

**FRAUD RISK MANAGEMENT PRACTICES AND OPERATIONAL PERFORMANCE
OF HORTICULTURAL FIRMS IN KENYA MODERATED BY FIRM SIZE.**

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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ABSTRACT

Kenya's horticultural sector is a major contributor to the economy, generating KES 136.6 billion in export earnings in 2024 and creating significant employment opportunities. However, the sector faces persistent revenue losses linked to increasing fraud risks. Fraud-related losses rose from 4.2% in 2018 to 5.0% in 2020 before slightly declining to 4.7% in 2022. Given that industry fraud losses are typically expected to remain below 2–3%, the 4–5% losses reported indicate a serious financial challenge, especially for firms operating on narrow profit margins. Therefore, this study examined the effect of fraud risk management (FRM) practices on the operational performance of horticultural firms in Kenya, with firm size as a moderating variable. Specifically, it assessed the influence of internal controls, audit and monitoring practices, legal compliance strategies, and electronic security measures on operational performance. This study was anchored on three theoretical perspectives: the Resource-Based View, Social Learning Theory, and the Fraud Management Lifecycle Theory. A positivist research philosophy guided this study, which targeted 236 horticultural firms in Kenya. Using a descriptive cross-sectional design, we applied a cluster random sampling technique to select a sample of 73 firms from different regions. The study focused on key personnel within these firms, including accountants, operations managers, and compliance managers, with a total of six respondents drawn from each firm, resulting in a total sample of 438 participants in the study. Data were collected using a structured questionnaire comprising closed-ended (Likert scale) items to generate quantitative results. Data analysis involved both descriptive and inferential techniques. Descriptive statistics, such as means, standard deviations, and frequencies, were used to summarize the data, while inferential methods were employed to examine the relationships between variables. The results of the multiple regression analysis without moderation indicated that all FRM practices (internal controls, auditing and monitoring, legal compliance, and electronic security) had a significant positive effect on operational performance. This suggests that these factors collectively contribute to variations in the performance of horticultural firms. Upon introducing firm size as a moderating variable, the findings revealed that it significantly strengthened the relationship between FRM practices and operational performance. Larger firms exhibited stronger positive effects, which was supported by the significant interaction terms between the independent and dependent variables. This indicates that firm size enhances the effectiveness of FRM in improving operational outcomes. In conclusion, this study provides empirical evidence on the relationship between Fraud risk management practices and operational performance within Kenya's horticultural sector and further demonstrates the moderating role of firm size, showing that larger firms are better positioned to enhance the effectiveness of FRM practices due to greater resource availability.

Based on these findings, future research should explore additional moderating factors, such as technology adoption, corporate governance structures, and organizational culture, and incorporate perspectives from a broader range of stakeholders.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACFE – Association of Certified Fraud Examiners

AFA – Agriculture and Food Authority

DMB – Deposit Money Banks

FML – Fraud Management Lifecycle

FRM – Fraud Risk Management

GDP – Gross Domestic Product

NGO – Non-Governmental Organizations

RBV – Resource-Based View

DEFINITION OF TERMS

Fraud Risk Management Practices	In this study, FRM practices are defined as structured mechanisms for detecting, preventing, and responding to fraudulent activities. (Sanusi et al., 2025).
Fraud Risk	It is the potential exposure an organization faces due to intentional deception or unethical behaviour aimed at financial gain (Okoth, 2022).
Moderating	It is a factor that influences the strength or direction of the relationship between an independent and dependent variable, affecting the overall outcome of a study (Kothari, 2019).
Operational Performance	In the context of horticultural firms, operational performance reflects the ability of firms to produce high-quality products, minimise wastage and losses, meet customer and export market requirements, and ensure timely delivery while maintaining cost efficiency (Kaydos, 2020).

DEDICATION

I dedicate this work to my parents, Mr. and Mrs. Mwandime Mbandi, whose unconditional love, guidance, sacrifices, and unwavering support have been my greatest source of strength throughout my academic journey.

To my sisters, Wendy, Loice, and Diana, thank you for your encouragement, understanding, and constant belief in me. Your support has inspired me to keep striving for excellence.

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CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

1.1.1 Operational Performance

Globally, operational performance has become a major concern across industries due to increasing operational inefficiencies, supply chain disruptions, technological changes, and rising customer expectations (Fatorachian & Kazemi, 2021). In the United States, agricultural and food supply firms have increasingly focused on improving operational performance, product quality, and supply chain resilience through automation, digital technologies, and integrated logistics systems to enhance productivity and competitiveness (Manono, 2025).

In China, the agricultural export sector has continued to experience operational challenges associated with production inefficiencies and quality inconsistencies prompting firms to adopt process improvement strategies and advanced quality assurance systems to sustain international competitiveness (Erokhin et al., 2020). Conversely, in the United Kingdom, horticultural firms have strengthened operational performance to improve product quality and delivery effectiveness in response to increasingly stringent consumer and export market requirements (Knox et al., 2020).

In the African context, operational performance challenges continue to affect agribusiness firms due to infrastructural limitations, inefficient supply chains, poor inventory management, and quality compliance challenges. In Nigeria, operational inefficiencies have been associated with reduced productivity, high post-harvest losses, and declining competitiveness among agro-allied firms (Oluwafemi, 2023; Olukunle, 2022). In South Africa, studies indicate that operational performance challenges negatively affect export competitiveness within the agricultural sector (Dlikilili, 2018).

Likewise, in Uganda, horticultural firms continue to experience operational performance challenges arising from weak accountability systems, delayed deliveries, and poor-quality management practices, which negatively affect organizational productivity (Frank, 2018; Kahuuga, 2017). In Kenya's horticultural sector remains one of the country's leading foreign exchange earners and employers. The sector generated approximately KES 136.6 billion in export earnings in 2024 and continues to support millions of livelihoods directly and indirectly (KNBS,

2025). Despite this contribution, the sector faces persistent operational challenges such as post-harvest losses, high transportation and logistics costs, product rejection in export markets, supply chain inefficiencies, and inconsistent product quality (Cheruiyot, 2025).

Reports by the Kenya Horticultural Association further indicate that horticultural firms continue to experience substantial operational losses associated with wastage, delays, and quality compliance issues, thereby affecting competitiveness in international markets (KHA, 2022). The operational performance challenges facing Kenya's horticultural industry extend beyond financial concerns and directly affect productivity, customer satisfaction, and export competitiveness (Ridolfi et al., 2018).

Operational performance refers to the extent to which an organization effectively and efficiently utilizes its resources, processes, and systems to achieve desired organizational outcomes and sustain competitiveness (Taouab & Issor, 2019). In the context of this study, operational performance reflects the ability of firms to produce high-quality products, minimize wastage and losses, meet customer and export market requirements, and ensure timely delivery while maintaining cost efficiency (Kaydos, 2020).

Although studies have examined organizational performance across different sectors, limited empirical attention has been given to operational performance within Kenya's horticultural sector (Nyamai & Anuri, 2025; Muita et al., 2025). Existing studies have largely focused on financial performance, export growth, and market access while giving less emphasis to operational dimensions such as efficiency, effectiveness, and quality (Kariuki et al., 2022; Osoro et al., 2024). Furthermore, operational challenges continue to affect the competitiveness of horticultural firms in both domestic and international markets (Muthoka & Ogutu, 2018).

These persistent operational performance challenges have led organizations to adopt fraud risk management practices such as internal controls, audits, segregation of duties, and monitoring systems to reduce losses and improve process reliability. These practices enhance efficiency, effectiveness, and quality by minimizing wastage, improving accountability, and strengthening operational processes (ACFE, 2024; Rahman & Subagio, 2021). Consequently, fraud risk management practices are increasingly recognized as key enablers of improved operational performance and competitiveness in horticultural firms.

1.1.2 Fraud Risk Management Practices

Anti-fraud management is crucial for the overall success and protection of business assets for organizations worldwide and their main stakeholders. The consequences of fraud are described in detail, and according to the Association of Certified Fraud Examiners' Report to the Nations in 2024, organizations lose approximately 5% of their annual revenues to fraud, which amounts to billions of dollars globally. For instance, asset misappropriation, procurement fraud, cyber fraud, and financial statement fraud affect organizations across all industries and locations. The existence of sound fraud risk management systems can offset these risks and enhance operational performance (ACFE., 2024).

In the U.S.A., companies that engaged in comprehensive fraud risk management, including auditing and monitoring, experienced significantly lower losses and improved operational efficiency. These organizations were better equipped to identify and mitigate fraud risks, contributing to more effective decision-making processes and an overall stronger financial position (Roszkowska, 2021).

In Pakistan, fraud risk management has been emphasized as a key factor in enhancing the financial stability and performance of microfinance institutions (Hussain and Anees, 2022). The implementation of effective FRM strategies positively influences the financial performance of these institutions, enabling them to better serve their clients while mitigating risks. This highlights the critical role of risk management practices in the sustainability and growth of microfinance organizations, especially in emerging economies (Hussain and Anees, 2022).

In Nigeria, anti-fraud policies, fraud detection strategies, and strong internal controls are critical to enhancing the operational performance of Nigerian banks. Danazumi et al. (2021) argue that the adoption of robust fraud prevention measures has not only contributed to improved financial performance but has also strengthened the trust of customers and investors in the banking sector. These measures ensure that banks can effectively combat fraud, protect their assets, and maintain a competitive edge in an increasingly complex financial landscape.

Sub-Saharan Africa is, therefore, riddled with fraud, which is compounded by poor or ineffective governance, non-existent regulation and rampant corruption. PwC Global Economic Crime and Fraud Survey (2020) shows that a higher percentage of African organisations (60%) reported fraud over the last two years, which is higher compared to the global average of 47%. Specific industries,

such as the agriculture and horticulture industries, face higher risks because of the likelihood of undertaking cash transactions and engaging in informal value chains and lacking the necessary mechanisms of risk management.

In a study conducted by Muriuki (2021) on the current measures to fight fraud within several financial organizations in Kenya, Muriuki (2021) noted that internal controls and good leadership both enhanced performances. Nevertheless, due to the scarcity of funds and the lack of skilled human resources, these practices do not materialize in small companies. Owiti (2025) observed that developing context-specific approaches to fraud risk management, including carrying out policy interventions in consonance with local policy structures, was encouraging. Nonetheless, there remains a gap in the research concerning how fraud risk management influences the operational performance of Kenya's horticulture sector.

Fraud Risk Management (FRM) has been defined in various ways in the literature. The ACFE (2024) defines FRM as a set of coordinated policies and controls aimed at preventing, detecting, and responding to fraud, while COSO (2023) conceptualizes it as part of enterprise risk management focused on identifying and mitigating fraud risks within organizations. Sanusi et al., (2025) defined FRM practices as structured mechanisms for detecting, preventing, and responding to fraudulent activities. Further, Utami et al., (2019) describe FRM as a continuous organizational process involving risk assessment, internal controls, and monitoring mechanisms to safeguard organizational resources.

This study adopts the definition by Sanusi et al. (2025), who define FRM practices as structured mechanisms for detecting, preventing, and responding to fraudulent activities. This definition is preferred because it provides a clear, concise, and operational focus that aligns well with empirical measurement in organizational settings, particularly in dynamic sectors such as horticulture. Based on this definition, FRM practices are conceptualized as a multidimensional construct comprising internal controls, audit and monitoring, legal compliance strategies, and electronic security measures, which collectively influence operational performance (Marzuki, 2020). Globally, FRM practices have gained prominence because of their role in enhancing organizational efficiency and resilience. Internal control systems are widely recognized as foundational because they safeguard organizational resources and support efficient operations. For instance, Cavaliere et al. (2021) and Stephens (2022) highlight that robust internal controls improve fraud deterrence and performance,

although their findings are largely based on industry-neutral and financial sector contexts, respectively. Supporting this, Vu et al. (2020) identified elements such as risk assessment and monitoring as critical to improving efficiency, although the predominance of cross-sectional studies limits insights into their long-term effectiveness, particularly in resource-constrained environments.

Audit and monitoring, as another dimension of FRM practices, play vital roles in enhancing transparency and fraud detection. Coram et al. (2019) and Chambers (2018) demonstrate that regular audits and continuous supervision strengthen accountability and reduce unethical behavior, although their applicability in developing contexts such as Kenya's horticultural sector remains underexplored. Similarly, legal compliance strategies contribute to fraud prevention by establishing formal frameworks that promote ethical conduct and adherence to regulations. While Hussain and Anees (2020) confirm their positive impact on performance in banking institutions, Mosoti et al. (2023) emphasize that their effectiveness varies across sectors, highlighting the need for context-specific approaches in horticulture firms.

Furthermore, electronic security measures represent a technological dimension of FRM practices, offering advanced tools for fraud detection and improving operational efficiency. Madhala et al. (2024) and Ria et al. (2023) demonstrate the effectiveness of information systems in improving performance, while Mwangi and Ndegwa (2020) note variations in the effectiveness of different security controls, underscoring the need for industry-specific adaptations. Collectively, these four dimensions form an integrated FRM framework that influences the operational performance.

However, the effectiveness of these FRM practices is not uniform across organizations and is influenced by firm size as a moderating factor. Larger firms typically benefit from greater resource availability, enabling the adoption of sophisticated fraud management systems, whereas smaller firms often face financial and human resource constraints despite their operational flexibility (Isik et al., 2017; Setiyanto & Nurzila, 2019). In Kenya's horticultural sector, where firm sizes vary significantly, it is essential to examine how firm size shapes the relationship between FRM practices and operational performance. Therefore, this study integrates these dimensions into a unified framework to address existing conceptual and contextual gaps and provide a clearer understanding of how FRM practices influence performance across firms of different sizes.

1.1.3 Moderating Role of Firm Size on Fraud Risk Management and Operational Performance.

The type of organization significantly affects the implementation and effectiveness of fraud risk management in Oman, as resources dictate an organization's ability to deploy such strategies (Rehman and Hashim, 2020). Large companies have the financial means and workforce to implement thorough systems that are essential for preventing fraud and maintaining integrity. Substantial budgets enable firms to use sophisticated systems for fraud detection and prevention, equipping them to handle potential risks (Rehman & Hashim, 2020). In India, larger firms benefit from greater resources to develop robust fraud management systems and allocate significant budgets to ensure that technologies and skilled personnel effectively mitigate fraud risks (Sohal et al., 2022). They often have dedicated teams that use advanced technologies, such as AI and data analytics, to monitor transactions, detect anomalies, and respond to threats promptly (Sohal et al., 2022).

In Kenya, a positive link exists between firm size and risk management. Larger firms can afford sophisticated fraud risk management systems, which are crucial for identifying and reducing fraud risks (Yegon et al., 2014). In contrast, small horticultural firms face resource limitations, operating with fewer financial and human resources, making it difficult to establish the same level of fraud risk management as larger organizations. They often lack the financial resources for sophisticated systems and may struggle to recruit skilled staff for effective fraud management. Thus, fraud risk management in small firms is less sophisticated and often reactive (Mwangi and Ndegwa, 2020). This resource disparity creates vulnerabilities, as small firms are less capable of effectively addressing fraud risks.

Rahman and Subagio (2021) noted larger firms often achieve better financial performance by using fraud detection technologies, hiring qualified staff, and establishing strong internal controls, leading to improved outcomes. Real-time fraud detection provides a competitive edge that smaller firms struggle to achieve.

However, Tashfeen and Azhar (2017) argued that firm size alone does not ensure fraud risk management success; management commitment is key. Small firms can effectively manage fraud risk through strong leadership. This highlights the role of management in prioritizing fraud prevention, regardless of firm size. Rahman and Subagio (2021) and Tashfeen and Azhar (2017) suggest that management commitment is crucial for successful fraud risk management strategies.

The reviewed studies reveal critical gaps in the literature on FRM practices and their effects on the operational performance of horticultural businesses. These gaps are conceptual, contextual, knowledge-based and methodological. Previous research often overlooks the unique challenges of the horticultural sector, especially in sub-Saharan Africa, which hinders the development of effective fraud strategies. One conceptual gap is the moderating role of firm size in the relationship between fraud risk management practices and firm performance. Larger firms have more resources, whereas smaller firms face challenges such as limited funding (Mwangi & Ndegwa, 2020). However, studies suggest that management commitment may be more crucial than firm size (Tashfeen & Azhar, 2017), leaving the effect of firm size on fraud risk management in horticulture uncertain.

Research on fraud risk management in Sub-Saharan Africa is scarce, and governance issues worsen fraud risks. Kenya's horticultural industry, a major economic player, remains underexplored in terms of specific fraud risks, hindering the development of localized strategies (Kiaka & Kimana 2024). Additionally, the literature lacks quantification of fraud risk and its relationship with operational performance in Kenya's horticultural firms, preventing an understanding of fraud trends and management effectiveness (Kenya Horticultural Association, 2022; ACFE Report, 2024).

