.08, indicating that participants generally lean toward a moderate level of agreement with the statements on centralising purchasing functions. This finding aligns with the overall mean of responses to other question measuring various aspects of centralising purchasing functions. Integrating business processes is, thus, a significant factor in increasing

auditing efficiency (Vasarhelyi, Alles & Kogan 2004). According to resource-based theory, the centralising of purchasing functions can be considered a strategic asset that strengthens and maintains competitive advantage.

5.3.18.3 Internal Audit Effectiveness (Dependent Variable)

Participants were asked to indicate the extent to which they strongly agree (1) or strongly disagree (5) with regard to the effectiveness of the internal audit team in their companies. Their replies are exhibited in Table 5.42.

Table 5.42: Effectiveness of Internal Audit

Statement	Mean	St. Dev	Rank
Internal audit makes recommendations for improving the internal control system when appropriate	1.41	0.641	1
Internal audit evaluates the internal control system	1.42	0.570	2
Internal audit provides adequate follow-up to ensure that appropriate corrective action is taken and that it is effective	1.49	0.620	3
Internal audit determines the adequacy and effectiveness of the organisation's systems of internal accounting and operating controls	1.49	0.641	4
Internal audit reviews operations and programmers to ascertain whether results are consistent with established objectives and goals	1.51	0.641	5
Internal audit improves organisational performance	1.52	0.640	6
Internal audit reviews the economic, effective and efficient use of resources	1.54	0.718	7
Internal audit reviews the accuracy and reliability of financial reports	1.57	0.733	8
Internal audit improves the organisation's productivity	1.66	0.829	9
Overall	1.51	0.528	

Source: Survey (Appendix A).

Table 5.42 revealed that the overall mean value was 1.51, indicating that participants lean toward a high level of agreement regarding the effectiveness internal audit. Therefore, participants had strong positive perceptions regarding the effectiveness internal audit. The overall standard deviation value was 0.528. The lowest mean value was 1.41 for statement 1, which suggested that most participates strongly agree with 'Internal audit makes recommendations for improving the internal control system when appropriate'. Its standard deviation value was 0.641. The highest mean value was 1.66 for statement 9: 'Internal audit improves the organisation's productivity', which suggests that most participants lean toward a high level of agreement with this statement. Its standard deviation value was 0.829.

5.3.18.4 Performance Expectancy (Independent Variable)

Participants were requested to indicate the extent to which they agree (1) or disagree (5) with statements addressing the performance expectancy of continuous auditing in their companies. Their responses are displayed in Table 5.43.

Table 5.43: Performance Expectancy

Statement	Mean	St. Dev	Rank
Continuous auditing increases the efficiency of the internal audit process	1.55	0.788	1
Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company	1.57	0.687	2
Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company	1.58	0.733	3
Continuous auditing helps internal auditors in fraud detection	1.59	0.775	4
Continuous auditing enhances the decisions usefulness of financial information for users	1.61	0.692	5
Continuous auditing reduces the waste and abuse of the warehouses inventory in the company	1.64	0.768	6
Continuous auditing helps internal auditors in fraud investigation	1.81	0.912	7
Overall	1.61	0.584	

Source: Survey (Appendix A).

Table 5.43 revealed that an overall mean value of 1.61, which indicates that participants lean toward a high level of agreement regarding the performance expectancy of continuous auditing. Therefore, internal auditors generally had strong positive perceptions for the performance expectancy of continuous auditing. The overall standard deviation was 0.584. The lowest mean value was 1.55 for statement 1, which suggests that most participants strongly agree with 'Continuous auditing increases the efficiency of the internal audit process'. Its standard deviation value was 0.788. In contrast, the highest mean value was 1.81 for statement 7: 'Continuous auditing helps internal auditors in fraud investigation', but this still reflects positive perceptions. Its standard deviation value was 0.912. Using UTAUT, a study conducted by Almagrashi et al. (2023) to investigate the factors that affect internal auditors' intentions to use CAATs in the Saudi public sector found that performance expectancy significantly affects internal auditors' intentions to use CAATs. In alignment with UTAUT, performance expectancy is a critical factor.

5.3.18.5 Facilitating Conditions (Independent Variable)

Respondents were asked to indicate the extent to which they agree (1) or disagree (5) with statements that address the lack of facilitating conditions for continuous auditing in their companies. Their responses are displayed in Table 5.44.

Table 5.44: Facilitating Conditions

Statement	Mean	St. Dev	Rank
There is not enough infrastructure in your firm to support the implementation of continuous auditing	2.63	1.390	1
Continuous auditing is too costly	2.75	1.214	2
There is a lack of efficient internal control systems in your company	2.97	1.268	3
Overall	2.78	1.074	

Source: Survey (Appendix A).

Table 5.44 revealed that the lowest mean value was 2.63 for statement 1, which indicates that most participants lean toward natural and a slight tendency towards agreement with the statement, 'There is not enough infrastructure in your firm to support the implementation of continuous auditing'. Its standard deviation value was 1.390. The highest mean value was 2.97 and standard deviation value was 1.268 for statement 3, which reflects a neutral perception concerning the statement, 'There is a lack of efficient internal control systems in your company'. The overall standard deviation was 1.074. The overall mean value was 2.78, which indicates that participants were neutral regarding the lack of facilitating conditions but recognise the need for improvement in the infrastructure to support continuous auditing. However, this issue is not considered highly problematic. The internal auditors had neutral perceptions regarding the lack of facilitating conditions for continuous auditing in their companies. In line with UTAUT, a study conducted in Saudi Arabia by Al-Gahtani, Hubona and Wang (2007) that investigated factors that affect behavioural intentions to use computers in the workplace did not find evidence of facilitating conditions affecting computer usage behaviour.

5.3.18.6 Effort Expectancy (Independent Variable)

Participants were asked to indicate the extent to which they agree (1) or disagree (5) with a statement that addresses the effort expectancy of continuous auditing in their companies. Their responses are displayed in Table 5.45.

Table 5.45: Effort Expectancy

Statement	Mean	St. Dev	Rank
Continuous auditing is too complex	3.08	1.171	1
Overall	3.08	1.171	

Source: Survey (Appendix A).

Table 5.45 reveals that the mean value for effort expectancy was 3.08 with regard to the statement 'Continuous auditing is too complex'. The standard deviation was 1.171. Participants therefore held neutral to slightly negative perceptions concerning effort expectancy as measured by complexity of continuous auditing in their companies. In line with UTAUT, a study conducted in Saudi Arabia by Al-Gahtani, Hubona and Wang (2007) also did not find an impact from effort expectancy on behavioural intentions to use computers.

5.3.18.7 Social Influence (Independent Variable)

Participants were requested to indicate the extent to which they agree (1) or disagree (5) with a statement that addresses social influence as concerns continuous auditing in their companies. Their responses are displayed in Table 5.46.

Table 5.46: Social Influence

Statement	Mean	St. Dev	Rank
Your firm thinks that continuous auditing will not improve the internal auditors' performance and the quality of internal audit	3.54	1.223	1
Overall	3.54	1.223	

Source: Survey (Appendix A).

Table 5.46 shows that the mean value of the social influence of continuous auditing was 3.54, which suggests that participants lean toward a neutral to slight disagreement view concerning the statement, 'Your firm thinks that continuous auditing will not improve the internal auditors' performance and the quality of internal audit'. The standard deviation value of the social influence of continuous auditing was 1.223. Internal auditors had a neutral to slightly negative perception of social influence, as characterised by management's negative perceptions toward continuous auditing. In line with UTAUT, a study conducted by Al-Hiyari, Hattab and Al Said (2019) also found that social influence did not affect internal auditors' intentions to use CAATs in Jordan.

5.3.18.8 Intentions to Use (Dependent Variable)

Respondents were requested to indicate the extent to which they agree (1) or disagree 95) with a statement that addresses intentions to use continuous auditing in their companies. Their responses are displayed in Table 5.47.

Table 5.47: Intentions to Use Continuous Auditing

Statement	Mean	St. Dev	Rank
Your company plans to increase the implementation of continuous auditing in the future	1.91	0.923	1
Overall	1.91	0.923	

Source: Survey (Appendix A).

Table 5.47 shows that the mean value for intentions to use continuous auditing was 1.91, indicating that most participants had a high level of agreement with the statement, 'Your company plans to increase the implementation of continuous auditing in the future'. The standard deviation was 0.923. Therefore, participants generally had a strong positive perception of intention to use continuous auditing.

5.4 Examining the Research Hypotheses

This section analyses the two research frameworks using multiple regression analyses. The first research framework investigates the effects of continuous auditing and centralising purchasing functions on the effectiveness of internal audit, as stipulated by hypothesis 1 and hypothesis 2. These hypotheses examine the relationships between the independent variables, continuous auditing and centralising purchasing functions and the dependent variable, the effectiveness of internal audit. The second research framework delves into the factors influencing internal auditors' intentions to use continuous auditing, as outlined in hypothesis 3, hypothesis 4, hypothesis 5 and hypothesis 6. These hypotheses explore the effects of facilitating conditions, social influence, effort expectancy and performance expectancy as independent variables on the dependent variable, internal auditors' intentions to use continuous auditing.

5.4.1 Independent Variables

In the initial research framework, two independent variables are examined: continuous auditing and the centralising of purchasing functions. The holistic measurement of these

variables is presented in Table 50. Conversely, the second research framework presents four independent variables: facilitating conditions, social influence, effort expectancy and performance expectancy. The holistic measurement of these variables is also presented in Table 5.48.

Table 5.48: First Research Framework (Two Independent Variables) v. Second Research Framework (Four Independent Variables)

	Independent Variables	Holistic Measurement
First Research Framework	Continuous Auditing	Capabilities, benefits, impacts, procedures and use of continuous auditing.
	Centralising Purchasing Functions	Capabilities, advantages, impacts and application of centralising purchasing functions.
Second Research Framework	Facilitating Conditions	Assessment of negative perceptions, infrastructure deficiencies and high costs as inhibiting factors for facilitating conditions in the adoption of continuous auditing.
	Social Influence	Assessment of internal auditors' perceptions of negative social influence and organisational resistance towards the adoption of continuous auditing.
	Effort Expectancy	Negative perceptions and perceived complexity as negative aspects of effort expectancy for utilising continuous auditing.
	Performance Expectancy	Assessment of positive perceptions regarding the benefits and impacts of using continuous auditing on performance expectancy among internal auditors.

5.4.2 Dependent Variables

The first research framework examines one dependent variable, internal audit effectiveness. The second research framework has intention to use as the dependent variable. The holistic measurements of these variables are both presented in Table 5.49.

Table 5.49: Dependent Variable in the First and Second Research Frameworks

	Dependent Variables	Holistic Measurement
First research framework	Internal audit effectiveness (IAE)	Reviews the accuracy and reliability of financial reports, boosting productivity and performance, evaluating the outcomes the goals and aims, determines the adequacy and effectiveness of the systems of internal accounting and internal control and providing recommendations for improvement, provides adequate follow-up.

Second research framework	Intention to use (ITU)	The plan to use continuous auditing in the future.

5.4.3 Normality

The normality test is intended to define whether the research data for both independent and dependent variables conform to a normal distribution. Given the central limit theorem, a significant sample size allows the presumption that the data are normally distributed (Field 2018). The sample size of this study is large. Statistical tests such as the skewness and kurtosis tests were conducted in this study to determine the normality of data distributions. According to Pallant (2020), skewness and kurtosis tests can be used to determine the normality of the research data. Table 5.50 shows that the majority of variables examined in this research exhibited normal distribution, with skewness and kurtosis scores at zero. A skewness and kurtosis score of zero indicates that the distributions of the data are normal (Pallant 2020). The scores of the skewness and kurtosis tests indicated normal distribution of research variables.

Table 5.50: Skewness and Kurtosis Scores

Variables	Skewness Scores	Kurtosis Scores
Continuous auditing	0.359	–0.293
Centralising purchasing functions	–0.096	–0.603
Facilitating conditions	0.573	–0.439
Effort expectancy	0.096	–0.946
Social influence	–0.555	–0.627
Intentions to use	0.850	0.393
Performance expectancy	0.971	1.432
Internal audit effectiveness	0.629	–0.731

Source: Survey (Appendix A).

Table 5.50 shows the outcomes scores for the skewness and kurtosis tests. Whereas all skewness scores were between 0.971 and –0.555, all kurtosis test scores were between 1.432 and –0.946.

5.4.4 Multivariate Analyses

This section outlines the results from multivariate analyses, meaning analyses that are often used to examine data sets that have more than one variable. Multivariate analysis aims to investigate the extent to which a set of variables interact with each other. Among its common applications is multiple regression analysis.

5.4.4.1 Appropriateness of Multiple Regression Analysis

Multiple regression analysis is a statistical method that examines the relationship between two or more independent variables and one dependent variable by determining coefficients that best fit the data (Pallant 2020). The objective of this is to identify the extent of the influence of each independent variable on the dependent variable (Field 2018). Multiple regression analysis depends on correlations (Pallant 2020). In the case of this study, multiple regression analysis was conducted to examine the effects of continuous auditing and centralising purchasing functions (independent variables) on internal audit effectiveness (dependent variable), as well as the effects of factors such as facilitating conditions, social influence, effort expectancy and performance expectancy (independent variables) on intention to use continuous audit by examining six hypotheses. There are some methods needed to address assumptions and that are necessary for the conducting of multiple regression analysis (Cronk 2019; Pallant 2020). The following sections address these points.

5.4.4.1.1 Sample Size

As has been outlined previously, there are many methods to determine the appropriate sample size for the regression model. According to Field (2018), the most popular methods for the appropriate sample size set ten or 15 cases for each independent variable in the linear model. Additionally, there is a need of 15 cases for each independent variables for an efficient equation (Stevens 1994). Similarly, 15 cases are considered efficient for each independent variables in the model (Pallant 2020). With six or fewer independent variables in the linear model, a sample size of 100 would be appropriate (Field 2018).

The approach proposed by Tabachnick and Fidell (2013) for determining an appropriate sample size depends on the number of independent variables: $N > 50 + 8m$ (where m is

the number of the total independent variables in the model used in the study). Accordingly, for the first conceptual framework that comprises two independent variables, the minimum sample size required would be 67 participants. For the second conceptual framework involving four independent variables, the minimum sample size required would be 83 participants. This study sample size included 152 participants, thereby exceeding the size of the sample needed for both frameworks. Therefore, this study sample size is appropriate for conducting a linear regression model.

5.4.4.1.2 Outliers

Outliers can occur because of mistakes, errors or the effects of extreme values held by the participants. Outliers can significantly affect the regression analysis (Field 2018). According to Pallant (2020), it is expected to discover outliers in large samples. Cases with standardised residual values above 3.29 or less than –3.29 are problems for the regression analysis (Field 2018). Additionally, cases with a score of standardised residuals of greater than 3.3 or less than –3.3 are described as outliers (Tabachnick & Fidell 2013). Two participants were identified as outliers because their standardised residual values were more than 3.3 in the first regression model for the first conceptual framework of the research.

A case-wide diagnostic approach can be used to identify standardised residual values greater than 3 or less than –3 (Pallant 2020). A case-wide diagnostic approach was conducted in both regression models to examine standardised residual values in this dataset. Case number 100 had a standardised residual value of 3.4 and case number 127 had a standardised residual value of 4 in the first regression model for the first conceptual framework of the research. These two cases were excluded from the dataset of this study because their data points significantly deviate from the trend observed in the dataset. After excluding these two participants, the range of standardised residual values in the dataset is between –2.038 and 2.917 for the first regression model and between –2.271 and 3.117 for the second regression model (see, e.g., Table 5.51). After removing the two outliers, the total participants in this study number 152 participants, with standardised residual values exceeding the value of 3.3.

