EFFECTS OF INFORMATION TECHNOLOGY ON INTERNAL AUDITING IN COMMERCIAL BANKS IN KENYA

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DECLARATION

I declare that this proposal is my original work and has not been submitted to any other college or university for academic credit

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TABLE OF CONTENTS

ABBREVIATIONS

CAATs: Computer-Assisted Audit Tools

CISA: Information System Audit Statement

EDP: Electronic Data Processing

ICAEW: Institute of Chartered Accountants in England and Wales

ICPA: Institutes of Certified Public Accountants

IT: Information and Communication Technology

IFAC: International Federation of Accountants

IIA: Institute of International Auditors

ISACAs: Information Systems Control Associations

IT: Information Technology

PCAOB: Public Company Accounting Oversight Board

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Information technology is the use of systematic appliances to store and transmit data. It entails the automation of processes by utilizing machines or software to work efficiently with minimal human intelligence involvement. Internal audit is an independent, objective, and advisory activity aimed at adding value and improving a company's operations. Internal audits examine a company's internal controls, including corporate governance and accounting. The use of IT in internal auditing is important as it improves auditing efficiency and effectiveness within organizations. There have been very few studies that have explored the effectiveness of IT on internal auditing in private sector which has led to insufficient knowledge on the use of IT in internal auditing specifically in private sector. This study sought to determine the effects of IT on internal auditing in private sector. To achieve this aim, the study answered the following research questions: How does IT promote integrity in internal auditing processes? What is the effect of IT on time spent and cost incurred in internal auditing? What are the challenges of adopting and implementing IT in internal auditing? The descriptive research design was used in this study. This study required this design because it enabled the author to explore and describe the distribution of one or more variables independently of any causal or other hypotheses. The data was collected using a questionnaire designed as per the objectives of the study. The collected data was decoded in excel, then imported to SPSS for analysis. Diagnostic tests were carried out to test the reliability and validity of the data. Correlation and regression analysis were carried out to establish the relationship between the variables of the study. The frequencies, mean score, standard deviations and percentages of the variables were determined. Tables, charts and graphs were used to present the data analyzed. The findings of the study, indicates that the use of IT in the commercial banks strengthened integrity, reduced the cost and time taken to execute internal audit processes. The findings also indicated that through the use of block-chain, cybersecurity, big data, and data analytics technologies, the auditing process was efficient, transparent, and accurate. The study also found that the cost of acquiring, implementing and updating the CAATs applications was quiet high thereby scaring away some entities. The study recommends that policy makers review and design policies that will make CAATs affordable for all organizations.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Information technology is the utilization of computers to frequently store, collect, transmit, and analyze data or information in business (Nicholas, 2019). The complexity of information's function has led to the term "information explosion" being used to describe the present. The link between internal audit and IT has not been extensively studied (Salehi & Husini, 2011). The role of both financial professionals and auditors transforms artificial intelligence, block chain technology, and data analytics into game changers for both the financial and accounting sectors, as well as the audit industry. Auditors collect and analyze previously inaccessible industry data sets in addition to enterprise data (ICAEW, 2017).

The study will adopt the Unified Theory of Acceptance and Use of Technology (UTAUT), Diffusion Innovation, and Agency Theory to provide deeper understanding of the effect of IT on internal auditing. These theories explain how adoption of IT influences the effectiveness and performance of internal auditing in an organization. Auditors around the globe have confirmed the adoption and implementation of computer assisted audit techniques strengthens the productivity of the audit process while maintaining a positive approach to the quality of audit work (Jaksic, 2009; Saygili, 2010).

Technology and economic reforms resulting from IT developments have had an invaluable effect on vital functionalities and operationalization of institutions and business sectors in recent decades (Akinleye & Olanipekun, 2019). Understanding the impact of using IT in internal auditing provides a clear path for organizations to use IT in auditing processes. The internal auditing process is an important component of the internal control system because it assists management in fulfilling its responsibilities through bolstered controls (Salehi & Husini, 2011). Therefore, this study sought to understand and provide sufficient knowledge about the effect of IT on internal auditing in the banking sector.

1.1.1 Information Technology

IT refers to a broad range of technologies used to create, operationalize, store, safeguard, and transfer information, such as application, hardware, telecommunication, and support services. (Brown, 2021). Information technology is also defined as the use of technological equipment to keep and transmit data. The procedure entails the automating processes by utilizing computers and

applications to function properly with minimized human intelligence intervention (Castagna & Bigelow, 2021). Six decades of robust and effective innovation are the cause of modern information technology. The centralized mainframe, personal computer, customer/server period, company computing, and cloud are the five major stages in the development of IT infrastructure (Brown, 2021).

The use of IT in auditing has continued to advance; however, studies have shown Internal audit functions just can't find enough people with the right skills to enable implantation of advanced technologies. Additionally, most businesses are still hesitant to integrate the necessary technologies into their internal auditing procedures. (McCafferty, 2018). Additionally, nothing is known about how it affects internal auditing in the banking industry. Therefore, this study will determine and establish the impact of IT on internal auditing in commercial banks.

The operationalization of variables provides the framework in which different variables of the study can be easily measured to obtain quantifiable results. Ahmi (2016) measured IT adoption and impact using perceived usefulness and benefits. Oginga (2013) in her study used audit quality, time taken when using IT, and the cost of using IT in auditing processes. Meyyappan and Lee (2011) measured the impact of IT on internal auditing using planning, record maintenance, communication, and risk mitigation when using IT.

It is important to distinguish between information technology and information, communication, and technology. Information Technology (IT), which includes computers, applications, network management, and other IT infrastructural facilities to help transmit or handle data, is extremely crucial in contemporary life, as evidenced predominantly by large companies or corporate entities that run multibillion-dollar enterprises. IT helps companies by providing a group of IT personnel who are furnished with servers, data management systems, and safety precautions to safeguard sensitive company data. Information, communication, and technology, on the other hand, are more suited to the educational setting. IT is defined as the use of computers and other electronic innovations to help individuals or organizations handle or use information. IT is used in academia to profit individuals or institutions that are smaller in size than those managed by IT experts in corporates. IT can be as simple as using audiovisual equipment for classroom learning, or as complex as using digital telephone service as well as other gadgets to help convey data throughout campus (Buttice, 2020).

1.1.2 Internal Auditing

The Corporate Finance Institute (2021) defines auditing as financial auditing or the objective review and evaluation of a company's financial statements. Internal auditing, on the other hand, is described as a distinct, impartial, ethics certainty, and financial advisory process designed to increase worth and increase an organization's efficiency and effectiveness (Nicholas, 2019). This is concerned with evaluating and enhancing an organization's risk mitigation, regulation, and operating efficiency. The IIA (2012) defines internal audit as "an impartial, unbiased, and advisory actively involved in a process at having to add value and improving a company's operations." Internal audit function investigates the internal control systems of a company, including governance practices and financial reporting. The above audits ensure that rules and regulations are followed, as well as timely and accurate financial reporting and data collection (Touvila, 2020).

An internal audit is important to a company because it reduces redundancies in business activities by ensuring that business actions and procedures are evaluated and monitored to ensure that they are properly conceived, implemented, and functioned; analyzes and monitors, verifies the accuracy and integrity of financial statements; and identifies company vulnerabilities (Scherer, 2020). Embedding and utilizing information technology in internal auditing strengthens auditing processes, ensuring efficiency (Moorthy et al., 2011).

Previous studies have measured internal auditing by using processes, guidelines, communication processes, periodic revision of audit criteria, time taken, total number of audits conducted, and record management of the audit process (Bota-Avram et al., 2011). The purpose of this research was to identify and assess the effects of information technology on governance, potency, integrity, and time in Kenya's banking industry's internal auditing process.

1.1.3 Internal Auditing and Information Technology

Fitrawansyah et al. (2015) contend that technology will always have a significant effect on almost every auditing process. The computer-created auditing programs are intended to audit software that tests all customers' data. For accountants to compete with the paperless audit system and understand their clients' business processes, Technology is extremely important (Fitrawansyah et al., 2015). Auditing efficiency and effectiveness will greatly benefit the auditor who benefits from new technologies.

Internal audits are crucial to a company's operation and management. Internal audits manage risk and protect against potential fraud, waste, or abuse, as well as ensuring compliance with legislation and regulations (Touvila, 2020). Internal auditing is carried out by experts who have a comprehensive knowledge of the company's culture, structures, and procedures to guarantee effective and efficient governance processes, as well as the achievement of corporate goals and objectives (IIA, 2012).

The use of IT in internal auditing enables auditors to identify more information, gain business insight, and concentrate on risk in business and financial reporting. Disruptive technologies also deepen auditors', finance's, accountants', and regulators' skills, which have implications for education, recruitment policies, and personnel development needs. This has implications for educators. (ICAEW, 2017). However, acknowledging the customer's business strategy remains critical. Even though big data is making data more accessible, remedial action is still required to sort through the data, interact with clients and provide expert guidance and assistance (ICAEW, 2017). This study focused on the effects of information technology on auditing, specifically internal auditing, by examining its role in integrity, cost, and time during the auditing process in organizations in the private sector.

1.1.4 Commercial Banks Kenya

The Co-operative Bank of Kenya, which began as a co-operative society, was Kenya's first wholly owned commercial bank. The bank began operations in 1968 to meet the needs of growing agrarian communities. That year, the National Bank of Kenya became Kenya's first government-owned bank (CBK, 2020In Kenya, there are currently 42 banking institutions. The Central Bank of Kenya regulates these banks, which are required by the Banking Act and its implementing regulations. The Act governs the CBK's licensing and supervision of banks, as well as the minimum operational requirements of banks (Omulele et al., 2022). Banks perform critical economic functions, the most important of which is the operation of a payment system; a modern economy cannot function properly without an efficient payment system.

Internal audit is a component of the bank's ongoing monitoring of its internal control processes and systems for assessing internal capital. That is, it aids managers and the board of directors in carrying out their duties effectively (Gramling, 1997). Information technology has affected audit risk reduction through electronic processing of information and auditing. This assists auditors in

minimizing the risk of auditing inconsistencies and increasing the likelihood of exploration, resulting in a reduction in audit risk (Kamil & Nashat, 2017). The purpose of this research was to determine the effects of information technology on internal audit functions in Kenyan commercial banks.

1.2 Research Problem

Several advancements have been made possible by the development of information technology. A rising number of businesses have utilized digital tools to boost their chances as information has gotten more digital. (Scheck, 2021). Technology has improved business management in recent decades by increasing transaction speed and efficiency. Technology has altered many business aspects, such as logistics and sales, data collection, auditing, accounting, and promotion (Christina, 2019). IT audit function lessens risk level through electronic processing of data and auditing. This helps auditors reduce the probability of audit inconsistencies while boosting the probability of discovery (Kamil & Nashat, 2017). Understanding the usage of IT in internal auditing is vital to ensure the efficiency, speed, and effectiveness of conducting internal auditing in the organization.

In Kenyan commercial banks, the internal audit function contributes significantly to the advancement of good corporate governance and financial performance (Changwony & Rotich, 2015). Thus, according to Chepkoriri (2010), internal auditing helps a business in achieving its goals by offering a methodical, principled method for evaluating and improving the effectivity of risk mitigation, regulation, and coordination mechanisms. An internal audit looks for risk exposures in the entity's internal control, operational processes, and information management. However, internal auditing in the banking sector faces challenges such as incorporating new technology, implementing updated international standards, and realigning skills to address new and emerging requirements.

