2025

Factors influencing the adoption of technology by SMEs - an empirical study of family- owned businesses in Nairobi County.

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Factors Influencing the Adoption of Technology by SMEs: An Empirical Study of Family-Owned Businesses in Nairobi County

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A Thesis Submitted in partial fulfilment of the requirements for the Degree of Master of Commerce at Strathmore University

Strathmore Business School
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Nairobi, Kenya

June 2025

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 thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

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Abstract

In developing countries, the rate of technology adoption among small businesses remains low. Family businesses, which constitute a significant portion of small and medium enterprises in these regions, often experience additional hurdles, such as conservative decision-making and intergenerational conflicts, which further impede technological advancement. There is a notable gap in the Kenyan literature specifically addressing the factors influencing adoption of technology among family-owned businesses. This research aimed to fill this gap by examining these factors having a bearing on the uptake of technology in family-owned small businesses in Nairobi, providing insights that could help these businesses overcome barriers and leverage technology for sustainable growth and competitiveness. More specifically, the study set out to establish the influence of perceived benefits on the adoption of technology by family-owned SMEs in Kenya; determine the influence of technological literacy on the adoption of technology by family-owned SMEs in Kenya; examine the influence of top management support on the adoption of technology by family-owned SMEs in Kenya; and evaluate the influence of competition on the adoption of technology by family-owned SMEs in Kenya. The theoretical framework establishing the foundational theory underpinning this research was the Diffusion of Innovations Theory. The target population was family-owned small and medium enterprises in Nairobi County. From the target population a sample of 399 respondents was drawn. The study used individual family-owned business as the units of analysis and designated persons responsible for technology adoption as units of observation. To ensure that the sample was representative of the diverse sectors within the small business population, both the stratified random and purposive sampling techniques was used, with the business sectors forming the strata. Quantitative data for this study was collected using a structured questionnaire. To ensure the quality and reliability of the research, a pilot study was conducted prior to the main data collection phase. The quantitative data was analyzed using both descriptive and inferential statistical techniques. The study revealed that competition is the strongest driver of technology adoption among family-owned SMEs in Kenya, with a statistically significant positive effect, indicating that businesses facing intense competition are more likely to invest in new technologies to stay competitive. Perceived benefits also contribute to technology adoption, though its impact is marginal, suggesting that SMEs that recognize technological advantages are more inclined to adopt them. However, technology literacy does not directly influence adoption, implying that knowledge alone may not be sufficient without other enabling factors. Similarly, top management support has a weak and statistically insignificant effect, indicating that managerial involvement alone does not strongly predict technology adoption and may sometimes introduce bureaucratic hurdles. The study recommended that policymakers should leverage technology dynamic by fostering open, competitive, and innovation-driven markets. From management point of view the study recommended that more action-oriented leadership within family-owned SMEs. Business owners and leaders should: Develop clear digital strategies aligned with business goals, including defined budgets, timelines, and performance indicators for technology investments; delegate decision-making authority to digitally skilled staff and invest in creating cross-functional teams to drive implementation

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Abbreviations and Acronyms

AI:	Artificial Intelligence
DOI:	Diffusion of Innovations
ICT:	Information and Communications Technology
KIPPRA:	Kenya Institute for Public Policy Research and Analysis
KNBS:	Kenya National Bureau of Statistics
MSMEs:	Micro, Small, and Medium Enterprises
NACOSTI:	National Commission for Science, Technology, and Innovation
OECD:	Organisation for Economic Co-operation and Development
PETs:	Privacy Enhancing Technologies
PU:	Perceived Usefulness
RBV:	Resource-Based View
SMEs:	Small and Medium-Sized Enterprises
SPSS:	Statistical Package for the Social Sciences
TAM:	Technology Acceptance Model
TOE:	Technology–Organization–Environment
VIF:	Variance Inflation Factor

Acknowledgement

I am immensely grateful to the Almighty God for blessing me with life, good health, and the wisdom needed to complete this project. My heartfelt appreciation goes to my husband, Alfred, and my children, Sasha, Sophie, and Sierra, for their unwavering support, understanding, and encouragement throughout this challenging yet fulfilling academic journey. I am also profoundly thankful to my supervisor, Dr. Sarah Muigai, for her outstanding guidance, consistent support, and invaluable feedback throughout the process of developing my thesis. Additionally, I would like to express my sincere gratitude to Strathmore Business School and the entire university community for granting me the opportunity to pursue my degree.

Chapter One: Introduction

1.1 Background to the Study

Technology adoption has become a critical factor in determining the competitiveness and sustainability of businesses globally. The rapid pace of technological advancement has transformed industries, enabling businesses to enhance efficiency, reduce costs, and create value through innovation (World Bank, 2021). Small and Medium Enterprises (SMEs), which constitute approximately 90% of global businesses and provide 50% of employment worldwide, are pivotal to economic growth and development (International Trade Centre [ITC], 2022). However, despite their significance, SMEs often face challenges in adopting modern technologies due to limited resources, inadequate infrastructure, and low levels of technological literacy (OECD, 2019; Albaz et al., 2020). These challenges are especially uniquely particularly pronounced among family business, which make up 70–80% of all businesses worldwide (Nwuke. 2024). This owes to such constraints rooted in family dynamics as resistance to change and decision-making (De Massis et al., 2018). Understanding the factors having a bearing on the uptake of technology in family-owned businesses is critical to fostering their long-term growth and ensuring their continued contribution to the global economy.

In Africa, family-owned businesses form the majority of SMEs, which collectively account for 80% of employment and nearly 40% of GDP in sub-Saharan Africa (African Development Bank [AfDB], 2020). Despite their importance, family-owned SMEs in the region face barriers to technology adoption, including limited digital skills, inadequate financing, and socio-cultural constraints (UNCTAD, 2022). Nonetheless, studies have shown that these businesses are beginning to embrace digital transformation, driven by factors such as the increasing penetration of mobile technology, government support programs, and the growing demand for digital services (GSMA, 2023). For instance, family businesses in Africa that adopt technology report improvements in market access, operational efficiency, and customer retention, underscoring the importance of targeted interventions to address the barriers they face.