Methodologically, most studies focus on financial institutions, with few addressing the needs of horticultural firms. Longitudinal and mixed-method approaches, which are crucial for understanding the evolution of fraud risk management over time and across firm sizes, are underutilized (Roszkowska, 2021; Hussain & Anees, 2022; Danazumi et al., 2021). Evaluating the long-term impact of fraud strategies on operational performance and sustainability is restricted. This study aims to fill these gaps by exploring how fraud risk management influences operational performance in Kenya's horticultural industry.

1.1.4 Kenya's Horticultural Industry

According to the Agriculture and Food Authority (2020), 236 horticultural firms registered for export by the end of 2020 in Kenya. This study is based in Kenya, whose horticultural industry is among the most influential income-generating industries; it earned KES 158 billion in the year 2021 and ranks as the highest foreign exchange earner (Business Daily, 2022). This sector is important in generating employment, providing food and export earnings. Nevertheless, the firms that exist in the horticulture industry encounter major risks of fraud such as inventory theft, monetary fraud, and cyber fraud.

According to the Kenya Horticultural Association (2022), fraud costs the horticultural sector between 3% and 5% of annual turnover. Kenya Horticultural Association Kiaka and Kimana (2024) note that fraud risk remains prevalent among Kenyan horticultural firms due to weak internal controls and limited adoption of advanced fraud prevention technologies. Although larger firms generally possess greater resources and more sophisticated systems, they still face challenges related to compliance management and the integration of fraud risk controls across complex supply chains. Despite these concerns, there is limited empirical research examining the effect of fraud risk management practices on the operational performance of Kenya's horticultural sector, which remains a significant contributor to both the Kenyan and global economy. Table 1 presents key statistics on revenue losses and operational efficiency in Kenya's horticultural firms.

Table 1: Key statistics on revenue losses and operational efficiency in Kenya's horticultural firms.

Year	Estimated Revenue Loss to Fraud (%)	Operational Efficiency Index (%)	Number of Reported Fraud Cases	Global Benchmark Loss (%)
2018	4.2%	75%	320	1.5%
2019	4.5%	72%	400	1.5%
2020	5.0%	68%	500	1.5%
2021	4.8%	70%	450	1.5%
2022	4.7%	73%	420	1.5%

Source: Kenya Horticultural Association (2022), ACFE Report (2024)

The data from 2018 to 2022 show that revenue losses due to fraud ranged between 4.2% and 5.0%, which is approximately three times higher than the global benchmark of about 1%–2% reported

by ACFE (2024). This confirms that the observed losses are not only persistent but also significantly above acceptable international norms.

Although there is a slight decline after 2020, the level of fraud remains structurally elevated, indicating that the issue is not cyclical but systemic. Given that horticultural firms often operate on thin margins, even a 4%–5% loss represents a substantial erosion of profitability and competitiveness (KHA, 2022). This reinforces the need for strengthened fraud risk management systems, particularly those targeting supply chain controls, financial oversight, and digital fraud detection mechanisms.

1.2 Statement of the Problem

Kenya's horticultural sector significantly contributes to the country's economy, generating KES 136.6 billion in export earnings in 2024 and creating substantial employment opportunities (KNBS, 2025). However, the sector faces a persistent revenue loss crisis linked to increasing fraud risks. Report from the Kenya Horticultural Association highlights a troubling trend of increasing revenue loss to fraud in Kenya's horticultural firms, rising from 4.2% in 2018 to 5.0% in 2020, and stabilising at 4.7% in 2022. This persistent issue is particularly concerning for firms operating on narrow profit margins, as even small losses can have a significant impact. With industry fraud losses typically expected to be below 2-3%, the 4-5% loss observed here signals a critical financial crisis (KHA, 2022; Kiaka & Kimana, 2024; ACFE Report, 2024). These crises threaten the sector's sustainability, competitiveness, and ability to meet both domestic and international market demands, necessitating a deeper examination of how FRM practices can mitigate these risks and improve operational performance.

While the global acknowledgment of the significance of fraud risk management in protecting organizational resources and enhancing performance is evident, there is a noticeable gap in research focused on the horticultural sector in Kenya. Studies by Hussain and Anees (2022) and Danazumi et al. (2021) have shown the positive impact of fraud risk management practices on financial and operational performance in financial institutions. However, these findings cannot be directly applied to agriculture-based sectors, which operate under different dynamics, such as complex supply chains, cash-based transactions, and compliance with export market regulations. Additionally, there is ongoing debate regarding the effectiveness of specific fraud risk management strategies. For example, Mwangi and Ndegwa (2020) found preventive controls to

be more effective than detective controls in reducing fraud, but their applicability in Kenya's horticultural firms remains unexplored. This gap leaves industry stakeholders without evidence-based recommendations for adopting optimal fraud management practices.

The influence of firm size on the relationship between fraud risk management practices and operational performance introduces an additional dimension of uncertainty. Larger firms often have greater resources to invest in sophisticated fraud risk management systems, including advanced fraud detection technologies and skilled personnel. Conversely, smaller firms face resource limitations, making it challenging to adopt comprehensive fraud mitigation strategies (Rahman & Subagio, 2021; Mwangi & Ndegwa, 2020). Existing research offers mixed findings on this issue. While Pattiruhu and Paais (2020) demonstrated a positive relationship between firm size and risk management practices, Tashfeen and Azhar (2022) argued that management commitment, rather than firm size, determines the success of fraud risk management initiatives. This discrepancy highlights the necessity for research tailored to specific contexts to understand how the size of a firm influences the implementation of FRM in Kenya's horticultural industry.

The study highlights significant gaps in the understanding of how fraud risk management practices affect operational performance in the horticultural industry, with conflicting evidence regarding the impact of firm size as a moderating factor. Conceptually, studies on Kenya's horticultural industry are scarce, leaving socio-economic and regulatory challenges underexplored (Mwangi & Ndegwa, 2020; Tashfeen & Azhar, 2017). Contextually, there is also limited empirical data linking fraud risks to operational performance and insufficient exploration of how firms of varying sizes adopt fraud risk management practices (Kiaka & Kimana, 2024). Methodologically, most studies relied on secondary data; this study used questionnaires consisting of closed-ended questions for a comprehensive analysis (Roszkowska, 2021; Hussain & Anees, 2022; Danazumi et al., 2021). Addressing these gaps enhanced understanding effects of fraud risk management on operational performance in Kenya's horticultural firms.

This study was motivated by the increasing operational inefficiencies and financial losses caused by fraud in Kenya's horticultural sector. Existing studies on fraud risk management have largely focused on banking and financial institutions, creating a contextual gap in agriculture-based sectors, such as horticulture. In addition, prior studies provide mixed findings on the role of firm

size, and limited empirical evidence linking fraud risk management practices to operational performance, revealing conceptual and knowledge gaps. Methodologically, many previous studies relied on secondary data or were conducted outside Kenya, limiting their applicability to local horticultural firms. Therefore, this study examines the effect of fraud risk management practices on the operational performance of horticultural firms in Kenya, considering firm size as a moderating variable. The findings contribute practical and policy insights aimed at strengthening fraud prevention strategies, improving operational resilience, and enhancing the sector's long-term sustainability and competitiveness.

1.3 Research Objectives

1.3.1 General Objective

The primary objective of this study is to examine how FRM practices influence the operational performance of horticultural firms in Kenya, while considering the moderating role of firm size.

1.3.2 Specific Objectives

1. To determine the effect of internal controls on operational performance of horticultural firms in Kenya.
2. To establish the effect of audit and monitoring measures on the operational performance of horticultural firms.
3. To assess the effect of legal compliance strategies on the operational performance of horticultural firms.
4. To determine the effect of electronic security strategies on the operational performance of horticultural firms.
5. To analyse the moderating effect of firm size on the relationship between the fraud-risk management practices and the operational performance of horticultural firms.

1.4 Research Questions

1. What is the effect of internal controls on operational performance of horticultural firms in Kenya?
2. What impact do audit and monitoring measures have on the operational performance of horticultural firms within the Kenyan context?
3. What is the effect of legal compliance strategies on the operational performance of horticultural firms in Kenya?
4. How do electronic security strategies influence the operational performance of horticultural firms in Kenya?
5. What is the moderating effect of firm size on the relationship between the FRM practices and the operational performance of horticultural firms in Kenya?

1.5 Scope of the Study

This study aimed to determine the effectiveness of FRM practices on the operational performance of horticultural firms in Kenya. The study was conducted in Kenya, with a focus on 236 horticultural businesses that were registered for export by the end of 2020. The research sample for this study comprised 73 firms selected from different regions across the country. This sample size represented approximately 31% of the total population, providing a diverse and representative subset for analysis. This study targeted key personnel within these firms, focusing on two accountants, two operational managers, and two compliance managers as respondents; thus, the total number of respondents was 438. A descriptive cross-sectional research design was adopted, and data were collected using structured questionnaires with closed-ended questions. The data collection process was conducted over a one-month period, from January 2025 to February 2025.

1.6 Significance of the Study

1.6.1 Industry players

The findings of this study help address the existing contextual and knowledge gaps in fraud risk management within Kenya's horticultural sector by providing empirical evidence that can guide regulators and policymakers in developing sector-specific fraud prevention policies and compliance frameworks. Unlike previous studies that largely focused on banking and financial institutions, this study offers insights tailored to the unique challenges faced by horticultural firms, including weak internal controls, complex supply chains, and resource limitations among smaller firms. These findings further support the development of practical guidelines, compliance support mechanisms, and scalable fraud prevention strategies that enhance transparency, accountability, and operational resilience across the sector. Ultimately, this study contributes to strengthening the long-term sustainability and competitiveness of Kenya's horticultural industry.

1.6.2 Regulators and Policymakers

The findings of this study provide practical and policy insights that can help regulators and policymakers strengthen fraud risk management within Kenya's horticultural sector, particularly among resource-constrained firms. By addressing existing contextual and knowledge gaps in the literature, this study supports the development of sector-specific regulations, compliance frameworks, and scalable fraud prevention strategies tailored to the unique challenges faced by horticultural firms. The findings further guide regulatory authorities in promoting transparency, accountability, and industry-wide standards while enhancing the sector's resilience to fraud and supporting its long-term sustainability and operational efficiency of the sector.

1.6.3 Academic researcher

This study offers valuable insights for academic researchers and provides a solid foundation for future investigations into fraud risk management strategies in the horticultural industry and their effects on operational performance of firms. In particular, it responds to the identified knowledge gap regarding the limited empirical evidence on how fraud risk management practices operate within horticultural firms, especially in developing countries. By addressing this gap in the literature, this study opens new avenues for exploring how industry-specific factors influence the effectiveness of fraud mitigation strategies. Researchers can build on these findings to further investigate the relationship between firm size, resource allocation, and fraud prevention outcomes, an area that remains underexplored in the existing literature. Moreover, this study contributes to the scholarly conversation on fraud risk management by presenting empirical evidence that helps bridge the gap between general fraud management theories and their application in sector-specific settings. Ultimately, this study advances the scholarly understanding of how fraud management practices can shape firms' operational success across different industries.

1.7 Chapter Summary

The first chapter explains the study's purpose. It covers the background, factors affecting financial stability, problem statement, goals, research questions, scope, and importance. The next chapter reviews existing literature to support the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter examines a range of publications and resources pertinent to this problem statement. It provides an overview of studies and analyses conducted by other researchers who have investigated, examined, and assessed various facets of the effectiveness of FRM practices in both small and large firms, and how these differences impact their operational performance. The chapter is organized into the following main sections: theoretical review, empirical review, fraud risk management practices in small and large firms, effectiveness of FRM practices in small and large firms, and a summary of the literature along with research gaps in the topic.

2.2 Theoretical Review

This research is anchored on the views of the resource-based view (RBV) theory, social learning theory, and fraud management lifecycle theory concerning fraud risk management and its effect on operational performance. Understanding complex phenomena such as fraud requires a multi-theoretical approach that combines separate theories to create a comprehensive perspective on the problem, as Bonnard and Riche (2020) note, 'it is often necessary for researchers to integrate different viewpoints to study something complex like fraud.

2.2.1 Resource-Based View Theory (RBV)

RBV Theory was initially introduced by Birger Wernerfelt in 1984 and later enhanced by Jay B. Barney in 1991. Wernerfelt's preliminary work contributed to understanding how firm resources can lead to various levels of competitive advantage in different industries. Building on this foundation, Barney (1991) extended the model with a wide-ranging framework that focused on the effective management of a firm's resources, diversification strategies, and potential for productivity. The primary aim of RBV is to understand how internal resources, not external factors, help a firm grow and remain successful in the long term. Consequently, RBV has led to a shift in focus from a competitive environment to a firm's unique capabilities and assets as the prime determinants of performance (Amit & Schoemaker, 1993).

The core concept of the RBV Theory is to define a firm's resources in a way that they contribute to achieving a lasting competitive edge for the firm. According to Barney (1991), valuable, rare, inimitable, and non-substitutable (VRIN) resources matter to achieve superior performance and

retain market positions. By focusing on these internal resources, firms can develop strategies to exploit their capabilities with increased operational efficiency and effectiveness. This perspective allows organizations to realize that resource endowments have a significant influence on strategic choices and operational outcomes (Peteraf, 1993). Therefore, firms that master their resources are better positioned to cope with industry challenges and maximize the advantages of growth opportunities (Barney & Hesterly, 2015).

Nevertheless, since its conceptualization, RBV theory has been criticized in various ways. The main criticism is that the theory pays little attention to factors external to the organization and market environment, which can play a major role in determining firm performance (Priem & Butler, 2001). According to these critics, focusing solely on internal resources can lead to a narrow perspective, failing to acknowledge the necessity of adjusting to evolving market dynamics and competitive landscapes. Moreover, resources are difficult to measure and categorize, making empirical research and theory application far from easy (Teece, 2007). These criticisms point to the need to accommodate both internal resource management and external market considerations to fully understand how competitive advantage extends.

Resource-based view theory explains why firms with superior resources are better able to implement effective fraud prevention measures in relation to the risk of fraud. Organizations that invest in skilled personnel, advanced technology, and robust internal controls are more likely to implement a suite of broad-based fraud management practices (Sameera, 2018). Such resources provide firms with an edge in detecting early fraudulent activities and are reactive in preventing potential operational losses. In contrast, the degree of resource availability may also determine the level at which firms can employ proactive fraud prevention methodologies and, accordingly, strengthen their resilience towards fraud risks (Lamprey & Singh, 2018). Motivated by this perspective, the value of resource allocation in the effectiveness of fraud management initiatives is emphasized.

An additional significant factor influencing the application of RBV theory, particularly in relation to fraud risk management, is the size of the firm. Larger firms have more assets to draw from, and they can reallocate a large number of assets for fraud prevention and detection measures (Bertram, 2016). Consequently, such firms may have better abilities to install advanced technologies and execute thorough training programs for fraud management. Moreover, FRM teams are relatively

common in the organizational structures of larger firms. Therefore, it is important to understand how firm size and resource availability relate to a firm's FRM fraud risk management effectiveness (Lamprey & Singh, 2018).

The Resource-Based View (RBV) theory is linked to operational performance by explaining that firms achieve superior performance through the effective use of valuable internal resources and capabilities (Sameera, 2018). In this study, RBV suggests that the differences in operational performance among horticultural firms are largely explained by variations in their internal resource endowments, with resource-rich firms achieving higher levels of operational efficiency and effectiveness (Lamprey & Singh, 2018). Consequently, for Objective 5, firm size is viewed as a proxy for resource availability, with larger firms better able to implement FRM practices, thereby strengthening their impact on operational performance.

2.2.2. Social Learning Theory

Albert Bandura's social learning theory suggests that individuals acquire behavioral norms and values by watching, imitating, and modeling the actions of others around them. In the context of organizations, social learning theory proposes that employees often mimic the behaviors they observe in their colleagues, peers, managers, and the overall organizational culture, both ethical and unethical (Bandura, 1977). Consequently, social learning theory emphasizes the role of organizational culture and leadership in influencing and shaping employee behavior. For instance, if employees observe unethical behaviors, such as fraud, being tolerated or even rewarded, they may be more likely to imitate or engage in similar actions (Gabbioneta et al., 2013). However, if managers, supervisors, and organizational leadership demonstrate a sense of integrity and transparency, employees are more likely to exhibit the same conduct.

The application of social learning theory is evident in how fraud-risk management strategies impact the operational success of horticultural companies in Kenya. Various factors underscore the significance of this theory, particularly the strong effect that the attitude of top executives has on the organizational environment. When senior management encourages and promotes ethical behavior, provides clear guidance on compliance, and enforces the repercussions of fraud, employees are more likely to internalize these values and exhibit fraud-resistant conduct. In other

words, firms that employ strong anti-fraud policies and have visible enforcement of these policies tend to be more successful in deterring fraudulent behavior (Roszkowska, 2021).