Using a computer changes how financial data is processed, stored, and communicated and can have an impact on an organization's internal control and accounting systems. Numerous studies have been conducted internationally to ascertain the impact of information technology on auditing. A quantitative study was conducted by Kamil and Nashat (2017) to assess the information technology's impact on the auditing profession. In their study of the effects of information technology on firm internal auditing, they discovered that effective use of audit technological devices is critical to audit exercise success. Sanusi and Hassan (2015) discovered in another study

that IT has a productive correlation with efficient internal control operations in the university system. However, these studies failed to indicate the integrity part of using IT in internal audit. According to statistics, the internal audit function is prone to fraud due to deception, falsifiability, or adjustment of audit records or documents, embezzlement, and inhibition or inadvertent of money transfers from records when using manual audit. Therefore, understanding the effect of IT in ensuring integrity in internal auditing is essential, as this will convince organizations as to why they need to implement IT in internal auditing.

Other studies have examined how information technology has affected internal auditing in Kenyan firms (Maina, 2013) and the influence of information technology on the effectiveness of internal auditing in Tanzanian organizations (Lotto, 2014). These studies looked at how information technology affected internal auditing processes in terms of efficiency and cost. However, none focused on the integrity impact of IT or adoption and implementation challenges in auditing processes, therefore, creating a knowledge gap, which this study seeks to fill. Furthermore, most of these studies were either carried out abroad or in other parts of Africa. In addition, most of the research didn't focus on commercial banks. To address integrity, cost, and time as well as the influence of IT adoption and deployment on internal auditing processes, this study concentrated on the impact of IT on internal auditing in commercial banks in Kenya.

The research sought to answer the following questions to understand the effect of IT on internal auditing processes in commercial banks:

I. How does IT promote integrity in internal auditing processes?
II. How does information technology affect report timeliness??
III. What is the cost of implementing IT in internal auditing?

1.3 Research Objectives

The study's overarching objective was to assess the effect of information technology on internal auditing in Kenyan commercial banks.

The specific objectives of the study are.

I. To determine how information technology promotes integrity in internal auditing process of commercial banks in Kenya

II. To identify the effect of information technology on timeliness of reports of commercial banks in Kenya

III. To identify the costs of implementing information technology in internal auditing of commercial banks in Kenya

1.4 Value of the Study

The findings of the study on the effects of information technology on internal auditing in Kenyan commercial banks will determined its success. The findings will be of great value to both banks and other public and private organizations seeking to strengthen and improve their internal auditing processes using information technology.

This study provides essential information on how IT enhances integrity, reduces timeline for audit report generation and the cost. This information is important because it will enable the policy makers, auditors, and the related departments to understand the need of implementing IT in internal audit functions. The study may also be useful as a reference tool for scholars planning future studies on the same subject. It may also be useful for non-scholars in need of expanding their knowledge of IT in auditing.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Theoretical review, empirical framework, and conceptual framework are all thoroughly covered in this chapter. The purpose of the literature review is to locate any knowledge gaps. In-depth analysis of the study's many theories and preceding studies.

2.2 Theoretical Review.

In this section, various study-related theories are discussed. These include Agency Theory, Diffusion of Innovation Theory, Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003).

2.2.1 Unified Theory of Acceptance and Use of Technology

The Unified Theory of Acceptance and Use of Technology (UTAUT) designed by Venkatesh et al. (2003), seeks to describe how users behave and their intentions for using an information system. According to the theory, the purpose and conduct of use are directly influenced by four fundamental structures: effectiveness expectations, effort expectations, social implications, and ease of use (Venkatesh et al., 2003).

The idea of performance expectations includes the range of authorized users who can use the tool to complete tasks (Venkatesh et al., 2003). According to research by Banker et al. (2002), the use of CAATs by very large audit firms shortens the time required to conduct an audit and prepare a working paper. The authors noticed that the decision-making process of audit professionals was influenced by the electronic submission of accounting information (Banker et al., 2002). The auditors concur that utilizing computer-assisted auditing procedures could increase their audit efficiency while keeping a focus on the caliber of their work (Jaksic, 2009; Saygili, 2010). Additionally, it shows that auditors are more likely to employ CAATs when employing them to alter the efficacy of immediate control tests and fixed testing (Bedard et al., 2003; Loraas & Wolfe, 2006; Mansour, 2016).

UTAUT's advocates believe that perceived usability is likely to have a positive effect through the expectation of effort and the willingness to adopt or implement (Venkatesh et al., 2003). According to Aidi and Kent (2013), the audit suggestions may have a detrimental effect on auditor adoption

because of the development and labor-intensive use of CAATs. Payne and Curtis (2010) say that, where they're easy to use, UTAUT proposes that auditors that are well trained in IT will likely use CAATs without a difficult process of cognition. The understanding of the facility of use appears to be important among practitioners and hypothesizes the use of the above-mentioned structure when modeling the auditor's technology acceptance (Bedard et al., 2003).

This theory has the drawback that the causes of behavior cannot be properly measured in observed research because of numerous subjective factors like social values and norms, individual qualities, and personality traits (Ang, 2015; Shan, 2015). The fact that this theory connects to the variable that refers to client behavior, which must be evaluated using subjective indicators like behavioral intention and interpersonal influence, is another weakness of this theory (Maruping et al., 2017).

This theory is crucial to the research because it helped to illustrate how simple it is to use IT tools for internal auditing. It also assisted in explaining the effectiveness of IT tools' performance while conducting internal audits.

2.2.2 Diffusion of Innovation Theory

Everett Rogers, an American communication theorist and sociologist, first proposed the Diffusion of Innovation (DOI) theory in 1962. It aims to explain how, why, and how quickly a good, service, or procedure spreads among a population or social system (Corporate Finance Institute, 2015). A new concept, behavior, or item is not immediately adopted by a social system; instead, acceptance is a phase in which some individuals are more inclined to accept an innovation than others (LaMorte, 2019). According to Rogers (2003), adoption refers to the choice "to fully utilize an invention as the optimal course of action," and rejection refers to the choice "not to accept an innovation."

The diffusion hypothesis's four parts are as follows: Time. A new concept, method, or project that is adopted by a person or other adoption unit is referred to as an innovation. Another term for this is a communication channel. Rogers (2003) asserts that the inclusion of the temporal dimension demonstrates one of the benefits of diffusion research. Time is considered in the adoption rate, adopter classification, and spread of innovations. A social system is made up of interconnected parts that work together to resolve problems and further a common goal. Given that innovation diffusion takes place within the social system, the social system's structure has an impact on it (Rogers, 2003).

Diffusion of innovation theory has faced several criticisms about its usage in the adoption of technology. The theory of innovation diffusion is usually oversimplified to ignore the many sociological, cultural, economic, and other elements that influence how an innovation gets adopted into society and to concentrate only on a product or innovation. Because social systems are so complicated, it can be challenging to ascertain the real factors influencing the adoption of a novel product (LaMorte, 2019). The concept is based on new product development and marketing theory. Both professions assume that people will adopt new technology to increase its utility. Additionally, the model does not take into consideration the implications of overlapping contexts and domains (MacVaugh & Schiavone, 2010).

This theory is important for this study because it helped to clarify why internal auditing processes need to adopt and apply IT. Evaluating the benefits of IT use in internal auditing procedures in Kenyan commercial banks also helps. This theory helps firms assess the chances of success or failure in adopting new technology and helps auditors understand how trends emerge.

2.2.3 Agency Theory

According to the hypothesis, internal audits assist in keeping managers and contractors cost-effective with other interventional tools like financial reports and external audits. The Agency theory describes and predicts the presence of internal audit, as well as the function of internal auditors within an organization. It also describes and predicts how organizational transition is likely to affect internal audit (Adams, 1994). The incentives of agents and principals are likely to be different. Non-principal elements, including financial incentives, job prospects, and connections with other people, may have an impact on them. As an illustration, this may cause agents to be more overconfident about an entity's economic performance or its compliance with a contract than is reasonable.

An agency problem, or a scenario where one side is required to act in the best interests of the other, can result in conflicts of interest. When an agent is provided incentives or motives to act in the principal's best interests, agency concerns arise (Chen, 2020). This theory is necessary for this study as it helped in explaining how IT adoption brings about change in the auditing processes and how the auditors respond to that change.

2.3 Determinants of IT in Impacts of Information Technology in Internal Auditing in Commercial Banks.

Empirical review examines past scientific investigations to answer a specific question of research (Gohavacy, 2020). This section discusses the previous research studies on the topic and the objectives of the study in detail.

2.3.1 IT and the Role of Auditors

Ernest and Young (2013) argue that the strained economic environment is complicated by advanced technology like cloud, social networks, and mobile devices, which challenges the IT internal audit's capacity to comfort managers already undermined by rapidly expanding opportunities and pressures arising from decreasing margins. The auditing developments in this fast technological escalation were discussed by David and Liming (2004). These made transparent contributions to internal control standards and guidelines as well as IT auditing. Technology, IT, and electronic data processing have revolutionized how firms operate, encourage operational efficiency, and enhance decision-making (EDP).

Iqbal (2005) conducted an online investigation into the extensive nature of corporate reporting and its participation in the auditing sector. Finally, electronic and internet-based reports benefit from the Internet's phenomenal expansion. To better comprehend the nature of best practices and a web-based corporate reporting code of conduct, he had first read through a variety of academic articles and accounting practices. Iqbal (2005) examined internet reporting practices in Malaysia subsequently and found that companies that use the internet to provide public information were significantly increasing. While using the Internet benefits, Iqbal has suggested that the company should be on guard for the reliability and verification of divulged information. Additionally, he put out a number of suggestions for enhancing audit supervision, lowering audit risks, and enhancing user trust and reliability. However, the genuine consequences of online reporting on auditors were not concluded, and only the implications of the shallow auditing profession were considered and examined.

Staciokas and Rupsys (2005) aimed to comprehend internal audit procedures, look at information technology (IT) issues, and weigh the advantages of internal audit to organizational management. The writers investigated the beginnings and deemed definition of internal audit using literature research, comparative analysis, and current reviews. Although the definition of internal audit has

undergone constant revision and development over the past ten years, there are still some issues with understanding and placement of the internal audit function inside the business. In addition to assessing the efficacy of internal controls, conducting fraud investigations, and supporting external auditors, internal audit also identifies organizational risks and consults with management on risk management, process changes, or worldwide operations. All members of the organization must have a common knowledge of what internal audit entails (management, accounts, audit committee, etc.).

2.3.2 Artificial Intelligence in Internal Auditing

Artificial intelligence (AI) is the imitation of human intelligence by machines that are programmed to reason and act in human ways (Frankenfield, 2021). According to ICAEW (2017), artificial intelligence also refers to machines doing tasks that call for some level of intelligence, notably learning, knowledge, sensing, reasoning, goal setting and achievement, language generation, and comprehension. Recent advancements in AI are based on methods like deep learning and machine learning. Algorithms learn how to perform jobs like identifying objects or IT values through statistical analysis of enormous quantities of data rather than through explicit programming (Advani, 2021).

Hassan (2022) indicates that AI can help automate specific tasks, such as data entry and analysis, improving accuracy and speeding up the auditing process. AI can help to generate more insights and understanding of complex data sets, which can improve the accuracy and reliability of audit reports. During audits, internal auditors can examine data sets more quickly, seek out patterns, and detect new relations between currently overlooked data points relations that may provide ways to further explore them (IIA, 2017). Checkers also use artificial intelligence to categorize risk across full books and feeder systems, without requiring a person to perform extensive data analysis. It enables a new evolution of strong reason to believe that goes beyond AI's raw processing power (Colthart, 2019).

Noordin et al. (2020) observed that AI can be used to assist in auditing, and concurrently, auditors can increase their technical skills regardless of which type of audit firm they work for. Managers in the private and public sectors should consider the value and importance of adopting AI to

improve work speed and quality. However, they must plan and organize AI adoption to avoid unsatisfactory results.