In Kenya, family-owned businesses are integral to the SME sector, which contributes about 40% of GDP and employs over 80% of the workforce (Kenya National Bureau of Statistics (KNBS), 2021). These businesses face distinctive challenges in technology adoption, including generational conflicts, limited strategic planning, and constrained financial resources (Mbogo & Mutua, 2022). Nonetheless, initiatives like the Ajira Digital Program and the proliferation of mobile money platforms such as M-Pesa have provided opportunities for family-owned SMEs to leverage technology (Kenya Private Sector Alliance (KEPSA), 2024). Despite these advancements, there remains a knowledge gap regarding the specific factors that influence technology adoption within family-owned SMEs. Addressing this gap is crucial to unlocking the full potential of these businesses and enhancing their contribution to Kenya's Vision 2030 development agenda.

1.1.1 Technology Adoption

The idea of technology deployment has been thoroughly researched in several academic fields, demonstrating its vital significance in promoting competitiveness, creativity, and organizational efficiency (Kraus et al., 2021; Zamani, 2022; Vassilakopoulou & Hustad, 2023; Vimal et al., 2023). Fundamentally, technology adoption is the process through which people, groups, or societies accept and incorporate technological advances into their daily activities and operations (Rogers, 2003). This adoption is framed by Rogers' Diffusion of Innovations (DOI) Theory as taking place gradually through the following stages: understanding, curiosity, assessment trial, and implementation. A technology's perceived utility, usability, integration, and overall advantage frequently influence an organization's decision to embrace it (Davis, 1989; Venkatesh et al., 2003). Scholars have further emphasized that the adoption process is influenced by the socio-technical environment, which includes organizational culture, leadership, and resource availability (Gutierrez et al., 2019; Adegbite & Govender, 2021; Kurniawati, 2022a).

From an operational perspective, technology adoption has been measured in various ways depending on the research context. Studies in information systems often focus on indicators such as the technology uptake rate, usage level, and extent of integration into core processes (Vassilakopoulou & Hustad, 2023). In SMEs, these measures have been supplemented by specific factors like the number of employees using technology, the range of applications supported, and the volume of business processes transformed (Afenta et al., 2019; Nguyen et al., 2020;

Kalumendo, 2023). Family-owned SMEs, given their unique governance and resource structures, require distinct operationalizations that account for decision-making's technological and familial dimensions (De Massis et al., 2018; Nandwa & Fatoki, 2021).

In empirical studies, researchers have employed diverse approaches to assess technology adoption. For instance, Zhu et al. (2022) analyzed technology adoption in SMEs through a multi-dimensional framework encompassing readiness, intensity, and impact. Readiness involves the organizational and environmental preparedness for technology uptake, while intensity measures the breadth and depth of technology utilization. Impact assesses the adoption outcomes regarding productivity, efficiency, and competitive advantage. Mishrif and Khan (2023) analyzed technology adoption by classifying the adoption levels into three distinct categories. High-level adoption was characterized by the implementation of cloud systems and online payment methods without any printing. Moderate adoption included the use of cloud systems and online payments, albeit with minimal printing. In contrast, low-level adoption was identified by reliance on cash and Visa payment methods. Similarly, other studies have highlighted the importance of focusing on technology-specific indicators, such as the adoption of digital platforms, cloud-based solutions, and automation tools (World Bank, 2021; McKinsey & Company, 2020; Kurniawati, 2022b; Eller et al. in 2020). These indicators speak to the evolving technological landscape, particularly in emerging economies where SMEs increasingly leverage digital solutions to address market challenges and expand their operations.

This study defined technology adoption as the extent to which family-owned SMEs in Nairobi County integrate hardware and software technologies into their operational activities. The construct was measured along two specific dimensions: hardware adoption and software adoption. Family-owned SMEs in Nairobi County often exhibit diverse levels of technology integration, ranging from basic hardware usage to advanced software applications. By categorizing adoption into hardware and software dimensions, the study addresses the multifaceted nature of technology adoption within this specific context. This dual-dimensional approach enables a nuanced understanding of adoption levels, which aligns with the unique operational practices of these enterprises. Hardware Adoption refers to the acquisition and effective utilization of physical technological infrastructure. For this study, hardware adoption was operationalized through the use of Desktop and laptop computers for administrative and operational tasks; Point-of-sale (POS)

systems for sales tracking and inventory management; Internet-enabled devices (e.g., tablets, smartphones) for remote access and mobile operations; and Local servers or cloud-connected storage devices for data storage and internal networking (Kasych et al., 2019; Eller et al., 2020).

Software Adoption refers to the use of digital tools that facilitate business processes. This includes Enterprise Resource Planning (ERP) systems for integrated management of core functions like finance, procurement, and supply chain; Customer Relationship Management (CRM) tools to manage customer interactions and sales pipelines; Accounting and payroll software such as QuickBooks or Sage for financial operations; E-commerce platforms (e.g., Shopify, Jumia, WooCommerce) for online sales; and Communication and collaboration tools like WhatsApp Business, Zoom, and Microsoft Teams (McKinsey & Company, 2020; Kallmuenzer, 2024).

1.1.2 Factors Influencing the Adoption of Technology

A wide range of interrelated factors influences the adoption of technology by small and medium-sized enterprises (SMEs). Empirical literature broadly categorizes these factors into three key dimensions: technological, organizational, and environmental (Omonga, 2019; Muhia & Mwiti, 2019a; Kamau & Njagi, 2021). Technological factors include the perceived compatibility, relative advantage, and complexity of the technology, as well as the cost of implementation and the level of technological literacy within the organization (Muhia & Mwiti, 2019a; Venkatesh et al., 2003). Organizational factors comprise internal attributes such as the size and structure of the firm, employee attitudes, technical skills, and the degree of support from top management (Kamau & Njagi, 2021; Lee & Choi, 2020). Environmental factors capture external influences such as competitive pressure, regulatory frameworks, and the availability of government support or incentives for digital transformation (Kamau & Njagi, 2021; Exposito & Sanchis-Llopis, 2018).

From this broad theoretical base, the present study narrowed its focus to four key determinants consistently emerging in empirical literature as pivotal for influencing technology adoption among SMEs in developing economies—perceived benefits, technological literacy, top management support, and competition. These variables are grounded in the DOI theory, reflecting core concepts such as relative advantage, complexity, social system influence, and peer pressure. They represent a balanced blend of both internal (perceived benefits, literacy, management support) and external (competition) factors, capturing the holistic nature of technology adoption among SMEs. This

combination of variables ensures that the study comprehensively addresses both organizational and contextual dynamics, providing a robust analysis of adoption patterns.