Social learning theory underscores the significance of peer influence in shaping employee behavior. For instance, if employees observe that their colleagues engage in fraudulent behavior and there are no repercussions, they may rationalize their conduct and, thus, be more inclined to engage in the same behavior (Liu & Liu, 2016). This can quickly form the norm in the work environment as more and more employees find the behavior acceptable. Organizations can mitigate this by designing FRM programs that foster a culture of collective accountability in which everyone within the organization is encouraged to support a culture of compliance and to speak out against any fraudulent behavior observed by a colleague. One way to achieve this, which is a practical application of social learning theory, is to design effective whistleblower practices. When employees see that whistleblowers are encouraged and well protected, they are more likely to report fraudulent behaviors, thus further mitigating fraud risk within the organization (Dorminey et al., 2010).

Social Learning Theory is linked to Objectives 1, 2, 3, and 5 by explaining how employee behavior and organizational culture influence FRM effectiveness. For Objective 1, internal controls are effective when employees observe and imitate ethical behavior from leadership, improving compliance and performance. For Objective 2, audit effectiveness depends on employee cooperation, shaped by a culture of accountability. For Objective 3, legal compliance is strengthened when employees learn appropriate behavior through leadership reinforcement of rules and regulations (Liu & Liu, 2016).

2.2.3 The Fraud Management Lifecycle Theory (FML)

Wilhelm developed the FML theory in 2004, conceptualizing fraud management as a continuous and systemic process that organizations must navigate. According to this theory, the effective management of fraud demands a combination of multidimensional, interdependent, and interconnected individual stages (Wilhelm, 2004). This lifecycle framework helps organizational teams understand and manage the convoluted aspects of preventing, detecting, and responding to fraud. Wilhelm aimed to draw attention to the multiplicity of fraud risks by delineating the fault stages of fraud management to underscore the role of proactiveness in an organization's traditional

establishment of fraud management strategies. The idea here is that the integration of specialized and multiple functions and activities into a unified fraud management system is essential (Wilhelm, 2004).

The primary aim of FML theory is to offer organizations a framework or plan to manage fraud across its various phases, thereby enhancing the overall management of fraud risks within any organization. According to this theory, this approach includes a ‘whole picture’ approach that outlines the eight distinct phases (deterrence, prevention, detection, mitigation, analysis, policy, investigation, and prosecution) (Wilhelm, 2004). These stages are critical of the fraud management process and allow fraud risks identified at various stages to be matched with tailored strategies to confront these identified fraud risks. This framework enables organizations to develop complete policies and practices that extend across the fraudulent life cycle and coordinate efforts to fight fraud effectively (Marzuki et al., 2020). Consequently, according to this theory, proactive and systematic fraud management would be beneficial to both operational performance and resilience.

Although the Fraud Management Lifecycle Theory has made some valuable contributions during its lifetime, it has been criticized in recent years. Another critique is that the linear progression of stages might oversimplify the reality of fraud management risk: organizations face overlapping challenges that require immediate attention (Kranacher et al., 2010). In addition, an emphasis on established stages may indicate that organizations fail to appreciate new fraud risks or new approaches to fraud management that do not conveniently fit into established phases. However, the theory should be more flexible in adapting to the dynamic landscape of fraud, in the presence of technology-enhancing fraud and changing market dynamics (Dandapani et al. 2019). These criticisms point to the need to improve the theory by responding to them and rendering it more helpful across a broader range of sectors and organizational settings.

However, Fraud Management Lifecycle Theory is particularly useful for FRM practices because it offers an all-encompassing framework in which organizations can maneuver through the complexities of fraud. Describing particular stages and actions in each phase allows organizations to design targeted strategies that are customized to address each organization's specific fraud risks (Wilhelm, 2004). For example, fraud occurrence can be greatly decreased by appropriate deterrence, prevention mechanisms, while appropriate detection, and countermeasures can provide organizations with the capability to identify and resolve fraud in a timely fashion. This systematic

approach drives organizations to spend funds as appropriately as possible, so that they have the device and capacity to manage fraud risks productively (Marzuki et al., 2020). Eventually, this theory can improve the operating performance of a firm by reducing the losses incurred from fraud and encouraging a culture of integrity and accountability.

Fraud Management Lifecycle Theory implies that the successive application of FRM practices helps solve the effectiveness and operational efficiency problems of all categories of firms. Organizations that are more likely to tackle fraud risks within various lifecycle stages are more likely to record lower fraud losses and better performance (Marzuki et al., 2020). Firms can protect their resources and reputation by prioritizing prevention and detection measures, resulting in a more sustainable and competitive business model. In addition, the analysis and policy stages teach companies to learn from past cases, making them consider fraud management a continuous improvement process (Hussain & Anees, 2022). As a result, the theory underscores the crucial link between effective fraud risk management and improved operations in today's business landscape.

Finally, FML Theory presents a solid accounting of the types of fraud risks facing an organization, as well as how to manage them. The theory delineates the stages of fraud management and insists that the effective control of fraud must be systematic and holistic. Nevertheless, its significance in fraud risk management practices and operational performance remains important, as businesses tend to safeguard their assets and comply with the law in an increasingly complicated environment (Marzuki et al., 2020).



Figure 2.1: Fraud Management Lifecycle

Source: Adapted from Wilhelm (2004).

The FML theory has been adapted and integrated into new frameworks and discussions in the field of management. COSO (2023) released an updated guide that emphasizes the importance of incorporating technology and ever-changing organizational environments in understanding and managing fraud. Fraud Management Lifecycle (FML) Theory is linked to Objectives 1, 2, 3, and 4 by explaining fraud risk management as a structured and continuous process through which different practices influence operational performance (Wilhelm, 2004). In relation to Objective 1,

internal controls are associated with the deterrence and prevention stages of the fraud lifecycle, where they reduce opportunities for fraud and enhance operational efficiency. For Objective 2, audit and monitoring measures correspond to the detection and analysis stages, enabling early identification of fraud and minimizing operational disruptions. With respect to Objective 3, legal compliance strategies align with the policy, investigation, and prosecution stages, ensuring that organizations adhere to regulatory requirements and avoid legal penalties that could affect performance. Finally, regarding Objective 4, electronic security strategies support the detection and mitigation stages by enabling timely identification and response to fraudulent activities through technological systems (Hussain & Anees, 2022).

2.3 Empirical Review

Horticultural firms in Kenya employ fraud risk management (FRM) strategies to identify, prevent, and address fraudulent activities. In this study, Fraud Risk Management Practices refer to a set of organizational strategies designed to prevent, detect, and respond to fraud, implemented through internal controls, audits and monitoring, legal compliance, and electronic security measures. To develop tailored strategies that enhance process capability (resilience and competitiveness) in the sector, it is essential to understand the specific FRM practices used, their effectiveness in improving operational performance, and how they might moderate their effects on firm size. This empirical review highlights the horticultural industry by examining the existing literature on these topics to identify practices and insights that could contribute to the industry's policies and management strategies.

2.3.1 Internal controls and operational performance

Cavaliere et al. (2021) conducted a comprehensive investigation into internal control structures as protective mechanisms for organizational resources within multinational firms, utilizing a mixed-methods approach. Their research demonstrated that strong internal controls enhance efficiency and ensure the optimal use of resources within organizational operations. A key strength of their study was its dual approach of combining quantitative data analysis with qualitative information gathering and interpretation, which provided a well-rounded perspective on the topic. However, the study presumed equal effectiveness of internal controls across different organizational types, potentially overlooking variations based on industry-specific factors. Despite this limitation, Cavaliere et al. (2021) focused on operational efficiency, complementing the insights provided by

Stephens (2022), who centered on fraud prevention. Collectively, these studies emphasize the importance of adopting a comprehensive approach that integrates both operational efficiency and fraud prevention to enhance the effectiveness of internal control systems.

Internal controls are among the most widely employed fraud-risk management practices. Stephens (2022) examined the features of internal control systems in relation to fraud risk and organizational objectives, adopting a descriptive research design that targeted mid-level managers in financial institutions. The research found a positive correlation between internal controls, the prevention of fraud, and enhancements in organizational performance. However, the use of self-reported data introduced potential response bias, which limits the applicability of the results to the financial sector. These constraints suggest the need for more robust methodologies to validate outcomes across diverse industries.

The importance of internal controls in mitigating fraud risk and enhancing operational efficiency has also been emphasized by Chang et al. (2018) and Ziorkluei et al. (2024). Vu et al. (2020) expanded on these insights by identifying the impact of internal control elements including the control environment, risk assessment, control activities, communication, and monitoring on the transport construction business. Among these elements, control activities emerged as the most influential, highlighting the effectiveness of targeted interventions. However, the heavy reliance on cross-sectional data in these studies limits their ability to assess the sustained impact of internal controls, highlighting the need for longitudinal research to examine the performance of these systems over time.

These findings collectively underscore the critical role of internal controls in both fraud risk management and operational performance enhancement. To build on this body of work, future research should address industry-specific differences, explore the long-term efficacy of internal controls, and integrate operational and fraud prevention perspectives. This holistic approach will enable organizations to design and implement more effective control systems tailored to their unique contexts and challenges.

2.3.2 Audit and monitoring measures and operational performance.

Coram et al. (2019) discussed audit and monitoring strategies and organizational performance. In a cross-sectional survey of 100 organizations, they supported their hypothesis, arguing that sound

corporate internal audit functions improve fraud identification and internal reporting. The study has a long and vast data collection period; however, its generalizability is somewhat restricted because it was conducted in developed nations only. Chambers (2018) used auditing and monitoring to establish how they deter employee misconduct.

Audit and monitoring strategies play a critical role in shaping organizational performance, as highlighted by Coram et al. (2019). Their cross-sectional survey of 100 organizations supported the hypothesis that robust corporate internal audit functions significantly enhance fraud detection and internal reporting processes. One of the study's strengths is its extensive data collection over an extended period, which adds depth to its findings. The study's applicability is somewhat restricted because it was carried out solely in developed countries, which may neglect the specific dynamics and challenges that organizations in developing areas encounter.

In a complementary study, Chambers (2018) explored the role of auditing and monitoring in deterring employee misconduct. Using a case study approach, Chambers demonstrated that unethical behaviors are mitigated through routine supervision, which fosters a heightened sense of perceived surveillance among employees. Although this study offers valuable insights, its focus on a limited group restricts its wider applicability. Nevertheless, it provides a nuanced understanding of how auditing affects individual behavior within an organization.

Coram et al. (2019) and Chambers (2018) offered distinct but interconnected perspectives. Coram et al. adopt a macro-organizational lens, emphasizing the systemic impact of internal audit functions across multiple entities. In contrast, Chambers takes a micro-approach, focusing on the behavioral responses of individual employees to auditing practices. These differing frameworks underscore the importance of integrating macro-level organizational analysis with micro-level behavioral insights to develop comprehensive and effective auditing and monitoring strategies. By bridging these approaches, organizations can achieve a more holistic understanding of how audit functions influence both organizational integrity and employee conduct, leading to targeted and impactful practices.

2.3.3 Legal compliance strategies and operational performance

Literature on legal compliance strategies confirms that they have the effect of improving the performance of an organization. Hussain and Anees (2020) examined preventive, deductive, and

responsive legal compliance strategies for private and public banks. The findings indicated a positive correlation between legal compliance strategies and performance outcomes. However, it espoused research and analysis principally on banking institutions, implying a limited experimental design across other sectors.

Building on this, Mosoti et al. (2023) examined the impact of legal compliance strategies on microfinance institutions (MFIs) in Kenya. Their findings affirmed that effective legal compliance strategies mitigate fraud risks and enhance financial performance. While aligning with the conclusions of Hussain and Anees (2022), Mosoti et al.'s research is contextually confined to MFIs, potentially overlooking the unique challenges faced by larger financial institutions or those operating in different regulatory environments. The constrained scope at the time of their study limits its applicability to broader financial sectors, highlighting the need for more expansive investigations.

In a related discussion, Silva (2023) explored legal compliance programs within the framework of environmental, social, and governance (ESG) practices. Although the study provided valuable insights, it did not directly measure the impact of these programs on fraud prevention, leaving a critical gap in understanding their practical effectiveness. Ishwardat et al. (2024) emphasized that inspections are more effective than sanctions or cooperation in achieving legal compliance, illustrating the mixed efficacy of different compliance approaches.

Chaves and Raufflet (2021) critiqued legal compliance programs for being overly self-regulated and often disconnected from broader anti-corruption strategies, thereby limiting their systemic impact. These findings underscore the importance of integrating legal compliance programs with other governance mechanisms to enhance their overall effectiveness. They also point to the necessity of adapting legal compliance strategies to diverse organizational contexts, ensuring that they address the specific challenges of various sectors while fostering broader anti-corruption and governance goals.

2.3.4 Electronic security strategies and operational performance.

Mwangi and Ndegwa (2020) observed that while preventive and corrective controls are effective in minimizing fraud within Kenyan-listed firms, detective controls appear to have no significant impact on fraud levels. This discrepancy raises critical questions regarding the relevance and

effectiveness of various control mechanisms. It prompts an investigation into whether the limited success of detective controls is due to the poor implementation of these structures or if the controls themselves are inherently ineffective, particularly when applied across diverse industry contexts. This issue highlights the need for a more nuanced understanding of how control systems function within specific organizational settings and industry dynamics.

Similarly, Madhala et al. (2024) and Ria et al. (2023) underscored the significant role of electronic measures and information systems in enhancing operational performance. Their research indicates that implementing inventory and supply chain management systems can enhance operational efficiency, lower expenses, and lead to improved performance. These conclusions were further reinforced by Amira (2024), who emphasized the importance of aligning technology-driven solutions with strategic objectives and ensuring their proper implementation for optimal results.

Despite the compelling evidence supporting these advancements, these studies predominantly focus on high-resource environments, thereby overlooking the unique challenges faced by resource-constrained organizations. This gap highlights the need for future research to explore the applicability and adaptability of these technological solutions in low-resource settings to ensure broader inclusivity and effectiveness.

2.3.3 Moderating Effect of Firm Size on the Relationship Between the Independent Variables and the Dependent Variable

Firm size is a special moderating variable in the analysis of characteristics, such as operations, strategy, and performance. It is often defined according to criteria such as the total amount of assets, sales revenues, or total headcount; the choice of which criteria depend on the context of the study (Budiharjo, 2023; Shafira et al., 2022). Shifa et al. (2022) equated total assets with firm size, while Rafsanjani and Surjandari (2022) considered more variables, including market capitalization and revenue, to obtain a more generalized picture of firm size. These variations in defining firm size further reinforce the need to match ‘falling into’ firm size measurements to the research goals.

Isik et al. (2017) affirmed that firm size, reflected by assets, total sales, and the number of employees, significantly affects operating returns on assets. Similarly, Setiyanto and Nurzilla (2019) established that there is a positive correlation between firm size and sales growth, implying that large firms can spread fixed overhead costs over a large volume of sales. In contrast, using a cross-sectional research design, Serolin (2023) provides evidence of a reverse relationship and

indicates that larger firms are likely to have lower firm values because of firm-size diseconomies arising from a proliferation of complexity and bureaucratic control.

Returning to the prediction of firm age, the inconsistency in findings is also apparent in this case. Trijayanti et al. (2022) and Poudel (2020) found a negative correlation between firm age and financial performance because older firms may have outdated systems and negative attitudes toward innovation. In contrast, Mansour et al. (2023) supported the notion that a firm's age does not affect non-financial or operating performance metrics. Hence, there could be other forces at play.

A notable strength of quantitative investigations, such as those by Isik et al. (2017) and Setiyanto and Nurzilla (2019), is that they provide liftable measures of the effects of firm size on performance. However, these studies found that measures such as return on assets or sales growth, their significance may be circumscribed and, therefore, generalizable to the other performance dimensions. In contrast, Serolin (2023) presents a pessimistic view of the challenges faced by larger firms but does not support the assertion that there is an inverse relationship with value.

Budiharjo (2023) and Shafira et al. (2022) pointed out moderating factors, such as credit and digital transformation, risk, ownership type that affect the impact of firm size on performance. These studies provide a finer-grained perspective on the topic; however, they rarely use longitudinal data to determine how these moderating effects may change over time. Empirical evidence indicates that firm size is a critical determinant of operational performance; however, its effects are not uniform. Larger firms often enjoy resource advantages that enhance efficiency but may struggle with complexity and bureaucracy.

Meanwhile, smaller firms face resource constraints but can be more agile. The variation in findings across studies underscores the need for context-sensitive approaches that consider metrics, moderating factors, and sector-specific dynamics. To better understand the effect of firm size on operational performance, future studies should employ standardized metrics and longitudinal research designs. Additionally, studies should explore the interplay between firm size and emerging trends, such as digital transformation, to capture the evolving dynamics of organizational performance.