Table 5.51: Standardised Residual Values

Case-wide Diagnostic Approach	Minimum	Maximum	Number of Participants

Standardised residuals (first regression model)	–2.038	2.917	152
Standardised residuals (second regression model)	–2.271	3.117	152

Source: Survey (Appendix A).

5.4.4.1.3 Multicollinearity Test

When the correlations between independent variables in the linear regression are strong, the multicollinearity issue occurs (Field 2018), affecting the regression model. A collinearity diagnostics procedure can be conducted to assess the multicollinearity between the independent variables in the regression analysis (Pallant 2020). According to Pallant (2020), tolerance values less than 0.10 or a variance inflation factor (VIF) more significant than 10 can exhibit multicollinearity problems. Tolerance values and VIF were established to evaluate the multicollinearity between the independent variables for both research frameworks in the regression analysis (see, e.g., Table 5.52).

Table 5.52: Multicollinearity

	Independent Variables	Tolerance	VIF
First Research Framework	Continuous auditing	0.941	1.063
	Centralising purchasing functions	0.941	1.063
Second Research Framework	Performance expectancy	0.967	1.034
	Facilitating conditions	0.568	1.760
	Effort expectancy	0.513	1.949
	Social influence	0.584	1.712

Source: Survey (Appendix A).

Table 5.52 shows that the multicollinearity values for both the tolerance and VIF were within an acceptable range. Whereas VIF scores were less than 10, tolerance scores were more than 0.10, indicating no multicollinearity issues exist in either regression model of this study.

5.4.4.1.4 Normality of Residuals

Another assumption of the linear regression analysis concerns the normality of residuals (Pallant 2020). The regression standardised residuals must be normally distributed. According to Pallant (2020), skewness and kurtosis tests can be used to determine the normality for the research data. Both skewness and kurtosis tests were conducted in this

study to determine the normality of residuals. Table 5.53 exhibits the outcome of skewness and kurtosis tests conducted on regression standardised residuals for the two regression models examined in this research. As has been noted, a skewness and kurtosis score of zero indicates that the data are normally distributed (Pallant 2020). Table 5.53 shows that the skewness score for standardised residuals in the first regression model was 0.452 and the kurtosis score for regression standardised residuals was –0.359. In the second regression model, whereas the score of skewness for regression standardised residuals was 0.552, the kurtosis score for regression standardised residuals was 0.107. Therefore, the skewness and kurtosis test scores for standardised residuals in both regression models indicate a normal distribution of residuals.

Table 5.53: Normality of Residuals in the First and Second Regression Models

Normality of Residuals	Skewness	Kurtosis
Regression standardised residual (first regression model)	0.452	–0.359
Regression standardised residual (second regression model)	0.552	0.107

Source: Survey (Appendix A).

5.4.4.2 Correlations

Correlations refer to the relationship between two variables (Field 2018). Correlation analyses, such as Pearson correlation coefficient, were conducted to determine the degree of the relationship between continuous auditing and centralising purchasing functions (independent variables) and internal audit effectiveness (dependent variable), as well as the performance expectancy, facilitating conditions, effort expectancy and social influence (independent variables) on intentions to use continuous audit (dependent variable).

Table 5.54 shows that all correlation scores were positive and statistically significant at $p < 0.01$ between the independent variables and dependent variable in the first conceptual framework. Continuous auditing showed greater positive correlations and was statistically significant at $p < 0.01$ level with internal audit effectiveness. In the first conceptual framework, all independent variables exhibited positive correlation with the dependent variable and were statistically significant at $p < 0.01$ level.

Table 5.54: Correlation for First Research Framework

Variables	Continuous Auditing	Centralising Purchasing Functions	Internal Audit Effectiveness
Continuous auditing	1		
Centralising purchasing functions	0.243**	1	
Internal audit effectiveness	0.408**	0.282**	1

** Correlations are significant at the 0.01 level.

Table 5.55 indicates that performance expectancy was the most positive correlation and statistically significant at $p < 0.01$ level with intention to use continuous audit, whereas facilitating conditions and social influence had negative correlations significant at $p < 0.01$ level with intention to use continuous audit. Additionally, the effort expectancy had negative correlations and was statistically significant at $p < 0.05$ level with intention to use continuous audit. In the second conceptual framework, the independent variables were correlated with the dependent variable, with some correlations statistically significant at $p < 0.01$ level and others at $p < 0.05$ level.

Table 5.55: Correlation for Second Research Framework

Variables	Facilitating Conditions	Social Influence	Performance Expectancy	Effort Expectancy	Intentions to Use
Facilitating conditions	1				
Social influence	0.542**	1			
Performance expectancy	–0.175*	–0.132	1		
Effort expectancy	0.617**	0.608**	–0.130	1	
Intentions to Use	–0.252**	–0.243**	0.541**	–0.177*	1

* Correlation is significant at the 0.05 level.

** Correlation is significant at the 0.01 level.

5.5 Research Frameworks Parameters

Two research frameworks were devised to test this study's hypotheses using two multiple regression analyses, estimated using OLS methods. The first OLS regression model was designed to test the relationships between continuous auditing and the centralisation of purchasing functions (independent variables) and internal audit effectiveness (dependent

variable). This model was used to evaluate the first conceptual framework and its hypotheses:

$$IAE = \beta 0 + \beta 1(CA) + \beta 2(CPF) + ei$$

where:

- IAE is internal audit effectiveness
- CA is continuous auditing
- CPF is centralising purchasing functions.

The first conceptual framework hypothesises:

H1 Continuous auditing is significantly associated with internal audit effectiveness.

H2 Centralising purchasing functions is significantly associated with internal audit effectiveness.

The second OLS regression model was utilised to test the second conceptual framework and its hypotheses:

$$ITU = \beta 0 + \beta 1(PE) + \beta 2(FC) + \beta 3(EE) + \beta 4(SI) + ei$$

where:

- ITU is intention to use continuous audit
- PE is performance expectancy
- FC is facilitating conditions
- EE is effort expectancy
- SI is social influence.

The second conceptual framework hypothesises:

H3: Positive perceptions of performance expectancy will increase internal auditors' intentions to use continuous auditing.

H4: Negative perceptions of facilitating conditions will decrease internal auditors' intentions to use continuous auditing.

H5: Negative perceptions of effort expectancy will decrease internal auditors' intentions to use continuous auditing.

H6: Negative perceptions of the social influence will decrease internal auditors' intentions to use continuous auditing.

5.6 Multiple Regression Analysis

Two multiple regression analyses were conducted to examine the six research hypotheses. The first multiple regression analysis made clear that continuous auditing and centralising purchasing functions are key metrics of internal audit effectiveness for the first conceptual framework. The second multiple regression analysis showed that performance expectancy is a critical metric for intentions to use continuous auditing. Facilitating conditions, effort expectancy and social influence are not indictors for intentions to use continuous auditing.

Table 5.56 displays the key metrics of internal audit effectiveness for the first conceptual framework and Table 5.57 shows that performance expectancy is the only important metric for intentions to use continuous auditing for the second conceptual framework.

Table 5.56: Outcome of First Multiple Regression Analysis

R^2 = 0.202	**Adjusted R^2 = 0.191**	**R = 0.449**	**F = 18.832**	**Sig. = < 0.001**	**Std. Error of the Estimate = 0.47571**
Variables	B	Std. Error	Standardised Coefficients Beta	*T* value	*P* value
Constant	0.404	0.187		2.146	0.033*
Continuous auditing	0.449	0.094	0.361	4.779	< 0.001**
Centralising purchasing functions	0.163	0.063	0.194	2.574	0.011*

* Significant at 0.05.

** Significant at 0.01.

Table 5.57: Outcome of Second Multiple Regression Analysis

R^2 = 0.330	Adjusted R^2 = 0.312	R = 0.575	F = 18.126	Sig. = < 0.001	Std. Error of the Estimate = 0.766
Variables	B	Std. Error	Standardised Coefficients Beta	*T* value	*P* value
Constant	1.148	0.296		3.880	< 0.001**
Performance expectancy	0.803	0.108	0.508	7.408	< 0.001**
Facilitating conditions	–0.098	0.077	–0.114	–1.270	0.206
Effort expectancy	0.036	0.074	0.046	0.487	0.627
Social influence	–0.108	0.067	–0.142	–1.612	0.109

According to Field (2018), R^2 aims to identify the degree of variance within the model. To determine the variance in internal audit effectiveness and intentions to use continuous auditing, R^2 scores were utilised. In the first regression model, continuous auditing and the centralisation of purchasing functions accounted for 20.2% of the variance in the effectiveness of internal auditing, with the remaining 79.8% attributed to other factors not examined in this study. In the second regression model, performance expectancy accounted for 33% of the variance in the intention to use continuous auditing, with the remaining 67% being attributed to other factors not examined in this study. The facilitating conditions, social influence and effort expectancy independent variables of the second conceptual framework were not statistically significant in the regression analysis.

Tables 58 and 59 have shown that the general results of the two multiple regression models were statistically significant. Regression analysis can identify which independent variables contribute significantly to correlation, exhibiting this via beta scores. These beta scores determine the degree of change in the dependent variable, accounted in standard deviations, corresponding to a one standard deviation alteration in the independent variable (Field 2018). A greater beta coefficient signifies a more substantial contribution of an independent variable to the dependent variable in regression analysis. Table 5.56 exhibited high beta scores for continuous auditing and centralising purchasing functions in the regression model, and Table 5.57 showed a strong beta score for performance

expectancy in the regression model. Consequently, an increase in the independent variables continuous auditing and centralising purchasing functions are associated with a corresponding increase in the dependent variable, internal audit effectiveness, in the first conceptual framework. Additionally, an increase in the performance expectancy would increase the intention to use continuous auditing, as shown in the second conceptual framework.

In first regression model, beta scores for continuous auditing and the centralising purchasing functions (independent variables) were positive and statically significant in the first research framework. Continuous auditing showed a strong positive and statistically significant relationship with internal audit effectiveness ($\beta = 0.361$, $p < 0.01$), meaning support of hypothesis 1. Centralising purchasing functions had a positive and a statistically significant relationship with internal audit effectiveness ($\beta = 0.194$, $p < 0.05$), meaning support of hypothesis 2. This indicates that continuous auditing was the primary factor influencing the dependent variables among the independent variables. This outcome indicates that the relationships between the independent variables and dependent variable are statistically significant and positive correlations.

In second regression model, the beta score of performance expectancy was the only statistically significant and strongly positive factor; facilitating conditions, effort expectancy and social influence were not statistically significant in the regression analysis. Performance expectancy had a significant relationship with intentions to use ($\beta = 0.508$, $p < 0.01$), thereby supporting hypothesis 3. In contrast, facilitating conditions, effort expectancy and social influence were not shown to be statistically significant with regard to intentions to use ($p = 0.206$, $p = 0.627$ and $p = 0.109$ respectively), thus not supporting hypothesis 4, hypothesis 5 or hypothesis 6. Therefore, the primary driver of internal auditors' intentions to use continuous auditing is performance expectancy and their relationship is strong with positive correlations. Table 5.58 provides the outcomes of the research hypotheses tests.

Table 5.58: Hypotheses, Outcomes and Significance for First and Second Research Frameworks

	Hypotheses	Outcomes and Significance
First research framework	H1 Continuous auditing is significantly associated with internal audit effectiveness	Supported, $p < 0.01$
	H2 Centralising purchasing functions is significantly associated with internal audit effectiveness	Supported, $p < 0.05$
Second research framework	H3: Performance expectancy has a positive impact on internal auditors' intentions to use continuous auditing	Supported, $p < 0.01$
	H4: Facilitating conditions have a negative impact on internal auditors' intentions to use continuous auditing	Not supported, $p = 0.206$
	H5: Effort expectancy has a negative impact on internal auditors' intentions to use continuous auditing	Not supported, $p = 0.627$
	H6: Social influence has a negative impact on internal auditors' intentions to use continuous auditing	Not supported, $p = 0.109$

Chapter 6: Discussion of the Findings

6.1 Introduction

This chapter discusses the findings from the data analysis conducted in this study, which, as outlined in the preceding chapters, utilised two conceptual frameworks. The first conceptual framework, informed by resource-based theory, allowed for examination of the effects of continuous auditing and the centralisation of purchasing functions on internal auditing effectiveness in Saudi Arabia companies. The second conceptual framework employs the UTAUT to examine how performance expectations, facilitating conditions, effort expectations and social factors influence the intentions of internal auditors to use continuous auditing in Saudi Arabia companies. The data for this study were gathered via a questionnaire administered to 152 internal auditors employed by companies in Saudi Arabia.

This chapter consists of two sections: (i) the impact of continuous auditing and centralising purchasing functions on the effectiveness of internal audits and (ii) the factors that influenced the intentions of internal auditors to use continuous auditing in Saudi Arabian companies. In particular, this chapter will discuss the data analysis described in Chapter 5 and provide answers to the following main research questions:

> **Research question 1:** How do continuous auditing and centralising purchasing functions affect the effectiveness of internal audits in non-financial companies in Saudi Arabia?
>
> **Research question 2:** How do performance expectations, facilitating conditions, effort expectations and social factors affect internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia?

6.2 Impact of Continuous Auditing and Centralising Purchasing Functions on the Effectiveness of Internal Audit

The following sections aim to answer the first research questions concerning how continuous auditing and centralising the purchasing functions affect the effectiveness of internal audits in non-financial companies in Saudi Arabia. With regard to this question, according to the resource-based theory and using a multiple regression analysis, this study

finds that continuous auditing and centralising purchasing functions both affect the effectiveness of internal audit for non-financial companies in Saudi Arabia.

6.2.1 Continuous Auditing

Informed by resource-based theory, this study has hypothesised that the implementation of continuous auditing affects internal auditing effectiveness. In the context of resource-based theory, continuous auditing is a strongly significant variable for increasing the effectiveness of internal audit. Indeed, the use of IT has a major impact on the effectiveness of internal audits (Alkebsi & Aziz 2017). Alkebsi and Aziz (2017) argue that internal audit effectiveness relies on the utilisation of IT. The extensive implementation of continuous audit procedures enhances the efficiency and effectiveness of auditing (Vasarhelyi, Alles & Kogan 2004). Gonzalez, Sharma and Galletta (2012) support this, noting that continuous auditing is widely recognised for providing numerous advantages to organisations, such as organisational communication, improving the timeliness of analysis, reducing accounting errors and enhancing the effectiveness and efficiency of audits. Additionally, according to Wiegerinck (2019), the practical advantages of continuous auditing encompass the enhanced efficiency of both business processes and auditing. According to Vasarhelyi et al. (2012), continuous assurance of data using continuous auditing has become essential. Continuous auditing enhances the quality of the audit trail, as well as the reliability and accuracy of the audit (Davidson, Desai & Gerard 2013).

As Alkebsi and Aziz (2017) have noted, previous studies have found that the use of technology is crucial for facilitating the internal audit process, particularly in the phases of preparation, evaluation and reviewing. A study by Appelbaum et al. (2016) supports this, with the authors having noted that the implementation of continuous auditing boosts various elements, including enhancing the effectiveness of the audit process, eliminating accounting errors and enabling real-time data analysis. Rikhardsson and Dull (2016) have also found that implementing and using continuous auditing systems enhances both the quality of the data delivered and the reliability of transaction recordings, as well as ensuring the data's integrity. These points are important because, according to Vasarhelyi et al. (2012), obtaining reliable and accurate data is crucial and advantageous for a firm. Continuous auditing provides advantages in strengthening internal control abilities and enhancing the effectiveness of firm operations (Wiegerinck 2019). In line with resource-

based theory, a company can enhance and secure a competitive advantage, such as internal audit effectiveness, through utilising organisational resources and capabilities, such as implementing continuous auditing procedures.

