

**EFFECT OF INTERNAL CONTROL SYTEMS ON FRAUD DETECTION  
IN BANKING INDUSTRY IN KENYA**


**BY  
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## DECLARATION

I declare that this project is my original work and has not been presented to any other university for the award of a degree or for any other purpose.

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## **DEDICATION**

I dedicate this project wholeheartedly to my beloved parents and family, whose unwavering love and steadfast support have been the guiding lights illuminating my path as I navigated the challenging journey of balancing academic pursuits and professional responsibilities. Their encouragement, sacrifices, and understanding have been the pillars that upheld me during the moments of intense study and demanding work. Their belief in my aspirations fuelled my determination, and their selfless commitment has been the foundation upon which I've built this project. With profound gratitude, I acknowledge the invaluable role they've played in my success, and I present this endeavour as a testament to the profound impact of their love and encouragement on my journey.

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## LIST OF ABBREVIATIONS

<b>ACFE</b>	Association of Certified Fraud Examiners
<b>ANOVA</b>	Analysis of Variance
<b>CBK</b>	Central Bank of Kenya
<b>COSO</b>	Committee of Sponsoring Organizations
<b>FN</b>	False Negatives
<b>IT</b>	Information Technology
<b>KBA</b>	Kenya Bankers Association
<b>KPMG</b>	Klynveld Peat Marwick Goerdeler
<b>NSE</b>	Nairobi Stock Exchange
<b>OLS</b>	Ordinary Least Squares
<b>SME</b>	Structural Equation Modelling
<b>TP</b>	True Positives
<b>TPR</b>	True Positive Rate
<b>VIF</b>	Variance Inflation Factor

## ABSTRACT

Effective internal control systems play a pivotal role in fraud detection within the dynamic and complex landscape of the banking industry in Kenya. As financial institutions continually face evolving risks and sophisticated fraudulent schemes, the need for robust internal controls becomes increasingly paramount. These controls serve as a proactive defence mechanism, safeguarding the integrity of financial transactions, customer data, and the overall stability of the banking sector. Drawing from agency theory, fraud triangle theory, and control theory, this study employed a descriptive research design with primary data collected through questionnaires which were distributed to 39 licenced commercial banks. Key variables investigated included control environment, risk assessment, control activities, information and communication, and monitoring. The dataset attained a commendable 88.46% response rate, and a combination of descriptive and inferential statistics was utilized to uncover meaningful insights into the association between internal control systems and fraud detection in the banking industry in Kenya. The study revealed several significant correlations between key variables and fraud detection. A strong positive correlation was identified between control environment and fraud detection. Additionally, there was a moderate positive correlation between thorough risk assessment practices and fraud detection. Control activities exhibited a strong positive correlation with fraud detection, indicating that effective control measures significantly influence the detection of fraudulent activities. Similarly, a strong positive correlation was found between information and communication practices and fraud detection, underscoring the substantial role of quality information exchange and communication within an organization. Lastly, monitoring activities showed a strong positive correlation with fraud detection, emphasizing the crucial role of frequent and diligent monitoring practices in identifying fraudulent activities. The study's comprehensive analysis of internal control system on fraud detection in the banking sector offers key recommendations for optimizing fraud detection. Strengthening the control environment is crucial, emphasizing an ethical culture, regular training, and accountability mechanisms. Prioritizing risk assessment practices and continuous monitoring is essential. Optimization of control activities, effective information and communication, and diligent monitoring practices are recommended for enhancing fraud detection capabilities in the dynamic banking landscape.

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

Fraud is a serious issue that can have a detrimental effect on an organization's finances and reputation. Fraud can have serious financial consequences for enterprises, resulting in significant financial losses, a damaged reputation, and, in extreme situations, bankruptcy. Effective fraud detection helps to mitigate these risks and ensures the organization's financial well-being. Stakeholder trust and confidence in the organization must be maintained through fraud detection. To make informed judgments, investors, stockholders, and customers rely on accurate financial information (Friedrichs, 2019). Effective fraud detection helps to mitigate these risks and ensures the organization's financial well-being. Fraudulent acts can cause financial statements to be distorted thereby, prompting stakeholders to make incorrect decisions that hurt their interests. Organizations can build stakeholder trust by implementing internal control systems that improve the quality and reliability of financial information. Internal control systems are critical for detecting fraud because they give a disciplined framework for identifying and preventing fraudulent behaviour. Control operations, risk assessments, information and communication and monitoring processes are all part of these systems (PricewaterhouseCoopers, 2018).

The foundational concept of this research stems from the agency theory, introduced by Jensen and Meckling in 1976. This theory asserts that conflicts of interest between owners and managers can lead to agency problems. To address this, the theory suggests the implementation of internal control systems to reduce agency costs and align the incentives of managers and owners (Jensen & Meckling, 1976). The fraud triangle theory, the second theory anchoring this study, which was created by Cressey in 1953, the opportunity, rationalization, and pressure factors are said to be

present in every deception. One of the essential components of the fraud triangle, the idea contends that internal control mechanisms are required to lessen the potential for fraud (Cressey, 1953). This study is also supported by the control theory, which was developed by Ouchi in 1977. The theory contends that internal control systems are required to accomplish organizational objectives by regulating and guiding organizational actions. According to the principle, internal controls can aid in the prevention of dishonest behaviour that could obstruct the accomplishment of corporate objectives (Ouchi, 1977).

Given the numerous challenges the Kenyan banking sector faces, it is critical to evaluate how well internal control systems function to prevent and uncover fraud. There have been a number of fraud incidents in the banking industry, which have cost banks and their clients a significant amount of money. The frequency of fraudulent activity, which has become an increasing worry in recent years, is one of the biggest obstacles. In 2018, losses were Ksh. 1.5 billion, according to a study by the Central Bank of Kenya (CBK) on the banking sector fraud survey. In 2017, there were 273 recorded fraud cases; in 2018, there were 415 cases (CBK, 2019). This emphasizes the requirement for efficient internal control mechanisms to stop and identify fraud in Kenya's banking sector. Additionally, the CBK has stressed the importance of banks improving their internal control systems as a crucial component in reducing the risks related to fraud (CBK, 2018). Due to the growing use of technology in banking, the industry is now vulnerable to fresh forms of fraud including cybercrime, which can be challenging to detect and mitigate. Internal control systems have become more sophisticated as a result of the recent expansion of rules and compliance requirements in the banking industry. Therefore, it is crucial to conduct a research to assess how well internal control mechanisms in Kenya's banking industry work to detect and prevent fraud.

### **1.1.1 Internal Control Systems**

Internal control systems encompass the set of regulations, methods, and workflows established by an entity to protect its resources, guarantee the precision and dependability of financial documentation, and enhance operational effectiveness. These encompass various components such as the separation of responsibilities, protocols for authorization and endorsement, comprehensive documentation and archiving, as well as systems for oversight and communication of outcomes (Stieb, 2019). Internal control systems, according to Vona et al. (2020), are a collection of processes, procedures, and mechanisms designed to protect an organization's assets, guaranteeing the precision and dependability of financial reporting, amplifying operational effectiveness, and streamlining adherence to legal and regulatory frameworks are fundamental objectives associated with internal control systems. This characterization is provided by Sharma and Bansal (2021) as a coordinated set of rules, procedures, and practices used by an organization's management to assure the achievement of goals, minimize risks, and identify and prevent fraud and error. They include a methodical approach to assessing, managing, and monitoring internal processes and activities.

An organization should highlight the value of assessing the efficiency of internal control systems in identifying and preventing fraud. A continual examination of the effective of internal control systems is required to improve their capacity to prevent and detect fraud, according to Wanyoike Ng'ang'a and Kihoro (2021). Ineffective internal control systems are a significant contributor to fraudulent actions in many businesses. Effective internal control systems are made to safeguard adherence to rules and regulations as well as to avoid and identify mistakes, fraud, and other anomalies. Internal control systems, according to Stieb (2019) are crucial to attaining organizational goals and objectives and ensuring the correctness of financial data. Effective

internal control systems have been demonstrated in numerous studies to enhance organizational performance and lower the frequency of fraudulent activities (Adeyemi & Fakile, 2018). However, the success of these systems frequently depends on elements like management support, employee understanding, and the quantity and quality of resources devoted to their setup and upkeep (Pickett & Pickett, 2015). Warren (2021) contends that although internal control systems are crucial, they might not always be able to thwart fraud and mistakes, particularly if staff members work together to get around them. To make sure they are reaching their goals and effectively managing risks, firms should invest in solid internal control systems and continually assess their effectiveness.

Alam et al. (2018) employed the level of adherence to internal control policies and procedures as a metric to gauge the efficiency of the internal control system. Their survey encompassed inquiries about the extent to which key facets of the internal control system, such as documentation, authorization, and responsibility segregation, were being followed. Meanwhile, Sharma and Senan (2019) undertook an assessment of internal control effectiveness, centering on five elements: the control environment, risk evaluation, accounting information and communication systems, control actions, and self-monitoring. Similarly, Salameh (2019) evaluated the efficacy of internal control systems through an appraisal of the control environment, execution of control methods, risk evaluation, information exchange, and monitoring framework. Accordingly, this present study will evaluate the efficiency of internal control systems within banks based on five core components: the control environment, risk assessment, control actions, information exchange, and monitoring.



### **1.1.2 Fraud Detection**

Fraud detection is the process of detecting potential instances of fraudulent activity by employing advanced analytical tools and artificial intelligence algorithms to automatically discover suspicious patterns, abnormalities, and deviations within huge datasets (Kshetri, 2017). Fraud detection is a multifaceted method to detecting, preventing, and managing fraudulent activities across several corporate processes and systems (Albrecht et al., 2015). Fraud detection is defined as the implementation of a continuous monitoring system that evaluates financial transactions, operational procedures, and internal controls on a frequent basis in order to identify and resolve suspected fraudulent activity (Association of Certified Fraud Examiners, 2020). Fraud detection is therefore a proactive method of discovering and uncovering instances of dishonest, misleading, or unlawful behaviours within an organization or system, with the goal of preventing financial losses, protecting assets, and maintaining confidence in the business ecosystem.

Fraud detection is an essential component of every organization's risk management plan not only to limit financial losses but also to safeguard the organization's brand guarantee regulatory compliance and uphold public confidence (KPMG, 2019). The adoption of fraud detection methods can provide firms with significant financial advantages. Fraudulent behaviour can have a serious negative impact on an organization's finances and reputation, and it may even lead to legal action. Therefore, it is imperative that firms put in place efficient methods to detect fraudulent activity such activities before they occur. Organizations that employ fraud detection techniques can reap considerable financial rewards, including cost savings and improved revenue, according to Asher and CFE (2019). Potential fraudsters can be repelled by encouraging moral conduct and cultivating a compliance culture. Thus, an organization can take proactive

steps to reduce the likelihood of fraudster happening in the first place when fraud is detected. This can involve putting in place efficient internal controls, doing frequent risk analyses, and encouraging moral conduct (ACFE, 2020).

The number of potential frauds discovered has been used as a statistic in several studies to operationalize the detection of fraud. Li (2019) operationalized the detection of financial statement fraud using the quantity of potential fraud cases found using a multi-classifier method. The number of potentially fraudulent healthcare claims discovered using a multi-classifier approach was utilized as an operationalization of healthcare fraud detection in another study by Kansagara et al. (2020). The number of potential frauds discovered will also be used in this study as a parameter to assess the detection of fraud.

### **1.1.3 Internal Control Systems and Fraud Detection**

Internal control systems are critical in detecting and preventing fraud within firms. Internal controls that are effective create a framework that ensures appropriate process execution, protects assets and promotes adherence to defined policies and procedures, decreasing the potential for fraud to occur (Cohen, Krishnamoorthy & Wright, 2018). Internal control systems generate a deterrent impact by implementing measures such as segregation of jobs, authorisation controls, and regular reconciliations, making it more difficult for individuals to engage in fraud without being detected. Internal controls that are strong contribute to enhanced openness and accountability, making it easier for auditors and fraud examiners to spot abnormalities and potential red flags during investigations (Hassan, Halim & Nassr, 2017). Internal control systems enable the timely detection of suspicious activity by providing a robust framework for

monitoring and oversight, allowing businesses to take remedial steps quickly and minimize the extent of fraud-related losses.

Numerous studies have found a link between the effectiveness of fraud detection and the strength of internal control systems. Krishnan Tendulkar and Palmon (2019) discovered that firms with well-designed and well executed internal control systems were more likely to detect fraud at an early stage, resulting in a shorter duration of fraudulent activities and a lower financial impact. According to a study conducted by Krishnan and Visvanathan (2018), organizations with complete internal control mechanisms had a much lower incidence of fraud than those with weaker control environments. Similarly, according to a study conducted by Bédard, Gendron and Saïdi (2015) organizations that implemented particular fraud prevention measures as part of their internal control structure were better suited to detect and remediate fraudulent activity.

Organizations with weak or inadequate internal control mechanisms, on the other hand, are more exposed to fraudulent activities because they lack controls that can deter and detect fraudulent behaviour (Pickett, 2014). Several studies have found that weak internal controls increase fraud occurrences and lengthen the time it takes to detect fraud. According to Kshetri (2017), businesses with poor control systems frequently lack the ability to quickly recognize and respond to fraud signs, resulting in increased financial losses and harm to stakeholder trust. Weak internal control systems have been linked to more undetected fraud and bigger financial losses. According to KPMG (2018) businesses with weak controls are more vulnerable to fraud because they lack the capabilities to detect and respond to fraudulent behaviour.