2.4 Summary of the Literature and Research Gap(s)

Table 2.1: Research Study Gaps

Author	Topic of the Study	Study Findings	Research Gaps
Stephens (2022)	Internal Control Systems and Fraud Risk Management	Internal control systems are essential for achieving corporate goals and managing fraud risk, enhancing operational efficiency.	Conceptual: Limited research on the specific components of internal control systems across different sectors.
Cavaliere et al. (2021)	The Role of Internal Control Structures in Organizational Performance	Effective internal control structures protect resources, minimize theft, and contribute to overall organizational efficiency and performance.	Knowledge: Need for more empirical evidence on how different internal control structures specifically influence operational performance.
Coram et al., (2019)	Audit and Monitoring Strategies in Corporate Governance	Organizations with in-house audits are more likely to detect and self-report fraud, improving governance and accountability.	Methodological: There is a scarcity of studies examining how audit and monitoring strategies impact organizational culture and employee behavior over the long term.
Chambers (2018)	Enhancing Organizational Performance through Audit and Monitoring	Audit and monitoring strategies enhance performance by improving operational efficiency, compliance, and governance.	Contextual: The impact of technological advancements on audit and monitoring strategies across various sectors has not been sufficiently explored.
Kummer, Singh, & Best (2014)	Legal Compliance Strategies in Fraud Risk Management	Legal compliance is critical for establishing a solid fraud control policy, influencing employee attitudes and behaviors.	Contextual: Limited understanding of the specific legal compliance frameworks that are most effective in reducing fraud risk across different industries.
Taherdoost (2021)	The Impact of Electronic Security Measures on Fraud Mitigation	Electronic security measures improve operational efficiency and contribute to fraud prevention by automating detection and compliance tasks.	Contextual: There is a need for further investigation into the effectiveness of electronic security measures across various organizational contexts and sectors.
Hussain & Anees (2022)	FRM Practices in Banking Performance	The significant impact of fraud risk management practices on both private and public banks,	Contextual: There is limited focus on how the effectiveness of FRM practices varies by bank size and operational context.

Author	Topic of the Study	Study Findings	Research Gaps
		with risk culture as a moderating factor.	
Mosoti et al. (2023)	The Effect of Fraud Risk Management on Financial Performance in Microfinance Institutions (MFIs)	Substantial investment in fraud risk management practices reduces fraud incidence and enhances financial performance in MFIs.	Methodological: Lack of studies examining the long-term effects of FRM practices in MFIs and their impact on customer satisfaction and trust.
Mwangi & Ndegwa (2020)	Fraud Prevention Mechanisms in Listed Firms in Kenya	Preventive and corrective controls effectively reduce fraud occurrence, while detective controls have limited impact.	Conceptual: Need for a deeper understanding of the specific conditions under which different types of controls are effective in reducing fraud in various sectors.
Ziorklui et al. (2024)	Internal Controls and Operational Performance	Effective internal controls enhance efficiency, reduce fraud risk, and improve overall performance across various sectors.	Conceptual: Insufficient research on the integration of internal controls with other operational strategies and their cumulative effects on performance.
Dharmawati et al. (2022)	The Interplay of Internal Control and Risk Management in Fraud Prevention	Internal control and risk management positively influence fraud prevention and, in turn, organizational performance.	Knowledge: Limited studies exploring how specific internal control practices influence fraud prevention effectiveness across different organizational types.
Silva (2023)	Compliance Programs and Corporate Governance within ESG Practices	An overview of compliance programs indicates mixed results in effectiveness regarding fraud prevention and overall governance, highlighting a disconnect from broader anticorruption initiatives.	Knowledge: More empirical evidence needed on the specific components of compliance programs that effectively curb corruption in diverse organizational contexts.
Albrecht et al. (2020)	The Impact of Fraud Detection Techniques on Organizational Performance	Effective fraud detection techniques lead to improved organizational performance and reduced losses.	Methodological: Limited focus on specific industries; lacks longitudinal analysis of performance changes over time.

Author	Topic of the Study	Study Findings	Research Gaps
Dae and Wamungo (2022)	Effect of foreign exchange transaction risk management	Foreign exchange transaction risk influences profitability of horticultural firms	Methodological: The study focused only on the explanatory research design
Kamau (2023)	Underwriting risk, firm size, and financial performance of insurance firms.	Underwriting risk had a negative effect on financial performance and firm size negatively moderated relationship	Methodological: There were limited studies on firm size as a moderator, and studies did not show an effect for a larger period.

Source: Researcher (2026)

2.5 Conceptual Framework

A conceptual framework is a structured system of concepts and variables that enables the definition and visualization of how to link them in a research study (Rocco & Plakhotnik, 2009). It provides the researcher with a blueprint for what needs to be explored in the study, what research questions need to be answered, and what hypothesis to test, in turn, for easier interpretation of findings. The application of this framework in this study was illustrative for depicting how FRM practices and moderating variables affect operational performance to ensure a complete understanding of the mediatory exposures and ascertain their effectiveness, as shown below:

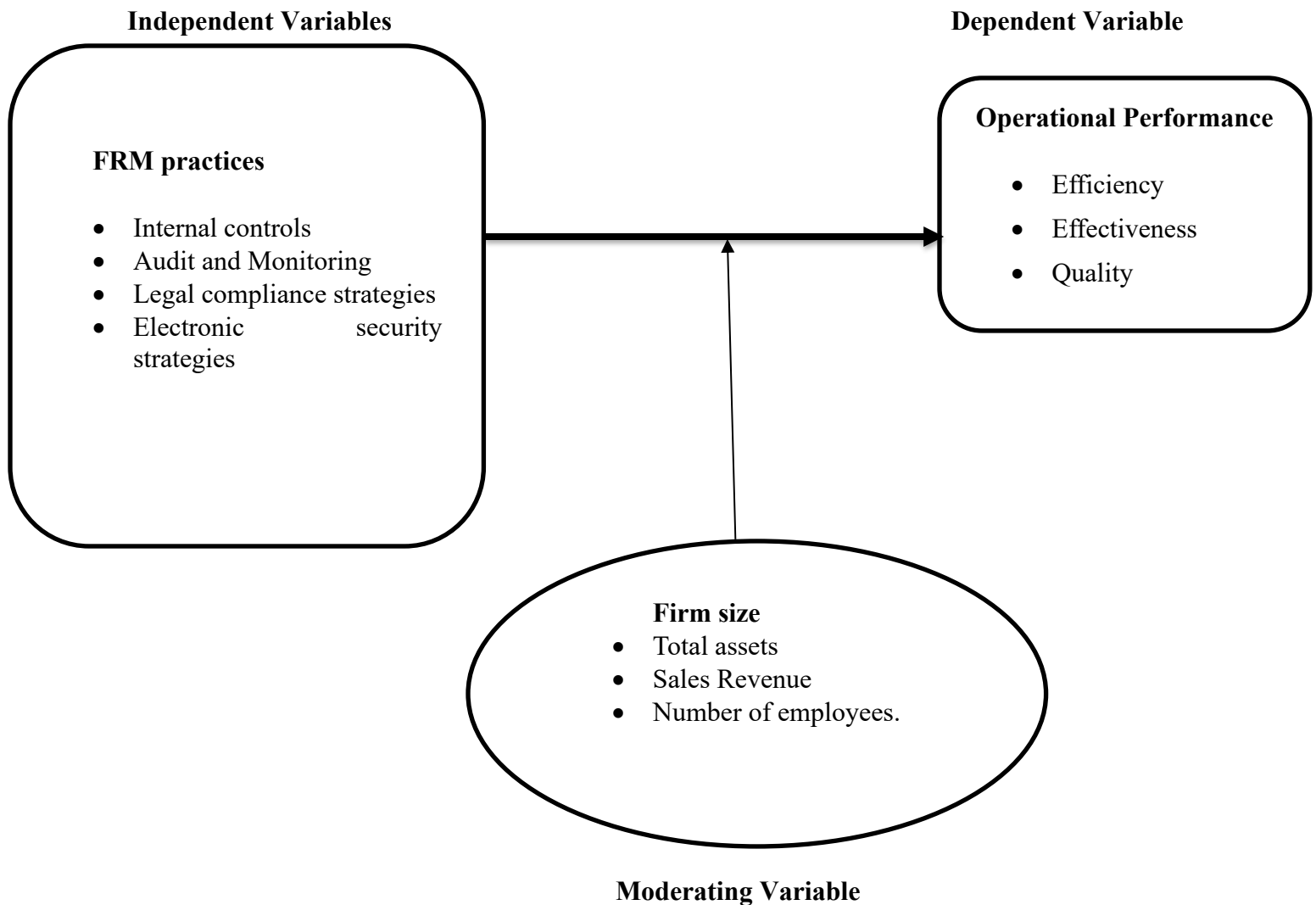


Figure 2.2 Conceptual framework

2.6 Operationalization of the Variables

Table 2.2: Operationalization of the Variables

Variable	Parameter	Measurement Scale	Literature	Supporting Theory
Internal Controls	Control effectiveness; Awareness	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Cavaliere et al. (2021); Stephens (2022); Vu et al. (2020)	Fraud Management Lifecycle Theory
Audit & Monitoring	Audit effectiveness; Fraud detection	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Coram et al. (2019); Chambers (2018)	Fraud Management Lifecycle Theory
Legal Compliance	Regulatory adherence Industry laws	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Hussain & Anees (2020); Mosoti et al. (2023)	Social learning Theory
Electronic Security	System security; Risk mitigation	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Mwangi & Ndegwa (2020); Madhala et al. (2024)	Resource-Based View (RBV)
FRM Effectiveness	Audit impact; Cost-effectiveness; Fraud reduction; Compliance	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Hussain & Anees (2022); Danazumi et al. (2021)	Fraud Management Lifecycle Theory
Operational Performance	Efficiency; Effectiveness; Quality	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Chang et al. (2018); Chen et al. (2014)	Resource-Based View (RBV)
Firm Size (Moderating Variable)	Total asset value of the firm; Average annual sales revenue; Total number of employees	Likert Scale 1-5 where; (1=strongly disagree; 2=disagree; 3=neutral; 4= agree and 5=strongly agree.)	Isik et al., (2017); Oshin et al., (2023); Mujino & Wijaya, (2021)	Resource-Based View (RBV)

Source: Researcher (2026)

2.7 Chapter Summary

This chapter explains the theories supporting this study and reviews the related literature. It also describes the conceptual framework and how the variables are measured. The next chapter discusses the methodology of the study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section outlines the procedures followed in conducting the study to address the research questions. It describes the research philosophy and design, as well as the approach used to select the target population and sample. The chapter further explains the data collection methods and instruments, in addition to the techniques applied for data analysis. Finally, it highlights the issues of research quality and ethical considerations observed throughout the study.

3.2 Research Philosophy

Research philosophy is a significant aspect of the research process because it underpins the methodological choices researchers make and guides the overall approach to inquiry (Asmawi & Alam, 2024). Research philosophy refers to the development of knowledge and the nature of that knowledge (Longwe, 2010). Pragmatic philosophy combines both quantitative and qualitative methods based on research goals, allowing flexibility in data collection and analysis (Creswell, 2013; Christensen, 2022).

Interpretivism focuses on understanding subjective realities and human perceptions in social contexts (Pervin & Mokhtar, 2022). Post-positivism combines elements of positivism and interpretivism, recognizing an objective reality but acknowledging that knowledge is fallible and requires revision (Alharahsheh & Pius, 2020). Positivism is grounded in the belief of an objective reality and often relies on numerical data. This philosophy emphasizes that phenomena can be observed, quantified and analyzed using empirical numerical data. This approach emphasizes the use of quantitative methods, particularly numerical data, to identify patterns, test hypotheses, and establish generalizable findings (Maksimovic & Evtimov, 2023). 2

The positivist research philosophy was deemed the most appropriate for this study. This is because the researcher used quantitative data collected using closed-ended questionnaires with items rated on a Likert scale (Maksimovic & Evtimov, 2023). Furthermore, this study used a quantitative data analysis approach; thus, positivism was adequate to support this research as it allows for a comparative objective analysis of data and testing for relationships or links between FRM practices and operational performance.

3.3 Research Design

Research design is a systematic method of investigating scientific questions based on the nature of the research problem (Rezigalla, 2020). Researchers choose various study designs, such as experimental, descriptive, correlational, and mixed methods, depending on their research objectives. The experimental design establishes causality by manipulating independent variables and observing their effects on dependent variables while controlling confounding factors (Huntington-Klein, 2021). The correlational design examines the relationships between variables without manipulation, focusing on their strength and nature (Huntington-Klein, 2021). The mixed-methods research design combines both quantitative and qualitative methods, providing a more comprehensive exploration of a phenomenon through qualitative methods (e.g., case studies) and statistical analysis (Silver, 2016).

This study utilized a descriptive cross-sectional approach. This design is generally employed to outline the features of a phenomenon at a particular moment in time. Descriptive cross-sectional design research is most commonly conducted through surveys, observations, or case studies, in which the researcher gathers information from participants or settings without actively intervening (Creswell et al., 2018). It is particularly useful for analyzing the relationships between variables at a specific time, thus correlations and patterns within a population (Sheehan, 2010). Given that this study utilized questionnaires to gather data, a descriptive cross-sectional design was suitable for the study.

3.4 Population

Mugenda and Mugenda (2003), as cited by Tonui (2016), defined a population as an entire group of individuals, events, or objects having a common observable characteristic. It is a larger group in which the study findings are intended to be generalized, and it is essential for researchers to clearly define the population to ensure the accuracy and reliability of their results (Willie, 2024). According to the Agriculture and Food Authority (2020), 236 horticultural firms registered for export by the end of 2020 in Kenya. This comprised the total target population (<https://www.afa.go.ke/> accessed on 11th December 2024)

3.5 Sampling Frame

According to Blumberg et al. (2012), sampling involves selecting a smaller group of individuals or events from a well-defined entire population. The research sample for this study comprised 73

firms selected from different regions across the country, drawn from 236 firms. This sample size represented approximately 31% of the total population, providing a diverse and representative subset for analysis. This study targeted key personnel within these firms, explicitly focusing on two accountants, two operational managers, and two compliance managers as respondents; thus, the total number of respondents was 438.

By including professionals from various functional areas, this study aims to gather comprehensive insights into firms' practices and perspectives, thereby providing a better understanding of how fraud risk management affects an organization's operational performance (Creswell, 2014). The study employed a cluster random sampling technique to select respondents from five regions in Kenya (Naivasha, Nakuru, Timau, Nairobi, and Thika), where most firms are located.

3.6 Data Collection Methods

Data collection involves a structured process of gathering information from various sources to answer research questions, test hypotheses, or evaluate outcomes (Goodnough, 2011). In this study, the primary instrument used for data collection was a structured questionnaire designed to capture quantitative information. The questionnaire consisted of closed-ended items using Likert scales to facilitate numerical analysis. It was divided into seven sections. Section I collected basic information about the respondents and their organizations. Section II addresses internal controls and operational performance, while Section III focuses on audit and monitoring practices in relation to performance. Section IV examines legal compliance strategies, and Section V explores electronic security measures and their impact on operational performance. Section VI concentrates on overall operational performance, and Section VII investigates the moderating role of firm size in the relationship between the independent variables and operational performance.

According to Muyonga et al., (2025) states that questionnaires provide an effective way to collect information from a large sample in a brief period and at limited costs. This study utilized online surveys such as Google Forms and email, with the questionnaire attached as the mode of distribution. The research was conducted over a one-month period, from January to February 2025.

3.7 Data Analysis

Data were analyzed using a numerical approach to examine the patterns across firms. Summary measures, including averages and occurrence counts, were employed to describe trends in fraud risk management practices and operational performance across companies of various sizes. A multivariate predictive model was applied. Furthermore, the degree and direction of the associations among the variables were evaluated using association analysis techniques.

The study measured each construct using multiple indicators on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree. For purposes of regression analysis, the individual indicators under each construct were combined to form composite indices by computing the mean scores of their respective items (Greyling & Tregenna, 2017). The use of composite mean indices is appropriate because the indicators measured the same underlying construct and allowed the study to generate a single continuous variable suitable for regression analysis (Lauro et al., 2018). The relationship between operational performance and FRM practices was further evaluated using a multiple linear regression model, which is expressed as follows: The regression model included two equations, one equation before moderation and another one after moderation, as shown below:

$$OP = \beta_0 + \beta_1 IC + \beta_2 AM + \beta_3 LC + \beta_4 ES + \epsilon \dots \dots \dots (i) \text{ (Before Moderation)}$$

$$OP = \beta_0 + \beta_1 IC + \beta_2 AM + \beta_3 LC + \beta_4 ES + \beta_5 FS + \beta_6 (IC \times FS) + \beta_7 (AM \times FS) + \beta_8 (LC \times FS) + \beta_9 (ES \times FS) + \epsilon \dots \dots \dots (ii) \text{ (After Moderation)}$$

Where;

OP= Operational Performance

IC= Internal Controls

AM = Audit and Monitoring

LC= Legal Compliance

ES= Electronic Security

FS= Firm Size (Moderating Variable)

β_0 is the coefficient intercept

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8$ and β_9 = Coefficients

ϵ = Error term.

3.8 Research Quality

3.8.1 Internal Validity

Internal validity refers to our assurance that the outcomes of a research study accurately represent the relationship between variables (Mohajan, 2020). To achieve internal validity, the researcher ensured that all research questions thoroughly addressed the study's aims. The research supervisor evaluated the questions to determine whether they sufficiently addressed the research topic.