The measurement items for continuous auditing that affect internal audit efficiency in Saudi Arabia companies were presented in Table 4.1 and Section 6.2.1.2. The findings of this study indicate that internal auditors have a strong positive perception of continuous auditing. Furthermore, the findings have also shown a prevalent and substantial adoption of continuous auditing among the companies. This study demonstrates that continuous auditing is significantly associated with internal audit effectiveness.

6.2.1.1 Hypothesis on the Impact of Continuous Auditing on Internal Audit Effectiveness

The impact of continuous auditing on internal auditing effectiveness has been investigated using a multiple regression analysis in this study. The result of the first multiple regression analysis has shown that continuous auditing was statically significant with a positive beta value ($\beta = 0.361$, $p < 0.01$), indicating that continuous auditing is significantly associated with internal audit effectiveness, supporting hypothesis 1. Furthermore, there was a statistically significant and moderately strong positive impact from continuous auditing on internal audit effectiveness ($\beta = 0.361$, at $p < 0.01$ level). The findings of this study are supported by resource-based theory, as well as by prior studies (see, e.g., Federicco & Tandiono 2023; Rikhardsson & Dull 2016; Wiegerinck 2019). All of these studies have, for example, highlighted the benefits and advantages of continuous auditing for internal audit processes.

Having conducted a study in the Netherlands, Wiegerinck (2019) found that implementing continuous auditing improved audit quality, increased audit effectiveness and enhanced the quality of the businesses processed. Rikhardsson and Dull (2016) found that implementing continuous auditing led to resource and time savings, decreased errors and enhanced decision quality for companies in Iceland. A study conducted by Federicco and Tandiono (2023) in Indonesia found that the use of continuous auditing technology improves audit quality and audit reliability, as well as enhancing efficiency and timeliness in identifying any faults. Additionally, these researchers' findings have indicated that a

significant obstacle to adopting continuous auditing is a lack of skills among internal auditors, a lack that can affect internal auditing effectiveness.

In accordance with resource-based theory, Alkebsi and Aziz (2017) contend that successful firms rely on their internal resources and that their utilisation of IT is a key factor. Alkebsi and Aziz (2017) have found, for example, that the use of IT influences the internal audit effectiveness in the public sector in Yemen. According to resource-based theory, the findings of this study indicate that the implementation of continuous auditing can be considered a strategic asset that enhances and secures a competitive advantage, such as improving the internal auditing effectiveness for companies in Saudi Arabia.

6.2.1.2 Measurement Items for Continuous Auditing:

- To what extent does your company use the continuous auditing?
- Continuous auditing helps internal auditors in fraud detection.
- Continuous auditing helps internal auditors in fraud investigation.
- Continuous auditing enhances the decisions usefulness of financial information for users.
- Continuous auditing increases the efficiency of the internal audit process.
- Continuous auditing reduces the waste and abuse of the warehouses inventory in the company.
- Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company.
- Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company.
- Your company plans to increase the implementation of continuous auditing in the future.
- How often do you use computers for your internal audit tasks in your company?
- How often do you use IT tools and techniques in planning of your internal audit assignments?
- How often do you use IT tools and techniques in assessment of internal control system?
- How often do you use IT tools and techniques in recording your internal audit tasks?
- How often do you use IT tools and techniques in data analysis of your internal audit tasks?
- How often do you use IT tools and techniques in performing substantive tests?
- How often do you use IT tools and techniques in Fraud detection and investigation?
- How often do you use IT tools and techniques in Reporting your internal audit tasks?
- The refusal of your company to use IT tools and techniques could lead to low-quality internal audits.
- The use of IT tools and techniques has made your performance more satisfactory to you as an auditor.
- The use of IT tools and techniques has enhanced your commitment to your firm’s goals.
- The increased adoption of IT in the internal audit process has aided your professional career development.

- The use of IT for internal audit tasks by your firm gives it a comparative advantage over its competitors who do not use IT.
- The use of IT tools and techniques for your internal audit tasks gives you an advantage over your colleagues who use IT tools lesser or do not use them.
- The use of IT tools and techniques ..... your professional competence.
- The use of IT tools and techniques ..... the scope of your professional expertise.
- The use of IT tools and techniques ..... your fairness and sense of justice.
- Audit automation ..... the internal audit efficiency.
- IT tools and techniques are important instruments for risk assessment.
- IT tools and techniques are important instruments for fraud detection.
- IT tools and techniques are important instruments for fraud investigation.
- The use of IT tools and techniques saves time and effort devoted to controlling testing.
- The use of IT tools and techniques saves time and effort devoted to substantive testing.

6.2.2 Centralising the Purchasing Functions

Using resource-based theory, this study has identified that centralising purchasing functions affects internal audit effectiveness. Centralising purchasing functions is a significant factor for improving the effectiveness of internal audits. A study conducted in Ghana's public agencies by Karikari et al. (2022) has showed comparable results, specifically that there is a positive relationship between the effectiveness of internal audit and sustainable public procurement. Vasarhelyi, Alles and Kogan (2004) support this, noting that the integration of business processes enhances auditing efficiency and effectiveness. They have also argued that auditing efficiency and effectiveness rely heavily on the automation and integration of business processes.

According to David (2022), the internal audit function is crucial for ensuring efficient procurement processes. Additionally, Vasarhelyi, Alles and Kogan (2004) have noted that auditing processes are driven by the degree of the integration processes of the business activities and the automation of business processes. A study conducted by Keshavamurthy and Narsipur Venkatesh (2020) on the Swedish healthcare system found that a centralised purchasing structure provides improved visibility and guarantees precise record-keeping and thorough transaction reporting. They argue that a centralised procurement approach promotes control, ensures uniformity and precision of data and boosts transparency in the procurement procedure. According to Yussuf, Tonya and

Mohamed (2021), the internal audit is important in organisations because it can prevent much waste and abuse, particularly in the procurement processes.

The implementation of centralised purchasing has the potential to improve both the efficiency of purchasing and inventory management (Keshavamurthy & Narsipur Venkatesh 2020). By utilising organisational resources and capabilities such as the centralising of purchasing functions, a company can enhance both its competitive edge and internal auditing effectiveness. Table 4.1 and Section 6.2.2.2 provide a comprehensive breakdown of the measurement items for centralised purchasing functions that affect the efficiency of internal audits for companies in Saudi Arabia. The findings of this study further indicate that internal auditors had a moderately positive perception of centralised purchasing functions. Furthermore, the findings indicate the adoption of centralised purchasing functions for materials, inventory and equipment among the companies,

6.2.2.1 Hypothesis on the Impact of Centralising Purchasing Functions on Internal Audit Effectiveness

This study has examined the impact of centralising purchasing functions on internal auditing effectiveness through a multiple regression analysis. The findings of the first multiple regression analysis indicate that the centralising of purchasing functions is statistically significant, with a positive beta value ($\beta = 0.194$, $p < 0.05$). This suggests that the centralising of purchasing functions is significantly associated with internal audit effectiveness, thus supporting hypothesis 2. Moreover, this finding demonstrates that there was a statistically significant and moderately positive impact from centralising purchasing functions on internal audit effectiveness ($\beta = 0.194$, $p < 0.05$). Furthermore, the findings of this study are corroborated by resource-based theory and previous studies (see, e.g., David & Ntegwa 2024; Karikari et al. 2022; Keshavamurthy & Narsipur Venkatesh 2020; OECD 2000; Vasarhelyi, Alles & Kogan 2004).

A study conducted by David and Ntegwa (2024) also found an association between the elements of public procurement and the effectiveness of internal audits in Tanzania. Karikari et al. (2022) discovered similar findings, demonstrating a direct relationship between the efficiency of internal audit and the promotion of sustainable public procurement in Ghana's public agencies. Centralised purchasing systems improve the

effectiveness of the audit trail by ensuring thorough transaction reporting and recording, as well as putting in place efficient management controls (OECD 2000). Integrating business processes is, thus, a significant factor in increasing auditing efficiency (Vasarhelyi, Alles & Kogan 2004). Keshavamurthy and Narsipur Venkatesh (2020) have also found that the implementation of centralised purchasing systems leads to increased organisational coordination, reduced costs and improved operational efficiency. According to resource-based theory, the findings of this study suggest that the centralising of purchasing functions can be considered a strategic asset that strengthens and maintains competitive advantage, including increasing internal audit effectiveness for companies in Saudi Arabia.

6.2.2.2 Measurement Items for Centralising Purchasing Functions:

- Your company is adopting the centralising purchasing functions of the materials.
- Your company is adopting the centralising purchasing functions of the inventories of the warehouses.
- Your company is adopting the centralising purchasing functions of the equipment.
- The centralising purchasing functions increases the efficiency of the warehouses' operations in your company.
- The centralising purchasing functions reduces the inventory costs in your company.
- The centralising purchasing functions reduce the materials costs in your company.
- The centralising purchasing functions reduces the equipment costs in your company.
- The centralising purchasing functions in your company enhances the supply chain efficiency.
- The centralising purchasing functions reduces the surplus inventories in your company warehouses.
- The centralising purchasing functions increases the internal auditing process efficiency in your company.
- The centralising purchasing functions enhances the efficiency of the internal control in your company.
- There is a procurement audit in your company.
- Implementing centralising purchasing functions in your company requires implementing a continuous auditing approach in your company.
- The centralising purchasing functions reduces the potential for fraud, waste and abuse in the company.

6.3 The Impacts of Performance Expectancy, Facilitating Conditions, Effort Expectancy and Social Factors on Internal Auditors' Intentions to Use Continuous Auditing

This section aims to answer the second main research question concerning how performance expectations, facilitating conditions, effort expectations and social factors affect internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia. With regard to this question, this study drawing on UTAUT and using a multiple regression analysis finds that performance expectancy strongly and positively affects internal auditors' intentions to use continuous auditing for non-financial companies in Saudi Arabia.

6.3.1 Performance Expectancy

According to the UTAUT, this study finds that performance expectancy is the primary factor influencing internal auditors' intentions to use continuous auditing. That is, performance expectancy is a highly influential factor for motivating internal auditors' intentions to adopt continuous auditing. This finding aligns with the research conducted by Al-Hiyari, Hattab and Al Said (2019), Almagrashi et al. (2023), Bierstaker, Janvrin and Lowe (2014) and Mahzan and Lymer (2014). However, it contradicts the results reported by Gonzalez et al. (2012). According to the UTAUT, this study reveals that internal auditors are more likely to utilise continuous auditing when they believe that its advantage will enhance their job effectiveness.

Previous research has suggested that motives for adopting continuous auditing technologies can be driven by the desires to optimise capacity utilisation and conserve economic resources, generally in response to heightened compliance demands (Rikhardsson & Dull 2016). Implementing continuous auditing is expected to yield numerous advantages, including the ongoing detection of mistakes and fraud, as well as the utilisation of data analysis and information modelling capabilities (Vasarhelyi, Alles & Kogan 2004). Internal auditors utilise CAATs for the purpose of conducting continuous auditing (Wu et al. 2017). According to Al-Hiyari, Hattab and Al Said (2019), internal auditors gain multiple advantages from utilising CAATs. Specifically, these researchers argue that CAATs allow auditors to efficiently examine all transactions, enhancing their abilities to make more informed risk evaluations.

Table 4.1 and Section 6.3.1.2 detail the measurement items for performance expectancy that affect internal auditors' intentions to use continuous auditing in companies in Saudi Arabia. The findings of this study indicate that internal auditors in companies in Saudi Arabia generally had a strong positive perception of the performance expectancy of continuous auditing. Furthermore, this research reveals that internal auditors in companies in Saudi Arabia are more inclined to adopt continuous auditing when they perceive that its benefits will improve their job effectiveness.

6.3.1.1 Hypothesis on the Impact of Performance Expectancy on Internal Auditors' Intentions to Use Continuous Auditing

This study employed multiple regression analysis to examine the influence of performance expectancy on the internal auditors' intentions to use continuous auditing. The second multiple regression analysis results indicate that performance expectancy was statistically significant, with a positive beta value ($\beta = 0.508$, $p < 0.01$), indicating that performance expectancy has a positive impact on internal auditors' intentions to use continuous auditing. This supports hypothesis 3. Informed by UTAUT, the findings indicate that there was a statistically significant and strongly positive effect from performance expectancy on internal auditors' intentions to use continuous auditing ($\beta = 0.508$, at $p < 0.01$ level).

Additionally, the findings of this study are supported by the UTAUT and past studies (Al-Gahtani, Hubona & Wang 2007; Alles, Kogan & Vasarhely 2008; Almagrashi et al. 2023; KPMG 2012; Rikhardsson & Dull 2016; Venkatesh et al. 2003). In line with UTAUT, a study conducted in Saudi Arabia by Al-Gahtani, Hubona and Wang (2007) to investigate the factors that affect behavioural intentions to use computers in the workplace found that performance expectancy positively influenced workers' intentions to use computers in their work. Using UTAUT, a study conducted by Almagrashi et al. (2023) to investigate the factors that affect internal auditors' intentions to use CAATs in the Saudi public sector found that performance expectancy significantly affects internal auditors' intentions to use CAATs. A study conducted by Alles, Kogan and Vasarhely (2008) in two major companies in the USA found that implementing continuous auditing was primarily motivated by economics; thus, the internal audit sought to enhance the competency and effectiveness of its function while lowering the duration of audit. These researchers argue

that the growing implementation of continuous auditing in practice has resulted in a heightened focus on continuous auditing within the realm of academic research.

Venkatesh et al. (2003) also support this, noting that performance expectations play a significant role in determining individuals' adoption of new technologies. A study conducted by KPMG (2012) involving more than 700 companies found that the main drivers for implementing and investing in continuous auditing are to improve process efficiencies and boost transparency and error rectification. Rikhardsson and Dull (2016) support this in their study of seven small businesses, finding that the most critical reasons for adopting continuous auditing are enhancing the accuracy, reliability and timeliness of the data that is used for making managerial decisions. In alignment with UTAUT, this study indicates that performance expectancy is a critical factor that strongly and positively affects the internal auditors' intentions to use continuous auditing in companies in Saudi Arabia.

The findings of this study indicate that the major driver for increasing internal auditors' intentions to use continuous auditing will be performance expectancy. The findings of this study also indicate, however, that there a need to develop training courses to enhance internal auditors' expectations regarding the benefits of continuous auditing and how continuous auditing could improve the performance of internal auditors. Internal auditors are more likely to utilise continuous auditing when they believe that it will enhance their job efficiency.

6.3.1.2 Measurement Items for Performance Expectancy:

- Continuous auditing helps internal auditors in fraud detection.
- Continuous auditing helps internal auditors in fraud investigation.
- Continuous auditing enhances the decisions usefulness of financial information for users.
- Continuous auditing increases the efficiency of the internal audit process.
- Continuous auditing reduces the waste and abuse of the warehouses inventory in the company.
- Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company.
- Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company.

6.3.2 Facilitating Conditions

Informed by the UTAUT, this study found that facilitating conditions did not have an effect on internal auditors' intentions to use continuous auditing. This finding aligns with the research conducted by Al-Gahtani, Hubona and Wang (2007) and Gonzalez et al. (2012), but contradicts the results reported by Al-Hiyari, Hattab and Al Said (2019) and Almagrashi et al. (2023). According to Wiegerinck (2019), company IT infrastructures do affect the implementation of continuous auditing; similarly, Rikhardsson and Dull (2016) have found that the implementation of continuous auditing is affected by the degree of the efficiency of internal control systems within an organisation.