#### **1.1.4 The Banking Industry in Kenya**

Kenya's banking industry has experienced substantial expansion and development over the years. With the founding of the National Bank of India, which eventually changed its name to the National Bank of Kenya, the banking industry was founded in 1896. Numerous banks have been established since then, both domestically and foreign banks that provide customers with a variety of goods and services. The Central Bank of Kenya (CBK, 2021) oversees the industry and has put in place a number of policies and rules to encourage growth and stability. In accordance with a CBK report, there were 40 commercial banks, 13 microfinance banks, and 1 mortgage financing institution functioning in the country as of December 2021. The sector has been able to greatly boost Kenya's economy and offer financial services and employment prospects. It is important for the mobilization and distribution of resources, which are crucial for the expansion and development of the economy. In order to encourage investment and economic activity, banks offer loan facilities to both enterprises and individuals (KBA, 2021).

Kenya's banking industry has been essential to the growth of the nation's economy. A survey by the Kenya Bankers Association (KBA, 2021) estimates that the banking industry contributed almost 7% of the nation's GDP in 2020. It has made it easier for people and enterprises to get financing, encouraging entrepreneurship and job development in the process. By funding infrastructure projects and helping to raise money through taxes, the business has also helped the government's development plan. The country's economic integration with the rest of the globe depends on banks' facilitation of international trade and commerce. The country's banking industry is governed by the Central Bank of Kenya (CBK, 2021). The CBK makes sure that banks operate in accordance with other pertinent laws and regulations, including the Banking Act. To make sure the financial system is stable and safe the CBK also keeps a close watch on

the performance and stability of the sector. The implementation of mobile banking was one of the significant turning points in Kenya's banking industry's history.

The Central Bank of Kenya reported that, compared to the prior year, the number of fraud cases in the banking industry grew by 56.4% in 2020 (Central Bank of Kenya, 2020). Effective internal control systems aid in the prevention of fraud by ensuring that there is a separation of roles, regular monitoring of transactions and prompt discovery of abnormalities. For instance, by reducing the need for manual staff intervention, the use of automated technologies for transaction processing and reconciliation can help lower the risk of fraud. By doing so, both the likelihood of mistakes and the potential for fraud are decreased. Additionally, internal auditors are essential in ensuring that internal control systems are successful by routinely evaluating and testing the systems to find flaws and suggest improvements (Nkama, 2017). Therefore, effective internal control systems that can reduce the risk of fraud and give early identification of any abnormalities are required in order to detect and prevent fraud in the banking sector in Kenya.

## **1.2 Research Problem**

The increasing sophistication of fraudulent schemes makes it difficult to recognize anomalies and unusual patterns using standard detection methods, which is key challenge influencing fraud detection in enterprises (Association of Certified Fraud Examiners, 2020). The massive amount of data produced by modern company operations might overwhelm manual monitoring measures, thereby resulting in the oversight of fraudulent activity. A lack of integration and communication between departments within a company might result in fragmented data, making it difficult to detect cross-functional fraudulent activity. The "fraud triangle" aspects of opportunity, incentive, and reasoning can create a difficult environment in which personnel

exploit control gaps and elude detection (Wells, 2018). Organizations can address these challenges and improve their ability to detect and prevent fraudulent activity by implementing a rigorous system of checks and balances, as well as regular internal audits and risk assessments. Automated fraud detection technologies that are incorporated into the internal control architecture may efficiently evaluate big datasets in real-time, detecting suspicious transactions and abnormalities as soon as they occur (Albrecht et al., 2015). Strong segregation of duties and role-based access controls can reduce the likelihood of collusion and unauthorized access, minimizing potential for fraudulent behaviour.

A rise in fraud cases has plagued Kenya's banking industry in recent years, underscoring the necessity of strong internal control mechanisms to prevent it from spreading. The Central Bank of Kenya (2020) estimates that there were 56.4% more banking industry fraud incidents in 2020 than there were in 2019. This poses a serious threat to the stability of the industry and erodes the public's trust in it. Cyber fraud, forgery and impersonation are the most often reported types of fraud. With 44.1% of the recorded cases involving this sort of fraud, cyber fraud made up the majority of fraud cases (CBK, 2020). According to the Central Bank of Kenya (2019), rapid technological improvement has resulted in the emergence of complex cyber threats and fraudulent schemes. Criminals' approaches for exploiting weaknesses in digital banking systems are constantly improving, making it difficult for traditional detection methods to keep up with the evolving threats. The enormous number and complexity of financial transactions in the banking sector also presents obstacles for manual monitoring and analysis, potentially leading to the discovery of fraudulent activity being delayed or ignored. The statistical data shows that there are considerable obstacles to identifying and preventing fraud in Kenya's banking industry, which necessitates an assessment of the efficiency of internal control mechanisms.

Research into the effectiveness of internal control systems in preventing and detecting fraudulent activities has been conducted by a range of scholars across different regions. Mohd-Sanusi et al. (2015) explored the factors auditors use to assess the likelihood of fraud risk in Malaysia, including the role of internal controls, motives behind fraud, and prior experiences. Similarly, Idogei et al. (2019) focused on Nigerian banks, examining the influence of internal control quality on the detection of financial fraud. Agyemang (2016) delved into the banking sector in Ghana, concentrating on how internal controls contribute to preventing and detecting fraud. In a more local context, Micheni (2016) investigated the impact of internal controls on fraud prevention and detection in commercial banks listed on the NSE. Joseph, Albert, and Byaruhanga (2015) studied the effects of internal controls on fraud prevention and detection in the district treasuries of Kakamega County, Kenya. These studies collectively contribute to our understanding of the multifaceted role of internal controls in addressing fraudulent activities, spanning various geographical and institutional settings.

The studies above reveal both conceptual and textual gap. The study by Mohd-Sanusi et al. (2015) does not focus on the effect of ICS on fraud detection thus, depicts a conceptual gap. Idogei et al. (2019) assess the extent to which internal control quality impacted financial fraud in banks in Nigeria and hence reveal a contextual gap where the study does not focus on Kenyan Banks. Similarly, Agyemang's (2016) focus is in banking industry in Ghana and not in Kenya indicating a contextual gap. Micheni (2016) conducts a similar study with the current study but focuses on listed commercial banks at NSE and fails to consider other banks that are not listed which depicts a contextual gap. Finally, the study by Joseph, Albert, and Byaruhanga (2015) reveal a contextual gap where the study focus on the district treasuries of Kakamega County, Kenya unlike the current study that focuses on the banking Industry in Kenya. Therefore, the

current study aims at filling that gap by addressing a research question on: What is the effectiveness of internal control systems in detecting fraud in the banking industry in Kenya?

### **1.3 Objective of the Study**

The objective of the study is to determine the effect of internal control systems in fraud detection in the banking industry in Kenya.

### **1.4 Value of the Study**

Upcoming researchers and academics engaged in the domain of fraud management and control systems will discover substantial utility in this investigation. The outcomes of this study hold the potential to enrich prevailing control systems, as they will offer insights into the efficacy of internal control mechanisms in mitigating the perils linked to fraudulent activities within the banking sector. Furthermore, the study's contributions could either substantiate or question established theories, potentially inspiring future researchers to construct novel frameworks and theories aimed at managing and thwarting fraudulent activities in the banking industry, drawing upon this study as a fundamental basis. The research will increase the understanding of fraud management and prevention, which is crucial for the banking sector's long-term expansion.

The CBK, which is the regulatory authority and the Kenyan government, will also find great value in the findings. The study's findings can be applied to the development of rules and policies that will enhance internal control systems in the banking sector and curb fraud. The study will be a helpful source of knowledge for the policy makers regarding the efficiency of the current control systems and the areas that need improvement. As a result, the policy makers will be able to enact laws and regulations that are founded on facts and have a positive impact on reducing the risks of fraud in the financial sector.



The study will be beneficial to all parties involved in the banking industry, including banks, customers, potential investors and the general public. The investigation will shed light on how well internal control systems work to detect and prevent fraud, and its conclusions can be utilized to strengthen the institutions' current control procedures. Customers and the general public will have more confidence in the banking industry as a result, which will help the sector develop and endure. The study will additionally provide the banks with important knowledge about the areas that need improvement, allowing them to create systems of internal control that are more successful at thwarting fraud.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

The chapter discusses literature related to the study. It entails theoretical review, factors of detecting fraud, review of studies, summary and the conceptual framework. The literature discussed will help the study identify the knowledge gap to be filled by further studies.

### **2.2 Theoretical Review**

In this segment, a number of pertinent theories forming the foundation of the study will be addressed. These theories encompass the agency theory which is the anchor theory of the study, the fraud triangle theory, and the control theory. The ensuing content will provide an in-depth exploration of these theories, scrutinize their drawbacks, and ascertain their applicability to the study's context.

#### **2.2.1 Agency Theory**

The concept of the agency theory, conceived by Jensen and Meckling in 1976, posits that inherent conflicts of interest exist between a corporation's proprietors and its management, which can cause issues with agency. According to this theory, managers may put their personal interests ahead of that of the owners, perhaps mismanaging resources and making decisions that don't support those aims (Jensen & Meckling, 1976). In line with the agency theory, effective internal control mechanisms are essential for diminishing agency costs and harmonizing the objectives of managers and proprietors, thus addressing these challenges. Internal control systems play a role in augmenting responsibility, transparency, and guaranteeing that managers operate in the best interests of the proprietors. Companies can boost their overall financial performance, raise

shareholder value and develop stronger relationships with customers by lowering the possibility of agency issues. The agency theory also acknowledges the function of external oversight mechanisms in reducing agency costs, such as the market for corporate control and shareholder activism. These systems give managers incentives to act in the owners' best interests and can aid in ensuring that ineffective managers are terminated.

Numerous critiques have been levelled at the agency theory. Its presumption that managers are always self-interested and that their interests are at odds with those of shareholders is one of its main criticisms. According to some scholars, this presumption is unreasonable and ignores the possibility of common interests and the advantages of working cooperatively with owners and management (Hillman & Dalziel, 2003). Another criticism of the agency theory is that it undervalues the importance of other stakeholders including employees, clients and communities and oversimplifies the relationship between managers and owners (Freeman, 1984). The agency theory has also come under scrutiny for placing too much emphasis on shareholders' short-term interests at the price of sustainability and value generation in the long run (Mintzberg, 1983).

The agency theory, which highlights the value of internal control systems in lowering agency costs and aligning the objectives of managers and owners, is pertinent to the study which aims to evaluate how well internal control systems work in Kenya's banking industry in identifying and preventing fraud, which is a major concern for bank owners and regulators. The research has the potential to provide valuable perspectives on enhancing banks' management of fraud risk and ensuring alignment of managers' actions with shareholders' interests. This can be achieved by investigating how internal control systems influence the reduction of agency issues and the enhancement of transparency and accountability. As a result, the study's emphasis on internal

controls and how they affect agency costs is consistent with the fundamental ideas of the agency theory.

### **2.2.2 Fraud Triangle Theory**

The fraud triangle theory, formulated by Donald Cressey in 1953, posits that fraud transpires under the confluence of three conditions: opportunity, rationalization, and pressure. The element of opportunity characterizes an individual's capability to engage in fraudulent acts due to inadequacies in internal controls or vulnerabilities within existing control mechanisms (Cressey, 1953). Contrarily, rationalization is the rationale or rationalization that a person uses to persuade oneself that their position warrants or calls for fraud. Financial hardships or the need to maintain a particular standard of living are two examples of pressures that could drive someone to commit fraud. By restricting chances and identifying fraudulent acts, the fraud triangle theory highlights the significance of internal controls in lowering the likelihood of fraud. To reduce the danger of fraud, the theory emphasizes the necessity for a strong control environment, efficient monitoring, and regular assessments of control effectiveness. The fraud triangle theory thus supports the idea that internal control procedures are necessary to reduce the likelihood of fraud (Wells, 2011).

According to some scholars, the theory oversimplifies the dynamic and complex nature of fraud and ignores additional elements that may influence fraudulent behaviour. The theory's critics claim that it ignores larger organizational, ethical management practices and cultural elements that may play a role in fraud because it places too much emphasis on individual factors (Sutherland, 1949). Others object to the theory for focusing too much on the traits and psychological makeup of the individual and ignoring the social and organizational context in which fraud happens. The theory, according to opponents (Krambia-Kapardis & Zopiatis, 2017),

does not offer instructions on how to put into practice efficient internal controls and reduce the risk of fraud. The fraud triangle theory is still a popular framework for comprehending and avoiding fraud in businesses in spite of these concerns.

Fraud triangle theory is relevant to the study that looks in to how well internal control systems work to prevent fraud. This theory highlights the value of internal controls in decreasing the potential of occurrence of fraud by limiting an individual's ability to commit fraud. According to the fraud triangle hypothesis, which emphasizes the necessity for a robust control environment to reduce the risk of fraud, the study's objective is to assess the efficiency of internal control systems in Kenya's banking industry for identifying and preventing fraud. The study can shed light on how internal controls might be reinforced to mitigate fraudulent actions by looking at the availability of opportunity, rationalization and pressure in the context of the banking business.

### **2.2.3 Control Theory**

According to the control theory, which Ouchi developed in 1977, internal control systems are essential for achieving organizational goals by regulating and directing organizational actions. According to the theory, internal controls can aid in the prevention of dishonest behaviour that could obstruct the achievement of organizational objectives. The control theory places a strong emphasis on the necessity of control within organizational frameworks as well as the function of monitoring and feedback systems in ensuring that organizational actions are in line with goals. Control theory acknowledges that rather than being rigorously standardized, control systems should be created to meet the unique demands and features of the organization (Ouchi, 1977). The significance of cultural values and norms in forming control systems within organizations is also highlighted by Ouchi's control theory. The theory also acknowledges the necessity of

striking a balance among various control mechanisms, such as ethnic control, bureaucracy control, and market control, in order to achieve organizational goals (Ouchi, 1977).