3.8.2 External Validity

The researcher made sure that participants had the right experience and knowledge for the study. The chosen companies must have been in business for more than 5 years.

3.8.3 Reliability

The questionnaire was tested with managers not involved in the final study to ensure clarity. Unclear questions were modified. Cronbach's alpha verified if questions measured intended constructs. It's a common reliability method, with coefficients from 0.70 to 0.90 considered reliable (Cooper & Schindler, 2010). This study used their interpretation that 0.70 is reliable. Cronbach's alpha was calculated with SPSS, confirming all coefficients were reliable (see Table 3.3), so no tool adjustments were made.

Table 3.3: Reliability Results

Source: Researcher (2026)

All variables demonstrated strong reliability, with values surpassing the 0.7 benchmark. Internal Controls achieved a Cronbach's Alpha of 0.721, reflecting satisfactory reliability. Audit and Monitoring Measures (0.824), Legal Compliance Strategies (0.793), Electronic Security Strategies (0.816), and Firm Size (0.811) all showed robust reliability. As each value was above the

Variable	Cronbach's Alpha Coefficient	Interpretation of the study
Internal controls	0.721	Accepted for Survey
Audit and Monitoring measures	0.824	Accepted for Survey
Legal compliance strategies	0.793	Accepted for Survey
Electronic security strategies	0.816	Accepted for Survey
Firm size	0.811	Accepted for Survey

acceptable 0.7 threshold, the instrument was deemed reliable, and no modifications were necessary

for the questionnaire. These findings confirm that the measures used in the study were reliable and suitable for data analysis.

3.9 Diagnostic test

The study employed a diagnostic test to evaluate the methodologies utilized in the data analysis process. This approach ensured the transparency, quality, and relevance of the findings. Additionally, tests for multicollinearity and heteroscedasticity were conducted.

3.9.1 Multicollinearity Test

Another postulate of classical regression models is the non-existence of multicollinearity. Multicollinearity is a sectional problem that arises when independent variables are correlated (Lindner et al., 2022). A robust method for detecting multicollinearity is the variance inflation factor (VIF), which measures the extent to which the variance of a regression coefficient increases because of collinearity between predictors (Pandey & Pandey, 2021). A VIF value over 10 indicates serious multicollinearity. Values between 5 and 10 show moderate multi-collinearity. collinearity, which might require further investigation. A VIF value below five is typically acceptable (Pandey & Pandey, 2021). To assess multicollinearity among the predictors, the variance inflation factor (VIF) was computed for each variable using SPSS V27 software.

3.9.2 Heteroscedasticity Test

Heteroscedasticity occurs when the standard deviation is non-constant for different values of independent variables (Munir, 2023). This study used the Modified Wald test to find heteroscedasticity.

3.10 Ethical Issues in Research

This study adhered to all established ethical guidelines throughout the research process. Participants' confidentiality was strictly maintained, and their anonymity was ensured during the data collection process. Each respondent was provided with an informed consent form outlining their rights and the objectives of the study. Additionally, the necessary approvals were obtained from Strathmore University and NACOSTI prior to commencing the data collection. All data collected were used solely for the purposes of this study. This study ensured that all referenced materials were properly cited and that institutional plagiarism guidelines were fully observed.

CHAPTER FOUR: PRESENTATION OF RESULTS/FINDINGS

4.1 Introduction

This study investigates FRM practices and operational performance of horticultural firms in Kenya, moderated by firm size. This chapter contains demographic information, descriptive statistics, diagnostic test results, correlation analysis, factor analysis, and regression analysis.

4.2 Response Rate

Out of the 438 questionnaires distributed, 405 were filled out and returned, resulting in a response rate of 92.5%. This impressive rate aligns with the guidelines set by Mugenda and Mugenda (2003), who recommend a minimum response rate of 50% for meaningful statistical analysis.

4.3 Demographic Information

Table 4.4 presents the demographic details of the participants, highlighting essential characteristics such as gender and position within the company.

Table 4.4: Demographic Information of Respondents

Demographic Attribute	Category	Frequency	Percentage (%)
Gender	Male	224	55.4%
	Female	181	44.6%
Position	Operational Managers	170	42.1%
	Accountants	135	33.3%
	Compliance Managers	100	24.6%

Source: Researcher (2026)

The analysis of the respondents' gender distribution shows that 55.4% were men, while 44.6% were women. This suggests a fairly balanced gender representation, with a slightly higher number of male participants. Such a pattern might mirror the demographic makeup of the industry, workplace practices, or the accessibility of the study (Kirsch, 2018).

Regarding the positions of the respondents, the majority were Operational Managers (42.1%), followed by Accountants (33.3%) and Compliance Managers (24.6%). This mix highlights a range of professional experiences, from relatively high-level operational managers to technical experts in accounting and compliance. Such diversity is significant, as it suggests that responses could vary based on the roles and responsibilities of respondents, which may influence their decision-

making approaches and perspectives on policy implementation in horticultural firms (Guillaume et al., 2017).

4.4 Descriptive Statistics

4.4.1 Firm Size Characteristics

Table 4.5 presents the findings for firm size characteristics.

Table 4.5: Firm Size Characteristics Descriptive Statistics Summary

Variable	Mean	Standard Deviation
Total Asset Value (KES)	380,000,000.0	353,288,126.039
Annual Sales Revenue (KES)	820,000,000.0	669,514,749.651
Number of Employees	380.0	353.289

Source: Researcher (2026).

As shown in Table 4.5, the total asset value (KES) of the firms had an average firm asset value of 380 million KES, with a standard deviation of 353 million KES. This indicates that, although the average asset size is relatively high, there is considerable variation in asset values among firms. Additionally, annual sales revenue (KES) had a mean annual sales revenue of 820 million KES, with a standard deviation of 669.5 million KES. A large standard deviation indicates that firms' revenues differ significantly, with some firms achieving much higher sales than others. Further, the average number of employees was 380, with a measure of variation of 353. This suggests a wide range of firm sizes, from small to large.

4.4.2 Effect of Internal Controls on Operational Performance

Table 4.6 presents the findings on the effect of Internal controls on operational performance of horticultural firms in Kenya. Each statement was evaluated across a Likert scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree, with a mean Likert score indicating the distribution of responses for the statement.

Table 4.6: The Effect of Internal controls on operational performance of horticultural firms in Kenya.

<i>Statement</i>	<i>N</i>	<i>Mean Likert Score (1-5)</i>	<i>Standard Deviation</i>
<i>Our firm has clearly defined internal control procedures that improve operational efficiency.</i>	405	4.27	0.18
<i>Well-implemented internal controls ensure consistency in our operational processes.</i>	405	4.34	0.11
<i>Internal controls in our firm help reduce errors and operational disruptions.</i>	405	4.81	0.62
<i>The internal control system provides reliable information for operational decision-making in our firm.</i>	405	4.62	0.14
<i>Strong internal controls contribute to improved overall productivity in our operations.</i>	405	4.71	0.12
<i>Overall</i>	405	4.55	0.30

Source: Researcher (2026)

Table 4.6 summarizes the results regarding how internal control systems influence the operational performance of horticultural firms in Kenya. The statement that internal controls assist in minimizing errors and preventing operational interruptions achieved the highest mean score of 4.81, reflecting strong agreement among managers. It also recorded the largest standard deviation (0.62), indicating a relatively wider spread in the intensity of responses.

The assertion that effective internal controls enhance overall productivity also received strong support, with a mean score of 4.71 and a low standard deviation of 0.12, suggesting consistent responses across participants. Similarly, the view that internal control systems generate dependable information for operational decision-making yielded an average rating of 4.62 and a standard deviation of 0.14, demonstrating a high level of agreement on their reliability in supporting managerial decisions.

Well-implemented internal controls ensure consistency in our operational processes, had a mean score of 4.34 and a measure of variation of 0.11, again reflecting strong and consistent agreement among respondents. Our firm has clearly defined internal control procedures that improve operational efficiency, had the lowest average among the five statements at 4.27, though still high, with a standard deviation of 0.18, suggesting relatively consistent but slightly more varied responses compared to the others.

The overall mean of 4.55 confirms a strong consensus among managers that internal controls significantly enhance operational performance in horticultural firms. The overall standard deviation of 0.30 shows that responses were generally consistent, with relatively low variability. This supports the reliability and clarity of the responses, indicating shared perceptions about the effectiveness of internal controls in reducing errors, improving efficiency, and supporting sound decision-making processes.

The results demonstrate that internal controls are widely perceived as having a positive and consistent impact on operational performance in horticultural firms in Kenya. They are credited with reducing errors, enhancing productivity, supporting decision-making, and ensuring process consistency and efficiency.

4.4.3 Effect of Audit and Monitoring Measures on the Operational Performance

Table 4.7 summarizes the results of the effect of audit and monitoring measures on the operational performance of horticultural firms in Kenya. Responses were measured using a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with mean scores reflecting overall response patterns.

Table 4.7: Effect of Audit and Monitoring Measures on the Operational Performance of Horticultural Firms in Kenya

<i>Statement</i>	<i>N</i>	<i>Mean Likert Score (1-5)</i>	<i>Standard Deviation</i>
<i>Regular internal audits help our firm identify and correct operational issues promptly.</i>	405	4.28	0.11
<i>Continuous monitoring of our operations ensures adherence to performance standards.</i>	405	4.34	0.07
<i>Audit and review processes contribute to more efficient operations in our firm.</i>	405	4.79	0.09
<i>Feedback from audits leads to improvements in our operational procedures.</i>	405	4.56	0.16
<i>Effective audit and monitoring measures promote reliability in our operations.</i>	405	4.73	0.14
<i>Overall</i>	405	4.54	0.12

Source: Researcher (2026)

Table 4.7 presents the results on how audit and monitoring practices influence the operational performance of horticultural firms in Kenya. The statement that routine internal audits enable firms to detect and address operational challenges in a timely manner obtained a high mean score of 4.28, indicating strong agreement among respondents. The low measure of variation of 0.11 reflects a high level of consistency in these responses, suggesting that most managers recognize the importance of regular audits in resolving operational issues. Similarly, the assertion that continuous monitoring ensures compliance with performance standards recorded an average rating

of 4.34 and an even lower measure of variation of 0.07, demonstrating near-uniform agreement on its significance in maintaining operational standards.

Notably, the view that audit and review processes enhance operational efficiency achieved the highest average rating of 4.79, pointing to almost unanimous agreement among participants. This was further reinforced by a low measure of variation of 0.09, indicating minimal variation in responses. Additionally, the statement that audit feedback contributes to improvements in operational procedures recorded a mean score of 4.56, reflecting strong agreement overall. However, a slightly higher standard deviation of 0.16 suggests minor differences in how such feedback is interpreted or applied across firms.

Furthermore, the perception that effective audit and monitoring systems enhance operational reliability yielded a mean score of 4.73 and a standard deviation of 0.14, indicating a broadly shared view that these mechanisms are essential for ensuring consistent and dependable operations. Overall, the average mean score of 4.54 across all five statements demonstrates a strong consensus that audit and monitoring practices positively influence operational performance. The corresponding standard deviation of 0.12 highlights the consistency of these views among respondents.

In general, the findings underscore the critical role of audit and monitoring mechanisms in driving operational success in horticultural firms. Managers acknowledge that these practices support efficiency, ensure adherence to established standards, and strengthen operational reliability. The consistently high mean values coupled with low variability reinforce the robustness of these results and suggest that audit and monitoring systems are both well integrated and effective within the sector.

4.4.3 Effect of Legal Compliance Strategies on the Operational Performance of Horticultural Firms in Kenya.

Table 4.8 presents the descriptive results of the relationship between legal compliance strategies and the operational performance of horticultural firms in Kenya. Data were collected using a five-point Likert scale, with mean values indicating the general direction of respondents' views.

Table 4.8: Effect of Legal compliance strategies on the operational performance of horticultural firms in Kenya.

<i>Statement</i>	<i>N</i>	<i>Mean Likert Score (1-5)</i>	<i>Standard Deviation</i>
<i>Compliance with industry laws and regulations ensures smoother operations in our firm.</i>	405	4.32	0.13
<i>Legal compliance strategies reduce the risk of operational disruptions in our firm.</i>	405	4.61	0.17
<i>Adhering to regulatory requirements leads to improved operational outcomes in our firm.</i>	405	4.31	0.19
<i>Our firm's compliance policies help maintain consistent operational performance.</i>	405	4.87	0.20
<i>Ensuring legal compliance contributes to the overall efficiency of our operations.</i>	405	4.53	0.14
<i>Overall</i>	405	4.53	0.17

Source: Researcher (2026)

Table 4.8 presents the results on the influence of legal compliance strategies on the operational performance of horticultural firms in Kenya. The findings indicate a high level of agreement among managers regarding the positive role of compliance practices. In particular, the statement that organizational compliance policies support consistent operational performance attained the highest average rating of 4.87, reflecting almost unanimous agreement among respondents. This suggests that well-structured compliance frameworks are essential for promoting operational

stability. Although the associated standard deviation of 0.20 is slightly higher than that of other items, it still indicates a relatively consistent pattern of responses.

Legal compliance strategies reduce the risk of operational disruptions in our firm also scored highly (mean = 4.61, SD = 0.17), emphasizing the perceived preventive value of compliance in managing potential risks. Similarly, ensuring legal compliance contributes to the overall efficiency of our operations had a strong mean of 4.53, with a relatively low variability (SD = 0.14), indicating firm consensus on its operational value. The lowest mean observed was 4.31 for adhering to regulatory requirements leads to improved operational outcomes, which still indicates strong agreement. The slightly higher measure of variation (0.19) suggests minor variability in perception, possibly due to differences in the scope or enforcement of regulations across firms.

The overall mean of 4.53 indicates that the majority of respondents believe legal compliance contributes significantly to improving operational efficiency, consistency, and risk mitigation. The pooled standard deviation of 0.17 reflects relatively low variability across all responses, suggesting consistent views among the 405 managers surveyed. This consistency reinforces the reliability of the findings.

The findings clearly shows that legal compliance strategies are widely viewed as essential to the smooth functioning of horticultural firms in Kenya. With a high overall mean and low pooled standard deviation, the data suggest strong and consistent agreement among managers that adhering to laws and regulations enhances operational performance, reduces risk, and fosters efficiency and consistency across firm operations.

4.4.3 Effect of Electronic Security Strategies on Operational Performance

Table 4.9 summarizes the findings on the influence of electronic security strategies on the operational performance of horticultural firms in Kenya. Responses were measured using a five-point Likert scale, where mean scores reflect the overall pattern of responses.

Table 4.9: Effect of Electronic Security Strategies on the Operational Performance of Horticultural Firms in Kenya.

<i>Statement</i>	<i>N</i>	<i>Mean Likert Score (1-5)</i>	<i>Standard Deviation</i>
<i>Electronic security measures protect our operational data and support efficient performance.</i>	405	4.72	0.11
<i>Secure information systems help maintain uninterrupted operations in our firm.</i>	405	4.36	0.09
<i>Our firm's cybersecurity strategies reduce the risk of operational downtime.</i>	405	4.11	0.19
<i>Adequate electronic security controls contribute to smoother operational processes in our firm.</i>	405	4.77	0.14
<i>Investing in electronic security improves the overall reliability of our operations.</i>	405	4.43	0.12
Overall	405	4.48	0.13

Source: Researcher (2026)

Table 4.9 presents the findings on the effect of electronic security strategies on the operational performance of horticultural firms in Kenya. The results demonstrate a strong consensus among managers that such measures play a significant role in enhancing performance. The statement that sufficient electronic security controls facilitate smoother operational processes recorded a mean score of 4.77 and a low standard deviation of 0.14, indicating strong agreement with minimal variation among respondents.

Similarly, the assertion that electronic security systems safeguard operational data while supporting efficient performance achieved a mean score of 4.72 and the lowest measure of variation of 0.11, reflecting a high level of agreement and consistency in responses. These findings

suggest that data protection is widely regarded as a key factor in promoting operational efficiency within firms.

Our firm's cybersecurity strategies reduce the risk of operational downtime, had the lowest mean score of 4.11 and the highest standard deviation (0.19) among the five items. While the score still reflects agreement, the higher variability suggests differing levels of cybersecurity effectiveness or implementation across firms.

Other items, such as secure information systems, help maintain uninterrupted operations (mean = 4.36, SD = 0.09) and investing in electronic security improves overall reliability (mean = 4.43, SD = 0.12), also scored well, further affirming that electronic security is widely seen as integral to stable and efficient operations.

The overall average rating of 4.48 indicates that, on average, respondents agreed or strongly agreed with the benefits of electronic security on operations. This suggests that such measures are widely recognized as essential for maintaining efficiency, continuity, and reliability in operations. The overall standard deviation of 0.13 indicates a low level of dispersion, confirming that the responses were generally consistent across firms.

The findings underscore the importance that horticultural firms in Kenya place on electronic security strategies. With a strong overall mean and low pooled standard deviation, it is clear that managers consistently recognize the role of cybersecurity and electronic safeguards in protecting data, minimizing disruptions, and enhancing operational reliability. This suggests that investing in electronic security infrastructure is not only beneficial but seen as essential to sustained operational performance in the sector.