2.3.3 Blockchain in Internal Auditing

Blockchain is an information recording technology that makes it difficult or impossible to alter, hack, or cheat the system. It is mainly a copied and dispersed digital transaction leader that is present across the whole blockchain computer network (Euromoney, 2020). All logging processes, including how transactions are started, processed, authorized, recorded, and reported, may be impacted by blockchain technology. Back-office activities such as financial reporting and tax preparation may be impacted by modifications to business models and business procedures (Deloitte, 2018). Blockchain has the potential to profoundly alter the landscape of the accounting profession and transform the corporate ecosystem by providing a radically new means to document, execute, and keep financial transactions and information (Wu et al., 2019).

Blockchain, according to Liu et al. (2019), offers a fundamentally new method for capturing, processing, and storing financial data and transactions and can fundamentally alter the environment and the business ecosystem. Blockchain technology provides essential functions for the safety and prevention of fraud during audits. These include encryption, posting of transactions in real-time and hosting of intelligent contracts.

A blockchain reduces the possibility of one party to the transaction failing to make payment by enabling transactions to be settled extremely instantly. It also includes a verifiable history of every transaction that has ever taken place on that blockchain. This stops the blockchain-tracked object from being used twice (Deloitte, 2017). Widespread blockchain use would make it possible to collect audit data from centralized sites, and auditors might create techniques to gather audit evidence directly from blockchain.

2.3.4 Cyber Security in Internal Auditing

According to Kaspersky (2021), cyber security is a technique used to protect networks, computers, servers, mobile devices, electronic systems, and data that has been maliciously accessed. Cybersecurity encompasses safeguards against intrusion, unauthorized access, and destruction of data as well as networks, systems, and devices. A wide range of IT monitoring tasks, intrusion or

breach detection, and safety failure reaction are also components of good cyber security practices (IIA, 2017). Given the prevalence of cyber risk across all business operations, the external nature of many hazards, and the rate of risk change, cyber security can help firms establish effective cyber security risk management methods.

2.3.5 Big Data Analytics in Internal Auditing

Advanced analytical methods are applied to very large and diverse data sets in big data analytics, which contain structured, semi-structured, and unstructured data from many sources and range in size from terabytes to zeta bytes (IBM India, 2020). Big data might essentially serve as a platform for more comprehensive risk thinking. With the data they comprehend to analyze the risks, auditors may more clearly describe the hazards to the firm and the policies and procedures to monitor compliance (Tabuena, 2012). Analytics breaks down huge amounts of data and then reconstructs it to form information clusters to analyze the risk landscape with the auditor. Efficient data analytics enhance performance, give the organization greater value, and increase the credibility with its stakeholders of an internal audit (Teammate Customers Service, 2020).

2.3.6 Integrity in Internal Auditing Process

Heathfield (2021) defines the quality of maintaining excellent ethical principles that are always followed. Integrity is the quality of being self-aware, accountable, and truthful, as well as having internal consistency in one's behavior (Santa Clara University, 1998). Integrity is one of the fundamental values that businesses strive for in the workers they hire since it serves as the cornerstone of employee relationships and trust (Heathfield, 2021). It promotes a professional society in which people can rely on one another and respect one another. This usually leads to increased productivity and motivation at work.

Internal auditing's goal is to add value and improve an organization's operations. Additionally, the goal and consulting action are different. A rigorous, disciplined approach to evaluating and improving the effectiveness of risk management, control, and governance systems will help a business achieve its goals (IIA Kenya, 2020). The integrity of internal auditors is required in accordance with the IIA Code of Ethics in the context of trust and subsequently a reliance on its judgments. To demonstrate the highest level of professional objectivity, internal auditors must gather, evaluate, and communicate information about the activity or process under examination.

According to the World Economic Forum (2020), technology is a major ally of clarity and a critical tool for combating corruption. However, the speed of change and the complexity of solutions associated with the 4th Industrial Revolution make the updating of emerging technologies difficult for any organization. In particular, the private sector appears to view new technological innovations more optimistically as potentially confident and integral. Four new technologies-blockchain, Big Data analysis, A.I., and e-government in particular-have a significant commitment to safeguarding the primary vulnerabilities of businesses. (Economic Forum, 2020). The purpose of this research was to discover how the use of information technology in internal auditing processes reduces fraud and promotes integrity in the private sector.

2.3.6 Time

The methodology for the audit refers to how audits are conducted in companies. It largely depends on the type of audit, as companies focus on specific procedures and problems using audits (Lacoma, 2016). All audits are, however, familiar with cost and time issues. Efficient companies are trying to use effective audits with low cost and time-consuming business. The use of advanced technology has become an essential component of a credible audit. It enables auditors to use application to store and process data for their clients. (KLR, 2016). CAATs are a type of IT that is often promoted and recommended by professionals and audit standards. CAAT can be defined as the tools and techniques used for the auditing and analysis of computer applications (Oginga, 2013).

A study by Ghasemi et al. (2011) shows that the advantages of information technology (IT) for accounting departments have been considerable. IT networks and computer systems have sped up the process for accountants in terms of compiling and delivering financial information to management and stakeholders. The lag time needed to provide financial information has been shortened, and IT has increased overall efficiency and accuracy. Edurev (2018) also adds that IT results in reduced audit costs: computer workloads are reduced. Computerized auditing reduces costs. The Trial Balance Software, for example, allows auditors to enter the working trial balance and handle all types of adjustment entries (Ghasemi et al.2011). The purpose of this research is to determine and comprehend how the use of information technology aids internal auditors in saving time during auditing processes in private entities via various technological innovations.

2.3.7 Cost

Automated controls require less testing during an audit than manual controls, which lowers the workload on management and makes the audit go more quickly and smoothly. By embracing data analytics, firms may gain a competitive edge, achieve cost savings, and create long-term value by using facts to assist decision-making (ICAEW, 2021). According to Bunker (2022) automation and cost-cutting initiatives frequently go hand in hand, and the audit function can benefit greatly from the introduction of new technologies. Many businesses may be put off by the initial investment and transformation initiatives needed for such significant changes, but in the medium to long term, it is likely to be cost-effective.

IT lowers transaction costs by lowering the cost of searching, easing performance monitoring and control, and resulting in more production flexibility, which lowers the transaction specificity of assets (Nooteboom, 1992). Arabi (2009) conducted an evaluation of information technology advancements and concluded that these advancements had an impact on the accounting information system by eliminating human error, decreasing costs, increasing efficiency, quality, and effectiveness, as well as by generating context and new applications in the accounting profession. This study evaluated the effect of IT on cost saving in internal auditing in commercial banks of Kenya.

2.4 Empirical Studies

Global Studies

Mahdi (2011) investigated how information technology affected listed companies' internal auditing at the Tehran Stock Exchange (TSE). 450 companies listed as TSE were included in the statistical sample. The primary goal of the study was to examine how information technology (IT) has affected internal auditing and each of its component processes, including planning, internal control, investigation, and reporting. Mahdi (2011) adopted a descriptive research design and used a Binomial test to test the hypotheses of the study. The study's findings showed that applying IT to internal auditing enhances the effectiveness and efficiency of internal auditing reports, their accuracy and reliability, and internal control quality. Mahdi (2011) suggested that businesses use IT more frequently to raise the caliber of internal auditing and that internal auditing operations be planned and carried out systematically in accordance with the same strategy.

Moorthy et al. (2011) evaluated the impact of information technology in Malaysia. The study's objectives included identifying the causes of the lack of best practices guidelines, addressing, and recommending accounting standards to assist in educating and supporting relevant auditors in carrying out audit tasks and lowering organizational risk, proposing a specific role for an internal auditor and the skills and competencies necessary for IT-related auditing, and addressing and outlining the IT system (software and hardware) for ongoing auditing. The study adopted a conventional approach. The study's outcomes showed that there isn't a universal technology tool for internal auditing. Although this is the first step in understanding the changes that technology is bringing about in business and the auditing profession, the effectiveness of audit activities depends on the appropriate use of audit technology tools. The design and implementation of business controls will be continuously altered by new technology, necessitating modifications to audit procedures and methods. As keyboards and email can never totally replace the requirement for interpersonal skills, Moorthy et al. (2011) draw the conclusion that the usefulness of interpersonal contact in auditing is limited.

Kombo (2013) investigated how computerized accounting systems (CAS) affected the auditing procedures. The study was conducted at Tanzania's Mtwara District Council. The study's specific goals were to investigate the ways in which CAS affects the efficacy and efficiency of the auditing process, the factors that affect these elements in CAS, the issues that organizations confront in CAS, and the issues with auditing in CAS. A sample size of 30 carefully chosen participants was used in the investigation. Cross tabulation and descriptive statistics were employed to analyze the data to identify the key aspects of the research variables. The study's findings demonstrate that CAS had very minor positive effects on the effectiveness and efficiency of the auditing procedure. The following elements were discovered to have an impact on the efficacy and efficiency of the auditing process in CAS: familiarity with CAS, quality of audit planning, accountability worries, responsibility awareness, ethical pressure, stakeholder forces, completeness of audit risk judgments, and appropriateness of sample chosen. According to Kombo (2013), management should make a concentrated effort to teach personnel to enhance workers' abilities and talents in a computerized environment.

Lotto (2014) studied on how information technology affected the efficiency of internal audits in Tanzanian firms. Determine the relationship between internal auditors' use of IT and their

perceived ability to audit computer-based information systems was one of the study's main goals. Another was to classify the methodologies used by auditors and, if they are IT-based, assess the ability of internal auditors to audit information systems. Organizations from the manufacturing, financial, and educational sectors that are based in Dar es Salaam make up the study's sample. The Chi-Square Assess was employed as the analytical model to test the association between the variables, while the study used exploratory and descriptive research approaches. The survey indicates that IT is essential to internal auditing. The poll also found that inadequate training and a lack of top management support were the main obstacles to using IT for internal audits. Lotto (2014) claims that specific services and audit considerations are necessary for transactions involving the use of personal data. Executives in industries like banking should be more aware of the difficulties with disaster recovery management and network security audit. Executives in the industrial sector ought to be more concerned about automated auditing solutions that deal with better inventory controls.

In Southwest Nigerian universities, Akinleye and Olapikun (2019) investigated how information technology affected internal audit. The study used binary logit regression analysis and factor analysis as estimate methodologies to reach the goal. A sample of 46 universities in Southwest Nigeria were employed in the study. The study's conclusions showed that internal audit was negatively and significantly impacted by IT effectiveness (ITE). Like how internal audit was negatively and negligibly impacted by asset recovery (AR), additionally, internal audit is positively affected by external audit (EA) although only marginally. According to Akinleye and Olapikun (2019), colleges in the Southwest ought to develop and promote information technology for both internal audit department and external users.

Local Studies

Oginga (2013) investigated how Kenya's deployment of computerized auditing might impact audit quality. The Institute of Accredited Public Accountants of Kenya (ICPA) certified 107 audit firms, which served as the study's sample size (K). Regression analysis was used in the study to analyze the data. According to the study's findings, 26 businesses out of 105 respondents had switched to computerized auditing. The results indicated a favorable correlation between the use of computerized auditing and audit quality. According to Oginga (2013), managers should set aside funds for employee training as well as the acquisition of computers and software for computerized

auditing, which will raise the caliber of the audits. In the event of failures and breakdowns, the government should also implement policies to safeguard information security and safety.

Otoko (2016) studied as to how computerized accounting systems affected risk-based internal audits in the Homa Bay County government. Using a descriptive research design, the study's goal was achieved. The study included a sample of 60 individuals who were divided into groups based on their work status. According to the study, RBIA had enhanced financial systems by boosting accountability and transparency in a computerized environment regarding risk appraisal and assessment, risk profiling, annual risk-based audit planning, and auditing personnel. To promote effective and efficient financial performance, policymakers should implement risk-based internal audit practices such risk profiling, risk assessment, annual risk-based audit scheduling, internal auditing standards and rules, and auditing recruitment.