The control theory has drawn criticism from academics despite the fact that it offers a useful framework for comprehending the role of internal controls in accomplishing corporate goals and reducing fraudulent behaviour. The theory's failure to effectively address the difficulties of putting control systems into reality has been criticized as one of its main weaknesses. For instance, according to some opponents, control mechanisms within corporations can hinder innovation and creativity (Merchant & Van der Stede, 2007). Others have also claimed that control systems may not be successful in identifying and stopping all forms of fraudulent behaviours since people may find ways to manipulate or go around the systems (Meyers, 2004). Some critics have remarked that control systems could be expensive to build and maintain and might not necessarily comport with the organization's principles and culture (Merchant & Van der Stede, 2007).

The control theory is pertinent to the study since it contends that organizations can choose between two different sorts of control systems: clan control and market control. Clan control depends on a common set of standards and values as well as a strong sense of community, whereas market control depends on formal laws, agreements, and rewards. Effective internal control systems are crucial in the banking sector, where there is a high danger of fraud. The formal rules and processes provided by these systems can be seen of as a type of market regulation that aids in preventing fraudulent activity. The culture of the organization must support these control measures, and staff members must be inspired to adhere to them. Ethnic control correlates with the need for a sense of belonging and shared values that are necessary for this. Therefore, the theory is relevant because it acknowledges the significance of

both ethnic and market control systems in developing efficient internal control systems that can identify and stop fraud in the banking industry.

## **2.3 Determinants of Fraud Detection**

Five fundamental constituents constitute internal control systems, encompassing the control environment, risk evaluation, control measures, information exchange and communication, and oversight. This segment will delve into the impact of these internal control components on the detection of fraud, exploring them as the independent variables of the study.

### **2.3.1 Control Environment**

An essential component of an effective ICS that has a substantial impact on identifying and preventing fraud is the control environment. The control environment refers to the aspect of establishing an organization's culture, ethical standards, and tone at the top, setting the tone for the remainder of the ICS. As stated by the Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2013), a robust control atmosphere serves as the initial barrier against fraudulent conduct. It also serves as the basis for efficient internal control. So, a good and moral control environment can lessen the possibility of fraud starting in the first place.

A culture of honesty, integrity and accountability is more likely to exist in organizations with a strong control environment, which lowers the likelihood that fraud will take place. This is due to the fact that a supportive work atmosphere promotes ethical behaviours and deters fraud. Albrecht et al. (2015) opines that people who work for companies with high ethical cultures are less likely to commit fraud than those who work for companies with weak ethical cultures. Organizations that place a high priority on their control environment can thereby reduce the likelihood of fraud by fostering a culture of ethics and responsibility.

The control environment is crucial for identifying and containing fraud in Kenya's banking industry. Kenyan banks have put in place a number of measures to guarantee a tight control environment that encourages moral conduct and compliance. Banks have created codes of conduct that outline moral principles and expectations for employee conduct. These codes set forth the values and guiding principles of the bank and place a strong emphasis on the value of integrity, honesty, and professionalism (Njuguna, 2018). Kenyan banks have made investments in training and development initiatives that give staff members the abilities to identify and prevent fraud. These courses include fraud awareness training, which teaches employees how to recognize red flags, recognize different types of fraud, and the value of reporting suspicious activity. Additionally, banks regularly perform internal audits and external evaluations to determine how well their control environment is working to detect and prevent fraud. In order to provide a robust control environment, the Central Bank of Kenya (CBK, 2015) has established regulatory standards that banks must adhere to. Banks must create and maintain efficient internal control systems, including risk management, policies and procedures, internal audits, and external audits, in accordance with the CBK. In accordance with the CBK, banks must also set up a board of directors that will be in charge of monitoring and holding management accountable for internal control-related issues (CBK, 2015).

### **2.3.2 Risk Assessment**

The Committee of Sponsoring Organizations of the Treadway Commission (COSO, 2013) defines efficient risk assessment procedure as the process that aids organizations in identifying and prioritizing their fraud risks and in developing efficient controls to reduce those risks. Risk analysis is crucial for identifying and combating fraud in Kenya's banking industry. In order to identify and prioritize their fraud risks and create efficient procedures to reduce such risks, banks



are required to carry out a thorough risk assessment. Banks must do an annual risk assessment of their operations and update it anytime there are substantial changes to the business environment, according to the Central Bank of Kenya (Central Bank of Kenya, 2021).

Kenyan banks undertake risk assessments using a variety of techniques, including the use of electronic devices and risk scoring models. For instance, one of the biggest banks in the country, Equity Bank Kenya Limited, uses a fraud detection system that relies on risk scoring models to categorize and rank high-risk transactions (Equity Bank, 2021). By highlighting transactions that have a high potential of being fraudulent, this method aids the bank in promptly identifying and stopping fraud. Customer due diligence (CDD), another method of risk assessment used by banks in Kenya to identify and prevent fraud, is another method. Verifying a customer's identification and determining their level of risk is done using CDD. This procedure aids banks in recognizing and evaluating the risk of fraud and other financial crimes, such as money laundering (Central Bank of Kenya, 2019). To prevent and identify fraud, Standard Chartered Bank Kenya Limited, for instance, has a strong client due diligence procedure (Standard Chartered Bank, 2021).

In order to identify and stop fraud in Kenyan banks, employee risk assessment is also a crucial element of risk analysis. Banks must make sure that all of its employees are thoroughly checked both before and after starting work in order to spot any potential red flags that could make them more likely to commit fraud. During the hiring process, employers may screen potential employees by doing background checks, assessing their performance and keeping an eye on their actions (Gatua & Kalani, 2015). Employee screening is a critical step in the risk assessment process, according to the Central Bank of Kenya's (CBK, 2013) report on the efficacy of internal control systems in Kenyan banks. The report suggests that banks create an employee screening

process, make sure that every applicant is investigated before hiring, and maintain on-going staff monitoring to look for any signs of potential fraud.

### **2.3.3 Control Activities**

Control activities could be defined as the policies and practices that an organization employs to make sure that the risks identified during the risk assessment process are effectively handled. One of the essential parts of an internal control system, is the control activities that play a crucial role in reducing the risk of fraud. They are employed to detect and prevent fraud in Kenya's banking sector. This section will go through ways in which Kenyan banks have implemented control measures to detect and prevent fraud. Strong authorization procedures are one method Kenyan banks employ control activities to detect and prevent fraud. The way transactions are authorized, who can authorize transactions, and the restrictions for authorisation are all governed by specific policies and procedures in place at banks. These processes aid in ensuring that transactions are carried out only by authorized parties and that they stay within predetermined boundaries. Fraudulent transactions are identified and prevented by flagging and investigating unauthorized transactions and transactions that exceed permissible limitations (Muhoro, 2016).

Segregation of tasks is another control activity that Kenyan banks employ to detect and prevent fraud. To lower the risk of fraud, segregation of duties requires dividing up responsibility for important procedures or functions. To lower the danger of fraud, banks, divide the tasks of managing cash, accounting and reconciliation. As a result, it is ensured that no one person has exclusive control over a process, making it harder for fraud to go unnoticed. Banks in Kenya are better able to prevent and discover fraud by segregating duties (Owino & Oduor, 2017). Furthermore, Kenyan banks use effective IT controls to detect and manage fraud through control

activities. With the development of technology, banks are now vulnerable to fresh forms of fraud, such as cybercrime, which can be challenging to identify through conventional means. In order to reduce this risk, Kenyan banks have put rigorous IT controls in place. They employ access controls to restrict access to important information, use firewalls and encryption to safeguard consumer data, and routinely check their systems for any unusual behaviour. These safeguards aid in the detection and prevention of potentially fraudulent technological activity (Ouma & Waweru, 2018).

#### **2.3.4 Information and Communication**

The passing of information from one information and communication are essential elements of an efficient internal control system. Effective channels of communication are essential for quickly identifying and reporting fraudulent actions. Kenyan banks have improved their communication lines to better deter and catch fraud by using a number of initiatives (Karuma, Nzuve & Kibera, 2020). Whistle-blower hotlines, which enable employees and customers to report suspected fraudulent acts anonymously, are one measure. Whistle-blower hotlines have been found to be a useful tool in the discovery and prevention of fraud. Organizations with a whistleblowing hotline caught fraud 50% faster than those without one, according to the Association of Certified Fraud Examiners' 2020 Global Study on Occupational Fraud and Abuse (ACFE, 2020).

Programs for training personnel in fraud awareness and prevention have also been introduced by banks in Kenya. These training sessions inform employees about the value of identifying and preventing fraud, the kinds of fraudulent activities that can happen in the banking sector, and the proper methods for reporting suspected fraudulent activity (ACFE, 2020).

Employee participation in fraud prevention is also emphasized in the training sessions, as is the immediate reporting of any suspicious activity to the proper authorities. A variety of technical solutions have also been adopted by Kenyan banks to improve their communication channels and combat fraud. For instance, some banks have put in place fraud detection software that makes use of cutting-edge analytics to track consumer transactions in real-time and detect any unusual activity. The software can detect unusual trends in transaction activity and notify bank officials so they may take the necessary action (Karuma, Nzuve & Kibera, 2020).

### **2.3.5 Monitoring**

An efficient internal control system must include monitoring in order to be able to identify and stop fraud in Kenya's banking sector. Monitoring in banks entails evaluating the success of the bank's on-going fraud detection strategy. Examining monitoring reports, putting essential monitoring procedures to the test, and speaking with pertinent staff members are all ways to assess this variable (Kariuki, 2019). Kenyan banks have put in place a variety of monitoring procedures to find and stop fraud. Transaction monitoring is one of the most used monitoring techniques. Real-time or nearly real-time transaction reviews are required to look for any questionable activity. In order to monitor transactions for abnormalities or patterns that point to fraudulent activity, Kenyan banks have made investments in cutting-edge fraud detection technologies. A fraud detection system is used by Standard Chartered Bank in Kenya to look at transaction trends and detect any irregularities (Standard Chartered, 2020).

Banks in Kenya monitor transactions, but they also periodically audit their internal control systems to make sure they're working properly. These audits can aid in identifying any systemic flaws that fraudsters might try to use. For instance, the Equity Bank in Kenya regularly audits its

internal control procedures and systems to find any holes or flaws that would allow fraud (Equity Bank, 2021).

Employee monitoring is a major monitoring technique used by banks in Kenya to identify and stop fraud. This entails keeping an eye on the actions of workers who have access to private information or who are involved in risky business. Kenyan banks have put in place a number of procedures to keep an eye on its staff, including limiting access to private data, keeping an eye on their online behaviours and running background checks on new hiring. For instance, the KCB Bank in Kenya routinely verifies the backgrounds of its staff to make sure they have no prior history of fraud (KCB Bank, 2021).

## **2.4 Empirical Review**

Research on dynamics of internal control systems and their impact on fraud detection has mainly focused on fraud risk assessment and anti-fraud strategies. Mohd-Sanusi et al. (2015) initiated this discourse by emphasizing how auditors consider fraud risk in relation to internal controls. Mangala and Kumari (2017) furthered this discussion by demonstrating the effectiveness of anti-fraud techniques, which often involve bolstering internal controls through corporate governance, audits, and technology. Idogei et al. (2019) reinforced this narrative by establishing a positive correlation between internal control quality and fraud detection, advocating for the expansion of internal audit divisions and staff training. Collectively, these studies contribute valuable insights into the relationship between effects of internal control systems and fraud prevention and detection. Still, further research is needed to assess the broader impact of internal control mechanisms on fraud detection across different industries and geographic locations, including Kenya's banking sector.

Studies regarding the dynamics of internal control systems and their influence on fraud detection in Kenya have predominantly centered on highlighting the crucial function of internal controls in preventing and detecting fraud within the country's banking industry. Kabue's 2015 assessment laid the foundation by identifying correlations between specific control measures and their impact on fraud prevention and detection, highlighting the intrinsic relevance of internal controls within the Kenyan banking industry. Subsequent study by Micheni (2016) built upon this foundation, focusing specifically on Kenya's NSE-listed banks, and reinforced the narrative by revealing a strong positive relationship between internal controls and fraud prevention and detection within these financial institutions. These studies provide a comprehensive perspective that underscores the critical significance of robust internal controls in mitigating fraud risks across the Kenyan banking sector. However, additional investigation is required to evaluate the overall effect of internal control measures in detecting fraudulent activities within Kenya's banking sector.

Research examining the impact of internal control systems on fraud detection has primarily centered its attention on elucidating the advantages of robust internal control systems and on risk management on fraud detection. Joseph, Albert, and Byaruhanga's (2015) examination of local government treasuries in Kakamega County, Kenya, emphasizes the practical advantages of robust internal control systems and consistently underscores the pivotal role of these controls in preventing fraud. This thematic emphasis seamlessly aligns with Nyakarimi, Kariuki, and Kariuki's (2020) research within Kenya's banking sector focusing mainly on commercial banks, which, although specialized in its focus on risk assessment on fraud detection, harmoniously reinforces that effective internal controls are indispensable for both preventing and detecting fraudulent activities. These studies established that the importance of internal controls on fraud

detection transcends sectorial boundaries. However, additional investigation is required to evaluate the overall effect of internal control measures in detecting fraudulent activities within Kenya's banking sector.