Perceived benefits refer to the extent to which SMEs believe that adopting technology will lead to improved business outcomes (Vimal et al., 2023). This includes efficiency, productivity, customer satisfaction, and competitive advantage gains. Venkatesh et al. (2022) similarly emphasize enhanced operational effectiveness, cost reduction, and market expansion as core anticipated outcomes. Mittal et al. (2018) and Ceipek et al. (2020) underscore that SMEs are more inclined to adopt technologies when clear and tangible benefits—such as increased sales, improved efficiency, and better customer service—are evident. This study adopted the definition and indicators proposed by Vimal et al. (2023), focusing on Operational efficiency, productivity improvements, enhanced customer satisfaction, and competitive positioning. These metrics provided a practical framework for measuring how anticipated value shapes technology adoption decisions within family-owned SMEs.

Technological literacy denotes employees' level of digital proficiency, including their capacity to use, adapt to, and troubleshoot various digital tools (Kotlar et al., 2020; Son & Han, 2021). High levels of digital literacy enable organizations to adopt and implement new systems smoothly (Akpan et al., 2022). For family-owned SMEs, bridging generational gaps and upskilling the workforce is essential to maximizing technology use (Erdogan et al., 2020). The study adopted Kotlar et al.'s (2020) definition. It evaluated technological literacy through Proficiency in using computers and the internet, familiarity with business-related software applications, ability to adapt to new digital tools, and participation in digital training programs. These indicators reflect both existing capabilities and the preparedness of SMEs for digital transitions.

Top management support refers to the strategic commitment of senior leadership to championing technology initiatives (Nambisan et al., 2019). It involves resource allocation, goal alignment, and a supportive digital culture (Lee & Choi, 2020). In family-owned SMEs, where leadership is often central and direct, this factor becomes even more critical in determining the pace and scope of adoption (Kamau & Njagi, 2021). Drawing on Nambisan et al. (2019), this study operationalized top management support using the following indicators: Provision of strategic direction for digital initiatives, allocation of resources (financial, human, time) for technology, and promotion of an

innovation-friendly organizational culture. These indicators capture the leadership dynamics that shape technology-related decisions in SMEs.

Competition, defined as the external market pressure exerted by other firms, influences SMEs to adopt technologies to maintain or gain a competitive advantage (Farida & Setiawan, 2022; Nguyen et al., 2021). The pressure to innovate, differentiate, and meet evolving customer expectations pushes SMEs to embrace digital tools (Exposito & Sanchis-Llopis, 2018; Arzubiaga et al., 2019). In this study, competition was assessed through the number of competitors in the same market segment, rate of technology adoption among competitors, customer demand for technologically enhanced products/services, and innovation levels in rival firms. These indicators allowed for a nuanced analysis of how market dynamics impact SME decisions regarding digital investments.

1.1.3 Family-Owned Businesses

Family-owned businesses (FOBs) are enterprises where decision-making is significantly influenced by multiple generations of a family, with family members holding substantial ownership stakes and actively participating in management. These businesses uniquely intertwine economic objectives with familial values, often emphasizing long-term commitment and legacy preservation. Scholars have explored the distinctions between family-owned and non-family businesses, operating on the core assumption that family ownership's enduring and widespread nature leads these firms to exhibit behaviors that differ from their non-family counterparts (Anderson & Reeb, 2003). Family owners often form an emotional bond with their business, viewing it as a source of the family's generational wealth and social status (Schulze et al., 2001). As a result, strategic decisions are shaped by a desire to avoid risks that could threaten non-financial assets while focusing on preserving and growing long-term wealth. While growth is valued, it is pursued in a way that ensures sustainable cash flow and profitability. Consequently, family-owned businesses tend to adopt a more cautious approach to strategic decision-making (Ray et al., 2017). Globally, FOBs contribute significantly to economies, accounting for approximately 70–90% of GDP and 50–80% of employment in various countries (PwC, 2021).

Family-owned small enterprises face unique challenges due to rapid technological change (Indrawati et al., 2020). Digitalization's importance for these businesses' long-term sustainability intensified following the COVID-19 pandemic (Kurniasari et al., 2023). Increasing digital trends

and the urgency for technological transformation compel businesses to adopt and implement diverse digital tools and strategies to stay competitive and ensure continuity across generations (Popović-Pantić et al., 2019).

Family-owned businesses span a broad spectrum in Kenya, from micro-enterprises to large conglomerates. The Micro and Small Enterprises (MSE) Act of 2012 provides specific definitions: Micro Enterprises employ less than 10 people with an annual turnover not exceeding KES 500,000, and Small Enterprises employ between 10 and 50 people, with annual revenues ranging from KES 500,000 to KES 5 million. Medium-sized enterprises, while not explicitly defined in the MSE Act, are generally understood to employ between 50 and 100 individuals, with annual revenues exceeding KES 5 million but below KES 50 million. Family ownership is prevalent across all these categories, though SMEs are particularly notable for their entrepreneurial dynamism supported by familial structures (KNBS, 2016).

Family-owned SMEs play a pivotal role in Kenya's economic landscape. Regarding economic output, SMEs contribute approximately 31.4% of Kenya's GDP. In terms of employment, they account for about 70% of total employment in the country. Regarding family ownership, around 70% of these SMEs are family-owned, employing 60% of workers within the small business sector (PwC, 2021).

The regulation and promotion of family-owned SMEs in Kenya involve multiple entities. Established under the MSE Act of 2012, the Micro and Small Enterprises Authority (MSEA) is tasked with formulating and coordinating policies related to micro and small enterprises, facilitating their development, and overseeing their operations. The Kenya Revenue Authority (KRA) is responsible for tax collection and ensuring compliance among all businesses, including family-owned SMEs. The Kenya Bureau of Standards (KEBS) ensures that products from these enterprises meet quality standards, which is crucial for both local and international market access. Local authorities, such as the Nairobi City County Government, provide business licenses, enforce local regulations, and offer support services to SMEs within their jurisdictions (Nandwa & Fatoki, 2021).