Gikonyo and Mutiso (2020) conducted research on how management information systems affect internal audit performance in Kenya's public sector. The National Treasury of Kenya conducted the study. A sample of 139 internal auditors from the National Treasury were included in the study. Descriptive and regression analysis were used in the study to draw sound inferences from the information gathered. The results showed the importance of information systems in assuring the efficacy and efficiency of organizational operations. The survey found that just a small percentage of internal auditors have adopted using information technology for auditing activities. Gikonyo and Mutiso (2020) advise making sufficient budgetary allowances for the equipment, networking, and dependable internet connectivity required for simpler communication and quicker reaction, as well as for proper training of internal auditors on the use of IFMIS.

In Kenya's public sector, Ngugi (2020) identified the factors that influence internal audit and its efficacy. The management information system and how it influences internal auditing effectiveness were two of the study's goals. The study used 198 internal auditors from Kenya's National Treasury as its sample size. Descriptive and regression analysis were utilized in the study to draw firm conclusions from the information gathered. The study discovered that management information systems are crucial to both risk management and internal controls. The delivery of internal auditor reports in a consistent manner that enforces compliance is possible thanks to technology, which is also required for the transfer of information and the execution of projects. The studies also showed minimal technology adoption and absorption; filing audit reports had both

a manual and an electronic component. Investment in management information systems, according to Ngugi (2020), ensures that standards are set and upheld. Management responds to and evaluates performance based on the findings of internal auditors in a proactive manner. Management and internal auditors can so actively take part in enhancing governance procedures.

2.5 Conceptual Framework

A conceptual framework illustrates what the researcher expects to find. It defines the variables relevant to your study and maps how they may be related (Swaen, 2021). A conceptual framework helps us initially identify, clarify, and value vital aspects of a study and then link it to the various other aspects and impacts of the research (Ravitch & Reagan, 2016). The conceptual framework for the study is figuratively illustrated below.

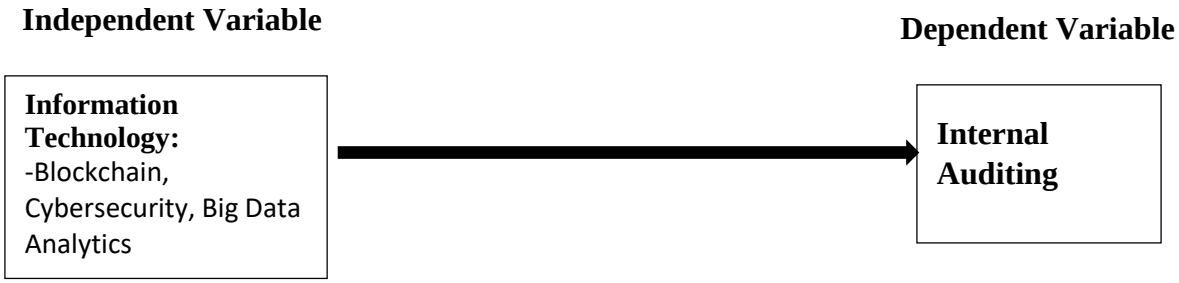

Figure 2.1: Conceptual Model

The measurable features that can alter throughout a scientific experiment are referred to as variables (Agravante, 2019). For this study, there are various types of variables. These are the experiment's dependent variables, which are measured or tested (Cherry, 2021). The impact of IT on internal auditing is the study's dependent variable, while the study's independent variable (IV) is a component of a psychological experiment that is altered or changed by researchers rather than other experimental factors (Cherry, 2020). Information technology serves as the study's independent variable.

2.5.1 Operationalization of Variables

The term "operationalizing a variable" describes the precise way researchers will track or quantify each variable. Additionally, it entails converting intangible ideas into quantifiable observations (Bhandari, 2020b).

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains the methods, processes, and instruments used by the researcher to carry out the study. It goes over study design, population, data collection techniques, method of data analysis, and ethical implications in detail.

3.2 Research Design

The research design outlines the approach for incorporating the study's multiple aspects in a coherent and logical way, guaranteeing that the research problem is successfully resolved, and providing a framework for data collection, measurement, and analysis (Libguides, 2021). The descriptive research design was used in this study. This study requires this design because it enables the author to explore and describe the distribution of one or more variables independently of any causal or other hypotheses (Aggarwal & Ranganathan, 2019). Descriptive design also seeks to characterize a population, circumstance, or event precisely and methodically. It can respond to inquiries about what, where, when, and how, but not why (McCombes, 2019).

3.3 Population

A population refers to a group of people about whom data must be gathered (Banerjee & Chaudhury, 2010). The population for this study was 42 commercial banks in Kenya, however only 40 banks accepted to participate in the study. The respondents were drawn from finance officers, accountants and other audit staff associated with financial matters of the banks.

3.4 Data Collection

Data collection is a methodical process for gathering and measuring data on relevant variables to answer research questions, testing the hypotheses, and evaluate results (Bhandari, 2020). Data collection enables accurate information to be disseminated (Benson, 2018). Questionnaires were the primary research instruments for this study. A questionnaire is a type of research tool that consists of a series of questions intended to gather data from participants (Mcleod, 2018). The advantages of using questionnaires as an efficient instrument of data collection, according to Zohrabi (2013), include the ability to send questionnaires simultaneously, easily gather data in field sites, provide respondent anonymity, and be time efficient and standard. However, the foreseeable difficulties in such research can include ensuring that questions are clear and

unambiguous, as well as collecting and returning enough questionnaires to allow for meaningful analysis of the collected data (Benson, 2018). To mitigate these difficulties, the researcher will take the necessary steps to reduce the effects to a bare minimum, including ensuring the confidentiality of information gathered and providing respondents with the option of anonymity.

The respondents of this study were the internal auditors, accountants, and finance officers with direct involvement in internal auditing within the banks. The study assumed that every commercial bank has an internal auditing department.

3.6 Data Analysis

To evaluate accuracy and completeness, the surveys collected were sorted. Only adequately filled questionnaires were included. The questionnaires were then coded and entered in the computer. The frequencies, mean, standard deviations, and percentages of the variables were be produced using the descriptive statistical tool. The data was analyzed with the Social Science Statistical Package. Tables, charts, and graphs were used to present the data analyzed.

3.5 Diagnostic Tests

In qualitative research, reliability and generalizability perform minor roles, whereas validity is a driving force for quality research. Validity will be considered if the design of the study fully addresses the research and study objectives (Creswell, 2012). The researcher employed Cronbach's alpha, the most popular internal consistency statistic. It demonstrates how a set of test questions can be used to successfully quantify a single dependent variable (Cronbach, 1951). The preferred value of 0.7 will used as a reliability cut-off.

The focus of reliability is on how well empirical indications support the theoretical idea after two or more tries (Saunders et al., 2012). To guarantee reliability, a pre-defined threshold of 0.7 is needed by Marczyk, DeMatteo & Festinger (2005). This means that values above 0.7 are reliable and below values are unsatisfactory. The alpha of Cronbach mainly assesses the average of all likely reliability coefficients (Bryman and Bell, 2009). A calculated alpha coefficient will be between 1 and 0. Many studies took the recommended level of 0.70 and above and therefore sufficient representation of buildings by the specified indicators is considered (Nachmias & Nachmias, 2000).

Therefore, both reliability and validity in this study was ensured and achieved through checking inaccuracies or missing information at various points in the collection, maintenance, processing, and reporting of data, proper processing and reporting of data, usage of proper sampling procedures to obtain a representative sample, careful selection of standardized data collection instruments.

3.6 Analytical Model

The suitability of the acquired data was examined, after which it was coded and entered SPSS. Tables and charts provided descriptive data such as frequency, mean, standard deviation, and percentage. Three independent factors, namely integrity, cost and time, and adoption problems of IT, were regressed against the impact of IT. To evaluate the relationship and test the hypothesis, the regression model was represented in the following equation.

$Y= \beta 0+ \beta 1 \times 1+ \varepsilon$

Where.

Y = Internal Auditing

$\beta 0$ = Constant (Coefficient of intercept)

$\times 1$ = Information Technology (Blockchain, Cybersecurity, Big Data, and Data Analytics)

ε = error

$\beta 1$, = Regression coefficient of the three variables.

3.6.3 Significance Tests

Chi-square test was used in the investigation. According to Turney (2022), a chi-square test of independence, commonly referred to as a chi-square test of association, should be used to evaluate whether two categorical variables are connected. When two variables are connected, the value of the other variable determines the likelihood of one variable having a specific value. The p value of chi square test was greater than 0.05, confirming the hypothesis that IT has influence on internal auditing processes. The results indicated that the use of information technology influenced internal auditing processes in cost and time reduction and prevention of integrity.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSION

4.1 Introduction

This chapter represents the results of the analysis and findings of the study. The researcher distributed 42 questionnaires to the 42 commercial banks in Kenya. However, 40 questionnaires were completed while the two were rejected. This represents 95.23% response rate. This response is reliable as it exceeds the recommended response rates of at least 60% (Fincham, 2008; Morton et al., 2012). The response rate was considered adequate and representative to allow generalization of the findings.

4.2 Diagnostic and Regression Analysis

4.2.1 Reliability Test

Case Processing Summary

		N	%
Cases	Valid	40	100.0
	Excluded[a]	0	.0
	Total	40	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.748	8

Table 4.1: Cronbach Alpha Test for the study

The reliability test was done using the Cronbach Alpha. The Cronbach Alpha value was found to be 0.748 as shown in Table 4.2 above. This value is within the recommended value of reliability test (0.7 to 0.8) (Taber, 2017).

4.2.2 Correlation Analysis

	Internal Auditing	*Blockchain*	*Cybersecurity*	*Big Data*	*Data Analytics*
Internal Auditing	1				
Blockchain	0.5	1			
Cybersecurity	0.948524971	0.748534767	1		
Big Data	0.777713771	0.933256525	0.936765907	1	
Data Analytics	0.911807773	0.811508918	0.994915913	0.96724713	1

Table 4.2: Correlation Analysis

The correlation results of the study indicate that implementation of technologies in internal auditing improves the auditing functions. Table 4.3 indicates a positive relationship between the variables, with coefficient values ranging from 0.5 to 0.995.

4.3 Presentation of Findings

4.3.1 Demographic Data

The sample size for this study was 42 commercial banks in Kenya as licensed by Central Bank of Kenya. Of the 42 banks, only 40 accepted to participate in the study.

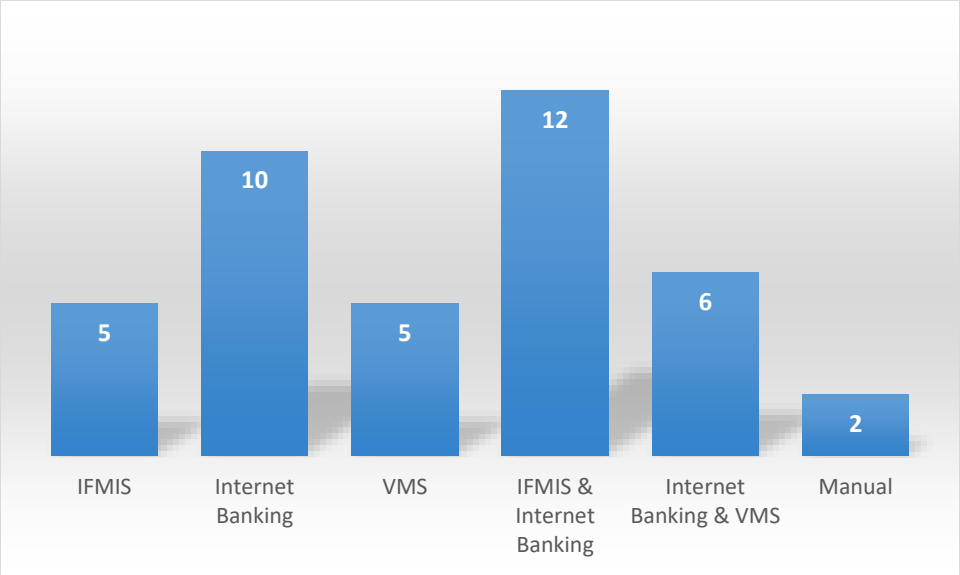

Figure 4.2: Computerized Systems Used in Auditing

Figure 4.1 above shows the type of computerized systems used in the commercial banks. The results indicate that 12 banks use combination of IFMIS & Internet Banking, 10 banks use internet banking system, 6 banks use a combination of Internet banking and VMS, while 5 banks use IFMIS alone. The results also indicate that 2 banks are still using manual processes in auditing processes.