## **2.5 Summary of the Literature**

The theoretical review, which includes the agency theory, the fraud triangle theory, and the control theory, is covered in this chapter. According to the agency theory, there are conflicts of interest between a company's owners and management, necessitating effective internal control mechanisms to lower agency costs and balance managers' and owners' interests. According to the fraud triangle theory, fraud happens when three factors, opportunity, justification and pressure, converge. This theory emphasizes the value of internal controls in lowering the risk of fraud. According to the control theory, internal control systems are essential for directing and controlling organizational actions in order to accomplish organizational goals. The theories are pertinent to the study's goal of determining how well internal control mechanisms detect and stop fraud in the banking sector.

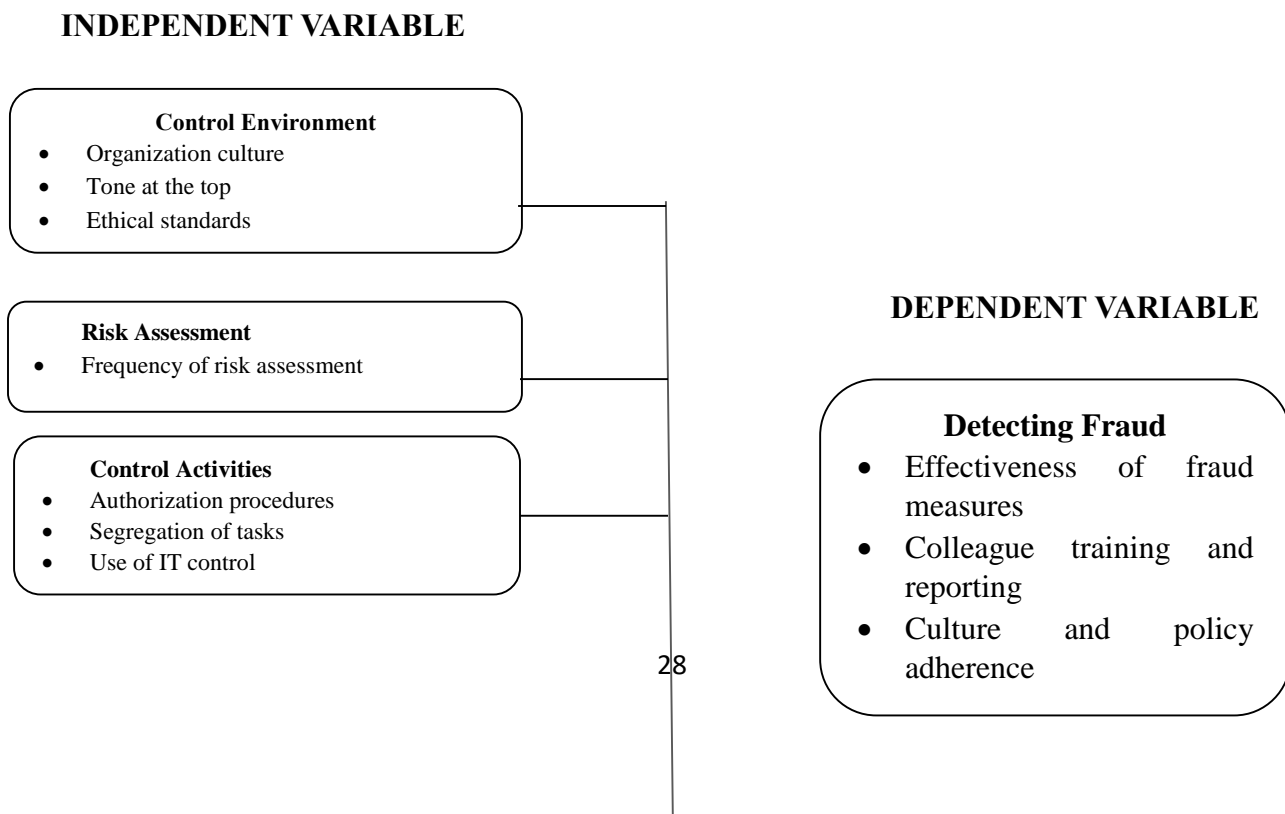
The chapter also focuses on how the control environments, risk assessment, control activities, information and communications and monitoring are all aspects of internal control system and how they affect detecting fraud. Promoting moral behaviours and lowering the likelihood of fraud require the control environment. The identification and prioritization of fraud risks as well as the creation of effective procedures to reduce them are aided by risk assessment. Risks that have been recognized can be effectively managed through control actions, which comprise policies and practices. Measures like fraud awareness training, risk scoring models, customer due diligence, personnel screening, internal audits, and external audits are utilized in Kenya's

banking sector to identify and prevent fraud. Information and communication give managers and employees with pertinent information that can be used to detect and prevent fraud and monitoring makes sure that the internal control systems are operating effectively.

The chapter also discusses empirical studies that resulted in conflicting findings. The studies' findings point to a need for more research into the efficiency of internal control systems in detecting fraud in the banking industry, particularly in the context of diverse countries or regions. There is a focus on the necessity to perform more study in other locations, such as Kenya, since their findings cannot be generalized. This is true even if studies completed in Malaysia, Nigeria, Ghana, and Namibia have demonstrated the importance of internal controls in preventing and detecting fraud. By evaluating the efficiency of internal control systems in spotting and preventing fraud in Kenya's banking sector, the current study seeks to close this knowledge gap.

## 2.6 Conceptual Framework

**Figure 2. 1: Conceptual Framework**





**Information and Communication**

- Use of software like whistle blower hotlines

**Monitoring**

- Transaction monitoring
- Internal and external auditing



## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

The chapter delineates the approach that was embraced to fulfil the study's objective. It encompasses the research design, the specified population, the technique for data collection, the methodologies for data analysis, diagnostic evaluations, the analytical framework employed, and the tests of significance.

### **3.2 Research Design**

The strategy for carrying out research that details the steps to be taken in order to gather and analyse data is referred to as the research design (Creswell, 2014). This study employed a descriptive research design, a form of study that seeks to describe or capture, without manipulation or intervention, the traits of a certain phenomenon or group. In social science research, it is frequently used to examine and characterize the attitudes, beliefs and actions of individuals or groups because it is useful for giving a thorough description of a situation or population (Creswell, 2004). The descriptive research design was appropriate for the study to evaluate how well the banking industry in Kenya enhances its internal control system to detect and prevent fraud.

### **3.3 Target Population**

The set of individuals or objects that a researcher is interested in examining and developing conclusions about is referred to as the target population. The population of interest is often described by a set of traits. The study targeted all the banks in Kenya licensed by CBK to operate by 2022. There are 39 in Kenya that are operational and are licensed by CBK. The Central Bank

of Kenya, which oversees the country's banking industry, is in charge of regulating these institutions (CBK, 2021).

### **3.4 Sampling**

Purposive sampling was used in the study to carefully select participants who were most relevant to the research aims. Two respondents were selected from each bank, with an emphasis on persons in positions such as branch managers, finance managers or head of department of internal control system with vast information on internal control system and fraud detection. This strategy was to yield a total of 78 replies, ensuring that the sample size is acceptable and appropriate for the scope and requirements of the study.

### **3.5 Data Collection**

The study utilized primary data which was collected by administering questionnaires in form of a survey. The surveys were administered using online links where the participants were required to fill all the questions before submitting. Upon submission, the answers were compiled in a google sheet for the analysis. The study aimed at collecting panel data from the 78 banks.

### **3.6 Data Analysis**

In order to offer a comprehensive grasp of the data's patterns and tendencies, descriptive statistical methods were employed to provide data summaries. Subsequently, relationships between variables were explored, and conclusions drawn from the data were guided by inferential statistical techniques, encompassing correlation and regression analyses. Regression analysis will serve to predict the value of a variable based on other variable values, while correlation analysis will be utilized to assess the intensity and direction of the connection

between two variables. The presentation of outcomes will involve the utilization of graphs and tables.

### **3.7 Diagnostic Tests**

To ensure the model used for regression analysis was strong and valid. The study conducted the following diagnostic tests prior. These tests included normality, linearity, autocorrelation, heteroscedasticity, and multicollinearity.

#### **3.7.1 Normality Test**

The normality test determines whether the data are distributed normally or asymmetrically. The assumption that the data is regularly distributed underlies many statistical procedures, making this crucial. The Shapiro-Wilk test, which examines whether the data are representative of a normal distribution, will be used to determine whether the distribution is normal. If the data fails the normality test, normalizing the data before applying statistical models may be accomplished via data transformations such logarithmic or square-root transformations (Field, 2013).

#### **3.7.2 Linearity Test**

The link between the predictor variable and the response variable is evaluated using the linearity test. Since linear regression models presume that the connection between the variables is linear, this test is crucial. Scatter plots, which show how the variables are related, will be used to test for linearity. It may be better to use a nonlinear regression model if the scatter plot reveals a nonlinear relationship. Additionally, by displaying the residuals against the expected values, a residual plot can be used to evaluate the linearity assumption. The linearity assumption is satisfied if the residuals are spread randomly around zero (Field, 2013). If data fails normality

test, then linear regression analysis may not be undertaken and other non-parametric analysis be adopted in undertaking the study analysis.

### **3.7.3 Autocorrelation Test**

The autocorrelation test determines whether there is a correlation between a regression model's residuals. When the residuals are associated over time or space, the statistical models' independence assumption has been violated and autocorrelation might result. The Durbin-Watson test, which examines the possibility that the residuals are uncorrelated, will be used to determine whether autocorrelation exists. It may be important to conduct additional analysis using time-series models if the Durbin-Watson test value differs significantly from 2 (fails the test) because this indicates the presence of autocorrelation (Field, 2013).

### **3.7.4 Heteroscedasticity Test**

The heteroscedasticity test determines if the residual variance is constant over the predictor variable's whole range. The regression models' homoscedasticity assumption is violated by heteroscedasticity, which results in biased standard errors and inaccurate p-values. A scatter plot of the residuals versus the anticipated values will be used to test for heteroscedasticity, with the existence of a funnel shape indicating heteroscedasticity. Robust standard errors or weighted regression models can be employed to account for the unequal variance if heteroscedasticity is found and therefore the study fails homoscedasticity test (Field, 2013).

### **3.7.5 Multi-collinearity Test**

The multicollinearity test determines whether the predictor variables have a high degree of correlation. Regression coefficients and standard errors may become unstable and inaccurate due

to multicollinearity. The variance inflation factor (VIF), which assesses the degree of correlation between each predictor variable and the other predictor variables, will be used to test for multicollinearity. The predictor is dropped from the model if it fails the test and therefore has a higher VIF than 10 (Field, 2013).

### 3.8 Analytic Model

The regression model depicted below explains the expected.

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \varepsilon$$

Where:

Y = Fraud detection

X<sub>1</sub> = Control Environment

X<sub>2</sub> = Risk Assessment

X<sub>3</sub> = Control Activities

X<sub>4</sub> = Information and Communication

X<sub>5</sub> = Monitoring

β<sub>0</sub> = the intercept

ε = the error term

β<sub>1</sub>, β<sub>2</sub>, β<sub>3</sub> and β<sub>4</sub> = Coefficients of X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>, X<sub>4</sub>, and X<sub>5</sub> respectively.

**Table 3. 1: Operationalization Table**

Variables	Types of variables	Indicators	Operationalization	Previous researcher
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Detecting fraud	Dependent variable	Effectiveness of fraud measures, Colleague training and reporting, Culture and policy adherence	Extent of internal control activities to detect fraud	(Albrecht et al., 2015)
Control environment	Independent variable	Organization culture Tone at the top Ethical standards	Likert scale	Micheni (2016)
Risk assessment	Independent variable	Frequency of risk assessment	Factor analysis, and correlation analysis based on structural equation modelling (SEM)	Nyakami, Kariuki, and Kariuki (2020)
Control activities	Independent variable	Authorization procedures Segregation of tasks Use of IT control	Likert scale	Mohd-Sanusi et al. (2015)
Information and communication	Independent variable	Use of software like whistle blower hotlines	Likert scale	Mangala and Kumari (2017)

Monitoring	Independent variable	Transaction monitoring Internal and external auditing	Likert scale	Joseph, Albert, and Byaruhanga (2015)
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Source: Researcher, (2023)

### 3.9 Test of Significance

ANOVA (Analysis of Variance) was used in the study to check for significant mean differences between two or more groups. There was a 5% possibility of rejecting the null hypothesis when it was true because the test was run at a 95% significance level. The null hypothesis was to be rejected and it was to be said that there was a significant relationship between the variables if the estimated F-value was higher than the critical value.



## **CHAPTER 4: DATA ANALYSIS, RESULTS AND DISCUSSIONS**

### **4.1 Introduction**

This section focuses on the analysis of the data to achieve the research objectives. To begin, the response rate is analyzed to assess participant engagement. Following this, background information is examined to provide a comprehensive understanding of the diverse backgrounds and characteristics of study participants, contributing to a deeper grasp of the sample's composition. Subsequently, the research instrument's reliability and validity are rigorously assessed, and a detailed descriptive analysis of the collected data was conducted, offering a clear overview of the dataset's characteristics. This chapter also entailed an exploration of correlation and regression analyses to identify relationships between variables, addressing the research question. Lastly, a discussion of the research findings is presented.

### **4.2 Response Rate**

The investigation effectively gathered 69 responses out of 78, resulting in a noteworthy response rate of 88.46%. This response rate aligns with the research methodology's recommended criteria and strengthens the reliability and robustness of the study. As per the research guidelines, a response rate exceeding 85% is considered appropriate for conducting research, as it ensures a substantial level of participation within the target population (Mugenda and Mugenda, 2003).