A study conducted by Alles, Kogan and Vasarhely (2008) in two major companies in the USA found that performing continuous auditing is impractical if the IT architecture incorporates legacy systems. Chiu, Liu and Vasarhelyi (2014) have further argued that a robust IT infrastructure is necessary for the successful implementation of continuous auditing. According to Mokhitli and Kyobe (2019), facilitating conditions encompass the organisational IT infrastructure and its accessibility, the latter being necessary for internal auditors to effectively carry out continuous auditing. According to Wiegerinck (2019), the disadvantages of continuous auditing encompass challenges related to internal control, the requirement for a strong IT infrastructure, substantial implementation costs and the need for IT-proficient human resources. Mokhitli and Kyobe (2019) found similar points, noting that lack of technological audit tools is one of factors that that hinders internal auditors from utilising IT for the purpose of continuous auditing.

According to Vasarhelyi, Alles and Kogan (2004), implementing continuous auditing necessitates further investment in advanced technology. Such investment in IT infrastructure and the associated high costs can pose a significant hindrance for firms seeking to implement effective continuous auditing (Wiegerinck 2019). The measurement items for facilitating conditions were presented in Table 4.1 and Section 6.3.2.1. The findings of this research reveal that the internal auditors had neutral perceptions regarding the lack of facilitating conditions for continuous auditing in their companies. However, the questionnaire data suggested that there is a need for improvement in the infrastructure to support continuous auditing, although this issue was not identified as highly problematic.

6.3.2.1 Hypothesis on the Impact of Facilitating Conditions on Internal Auditors' Intentions to Use Continuous Auditing

Multiple regression analysis was used to investigate the impact of facilitating conditions on internal auditors' intentions to use continuous auditing. The result of the second multiple regression analysis indicated that facilitating conditions were not statistically significant and had a negative beta value ($\beta = -0.114$, $p = 0.206$), which indicated that facilitating conditions did not significantly affect internal auditors' intentions to use continuous auditing. This result did not, therefore, support hypothesis 4. According to the UTAUT, these findings indicate that facilitating conditions does not have a statistically significant effect on internal auditors' intentions to use continuous auditing.

The results of this study are consistent with UTAUT and past studies (see, e.g., Al-Gahtani, Hubona & Wang 2007; Gonzalez et al. 2012). For instance, in line with UTAUT, a study conducted by Gonzalez et al. (2012) to investigate the factors that affect internal auditors' intentions to use continuous auditing in companies worldwide did not find that facilitating conditions had such an affect. Similarly, a study conducted in Saudi Arabia by Al-Gahtani, Hubona and Wang (2007) that investigated factors that affect behavioural intentions to use computers in the workplace did not find evidence of facilitating conditions affecting computer usage behaviour.

A study to investigate the adoption of continuous auditing by internal auditors conducted by Vasarhelyi et al. (2012) in nine leading internal audit organisations found that there is a need of efficient IT infrastructures within organisations for internal auditors to perform audit procedures and associated data analysis. Alles, Kogan and Vasarhelyi (2002) have similarly noted that the need for new IT infrastructure is considered a factor that affects the implementation of continuous auditing. With reference to UTAUT, the findings of this study have indicated that facilitating conditions do not have a statistically significant impact on internal auditors' intentions to use continuous auditing in companies in Saudi Arabia. Some internal auditors do recognise a need for infrastructure improvement to support continuous auditing, but this issue was not considered highly problematic. The lack of statistically significant results regarding the role of facilitating conditions can be attributed to the prevalent adoption of continuous auditing as indicated by the questionnaire data among the participants.

6.3.2.2 Measurement Items for Facilitating Conditions:

- Continuous auditing is too costly.
- There is not enough infrastructure in your firm to support the implementation of continuous auditing.
- There is a lack of efficient internal control systems in your company.

6.3.3 Effort Expectancy

Using the UTAUT, this study also found that effort expectancy did not have an impact on internal auditors' intention to use continuous auditing. This finding is consistent with the UTAUT and the findings from past research (see, e.g., Al-Gahtani, Hubona & Wang 2007; Al-Hiyari, Hattab & Al Said 2019; Mahzan & Lymer 2014), but it contradicts the results reported by Almagrashi et al. (2023) and Gonzalez et al. (2012). The transition from the traditional method to the automated method of auditing has, however, created some complexity in the role of internal auditors (Pedrosa & Costa 2012). Sun (2012) recognises this, noting that as auditing needs and environments have changed, automated auditing systems have had to be continuously updated. This has increased their complexity and made them more challenging to manage and maintain.

According to Gonzalez et al. (2012), implementing automated audit techniques transfers the auditor's tasks to more significant complex audit objectives. A study conducted by Vasarhelyi et al. (2012) in nine leading internal audit organisations to investigate the adoption of continuous auditing by internal auditors found that many organisations encounter difficulties in effectively utilising IT and ensuring that they possess the necessary skillsets to adapt to technological advancements. According to Gonzalez et al. (2012), internal auditors must possess a high level of proficiency in utilising continuous auditing techniques.

A study conducted by Hardy (2014) found a lack of internal auditors with IT skills in data analysis. However, the author argued that some organisations do actively develop these skills within their workforce. Rezaee et al. (2002) have noted that continuous auditing is an evolving practice that puts pressure on people involved in its implementation. However, it has also been argued that the efficiency of the audit process is more important for internal auditors when determining the use of new technology than the efforts needed

for the use of that technology (Bierstaker et al. 2014). Table 4.1 and Section 6.3.3.1 have exhibited the measurement item for effort expectancy. The findings of this research reveal that the internal auditors had neutral to slightly negative perceptions of effort expectancy, as measured by the complexity of continuous auditing in their companies. The questionnaire data also suggested that some perceived continuous auditing as complex.

6.3.3.1 Hypothesis on the Impact of Effort Expectancy on Internal Auditors' Intentions to Use Continuous Auditing

Multiple regression analysis was used to examine the influence of effort expectancy on internal auditors' intentions to use continuous auditing. The findings of the second multiple regression analysis showed that effort expectancy was not statistically significant and had a positive beta value ($\beta = 0.046$, $p = 0.627$), suggesting that effort expectancy did not affect internal auditors' intentions to use continuous auditing. This finding did not, therefore, support hypothesis 5. According to UTAUT, the findings showed that effort expectancy does not have a statistically significant effect on the internal auditors' intentions to use continuous auditing.

The findings of this study are supported by the UTAUT and the findings from past studies (see, e.g., Al-Gahtani, Hubona & Wang 2007; Al-Hiyari, Hattab & Al Said 2019), but they contradict the findings reported by Almagrashi et al. (2023) and Gonzalez et al. (2012). In line with UTAUT, a study conducted in Saudi Arabia by Al-Gahtani, Hubona and Wang (2007) also did not find an impact from effort expectancy on behavioural intentions to use computers. Similarly, a study by Al-Hiyari, Hattab and Al Said (2019) to examine the factors that affect internal auditors' intentions to use CAATs in Jordan found no impact from effort expectancy on internal auditors' intentions to use CAATs.

The demand for skilled human resources does, however, pose a significant obstacle for companies seeking to successfully implement continuous auditing (Wiegerinck 2019). It is argued that human capital should have skills in technology and continuous auditing, skills that require ongoing learning. A study conducted by Vasarhelyi et al. (2012) found that staff working with continuous auditing are required to possess skills in technology. In accordance with UTAUT, the findings from this study indicate that effort expectancy does not have a statistically significant effect on internal auditors' intentions to use continuous auditing in companies in Saudi Arabia.

6.3.3.2 Measurement Item for Effort Expectancy:

- Continuous auditing is too complex.

6.3.4 Social Influence

This study also found that social influence did not affect internal auditors' intentions to use continuous auditing. The findings of this study are consistent with UTAUT and the research conducted by Al-Hiyari, Hattab and Al Said (2019), Bierstaker, Janvrin and Lowe (2014) and Mahzan and Lymer (2014), but they contradict the results reported by Al-Gahtani, Hubona and Wang (2007) and Gonzalez et al. (2012). According to Gonzalez et al. (2012), internal auditors gain their perceptions of social influence from their higher-level managers. These researchers argue that there are several responsibilities involved in adopting continuous auditing technology, including gaining permission from all relevant influential individuals such as the manager of the internal audit function and obtaining the necessary funding for implementing the technology.

A study conducted by Vasarhelyi et al. (2012) found that management support plays a crucial role in determining the effective implementation of continuous auditing. A study conducted by Hardy (2014) found that effective continuous auditing execution requires a comprehensive understanding of each stakeholder's specific roles and their collective contributions to its success. More specifically, it necessitates a nuanced comprehension of each party's inherent responsibilities, as well as requiring efficient collaboration and a coordinated effort among stakeholders. As Wiegerinck (2019) notes, administration and investors have a preference for receiving financial statements in real time.

According to Sun (2012), the success or failure of continuous auditing is influenced by organisational culture. Implementing continuous auditing encompasses not just IT investment but also the resolution of audit challenges, management concerns and organisational changes (Hardy 2014). The measurement item for social influence was detailed in Table 4.1 and Section 6.3.4.1. The findings of this research reveal that internal auditors in companies in Saudi Arabia had a neutral to slightly negative perception of social influence, as characterised by management's negative perceptions toward continuous auditing.

6.3.4.1 Hypothesis on the Impact of Social Influence on Internal Auditors' Intentions to Use Continuous Auditing

A multiple regression analysis was used to investigate the effects of social influence on the internal auditors' intentions to use continuous auditing. The findings of the second multiple regression analysis have indicated that social influence was not statistically significant and had a negative beta value ($\beta = -0.142$, $p = 0.109$). This indicates that social influence did not affect internal auditors' intentions to use continuous auditing, meaning that hypothesis 5 is not supported. In other words, in accordance with UTAUT, social influence did not have a statistically significant effect on internal auditors' intentions to use continuous auditing.

These findings are supported by the UTAUT and the findings from past studies (see, e.g., Al-Hiyari, Hattab & Al Said 2019; Bierstaker, Janvrin & Lowe 2014; Mahzan & Lymer 2014). For example, a study conducted by Al-Hiyari, Hattab and Al Said (2019) also found that social influence did not affect internal auditors' intentions to use CAATs in Jordan. Additionally, a study conducted by Mahzan and Lymer (2014) did not find that social influence affected internal auditors' motivation to adopt CAATs. In the context of internal auditing, social influence is derived from various sources within a company, including managers, the manager of the internal auditing function, the audit committee and other relevant parties (Mahzan & Lymer 2014).

This lack of statistically significant results regarding the negative perceptions of social influence toward continuous auditing can be attributed to the widespread adoption of continuous auditing among the participants, as indicated by the data collected from the questionnaire.

6.3.4.2 Measurement Item for Social Influences:

- Your firm thinks that continuous auditing will not improve the internal auditors' performance and the quality of internal audit.

6.4 Conclusions

The aim of this chapter was to discuss the study data that was collected from questionnaires and analysed in the preceding chapter. In addition, this chapter links the main research questions and the research hypotheses with the findings of this study. Using multiple regressions analysis, although three hypotheses were supported (H1, H2 and H3), another three hypotheses were not supported (H4, H5 and H6). In accordance with resource-based theory, the findings of this study have indicated that continuous auditing and the centralising of purchasing functions significantly affect internal audit effectiveness for non-financial companies in Saudi Arabia. As has been shown, the findings of this study are supported by resource-based theory as well as prior studies (see, e.g., Federicco & Tandiono 2023; Karikari et al. 2022; Keshavamurthy & Narsipur Venkatesh 2020; OECD 2000; Rikhardsson & Dull 2016; Vasarhelyi, Alles & Kogan 2004; Wiegerinck 2019). The findings from this study have also indicated that performance expectancy does strongly and positively affect internal auditors' intentions to use continuous auditing for non-financial companies in Saudi Arabia. This finding is consistent with UTAUT and past studies (see, e.g., Al-Gahtani, Hubona & Wang 2007; Alles, Kogan & Vasarhely 2008; KPMG 2012; Rikhardsson & Dull 2016; Venkatesh et al. 2003). In accordance with UTAUT, the findings of this study have also indicated that facilitating conditions, effort expectations and social factors do not have a statistically significant effect on internal auditors' intentions to use continuous auditing for non-financial companies in Saudi Arabia.

Chapter 7: Conclusion and Recommendations

7.1 Introduction

The objective of this study was to examine the effects of continuous auditing and the centralising of purchasing functions on the effectiveness of internal audit in non-financial companies in Saudi Arabia using resource-based theory. Additionally, utilising UTAUT, it aimed to investigate the effects of performance expectancy, facilitating conditions, effort expectancy and social influences on internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia. The specific objectives of this study were to:

1. Investigate the impact of continuous auditing and centralising purchasing functions on the effectiveness of internal audit in non-financial companies in Saudi Arabia.
2. Examine the relationships between the independent variables (i.e., continuous auditing and centralising purchasing functions) and the dependent variable (i.e., effectiveness of internal audit) in non-financial companies in Saudi Arabia.
3. Examine the influence of performance expectancy, facilitating conditions, effort expectancy and social influences on internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia.
4. Investigate the relationship between the independent variables (i.e., performance expectancy, facilitating conditions, effort expectancy and social influences) and the dependent variable (i.e., internal auditors' intentions to use continuous auditing) in non-financial companies in Saudi Arabia.
5. Offer recommendations for non-financial companies in Saudi Arabia.

To achieve the aims of this study, two research questions were developed:

> **Research question 1:** How do continuous auditing and centralising the purchasing functions affect the effectiveness of internal audits in non-financial companies in Saudi Arabia?

> **Research question 2:** How do performance expectations, facilitating conditions, effort expectations and social factors affect internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia?

7.2 Major Findings on Continuous Auditing and Centralising Purchasing Functions

This research has found a positive impact from continuous auditing and centralising purchasing functions on the effectiveness of internal audits in non-financial companies in Saudi Arabia. These findings were derived from data obtained through questionnaires distributed to internal auditors in such companies. Using resource-based theory, the findings of this research reveal that non-financial companies in Saudi Arabia have resources and capabilities namely continuous auditing and centralising purchasing functions that are significant factors in improving the effectiveness of internal audit and securing a competitive edge.

The influence of continuous auditing on internal audit effectiveness was investigated using multiple regression analysis. These results revealed that continuous auditing was statistically significant with a positive beta value ($\beta = 0.361$, $p < 0.01$), indicating a significant association with internal audit effectiveness, thereby supporting hypothesis 1. There was, therefore, a statistically significant and moderately strong positive impact from continuous auditing on internal audit effectiveness ($\beta = 0.361$, $p < 0.01$). These findings are consistent with resource-based theory and prior studies (e.g., Federicco & Tandiono 2023; Rikhardsson & Dull 2016; Wiegerinck 2019). Therefore, these research findings indicate that the implementation of continuous auditing can be considered a strategic asset that secures a competitive advantage by improving the effectiveness of internal audit in non-financial companies in Saudi Arabia. Moreover, the results suggest a widespread and significant implementation of continuous auditing among these companies. Continuous auditing is clearly a significant factor for internal audit effectiveness for non-financial companies in Saudi Arabia.

The effect of centralising purchasing functions on internal audits effectiveness was also examined through a multiple regression analysis. These findings indicated that centralising purchasing functions had a statistically significant effect, with a positive beta value ($\beta = 0.194$, $p < 0.05$). This suggests that centralising purchasing functions is significantly associated with the effectiveness of internal auditing, supporting hypothesis 2. Moreover, this finding demonstrates that there was a statistically significant and moderate positive impact on internal audit effectiveness from centralising purchasing functions ($\beta = 0.194$, $p < 0.05$). The findings of this study are corroborated by resource-

based theory and previous studies (David & Ntegwa 2024; Karikari et al. 2022; Keshavamurthy & Narsipur Venkatesh 2020; OECD 2000; Vasarhelyi, Alles & Kogan 2004). Therefore, centralising purchasing functions is a significant factor with regard to the effectiveness of internal audits for non-financial companies in Saudi Arabia. According to the resource-based theory, the findings suggest that centralised purchasing functions can be considered a strategic asset that strengthens and maintains competitive advantage, particularly by enhancing internal audit effectiveness for non-financial companies. Furthermore, the findings indicate a prevalent adoption of centralising purchasing functions for materials, inventory and equipment among these companies in Saudi Arabia.