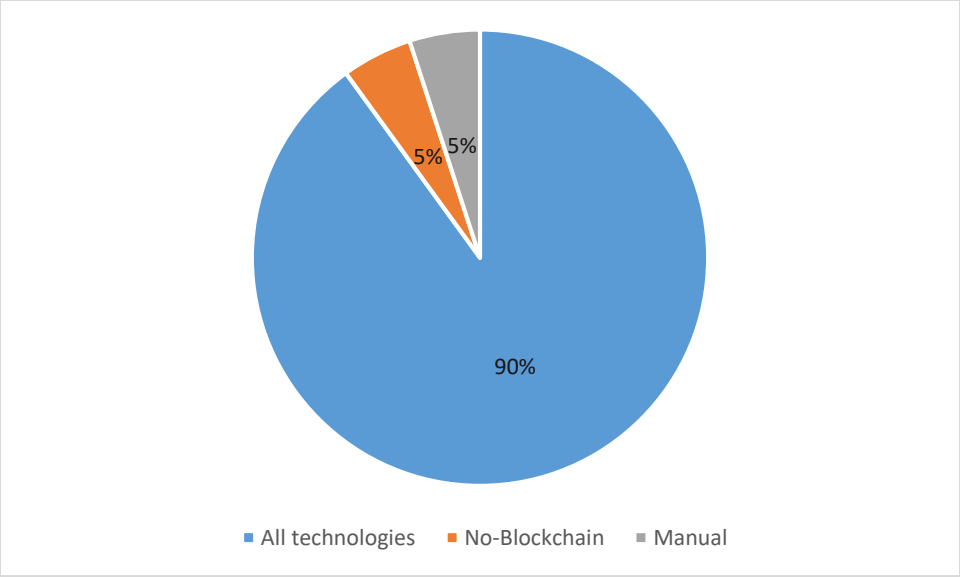

Figure 4.3: Technologies Used

Figure 4.2 indicates that 90% of the banks are familiar with the technologies mostly used in auditing processes. These include block-chain, big data, cybersecurity, and data science and analysis. The 5% of the respondents had no knowledge of block-chain technologies while 5% of the respondents were still using manual processes therefore, they were unfamiliar with the IT technologies in auditing processes.

4.3.2 Effect of IT on Integrity of internal audit processes

Table 4.3: The Effect of IT on Integrity

Statement	N	Mean	Std. Deviation	Variance	Frequency
Instances of fraud in the audit processes in the bank	40	2.00	.000	.000	100
IT has reduced the fraud cases/mistakes in audit processes	40	1.05	.221	.049	95
IT has improved the internal controls that help promote integrity	40	1.05	.221	.049	95
IT helps in strategic decisions of the bank in preventing fraud	40	1.05	.221	.049	95
Data mining methods helps banks detect more subtle signs of fraud	40	1.05	.221	.049	95
The bank uses block-chain technology to prevent fraud in auditing	40	1.23	.423	.179	77.5
IT helps the bank to reduce the likelihood of errors in audit processes	40	1.05	.221	.049	95
The bank uses data analysis tools to prevent fraud	40	1.08	.267	.071	92.5
Valid N (listwise)	40				

Source: Study Findings

The results in Table 4.4 above indicates there were no cases of fraud in the banks in the past five years. The results indicate that IT reduces the fraud cases in audit process. This is indicated by a mean of 1.05 with 95% respondents in agreement. The impact of IT on internal controls had a mean of 1.05 with 95% of the respondents agreeing that it played a vital role in strengthening internal controls in enhancing integrity in audit processes. IT helps in strategic decisions that help in reducing fraud in the banks (mean of 1.05, response rate of 95%). The study also found that data mining methods helped banks to detect subtle signs of fraud (mean of 1.05, response rate of 95%), banks used block-chain technology in auditing processes (mean of 1.23, response rate of 77.5), IT helped auditors in the banks to reduce the likelihood of errors in auditing (mean of 1.05, response rate of 95%), and banks used data analysis tools to detect fraud in auditing processes (mean of 1.08, response rate of 92.5).

4.3.3 Effect of IT on the time of executing audit processes

Table 4.4: Overall Performance of IT Tools in Auditing Process

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Excellent	10	25.0	25.0	25.0
	Great	17	42.5	42.5	67.5
	Good	13	32.5	32.5	100.0
	Total	40	100.0	100.0	

Source: Study Findings

Table 4.5 indicates the overall performance of IT tools in auditing processes. The results indicate that 25% of the respondents confirmed that the performance was excellent, 42.5% confirmed it was great while 32.5 confirmed the performance of IT tools was good.

Table 4.5: Effect of IT on execution time and costs

Statement	N	Mean	Std. Deviation	Variance	Frequency
IT networks and computer systems reduce lead time	40	1.00	.000	.000	100.0
IT has increased the overall efficiency and accuracy in the audit processes	40	1.05	.221	.049	95.0
Computerized audit saves time and costs incurred in manual processes	40	1.05	.221	.049	95.0
Banks use IT tools to generate reports and financial statements	40	1.05	.221	.049	95.0
Computerized systems ease the process of monitoring transactions in the bank	40	1.05	.221	.049	95.0
With technology, audit department is better equipped to complete its audit plan	40	1.05	.221	.049	95.0
Computerized systems help auditors to produce documentation and evidence within time	40	1.10	.304	.092	90
Valid N (listwise)	40				

Source: Study Findings

Table 4.6 above shows that IT has a positive impact on the execution costs and time of the audit processes. The results indicate, computerized systems; reduce lead time (mean of 1.00, acceptability at 100%); increases the overall efficiency and accuracy (mean of 1.05, acceptability

at 95%); saves time and costs incurred in manual processes (mean of 1.05, acceptability at 95%); helps to generate reports and financial statements faster (mean of 1.05, acceptability at 95%); makes monitoring of transactions easier(mean of 1.05, acceptability at 95%); helps audit department to complete audit plan within time (mean of 1.05, acceptability); and helps auditors to produce documentation and evidence within time (mean of 1.10, acceptability at 90%).

4.3.4 Effect of IT on the Cost of Audit Processes

Table 4.6: Cost of Acquiring and Implementing CAATs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cheap	20	50.0	50.0	50.0
	Expensive	18	45.0	45.0	95.0
	Very Expensive	2	5.0	5.0	100.0
	Total	40	100.0	100.0	

Source: Study Findings

Table 4.7 indicates that majority respondents (50%) agreed that acquisition and implementation of CAATs was cheap compared to using manual processes. 18% of the respondents said it was expensive while 5% of the respondents confirmed that acquiring CAATs is very expensive compared to using manual processes in auditing.

Table 4.7: Effect of IT on the cost of audit processes

Statement	N	Mean	Std. Deviation	Variance	Frequency
Banks save the cost of using manual processes	40	1.08	.267	.071	92.5
IT reduces the cost of hiring external auditors	40	1.10	.304	.092	90
Use of IT ensures continuous compliance	40	1.05	.221	.049	95
Updating of IT tools is costly	40	1.25	.439	.192	75
Valid N (listwise)	40				

Source: Study Findings

Table 4.8 above indicates that use of IT enables the banks to save on the cost of using manual processes (mean of 1.08, acceptability at 92.5%), it reduces the cost of hiring external auditors (mean of 1.10, acceptability at 90%) and it ensures continuous compliance thereby saving the banks on the cost of implementing new compliance procedures as it is the case in manual processes. The results also indicate the required updating of IT applications is costly (mean of 1.25, acceptability of 75%).

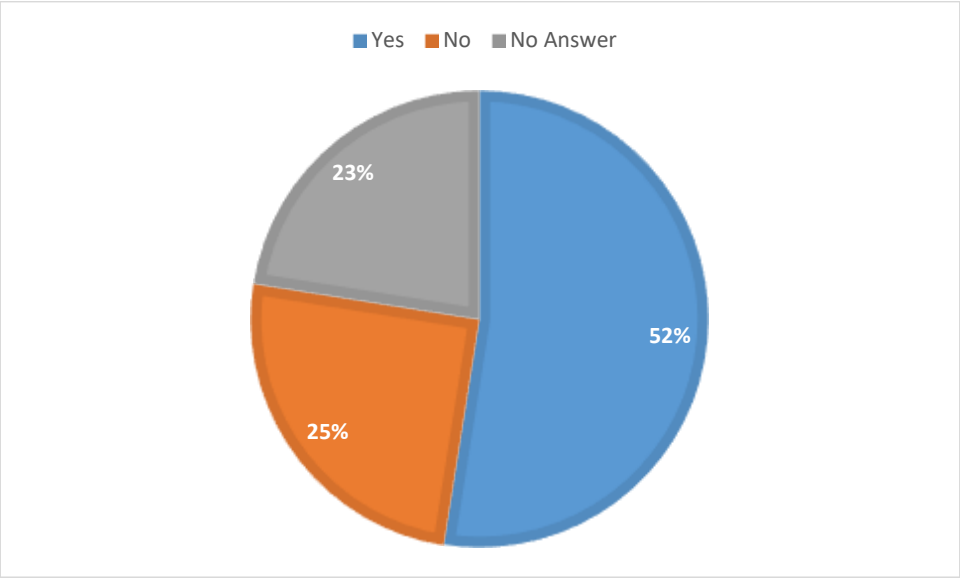

Figure 4.4: IT use has saved the bank some costs

Figure 4.3 above shows that 52% of the respondents agreed, that the use of IT tools in auditing processes has saved their respective banks certain amount of money, while 25% indicated there no costs had been saved. The 23% of the respondents declined to respond to the question citing that the information required was confidential as indicated by their bank's rules and regulations.

4.3.5 Regression Analysis of Variables

Regression Statistics	
Multiple R	0.424799031
R Square	0.180423152
Adjusted R Square	0.086310836
Standard Error	0.580810012
Observations	40

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.416	.199		22.196	.000	4.012	4.820
	Blockchain	.159	.142	.366	1.117	.271	-.130	.448
	Cybersecurity	.081	.190	.221	.427	.672	-.305	.468
	Big Data	-.246	.167	-.789	-1.475	.149	-.584	.092
	Data Analytics	-.055	.164	-.129	-.339	.737	-.388	.277

a. Dependent Variable: Internal Auditing

Table 4.8: Regression Analysis

Table 4.9 indicates the regression results of the study variables. The results indicate that implementation of the information technology (block-chain, cybersecurity, big data, and data analytics) will explain 42% efficiency in the execution of internal audit processes, through enhancing integrity and reducing the time and cost that would have been incurred on manual processes.

4.4 Interpretation and Discussion of the Results

This section provides the interpretation and discussion of the findings in relation to the objectives of the study.

4.4.1 Effect of IT on Integrity of Internal Auditing Processes

The results of this study indicate that IT plays a vital role in ensuring the integrity of auditing processes. The implementation of computerized systems reduces the fraud cases and mistakes in audit processes. According to the respondents, this is achieved through: provision of accurate, timely and complete information including accounting records to the management; provision of sufficient and appropriate audit evidence; IT is used to monitor auditors; and reduction of scopes of misunderstanding and blame game among audit members.

IT improves the internal controls that help promote integrity. The respondents indicated that IT helped strengthen internal controls through provision of value-added services to the management and board of directors by detecting and correcting any weaknesses in audit process before external audit can be done. IT helps the banks to supervise and control financial management to prevent fraud. IT helps the bank in developing strategic decisions meant to enhance integrity. This is achieved in different ways. One of the respondents indicated.