### **4.3 Validity and Reliability of Data**

The study examined the validity and reliability of the questionnaire items related to each variable to ensure the data's quality and precision. Through validity tests, specifically the KMO Bartlett's test, the research assessed the suitability and effectiveness of these items in capturing the intended constructs. This process affirmed the questionnaire items' relevance and their alignment

with the research objectives. In addition, by utilizing the Cronbach Alpha test to evaluate reliability, the investigation scrutinized the internal consistency of the questionnaire, ensuring that the items consistently measured the same underlying constructs. These rigorous assessments upheld the questionnaire's credibility and enhanced the data's trustworthiness for subsequent analyses.

**Table 4. 1: Validity and Reliability tests**

<b>Variable</b>	<b>KMO Bartletts</b>	<b>Cronbach's Alpha</b>	<b>NO of items</b>
Fraud Detection	0.909	0.958	7
Control Environment	0.941	0.967	10
Risk Assessment	0.912	0.948	10
Control Activities	0.946	0.966	10
Information and Communication	0.935	0.962	10
Monitoring	0.925	0.964	10

**Source: Researcher (2023)**

The results of the validity and reliability assessments, as depicted in Table 4.1, for the variables provided robust and favourable findings. The KMO Bartlett's test yielded highly significant values for all variables, ranging from 0.909 to 0.946, indicating a robust degree of sampling adequacy. This underscores the questionnaire items' suitability for effectively measuring each construct. Similarly, the Cronbach's Alpha coefficients were notably high, ranging from 0.948 to 0.967, demonstrating strong internal consistency within each variable.

#### **4.4 Descriptive Statistics**

Descriptive statistics serve as the fundamental framework for summarizing and simplifying data, enabling one to gain insights into the central tendencies and variations within the dataset. It

facilitates a comprehensive understanding of the research variables and sets the stage for further in-depth analysis. In this study, descriptive statistics played a pivotal role in data analysis. For the variables under investigation, measures such as mean, median, mode, and standard deviation were utilized to determine their central tendencies and levels of variability. This comprehensive approach allowed for a thorough examination of both the contextual background and the primary research variables, contributing to a well-rounded analysis.

**Table 4. 2: Control Environment**

	N		Mean	Median	Mode	Std. Deviation
	Valid	Missing				
The control environment of my organization promotes ethical behaviors and deters fraudulent activity.	69	0	3.77	4.00	5	1.202
My organization places a high priority on creating a strong control environment to reduce the likelihood of fraud.	69	0	3.71	4.00	4	1.045
Statement [The code of conduct in my organization emphasizes the importance of integrity, honesty, and professionalism.]	69	0	3.72	4.00	4	1.162
My organization invests in training and development initiatives that help employees identify and prevent fraud.	69	0	3.80	4.00	4	1.065
Internal audits and external evaluations are regularly conducted in my organization to determine how well the control environment is working to detect and prevent fraud.	69	0	3.84	4.00	4	1.066
My organization adheres to regulatory standards established by the Central Bank to maintain efficient internal control systems and manage risks.	69	0	3.68	4.00	4	1.131
The board of directors in my organization is actively involved in monitoring and holding management accountable for internal control-related issues.	69	0	3.78	4.00	4	1.110
The control environment of my organization fosters a culture of honesty, integrity, and accountability.	69	0	3.87	4.00	4	1.042

Employees in my organization are encouraged to report suspicious activity without fear of retaliation.	69	0	3.84	4.00	4	1.080
My organization has effective processes in place to identify and address internal control weaknesses that could lead to fraudulent activity.	69	0	3.87	4.00	4	1.136

Table 4.2 presents a thorough examination of participant responses concerning the organization's control environment and its role in preventing fraud. Respondents consistently conveyed positive viewpoints, with mean scores spanning from 3.68 to 3.87 across all statements. The median and mode scores consistently indicated a favorable assessment of the control environment's effectiveness, with median values predominantly hovering around 4 and mode values clustering around 4 and 5. Low standard deviations, ranging from 1.042 to 1.202, hinted at limited variability in responses, signifying a shared consensus among participants.

Within the statements, "The control environment of my organization fosters a culture of honesty, integrity, and accountability" garnered the highest mean score of 3.87, reflecting a strong collective agreement on this aspect. Conversely, "My organization places a high priority on creating a strong control environment to reduce the likelihood of fraud" recorded the lowest mean score of 3.71, indicating a slightly lower level of consensus.

**Table 4. 3: Risk Assessment**

	N		Mean	Median	Mode	Std. Deviation
	Valid	Missing				
I believe that a thorough risk assessment procedure is important in identifying and combating fraud in Kenyan banks.	69	0	4.01	4.00	4 <sup>a</sup>	0.993
I believe that the use of electronic devices and risk scoring models is an effective technique for risk assessment in Kenyan banks.	69	0	3.64	4.00	4	0.923

I believe that customer due diligence (CDD) is an effective method for identifying and preventing fraud in Kenyan banks.	69	0	3.88	4.00	4	1.008
I believe that employee risk assessment is a crucial element of risk analysis in Kenyan banks.	69	0	3.88	4.00	4	0.900
I believe that employee screening is a critical step in the risk assessment process in Kenyan banks.	69	0	3.90	4.00	4	1.017
I believe that Kenyan banks should conduct an annual risk assessment of their operations to identify and prioritize their fraud risks.	69	0	3.91	4.00	4	0.870
I believe that Kenyan banks should update their risk assessment anytime there are substantial changes to the business environment.	69	0	4.00	4.00	4	0.939
I believe that efficient controls can be developed to reduce fraud risks through a thorough risk assessment procedure.	69	0	3.94	4.00	4	0.968
I believe that identifying and prioritizing fraud risks is an important step in the risk assessment process in Kenyan banks.	69	0	3.99	4.00	4	0.993
I believe that creating efficient procedures to reduce fraud risks is an important outcome of a thorough risk assessment procedure in Kenyan banks.	69	0	3.91	4.00	4	1.025
a. Multiple modes exist. The smallest value is shown						

Table 4.3 offers a comprehensive overview of participant responses related to the importance of risk assessment procedures in identifying and addressing fraud in Kenyan banks. Across all statements, respondents consistently expressed positive opinions, with mean scores ranging from 3.64 to 4.01. The median and mode scores further illustrated a favorable perception of the efficacy of risk assessment procedures, with median values predominantly at 4, and mode values centered around 4a and 4. The standard deviations, ranging from 0.870 to 1.025, suggested a

relatively low level of variability in responses, indicating a collective consensus among participants.

Specifically, the statement "I believe that a thorough risk assessment procedure is important in identifying and combating fraud in Kenyan banks" received the highest mean score of 4.01, reflecting a strong agreement among respondents. Conversely, "I believe that the use of electronic devices and risk scoring models is an effective technique for risk assessment in Kenyan banks" had the lowest mean score of 3.64, indicating a slightly lower level of agreement on this particular statement.

**Table 4. 4: Control activities**

	N		Mean	Median	Mode	Std. Deviation
	Valid	Missing				
The control activities in my organization are effective in reducing the risk of fraud.	69	0	3.83	4.00	5	1.137
The policies and practices employed by my organization effectively handle the risks identified during the risk assessment process.	69	0	3.59	4.00	4	0.975
The authorization procedures in my organization are strong and effective in preventing fraudulent transactions.	69	0	3.70	4.00	4	1.102
I am confident that transactions are carried out only by authorized parties in my organization.	69	0	3.67	4.00	4	1.133
Segregation of tasks is well implemented in my organization to prevent fraud.	69	0	3.64	4.00	4	1.084
The division of responsibilities for managing cash, accounting and reconciliation in my organization reduces the risk of fraud.	69	0	3.78	4.00	4	1.123
I am satisfied that no one person has exclusive control over a process in my organization, making it harder for fraud to go unnoticed.	69	0	3.70	4.00	4	1.129

My organization has effective IT controls to detect and manage fraud.	69	0	3.77	4.00	4	1.190
My organization employs access controls to restrict access to important information and safeguard consumer data.	69	0	3.68	4.00	4	1.118
My organization routinely checks its systems for any unusual behaviour to detect and prevent potentially fraudulent technological activity.	69	0	3.71	4.00	5	1.099

Table 4.4 offers a comprehensive examination of participant responses concerning the effectiveness of control activities in mitigating fraud risk within their respective organizations. Participants consistently conveyed positive perspectives across various statements, with mean scores ranging from 3.59 to 3.83. The median values, predominantly centered at 4, and mode values clustering around 4 and 5, indicated a favorable outlook on the efficacy of control activities. The standard deviations, ranging from 0.975 to 1.190, suggested a moderate level of variability in responses, reflecting a general consensus among participants.

In particular, the statement "The control activities in my organization are effective in reducing the risk of fraud" achieved the highest mean score of 3.83, signaling a strong consensus among participants. Conversely, "The policies and practices employed by my organization effectively handle the risks identified during the risk assessment process" attained the lowest mean score of 3.59, suggesting a slightly lower level of agreement on this specific statement.

**Table 4. 5: Information and Communication**

Statement	N		Mean	Median	Mode	Std. Deviation
	Valid	Missing				
The communication channels of my bank are effective in detecting fraudulent actions.	69	0	3.14	3.00	2	1.088
My bank has implemented measures such as whistle-blower hotlines to enable the reporting of suspected fraudulent acts anonymously.	69	0	3.10	3.00	3	1.165

I feel confident that my bank's fraud prevention training programs are effective in raising fraud awareness among its employees.	69	0	3.38	4.00	4	1.099
My bank emphasizes the importance of employee participation in fraud prevention.	69	0	3.20	3.00	3	1.220
I am aware of the different types of fraudulent activities that can happen in the banking sector, thanks to my bank's training sessions on fraud awareness and prevention.	69	0	3.28	3.00	4	1.174
My bank has proper methods for reporting suspected fraudulent activity.	69	0	3.33	4.00	4	1.245
My bank's adoption of fraud detection software has improved its communication channels and helped combat fraud.	69	0	3.33	3.00	3 <sup>a</sup>	1.172
I feel confident that my bank's fraud detection software is effective in detecting fraudulent activity.	69	0	3.48	4.00	4	1.290
My bank should continue to invest in technical solutions to improve its communication channels and prevent fraud.	69	0	3.52	4.00	4	1.158
I believe that effective information and communication systems are essential for an efficient internal control system in the Kenyan banking sector.	69	0	3.46	4.00	4	1.220

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a. Multiple modes exist. The smallest value is shown

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In Table 4.5 an in-depth analysis of participant responses regarding the efficacy of information and communication channels and fraud detection measures in the banking sector is presented. Across all statements, participants expressed varying viewpoints, with mean scores ranging from 3.10 to 3.52. The median values, centered at different points between 3 and 4, and the presence of multiple modes indicated diverse perspectives on the effectiveness of information and communication channels and fraud prevention measures. The standard deviations, ranging from 1.088 to 1.290, signified a considerable level of variability in responses.



The communication channels of my bank are effective in detecting fraudulent actions" earned a mean score of 3.14, showcasing a notable degree of agreement among participants. In contrast, "My bank should continue to invest in technical solutions to improve its communication channels and prevent fraud" secured a higher mean score of 3.52, indicating an even stronger consensus among participants regarding the potential benefits of investing in technical solutions to enhance communication channels and deter fraud.

**Table 4. 6: Monitoring**

	N		Mean	Median	Mode	Std. Deviation
	Valid	Missing				
My bank's monitoring procedures effectively detect and prevent fraudulent activities.	69	0	3.59	4.00	4	1.142
My bank invests in cutting-edge fraud detection technologies to monitor transactions for abnormalities.	69	0	3.43	3.00	4	0.962
My bank periodically audits its internal control systems to ensure they are working properly.	69	0	3.58	4.00	4	1.090
My bank's monitoring procedures effectively identify any systemic flaws that fraudsters might try to use.	69	0	3.58	4.00	4	1.063
My bank's transaction monitoring is effective in identifying fraudulent activities.	69	0	3.48	4.00	4	1.066
My bank has put in place adequate procedures to monitor its employees for any suspicious behavior.	69	0	3.59	4.00	4	1.129
My bank's monitoring procedures are an essential element of its internal control system.	69	0	3.55	4.00	4	1.065
My bank's management encourages reporting of any suspicious activity by its employees.	69	0	3.54	4.00	4	1.267
My bank provides adequate training to its employees on fraud detection .	69	0	3.75	4.00	4	1.063
My bank's monitoring procedures have been effective in preventing fraudulent activities in the past.	69	0	3.52	4.00	4	1.133

In Table 4.6, a comprehensive examination of participant responses regarding the effectiveness of monitoring procedures and fraud detection measures in the banking sector is presented. Across all statements, participants conveyed diverse perspectives, with mean scores ranging from 3.43 to 3.75. The mode values, consistently centered around 4, highlight a prevalent consensus on the perceived effectiveness of monitoring procedures and fraud prevention measures. The standard deviations, ranging from 0.962 to 1.267, signify a notable level of variability in responses, indicating a range of opinions within the consensus. Specifically, the statement "My bank's monitoring procedures effectively detect and prevent fraudulent activities" achieved a mean score of 3.59, aligning with the mode and emphasizing a considerable level of agreement among respondents. Conversely, "My bank invests in cutting-edge fraud detection technologies to monitor transactions for abnormalities" received a mean score of 3.43, suggesting a slightly lower but still favourable consensus among participants regarding the effectiveness of the bank's investment in advanced fraud detection technologies.