7.2.1 Measurement Items for Continuous Auditing:

- To what extent does your company use the continuous auditing?
- Continuous auditing helps internal auditors in fraud detection.
- Continuous auditing helps internal auditors in fraud investigation.
- Continuous auditing enhances the decisions usefulness of financial information for users.
- Continuous auditing increases the efficiency of the internal audit process.
- Continuous auditing reduces the waste and abuse of the warehouses inventory in the company.
- Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company.
- Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company.
- Your company plans to increase the implementation of continuous auditing in the future.
- How often do you use computers for your internal audit tasks in your company?
- How often do you use IT tools and techniques in planning of your internal audit assignments?
- How often do you use IT tools and techniques in assessment of internal control system?
- How often do you use IT tools and techniques in recording your internal audit tasks?
- How often do you use IT tools and techniques in data analysis of your internal audit tasks?
- How often do you use IT tools and techniques in performing substantive tests?
- How often do you use IT tools and techniques in Fraud detection and investigation?
- How often do you use IT tools and techniques in Reporting your internal audit tasks?
- The refusal of your company to use IT tools and techniques could lead to low-quality internal audits.
- The use of IT tools and techniques has made your performance more satisfactory to you as an auditor.
- The use of IT tools and techniques has enhanced your commitment to your firm’s goals.
- The increased adoption of IT in the internal audit process has aided your professional career development.

- The use of IT for internal audit tasks by your firm gives it a comparative advantage over its competitors who do not use IT.
- The use of IT tools and techniques for your internal audit tasks gives you an advantage over your colleagues who use IT tools lesser or do not use them.
- The use of IT tools and techniques ..... your professional competence.
- The use of IT tools and techniques ..... the scope of your professional expertise.
- The use of IT tools and techniques ..... your fairness and sense of justice.
- Audit automation ..... the internal audit efficiency.
- IT tools and techniques are important instruments for risk assessment.
- IT tools and techniques are important instruments for fraud detection.
- IT tools and techniques are important instruments for fraud investigation.
- The use of IT tools and techniques saves time and effort devoted to controlling testing.
- The use of IT tools and techniques saves time and effort devoted to substantive testing.

7.2.2 Measurement Items for Centralising Purchasing Functions:

- Your company is adopting the centralising purchasing functions of the materials.
- Your company is adopting the centralising purchasing functions of the inventories of the warehouses.
- Your company is adopting the centralising purchasing functions of the equipment.
- The centralising purchasing functions increases the efficiency of the warehouses' operations in your company.
- The centralising purchasing functions reduces the inventory costs in your company.
- The centralising purchasing functions reduce the materials costs in your company.
- The centralising purchasing functions reduces the equipment costs in your company.
- The centralising purchasing functions in your company enhances the supply chain efficiency.
- The centralising purchasing functions reduces the surplus inventories in your company warehouses.
- The centralising purchasing functions increases the internal auditing process efficiency in your company.
- The centralising purchasing functions enhances the efficiency of the internal control in your company.
- There is a procurement audit in your company.
- Implementing centralising purchasing functions in your company requires implementing a continuous auditing approach in your company.
- The centralising purchasing functions reduces the potential for fraud, waste and abuse in the company.

7.3 Major Findings on Performance Expectancy, Facilitating Conditions, Effort Expectancy and Social Influences

In accordance with UTAUT, the impact of performance expectancy on the internal auditors' intentions to use continuous auditing was examined using a multiple regression analysis. The second multiple regression analysis result has indicated that performance expectancy was statistically significant with a positive beta value ($\beta = 0.508$, $p < 0.01$). This indicates that performance expectancy positively affects internal auditors' intentions to use continuous auditing, thus supporting hypothesis 3. The findings have also indicated a statistically significant and a strongly positive effect from performance expectancy on the internal auditors' intentions to use continuous auditing. These findings are, furthermore, supported by the UTAUT and past studies (e.g., Al-Gahtani, Hubona & Wang 2007; Alles, Kogan & Vasarhely 2008; Almagrashi et al. 2023; KPMG 2012; Rikhardsson & Dull 2016; Venkatesh et al. 2003). Therefore, the findings of this research reveal that performance expectancy is the primary factor influencing internal auditors' intention to use continuous auditing in non-financial companies in Saudi Arabia. The study also reveals that internal auditors in these companies are more inclined to adopt continuous auditing when they perceive that its benefits will enhance their job effectiveness. The findings do, however, suggest a need to develop training courses to enhance internal auditors' understanding of the benefits of continuous auditing and how it can improve their performance.

Facilitating conditions were also investigated with regard to their possible influence on internal auditors' intentions to use continuous auditing. The result of the second multiple regression analysis indicated that facilitating conditions were not statistically significant and had a negative beta value ($\beta = -0.114$, $p = 0.206$). This indicates that facilitating conditions did not affect internal auditors' intentions to use continuous auditing. This result did not support hypothesis 4. In accordance with UTAUT, the findings indicated that facilitating conditions did not have a statistically significant effect on the internal auditors' intentions to use continuous auditing. The results of this study are consistent with UTAUT and past studies (see Al-Gahtani, Hubona & Wang 2007; Gonzalez et al. 2012). Some internal auditors do, however, recognise a need for improvement in infrastructure to support continuous auditing, although this issue was not considered highly problematic. The lack of statistically significant results regarding the absence of

facilitating conditions can be attributed to the prevalent adoption of continuous auditing among the participants, as indicated by the questionnaire data.

In accordance with the UTAUT, the effects of effort expectancy on internal auditors' intentions to use continuous auditing was examined using multiple regression analysis. The findings of the second multiple regression analysis showed that that effort expectancy was not statistically significant and had a positive beta value ($\beta = 0.046$, $p = 0.627$). This suggests that effort expectancy did not affect internal auditors' intentions to use continuous auditing, a finding that did not support hypothesis 5. The findings, therefore, showed that effort expectancy did not have a statistically significant effect on internal auditors' intentions to use continuous auditing ($\beta = 0.046$, $p = 0.627$). These findings are supported by UTAUT and the findings from past studies (see Al-Gahtani, Hubona & Wang 2007; Al-Hiyari, Hattab & Al Said 2019). The absence of statistically significant findings regarding effort expectancy, as measured by perceptions concerning complexity, can be ascribed to the participants' high IT skills and the training courses they had undertaken, as indicated by the questionnaire data. However, some internal auditors did perceive continuous auditing to be complex.

The effects of social influence on internal auditors' intentions to use continuous auditing were also examined by multiple regression analysis. The findings of the second multiple regression analysis indicated that the social influence was not statistically significant and had a negative beta value ($\beta = –0.142$, $p = 0.109$), which indicated that social influence did not affect internal auditors' intentions to use continuous auditing. This finding did not support hypothesis 6. According to UTAUT, these findings indicate that social influence does not have a statistically significant impact on internal auditors' intentions to use continuous auditing. These findings are consistent with the UTAUT and the findings from past studies (see Al-Hiyari, Hattab & Al Said 2019; Bierstaker, Janvrin & Lowe 2014; Mahzan & Lymer 2014). This lack of statistically significant results regarding the negative perceptions of social influence toward the continuous auditing can be attributed to the widespread adoption of continuous auditing among the participants, as indicated by the data collected from the questionnaire.

7.3.1 Measurement Items for Performance Expectancy:

- Continuous auditing helps internal auditors in fraud detection.
- Continuous auditing helps internal auditors in fraud investigation.

- Continuous auditing enhances the decisions usefulness of financial information for users.
- Continuous auditing increases the efficiency of the internal audit process.
- Continuous auditing reduces the waste and abuse of the warehouses inventory in the company.
- Continuous auditing reduces the financial errors and the potential for fraud, waste and abuse in the company.
- Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company.

7.3.2 Measurement Items for Facilitating Conditions:

- Continuous auditing is too costly.
- There is not enough infrastructure in your firm to support the implementation of continuous auditing.
- There is a lack of efficient internal control systems in your company.

7.3.3 Measurement Item for Effort Expectancy:

- Continuous auditing is too complex.

7.3.4 Measurement Item for Social Influences:

- Your firm thinks that continuous auditing will not improve the internal auditors' performance and the quality of internal audit.

7.4 Research Contributions

This research contributes both practical and theoretical knowledge regarding the effectiveness of internal audit and the factors influencing the use of continuous auditing by internal auditors in non-financial companies in Saudi Arabia. Practically, the study provides two frameworks. The first framework, drawn from resource-based theory, investigates the effects of continuous auditing and the centralising of purchasing functions on the effectiveness of internal audit in non-financial companies in Saudi Arabia. Notably, no previous research has studied these effects in Saudi Arabian companies. The second framework examines the factors influencing internal auditors' intentions to use continuous auditing. Similarly, there are few studies that explore the factors affecting internal auditors' intentions to adopt continuous auditing in non-financial companies in Saudi Arabia.

This research contributes to theoretical knowledge by being the first study to use resource-based theory to investigate the influence of continuous auditing and centralising purchasing functions on the effectiveness of internal audit in non-financial companies in Saudi Arabia. Consequently, this research extends the literature on the effectiveness of internal audit in non-financial companies in Saudi Arabia. Additionally, it extends the literature by using the UTAUT to investigate the factors influencing internal auditors' intentions to use continuous auditing in Saudi Arabian companies. The findings of this research are valuable not only for companies in Saudi Arabia but also for those in developing countries.

7.5 The Research Recommendations

This research presents recommendations to enhance the internal audit function in non-financial companies in Saudi Arabia. The following are research recommendations for the internal audits in non-financial companies in Saudi Arabia.

- The internal audit departments of companies should increase the number of female internal auditors to enhance diversity and effectiveness. This is because research findings show that the number of female internal auditors is significantly lower than that of male internal auditors.
- The internal audit departments of companies should encourage their staff to obtain appropriate professional qualifications (e.g., certified internal auditor, certified public accountant and Saudi-certified public accountant) to enable them to perform their functions effectively and efficiently. The research findings show that most internal auditors lack these professional qualifications. The absence of these qualifications among internal auditors can affect the quality of internal auditing performance within companies.
- The internal audit departments of companies should increase the number of internal auditors, an initiative that will help improve the effectiveness of internal audit processes. The research findings show that the number of internal auditors within the internal audit departments is low and inadequate, and that this can negatively affect the internal audit processes within companies.
- Companies need to address deficiencies in their internal control systems and facilitate the successful implementation of continuous auditing. The research findings indicate that many companies have weaknesses in their internal control

systems, including lack of data security and access controls, concerns regarding data integrity, lack of competence among internal auditors and the disappearance of internal audit trails. These weaknesses can significantly affect the implementation of continuous auditing.

- Companies need to minimise internal audit risks. The research findings show that several factors can significantly increase internal audit risks, including the use of unsuitable accounting software, a lack of competence among employees, weaknesses in internal control systems, the auditing around the computer approach where internal auditors examine only the input and output, ignoring detailed processing within the computer and a lack of competence among internal auditors.
- Companies need to increase training courses for their internal auditors to enhance their capabilities. The research findings show that some companies provide only a low level of training courses to their internal auditors in areas such as basic data processing, online/real-time processing concepts, system and program documentation, internal controls in an IT-based accounting environment, internal auditing in an IT-based accounting environment and the use of specific internal audit software and tools. This lack of training can negatively affect the performance of internal auditors.
- Companies need to increase the implementation of continuous auditing to enhance the effectiveness of their internal audit functions. The research findings show that some companies either do not implement continuous auditing or have only limited implementation, which can affect the effectiveness of their internal audit departments.
- Companies need to increase the centralisation of their purchasing functions to improve the effectiveness of their internal audits. The research findings show that some companies either do not centralise their purchasing functions for inventory, materials and equipment or have only limited centralisation, which can affect the effectiveness of their internal audits.
- Companies need to develop training courses for their internal auditors that highlight the advantages and benefits of implementing continuous auditing on their work efficiency. The aim of these training courses is to increase the adoption of continuous auditing by internal auditors. The research findings show that the

primary driver for increasing internal auditors' intentions to use continuous auditing is performance expectancy.

- Companies need to allocate additional resources to invest in their technical infrastructure and address infrastructure shortcomings to efficiently implement continuous auditing. The research findings show that some companies lack the infrastructure to support continuous auditing. This deficiency can significantly affect the implementation of continuous auditing in these companies.
- Companies need to improve the IT skills of their internal auditors to facilitate the implementation of continuous auditing procedures. The research findings show that some internal auditors perceive continuous auditing as complex, a perception that may influence the efficiency of implementing continuous auditing.

7.6 Research Constraints

There are limitations to this research. First, the data for this research was collected solely through questionnaires. Second, the sample size of this research was not very large. Third, other factors affecting internal audit effectiveness within companies were not investigated in this research model.

7.7 Suggestions for Future Studies

- Given the limited sample size of this research, future research should consider examining a larger and more diverse sample.
- Future research could adopt a mixed-methods approach, utilising both questionnaires and interviews for data collection.
- Future research can investigate additional factors not included in this study that affect the effectiveness of internal audits.
- Future research can investigate the effects of continuous auditing and centralising purchasing functions on the effectiveness of internal audit in the public sector in Saudi Arabia.
- Future research can examine the factors that influence internal auditors' intentions to use continuous auditing in public sector in Saudi Arabia.
- Future research could employ both the resource-based theory and the UTAUT.

7.8 Conclusion

This research has leveraged resource-based theory to investigate the influence of continuous auditing and the centralisation of purchasing functions on internal audits' effectiveness within Saudi Arabia's non-financial companies. Additionally, employing the UTAUT, it explores how four key factors performance expectancy, facilitating conditions, effort expectancy and social influence affect internal auditors' intentions concerning the adoption of continuous auditing. The data were collected using a questionnaire-based method and analysed using SPSS.

This research provides valuable insights into the effects of continuous auditing and the centralisation of purchasing functions on the effectiveness of internal audits in non-financial companies in Saudi Arabia. Additionally, it identifies the factors influencing internal auditors' intentions to adopt continuous auditing within these companies. In accordance with resource-based theory, non-financial companies in Saudi Arabia implement continuous auditing and centralise purchasing functions, viewing them as important resources and capabilities that can enhance internal audit effectiveness and allow companies to gain a competitive advantage. However, as shown with reference to the UTAUT, there is a need for non-financial companies in Saudi Arabia to develop training programs to enhance their internal auditors' understanding of the benefits of continuous auditing and its potential for improving internal auditors' performance. As has been argued, these findings align with both resource-based theory and UTAUT and offer practical implications for non-financial companies in Saudi Arabia.

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Appendix A: Questionnaire Survey in English

Dear respondent

Greetings,

You are invited to participate in a research project entitled 'Impact of Continuous Auditing and Centralising the Purchasing Functions for Higher Internal Audit Effectiveness: A Study of Saudi Arabia Companies'.

This project is being conducted by a student researcher Hamad Al Towaijri in fulfilment of the requirements of the degree of Doctor of Philosophy at Victoria University under the supervision of Professor Sophia Everett and Doctor Chitra DeSilva from the College of business. This study has been approved by the Victoria University Human Research Ethics Committee.

This research aims to explore the impact of continuous auditing and centralising the purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. Additionally, it investigates the factors that impact internal auditors' intentions to use continuous auditing.

Continuous auditing is referred to as a comprehensive electronic audit process that enables auditors to provide some degree of assurance on continuous information simultaneously with, or shortly after, the disclosure of the information. Centralising purchasing functions is referred to as the consolidation of the purchasing functions in your company.