Nairobi County is a central hub for family-owned SMEs, reflecting the city's status as Kenya's commercial and industrial epicenter (Nyamwanza, 2020). While exact numbers fluctuate due to the dynamic nature of business registrations and closures, Nairobi hosts a substantial concentration of these enterprises across various sectors, including retail, manufacturing, and professional services. The Nairobi City County Government is pivotal in facilitating an enabling environment for these businesses, offering business registration, infrastructural support, and training programs (Kamau & Njagi, 2021).

This study focused specifically on family-owned SMEs within Nairobi County. While family-owned businesses exist across all sizes, from micro to large enterprises, the emphasis here was on SMEs due to their significant representation in the county's economic activities and their unique challenges and opportunities in adopting new technologies. In narrowing the focus to this segment, the study aimed to provide targeted insights into the factors influencing technology adoption among family-owned SMEs in Nairobi. It is important to note that not all family-owned businesses fall within the SME category. Family-owned enterprises range from small, informal businesses to large, multinational corporations. In Kenya, while a significant proportion of SMEs are family-owned, substantial family-owned businesses exceed the SME thresholds regarding employee numbers and annual turnover. Therefore, while there is considerable overlap, the categories are not synonymous.

1.2 Statement of the Problem

The adoption of technology by small and medium-sized enterprises (SMEs) has emerged as a critical driver of innovation, productivity, and competitiveness in the global economy (OECD, 2017). Family-owned SMEs are particularly important among these enterprises due to their dual role in driving economic activity and sustaining intergenerational wealth and employment (Zellweger, 2017). Globally, however, the uptake of technology among family-owned SMEs remains uneven. Developed economies exhibit higher adoption levels, bolstered by better digital infrastructure, stronger institutional support, and greater managerial capacity (OECD, 2021). In contrast, SMEs in developing countries, including Kenya, face persistent barriers such as financial constraints, limited digital skills, inadequate infrastructure, and uncertainty about the benefits of digital transformation (World Bank, 2020).

In Sub-Saharan Africa, the situation is particularly concerning. Despite growing policy emphasis on digital integration through frameworks such as the African Continental Free Trade Area (AfCFTA), technological uptake among SMEs remains low. According to UNECA (2022), only 28% of SMEs in the region use advanced digital tools, with the majority still reliant on basic technologies such as mobile phones for transactional operations. Family-owned businesses, which comprise a significant share of the SME ecosystem in Africa, are especially constrained by a lack of access to finance, low digital literacy, and resistance to organizational change stemming from deeply rooted familial traditions and leadership hierarchies (Nyamwanza, 2020).

In Kenya, family-owned SMEs are foundational to the national economy. They account for approximately 40% of GDP and provide livelihoods to over 14.9 million people, forming the largest segment of the country's private sector (KNBS, 2016). Nairobi County, in particular, hosts the highest concentration of these businesses, operating across sectors such as trade, light manufacturing, construction, and services. Despite this significance, technology adoption within family-owned SMEs remains suboptimal. A study by Wamuyu (2019) found that only 35% of SMEs in Nairobi had integrated digital platforms into their operations, citing major barriers such as high initial investment costs, lack of awareness, and insufficient digital competencies.

While numerous studies have examined technology adoption among Kenyan SMEs, few have isolated or deeply examined family-owned SMEs as a distinct analytical category. Existing research often aggregates all SMEs under a single framework, overlooking the unique characteristics that define family-owned businesses, such as informal governance structures, emotional ownership, succession planning issues, and the tension between traditional practices and modern management approaches (PwC, 2021; Nandwa & Fatoki, 2021). These organizational and relational dynamics are crucial in shaping decisions around resource allocation, strategic priorities, and technology adoption.

Moreover, there are notable inconsistencies in how previous studies conceptualize technology adoption and its influencing factors. For instance, Wamuyu (2019) focused on the use of digital tools to improve efficiency but did not examine the organizational or environmental conditions influencing adoption. Kariuki and Kimani (2022) emphasized competition but did not assess internal factors such as top management support or technological literacy. Regionally, Nyamwanza

(2020) offered insights on infrastructure and policy barriers but lacked country-specific nuance from a broad Sub-Saharan Africa lens. Gikandi and Bloor (2021) concentrated on Nairobi's tech hubs but did not address the specific dynamics of family-owned enterprises. Additionally, many of these studies adopted qualitative or descriptive methods, which, while valuable, limit the generalizability and quantification of findings necessary for policy and managerial interventions.

Thus, the problem this study seeks to address is the limited empirical understanding of the specific factors that influence technology adoption in family-owned SMEs in Kenya—particularly in Nairobi County**.** Despite their outsized economic role, these enterprises are underrepresented in research, especially in how perceived benefits, technological literacy, top management support, and competitive pressure interact to drive or hinder digital transformation. This gap undermines the ability of policymakers, development agencies, and business leaders to craft effective strategies for inclusive technological growth within this vital business segment.

1.3 Study Objectives

1.3.1 General Objective

To assess the factors influencing the adoption of technology by SMEs with reference to family-owned businesses in Nairobi County, Kenya.

1.3.2 Specific Objectives

i. To establish the influence of perceived benefits on the adoption of technology by family-owned SMEs in Nairobi County
ii. To determine the influence of technological literacy on the adoption of technology by family-owned SMEs in Nairobi County
iii. To determine the influence of top management support on the adoption of technology by family-owned SMEs in Nairobi County
iv. To establish the influence of competition on the adoption of technology by family-owned SMEs in Nairobi County

1.4 Research Questions

i. What is the influence of perceived benefits on the adoption of technology by family-owned SMEs in Nairobi County?
ii. What is the influence of technological literacy on the adoption of technology by family-owned SMEs in Nairobi County?
iii. What is the influence of top management support on the adoption of technology by family-owned SMEs in Nairobi County?
iv. What is the influence of competition on the adoption of technology by family-owned SMEs in Nairobi County?

1.5 Scope of the Study

Conceptually, this study focused on understanding the factors influencing the adoption of technology by family-owned SMEs. Specifically, the study examined key variables such as perceived benefits, technological literacy, top management support, and competition. These factors were identified as crucial determinants of technology adoption within the existing literature and provided a comprehensive framework for analyzing how family-owned SMEs navigate digital transformation.