**Table 4. 7: Fraud Detection**

Statement	N		Mean	Median	Mode	Std. Deviation
	Valid	Missing				
I believe that my organization has effective measures in place to detect and prevent fraud.	69	0	3.78	4.00	5	1.402
My colleagues are well trained to identify and report suspicious activities that may lead to fraudulent behaviour.	69	0	3.67	4.00	4	1.120
I feel confident that our fraud prevention policies are regularly reviewed and updated to reflect changing risks.	69	0	3.86	4.00	5	1.154
I believe that our organization has a culture that strongly discourages fraudulent behaviour.	69	0	3.72	4.00	4	1.110
I think that our organization provides adequate resources to support fraud detection and prevention efforts.	69	0	3.90	4.00	5	1.152
I believe that employees are held accountable for adhering to our organization's fraud prevention policies.	69	0	3.71	4.00	4	1.214
All employees in the bank are comfortable reporting potential fraudulent activity without fear	69	0	3.75	4.00	4 <sup>a</sup>	1.242

of retaliation.

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a. Multiple modes exist. The smallest value is shown

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In Table 4.7, an in-depth examination of participant responses regarding the effectiveness of fraud prevention measures and the organizational culture in deterring fraudulent behaviour is presented. Across all statements, participants conveyed varying opinions, with mean scores ranging from 3.67 to 3.90. The median values, centered at 4, and the presence of multiple modes indicate diverse perspectives on the efficacy of fraud prevention measures and the organizational culture against fraudulent behaviour. The standard deviations, ranging from 1.120 to 1.242, suggest a notable level of variability in responses, reflecting differing viewpoints among participants.

Specifically, the statement "I believe that my organization has effective measures in place to detect and prevent fraud" garnered a mean score of 3.78, indicating a substantial consensus among participants. Conversely, "My colleagues are well trained to identify and report suspicious activities that may lead to fraudulent behaviour" received a mean score of 3.67, suggesting a slightly lower but still favourable agreement among respondents regarding the effectiveness of colleagues' training in identifying and reporting suspicious activities. These results underscore varying perspectives among participants concerning the perceived effectiveness of different measures in preventing fraudulent activities within the organization.

## 4.5 Diagnostic Test

### 4.5.1 Normality Test

The distribution of the data should exhibit an inclination towards normality, as evidenced by the presence of a bell-shaped curve, a characteristic feature of datasets following a normal distribution pattern. The evaluation of normality involves using the Shapiro-Wilk test, where a significance level exceeding 0.05 indicates adherence to a normal distribution. Conversely, p-values below 0.05 suggest that the data deviates from a normal distribution.

**Table 4. 8: Normality Test Table**

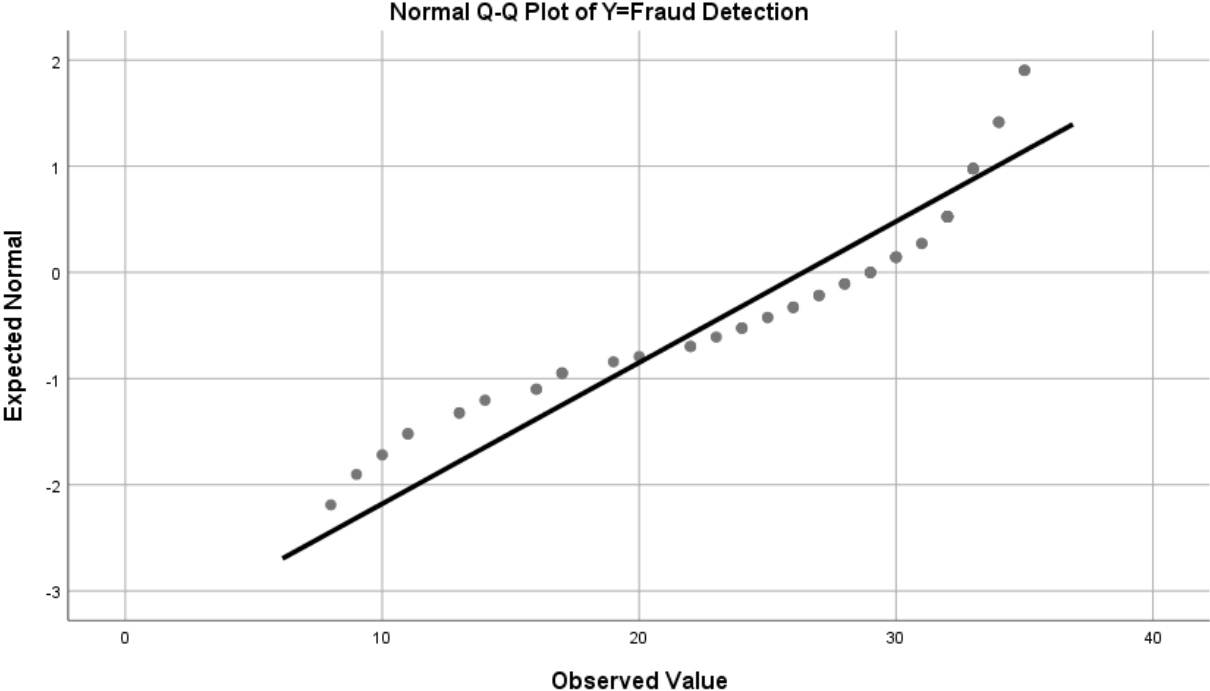
Tests of Normality						
	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Y=Fraud Detection	.163	69	.000	.871	69	.000
X2=Risk Assessment	.139	69	.002	.922	69	.000
XI= Control Environment	.159	69	.000	.890	69	.000
X3=Control Activities	.144	69	.001	.915	69	.000
X4=Information and Communication	.137	69	.003	.932	69	.001
X5=Monitoring	.140	69	.002	.932	69	.001

a. Lilliefors Significance Correction

In light of the outcomes obtained through the Shapiro-Wilk test, it was notable that the p-values for all variables were found to be below the 0.05 threshold. This suggests that the data distribution for each of these variables deviates from a normal distribution. Consequently, in order to facilitate the appropriate use of standardized variables in correlation and regression analyses, a prerequisite was to standardize these variables in advance.

### 4.5.2 Linearity Test

The purpose of conducting a linearity test is to verify the presence of linear patterns within the variables. This evaluation entails utilizing visual representations such as normal plots, aiding in the identification of potential linear characteristics in the variables. By scrutinizing these plots, it becomes feasible to ascertain the existence of linear patterns within the variables.



Figur4. 1:Normal Q-Q Plot of Y= Fraud Detection

### 4.5.3 Multicollinearity Test

A multicollinearity test was performed to assess the independence of the independent variables and confirm that they were not subsets of one another. This examination involved calculating Variable Inflation Factors (VIF), where values surpassing 10 indicated noteworthy collinearity among the independent variables, potentially impacting the accuracy of the regression analysis.

**Table 4. 9: Multicollinearity Test**

		Collinearity Statistics	
Model		Tolerance	VIF
1	(Constant)		
	X1= Control Environment	.447	2.237
	X2=Risk Assessment	.814	1.228
	X3=Control Activities	.362	2.761
	X4=Information and Communication	.360	2.776
	X5=Monitoring	.346	2.889

Table 4.3 provides a comprehensive overview of the independent variables, accompanied by their respective Variance Inflation Factor (VIF) values. A noteworthy observation emerges as all VIF values consistently fall below 10. This finding strongly suggests the absence of substantial multicollinearity among the independent variables. The indication of VIF values below the threshold of 10 reflects a minimal degree of intercorrelation among these variables.

#### 4.5.4 Heteroscedasticity

The Breusch-Pagan test assesses whether the variability of errors (residuals) in a regression model is impacted by the values of the independent variables. A p-value below 0.05 from the test indicates the absence of heteroscedasticity, suggesting that the error variance remains relatively consistent across different levels of the independent variables. Conversely, a p-value exceeding 0.05 signals the presence of heteroscedasticity, signifying that the error variance does significantly vary with different values of the independent variables.

**Table 4. 10: Breusch-Pagan Test**

Breusch-Pagan Test for Heteroskedasticity <sup>a,b,c</sup>		
Chi-Square	df	Sig.
11.387	1	.001

In Table 4.10, a notable p-value of 0.001 is observed. With  $P < 0.05$ , this low p-value leads us to reject the null hypothesis, implying that the variance of the errors is influenced by the values of



the independent variables. Essentially, this points to the existence of heteroscedasticity in the regression model. To ensure the effective utilization of standardized variables in correlation and regression analyses, it was crucial to standardize these variables beforehand.

#### 4.6 Correlation Analysis

**Table 4. 11: Correlation Analysis Table**

	Y	X1	X2	X3	X4	X5
Spearman's rho	1.000					
Y=Fraud Detection						
X1= Control Environment	.735**	1.000				
X2=Risk Assessment	.365**	.509**	1.000			
X3=Control Activities	.730**	.674**	.335**	1.000		
X4=Information and Communication	.663**	.674**	.392**	.630**	1.000	
X5=Monitoring	.679**	.698**	.476**	.673**	.724**	1.000

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

Spearman's coefficients were applied to evaluate correlations among the study variables following the standardization of data, considering its non-parametric nature. Focusing on the primary column, particularly linked to the dependent variable (Fraud Detection), the correlation analysis revealed unique associations regarding the independent variables.

There was a robust positive and highly significant correlation between Control Environment (X1) and Fraud Detection ( $\rho = 0.735$ ,  $p > 0.01$ ) underscores the influential impact of the control

environment on the efficacy of fraud detection. This highlights the pivotal role of a well-established control environment in significantly enhancing an organization's capacity to identify and address fraudulent activities.

Risk Assessment had a positive moderate significant correlation with Fraud Detection ( $\rho = 0.365$ ,  $p > 0.01$ ) underscoring the noteworthy association between the degree of risk assessment within an organization and its effectiveness in fraud detection. This emphasized the importance of implementing thorough risk assessment practices to augment the organization's capabilities in detecting fraudulent activities.

Control Activities exhibited a strong positive significant correlation with Fraud Detection ( $\rho = 0.730$ ,  $p > 0.01$ ). This signifies that the effectiveness of control activities significantly influences the detection of fraudulent activities. Organizations with robust control activities are better equipped to identify and mitigate fraudulent actions, contributing to an overall effective fraud detection system.

Similarly, Information and Communication demonstrated a strong positive significant correlation with Fraud Detection ( $\rho = 0.663$ ,  $p > 0.01$ ). This underscores that the quality of information exchange and communication within an organization plays a substantial role in contributing to fraud detection. Effective communication channels and information flow enhance the organization's ability to identify and address fraudulent activities.

Monitoring exhibited a strong positive significant correlation with Fraud Detection ( $\rho = 0.679$ ,  $p > 0.01$ ). This highlights that the level of monitoring activities within an organization aid in fraud detection. Frequent and diligent monitoring practices play a crucial role in identifying and mitigating fraudulent activities, contributing to an effective fraud detection system.

## 4.7 Regression Analysis

Regression analysis serves as a statistical approach employed for the exploration and quantification of the connection between a dependent variable and one or more independent variables. The primary objective is to grasp the correlation between alterations in the independent variables and corresponding changes in the dependent variable. In regression analysis, the formulation of a mathematical model becomes pivotal, encapsulating this relationship. Such a model facilitates the prediction or estimation of the dependent variable by considering the values of the independent variables.

### 4.7.1 Regression Model Summary

To evaluate fraud detection, the study utilized a regression model summary expressed as:  $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \varepsilon$ . This equation incorporated variables such as control environment, risk assessment, control activities, information and communication, and monitoring. The all-encompassing model yielded valuable insights into the interconnections among these elements and their combined impact on fraud detection.

**Table 4. 12: Regression Analysis Model Table**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.832 <sup>a</sup>	.692	.668	.57641152

The R-squared (R<sup>2</sup>) value observed in the model summary table, specifically at 0.692, implied that approximately 69.2% of the variability in the dependent variable was explained by the collective influence of the independent variables in the model. This indicated that a substantial proportion of the observed fluctuations in the dependent variable was accounted for by the model's regression equation.

Regarding the adjusted R-squared (Adjusted R<sup>2</sup>), recorded at 0.668, it serves as a refined evaluation considering both predictors and sample size. This adjusted value offered a more realistic estimate of the model's explanatory power. In this instance, the moderately high adjusted R-squared value suggested that the model is statistically significant and therefore it was well-suited for explaining the variation in the dependent variable, even after considering the number of predictors and sample size. The included predictors demonstrated a meaningful contribution to elucidating the dependent variable under examination.

#### 4.7.2 Analysis of Variance

An examination of variance was performed to assess the decision-making process regarding whether to accept or reject the null hypothesis. The model's significance was ascertained by contrasting the p-value with a predetermined significance threshold, typically set at 0.05. Should the p-value be lower than 0.05, it signifies a noteworthy relationship, thereby categorizing the model as statistically significant.

**Table 4. 13: ANOVA Test Table**

ANOVA <sup>a</sup>						
Model	Sum	of	df	Mean	F	Sig.
	Squares			Square		

1	Regression	47.068	5	9.414	28.333	.000 <sup>b</sup>
	Residual	20.932	63	.332		
	Total	68.000	68			

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The ANOVA analysis table unveiled a significant F-statistic, signifying the effectiveness of the regression model in explaining the observed variability in the dependent variable. With the p-value (Sig.) at 0.000, below the threshold of 0.05, we reject the null hypothesis. This indicates a statistically significant relationship between the provided predictors and the dependent variable. Therefore, the model offers compelling evidence to affirm a significant association between the variables under scrutiny.