You are kindly invited to participate in this study by completing on an online survey to answer some questions. You can withdraw from the survey at any time. No names or other personal information will be revealed at any point during the research in accordance with Victoria University Human Research Ethics approval. The information you provide will contribute to understanding the impact of continuous auditing and centralising the purchasing functions on internal audit effectiveness in non-financial companies in Saudi Arabia. Also, the information you provide will contribute to understanding the factors that impact internal auditors' intentions to use continuous auditing in non-financial companies in Saudi Arabia. The information from online survey will be used for academic

purposes only and the results will be presented in the aggregate form and will be used for academic purposes only. There are no anticipated potential risks in the study.

Your participation in this study is voluntary and is highly appreciated. All the information will be confidential. This study does not have any risk, and you will not be asked to write your name or your company' name. To help us to achieve this study, please carefully answer all questions before submitting the survey.

Contact:
This research is conducted by Hamad Altowaijri, a Saudi citizen who is a PhD student at Victoria University in Australia.

If you have any questions regarding this study or to learn more, you can contact the researcher.

Researcher:

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Any queries about your participation in this project may be directed to the Chief Investigator listed above.

If you have any queries or complaints about the way you have been treated, you may contact the Ethics Secretary, Victoria University Human Research Ethics Committee, Office for Research, Victoria University, PO Box 14428, Melbourne, VIC, 8001, email researchethics@vu.edu.au or phone (03) 9919 4781 or 4461.

Consent:

I have read the above information, and I am 18 years or older, living in Saudi Arabia, and I certify that the objectives of the study have been fully explained to me by Hamad Altowaijri and that I freely consent to participate in this study.

Yes, I consent.

No, I do not consent.

Start of Block: Default Question Block

Q1 Are you an internal audit employee?

- A. Yes, I am an internal auditor. (You will complete the survey)
- B. No, I am not an internal auditor. (The survey will end)

Skip To: End of Block If Are you an internal audit employee? = B. No, I am not an internal auditor. (The survey will end)

Q2 What is your gender?

- A. Male
- B. Female

Q3 Which of the following age group are you in?

- A. 20–29 years old.
- B. 30–39 years old.
- C. 40–49 years old.
- D. 50–59 years old.
- E. 60 and above years old.

Q4 How many years of work experience do you have in internal audit?

- ○ A. Less than 3 years.
- ○ B. 3 to less than 6 years.
- ○ C. 6 to less than 9 years.
- ○ D. 9 to less than 12 years.
- ○ E. 12 years or more.

Q5 What is your highest academic qualification?

- ○ A. High school or less.
- ○ B. Diploma.
- ○ C. Bachelor’s degree.
- ○ D. Master degree.
- ○ E. PhD.

Q6 Do you have any type of the following professional qualifications? (You can select more than one answer)

- ☐ A. None.
- ☐ B. Certified Public Accountant (CPA).
- ☐ C. Certified Internal Auditor (CIA).
- ☐ D. Saudi Certified Public Accountant (Saudi CPA).

Q7 What is the size of your company?

- ○ A. Tiny company (its income is 3 million Saudi Riyal or less).
- ○ B. Small company (its income is more than 3 million and less than 40 million Saudi Riyal).
- ○ C. Medium company (its income is 40 million and less than 200 million Saudi Riyal).
- ○ D. Large company (its income is 200 million Saudi Riyal or more).

Q8 How many employees are in your company?

- ○ A. The company’s employees are between 1 to 5 employees.
- ○ B. The company’s employees are between 6 to 49 employees.
- ○ C. The company’s employees are between 50 to 249 employees.
- ○ D. The company’s employees are more than 249 employees.

Q9 How many internal auditors are in your company?

- ○ A. Fewer than 5 internal auditors.
- ○ B. 5–15 internal auditors.
- ○ C. 16–25 internal auditors.
- ○ D. More than 25 internal auditors.

Q10 Please rate your IT skills:

	Very good (programmer)	Good	Adequate	Basic	Very basic (Windows, Word etc.)
Your IT Skills	○	○	○	○	○

Q11 Please indicate approximately what proportion of your company uses IT-based accounting systems? The proportion of transactions initiated, processed, saved and reported electronically to all transactions.

○ 100%

○ 75%

○ 50%

○ 25%

○ 0%

Q12 Please indicate approximately what proportion of your company uses:

A) An integrated accounting system (a system in which two or more accounting modules such as debtors, sales, purchases, creditors etc. are used together and share information).

B) A stand-alone accounting system (a system in which only one module, such as sales, is used).

	100%	75%	50%	25%	0%
A. An integrated accounting system.	○	○	○	○	○
B. A stand-alone accounting system.	○	○	○	○	○

Q13 Please indicate approximately what proportion of your company uses:

	100%	75%	50%	25%	0%
A. Ready-made accounting software.	○	○	○	○	○
B. Specific accounting software designed for their business.	○	○	○	○	○

Q14 Please indicate approximately what proportion of your company uses:

	100%	75%	50%	25%	0%
A. Batch mode processing accounting system.	○	○	○	○	○
B. Real-time (online) mode processing accounting system.	○	○	○	○	○

Q15 Please indicate approximately what proportion of your company uses:

	100%	75%	50%	25%	0%
A. Centralised data processing accounting system.	○	○	○	○	○
B. Decentralised or distributed data processing accounting system.	○	○	○	○	○

Q16 The following are couples of opposite extremes of internal audit approaches. To what extent does your company use the internal auditing approaches listed below?

	Always	Often	Sometimes	Rarely	Never
A. Auditing around the computer.	○	○	○	○	○
B. Auditing through the computer.	○	○	○	○	○
C. Auditing by cycles (e.g. Sale, Purchasing, Cash etc.).	○	○	○	○	○
D. Auditing by process (form the beginning to the end of a transaction).	○	○	○	○	○
E. Continuous auditing.	○	○	○	○	○
F. Year-end auditing.	○	○	○	○	○
G. Adopting substantive tests approach.	○	○	○	○	○
H. Adopting risk based approach.	○	○	○	○	○

Q17 Continuous Auditing (CA) is referred to as a comprehensive electronic audit process that enables auditors to provide some degree of assurance on continuous information simultaneously with, or shortly after, the disclosure of the information. To what extent do you agree with the following statements related to continuous auditing in your company?

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. Continuous Auditing helps internal auditors in fraud detection.	○	○	○	○	○
B. Continuous Auditing helps internal auditors in fraud investigation.	○	○	○	○	○
C. Continuous Auditing enhances the decisions usefulness of financial information for users.	○	○	○	○	○
D. Continuous Auditing increases the efficiency of the internal audit process.	○	○	○	○	○
E. Continuous Auditing reduces the waste and abuse of the warehouses inventory in the company.	○	○	○	○	○
F. Continuous Auditing reduces the financial errors and the potential for fraud, waste and abuse in the company.	○	○	○	○	○
G. Implementing continuous auditing in your company requires implementing efficient and effective internal control systems in your company.	○	○	○	○	○
H. Your company plans to increase the implementation of continuous auditing in the future.	○	○	○	○	○

Q18 Please indicate the extent to which the following are used in your company.

	Always	Often	Sometimes	Rarely	Never
A. Test Data	○	○	○	○	○
B. Integrated Test Facilities	○	○	○	○	○
C. Embedded Audit Modules	○	○	○	○	○
D. Parallel Simulation	○	○	○	○	○
E. Generalised Audit Software	○	○	○	○	○
F. Interactive Data Extraction and Analysis (IDEA)	○	○	○	○	○
G. Audit Command Language (ACL)	○	○	○	○	○
H. TeamMate Audit Management System	○	○	○	○	○
I. Robotic process automation RPA	○	○	○	○	○
J. Tableau	○	○	○	○	○

Q19 What makes your company not implementing or less utilisation of Continuous Auditing?

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. Your firm thinks that continuous auditing will not improve the internal auditors' performance and the quality of internal audit.	○	○	○	○	○
B. Continuous auditing is too complex.	○	○	○	○	○
C. Continuous auditing is too costly.	○	○	○	○	○
D. There is not enough infrastructure in your firm to support the implementation of continuous auditing.	○	○	○	○	○
E. There is a lack of efficient internal control systems in your company.	○	○	○	○	○

Q20 How often do you use computers for your internal audit tasks in your company?

	Always	Often	Sometimes	Rarely	Never
Status	○	○	○	○	○

Q21 Please indicate how often you use IT tools and techniques in the following tasks:

	Always	Often	Sometimes	Rarely	Never
A. Planning of your internal audit assignments.	○	○	○	○	○
B. Assessment of internal control system.	○	○	○	○	○
C. Recording your internal audit tasks.	○	○	○	○	○
D. Data analysis of your internal audit tasks.	○	○	○	○	○
E. Performing substantive tests.	○	○	○	○	○
F. Fraud detection and investigation.	○	○	○	○	○
G. Reporting your internal audit tasks.	○	○	○	○	○

Q22 According to your experience, to what extent do you agree with the following statements?

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. The refusal of your company to use IT tools and techniques could lead to low-quality internal audits.	○	○	○	○	○
B. The use of IT tools and techniques has made your performance more satisfactory to you as an auditor.	○	○	○	○	○
C. The use of IT tools and techniques has enhanced your commitment to your firm's goals.	○	○	○	○	○
D. The increased adoption of IT in the internal audit process has aided your professional career development.	○	○	○	○	○
E. The use of IT for internal audit tasks by your firm gives it a comparative advantage over its competitors who do not use IT.	○	○	○	○	○
F. The use of IT tools and techniques for your internal audit tasks gives you an advantage over your colleagues who use IT tools lesser or do not use them.	○	○	○	○	○

Q23 Please indicate the impact of factors specified below:

	Greatly Increases	Mildly Increases	Neither Increases nor Decreases	Mildly Decreases	Greatly Decreases
A. The use of IT tools and techniques ..... your professional competence.	○	○	○	○	○
B. The use of IT tools and techniques .....the scope of your professional expertise.	○	○	○	○	○
C. The use of IT tools and techniques ..... Your fairness and sense of justice.	○	○	○	○	○
D. Audit automation ..... the internal audit efficiency.	○	○	○	○	○

Q24 Please indicate the extent to which you agree with the following statements related to the use of IT tools and techniques in your company (Please circle the appropriate answer).

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. IT tools and techniques are important instruments for risk assessment.	○	○	○	○	○
B. IT tools and techniques are important instruments for fraud detection.	○	○	○	○	○
C. IT tools and techniques are important instruments for fraud investigation.	○	○	○	○	○
D. The use of IT tools and techniques saves time and effort devoted to controlling testing.	○	○	○	○	○
E. The use of IT tools and techniques saves time and effort devoted to substantive testing.	○	○	○	○	○

Q25 In complex situations with a large volume of transactions processed in a complex IT environment, how often do you do the following options as your internal audit tasks?

	Always	Often	Sometimes	Rarely	Never
A. Perform test of controls to assess control risk below the maximum.	○	○	○	○	○
B. Perform only substantive tests to reduce detection risk to an acceptable level.	○	○	○	○	○
C. Perform tests of both the design and operation of controls to reduce the assessed level of control risk.	○	○	○	○	○

Q26 Please indicate your opinion regarding the following.

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. You are satisfied with your organisation's provision of appropriate knowledge-based expert systems for your internal audit tasks.	○	○	○	○	○
B. You are satisfied with your organisation's provision of appropriate decision aids for your internal audit tasks.	○	○	○	○	○
C. You are satisfied with your organisation's provision of appropriate general IT packages for your use.	○	○	○	○	○
D. You are satisfied with your organisation's provision of appropriate IT training for you as an auditor.	○	○	○	○	○

Q27 What level of training courses in your company is given to internal auditors who audit IT-based accounting systems in the following IT-related areas:

	High level	Intermediate level	Low level	Basic level	None
A. Basic data processing	○	○	○	○	○
B. Online / real-time processing concepts	○	○	○	○	○
C. System and program documentation	○	○	○	○	○
D. Internal controls in an IT-based accounting	○	○	○	○	○
E. Internal auditing in an IT-based accounting environment	○	○	○	○	○
F. The use of specific internal audit software and tools	○	○	○	○	○

Q28 Please indicate the type of knowledge in IT that your company requires internal auditors to gain to audit IT-based accounting systems.

	Highly required	Often required	Sometimes required	Rarely required	Not required
A. Basic knowledge in dealing with computers (e.g. printing a report).	○	○	○	○	○
B. Basic knowledge in auditing the common, ready-made accounting software.	○	○	○	○	○
C. Advanced knowledge in auditing IT-based accounting systems.	○	○	○	○	○

Q29 Please indicate the extent to which you agree with the following statements related to the effectiveness of the internal audit team in your company:

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. Internal audit improves the organisation's productivity.	○	○	○	○	○
B. Internal audit improves organisational performance.	○	○	○	○	○
C. Internal audit evaluates the internal control system.	○	○	○	○	○
D. Internal audit makes recommendations for improving the internal control system when appropriate.	○	○	○	○	○
E. Internal audit determines the adequacy and effectiveness of the organisation's systems of internal accounting and operating controls.	○	○	○	○	○
F. Internal audit reviews the economic, effective and efficient use of resources.	○	○	○	○	○
G. Internal audit reviews operations and programmers to ascertain whether results are consistent with established objectives and goals.	○	○	○	○	○
I. Internal audit provides adequate follow-up to ensure that appropriate corrective action is taken and that it is effective.	○	○	○	○	○
J. Internal audit reviews the accuracy and reliability of financial reports.	○	○	○	○	○

Q30 Please indicate your opinion on whether the following reason discourages your company from providing IT training sessions for internal auditors who audit IT-based accounting systems.

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. Your company think that IT skills will not improve the staff performance.	○	○	○	○	○
B. Internal auditors think that the training programmes contain complex issues that make them difficult to understand.	○	○	○	○	○
C. The adopted auditing standards in Saudi Arabia do not require internal auditors to get any IT-related training.	○	○	○	○	○
D. The high cost of training.	○	○	○	○	○
E. Lack of courses available.	○	○	○	○	○

Q31 Please indicate how often your company has suffered from each of the following weaknesses of internal control systems in an IT-based accounting environment when you do the internal auditing:

	Always	Often	Sometimes	Rarely	Never
A. Lack of data security and access controls.	○	○	○	○	○
B. Concerns regarding data integrity.	○	○	○	○	○
C. Lack of competence among internal auditors.	○	○	○	○	○
D. Disappearance of internal audit trail.	○	○	○	○	○

Q32 Please indicate the extent to which you agree with the following reasons for weakness of your company internal control systems in an IT-based accounting environment:

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. The high cost associated with tight internal controls.	○	○	○	○	○
B. Management lacks understanding of IT (management is unaware of the nature of the IT-based accounting environment).	○	○	○	○	○

Q33 Please indicate to what extent, if at all, the following factors contribute to an increase in the overall level of internal audit risks in an IT-based accounting environment.

	Very high	High	Medium	Low	Very low	No contribution
A. Using unsuitable accounting software by the company in terms of its unsuitability to the company's activity, poor or faulty programming, providing a minimum level of information, and making the tracing of transactions difficult.	○	○	○	○	○	○
B. Lack of competence of company's staff in dealing with IT-based accounting systems, for example, their inability to harness the advantages of IT systems and to avoid mistakes.	○	○	○	○	○	○

C. The weakness of the company's internal control systems in an IT-based accounting environment in terms of, for example, no passwords and lack of access and changing data logs.	○	○	○	○	○	○
D. Using auditing around the computer approach where internal auditors examine input and output only and where the detailed processing within the computer is ignored.	○	○	○	○	○	○
E. Lack of competence of internal auditors in auditing IT-based accounting systems, for example, their inability to use CAATs and their lack of awareness of the problems and risks associated with such systems.	○	○	○	○	○	○

Q34 Please indicate the extent to which you agree with the following regarding the centralising purchasing functions of your company's inventory, materials and equipment. Centralising purchasing functions is referred to as the consolidation of the purchasing functions in your company.