"*They (the management team) have introduced machine learning algorithm that can decipher the data and learn from it, and this helps them in preventing such fraudulent attacks in future"*

Another respondent said.

"IT helps the managers to make decisions faster and more efficiently as all the information is available"

The use of IT also helps the bank to detect more subtle signs of fraud with high levels of accuracy. The results also indicated that banks used data analysis and block-chain technologies to prevent fraud. The findings of this study confirm to the findings of Zakiah et al. (2022) who established that implementing a computerized system in auditing processes improves fraud prevention. The study also confirms the results of Alzakwani & Matriano (2021) who indicates that the use of IT tools can reduce errors and increase the efficiency of operations. In addition, the use of IT strengthens internal control which is needed in operational activities to maintain organizational stability and performance in a company and is expected to reduce the deviant actions taken by employees who are responsible for carrying out the process accounting and preparing financial statements (Supriati et al., 2020).

Data analysis tools also helped in promoting integrity as they were used to: Machine learning tools to predict fraud; data modification in the system to filter our unnecessary data and errors; tracking specific account balances, comparison of data from different reports for accuracy; and assessment and verification of accounts.

4.4.2 Effect of on the time of executing audit processes

The study findings indicate that the use of IT has a positive influence on time execution of audit processes. Generally, the study has shown that the use of IT provides an excellent performance of audit tasks within banks. The use of IT also improves the overall efficiency and accuracy in the audit processes. IT promotes transparency during auditing which improved efficiency and accuracy.

IT saves time and costs incurred in manual processes, helps in generating reports and financial reports and helps the banks to monitor transaction flow easily. The use of IT helps the bank to complete its audit plan in a timely manner and produce documentation and evidence faster, thereby saving time and money that would have rather been used on manual processes.

The study indicates that the use of IT tools makes the audit process easier, faster, and accurate. One of the respondents indicated.

"Auditing process becomes easier and more effective with IT"

Another respondent said.

"IT improves on accuracy of data and reduce duplication of reports"

Another respondent added.

"Monitoring helps banks to automatically spot suspicious transactions and act upon it faster"

4.4.3 Effect of IT on the Cost of Audit Processes

The findings of this study indicate that the use of IT plays a vital role on the cost. The study indicates that IT saves on the cost that would have been incurred on manual processes, reduces the cost of hiring external auditors, and ensures compliance to the current standards of auditing the study also indicates, despite the numerous benefits of its systems, the cost of acquiring and updating the applications is high, therefore may scare away companies in venturing into such systems.

These findings confirm to the findings of Madhar & Almaktoomi (2022) who found that auditors improved their ability to analyze systems and information and managed their tasks more effectively by seeking new uses for computers and communications. The productivity of the auditor, as well as the audit functions, improved by using automated techniques, thereby saving the organizations costs incurred on manual processes.

CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATION

5.1 Introduction

This chapter provides the summary, conclusion and recommendations as observed from the findings.

5.2 Summary of Findings

Most of the respondents confirmed that the implementation of IT in internal auditing processes played a vital role in promoting integrity of audit processes. The use IT promotes integrity of audit processes through strengthening internal controls, supervision, and control of financial management, influence strategic decisions, and reduction of errors in audit processes.

The study indicates that IT reduces the time and costs incurred in manual processes. Using IT, auditors generate reports faster and at a cheaper cost, reduces the likelihood of errors in auditing processes, and saves on the cost of hiring external auditors. In general, the combination of blockchain technology, big data, data science and analysis and cyber security ensures smooth, effective, accurate and transparent audit processes.

5.3 Conclusions

The study assessed the effect of IT on internal auditing in commercial banks in Kenya. The findings of the study indicates that acquisition and implementation of IT technologies and systems is essential to ensure a smooth, transparent, and faster internal auditing process in the banks. Data analytics gives practitioners the ability to analyze an entire data for anomalies, trends, and areas of risk. With the implementation of technology in internal controls, processing errors are reduced as the human element is removed. Block-chain enables the auditors in examining certain transactions and verifying the existence of digital assets and verifying the consistency between the information on a blockchain and the real world. However, despite the numerous benefits of implementing IT, the cost of acquisition and continuous updating of IT applications is costly. These costs have made some banks to minimize the usage of IT, while some have opted for manual processes.

5.4 Recommendation

Based on the findings of the study, the following recommendations are made.

- The policy makers need to review the cost of CAATs tools to make them affordable for all organizations.
- Private organizations need to develop educational programs and trainings aimed at educating the auditors on the use of IT in auditing processes.
- Further studies need to be carried out in the private companies in Kenya to provide deeper understanding of the impact of IT on internal auditing.

REFERENCES

Abu-Musa, A. A. (2008). Information technology and its implications for internal auditing: An empirical study of Saudi organizations. *Managerial Auditing Journal*.

Account learning. (2020, December 18). *Advantages and Disadvantages of Sampling*. Account learning | Contents for Management Studies |. https://accountlearning.com/advantages-and-disadvantages-of-sampling/

Adams, M. B. (1994). Agency Theory and the Internal Audit. *Managerial Auditing Journal*, *9*(8), 8–12. https://doi.org/10.1108/02686909410071133

Advani, V. (2021, June 9). *What is Artificial Intelligence? How does AI work, Types and Future of it?* Great Learning Blog: Free Resources What Matters to Shape Your Career! https://www.mygreatlearning.com/blog/what-is-artificial-intelligence/

Aggarwal, R., & Ranganathan, P. (2019). Study designs: Part 2 – Descriptive studies. *Perspectives in Clinical Research*, *10*(1), 34. NCBI. https://doi.org/10.4103/picr.picr_154_18

Agravante, M. (2019, March 2). *What Is the Meaning of Variables in Research?* Sciencing. https://sciencing.com/meaning-variables-research-6164255.html

Ahmi, A. (2016). IT Adoption by Internal Auditors in Malaysian Public Sector: A Preliminary Finding. *European Proceedings of Social & Behavioral Sciences*. https://doi.org/10.15405/epsbs.2016.08.94

AKINLEYE, G. T., & OLANIPEKUN, C. T. (2019). Effects of Information Technology (IT) on Internal Audit in Southwest Nigeria Universities. *Journal of Economics and Behavioral Studies*, *11*(1(J)), 22–26. https://doi.org/10.22610/jebs.v11i1(j).2742

Akinleye, G. T., & Olanipekun, C. T. (2019). Effects of Information Technology (IT) on Internal Audit in Southwest Nigeria Universities. *Journal of economics and behavioral studies*, *11*(1 (J)), 22-26.

Alzakwani, A., & Matriano, M. (2021). The Impact of Internal Control through Computerized Accounting System among Small and Medium Enterprises in Oman. *International Journal of Research in Entrepreneurship & Business Studies*, *2*(3), 65–74. https://doi.org/10.47259/ijrebs.237

Ang, M. C., Ramayah, T., & Amin, H. (2015). A theory of planned behavior perspective on hiring Malaysians with disabilities. *Equality, Diversity and Inclusion: An International Journal*.

Banerjee, A., & Chaudhury, S. (2010). Statistics without tears: Populations and samples. *Industrial Psychiatry Journal*, *19*(1), 60–65. https://doi.org/10.4103/0972-6748.77642

Banker, R. D., Chang, H., & Kao, Y. C. (2002). Impact of information technology on public accounting firm productivity. *Journal of information systems*, *16*(2), 209-222.

Benson, M. T. (2018). *Entrepreneurial Factors Influencing Performance of Small and Medium Enterprises in Ongata Rongai Town, Kajiado County, Kenya* (Doctoral dissertation, JKUAT-COHRED).

Bhandari, P. (2020, July 30). *An introduction to qualitative research*. Scribbr. https://www.scribbr.com/methodology/qualitative-research/

Bhandari, P. (2020, June 5). *Data Collection | A Step-by-Step Guide with Methods and Examples*. Scribbr. https://www.scribbr.com/methodology/data-collection/

Bhandari, P. (2021, February 15). *An introduction to quantitative research*. Scribbr. https://www.scribbr.com/methodology/quantitative-research/

Bota-Avram, C., Popa, I., & Stefanescu, C. (2011). Methods of measuring the performance of internal audit. *The USV Annals of Economics and Public Administration*, *10*(3), 137-146.

Brown, T. (2021, March 12). *What Is Information Technology? A Story of Evolution*. IT Chronicles. https://itchronicles.com/it/what-is-information-technology-a-story-of-evolution/

Bryman, A., & Bell, E. (2011). *Business Research Methods. Third Edition*. New York: Oxford University Press

Castagna, R., & Bigelow, S. J. (2021, February 12). *information technology (IT)*. Search Datacenter. https://searchdatacenter.techtarget.com/definition/IT

Changwony, M. K., & Rotich, G. (2015). Role of internal audit function in promoting effective corporate governance of commercial banks in Kenya. *International Journal of Business &Law Research, 3*(1), 15-33.

Chen, J. (2020, May 24). *Agency Problem*. Investopedia. https://www.investopedia.com/terms/a/agencyproblem.asp

Chepkorir, L. (2010). *The roles and challenges of internal auditing in the banking industry in Kenya* (Doctoral dissertation, University of University).

Cherry, K. (2020). *Independent Variable in Psychology Experiments*. Very well Mind. https://www.verywellmind.com/what-is-the-independent-variable-2795278

Cherry, K. (2021). *Why the Dependent Variable Is So Important to Valid Experiments*? Very well Mind. https://www.verywellmind.com/what-is-a-dependent-variable-2795099

Christina, C. (2019, June 10). *8 Major Impacts of Information Technology on Businesses*. Kivo Daily. https://www.kivodaily.com/technology/8-major-impacts-of-information-technology-on-businesses/

Clarke, I. (2019, January 29). *What is Internal Audit? Types, Value, Process & Standards*. Linford & Company LLP. https://linfordco.com/blog/what-is-internal-audit/

Colthart, J. (2019, May 17). *How Real Firms are Using AI for Audit*. Accounting WEB. https://www.accountingweb.com/technology/trends/how-real-firms-are-using-ai-for-audit

Cooper, D. R. & Schindler, P. S. (2014). *Business research methods* (12thed). New York, NY. McGraw-Hill/Irwin.

Corporate Finance Institute. (2015). *Diffusion of Innovation - Definition, Rationale and Adopter Categories*. Corporate Finance Institute. https://corporatefinanceinstitute.com/resources/knowledge/other/diffusion-of-innovation/

Corporate Finance Institute. (2021, January 6). *Auditing*. https://corporatefinanceinstitute.com/resources/knowledge/accounting/what-is-an-audit/

Creswell John, W. (2012). Educational Research: Planning, conducting, and evaluating quantitative and qualitative research. *published by Pearson Education, Inc*.

Cronbach, L. J. (1951). 'Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334 *Cultural Change*. San Francisco: Jossey Bass Publishers

Crossman, A. (2019). *How Intervening Variables Work in Sociology*. ThoughtCo. https://www.thoughtco.com/intervening-variable-3026367

Deloitte. (2018, August 21). *Blockchain and its potential impact on the audit profession*. Deloitte South Africa. https://www2.deloitte.com/za/en/pages/audit/articles/impact-of-blockchain-in-accounting.html#:%7E:text=Blockchain%20technology%20has%20the%20potential,financial%20reporting%20and%20tax%20preparation.