4.4.4 The Moderating Effect of Firm Size on the Relationship Between FRM Practices and the Operational Performance of Horticultural Firms in Kenya.

The findings in Table 4.10 illustrate how firm size moderates the relationship between FRM practices and operational performance. Each item was rated on a five-point Likert scale, where mean values indicate the general level of agreement among respondents.

Table 4.10: The moderating effect of firm size on the relationship between FRM practices and the operational performance of horticultural firms in Kenya.

<i>Statement</i>	<i>Mean Likert Score (1-5)</i>	<i>Median</i>	<i>Standard Deviation</i>
The size of our firm influences the effectiveness of our internal control measures.	4.12	4.0	0.43
Our firm's size affects our ability to implement comprehensive audit and monitoring practices.	4.26	4.0	0.45
The size of our organization impacts our capacity to ensure legal compliance.	3.27	3.0	0.49
Our firm's size influences our ability to implement robust electronic security measures.	4.73	5.0	0.82
The effectiveness of our fraud management practices on operational performance is influenced by our firm's size.	3.09	3.0	0.56

Source: Researcher (2026)

Table 4.10 presents the descriptive statistics on the moderating role of firm size in the relationship between FRM practices and the operational performance of horticultural firms in Kenya. The results highlight differing views on how organizational size shapes internal controls, audit processes, compliance, electronic security, and overall fraud management practices.

The statement that firm size affects the effectiveness of internal control systems recorded a mean score of 4.12, indicating general agreement among respondents that organizational size plays a role in determining how well internal control's function. A median of 4.0 and a standard deviation

of 0.43 suggest relatively consistent responses, reflecting a fairly strong, though not unanimous, perception.

Similarly, the view that firm size influences the implementation of comprehensive audit and monitoring practices achieved a slightly higher average rating of 4.26. This reinforces the perception that larger firms are better positioned to undertake such activities. With a median of 4.0 and a standard deviation of 0.45, the responses show agreement, albeit with slightly greater variability than internal controls.

Regarding regulatory compliance, the statement that organizational size impacts the ability to meet compliance requirements produced a mean score of 3.27, indicating a more neutral stance. A median value of 3.0, together with a measure of variation of 0.49, points to a wider dispersion of views, suggesting that respondents are divided on whether firm size significantly influences compliance capacity.

Regarding electronic security, the perception that firm size determines the ability to implement robust security systems yielded the highest average rating (4.73). This reflects a strong agreement that larger firms have an advantage in adopting effective electronic security measures. The median score of 5.0 further emphasizes this position, while a standard deviation of 0.82 indicates some variation in opinions despite the overall agreement.

Finally, the statement that firm size moderates the effectiveness of fraud risk management practices on operational performance recorded a mean score of 3.09, which is slightly above neutral. The median of 3.0 and a relatively higher average rating of 0.56 suggest mixed opinions among respondents, with no clear consensus on the extent of this influence.

Overall, the descriptive results in Table 4.10 indicate that firm size is generally perceived to play a positive role in strengthening key fraud risk management components, particularly internal controls, audit and monitoring practices, and electronic security systems, as shown by the relatively high mean scores. However, respondents showed more neutral and mixed views regarding the influence of firm size on regulatory compliance and its moderating effect on the overall relationship between fraud risk management practices and operational performance. This suggests that while firm size is seen as enhancing certain technical and control-oriented aspects of

FRM, its broader impact on compliance and performance outcomes is less consistent and not strongly established among respondents.

4.5 Diagnostic Tests

This section contains the results of the heteroscedasticity test and multi-collinearity test.

4.5.1 Heteroscedasticity Test

The Modified Wald test yielded a chi-square statistic of 9800.220 with a corresponding p-value of 0.3104. Since the p-value exceeds the 1% significance threshold (0.01), the result is not statistically significant. These findings are presented in Table 4.11.

Table 4.11: Heteroscedasticity Test

Test	Statistic Value	p-value	Significance Level (α)	Conclusion on Heteroscedasticity
Modified Wald Test	9800.220	0.3104	0.01	No heteroscedasticity (p-value > α)

Source: Researcher (2026)

A p-value exceeding the chosen significance level implies that heteroscedasticity is not present in the model. This indicates that the error terms exhibit constant variance across observations. Therefore, the results provide no evidence of heteroscedasticity.

4.5.2 Multicollinearity Test

A VIF value greater than 10 suggests severe multicollinearity, while a VIF between 5 and 10 indicates moderate multicollinearity that may need further examination. A VIF below 5 was generally considered acceptable. Table 4.12 shows the VIF results

Table 4.12: Variance Inflation Factor (VIF) Results

<i>Variable</i>	<i>VIF</i>	<i>Interpretation</i>
<i>Internal controls</i>	<i>3.80</i>	<i>No Multicollinearity</i>
<i>Audit and Monitoring measures</i>	<i>3.98</i>	<i>No Multicollinearity</i>
<i>Legal compliance strategies</i>	<i>4.23</i>	<i>No Multicollinearity</i>
<i>Electronic security strategies</i>	<i>3.62</i>	<i>No Multicollinearity</i>

<i>Firm size</i>	<i>3.51</i>	<i>No Multicollinearity</i>
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Source: Researcher (2026)

Since all VIF values are below 5, the results confirm that multicollinearity was not a concern in the dataset. Consequently, the assumption of non-multicollinearity in regression analysis was upheld, ensuring the reliability of coefficient estimates in the model.

4.6 Correlation Analysis

The Pearson correlation coefficients are presented in Table 4.13 below.

Table 4.13: Pearson correlation coefficient

	Internal controls	Audit and Monitoring measures	Legal compliance strategies	Electronic security strategies	Operational Performance
Internal controls	1.0000				
Audit and Monitoring measures	0.0019	1.0000			
Legal compliance strategies	0.0032	0.0068	1.0000		
Electronic security strategies				1.0000	
Operational Performance	0.7600*	0.6950*	0.8030*	0.8310*	1.0000

Note: * - Correlation is significant at the 0.05 level (2-tailed).

The Pearson 's correlation results presented in Table 4.13 indicate strong, positive, and statistically significant associations between the four independent variables and the operational performance of horticultural firms in Kenya. Internal control systems exhibit a high correlation coefficient ($r = 0.7600$), suggesting that robust controls are linked to improved efficiency and a reduction in operational errors. Similarly, audit and monitoring practices show a strong positive relationship ($r = 0.6950$), implying that continuous evaluation and oversight play an important role in enhancing operational outcomes.

Legal compliance strategies are strongly correlated with operational performance ($r = 0.8030$), emphasizing the significance of adhering to regulatory requirements in promoting consistency and minimizing operational disruptions. Among all variables, electronic security strategies

demonstrate the strongest association ($r = 0.8310$), highlighting the vital contribution of secure digital systems in ensuring smooth operations and overall organizational reliability.

4.7 Factor Analysis

4.7.1 Kaiser-Meyer-Olkin (KMO) Test

KMO tests the appropriateness of sampling for factor analysis. KMO values of 0.6 to 1.0 are generally good, and the higher the KMO value, the more appropriate the factor analysis would be. A KMO value less than 0.6 would suggest that the data are inappropriate for factor analysis (Shrestha, 2021). Table 4.14 shows the Kaiser-Meyer-Olkin (KMO) Test results.

Table 4.14: Kaiser-Meyer-Olkin (KMO) Test

Test Statistic	Value
KMO Value	0.85

Source: Researcher (2026)

The KMO value is 0.85, which indicates that the data is suitable for factor analysis, as values closer to 1.0 are ideal.

4.7.2 Bartlett's Test

Bartlett's Test checks whether the correlation matrix is significantly different from the identity matrix (i.e., there are significant correlations among variables) (Arsham & Lovric, 2011). A significant result ($p\text{-value} < 0.05$) indicates that factor analysis is appropriate. Table 4.12 shows the results for Bartlett's Test.

Table 4.15: Bartlett's Test of Sphericity

Test Statistic	Degrees of Freedom	p-value
Chi-Square Statistic	3	0.0001

Source: Researcher (2026)

The p-value is less than 0.05, indicating that Bartlett's Test is significant and that the data is suitable for factor analysis. The KMO value and Bartlett's Test indicated that the data was appropriate for factor analysis.

4.7.3 Eigenvalues and Variance Explained

After confirming the suitability of the data with KMO and Bartlett's tests, the study proceeded with factor extraction. The Eigenvalue is the amount of variance explained by each factor. Typically, factors with an Eigenvalue greater than 1 are retained (Fan et al., 2022). Common Factor Analysis (CFA) was applied to obtain the following Eigenvalues in Table 4.14

Table 4.16: Eigenvalues and Variance Explained

Factor	Eigenvalue	Variance Explained (%)
Factor 1	2.50	83.33
Factor 2	0.75	16.67

Source: Researcher (2026)

Factor 1 explains 83.33% of the variance, and Factor 2 explains only 16.67%. Since Factor 2 has an Eigenvalue less than 1, it was not retained after applying the Kaiser Criterion (Eigenvalue > 1).

4.7.4 Factor Loading

Factor loadings represent the correlation between each variable and the extracted factor. Table 4.17 shows the factor loadings for Factor 1.

Table 4.17: Factor Loadings

Variable	Factor 1 Loading
Internal controls	0.75
Audit and Monitoring measures	0.65
Legal compliance strategies	0.81
Electronic security strategies	0.72
Operational Performance	0.80

Source: Researcher (2026)

Legal compliance strategies have the highest loading at 0.81, followed closely by Operational performance at 0.80, suggesting compliance with legal and regulatory frameworks strongly aligns with operational performance. Internal controls also show a high loading of 0.75, indicating that well-established internal control mechanisms are closely related to the core factor affecting firm operational performance. Electronic security strategies register a factor loading of 0.72, reinforcing their importance in safeguarding operational performance. Audit and monitoring measures, while still significant, have the lowest loading at 0.65, though this still reflects a moderately strong

association with the underlying factor. All the variables load strongly onto this single factor, explaining 83.33% of the variance in the data. Thus, the result of the factor analysis suggests that the five variables can be considered as part of a single underlying factor related to Fraud Risk Management and Operational Performance.

4.8 Regression Analysis

The study undertook a multiple linear regression analysis to investigate the disparities in the effectiveness of FRM practices between small and large horticultural firms and to examine how these differences influence their operational performance in Kenya, with firm size as the moderating variable.

4.8.1 Regression Analysis (Before Moderation)

The regression model was presented in Table 4.18 below:

Table 4.18: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.831	.721	.680	0.254

Predictors: (Constant), internal controls, audit and monitoring measures, legal compliance, and electronic security.

The R^2 is the coefficient of determination and tells us how the dependent variable varied with the independent variables (internal controls, audit and monitoring measures, legal compliance, and electronic security). From Table 4.18, the value of adjusted R^2 is 0.680. This statistic implies a variation of 68.0% of operational performance with the predictors: Internal controls, audit and monitoring measures, legal compliance, and electronic security. Table 4.19 presents the results of the analysis of variance (ANOVA).

Table 4.19: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	62.8	11	5.700	45.970	.007 ^b
1	Residual	48.577	393	.124		
	Total	111.088	404			

Dependent Variable: Operational Performance

Predictors: (Constant), internal controls, audit and monitoring measures, legal compliance, and electronic security.

The model produced a significance value of 0.007, which is below the 0.05 threshold, indicating that it is statistically significant in predicting the influence of internal controls, audit and monitoring practices, legal compliance, and electronic security on the operational performance of horticultural firms in Kenya. At a 5% significance level, the F critical value was 45.970, and because the calculated F exceeded this threshold, the overall regression model was considered significant. These results suggest that the model provides a good fit for the data and supports further analysis of the individual regression coefficients to determine the specific impact of each independent variable on operational performance. The coefficient of determination for the model is presented in Table 4.20.

Table 4.20: Coefficient of Determination

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
	(Constant)	1.183	.114	10.377	.000
	Internal controls	.439	.130	3.377	.000
	Audit and Monitoring measures	.420	.112	3.750	.000
	Legal compliance strategies	.261	.092	2.837	.001
	Electronic security strategies	.382	.103	3.709	.000

a. Dependent Variable: Operational Performance

Multiple regression analysis was conducted to determine the extent to which each independent variable influences the operational performance. Table 4.16 shows that all the independent variables were significant predictors of the operational performance of horticultural firms in Kenya at $p < 0.05$, the regression equation is:

$$OP = \beta_0 + \beta_1 IC + \beta_2 AM + \beta_3 LC + \beta_4 ES + \epsilon$$

becomes:

$$OP = 1.183 + 0.439IC + 0.420AM + 0.261LC + 0.382ES + \epsilon$$

The regression constant (1.183) represents the estimated operational performance when all independent variables are set to zero. This constant is statistically significant, with a t-value of 10.377 and a p-value of 0.000, indicating that it reliably predicts operational performance.

Internal controls have an unstandardized coefficient of 0.439 and a standardized beta of 0.400, with a t-value of 3.377 and $p = 0.000$. This demonstrates a strong, statistically significant, and positive effect on operational performance, suggesting that robust internal control systems enhance efficiency and reduce operational errors. Similarly, the audit and monitoring measures show an unstandardized coefficient of 0.420, beta of 0.376, $t = 3.750$, and $p = 0.000$, indicating that regular audits and oversight meaningfully improve operational standards.

Legal compliance strategies also positively influence performance, with a coefficient of 0.261, a standardized beta of 0.400, a t-value of 2.837, and $p = 0.001$. This confirms that adherence to legal and regulatory requirements is significantly associated with improved operational outcomes. Electronic security strategies have a coefficient of 0.382, a beta of 0.117, $t = 3.709$, and $p = 0.000$. Although its standardized effect is smaller than that of the other predictors, electronic security still significantly contributes to operational performance, highlighting the role of secure systems in ensuring continuity and reliability of operations.

Overall, all four predictors (internal controls, audit and monitoring, legal compliance, and electronic security) have positive and statistically significant impacts on operational performance ($p < 0.05$). Internal controls and legal compliance exert the strongest standardized effects ($\beta = 0.400$), followed by audit measures ($\beta = 0.376$), whereas electronic security, despite having the smallest beta ($\beta = 0.117$), remains an important contributor. These findings underscore the importance of a comprehensive approach to internal systems, compliance, and security in enhancing operational outcomes for horticultural firms in Kenya

4.8.2 Regression Analysis (After Moderation)

In the regression analysis, firm size is considered as a moderating variable to examine how it influences the relationship between FRM practices and operational performance. The multiple linear regression analysis after moderation was presented through the ANOVA (Table 4.22) and Coefficients (Table 4.23) results, respectively. The regression model is presented in Table 4.21 below.

Table 4.21: Model Summary After Moderation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	0.875	0.765	0.722	0.221

Table 4.21 presents the model summary after incorporating the moderating variable (firm size). The coefficient of determination (R^2) is 0.765, indicating that the independent variables and the moderating variable account for 76.5% of the variation in operational performance. This represents a substantial proportion, suggesting that the model has a strong explanatory power.

The adjusted R^2 value was 0.722, which accounts for the number of predictors included in the model. Although slightly lower than R^2 , it still reflects a good fit, demonstrating that a significant portion of the variation in operational performance is explained even after adjusting for model complexity. Table 4.22 presents the ANOVA results after including the moderating variable.

Table 4.22: ANOVA After Moderation

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	76.588	13	5.891	66.943	0.005
Residual	34.5	391	0.088		
Total	111.088	404			

Based on the ANOVA results, the F-statistic is 66.943, which assesses whether the regression model provides a better fit than a model with no predictors. A higher F-value indicates statistical significance of the model. The associated p-value of 0.005 is below the 0.05 threshold, confirming that the regression model was significant. This implies that the model explains a meaningful portion of the variation in dependent variable. Table 4.23 shows the coefficients of determination after moderation.

Table 4.23: Coefficients of Determination After Moderation

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.
	B	Std. Error	Beta	
(Constant)	1.143	.112	10.205	.000
Internal controls	.439	.130	3.377	.000
Audit and Monitoring measures	.420	.112	3.750	.000
Legal compliance strategies	.261	.092	2.837	.001
Electronic security strategies	.382	.103	3.709	.000
Firm Size	.285	.058	4.914	.000
Firm Size x Internal controls	.210	.090	2.333	.009
Firm Size x Audit and Monitoring measures	.245	.075	3.267	.001
Firm Size x Legal compliance strategies	.212	0.105	2.019	.007
Firm Size x electronic security strategies	.215	0.081	2.654	.005

$$OP = \beta_0 + \beta_1 IC + \beta_2 AM + \beta_3 LC + \beta_4 ES + \beta_5 FS + \beta_6 (IC \times FS) + \beta_7 (AM \times FS) + \beta_8 (LC \times FS) + \beta_9 (ES \times FS) + \epsilon$$

becomes:

$$OP = 1.143 + 0.439 IC + 0.420 AM + 0.261 LC + 0.382 ES + 0.285 FS + 0.210 (IC \times FS) + 0.245 (AM \times FS) + 0.212 (LC \times FS) + 0.215 (ES \times FS) + \epsilon$$

The findings from Table 4.23 reveal that the introduction of firm size as a moderating variable has a direct and statistically significant positive effect on operational performance, with a coefficient of $B = 0.285$, $t = 4.914$, and $p = 0.000$. This indicates that larger horticultural firms tend to experience higher levels of operational performance, suggesting that scale provides these firms with advantages such as more resources, better infrastructure, and greater capacity to implement operational strategies effectively.