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. Your company is adopting the centralising purchasing functions of the materials.	○	○	○	○	○
B. Your company is adopting the centralising purchasing functions of the inventories of the warehouses.	○	○	○	○	○
C. Your company is adopting the centralising purchasing functions of the equipment.	○	○	○	○	○
D. The centralising purchasing functions increases the efficiency of the warehouses' operations in your company.	○	○	○	○	○
E. The centralising purchasing functions reduces the inventory costs in your company.	○	○	○	○	○
F. The centralising purchasing functions reduce the materials costs in your company.	○	○	○	○	○
G. The centralising purchasing functions reduces the equipment costs in your company.	○	○	○	○	○

Q35 Please indicate the extent to which you agree with the following regarding the centralising purchasing functions of your company's inventory, materials, and equipment.

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. The centralising purchasing functions in your company enhances the supply chain efficiency.	○	○	○	○	○
B. The centralising purchasing functions reduces the surplus inventories in your company warehouses.	○	○	○	○	○
C. The centralising purchasing functions increases the internal auditing process efficiency in your company.	○	○	○	○	○
D. The centralising purchasing functions enhances the efficiency of the internal control in your company.	○	○	○	○	○
E. There is a procurement audit in your company.	○	○	○	○	○
F. Implementing centralising purchasing functions in your company requires implementing a continuous auditing approach in your company.	○	○	○	○	○
G. The centralising purchasing functions reduces the potential for fraud, waste, and abuse in the company.	○	○	○	○	○

Q36 What makes your firm not implementing the centralising purchasing functions in the company?

	Strongly Agree	Mildly Agree	Neutral	Mildly Disagree	Strongly Disagree
A. Centralising purchasing functions is too complex.	○	○	○	○	○
B. Centralising purchasing functions is too costly as it requires creating a system.	○	○	○	○	○
C. There is not enough infrastructure in your firm to support the implementation of the centralising purchasing functions.	○	○	○	○	○
D. Your firm thinks that centralising purchasing functions will not enhance the supply chain efficiency in the company.	○	○	○	○	○
E. Your firm thinks that centralising purchasing functions will not enhance the internal audit efficiency in the company.	○	○	○	○	○

Thank you for your participation

Appendix B: Questionnaire Survey in Arabic

الاستبيان باللغة العربية

عزيزي المشارك

تحياتي،

أنت مدعو للمشاركة في مشروع بحثي بعنوان "أثر المراجعة المستمرة ومركزية وظائف الشراء على زيادة فعالية المراجعة الداخلية: دراسة على الشركات في السعودية".

يقوم بتنفيذ هذا المشروع الطالب الباحث حمد التويجري استكمالاً لمتطلبات درجة دكتوراه الفلسفة في جامعة فيكتوريا ، تحت إشراف البروفيسورة صوفيا إيفريت والدكتورة شيترا دي سيلفا من كلية الأعمال.

تمت الموافقة على هذه الدراسة من قبل لجنة أخلاقيات البحوث الإنسانية بجامعة فيكتوريا.

يهدف هذا البحث إلى استكشاف أثر المراجعة المستمرة ومركزية وظائف الشراء على فعالية المراجعة الداخلية في الشركات غير المالية في المملكة العربية السعودية. بالإضافة إلى ذلك، فإنه يبحث في العوامل التي تؤثر على نية المراجعين الداخليين لاستخدام المراجعة المستمرة. ويشار إلى المراجعة المستمرة على أنه عملية مراجعة إلكترونية شاملة تمكن المراجعين من تقديم درجة معينة من التأكيد على المعلومات المستمرة في وقت واحد مع الكشف عن المعلومات أو بعده بفترة قصيرة. يُشار إلى مركزية وظائف الشراء على أنها توحيد وظائف الشراء في شركتك.

أنت مدعو للمشاركة في هذه الدراسة من خلال إكمال استبيان عبر الإنترنت للإجابة على بعض الأسئلة. يمكنك الانسحاب من الاستطلاع في أي وقت. لن يتم الكشف عن أي أسماء أو معلومات شخصية أخرى في أي وقت أثناء البحث وفقًا لموافقة أخلاقيات البحوث الإنسانية بجامعة فيكتوريا. ستساهم المعلومات التي تقدمها في فهم تأثير المراجعة المستمرة ومركزية وظائف الشراء على فعالية المراجعة الداخلية في الشركات غير المالية في المملكة العربية السعودية. كما أن المعلومات التي تقدمها ستساهم في فهم العوامل التي تؤثر على نية المراجعين الداخليين لاستخدام المراجعة المستمرة في الشركات غير المالية في المملكة العربية السعودية.

سيتم استخدام المعلومات الواردة في الاستطلاع عبر الإنترنت للأغراض الأكاديمية فقط وسيتم عرض النتائج في النموذج الإجمالي وسيتم استخدامها للأغراض الأكاديمية فقط. لا توجد مخاطر محتملة متوقعة في الدراسة. إن مشاركتك في هذه الدراسة تطوعية وتحظى بتقدير كبير. جميع المعلومات ستكون سرية. هذه الدراسة ليس بها أي مخاطرة، ولن يطلب منك كتابة اسمك أو اسم شركتك. لمساعدتنا في إنجاز هذه الدراسة، يرجى الإجابة بعناية على جميع الأسئلة قبل إرسال الاستبيان.

معلومات التواصل:

أجرى هذا البحث حمد التويجري، مواطن سعودي، طالب دكتوراة في جامعة فيكتوريا في أستراليا.

إذا كان لديك أي أسئلة بخصوص هذه الدراسة أو لمعرفة المزيد يمكنك التواصل مع الباحث.

الباحث:

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يمكن توجيه أي استفسارات حول مشاركتك في هذا المشروع إلى كبير المحققين المذكور أعلاه.

إذا كانت لديك أي استفسارات أو شكاوى حول الطريقة التي تمت معاملتك بها، يمكنك الاتصال بسكرتير الأخلاقيات، لجنة أخلاقيات البحوث الإنسانية بجامعة فيكتوريا، مكتب الأبحاث، جامعة فيكتوريا.

صندوق بريد ١٤٤٢٨ ملبورن ، فكتوريا ٨٠٠١.

البريد الإلكتروني **Researchethics@vu .edu.au** أو الإتصال على الرقم ٠٣٩٩١٩٤٧٨١ أو ٤٤٦١

الإقرار:

لقد قرأت المعلومات المذكورة أعلاه، وعمري 18 عامًا أو أكبر، وأعيش في المملكة العربية السعودية، وأشهد أن أهداف الدراسة قد تم شرحها لي بالكامل من قبل حمد التويجري وأنني أوافق بحرية على المشاركة في هذه الدراسة.

- نعم أوافق.
- لا، أنا لا أوافق.

Start of Block: Default Question Block

Q1 هل أنت موظف في إدارة المراجعة الداخلية ؟

- أ .نعم ، أنا مراجع داخلي - سوف تُكمل الإستبيان
- ب .لا ، أنا ليس بمراجع داخلي - الإستبيان سينتهي

Skip To: End of Block If Are you an internal audit employee? = B. No, I am not an internal auditor. (The survey will end

Q2 ما هو جنسك ؟

- أ .ذكر
- ب .أنثى

Q3 ما فئتك العمرية ؟

- أ .٢٠ - ٢٩
- ب .٣٠ - ٣٩
- ج .٤٠ - ٤٩
- د .٥٠ - ٥٩
- هـ .٦٠ فما فوق

Q4 كم عدد سنوات خبرتك العملية في المراجعة الداخلية ؟

- أ .أقل من ٣ سنوات
- ب .من ٣ سنوات إلى أقل من ٦ سنوات
- ج .من ٦ سنوات إلى أقل من ٩ سنوات
- د .من ٩ سنوات إلى أقل من ١٢ سنة
- هـ .١٢ سنة فأكثر

Q5 .ما هو أعلى مؤهل أكاديمي حصلت عليه؟ (ضع دائرة حول الإجابة المناسبة)

- أ .تعليم ثانوي أو أقل
- ب .دبلوم
- ج .بكالريوس
- د .ماجستير
- هـ .دكتوراه

Q6 هل تمتلك أيّ من المؤهلات المهنية التالية؟ (يمكنك تحديد أكثر من إجابة)

- أ .لا يوجد
- ب .محاسب قانوني معتمد (CPA)
- ج. مراجع داخلي معتمد (CIA)
- د. شهادة الزمالة السعودية (SOCPA)

Page Break

Q7 ما هو حجم شركتك؟

- أ .شركة صغيرة جداً)لا تزيد إيراداتها لا تزيد عن ٣ مليون ريال سعودي(
- ب .شركة صغيرة)تتراوح إيراداتها أكثر من ٣ مليون وأقل من ٤٠ مليون ريال سعودي(
- ج .شركة متوسطة)تتراوح إيراداتها من ٤٠ مليون وأقل من ٢٠٠ مليون ريال سعودي(
- د. شركة كبيرة)تتراوح إيراداتها من ٢٠٠ مليون ريال سعودي فأكثر(

Q8 كم يبلغ عدد الموظفين في شركتك؟

- أ) ١-٥ (موظفين
- ب) ٦-٤٩ (موظفاً
- ج) ٥٠-٢٤٩ (موظفاً
- د ٢٥٠ موظفاً فأكثر

Q9 كم يبلغ عدد المراجعين الداخليين في شركتك؟

- أ .أقل من ٥ مراجعيين داخليين
- ب ٥-١٥ مراجعاً داخلياً
- ج ١٦- ٢٥ مراجعاً داخلياً
- د .أكثر من ٢٥ مراجعاً داخلياً

Q10 :يُرجى تقييم مستوى مهاراتك في تكنولوجيا المعلومات

	أ. ممتاز (مبرمج)	ب. جيد جداً	ج. جيد	د. مبتدئ	هـ. مبتدئ جداً) ويندوز،وورد..إلى آخره.)
مهاراتك في تكنولوجيا المعلومات	○	○	○	○	○

Page Break

Q11 يُرجى تقدير نسبة استخدام أنظمة المحاسبة القائمة على تكنولوجيا المعلومات في شركتك؟
(نسبة المعاملات التي تم إجراؤها ومعالجتها وحفظها وإعداد التقارير عنها إلكترونيًا مقارنةً بكافة المعاملات)

- ١٠٠ ٪
- ٧٥ ٪
- ٥٠ ٪
- ٢٥ ٪
- ٠ ٪

Q12 :يُرجى تقدير نسبة استخدام الأنظمة التالية في شركتك

	١٠٠ ٪	٧٥ ٪	٥٠ ٪	٢٥ ٪	٠ ٪
أ. نظام محاسبي متكامل An integrated accounting system.					
ب. نظام محاسبي مستقل A stand-alone accounting system.					

Q13 :يُرجى تقدير نسبة استخدام الأنظمة التالية في شركتك

	١٠٠ ٪	٧٥	٥٠ ٪	٢٥ ٪	٠ ٪
أ. البرامج المحاسبية الجاهزة - Ready-made accounting software.					
ب.البرامج المحاسبية المصممة خصيصًا للشركة.					

Q14 :يُرجى تقدير نسبة استخدام الأنظمة التالية في شركتك

	١٠٠ ٪	٧٥ ٪	٥٠ ٪	٢٥ ٪	٠ ٪
أ. نظام المحاسبة - المعتمد على المعالجة بالدفعات Batch mode processing accounting system.	○	○	○	○	○
ب. نظام المحاسبة المعتمد على المعالجة الفورية المباشرة - Real-time (on-line) mode processing accounting system.	○	○	○	○	○

Q15 :يُرجى تقدير نسبة استخدام الأنظمة التالية في شركتك

	١٠٠ ٪	٧٥ ٪	٥٠ ٪	٢٥ ٪	٠ ٪
أ. النظام الماسبي لمعالجة البيانات المركزية - Centralised data processing accounting system.	○	○	○	○	○
ب. النظام المحاسبي لمعالجة البيانات اللامركزية أو الموزعة - Decentralised or distributed data processing accounting system.	○	○	○	○	○

Page Break

Q16 فيما يلي مجموعة من الأساليب المختلفة المتبعة في المراجعة الداخلية
إلى أيّ مدى تستخدم شركتك أساليب المراجعة الداخلية التالية:

	دائماً	غالباً	أحياناً	نادراً	أبداً
أ. المراجعة حول الحاسوب	○	○	○	○	○
ب. المراجعة من خلال الحاسوب	○	○	○	○	○
ج. المراجعة الدورية (المبيعات، والمشتريات، والأموال النقدية، إلخ)	○	○	○	○	○
د. مراجعة العمليات (من بداية المعاملة إلى نهايتها)	○	○	○	○	○
هـ. المراجعة المستمرة	○	○	○	○	○
و. المراجعة في نهاية العام	○	○	○	○	○
اعتماد نهج الاختبارات الموضوعيه او الاساسيه.	○	○	○	○	○
ز. اعتماد نهج قائم على المخاطر.	○	○	○	○	○

Q17 تعرف المراجعة المستمرة بأنها عملية مراجعة إلكترونية شاملة تمكّن المراجعين من توفير درجة عالية من الضمان للمعلومات المستمرة فور الكشف عنها أو بعدها بوقت قصير
إلى أيّ مدى توافق على العبارات التالية؟

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. المراجعة المستمرة تساعد المراجعين الداخليين في الكشف عن الاحتيال	○	○	○	○	○
ب. المراجعة المستمرة تساعد المراجعين الداخليين في التحقيق في الاحتيال	○	○	○	○	○
ج. المراجعة المستمرة تعزز فائدة القرارات المتعلقة بالمعلومات المالية للمستخدمين	○	○	○	○	○

د. المراجعة المستمرة تزيد من كفاءة عملية المراجعة الداخلية	○	○	○	○	○
هـ. المراجعة المستمرة تساعد الشركة على تقليل الهدر وإساءة التصرف في مخزون المستودعات	○	○	○	○	○
و. المراجعة المستمرة تساعد الشركة على تقليل الأخطاء المالية واحتمالات الاحتيال والهدر وإساءة التصرف	○	○	○	○	○
ز. تنفيذ المراجعة المستمرة في شركتك يتطلب استخدام أنظمة رقابة داخلية ذات كفاءة وفعالية في الشركة	○	○	○	○	○
ي. تخطط شركتك لزيادة تنفيذ التدقيق المستمر في المستقبل	○	○	○	○	○

Q18 فضلاً، ما مدى استخدامك لما يلي في شركتك؟

	دائماً	غالباً	أحياناً	نادراً	أبداً
A. Test Data.	○	○	○	○	○
B. Integrated Test Facilities.	○	○	○	○	○
C. Embedded Audit Modules.	○	○	○	○	○
D. Parallel Simulation.	○	○	○	○	○
E. Generalized Audit Software.	○	○	○	○	○
F. Interactive Data Extraction and Analysis IDEA.	○	○	○	○	○
G. Audit Command Language ACL.	○	○	○	○	○

H TeamMate Audit Management System	○	○	○	○	○
I Robotic process automation RPA.	○	○	○	○	○
J. Tableau.	○	○	○	○	○

Q19 ما الذي يعيق قدرة شركتك على تنفيذ المراجعة المستمرة؟

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. تعتقد شركتك أن المراجعة المستمرة لن تسهم في تحسين أداء المراجعين الداخليين أو جودة المراجعة الداخلية	○	○	○	○	○
ب. التعقيدات الكثيرة للمراجعة المستمرة	○	○	○	○	○
ج. ارتفاع تكلفة تنفيذ المراجعة المستمرة	○	○	○	○	○
د. افتقار الشركة إلى البنية التحتية اللازمة لدعم المراجعة المستمرة	○	○	○	○	○
هـ. هناك نقص في أنظمة الرقابة الداخلية الفعالة في شركتك	○	○	○	○	○