#### 4.7.3 Regression Coefficient

Regression coefficients in a statistical model quantify the strength and direction of the relationship between an independent variable and the dependent variable. The p-value associated with each regression coefficient indicates the statistical significance of the relationship. If the p-value is below 0.05, it suggests that the corresponding variable is deemed statistically significant. This indicates that the variable contributes meaningfully to explaining the variability in the dependent variable and is an important factor in the model. Conversely, if the p-value is above 0.05, the variable is not considered statistically significant

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Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	

1	(Constant)		-4.605E-16	.069		.000	1.000
	Zscore: XI= Control Environment		.496	.105	.496	4.744	.000
	Zscore: X2=Risk Assessment		.002	.077	.002	.028	.978
	Zscore: X3=Control Activities		.124	.116	.124	1.070	.289
	Zscore: X4=Information and Communication		.148	.116	.148	1.273	.208
	Zscore: X5=Monitoring		.163	.119	.163	1.369	.176

**Table 4. 14: Regression Coefficient Table**

In the examination of the regression analysis using the specified values for the provided data, the results unfold as follows: The constant term ( $\beta_0$ ) is remarkably close to zero, approximately -4.605E-16, and is not statistically significant ( $p = 1.000$ ). This suggests that the constant term does not make a significant contribution to the model.

Exploring the independent variables, the Zscore for Control Environment (XI) ( $\beta = 0.496$ ,  $p = 0.000$ ) exhibits a highly statistically significant impact on the dependent variable (Fraud Detection). Conversely, Risk Assessment (X2) ( $\beta = 0.002$ ,  $p = 0.978$ ), Control Activities (X3) ( $\beta = 0.124$ ,  $p = 0.289$ ), Information and Communication (X4) ( $\beta = 0.148$ ,  $p = 0.208$ ), and Monitoring (X5) ( $\beta = 0.163$ ,  $p = 0.176$ ) do not demonstrate statistically significant relationships with Fraud Detection.

#### **4.8 Interpretation of Findings**

Standard deviations ranging from 1.042 to 1.202 indicated a low level of variability, signifying that participants predominantly agreed on the positive impact of the control environment in fostering ethical behaviour and deterring fraud. The clustering of mode values around 4 and 5 emphasizes that participants highly agreed on the effectiveness of the control environment. Standard deviations between 0.870 and 1.025 pointed to a collective consensus, with participants highly agreeing on the importance of thorough risk assessment procedures. The mode values centered around 4 and 4a indicated that participants highly agreed on the need of comprehensive risk assessment in identifying fraud.

A moderate level of variability in control activities was indicated by standard deviations ranging from 0.975 to 1.190. This reflected that participants agreed on the efficacy of control activities in reducing fraud risk. The mode values predominantly centered around 4 and 5 signified that respondents highly agreed on the effectiveness of control activities in detecting fraudulent activities.

Notable variability in information and fraud detection was evident with standard deviations from 1.088 to 1.290, suggesting diverse perspectives on the effectiveness of information and communication in fraud prevention. While mean scores provided an overall positive outlook, mode between 2 and 4 suggested a diverse range of opinions among participants. This indicated that while there was some agreement on the effectiveness of information and communication in detecting fraud, there is also a notable presence of disagreement on the same. This signifies varying degrees of confidence in the ability of information technology to detect and prevent fraud, therefore underscoring skepticism about the efficacy of information and communication in detecting fraudulent activities.

Concerning monitoring, considerable variability was reflected in standard deviations ranging from 0.962 to 1.290. This pointed to differing opinions on the impact of monitoring procedures and fraud prevention measures. A mode of 4 ascertained that participants predominantly agreed that the monitoring procedures in fraud detection were effective. Emphasizing that the implemented monitoring procedures contribute positively to detecting fraudulent activities.

Standard deviations between 1.120 and 1.242 highlighted a notable level of variability in responses regarding fraud detection. Despite an overall favourable agreement, the wider spread of opinions suggests diversity in participants' views. The mode values around 4 indicate that participants agreed significantly on the effectiveness of internal control systems in detecting against fraudulent behaviour.

The study's findings unveil robust positive correlations between key organizational variables and fraud detection, highlighting their crucial role in identifying and addressing fraudulent activities. The highly significant correlation ( $\rho = 0.735$ ,  $p > 0.01$ ) between Control Environment and Fraud Detection underscores the substantial impact of a well-established control environment on the efficacy of fraud detection, emphasizing the importance of fostering an ethical culture.

Furthermore, the moderate yet positive correlation ( $\rho = 0.365$ ,  $p > 0.01$ ) between Risk Assessment and Fraud Detection emphasizes the association between thorough risk assessment practices and effective fraud detection. This underscores the need for organizations to implement comprehensive risk assessment procedures to enhance their capabilities in detecting fraudulent activities.

Control Activities demonstrate a strong positive significant correlation with Fraud Detection ( $\rho = 0.730$ ,  $p > 0.01$ ), indicating that effective control measures significantly influence the detection



of fraudulent activities. Organizations with robust controls are better equipped to identify and mitigate fraudulent actions, contributing to an overall effective fraud detection system.

Similarly, the strong positive significant correlation ( $\rho = 0.663$ ,  $p > 0.01$ ) between Information and Communication and Fraud Detection highlights the substantial role of quality information exchange and communication within an organization in contributing to fraud detection. Effective communication channels and information flow enhance the organization's ability to identify and address fraudulent activities.

The strong positive significant correlation ( $\rho = 0.679$ ,  $p > 0.01$ ) between Monitoring and Fraud Detection underscores that the level of monitoring activities within an organization plays a crucial role in fraud detection. Frequent and diligent monitoring practices contribute significantly to identifying and mitigating fraudulent activities, enhancing an effective fraud detection system.

The regression analysis of the model indicated a noteworthy influence of the predictors on the variance in the dependent variable. The R-squared ( $R^2$ ) value, standing at 0.692, suggested that approximately 69.2% of the variability in the dependent variable could be ascribed to the collective impact of the independent variables incorporated into the model. This substantial R-squared value implied that the model's regression equation offered a robust explanation for the observed fluctuations in the dependent variable. Furthermore, the adjusted R-squared (Adjusted  $R^2$ ) value, recorded at 0.668, took into account the number of predictors and the sample size. This high adjusted R-squared value indicated that the model was statistically significant, demonstrating its suitability for explaining the variation in the dependent variable. The factors considered in the analysis demonstrated a significant and impactful role in explaining the changes observed in the dependent variable under investigation.

The ANOVA analysis highlights that only one of the predictors contributed significantly to explaining the variance in the dependent variable, as evidenced by the statistically significant impact of Control Environment on fraud detection. The non-significant relationships observed for Risk Assessment, Control Activities, Information and Communication, and Monitoring suggest that these variables might not be robust in fraud detection. This challenges the model's effectiveness in capturing the relationships between these specific variables and fraud detection. Further refinement or exploration of additional factors influencing fraud detection may be warranted for a more comprehensive understanding.

Mohd-Sanusi et al. (2015) and Nyakarimi, Kariuki, and Kariuki's (2020) research within Kenya's banking sector unveiled a positive correlation between internal control systems and fraud detection, aligning with the current study's findings that also revealed a positive correlation between internal control and fraud detection. In a similar vein, Mangala and Kumari (2017) established a positive correlation between internal control systems and fraud detection. This study substantiates and confirms their findings by also identifying a positive correlation between internal control systems and fraud detection. In line with Kabue's (2015) assessment and broader literature, our study echoes the discovery of a strong positive correlation between internal control and Fraud Detection. Moreover, Joseph, Albert, and Byaruhanga's (2015) investigation into local government treasuries and Nyakarimi, Kariuki, and Kariuki's (2020) research within Kenya's banking sector collectively affirm the efficacy of internal control systems in fraud detection. This thematic emphasis seamlessly aligns with the present study, which identified a substantial positive correlation between internal control systems and fraud detection. Idogei et al. (2019) underscored a positive correlation between internal control systems and fraud detection. This study extends the discourse by emphasizing the efficacy of internal control systems in fraud

detection, highlighting a robust positive correlation between internal control systems and fraud detection. These confirm the Fraud Triangle theory, which posits that internal control mechanisms are essential for mitigating the potential for fraud (Cressey, 1953).

However

## **CHAPTER 5: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This section presents a comprehensive overview of the study outcomes corresponding to predefined research objectives. It encompasses the conclusions drawn from these outcomes, offers valuable recommendations based on the study's findings, and underscores areas that might necessitate additional investigation.

### **5.2 Summary of Study Findings**

The comprehensive findings of the study indicate a positive and statistically significant impact of the examined variables on fraud detection within the banking sector. The developed model exhibits a robust ability to predict variations in fraud detection, as evidenced by a high R-squared (R<sup>2</sup>) value of 0.692. This suggests a substantial effectiveness of the model in elucidating the observed changes in fraud detection. Nevertheless, it's crucial to acknowledge that 30.8% of the variance in fraud detection remains unexplained, implying the potential influence of other unaccounted factors on the observed outcomes.

#### **5.2.1 The Effect of Control Environment on Fraud Detection**

The Control Environment, as a crucial component of internal control systems within organizations, plays a pivotal role in influencing fraud detection capabilities. In the current study, the positive and highly significant correlation between control environment and fraud detection underscores the integral connection between fostering a strong control environment and enhancing an organization's capacity to identify and address fraudulent activities. A well-established control environment cultivates a culture of honesty, integrity, and accountability, creating an atmosphere where fraudulent behaviour is less likely to occur. The findings suggest that organizations with a robust control environment are more adept at detecting and preventing

fraudulent activities, thereby contributing to an effective fraud detection system within the banking sector.

### **5.2.2 Effect of Risk Assessment on Fraud Detection**

A comprehensive and thorough risk assessment process equips organizations with the tools needed to identify potential areas of vulnerability to fraud. In this study the relationship between Risk Assessment and Fraud Detection is highlighted by a positive and moderately significant correlation. This correlation emphasizes the notable association between the depth of risk assessment practices within an organization and its effectiveness in detecting fraudulent activities. This suggests that organizations with robust risk assessment procedures are better positioned to detect and address fraudulent activities. It underscores the importance of implementing detailed risk assessment practices as a strategic approach to enhance the overall capabilities of fraud detection within the banking sector.

### **5.2.3 Effect of Control Environment and Fraud Detection**

Organizations with robust control activities are better equipped to create an environment that discourages fraudulent behaviour and effectively addresses potential risks. Control Activities exhibit a strong positive significant correlation with Fraud Detection in this particular study indicating that the effectiveness of control activities significantly influences the detection of fraudulent activities. This correlation underscores the crucial role that well-established control measures play in enhancing an organization's capacity to identify and mitigate fraudulent actions. The findings emphasize the strategic importance of implementing and maintaining effective control activities as a proactive measure to strengthen overall fraud detection capabilities within the banking sector.

#### **5.2.4 Effect of Information and Communication on fraud detection**

Organizations with efficient information and communication processes are better positioned to detect irregularities and potential fraudulent behaviour. Furthermore, the integration of advanced technology in Information and Communication processes can further bolster fraud detection capabilities. The strong positive significant correlation between Information and Communication and Fraud Detection highlights the substantial role of quality information exchange and communication within an organization in contributing to fraud detection. This correlation underscores the importance of effective communication channels and information flow in enhancing the organization's ability to identify and address fraudulent activities. The positive correlation between Information and Communication and Fraud Detection, coupled with the potential benefits of technological solutions, suggests that leveraging cutting-edge tools and systems for communication and information exchange can enhance the organization's overall ability to detect and prevent fraudulent activities. The findings underscore the significance of fostering a culture of transparent and effective communication and information exchange as a vital component of a comprehensive approach to fraud detection within the banking sector.

#### **5.2.5 Effect of Monitoring on Fraud Detection**

Frequent and rigorous monitoring practices contribute significantly to identifying patterns and anomalies indicative of fraudulent behavior. The strong positive correlation between Monitoring and Fraud Detection underscores the pivotal role of diligent monitoring activities in enhancing the organization's capabilities to detect and mitigate fraudulent actions. This correlation highlights the importance of establishing comprehensive monitoring procedures, which may involve both manual oversight and advanced technological solutions. It suggests that organizations investing in robust monitoring mechanisms are better equipped to safeguard

against fraudulent activities, emphasizing the critical nature of continuous vigilance in the banking sector.

### **5.3 Conclusion**

The study's comprehensive exploration of organizational variables in the banking sector reveals significant correlations with fraud detection, emphasizing their vital role in identifying and mitigating fraudulent activities. The well-established Control Environment demonstrates a highly significant correlation, highlighting the substantial impact of fostering an ethical culture on fraud detection efficacy. Similarly, the moderate yet positive correlation between Risk Assessment and Fraud Detection underscores the importance of thorough risk assessment practices for effective fraud detection.

Control Activities exhibit a strong positive correlation, indicating that robust control measures significantly contribute to the identification and mitigation of fraudulent actions, fostering an overall effective fraud detection system. Likewise, the strong positive correlation between Information and Communication and Fraud Detection emphasizes the substantial role of quality information exchange and communication within an organization in contributing to fraud detection. Effective communication channels and information flow enhance the ability to identify and address fraudulent activities.

The correlation between Monitoring and Fraud Detection underscores the crucial role of diligent monitoring practices in identifying and mitigating fraudulent activities, contributing significantly to an effective fraud detection system. The regression analysis reinforces these findings, indicating that approximately 69.2% of the variability in fraud detection can be attributed to the collective impact of the analyzed independent variables.

However, the ANOVA analysis highlights that only Control Environment significantly contributes to explaining the variance in fraud detection, while Risk Assessment, Control Activities, Information and Communication, and Monitoring show non-significant relationships. This suggests the need for further refinement or exploration of additional factors influencing fraud detection for a more comprehensive understanding. In conclusion, the study provides valuable insights into the complex relationships between organizational variables and fraud detection in the banking sector, offering directions for future research and practical implications for enhancing fraud detection measures.