Contextually, the research was situated within the context of family-owned SMEs, which have unique operational and structural characteristics compared to other types of businesses. The study explored how these enterprises, often managed and staffed by family members, approach technology adoption, and the particular challenges they face. Focusing on family-owned businesses, the study aimed to uncover insights specific to these enterprises, thereby contributing to a deeper understanding of their technological adoption processes and strategies.

Geographically, the study was conducted in Nairobi County, Kenya. As the capital city and a major economic hub, Nairobi hosts various SMEs across various sectors. This location was ideal for examining the technological adoption practices of family-owned SMEs due to its dynamic business environment and numerous support structures for small and medium enterprises. Focusing on Nairobi enabled the study to capture a representative snapshot of the challenges and opportunities faced by family-owned SMEs in a key urban setting within Kenya.

Temporally, the study was conducted in December of 2024, and considered data from recent years to ensure that the findings are relevant to the current technological landscape and economic conditions. This timeframe provided insights into the most recent trends and practices in technology adoption among family-owned SMEs, offering timely and applicable recommendations for stakeholders.

Methodologically, the research employed the quantitative approach, as it will provide broad, generalizable data. This made the study findings generalizable to family-owned SMEs across Nairobi and beyond.

1.6 Significance of the Study

This investigation's rationale for examining the factors bearing on the uptake of technology by family-owned SMEs in Nairobi extends to various stakeholders, including policymakers, small business owners, and scholars, among other key actors in the business ecosystem.

1.6.1 For Policymakers

This study provided critical insights into the factors affecting technology uptake among family-owned SMEs. Policymakers can leverage these insights to design and implement more effective policies and programs that specifically address any identified challenges in the adoption. For example, understanding the need for enhanced technological literacy and digital infrastructure can lead to targeted government interventions such as subsidized training programs, improved access to digital tools, and infrastructure development projects.

1.6.2 Small Business Owners

Family-owned SMEs will benefit greatly from the practical implications of this research. In identifying the key factors that influence technology adoption, business owners can better understand the steps they need to take to integrate digital solutions effectively. The study highlights the importance of top management support, technological literacy, and financial investment in technology, providing a clear roadmap for business owners to enhance their digital capabilities. Further, insights into the perceived benefits of technology adoption can help SMEs make informed

decisions about investing in new technologies, ultimately leading to improved efficiency, competitiveness, and growth.

1.6.3 Scholars

The study fills a gap in existing research, which often overlooks the unique dynamics of family-owned enterprises. Scholars can build on this research to explore further the nuances of technology adoption in similar contexts, developing more comprehensive theories and models. In addition, the study's findings can serve as a basis for comparative studies across different regions and types of SMEs, enriching the broader discourse on digital transformation in the SME sector. This study extends the theoretical framework of DOI Theory by examining how family-owned SMEs adopt technology. It highlights the unique influence of family dynamics, top management values, and strategic resource allocation in shaping technology adoption decisions.

1.7 Chapter Summary

This chapter laid the foundation for the study by exploring the background of the study, emphasizing the global, regional, and Kenyan contexts of technology adoption among family-owned SMEs and their economic significance. The Statement of the Problem identified gaps in previous research, including a limited focus on family-owned SMEs and a lack of comprehensive quantitative analysis of factors having a bearing on the uptake of technology. The study objectives and research questions focused on perceived benefits, technological literacy, top management support, and competition. The scope of the study defined the conceptual, contextual, methodological, and time dimensions, while the Significance of the Study highlighted its potential contributions to policymakers, SME owners, and scholars. This chapter provides a structured framework for the research, guiding subsequent chapters.

Chapter Two: Literature Review

2.1 Introduction

This chapter reviews relevant literature on technology adoption by family-owned SMEs in Kenya. It is organized into three key sections: the theoretical framework, which outlines the guiding theories; the empirical review, which synthesizes recent studies and findings; and the conceptual framework, which illustrates the relationships between the study's main variables and forms the basis for analysis.

2.2 Theoretical Framework

This section presents the theoretical foundation underpinning the study. It explores the Diffusion of Innovations (DOI) Theory, which offers a useful lens for understanding how new technologies are adopted within social and organizational systems. The theory provides insight into the stages, characteristics, and contextual factors that influence the adoption of innovations, making it particularly relevant to the current study of technology uptake among family-owned SMEs.

2.2.1 Diffusion of Innovations Theory

The study was grounded on the DOI Theory, proposed by Rogers (1962). The theory describes the reasons for how and how quickly different cultures absorb new concepts and innovations. As per the DOI, the five steps of the technology acceptance process include expertise, persuasiveness, decision-making, execution, and approval, argues Rogers (Greenhalgh et al., 2005). The theory also highlights several important characteristics of inventions that influence their uptake, i.e., relative advantage in comparison to existing technologies, compatibility with the organization's workflows and knowledge, complexity to implement, trialability, and observability of the development of the innovation both inside the organization and in competitors. Five kinds of adopters are distinguished by Rogers (1962): creators, early supporters, early adopters, laggards, and late supporters, each group exhibiting distinct characteristics that influence their adoption behavior. This paradigm thoroughly comprehends how innovations diffuse within a social system over time.

The Diffusion of Innovations Theory has found applications beyond business and communication studies, extending into disciplines such as public health, education, and sociology. In public health,

DOI has been widely used to examine how new medical practices, technologies, and public health interventions spread within communities, especially during disease outbreaks (Dearing & Cox, 2018). For instance, it has been applied to understand the adoption of health innovations like vaccines, sanitation practices, and disease prevention strategies (Greenhalgh et al., 2005). The theory has been utilized in education to explore the spread of pedagogical innovations and e-learning technologies, offering insights into how teachers and institutions adopt new teaching methods (Rogers, 2003). In sociology, DOI has examined social movements and how new social behaviors, norms, or technologies become accepted and integrated into society (Valente, 1996).

Despite its widespread application, the DOI has faced several criticisms. One major critique is its perceived oversimplification of the complex and multifaceted process of innovation adoption. Critics argue that the theory does not adequately account for the influence of contextual factors such as social, economic, and political environments on the adoption process (Greenhalgh et al., 2005). The theory's linear and sequential portrayal of the adoption process has also been criticized for failing to capture real-world adoption scenarios' iterative and non-linear nature (Lyytinen & Damsgaard, 2001). Another criticism is that the theory heavily emphasizes the attributes of the innovation itself, potentially neglecting important adopter characteristics such as organizational culture, individual attitudes, and the role of interpersonal networks (Fichman, 1992).