Depersio, G. (2018). *The Advantages of Using Simple Random Sample to Study Larger Populations*.Investopedia. https://www.investopedia.com/ask/answers/042915/what-are-advantages-using-simple-random-sample-study-larger-population.asp

EAC. (2022). *Banking*. Www.eac.int. https://www.eac.int/financial/banking

Edurev. (2018, January 31). *Benefit Of Computerized Audit, Recent Trend or Current Issues - Auditing & Secretarial Practice B Com Notes | EduRev*. EDUREV.IN. https://edurev.in/studytube/Benefit-Of-Computerized-Audit--Recent-Trend-or-Cur/

Euromoney. (2020). *Blockchain Explained: What is blockchain? | Euromoney Learning*. https://www.euromoney.com/learning/blockchain-explained/what-is-blockchain

Fincham, J. E. (2008). Response rates and responsiveness for surveys, standards, and the Journal. *American Journal of Pharmaceutical Education, 72*(2), 43. https://doi.org/10.5688/aj720243

Fitrawansyah, STIE Pertiwi, Bekasi Indonesia, & Pdjajaran University. (2015). The Roles of Information Technology in Accounting Information System Audit. *Research Journal of Finance and Accounting*, *6*(9), 1. https://iiste.org/Journals/index.php/RJFA

Francis, A. (2018, June 7). *Audit Theories – Theories of Demand for Audit*. MBA Knowledge Base. https://www.mbaknol.com/business-finance/audit-theories-theories-of-demand-for-audit

Frankenfield, J. (2021). *How Artificial Intelligence Works*. Investopedia. https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp

Ghasemi, M., Shafeiepour, V., Aslani, M., & Barvayeh, E. (2011). The impact of Information Technology (IT) on modern accounting systems. *Procedia-Social and Behavioral Sciences*, *28*, 112-116.

Gikonyo, N. G., & Mutiso, A. (2020). Effect of Management Information Systems on the Effectiveness of Internal Audit in the Public Sector in Kenya.

Gohavacy, G. (2020, April 3). *EMPIRICAL LITERATURE REVIEW MEANING IN RESEARCH WRITING*. Gohavacyf. https://gohavacyf.wordpress.com/2020/04/03/empirical-literature-review-meaning-in-research-writing/

Harrison. M. J, Datta. P., (2007). An empirical assessment of user perceptions of feature versus application-level usage. *Communications Association Information Systems*. 20: 300 321 http://www.academicjournals.org/journal/AJBM/article-full-text pdf/38E587161500.html

Health Knowledge. (2018, August 20). *Methods of sampling from a population*. https://www.healthknowledge.org.uk/public-health-textbook/research-methods/1a-epidemiology/methods-of-sampling-population#:

Heathfield, S. M. (2021). *What Is Integrity?* The Balance Careers. https://www.thebalancecareers.com/what-is-integrity-really-1917676

Howard, T. W. (2020). *Sampling Frame - an overview | ScienceDirect Topics*. ScienceDirect. https://www.sciencedirect.com/topics/computer-science/sampling-frame

IBM India. (2020). *Big Data Analytics*. India | IBM. https://www.ibm.com/in-en/analytics/hadoop/big-data-analytics

ICAEW. (2017). *Understanding the impact of technology in audit and finance*. The Institute of Chartered Accountants in England and Wales. https://www.icaew.com/-/media/corporate/files/middle-east-hub/understanding-the-impact-of-technology-in-audit-and-finance.ashx

IFAC. (2020, November 4). *Roles and Importance of Professional Accountants in Business*. https://www.ifac.org/about-ifac/professional-accountants-business/news-events/2013-10/roles-and-importance-professional-accountants-business

IFAC. (2021). *INTERNATIONAL STANDARD ON AUDITING 315*. International Federation of Accountants. https://www.ifac.org/system/files/downloads/a017-2010-iaasb-handbook-isa-315.pdf

IIA Kenya. (2020). *Code of Ethics*. The Institute of Internal Auditors, Kenya. http://www.iiakenya.co.ke/index.php/39-standards-sub/112-code-of-ethics

IIA N. America. (2021). *Pages - Code of Ethics*. The Institute of Internal Auditors, North America. https://na.theiia.org/standards-guidance/mandatory-guidance/Pages/Code-of-Ethics.aspx

IIA. (2012). *About Internal Auditing*. The Institute of Internal Auditors. https://global.theiia.org/about/about-internal-auditing/Pages/About-Internal-Auditing.aspx

IIA. (2017). *Artificial Intelligence: The Future for Internal Auditing*. The Institute of Internal Auditors. https://global.theiia.org/knowledge/Public%20Documents/Tone-at-the-Top-December-2017.pdf

Indeed. (2021). *Integrity: Definition and Examples*. Indeed, Career Guide. https://www.indeed.com/career-advice/career-development/integrity-at-work

James L. Bierstaker. J. L, Burnaby. P, Thibodeau. J, (2001). *The impact of information technology on the audit process:* an assessment of the state of the art and implications for the future URL: http://www.emeraldinsight.com/Insight/Articles/0382201206.html

Jayalakshmy R, Seetharaman A, Khong. T. W (2005). The changing role of the auditors. URL: http://www.emeraldinsight.com/Insight/Articles/057785604.html

Johnson, R. B., Onwuegbuzie, A. J., & Turner, L. A. (2007). Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research*, *1*(2), 112–133. https://doi.org/10.1177/1558689806298224

Juergens, M. (2016). *Top Ten Information Technology (IT) Internal Audit Issues - 2016*. The International Institute of Auditors. https://chapters.theiia.org/san-francisco/ChapterDocuments/2820751%20Top%2010%20Information%20%20Technology%20(IT)%20Audit%20Issues%202016%20(1).pdf

KAMIL, O. A., & NASHAT, N. M. (2017). The Impact of Information Technology on the Auditing Profession-Analytical Study. *International Review of Management and Business Research*, *6*(4), 1. https://www.irmbrjournal.com/papers/1513071494.pdf

Kaspersky. (2021, April 26). *What is Cyber Security?* Www.Kaspersky.Com. https://www.kaspersky.com/resource-center/definitions/what-is-cyber-security

Kim. H. J, Mannino M, Nieschwietz. R. J (2009). Information technology acceptance in the internal audit profession: Impact of technology features and complexity. *Int. J. Accounting Inf. Syst*. 10(4): 214 228

KLR. (2016). *How has Technology Improved the Audit Process?* https://kahnlitwin.com/blogs/business-blog/how-has-technology-improved-the-audit-process

Kombo, B. (2013). *The effects of computerized accounting system on auditing process: A case study of Mtwara distrIT council (mdc)* (Doctoral dissertation, Mzumbe University).

Kothari, C. R., & Garg, G. (2014). *Research methodology methods and techniques* (3rded.). New Dellhi: New Age International (P) Ltd.

Kuenkaikaew, S., & Vasarhelyi, M. A. (2013). The PredITive Audit Framework. *The International Journal of Digital Accounting Research*, *13*, pp. 37-71.

Lacoma, T. (2016, October 26). *Auditing Methodology Cost & Time*. Small Business - Chron.Com. https://smallbusiness.chron.com/auditing-methodology-cost-time-25512.html

LaMorte, W. (2019). *Diffusion of Innovation Theory*. Sphweb.bumc.bu.edu; Boston University School of Public Health. https://sphweb.bumc.bu.edu/otlt/MPH-Modules/SB/BehavioralChangeTheories/BehavioralChangeTheories4.html

Libguides. (2021a). *Research Guides: Organizing Your Social Sciences Research Paper: Quantitative Methods*. Libquides.Usc. Edu. https://libguides.usc.edu/writingguide/quantitative

Libguides. (2021b). *Research Guides: Organizing Your Social Sciences Research Paper: Types of Research Designs*. Libguides.Usc. Edu. https://libguides.usc.edu/writingguide/researchdesigns

Lindsay, J. B., Doutt, A., & Ide, C. (2019). *Emerging Technologies, Risk, and the Auditor's Focus*. Harvard Law School Forum on Corporate Governance. https://corpgov.law.harvard.edu/2019/07/08/emerging-technologies-risk-and-the-auditors-focus/#1

Liu, M., Wu, K., & Xu, J. J. (2019). How Will Blockchain Technology Impact Auditing and Accounting: Permissionless versus Permissioned Blockchain. *Current Issues in Auditing*, *13*(2), A19–A29. https://doi.org/10.2308/ciia-52540

Lotto, J. (2014). Examining the impact of information technology on internal auditing effectiveness in Tanzanian organizations. 2. 13-23.

Madhar, M. A., & Almaktoomi, I. (2022). The Impact of Information Technology on Internal Auditing and Customers' Perception on Banking Transactions: A case study on National Bank of Oman. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4198852

Mahdi, S., & Reza, H. (2011). A study of the effect of information technology on internal auditing: Some Iranian evidence. *African Journal of Business Management*, *5*(15),6168-6178.

Maina, B. (2013). *The impact of information technology on internal auditing*. Academia. https://www.academia.edu/22799466/The_impact_of_information_technology_on_internal_auditing

Maruping, L. M., Bala, H., Venkatesh, V., & Brown, S. A. (2017). Going beyond intention: Integrating behavioral expectation into the unified theory ofacceptance and use of technology. *Journal of the Association for Information Science and Technology*, *68*(3), 623-637.

McCafferty, J. (2018, March 28). *Research Finds Internal Audit Lags in Tech Adoption: Here's Why - Page 2 of 3*. Internal Audit 360. https://internalaudit360.com/research-finds-internal-audit-lagging-in-tech-adoption-heres-why/2/

McCafferty, J. (2019, December 13). *Survey Identifies Top Tech Challenges for IT Auditors*. Internal Audit 360. https://internalaudit360.com/survey-identifies-top-tech-challenges-for-it-auditors/

McCombes, S. (2019, May 15). *Descriptive research design | definition, methods, and examples*. Scribbr. https://www.scribbr.com/methodology/descriptive-research/

Mcleod, S. (2018, February 2). *Questionnaire: Definition, Examples, Design and Types*. Simply Psychology. https://www.simplypsychology.org/questionnaires.html

McVaugh, J., & Schiavone, F. (2010). Limits to the diffusion of innovation. *European Journal of Innovation Management*, *13*(2), 197–221. https://doi.org/10.1108/14601061011040258

Meyyappan, G., & Lee, H. S. (2011). The impact of information technology on internal auditing. *African Journal of Business Management*, *5*(9), 3523-3539.

Michael, S., Lewis-Beck, Bryman, A., & Liao, T. F. (2004). Sampling Frame. *The SAGE Encyclopedia of Social Science Research Methods*. Published. https://doi.org/10.4135/9781412950589.n884

Moorthy, M. & Seetharaman, A. & Mohamed, Zulkifflee & Gopalan, Meyyappan & San, Lee. (2011). The Impact of Information Technology on Internal Auditing. South African Journal of Business Management. 5. 3523-3539. 10.5897/AJBM10.1047.

Moorthy, M. K., Seetharaman, A., Mohamed, Z., Gopalan, M., & San, L. H. (2011). The impact of information technology on internal auditing. *African Journal of Business Management*,5(9), 3523-3539.

Morton, S. M. B., Bandara, D. K., Robinson, E. M., & Carr, P. E. A. (2012). In the 21stCentury, what is an acceptable response rate? *Australian and New Zealand Journal of Public Health*, *36*(2), 106–108. https://doi.org/10.1111/j.1753-6405.2012.00854.x

Mugenda, M. &. Mugenda (2008). Research Methods: Qualitative and Quantitative approaches. Nairobi: Act Press

Ngugi, G. G. (2020). *Determinants of internal audit and its effectiveness in the public sector in Kenya: A case of the national treasury* (Doctoral dissertation, Africa Nazarene University).

Nicholas, T. A. (2019, June 10). *Information Technology And Internal Auditing - Information Technology And Internal Auditing*. Medium. https://medium.com/information-technology-and-internal-auditing/https-medium-com-it-and-internal-auditing-taremwa256-7982e3a3456b

Oginga, M. G. (2013). *The effect of adoption of computerized auditing on audit quality in Kenya* (Doctoral dissertation, University of Nairobi,).

Oginga, M. G. (2013). *The effect of adoption of computerized auditing on audit quality in Kenya* (Doctoral dissertation, University of Nairobi,).