Q20 إلى أيّ مدى تستخدم الحاسوب لإجراء مهام المراجعة الداخلية في شركتك؟

	دائماً	غالباً	أحياناً	نادراً	أبداً
الحالة	○	○	○	○	○

Q21 إلى أيّ مدى تستخدم أدوات وتقنيات تكنولوجيا المعلومات في المهام التالية؟

	دائماً	غالباً	أحياناً	نادراً	أبداً

أ. التخطيط	○	○	○	○	○
ب. تقييم نظام الرقابة الداخلية	○	○	○	○	○
ج. تسجيل مهام المراجعة الداخلية الخاصة بك	○	○	○	○	○
د. تحليل بيانات مهام المراجعة الخاصة بك	○	○	○	○	○
هـ. إجراء الاختبارات الموضوعية	○	○	○	○	○
و. الكشف عن حالات الاحتيال والتحقيق فيها	○	○	○	○	○
ز. إعداد التقارير المتعلقة بمهام المراجعة الداخلية الخاصة بك	○	○	○	○	○

Q22 من واقع تجربتك، إلى أيّ مدى تتفق مع العبارات التالية؟

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. قد يؤدي رفض شركتك لاستخدام أدوات وتقنيات تكنولوجيا المعلومات إلى عمليات مراجعة داخلية منخفضة الجودة.	○	○	○	○	○
ب. لقد ساهم استخدام أدوات وتقنيات تكنولوجيا المعلومات في زيادة رضاك عن أدائك في المراجعة الداخلية.	○	○	○	○	○
ج. لقد عزّز استخدام أدوات وتقنيات تكنولوجيا المعلومات من التزامك بأهداف شركتك.	○	○	○	○	○

د. لقد ساعد زيادة استخدام تكنولوجيا المعلومات في عملية المراجعة الداخلية على تطوير حياتك المهنية.	○	○	○	○	○
هـ. يمنح استخدام تكنولوجيا المعلومات في عملية المراجعة الداخلية ميزة نسبية لشركتك عن منافسيها الذين لا يستخدمون تكنولوجيا المعلومات.	○	○	○	○	○
و. يمنح استخدامك أدوات وتقنيات تكنولوجيا المعلومات في مهام المراجعة الداخلية الخاصة بك ميزةً على زملائك الذين يستخدمون التكنولوجيا بشكلٍ أقل أو لا يستخدمونها.	○	○	○	○	○

Q23 :حدد مدى تأثير كلٍ من العوامل التالية

	يزيد بشكل كبير	يزيد	لا يؤثر	يقلل	يقلل بشكل كبير
أ. استخدام أدوات وتقنيات تكنولوجيا المعلومات كفاءتك المهنية	○	○	○	○	○
ب. استخدام أدوات وتقنيات تكنولوجيا المعلومات ..... نطاق خبرتك المهنية.	○	○	○	○	○
ج. استخدام أدوات وتقنيات تكنولوجيا المعلومات شعورك ..... بالإنصاف والعدل.	○	○	○	○	○
د. التشغيل الآلي لأنظمة المراجعة..... كفاءة المراجعة الداخلية.	○	○	○	○	○

Q24 بغض النظر عمّا إذا كنت قد استخدمت أدوات وتقنيات تكنولوجيا المعلومات أم لا في مهام المراجعة الخاصة بك إلى أيّ مدى تتفق مع العبارات التالية؟

	أوافق بشدّة	أوافق	محايد	أعارض	أعارض بشدّة

أ. أدوات وتقنيات تكنولوجيا المعلومات هي أدوات مهمة لتقييم المخاطر	○	○	○	○	○
ب. أدوات وتقنيات تكنولوجيا المعلومات مهمة للكشف عن الاحتيال	○	○	○	○	○
ج. أدوات وتقنيات تكنولوجيا المعلومات مهمة للتحقيق في الاحتيال	○	○	○	○	○
د. يوفر استخدام أدوات وتقنيات تكنولوجيا المعلومات الوقت والجهد المخصصين لاختبارات الرقابة	○	○	○	○	○
هـ. يوفر استخدام أدوات وتقنيات تكنولوجيا المعلومات الوقت والجهد المخصصين للاختبارات الأساسية للعمليات	○	○	○	○	○

Q25

في الحالات المعقدة التي تشمل قدرًا كبيرًا من المعاملات التي يتم معالجتها في بيئة تكنولوجيا معلومات معقدة، إلى أيّ مدى تقوم بما يلي كمهام مراجعة داخلية خاصة بك؟

	دائماً	غالباً	أحياناً	نادراً	أبداً
أ. إجراء اختبارات الرقابة لتقييم مخاطر الرقابة دون مستوى الحد الأقصى	○	○	○	○	○
ب. الاكتفاء بإجراء الاختبارات الأساسية للعمليات لتقليل مخاطر الكشف إلى مستوى مقبول	○	○	○	○	○
ج. إجراء اختبارات التصميم والتشغيل لأدوات الرقابة لتقليل المستوى المقدر لمخاطر الرقابة	○	○	○	○	○

Q26 فضلاً وضح رأيك فيما يتعلق بما يلي:

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. أنت راضٍ عن توفير شركتك لأنظمة متخصصة مناسبة وقائمة على أساس المعرفة للقيام بمهام المراجعة الداخلية الخاصة بك	○	○	○	○	○
ب. أنت راضٍ عن توفير شركتك لوسائل مناسبة لاتخاذ القرارات الخاصة بمهام المراجعة الداخلية الخاصة بك	○	○	○	○	○
ج. أنت راضٍ عن توفير شركتك لحزم برامج عامة مناسبة لتستخدمها	○	○	○	○	○
د. أنت راضٍ عن تقديم شركتك تدريب لتكنولوجيا المعلومات مناسب لك كمراجع	○	○	○	○	○

Q27

ما تقييمك لمستوى الدورات التقنية التدريبية التالية والمقدّمة للمراجعين الداخلين في شركتك المنوط بهم مراجعة أنظمة المحاسبة القائمة على تكنولوجيا المعلومات؟

	مستوى مرتفع	مستوى متوسط	مستوى منخفض	مستوى الأساسيات	لا يوجد
أ. معالجة البيانات الأساسية	○	○	○	○	○
ب. مفاهيم On-time/ Real-time - المعالجة الفورية	○	○	○	○	○
ج. توثيق النظام والبرامج	○	○	○	○	○
د.عمليات المراقبة الداخلية في أنظمة المحاسبة القائمة على تكنولوجيا المعلومات	○	○	○	○	○

هـ. عمليات المراجعة الداخلية في بيئة محاسبة قائمة على تكنولوجيا المعلومات	○	○	○	○	○
و. استخدام برامج وأدوات معينة للمراجعة الداخلية	○	○	○	○	○

Q28
ما هو مستوى المعرفة التقنية الذي يتعين على المراجعين الداخليين في شركتك اكتسابه للتمكن من مراجعة أنظمة المحاسبة القائمة على تكنولوجيا المعلومات

	مطلوب كثيراً	مطلوب غالباً	مطلوب أحياناً	مطلوب نادراً	غير مطلوب
أ. معرفة أساسية في التعامل مع الحاسوب (مثل: طباعة تقرير)	○	○	○	○	○
ب. معرفة أساسية في مراجعة البرامج المحاسبية الشائعة والجاهزة	○	○	○	○	○
ج. معرفة متقدمة في مراجعة أنظمة المحاسبة القائمة على تكنولوجيا المعلومات	○	○	○	○	○

Q29 ما مدى موافقتك على العبارات التالية المتعلقة بفعالية إدارة المراجعة الداخلية في شركتك:

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة

أ. تقوم ادارة المراجعة الداخلية بتحسين انتاجيه الشركة	○	○	○	○	○
ب. تقوم ادارة المراجعة الداخلية بتحسين الاداء التنظيمي للشركة	○	○	○	○	○
ج. تقيم ادارة المراجعة الداخلية نظام الرقابة الداخلية للشركة	○	○	○	○	○
د. تقوم ادارة المراجعة الداخلية بتقديم توصيات لتحسين وتطوير نظام الرقابة الداخلية للشركة	○	○	○	○	○
هـ. تحدد ادارة المراجعة الداخلية مدى كفاية وفعالية انظمة المحاسبة الداخلية والرقابة على العمليات في الشركة	○	○	○	○	○
و. تقوم ادارة المراجعة الداخلية بمراجعة الاستخدام الامثل والاقتصادي والفعال والكفء للموارد	○	○	○	○	○
ز. تقوم إدارة المراجعة الداخلية بمراجعة العمليات والبرامج للتأكد مما إذا كانت تتفق مع الأهداف والغايات المحددة	○	○	○	○	○
ك. تقوم ادارة المراجعة الداخلية بمتابعة كافيه لضمان انه تم تنفيذ الإجراءات التصحيحية المناسبة والفعالة	○	○	○	○	○
ي. تقوم ادارة المراجعة الداخلية بمراجعة دقه وموثوقية التقارير المالية	○	○	○	○	○

Q30

يُرجى توضيح رأيك فيما إذا كان السبب التالي يثني شركتك عن تقديم دورات تدريبية في تكنولوجيا المعلومات للمراجعين الداخليين الذين يراجعون أنظمة محاسبة قائمة على تكنولوجيا المعلومات

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. تعتقد شركتك أن مهارات تكنولوجيا المعلومات لن تسهم في تحسين أداء الموظفين	○	○	○	○	○

ب. يعتقد المراجعون الداخليون أن الدورات التدريبية تناقش مسائل معقدة يصعب فهمها	○	○	○	○	○
ج. عدم ضرورة حصول المراجعين الداخليين على أيّ تدريب في مجال تكنولوجيا المعلومات وفقًا لمعايير المراجعة المعتمدة في السعودية	○	○	○	○	○
د. ارتفاع تكلفة الدورات التدريبية	○	○	○	○	○
هـ. عدم توفر الدورات التدريبية	○	○	○	○	○

Q31

ما مدى معاناة شركتك من نقاط الضعف المذكورة أدناه في أنظمة الرقابة الداخلية في بيئة المحاسبة القائمة على تكنولوجيا المعلومات عند إجراء عمليات المراجعة الداخلية

	دائماً	غالباً	أحياناً	نادراً	أبداً
أ. نقص أمن البيانات وضوابط الوصول	○	○	○	○	○
ب. المخاوف بشأن سلامة البيانات	○	○	○	○	○
ج. عدم كفاءة المراجعين الداخليين	○	○	○	○	○
د. اختفاء مسار المراجعة الداخلية	○	○	○	○	○

Q32

ما مدى مساهمة الأسباب التالية في معاناة شركتك من نقاط الضعف في أنظمة الرقابة الداخلية في بيئة المحاسبة القائمة على تكنولوجيا المعلومات؟

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة

أ. التكلفة المرتفعة لعمليات المراقبة الداخلية المحكمة	○	○	○	○	○
ب. تفتقر الإدارة لفهم تكنولوجيا المعلومات، أو عدم إدراكها لطبيعة بيئة المحاسبة القائمة على تكنولوجيا المعلومات	○	○	○	○	○

Q33

حدد إلى أيّ مدى تسهم العوامل التالية إن وجدت في زيادة مخاطر المراجعة الداخلية في بيئة محاسبة قائمة على تكنولوجيا المعلومات

	مرتفع جداً	مرتفع	متوسط	قليل	قليل جدا	لا تسهم أبداً
أ. استخدام الشركة برامج محاسبية غير مناسبة إما لعدم ملاءمتها لنشاط الشركة أو رداءة برمجيتها؛ الأمر الذي يجعلها توفر الحد الأدنى من المعلومات، كما يجعل تتبع المعاملات أمرًا صعبًا	○	○	○	○	○	○
ب. عدم كفاءة موظفي الشركة في التعامل مع أنظمة المحاسبة القائمة على تكنولوجيا المعلومات، مثل عدم قدرتهم على الاستفادة من ،مزايا أنظمة التكنولوجيا أو حتى تجنب الأخطاء	○	○	○	○	○	○

ج. ضعف أنظمة الرقابة الداخلية للشركة في بيئة المحاسبة القائمة على تكنولوجيا المعلومات، مثل: عدم وجود كلمات مرور، وعدم إمكانية الوصول، وتغيير سجلات البيانات	○	○	○	○	○
د. استخدام المراجعة حول الحاسوب، حيث يفحص المراجعون الداخليون العلاقة بين المدخلات والمخرجات فقط، ويتجاهلون المعالجة التفصيلية داخل الحاسوب نفسه	○	○	○	○	○
هـ.عدم كفاءة المراجعين الداخليين في مراجعة أنظمة المحاسبة القائمة على تكنولوجيا المعلومات، مثل عدم تمكنهم من استخدام اساليب المراجعة الداخلية بمساعدة الحاسوب (CAATs)، وعدم إدراكهم للمشكلات والمخاطر المرتبطة بها	○	○	○	○	○

Q34

ما مدى موافقتك على العبارات التالية فيما يتعلق بمركزية عمليات الشراء للمخزون والمواد والمعدات في شركتك؟ ويقصد "مركزية عمليات الشراء" هنا توحيد عمليات الشراء في شركتك

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. تعتمد شركتك على مركزية عمليات الشراء للمواد	○	○	○	○	○
ب. تعتمد شركتك على مركزية عمليات الشرا للمعدات	○	○	○	○	○
ج. تعتمد شركتك على مركزية عمليات الشراء لمخزون المستودعات	○	○	○	○	○
د. مركزية عمليات الشراء تقلل من تكاليف المواد	○	○	○	○	○

هـ. مركزية عمليات الشراء تقلل من تكاليف المخزون في شركتك	○	○	○	○	○
و. مركزية عمليات الشراء تقلل من تكاليف المعدات	○	○	○	○	○
ز. مركزية عمليات الشراء تزيد من كفاءة عمليات المستودعات في شركتك	○	○	○	○	○

Q35

ما مدى موافقتك على العبارات التالية فيما يتعلق بمركزية عمليات الشراء للمخزون والمواد والمعدات في شركتك؟

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. تعزز مركزية عمليات الشراء من كفاءة سلسلة التوريد في شركتك	○	○	○	○	○
ب. تسهم مركزية عمليات الشراء في تقليل فائض المخزون في مستودعات شركتك	○	○	○	○	○
ج. تزيد مركزية عمليات الشراء من كفاءة المراجعة الداخلية في شركتك	○	○	○	○	○
د. تعزز مركزية عمليات الشراء من كفاءة الرقابة الداخلية في شركتك	○	○	○	○	○
هـ. يتم إجراء عمليات مراجعة للمشتريات في شركتك	○	○	○	○	○
و. تنفيذ مركزية عمليات الشراء في شركتك يتطلب تنفيذ أسلوب المراجعة المستمرة في شركتك	○	○	○	○	○
ز. تسهم مركزية عمليات الشراء في تقليل احتمالية الاحتيال والهدر وإساءة التصرف في الشركة	○	○	○	○	○

Q36 ما الأمور التي تعيق تطبيق مركزية عمليات الشراء في شركتك؟

	أوافق بشدة	أوافق	محايد	أعارض	أعارض بشدة
أ. التعقيدات الكثيرة لمركزية عمليات الشراء	○	○	○	○	○
ب. التكلفة العالية ،لمركزية عمليات الشراء حيث تتطلب إنشاء نظام خاص	○	○	○	○	○
ج. افتقار شركتك إلى البنية التحتية اللازمة لدعم مركزية عمليات الشراء	○	○	○	○	○
د. تعتقد شركتك أن مركزية عمليات الشراء لن تعزز من كفاءة سلسلة التوريد في الشركة	○	○	○	○	○
هـ. تعتقد شركتك أن مركزية عمليات الشراء لن تعزز من كفاءة المراجعة الداخلية في الشركة	○	○	○	○	○

شكراً جزيلاً على مشارتك