In addition to its direct impact, firm size significantly moderates the relationship between all four key strategic predictors and operational performance, as shown by the interaction terms. The interaction between firm size and internal controls ($B = 0.210$, $t = 2.333$, $p = 0.009$) demonstrates that the effectiveness of internal control systems in enhancing operational performance is greater

in larger firms. Similarly, the interaction with audit and monitoring measures ($B = 0.245$, $t = 3.267$, $p = 0.001$) indicates that larger firms benefit more from structured audit and oversight processes.

The moderating effect also holds for legal compliance strategies ($B = 0.212$, $t = 2.019$, $p = 0.007$), suggesting that adherence to legal and regulatory frameworks contributes more significantly to performance in firms with larger operational footprints. Lastly, electronic security strategies show a positive moderated effect ($B = 0.215$, $t = 2.654$, $p = 0.005$), highlighting that investment in digital security systems is more impactful in larger firms, likely due to their broader exposure to digital threats and reliance on IT infrastructure.

Generally, all the independent variables (internal controls, audit and monitoring, legal compliance, and electronic security) have positive and significant effects on operational performance. The presence of firm size as a moderator not only enhances the direct impact of these strategies but also amplifies their influence on performance outcomes. This suggests that larger horticultural firms in Kenya are better positioned to leverage these strategies effectively, making firm size a critical contextual factor in the success of operational interventions.

CHAPTER FIVE: DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings, the study's discussion, conclusion, and recommendations, presented in accordance with the study objectives.

5.2 Summary of Findings

According to the results of multiple regression analysis without moderation, FRM practices have a significant impact on the operational performance of horticultural companies in Kenya. All independent variables (internal controls, audit and monitoring measures, legal compliance, and electronic security) were statistically significant predictors of operational performance. These factors help explain the differences in how well horticultural companies in Kenya perform. Regression analysis, which incorporated firm size as a moderating factor, demonstrated a significant link between FRM practices and operational performance, with the influence of firm size enhancing these outcomes. Firm size plays a crucial role in influencing the relationship between FRM practices and operational performance. In larger companies, this positive impact is more pronounced, as evidenced by the significant interaction terms between the independent and dependent variables.

5.3 Discussions

5.3.1 Effect of Internal Controls on Operational Performance

Descriptive results indicate that internal controls are generally viewed as having a beneficial and consistent effect on the operational performance of horticultural companies in Kenya. They are credited with reducing errors, enhancing productivity, supporting decision-making, and ensuring process consistency and efficiency in the workplace. Correlation analysis shows a strong positive link between internal control and operational performance. This means that when internal controls improve, operational performance improves significantly. This link is statistically significant. In addition, regression analysis found that internal controls have a significant positive effect on operational performance. The relationship is strong enough to be statistically significant, indicating that as internal controls improve, operational performance is expected to improve.

This aligns with the empirical findings of Stephens (2022), who examined the features of internal control systems in relation to fraud risk and organizational objectives, adopting a descriptive

research design that targeted mid-level managers in financial institutions. The study found that good internal controls help prevent fraud and improve organizational performance. However, the use of self-reported data introduced potential response bias, which limits the applicability of the results to the financial sector. These constraints suggest the need for more robust methodologies to validate outcomes across diverse industries.

This study corroborates the findings of Vu et al. (2020), who identified the impact of internal control elements, including the control environment, risk assessment, control activities, communication, and monitoring, on transport construction businesses. Among these elements, control activities emerged as the most influential, highlighting the effectiveness of targeted interventions. However, the predominance of cross-sectional data in these studies limits their ability to provide insights into the long-term effectiveness of internal controls, suggesting a need for longitudinal studies to explore their sustained impact.

The results of this study align with the principles of the fraud management lifecycle theory. This theory emphasizes the stages involved in managing fraud risk, including prevention, detection, and response. The results show that internal controls significantly improve operational performance and reduce fraud incidents, aligning with the fraud management lifecycle theory (Marzuki et al., 2020). This suggests that firms actively engage in internal controls strategies, with larger firms benefiting more from a systematic lifecycle-based approach to managing fraud risks.

Additionally, social learning theory supports the findings of this study. This theory posits that individuals learn by observing others and the outcomes of their behaviors (Gabbioneta et al., 2013). This theory aligns with the crucial function of internal controls in reducing the risk of fraud, as employees in horticultural companies might notice the beneficial effects of these mechanisms and adopt such behaviors themselves. Additionally, moderation by firm size suggests that larger firms, with more extensive resources and training programs, facilitate stronger learning environments around effective fraud prevention practices.

5.3.2 Effect of Audit and Monitoring Measures on Operational Performance

Descriptive findings clearly demonstrate that audit and monitoring measures are crucial for operational success in horticultural firms. Managers strongly believe that these practices contribute to efficiency, adherence to standards, and overall reliability. The consistently high mean scores and low standard deviations affirm the credibility of these findings and suggest that audit and

monitoring systems are well-established and effective across the sector. Correlation analysis shows a strong positive relationship between audit and monitoring measures and operational performance, indicating that as audit and monitoring measures improve, operational performance also increases significantly. This relationship is statistically significant. Furthermore, the regression analysis found that audit and monitoring measures have a significant and positive influence on operational performance. The relationship is strong enough to be statistically significant, indicating that as audit and monitoring measures improve, operational performance is also expected to improve.

These findings are consistent with those of Coram et al. (2019). They argued that strong internal corporate audit functions improve fraud identification and internal reporting. To its credit, their study had a long and vast data collection period; however, its generalizability is somewhat restricted because it was conducted in developed nations only.

The findings of this study align with those of Chambers (2018), who used auditing and monitoring to establish how they deter employee misconduct. Chambers (2018) demonstrated that unethical behaviors are mitigated through routine supervision, which fosters a heightened sense of perceived surveillance among employees. Despite this valuable insight, the study's focus on a small population limits its broader applicability. Nevertheless, it provides a nuanced understanding of how auditing impacts individual behavior within an organization.

Further, the findings of this study align with the resource-based view (RBV) theory. According to RBV, firms gain a competitive advantage through their unique resources and capabilities. In this study, the significant effect of audit and monitoring measures on operational performance aligns with RBV (Sameera, 2018). Effective FRM practices are valuable resources that can reduce fraud, enhance financial security, and improve operational efficiency. The finding that larger firms experience a stronger influence of audit and monitoring measures also supports RBV, as larger firms typically have more resources to invest in effective fraud management strategies, thereby enhancing their operational performance.

5.3.3 Effect of Legal Compliance on Operational Performance

Descriptive findings clearly show that legal compliance strategies are widely viewed as essential to the smooth functioning of horticultural firms in Kenya. With a high overall mean and low pooled

standard deviation, the data suggest strong and consistent agreement among managers that adhering to laws and regulations enhances operational performance, reduces risk, and fosters efficiency and consistency across firm operations. Correlation analysis shows that there is a strong positive relationship between legal compliance and operational performance, meaning that as legal compliance improves, operational performance also increases significantly. This relationship is statistically significant.

Further, the regression analysis found that legal compliance has a significant and positive influence on operational performance. The relationship is strong enough to be statistically significant, indicating that as legal compliance improves, operational performance is expected to improve as well. The findings of this study align with those of Hussain and Anees (2020). The results demonstrated a positive relationship between the legal compliance strategies and performance outcomes. However, it espoused the research and analysis principally on banking institutions, implying a limited experimental design across other sectors.

Additionally, the findings of the study concur with those of Mosoti et al. (2023) examined the impact of legal compliance strategies on microfinance institutions (MFIs) in Kenya. Their findings affirmed that effective legal compliance strategies not only mitigate fraud risks but also enhance financial performance. While aligning with the conclusions of Hussain and Anees (2022), Mosoti et al.'s research is contextually confined to MFIs, potentially overlooking the unique challenges faced by larger financial institutions or those operating in different regulatory environments. The constrained scope at the time of their study limits its applicability to broader financial sectors, highlighting a need for more expansive investigations.

Further, the findings of the study concur with those of Silva (2023) explored legal compliance programs within the framework of Environmental, Social, and Governance (ESG) practices. Although the study provided valuable insights, it did not directly measure the impact of these programs on fraud prevention, leaving a critical gap in understanding their practical effectiveness.

Also, the findings of this study are inconsistent with Chaves and Raufflet (2021) critiqued legal compliance programs for being overly self-regulated and often disconnected from broader anti-corruption strategies, thereby limiting their systemic impact. Meanwhile, Ishwardat et al. (2024) emphasized that inspections are more effective than sanctions or cooperation in achieving legal compliance, illustrating the mixed efficacy of different compliance approaches.

Lastly, the findings of this study align well with the theoretical foundations provided by the Resource-Based View (RBV) Theory, Social Learning Theory, and Fraud Management Lifecycle Theory, highlighting their relevance in understanding the relationship between legal compliance strategies and operational performance. From the perspective of the RBV Theory, legal compliance strategies act as critical organizational resources that enhance operational performance by fostering efficiency, reducing risk, and ensuring consistency. The findings, which show a statistically significant positive relationship between legal compliance and operational performance, align with RBV's assertion that effective resource utilization drives organizational success. Moreover, the strong and consistent agreement among managers underscores the strategic importance of compliance systems in building operational resilience.

Social Learning Theory is also supported by the study's findings. The implementation of legal compliance practice fosters an environment where ethical behaviors are learned, reinforced, and institutionalized. The significant impact of these measures on operational performance demonstrates how structured systems influence individual and organizational behavior, creating a culture of accountability and operational efficiency.

The Fraud Management Lifecycle Theory finds strong resonance in the findings as well. Legal compliance strategies contribute to the prevention, detection, and response to fraudulent activities key stages of the fraud management lifecycle. The findings show that effective legal compliance reduces fraud risks and enhances operational performance, affirming the importance of proactive and systematic fraud management. These insights highlight how integrated compliance measures bolster organizational resilience and performance.

5.3.4 Effect of Electronic Security Strategies on Operational Performance

Descriptive findings underscore the importance that horticultural firms in Kenya place on electronic security strategies. With a strong overall mean and low pooled standard deviation, it is clear that managers consistently recognize the role of cybersecurity and electronic safeguards in protecting data, minimizing disruptions, and enhancing operational reliability. This suggests that investing in electronic security infrastructure is not only beneficial but seen as essential to sustained operational performance in the sector.

Correlation analysis shows that there is a strong positive relationship between electronic security strategies and operational performance, meaning that as audit and monitoring measures improves, operational performance also increases significantly. This relationship is statistically significant. Further, the regression analysis found that the electronic security strategies have a significant and positive influence on operational performance. The relationship is strong enough to be statistically significant, indicating that as electronic security strategies improve, operational performance is expected to improve as well.

The findings of the study concur with those Mwangi and Ndegwa (2020) who observed that while preventive and corrective controls are effective in minimizing fraud within Kenyan listed firms, detective controls appear to have no significant impact on fraud levels. This discrepancy raises critical questions regarding the relevance and effectiveness of various control mechanisms. It prompts an investigation into whether the limited success of detective controls is due to poor implementation of these structures or if the controls themselves are inherently ineffective, particularly when applied across diverse industry contexts. This issue highlights the need for a more nuanced understanding of how control systems function within specific organizational settings and industry dynamics.

Similarly, the findings of the study concur with those Madhala et al. (2024) and Ria et al. (2023) underscored the significant role of electronic measures and information systems in enhancing operational performance. Their findings suggest that the adoption of inventory and supply chain management systems can lead to improved operational efficiency, reduced costs, and overall better performance outcomes. These findings further concur with Amira (2024), who emphasized the importance of aligning technology-driven solutions with strategic objectives and ensuring their proper implementation for optimal results.

The findings on electronic security strategies align well with the theoretical framework underpinning this study, which integrates the Resource-Based View (RBV) Theory, Social Learning Theory, and Fraud Management Lifecycle Theory. Each of these theories provides a lens through which the importance of electronic security strategies in enhancing operational performance can be understood.

From the perspective of the Resource-Based View (RBV) Theory, the adoption of robust electronic security strategies represents a critical organizational resource that offers competitive advantage.

The findings that managers in horticultural firms recognize the importance of electronic safeguards in protecting data and ensuring operational reliability align with RBV's emphasis on leveraging unique and valuable resources to achieve sustained performance improvements. By investing in advanced cybersecurity measures, firms enhance their operational capabilities, thereby gaining resilience and efficiency in a competitive market.

The Social Learning Theory further contextualizes these findings by highlighting the role of behavioral reinforcement in organizational practices. Managers' consistent acknowledgment of the benefits of electronic security strategies suggests a collective understanding and reinforcement of their importance across the industry. This theory supports the idea that through observation, shared practices, and institutional norms, firms in the horticultural sector adopt and maintain effective electronic security measures as part of their operational culture.

Finally, the Fraud Management Lifecycle Theory directly ties to the statistical findings that electronic security strategies significantly influence operational performance. This theory emphasizes the proactive detection, prevention, and mitigation of fraudulent activities as a continuous process. The strong positive relationship between electronic security measures and operational performance reflects the effectiveness of these strategies in minimizing disruptions, reducing fraud risks, and safeguarding operational integrity. The regression results further validate that improved electronic security systems directly contribute to better operational outcomes, resonating with the lifecycle theory's focus on integrated fraud risk management.

5.3.5 The Moderating Effect of Firm Size on the Relationship between FRM Practices and the Operational Performance of Horticultural Firms in Kenya.

The descriptive findings show that respondents generally perceive firm size as being associated with stronger internal controls, more effective audit practices, and better implementation of electronic security measures. In contrast, perceptions of the relationship between firm size and legal compliance were more neutral, with responses indicating less certainty and greater variation among respondents. Overall, the results reflect mixed perceptions of how firm size relates to different aspects of fraud risk management practices, with stronger agreement on technical control areas and less decisive views on compliance-related aspects.

This finding is consistent with Isik et al. 's (2017) research, which confirmed that the size of a firm, as indicated by its assets, total sales, and employee count, has a significant impact on the operating return on assets. Similarly, the study findings concur with Setiyanto and Nurzilla (2019), indicating a positive correlation between firm size and growth in sales, implying that large firms can spread fixed overhead costs for a large volume of sales.

On the other hand, the results of the study are inconsistent with Serolin (2023), who submitted evidence of a reverse relationship and indicated that larger firms are likely to have less operational performance, owing to the firm size diseconomies arising from a proliferation of complexity and bureaucratic control. The inconsistency in findings is also apparent in Trijayanti et al. (2022) and Poudel (2020), who find a negative correlation between firm age and size and financial performance because older firms may have old systems and negative attitudes toward innovation. Theoretically, fraud management lifecycle theory supports the findings of this study. It suggests that firms actively engage in fraud prevention and mitigation strategies, with larger firms benefiting more from a systematic, lifecycle-based approach to managing fraud risks. Moderation by firm size also reflects the theory's notion that the scale and sophistication of fraud management efforts improve with the size of the organization.

Additionally, social learning theory supports the findings of this study. Moderation by firm size suggests that larger firms, with their more extensive resources and training programs, facilitate stronger learning environments around effective fraud prevention practices.

5.4 Conclusion

This study arrived at several key conclusions in line with the research objectives.

First, internal control systems were found to have a significant and positive influence on the operational performance of horticultural firms in Kenya. These controls contribute to minimizing errors, improving productivity, enhancing decision-making, and ensuring consistency in the operational processes. As the effectiveness of internal controls increases, there is a corresponding improvement in the overall operational performance.

Second, audit and monitoring practices were established to have a strong positive effect on the operational performance. These mechanisms are widely perceived as essential for promoting efficiency, ensuring compliance with standards, and strengthening operational reliability. The

consistency in responses further suggests that such practices are well developed and effectively implemented across the sector.

Third, legal compliance strategies significantly enhance operational performance. Adherence to regulatory requirements is critical for facilitating smooth operations, reducing risks, and maintaining consistency. The findings indicate a high level of agreement among managers regarding the importance of compliance in achieving better performance outcomes.

Fourth, electronic security strategies were also found to positively influence operational performance. Managers consistently acknowledge the importance of digital security systems in safeguarding data, preventing disruption, and supporting reliable operations. This underscores the necessity of investing in a robust electronic security infrastructure to sustain performance in the sector.