Despite these criticisms, the DOI remained highly relevant for anchoring and evaluating the influence of technological literacy on the adoption of technology by family-owned SMEs in Kenya. The DOI Theory was relevant to this study as it provided a robust framework for understanding how family-owned SMEs adopt technology in Nairobi County. The theory explains how innovations are communicated and adopted over time, highlighting key attributes like relative advantage, compatibility, and complexity that influence adoption decisions (Rogers, 1962). These attributes aligned closely with the study's variables: perceived benefits, which reflect the relative advantage of adopting technology; technological literacy, which addressed the complexity of innovations and users' ability to navigate them; top management support, which emphasized the role of decision-makers in championing adoption within firms; and competition, which reflects external pressures as part of the social system influencing diffusion. In anchoring these variables in DOI theory, the study explored how internal perceptions and external forces collectively drive technology adoption, offering insights into the diffusion process within family-owned SMEs.

2.3 Empirical Review

This part of the report delves into a thematic exploration of existing research related to the adoption of technology by family-owned SMEs in Kenya, organized according to the study's objectives. It systematically examines relevant empirical evidence, showing how perceived benefits, technological literacy, top management support, and competition influence technology adoption. Each theme is explored by synthesizing recent studies and findings, offering insights into these factors' practical implications and real-world applications.

2.3.1 Perceived Benefits and the Adoption of Technology

Perceived benefits refer to the extent to which an organization views technology as providing advantages such as efficiency, cost reduction, and market competitiveness. According to Tornatzky and Fleischer (2020), organizations adopt technologies primarily when the perceived benefits outweigh the costs. Empirical studies have operationalized perceived benefits through increased productivity, improved customer service, and streamlined operations (Davis, 1989). For example, Kuan and Chau (2021) used measures like cost-effectiveness, operational efficiency, and market responsiveness to gauge perceived benefits in SMEs. In the context of family-owned SMEs, this study adopted perceived improvements in cost savings, efficiency of operations, and customer satisfaction as the operational measures, which speak to their priorities for sustaining competitiveness while managing resource constraints.

In a systematic literature review, Zamani (2022) revealed 11 influential categories related to technology adoption. However, the review highlighted the fragmented nature of existing literature, which often focused on a limited range of concepts and lacked cohesive theoretical and conceptual frameworks. This points to the need for a comprehensive framework to address the dynamic nature of technology adoption in rapidly evolving technologies. The study, however, adopted the desktop design, which may not fully address the specific challenges and nuances faced by SMEs in different regional contexts, such as those in developing countries or family-owned businesses, which could affect the generalizability of its findings.

Tornatzky and Fleischer (2019) examined how perceived benefits influence technology adoption among SMEs in the United States. The authors aimed to understand the various factors SMEs

consider beneficial when adopting new technologies and how these perceptions drive their decision-making process. Employing a mixed-methods approach, the study found that perceived benefits, including increased efficiency, competitive advantage, and improved customer satisfaction, play a significant role in SMEs' technology adoption. The study, however, focused on SMEs in general and not specific to family-owned businesses, which may have a peculiar set of business-specific dynamics different from other SMEs.

Abdullah et al. (2021) conducted a cross-national comparative study on SMEs in Kedah, Malaysia, and Kaduna, Nigeria, to explore how perceived usefulness moderates the relationship between entrepreneurial behavior, culture, and technology adoption. The study highlighted the differing dynamics of technology adoption across countries but acknowledged other factors that have a bearing on the uptake of technology and may warrant further investigation. The study explored SMEs in general, without a specific focus on family-owned businesses whose managerial dynamics are more nuanced.

Kimana (2020) investigated the factors affecting the adoption of e-commerce by retail SMEs in Kenya. The study reviewed existing literature and analyzed data to develop a framework identifying key factors influencing e-commerce adoption. The findings revealed that while all participating SMEs had adopted basic e-commerce applications, such as simple websites and social media, the applications used were generally less sophisticated. The study identified motivating factors for adoption, including operational efficiency, cost reduction, global market access, and increased sales, which are perceived as significant benefits by the SMEs involved. The study, however, narrowly focused on e-commerce, overlooking other aspects of technological adoption, including perceived benefits, technological literacy, top management support, and the influence of competition.

Otieno (2015) aimed to explore the factors influencing the adoption and utilization of ICT systems among SMEs in Kenya. The research revealed that the perceived usefulness of ICT positively impacted its adoption and use, with SMEs more likely to embrace ICT solutions when they could measure benefits such as enhanced productivity and reduced operational costs. The study, however, explored SMEs in general without a specific focus on family-owned businesses.

2.3.2 Technological Literacy and Adoption of Technology

Technological literacy reflects the skills and knowledge necessary to understand, evaluate, and effectively use technological solutions. Zhao et al. (2024) emphasized that technological literacy is a crucial determinant of technology adoption, especially in SMEs where resource constraints often limit access to skilled personnel. Studies have operationalized this factor using metrics such as employee familiarity with technology, the availability of training programs, and the capacity to troubleshoot technological issues (Venkatesh et al., 2022). This study adopted indicators like the proportion of employees trained in technology, management's technological expertise, and access to external technical support. These measures are justified because family-owned SMEs often rely on the expertise of a small team, making technological literacy a pivotal factor in adoption success.

Almashawreh et al. (2024) investigated the factors influencing the adoption of artificial intelligence (AI) among SMEs in Jordan, focusing on technological capabilities and organizational dynamics. Utilizing the Technology–Organization–Environment (TOE) framework, the study surveyed 364 SME owner-managers in Jordan to analyze AI adoption. The research found that employee IT knowledge, managerial commitment, IT infrastructure, well-designed reward systems, and training initiatives significantly impact attitudes toward AI adoption. These insights offer valuable guidance for SME leaders and stakeholders in aligning AI integration with Jordan's societal needs. The study highlighted its contributions, implications, limitations, and proposed directions for future research.