#### **5.4 Recommendations**

The study's in-depth analysis of organizational variables within the banking sector offers compelling insights, leading to robust recommendations for optimizing fraud detection measures. A paramount recommendation involves strengthening the Control Environment, as evidenced by its highly significant correlation with Fraud Detection. Fostering an ethical culture, regular training, and establishing accountability mechanisms are crucial components. Fostering an ethical culture within an organization involves embedding principles of integrity and moral conduct into its core values, promoting transparency and responsibility across all levels. Regular training further ensures continuous education on fraud prevention, detection, and ethical practices, employing periodic sessions ranging from awareness campaigns to detailed workshops. This equips employees with the knowledge to identify and address potential fraudulent activities. Simultaneously, establishing accountability mechanisms includes implementing systems to hold individuals responsible for their actions. This entails defining clear roles, incorporating checks and balances, and creating a framework for reporting and investigating suspected fraudulent activities. These mechanisms act as deterrents, signalling that



unethical behaviour will be met with consequences, fostering a culture of responsibility and integrity within the organization.

Simultaneously, organizations should prioritize thorough Risk Assessment practices, leveraging comprehensive frameworks and continuous monitoring to identify vulnerabilities to fraud. Leveraging comprehensive frameworks" involves utilizing multifaceted structures like robust internal controls, thorough risk assessments, and industry best practices to comprehensively address fraud vulnerabilities. These frameworks offer a systematic approach to identify, assess, and mitigate fraud risks across organizational processes. Simultaneously, continuous monitoring underscores the vigilant scrutiny of activities through advanced technologies and data analytics to detect and address fraud vulnerabilities in real-time. This proactive approach, surpassing periodic checks, enables organizations to identify emerging threats promptly, adapting fraud prevention measures to prevent or minimize potential damages. Together, these practices create a dynamic and resilient fraud prevention ecosystem within the organization.

The optimization of Control Activities emerges as a key strategy, given its strong positive correlation with Fraud Detection. This entails regular assessments, technology integration, and proactive measures to mitigate fraudulent actions. Regular assessments involve systematic and routine evaluations of an organization's fraud prevention measures to ensure their effectiveness and relevance. This includes periodic reviews of internal controls, risk assessments, and fraud detection technologies. Technology integration refers to incorporating advanced tools and systems that enhance the organization's ability to detect and prevent fraudulent actions. This can include the use of artificial intelligence, machine learning, and data analytics to analyze patterns and identify anomalies indicative of fraud. Proactive measures involve taking anticipatory actions to prevent fraud before it occurs, rather than merely responding to incidents.

Effective Information and Communication play a pivotal role, with a strong positive correlation with Fraud Detection, necessitating investments in communication channels, information flow, and technological solutions. Investments in communication channels, information flow, and technological solutions signify allocating resources to enhance the organization's communication infrastructure, streamline information exchange, and leverage technology for improved efficiency and security. This involves implementing advanced communication systems, ensuring seamless information flow across departments, and adopting cutting-edge technological solutions such as cybersecurity measures and data encryption. By investing in these aspects, organizations can facilitate quick and secure communication, ensure the timely and accurate exchange of information, and strengthen their overall technological capabilities. This, in turn, contributes to the organization's ability to identify and address fraudulent activities effectively, as efficient communication and advanced technology are crucial components of a robust fraud detection system.

Lastly, diligent Monitoring Practices, underscored by a strong positive correlation, should be maintained through advanced tools, real-time data analysis, and continuous process improvement. Leveraging advanced tools involves deploying cutting-edge software and technologies, such as analytics tools and machine learning algorithms, to optimize specific tasks related to fraud detection. Real-time data analysis focuses on immediate examination of generated data, enabling quick identification of anomalies or potential fraudulent behaviour through advanced tools. Continuous process improvement emphasizes ongoing efforts to systematically enhance organizational processes, ensuring adaptability to evolving fraud schemes and incorporating lessons learned from past incidents. This iterative approach, rooted in learning from experience, enables the organization to refine strategies and stay ahead of emerging threats

in fraud detection. By implementing these recommendations collectively, organizations can fortify their fraud detection capabilities and foster a resilient defence against fraudulent activities in the dynamic landscape of the banking sector.

### **5.5 Limitation of the Study**

The research encountered challenges that were duly recognized in the course of its implementation. Initially, the primary approach for collecting data involved the use of questionnaires, a commonly used and effective tool. However, questionnaires come with inherent limitations. A significant concern revolved around the possibility of response bias and social desirability bias. To address this issue, the researcher took measures such as making the Google Form survey questionnaire anonymous, using clear language, and assuring participants of the confidentiality of their information.

The absence of statistical significance among the variables under investigation was also a limitation. Only one variable was statistically significant the rest were insignificant. The lack of statistical significance observed among the variables examined can be ascribed to various factors. One potential factor is the relatively modest sample size utilized in the study, which could diminish the statistical strength of the analysis, making it difficult to identify significant connections between variables. Furthermore, the selection of variables in the study model might not have sufficiently encompassed all relevant factors influencing the outcomes, resulting in a model with restricted explanatory capacity. It's also plausible that the study's scope may not have fully embraced all relevant variables that could aid in fraud detection.

The R-squared value of 69.2%, obtained from the model, although statistically meaningful, suggests that the model explains only a fraction of the variability in fraud detection, pointing to

the existence of unconsidered factors outside the model. It's important to highlight that the mentioned limitations do not notably compromise the credibility and dependability of this study.

### **5.6 Suggestions for Further Research**

To address the limitations identified in this study and enhance the understanding of internal control systems on fraud detection in commercial banks, future research avenues may involve adopting a mixed-methods approach. Integrating quantitative data from surveys with qualitative insights obtained through interviews can offer a more comprehensive and nuanced perspective, minimizing biases linked to questionnaire responses. Additionally, further investigation into the variables influencing fraud detection is warranted, considering the limitations in statistical significance observed among the variables in the current study. Future research should consider expanding the sample size and incorporating a more comprehensive set of variables to provide a more nuanced understanding of the factors affecting fraud detection within the banking sector. Despite the acknowledged limitations, the current study lays a foundation for future research to build upon and refine methodologies for a more comprehensive examination of fraud detection mechanisms.

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## APPENDICES

### Appendix I: Questionnaire

#### Part 1: General Profile

1. Give the name of the bank.
2. What is your role in the bank?
  - a) Branch manager
  - b) Financial manager
  - c) Head of department of internal control system
3. How many years have you worked in the banking industry?
  - a) Less than 1 year
  - b) 1-5 years
  - c) 6-10 years
  - d) 11-15 years
  - e) More than 15 years

#### Part 2: Detecting Fraud

This section examines fraud detection fraud in your bank. Kindly rate each statement using the following Likert scale:

(1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree

Statement	1	2	3	4	5
I believe that my organization has effective measures in place to detect and prevent fraud.					
My colleagues are well trained to identify and report suspicious activities that may lead to fraudulent behavior.					
I feel confident that our fraud prevention policies are regularly reviewed and updated to reflect changing risks.					
I believe that our organization has a culture that strongly discourages fraudulent behavior.					
I think that our organization provides adequate resources to support fraud					

detection and prevention efforts.					
I believe that employees are held accountable for adhering to our organization's fraud prevention policies.					
All employees in the bank are comfortable reporting potential fraudulent activity without fear of retaliation.					

### Part 3: Control Environment

This section examines control environment in your bank. Kindly rate each statement using the following Likert scale:

(1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree

Statement	1	2	3	4	5
The control environment of my organization promotes ethical behaviors and deters fraudulent activity.					
My organization places a high priority on creating a strong control environment to reduce the likelihood of fraud.					
The code of conduct in my organization emphasizes the importance of integrity, honesty, and professionalism.					
My organization invests in training and development initiatives that help employees identify and prevent fraud.					
Internal audits and external evaluations are regularly conducted in my organization to determine how well the control environment is working to detect and prevent fraud.					
My organization adheres to regulatory standards established by the Central Bank to maintain efficient internal control systems and manage risks.					
The board of directors in my organization is actively involved in monitoring and holding management accountable for internal control-related issues.					
The control environment of my organization fosters a culture of honesty, integrity, and accountability.					
Employees in my organization are encouraged to report suspicious activity without fear of retaliation.					
My organization has effective processes in place to identify and address internal control weaknesses that could lead to fraudulent activity.					

### Part 4: Risk Assessment

This section examines risk assessment in your bank. Kindly rate each statement using the following Likert scale:

(1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree

Statement	1	2	3	4	5
I believe that a thorough risk assessment procedure is important in identifying and combating fraud in Kenyan banks.					
I believe that the use of electronic devices and risk scoring models is an effective technique for risk assessment in Kenyan banks.					
I believe that customer due diligence (CDD) is an effective method for identifying and preventing fraud in Kenyan banks.					
I believe that employee risk assessment is a crucial element of risk analysis in Kenyan banks.					
I believe that employee screening is a critical step in the risk assessment process in Kenyan banks.					
I believe that Kenyan banks should conduct an annual risk assessment of their operations to identify and prioritize their fraud risks.					
I believe that Kenyan banks should update their risk assessment anytime there are substantial changes to the business environment.					
I believe that efficient controls can be developed to reduce fraud risks through a thorough risk assessment procedure.					
I believe that identifying and prioritizing fraud risks is an important step in the risk assessment process in Kenyan banks.					
I believe that creating efficient procedures to reduce fraud risks is an important outcome of a thorough risk assessment procedure in Kenyan banks.					

### Part 5: Control Activities

This section examines control activities in your bank. Kindly rate each statement using the following Likert scale:

(1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree

Statement	1	2	3	4	5
The control activities in my organization are effective in reducing the risk of fraud.					
The policies and practices employed by my organization effectively handle the risks identified during the risk assessment process.					
The authorization procedures in my organization are strong and effective in preventing fraudulent transactions.					

I am confident that transactions are carried out only by authorized parties in my organization.					
Segregation of tasks is well implemented in my organization to prevent fraud.					
The division of responsibilities for managing cash, accounting and reconciliation in my organization reduces the risk of fraud.					
I am satisfied that no one person has exclusive control over a process in my organization, making it harder for fraud to go unnoticed.					
My organization has effective IT controls to detect and manage fraud.					
My organization employs access controls to restrict access to important information and safeguard consumer data.					
My organization routinely checks its systems for any unusual behavior to detect and prevent potentially fraudulent technological activity.					

**Part 6: Information and Communication**

This section examines information and communication in your bank. Kindly rate each statement using the following Likert scale:

(1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree

Statement	1	2	3	4	5
The communication channels of my bank are effective in detecting fraudulent actions.					
My bank has implemented measures such as whistle-blower hotlines to enable the reporting of suspected fraudulent acts anonymously.					
I feel confident that my bank's fraud prevention training programs are effective in raising fraud awareness among its employees.					
My bank emphasizes the importance of employee participation in fraud prevention.					
I am aware of the different types of fraudulent activities that can happen in the banking sector, thanks to my bank's training sessions on fraud awareness and prevention.					
My bank has proper methods for reporting suspected fraudulent activity.					
My bank's adoption of fraud detection software has improved its communication channels and helped combat fraud.					
I feel confident that my bank's fraud detection software is effective in detecting fraudulent activity.					
My bank should continue to invest in technical solutions to improve its communication channels and prevent fraud.					
I believe that effective information and communication systems are essential					

for an efficient internal control system in the Kenyan banking sector.					
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**Part 7: Monitoring**

This section examines monitoring in your bank. Kindly rate each statement using the following Likert scale:

(1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly agree

Statement	1	2	3	4	5
My bank's monitoring procedures effectively detect and prevent fraudulent activities.					
My bank invests in cutting-edge fraud detection technologies to monitor transactions for abnormalities.					
My bank periodically audits its internal control systems to ensure they are working properly.					
My bank's monitoring procedures effectively identify any systemic flaws that fraudsters might try to use.					
My bank's transaction monitoring is effective in identifying fraudulent activities.					
My bank has put in place adequate procedures to monitor its employees for any suspicious behavior.					
My bank's monitoring procedures are an essential element of its internal control system.					
My bank's management encourages reporting of any suspicious activity by its employees.					
My bank provides adequate training to its employees on fraud detection .					
My bank's monitoring procedures have been effective in preventing fraudulent activities in the past.					

**Thank you!**

## Appendix II: List of Commercial Banks Licenced by CBK

1. ABC Bank (Kenya)
2. Absa Bank Kenya
3. Access Bank Kenya
4. Bank of Africa
5. Bank of Baroda
6. Bank of India
7. Citibank
8. Consolidated Bank of Kenya
9. Cooperative Bank of Kenya
10. Credit Bank
11. Development Bank of Kenya
12. Diamond Trust Bank
13. Dubai Islamic Bank
14. Ecobank Kenya
15. Equity Bank Kenya
16. Family Bank
17. First Community Bank
18. Guaranty Trust Bank Kenya
19. Guardian Bank
20. Gulf African Bank
21. Habib Bank AG Zurich
22. Housing Finance Company of Kenya
23. I&M Bank
24. Imperial Bank Kenya
25. Kingdom Bank Limited
26. Kenya Commercial Bank
27. Mayfair Bank
28. Middle East Bank Kenya
29. M Oriental Bank
30. National Bank of Kenya
31. NCBA Bank Kenya
32. Paramount Universal Bank
33. Prime Bank (Kenya)
34. SBM Bank Kenya
35. Sidian Bank
36. Spire Bank
37. Stanbic Holdings Plc
38. Standard Chartered Kenya
39. United Bank for Africa
40. Victoria Commercial Bank