Omulele, E., Kamau, I., & Maelo, M. (2022). *Banking Laws and Regulations | Kenya | GLI*. GLI - Global Legal Insights - International Legal Business Solutions.

https://www.globallegalinsights.com/practice-areas/banking-and-finance-laws-and-regulations/kenya

ORI. (n.d.). *Data Collection*. Responsible Conduct of Research, INU. https://ori.hhs.gov/education/products/n_illinois_u/datamanagement/dctopic.html

Otoko, B. O. (2016). *Effect of Computerized Accounting Systems on Risk Based Internal Auditing in Homa Bay County Government, Kenya* (Doctoral dissertation, University of Nairobi).

Oyaro, T. (2016, June 9). *Changes in the requirements for Auditing of Companies' Financial Statements*. CFL Advocates. https://cfllegal.com/audit-requirements-under-the-companies-act-june-2016/

PCAOB. (2010a). *AU 312 Audit Risk and Materiality in Conducting an Audit*. Public Company Accounting Oversight Board. https://pcaobus.org/oversight/standards/auditing-standards/details/AU312

PCAOB. (2010b). *AU 319 Consideration of Internal Control in a Financial Statement Audit*. Public Company Accounting Oversight Board. https://pcaobus.org/oversight/standards/archived-standards/details/AU319

PCAOB. (2019). *AS 1210: Using the Work of an Auditor-Engaged Specialist*. Public Company Accounting Oversight Board. https://pcaobus.org/oversight/standards/auditing-standards/details/AS1210

Qureshi, M. A. (2020). *Auditing Emerging Technologies*. ISACA. https://www.isaca.org/resources/isaca-journal/issues/2020/volume-2/auditing-emerging-technologies

Ravitch, & Reagan. (2016). *Conceptual Framework in Research*. Sagepub.Com. https://us.sagepub.com/sites/default/files/upm-assets/110533_book_item_110533.pdf

Salehi, M., & Husini, R. (2011). *A study of the effect of information technology on internal auditing: Some Iranian evidence*. Academic Journals. https://academicjournals.org/article/article1380368033_Salehi%20and%20Husini.pdf

Santa Clara University. (1998). *Consistency and Ethics*. Markkula Center for Applied Ethics. https://www.scu.edu/ethics/ethics-resources/ethical-decision-making/consistency-and-ethics/

Sanusi, F. A., & Hassan, H. (2015). Evaluation of information technology impact on effective internal control in the University system. *AIP Conference Proceedings*, *1691*(1), 1. https://doi.org/10.1063/1.4937086

Saunders, M., Lewis, P. &Thornhill, A. (2012). *Research Methods for Business Students* 6th ed. Pearson Education Limited

Scheck, S. (2021, April 27). *8 Major Impacts of Information Technology on Businesses*. Tweak Your Biz. https://tweakyourbiz.com/technology/8-major-impacts-of-information-technology-on-businesses

Scherer, T. (2020, August 29). *Benefits of Internal Auditing*. Reciprocity. https://reciprocitylabs.com/6-benefits-of-internal-auditing/

Shan, Y., & King, K. W. (2015). The effects of interpersonal tie strength and subjective norms on consumers' brand-related eWOM referral intentions. *Journal of Interactive Advertising*, *15*(1), 16-27.

Staciokas R, Rupsys R (2005) Internal Audit and its Role in Organizational Government. URL: http://www.ktu.lt/en/science/journals/econo/infaut038.html

Supriati, D., Ristiyani, R., & Bawono, I. R. (2020). The Effect of Information Technology and Internal Control of Accounting Fraud (Case Study at PT. Sugih Makmur Eka Industri Indonesia). *Proceedings of the Annual International Conference on Accounting Research (AICAR 2019)*. https://doi.org/10.2991/aebmr.k.200309.025

Swaen, B. (2021, March 8). *Constructing a conceptual framework*. Scribbr. https://www.scribbr.com/dissertation/conceptual-framework/

Tabuena, J. (2012). *What Every Internal Auditor Should Know About Big Data*. Compliance Week. https://www.complianceweek.com/what-every-internal-auditor-should-know-about-big-data/15849.article.

Teammate Customers Service. (2020, September 10). *How data analytics helps internal audit evolve*. Wolters Kluwer. https://www.wolterskluwer.com/en/expert-insights/how-data-analytics-helps-internal-audit-evolve

technology: Toward a unified view. *MIS quarterly*, 425-478.

Theorizeit. (2011). *Unified theory of acceptance and use of technology - IS Theory*. Theorizeit.Org. https://is.theorizeit.org/wiki/Unified_theory_of_acceptance_and_use_of_technology

Thomas, L. (2020, October 2). *An introduction to simple random sampling*. Scribbr. https://www.scribbr.com/methodology/simple-random-sampling/

Tongren, J. (1997). Coactive audit: the enhancement audit model", *Managerial Finance*, 23 (12) pp. 44-51.

Touvila, A. (2020). *Internal Audit Definition*. Investopedia. https://www.investopedia.com/terms/i/internalaudit.asp.

Tucker. G. H (2001) IT and the Audit. URL: http://www.aicpa.org/pubs/jofa/sept2001/tucker.html

Turney, S. (2022, May 30). *Chi-Square Test of Independence | Formula, Guide & Examples*. Scribbr. https://www.scribbr.com/statistics/chi-square-test-of-independence/

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of

VistaCollege. (2018, December 4). *History of Information Technology and Evolution of IT Jobs*. https://www.vistacollege.edu/blog/careers/history-information-technology-evolution-jobs/

Volosin, E. (2007). *GRIN - The theories of audit expectations and the expectations gap*. GRIN Verlag. https://www.grin.com/document/116911

Wisdom, J., & Creswell, J. W. (2013). Mixed methods: integrating quantitative and qualitative data collection and analysis while studying patient-centered medical home models. *Rockville: Agency for Healthcare Research and Quality*.

World Economic Forum. (2020). Tech for Integrity. https://widgets.weforum.org/tech4integrity/index.html

Zakiah, A. N., Agustini, D., & Twinarti, X. (2022). Application of Accounting Information System to Auditor Responsibility in Fraud Prevention. *ASEAN Journal of Economic and Economic Education*, *1*(1), 19–26. https://ejournal.bumipublikasinusantara.id/index.php/ajeee/article/view/79

APPENDICES

Appendix I: Budget

ITEMS	**Amount (Kshs)**
Typing and Printing	**14,500**
Secretarial and Binding services	**13,200**
Data collection and Analysis Costs	**165,000**
Research Assistant	**108,000**
Miscellaneous	**54,000**
Total	**354,700**

Appendix II: Work Plan

Developing Research Proposal								
Defence in the department and corrections								
Defence in the Faculty								
Data collection								
Data analysis								
Final report writing								
Submission of final Report								

Appendix III: Questionnaire

This study's objective is to assess how IT has affected internal auditing in Kenyan commercial banks. Select the best answers to each question to help complete each area as much as you can. Please know that your responses will be handled with the utmost discretion.

Thank you for your participation.

Charles Oluoch

SECTION A: BIO DATA

1. Indicate the name of the bank……..
2. What sort of computerized accounting program does the bank utilize?

   IFMIS [ ] Internet Banking [ ] VMS [ ]
3. Indicate your position in the bank…….
4. Indicate the technologies this bank is familiar with, in relation to auditing processes

   Blockchain [ ]

   Big data [ ]

   Cybersecurity [ ]

   Data science and analysis [ ]

SECTION B: EFFECT OF IT ON INTEGRITY OF INTERNAL AUDIT PROCESSES

1. Has there been any instance(s) of fraud in the audit process in the bank for the past 5 years?

Yes [ ]

No [ ]

If your answer is [Yes], give example (s), else proceed to Q2.

1……..

2……..

3……..

2. Has the implementation of IT reduced the fraud cases/mistakes in audit processes in the bank?

Yes [ ]

No [ ]

Give reason(s) for your answer above:

……

……

……

3. Has the implementation of IT improved the internal controls that help promote integrity in audit processes in the bank?

Yes [ ]

No [ ]

If your answer is [Yes], explain how:

……

……

……

……

4. Explain ways in which this bank uses the accounting system application in supervising and controlling financial management to prevent fraud.

a)……...

……

b)…….

……...

c)……..

……...

5. Does the use of information technology affect the strategic decisions of the bank in preventing fraud in audit processes?

Yes [ ]

No [ ]

Give reason(s) to your answer above:

……

……

……

6. Does the use of data mining methods help the bank detect more subtle signs of fraud with high levels of accuracy?

Yes [ ]

No [ ]

7. Does the bank use blockchain technology in its auditing processes?

Yes [ ]

No [ ]

If [Yes], state ways in which blockchain technology helps the bank prevent fraud in auditing Processes:

a)……..

b)…….

c)…….

d)…….

8. Does IT help the auditors in the bank to reduce the likelihood of errors in audit work and increase the probability of discovery?

Yes [ ]

No [ ]

Give reasons for your answer above:

……..

……..

……..

9. Does this bank use data analysis tools to prevent audit fraud?

Yes [ ]

No [ ]

If [Yes], state ways in which this bank uses data analysis to prevent fraud in audit processes:

a)…….

b)……

c)……

SECTION C: EFFECT OF IT ON THE TIME OF EXECUTING AUDIT PROCESSES

1. Does the use of IT networks and computer systems reduces lead time for accountants in providing financial statements to management in the bank?

Yes [ ]

No [ ]

Give reason for your answer above:

…….

…….

……..

2. How is the overall performance of audit processes when using IT tools

Excellent [ ]

Great [ ]

Good [ ]

Bad [ ]

Give reason(s) for your answer above:

…….

…….

…….

3. Has the use of IT increased overall efficiency and accuracy in the audit processes for this bank?

Yes [ ]

No [ ]

Explain your answer above:

……..

……..

4. Do you agree that the use of computerized audit saves time and cost incurred in manual audit processes?

Yes [ ]

No [ ]

Give reason(s) for your answer above:

……

……

……

5. Does the bank's auditors use IT tools to generate reports and financial statements?

Yes [ ]

No [ ]

If your answer is [Yes], give reasons as to why the bank uses IT to generate reports:

a)……..

b)……..

c)……..

6. Do you find it easy to monitor the bank's transaction flow when using computerized systemss?

Yes [ ]

No [ ]

Give reason(s) for your answer above:

……..

……

……

7. Do you agree that with technology, the bank's audit department is better equipped to complete its audit plan in a timely manner?

Yes [ ]

No [ ]

State the reason for your answer above.

……

……

8. Does the use of computerized systems, help auditors in this bank produce documentation and evidence in just a few clicks, thus, saving time and money for the bank?

Yes [ ]

No [ ]

SECTION D: EFFECT OF IT ON THE COST OF AUDIT PROCESSES

1. What is the cost of acquiring and implementing CAATs compared to manual processes?

Very cheap [ ]

Cheap [ ]

Expensive [ ]

Very expensive [ ]

2. Does this bank save on the audit costs when using IT tools compared to manual audit processes?

Yes [ ]

No [ ]

Give reason(s) for your answer above:

…….

…….

…….

3. Has the use of IT tools in auditing processes in this bank, reduced the cost of hiring external auditors?

Yes [ ]

No [ ]

State the reason for your answer above:

…….

…….

…….

4. Does the use of IT in auditing processes in this bank ensured continuous compliance therefore saving on the cost of implementing new compliance procedures?

Yes [ ]

No [ ]

Explain your answer above:

……

……

……

5. IT tools and applications require continuous updating, which incurs costs. Is the updating of IT tools and applications for auditing processes costly compared to manual processes?

Yes [ ]

No [ ]

Give reason for your answer above:

……

……

……

6. Has this bank saved on the cost of auditing processes since the acquisition and implementation of IT tools and applications in auditing processes?

Yes [ ]

No [ ]

If [Yes], give a rough estimate in **Ksh**, the bank saves on yearly basis.

……