Siyami and Rusmiyatun (2023) investigated the moderating role of financial inclusion on the relation between technological literacy and the financial performance of micro, small, and medium enterprises (MSMEs) in Indonesia. The study, involving 65 participants, used various data analysis techniques. Findings reveal that financial literacy significantly enhances financial performance, while technological literacy and financial technology do not show significant direct effects. The study, however, focused on MSMEs in general without specific reference to family-owned businesses, which is the focus of the current study.

Mishrif and Khan (2023) examined the technological transformations and challenges faced by SMEs during the COVID-19 pandemic, focusing specifically on the logistics and supply chain

sector in Oman. The study assessed customer satisfaction and future technological innovation plans through quantitative and qualitative data collected via surveys and interviews from 2020 to 2021. Using paired t-tests and Pearson's correlation, the research finds significant correlations between technology use before and during the pandemic and future technology adoption. The results suggest that technology adoption was a key strategy for SMEs during the pandemic and that those with digitally skilled employees are more likely to embrace Industry 4.0 technologies. The study was, however, conducted in the context of COVID-19, which may not reflect the scenario outside a pandemic.

Mabula and Dong (2018) analyzed the dual impact of SME financial literacy and technology use on record-keeping and risk-management practices and their subsequent effect on firm performance among SMEs in Sub-Saharan Africa. Financial literacy was also positively associated with better risk management practices. However, the study noted an insignificant link between financial literacy and record-keeping practices. The findings emphasized the practical benefits of financial literacy and technology use in enhancing financial practices within SMEs in developing economies. The research, however, focused on SMEs in developing economies and did not specify which countries or regions were studied. This lack of detail may limit the generalizability of the findings to different economic or cultural contexts. Expanding the study to include various developing regions or countries could provide a broader understanding of these dynamics.

Nyamu (2014) examined the factors affecting the adoption of Information and Communication Technology (ICT) among clothing SMEs in Nairobi County, Kenya, to create a framework to enhance adoption rates. Using a descriptive research design, the study randomly sampled 100 out of 444 clothing SMEs. Qualitative data were thematically organized, while quantitative data were analyzed using descriptive statistics and inferential methods like factor analysis and multiple regression. The outcomes showed that technology availability, compatibility, complexity, literacy, characteristics, and accessibility significantly influence ICT adoption in the industry. The focus is, however, solely on clothing SMEs in Nairobi County, which may limit the applicability of the findings to other sectors or regions. Expanding the study to include a variety of industries and locations could offer a broader perspective on ICT adoption in different contexts.

2.3.3 Top Management Support and Adoption of Technology

Top management support entails the commitment of senior leaders to allocate resources, foster a conducive environment, and champion the adoption of technology. Hambrick and Mason's (1984) Upper Echelons Theory highlights that top leaders' values, experiences, and decisions significantly influence organizational outcomes. Empirical studies have measured top management support through indicators such as financial commitment, decision-making involvement, and technology adoption prioritization in strategic plans (Ifinedo, 2021). For family-owned SMEs, top management often overlaps with ownership, making their support a strategic and operational driver. This study operationalized this variable through indicators like the allocation of funds for technology, direct involvement in adoption decisions, and the establishment of technology-focused policies. These measures are relevant because family-owned businesses typically have centralized decision-making structures.

Hasani et al. (2023) investigated the factors influencing the adoption of Privacy Enhancing Technologies (PETs) in SMEs amid increasing societal focus on data protection in Canada. The study employed the Technology-Organization-Environment (TOE) framework to explore how industry sector, firm size, adoption intent, and managerial readiness affect PET adoption and performance. Data from 202 Canadian employees revealed that managerial, technological, environmental, and organizational readiness positively impact the intention to adopt PETs. This intention, in turn, significantly enhances firm performance. Key factors influencing PET adoption included cybersecurity awareness, adoption cost, ease of use, perceived benefits, and IT infrastructure. Technological readiness emerged as the most significant factor, followed by managerial, environmental, and organizational readiness. The research is limited to Canadian SMEs, which may not fully capture the diverse factors influencing PET adoption in different geographic or economic contexts, particularly in developing economies like Kenya.

Al Busaidi et al. (2019) investigated the critical success factors influencing ICT adoption in SMEs, focusing on Oman. The study employed a questionnaire survey directed at SME managers and identified several key factors affecting effective ICT adoption. These factors include poor management skills, limited access to markets and finance, insufficient awareness of global markets, a challenging business environment, outdated technology, bureaucratic complexities, and

inadequate training in basic business practices. While the focus was on Oman, the findings may not have fully captured the ICT adoption challenges SMEs face in different regions or countries. Expanding the study to include SMEs from various geographic and economic contexts could have offered a more generalizable understanding of the critical success factors.

Shahadat et al. (2019) investigated the managerial, technological, and natural factors influencing the adoption of electronic devices in SMEs within developing countries. They proposed a conceptual framework combining the TOE framework and DOI theory to analyze the causes of the adoption of digital technology, specifically focusing on ICT in SMEs. The study found that factors such as comparative advantage, intricacy, transparency, apparent expense, backing from upper management, upper management's inventiveness, pressure from competitors, and government assistance significantly influenced ICT adoption. The study, however, focused on MSMEs in general, without specific reference to family-owned businesses, which is the focus of the current study.

Onyedimekwu and Oruan (2023) examined the influence of Owner/Top Management Support on the adoption and use of ICT systems among SMEs in Nigeria. The study employed hypotheses derived from the TAM and TOE. Results indicate that 54.1% of SMEs use computers, 91.9% use GSM/telephone, 35.1% use internet facilities, 18.9% have corporate websites, and 13.5% use bulk SMS. The perceived usefulness of ICT was notably high (mean of 4.11), while ease of use was generally perceived as difficult. Many SME owners/top managers reported that the cost of deploying ICT systems is a significant barrier. The research focused on a specific geographical area (Rivers State, Nigeria) and a limited sample size of 37 SMEs. This narrow scope may not fully capture the diversity of ICT adoption practices across different regions or sectors in Nigeria or other countries. A larger, more representative sample and the inclusion of qualitative methods could offer deeper insights into the factors influencing ICT adoption.