Finally, this study established that firm size plays a significant moderating role in the relationship between fraud risk management (FRM) practices and operational performance. Larger firms tend to derive greater benefits from FRM practices because their size enhances the effectiveness of internal controls, audit processes, compliance strategies, and electronic security measures. Overall, the relationship between FRM practices and operational performance strengthens as firm size increases, indicating that the organizational scale amplifies the positive impact of these practices.

5.5 Recommendation

5.5.1 Policy Recommendations

This study recommended that policymakers should focus on promoting robust internal controls tailored to the needs of the sector. Training and awareness programs should be developed to ensure compliance with best practices. Additionally, regulatory bodies should mandate the adoption of audit and monitoring systems by horticultural firms, accompanied by periodic compliance checks to reinforce operational reliability.

This study recommended that clear, sector-specific legal and regulatory guidelines should also be provided to simplify the compliance process for firms. Offering incentives such as tax breaks or certifications for adhering to legal standards could encourage wider adoption. Furthermore, a national policy framework promoting cybersecurity in agribusiness should be introduced. This could include subsidies, grants, or low-interest loans to encourage investment in electronic security

infrastructure. Policymakers should also focus on supporting smaller firms through subsidies, training, and technology access, enabling them to leverage fraud risk management (FRM) practices effectively.

5.5.2 Recommendation for Theory

The study recommends enhancing resource-based view (RBV) theory. While RBV theory effectively explains how firm resources, such as effective FRM practices, contribute to operational performance, it does not fully account for external environmental factors that could influence the implementation of these practices. Future research could use resource dependency theory (RDT) to integrate external factors, such as market dynamics, government policies, or industry competition, to provide a more comprehensive understanding of how resources interact with external forces to affect FRM.

This study recommends expanding the application of social learning theory. Social learning theory emphasizes the importance of observing and mimicking behaviors to learn within an organization. However, this theory may not fully capture the complexities of how organizational culture, leadership, or specific communication structures influence the adoption of fraud prevention practices. Future studies could explore how leadership styles or peer mentoring programs within firms influence employees' adoption of fraud risk-management behaviors. Additionally, the role of digital learning tools and remote work environments in fraud risk management can be incorporated to make the theory more applicable to modern organizational contexts.

The study recommends improving the fraud management life cycle theory. The fraud management life cycle theory provides a structured framework for understanding the stages of fraud risk management, such as prevention, detection, and response. However, in practice, it may oversimplify the dynamic and often interconnected nature of fraud risk management. For example, the theory assumes a linear progression through stages, whereas, in reality, firms may cycle through these stages iteratively based on evolving fraud risks. Future research could refine this theory by exploring the feedback loops between fraud prevention, detection, and response stages and how these stages might be influenced by firm size or other contextual factors. Additionally, the theory can be expanded to consider the role of technological advancements (e.g., AI or data analytics) in reshaping the fraud management lifecycle.

5.5.3 Recommendation for Practice

The study recommended that horticultural firms should prioritize capacity-building initiatives to equip managers with the necessary skills to implement internal controls, audit practices, legal compliance, and electronic security strategies effectively. Larger firms should leverage their resources to invest in advanced fraud risk management technologies, while smaller firms can adopt scalable, cost-effective solutions tailored to their needs.

This study recommends that firms strengthen their fraud risk management by adopting a phased and prioritized approach to implementation rather than attempting to integrate all practices simultaneously. In the initial stage, firms should focus on establishing strong internal control systems and audit mechanisms as foundational elements of the FRM. Once these are effectively operationalized, attention can gradually shift toward enhancing legal compliance processes and adopting advanced electronic security measures. Additionally, firms should establish mechanisms for continuous improvement by regularly reviewing and updating their FRM strategies to respond to emerging risks, technological developments and changes in regulatory requirements. This progressive approach ensures that FRM practices are implemented sustainably and, in a context, - appropriate manner across firms of different sizes.

5.5.4 Recommendations for Further Research

The study recommends that future studies investigate other moderating variables, such as technology adoption, corporate governance mechanisms, and organizational culture, to further understand how these variables moderate the effectiveness of FRM practices and operational performance.

This study recommends that comparative studies across different geographic regions would help identify how cultural, economic, and regulatory differences shape the effectiveness of FRM practices. These avenues for research could significantly expand the existing knowledge base and provide actionable insights for people working in the field and those making policies.

Future studies could broaden the focus of this study by examining the perceptions of stakeholders, such as customers and suppliers. This study relied on responses from managers within the organization; future studies may collect data from external users who interact with these firms and

directly experience the outcomes of their operational processes. This would provide a broader perspective on how FRM practices influence service reliability and stakeholder satisfaction.

5.6 Limitations of the Study

This study faced several limitations that may have influenced the findings. First, the study adopted a cross-sectional research design in which data were collected at a single point in time. Consequently, the study was limited in establishing causal relationships between fraud risk management practices and operational performance, as changes over time could not be observed.

Second, the study relied on self-reported data collected using questionnaires. This may have introduced response bias, where respondents could provide socially desirable answers, particularly on sensitive issues related to fraud risk management and compliance practices within their firms.

Third, the study focused only on horticultural firms registered for export in Kenya, which may limit the generalizability of the findings to other sectors or smaller non-export horticultural firms operating under different conditions in Kenya.

Additionally, some respondents may have been reluctant to disclose complete information regarding fraud-related practices because of confidentiality concerns and fear of reputational risk. However, the researcher assured the respondents of confidentiality and anonymity to minimize this limitation.

Finally, this study used Likert-scale measures to assess key constructs, such as operational performance and fraud risk management practices. Although composite indices were developed to improve measurement consistency, perceptions captured through Likert scales may not fully reflect the actual operational or financial performance of firms. Despite these limitations, appropriate research procedures were followed to ensure the reliability and validity of our findings.

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APPENDICES

APPENDIX I: LETTER OF INTRODUCTION

Hannah Mwadime,
Strathmore University,
Nairobi, Kenya.

Dear Respondent

RE: LETTER OF INTRODUCTION

I am currently pursuing a Master of Science degree at Strathmore University. I am conducting a research study titled "**FRAUD RISK MANAGEMENT PRACTICES AND OPERATIONAL PERFORMANCE OF HORTICULTURAL FIRMS IN KENYA MODERATED BY FIRM SIZE.**" I would greatly appreciate your involvement in this study by taking a few moments to fill out the questionnaire through the shared link.

Your insights are invaluable and significantly contribute to the completion of my research. Please be assured that all information provided was treated with the utmost confidentiality and used solely for academic purposes. Your willingness to participate is highly appreciated and I sincerely thank you for dedicating the time to complete and submit the form.

Yours Sincerely,



24/10/2024

Hannah | Researcher

APPENDIX II: RESEARCH QUESTIONNAIRE

This questionnaire is designed to explore the disparities in the effectiveness of FRM practices between small and large horticultural firms and to examine how these differences influence their operational performance in Kenya, with firm size as the moderating variable. The questionnaire is divided into four parts. Section I requests brief details regarding the respondents' backgrounds and organizations. Section II focuses on the company's fraud-management practices and consists of three subsections that address questions related to the study's research objectives. Section III discusses the effects of the results in Section IV on the operational performance of horticultural firms of different sizes. Section V focuses on the impact of firm size on FRM practices and operational performance. Kindly follow the instructions below while completing the questionnaire:

- Do not write your name on the questionnaire.
- Respond to the questions objectively and honestly.
- Please indicate your responses by **ticking** (✓) in the appropriate response box or filling in the blank spaces provided for each question.

The information submitted below shall be held in confidence and used solely for research purposes.

SECTION I: DEMOGRAPHIC INFORMATION

Personal Information

PART A: General Information

1. **Name of the Firm** (optional): _____
2. **Location of the Firm:** _____
3. **State your Gender**
Male
Female
4. **Position of the Respondent:**
Finance officer
Operational officer
Compliance officer
Others (Specify _____)

PART B: Firm Size Characteristics

1. What is the total asset value of your firm (in KES)?
 - Less than 50 million
 - 50 million - 100 million
 - 101 million - 500 million
 - Over 500 million
2. What is your firm's average annual sales revenue (in KES)?
 - Less than 100 million
 - 100 million - 500 million
 - 501 million - 1 billion
 - Over 1 billion
3. How many employees does your firm have?
 - Less than 50
 - 51 - 100
 - 101 - 500
 - Over 500

SECTION II: EFFECT OF INTERNAL CONTROLS ON OPERATIONAL PERFORMANCE

Indicate the extent to which you agree or disagree with each aspect at firm on a scale of 1-5 where; (1=strongly disagree; 2=disagree; 3= neutral; 4= agree and 5=strongly agree.) (Tick one number).

No.	Statement	Response				
		1	2	3	4	5
1.	Our firm has clearly defined internal control procedures that improve operational efficiency.					
2.	Well-implemented internal controls ensure consistency in our operational processes.					
3.	Internal controls in our firm help reduce errors and operational disruptions.					
4.	The internal control system provides reliable information for operational decision-making in our firm.					
5.	Strong internal controls contribute to improved overall productivity in our operations.					

SECTION III: EFFECT OF AUDIT AND MONITORING MEASURES ON OPERATIONAL PERFORMANCE

Indicate the extent to which you agree or disagree with each aspect at firm on a scale of 1-5 where; (1=*strongly disagree*; 2=*disagree*; 3= *neutral*; 4= *agree* and 5=*strongly agree*.) (Tick one number).

No.	Statement	Response				
		1	2	3	4	5
1	Regular internal audits help our firm identify and correct operational issues promptly.					
2	Continuous monitoring of our operations ensures adherence to performance standards.					
3	Audit and review processes contribute to more efficient operations in our firm.					
4	Feedback from audits leads to improvements in our operational procedures.					
5	Effective audit and monitoring measures promote reliability in our operations.					

SECTION IV: EFFECT OF LEGAL COMPLIANCE STRATEGIES ON OPERATIONAL PERFORMANCE

Indicate the extent to which you agree or disagree with each aspect at firm on a scale of 1-5 where; (1=*strongly disagree*; 2=*disagree*; 3= *neutral*; 4= *agree* and 5=*strongly agree*.) (Tick one number).

No.	Statement	Response				
		1	2	3	4	5
1	Compliance with industry laws and regulations ensures smoother operations in our firm.					
2	Legal compliance strategies reduce the risk of operational disruptions in our firm.					
3	Adhering to regulatory requirements leads to improved operational outcomes in our firm.					
4	Our firm's compliance policies help maintain consistent operational performance.					
5	Ensuring legal compliance contributes to the overall efficiency of our operations.					

SECTION V: EFFECT OF ELECTRONIC SECURITY STRATEGIES ON OPERATIONAL PERFORMANCE

Indicate the extent to which you agree or disagree with each aspect at firm on a scale of 1-5 where; (1=*strongly disagree*; 2=*disagree*; 3= *neutral*; 4= *agree* and 5=*strongly agree*.) (Tick one number).

No.	Statement	Response				
		1	2	3	4	5
1.	Electronic security measures protect our operational data and support efficient performance.					
2.	Secure information systems help maintain uninterrupted operations in our firm.					
3.	Our firm's cybersecurity strategies reduce the risk of operational downtime.					
4.	Adequate electronic security controls contribute to smoother operational processes in our firm.					
5.	Investing in electronic security improves the overall reliability of our operations.					

SECTION IV: OPERATIONAL PERFORMANCE

Indicate the extent to which you agree or disagree with each statement on a scale of 1-5 where; (1=strongly disagree; 2=disagree; 3= neutral; 4= agree and 5=strongly agree.) (Tick one number).

No.	Statement	Response				
		1	2	3	4	5
1.	Our FRM practices contribute to overall operational efficiency in our organization.					
2.	Efficient fraud management practices streamline our operational processes					
3.	The effectiveness of our fraud management strategies is regularly assessed.					
4.	Our team measures the effectiveness of fraud prevention initiatives.					
5.	Effective fraud risk management enhances the quality of our services.					
6.	Maintaining high-quality standards is crucial in our fraud prevention strategy.					

SECTION V: MODERATING EFFECT OF FIRM SIZE

1. Do you think the size of your firm affects the implementation of fraud risk management practices?

Yes ☐

No ☐

Not sure ☐

2. In your opinion, how does the size of your firm influence the effectiveness of FRM practices?

Larger firms benefit more from FRM practices ☐

Smaller firms benefit more from FRM practices ☐

FRM practices are equally effective regardless of firm size ☐

Not sure ☐

3. Indicate the extent to which you agree or disagree with each statement on a scale of 1-5 where; (1=strongly disagree; 2=disagree; 3= neutral; 4= agree and 5=strongly agree.) (Tick one number).

No.	Statement	Response				
		1	2	3	4	5
1.	The size of our firm influences the effectiveness of our internal control measures.					
2.	Our firm's size affects our ability to implement comprehensive audit and monitoring practices.					
3.	The size of our organization impacts our capacity to ensure regulatory compliance.					
4.	Our firm's size influences our ability to implement robust electronic security measures.					
5.	The effectiveness of our fraud management practices on operational performance is influenced by our firm's size.					

Thank you for your participation

APPENDIX III: LIST HORTICULTURAL FIRMS IN KENYA

1. AAA GROWERS
2. AGRIFLORA KENYA LTD
3. AGRIFRESH KENYA LTD
4. AMIRAN KENYA LTD
5. BARAKA ROSES LTD
6. BEAUTY LINE LTD
7. BILASHAKA FLOWERS
8. BLACK PETALS LTD
9. BLISS FLORA LTD
10. BLOOMING OASIS LTD
11. BLOOMINGDALE ROSES KENYA LTD
12. BUDS & BLOOMS
13. CARZAN FLOWERS KENYA LTD
14. COLOUR CROPS LTD
15. CREDIBLE BLOOMS LTD
16. DALE FLORA LTD
17. DEL MONTE KENYA LTD
18. DESIRE FLORA [K] LTD
19. EAST AFRICAN GROWERS
20. ENKACITY FLOWER GROWERS LTD
21. EQUATOR FLOWERS KENYA LTD
22. EQUINOX HORTICULTURE LTD
23. EVERFLORA LTD
24. EVERGREEN HERBS LTD
25. FIDES KENYA LTD
26. FLAMINGO HORT KENYA LTD
27. GATOKA LTD
28. GOLDEN TULIP FARMS LTD
29. INTER PLANT ROSES
30. KAKUZI PLC
31. KAREN ROSES
32. KARIKI LIMITED- NANYUKI
33. KEITT EXPORTERS LTD
34. KEVIAN KENYA LTD
35. KISIMA FARM
36. KORDES ROSES EAST AFRICA LTD
37. KREATIVE ROSES LTD
38. KUBALI BLUESKY HERBS LTD
39. KUBALI LIMITED
40. LOLOMARIK LTD
41. LOWLAND VEG GROWING CO. LTD
42. MAASAI FLOWERS LTD

43. MAGANA FLOWERS KENYA LTD 74.
44. MAJI MAZURI FLOWERS LTD
45. MOLO RIVER ROSES
46. MT MERU FLOWERS
47. MURARA PLANTS KENYA LTD
48. NINI LTD
49. NIRP EAST AFRICA
50. OL JOGI LTD
51. OL NJOROWA LTD
52. OLIJ KENYA PROPAGATION LTD
53. PANOCAL INTERNATIONAL LTD
54. PENTA TANCOM LIMITED
55. PRIMAROSA FLOWERS LTD
56. RAINFOREST FARMLANDS KENYA LTD
57. RED LANDS ROSES PLC
58. RIFT VALLEY ROSES KENYA LTD
59. ROSETO FARM LTD
60. ROYAL HERBS EXPORTERS LTD
61. SAVANNA FLOWERS PLC
62. SIERRA FLORA
63. STOKMAN ROZEN KENYA LTD
64. SUBATI GROUP LIMITED
65. SUN FLORITECH LTD
66. THE FLOWER MARKET LTD
67. TIMAFLORE LTD
68. UHURU FLOWERS
69. VALENTINE GROWERS LTD
70. VAN DEN BERG KENYA LTD
71. VEGPRO KENYA LTD
72. WINCHESTER FARM LTD
73. WINDSOR FLOWERS LTD

APPENDIX IV: NACOSTI RESEARCH PERMIT

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 540903	Date of Issue: 14/February/2025
RESEARCH LICENSE	
	
This is to Certify that Miss: Hannah SANGULI MWADIME of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi, Nakuru on the topic: FRAUD RISK MANAGEMENT PRACTICES AND OPERATIONAL PERFORMANCE OF HORTICULTURAL FIRMS IN KENYA MODERATED BY FIRM SIZE. for the period ending : 14/February/2026.	
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See overleaf for conditions	

APPENDIX V: ETHICS APPROVAL



31st January 2025

Ms Mwadime Hannah,
mwadime.sanguli@strathmore.edu

Dear Ms Mwadime,

RE: Fraud Risk Management Practices and Operational Performance of Horticultural Firms in Kenya Moderated by Firm Size

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** proposal. Your application reference number is **SU-ISERC2568/25**. The approval period is from **31st January 2025 to 30th January 2026**.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
- iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 72 hours.
- v. Clearance for the export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,

Mr Ambrose Rachier,
Chairperson; SU-ISERC