Otieno (2015) aimed to investigate how Owner/Top Management Support influences the adoption and utilization of ICT systems among SMEs in Kenya. The descriptive survey sampling 250 SME participants found that support from owners and top management positively affects SMEs' adoption and use of ICT systems. The research was confined to Kenyan SMEs in general, without a specific focus on family-owned SMEs, which may have nuanced managerial dynamics different

from those of other SMEs. In addition, examining longitudinal data could reveal changes and trends over time. The study also revealed that owner/top management support of ICT positively affects its adoption and use by SMEs.

2.3.4 Competition and Adoption of Technology

Competition refers to the pressure organizations face from market rivals to innovate and adopt new technologies. Porter's (1980) Competitive Forces Model posits that competition is a key external driver of strategic decisions, including technology adoption. Empirical studies operationalize competition using metrics such as the intensity of rivalry, market dynamism, and the adoption rates of competitors (Zhu et al., 2022). For SMEs, mainly family-owned businesses, competition often dictates their pace and direction of technology adoption as they seek to maintain relevance in dynamic markets. This study adopted measures such as the number of competitors adopting similar technologies, perceived market pressure, and the impact of competition on innovation strategies. These indicators are justified because they asses SMEs' external pressures in Nairobi County.

Porter and Heppelmann (2024) explored how competitive pressures drive technology adoption among SMEs in the manufacturing sector in the United States. The study employed a mixed-methods design, combining surveys and case studies. A sample of 300 SMEs was selected using stratified random sampling. The study found that competition motivates SMEs to adopt advanced manufacturing technologies like automation and the Internet of Things (IoT). Competitive pressure was identified as a critical factor in driving innovation and efficiency. The study, however, focused mainly on the manufacturing sector, leaving out other sectors that might experience different competitive dynamics. The current study aims to address this by including a broader range of industries.

Beck et al. (2020) assessed the impact of market competition on the technology adoption strategies of SMEs in the technology sector in Germany. This study utilized a quantitative survey design. A sample of 250 SMEs was selected through random sampling. The data were analyzed using regression analysis to determine the relationship between competition and technology adoption. The results showed a strong positive correlation between competitive intensity and adopting new technologies like cloud computing and data analytics. SMEs in highly competitive markets were

more likely to invest in innovative technologies to gain a competitive edge. While the study provided valuable insights into the technology sector, it focused on SMEs in general,

Adebayo and Adesina (2021) assessed the role of competition in driving SMEs' adoption of digital marketing technologies in Lagos, Nigeria. Using a survey research design, a sample of 200 SMEs was selected through random sampling. The outcomes showed that competitive pressure significantly drives the adoption of digital marketing technologies among SMEs. Firms in highly competitive markets were more likely to invest in social media marketing and search engine optimization. The study did not consider the impact of the external economic environment on technology adoption. The current study incorporated external economic factors to provide a more holistic understanding.

Molla and Licker (2021) examined the influence of competition on SMEs' adoption of e-commerce technologies in Ethiopia. The study used a qualitative case study approach. Data were collected from 20 SMEs through purposive sampling and analyzed using content analysis. The study found that competitive pressure significantly drove e-commerce adoption among SMEs. However, other factors, such as infrastructural challenges and lack of skilled personnel, played a crucial role. Thus, the study was limited to e-commerce, which may not reflect technological adoption in the broader sense, hence the current study.

Nyaga and Okeyo (2020) investigated the impact of competitive pressure on SMEs' adoption of mobile technologies in Nairobi. A cross-sectional survey design was employed. The study sampled 150 SMEs using convenience sampling. Data were analyzed using correlation and regression analyses. The study concluded that competition positively influences the adoption of mobile technologies. SMEs facing higher competitive pressures were more likely to adopt mobile payment and communication solutions to enhance operational efficiency. The study, however, focused solely on mobile technologies, not considering other technological innovations. The current study aims to explore a broader range of technologies to provide a more comprehensive view.

2.4 Research Gaps

Existing literature on technology adoption among SMEs provided a solid foundation, yet significant gaps remain—particularly regarding family-owned businesses and the interplay of

various organizational and environmental factors. Studies such as Zamani (2022) and Tornatzky and Fleischer (2019) explored frameworks for understanding technology adoption and the role of perceived benefits but largely focused on general SMEs in developed contexts. These studies often lacked specificity around family-owned enterprises operating under different decision-making dynamics, blending emotional and economic goals. This study addresses that gap by focusing exclusively on family-owned SMEs in Nairobi County, providing contextual insights into how perceived benefits influence adoption in this unique subset of businesses.

Cross-country comparative studies like Abdullah et al. (2021) and Almashawreh et al. (2024) highlighted the influence of organizational culture, managerial support, and technological readiness on adoption. However, their general SME focus and emphasis on specific technologies, such as artificial intelligence or e-commerce, limit the generalizability of their findings to broader technology categories. These studies did not isolate the structural and relational factors distinct to family-owned SMEs. The current study addressed these limitations by incorporating a broader technological scope while contextualizing adoption within family business structures, where leadership is often hereditary and decisions are made collectively or informally.

In Kenya, Kimana (2020) and Otieno (2015) investigated factors influencing e-commerce and ICT adoption, identifying perceived usefulness, cost savings, and improved efficiency as key motivators. However, both studies treated SMEs as a homogeneous group without acknowledging the specific challenges faced by family-owned firms—such as informal governance, generational gaps in technological literacy, and resource allocation influenced by familial priorities. This study filled this critical void by examining how these family-specific characteristics influenced adopting a broader range of digital technologies beyond e-commerce or ICT.

Other researchers like Mishrif and Khan (2023) and Mabula and Dong (2018) investigated technology adoption in response to crises such as the COVID-19 pandemic or, in general, Sub-Saharan Africa contexts without focusing on Kenya specifically. These studies provided important insights into resilience and digital response strategies, yet their findings were temporally or geographically constrained. By shifting the focus to the post-pandemic context of Nairobi County, this study sought to uncover long-term determinants of digital transformation in a stable economic period, offering more sustainable and applicable insights.

Studies such as Siyami and Rusmiyatun (2023) and Hasani et al. (2023) also addressed the role of technological literacy, linking it to performance and readiness in various countries. Nevertheless, these studies excluded family-owned SMEs or narrowly focused on a single technology type. This research addressed that gap by integrating technological literacy as a core variable in diverse technology applications within Nairobi's family enterprises, from point-of-sale systems to customer relationship management tools.

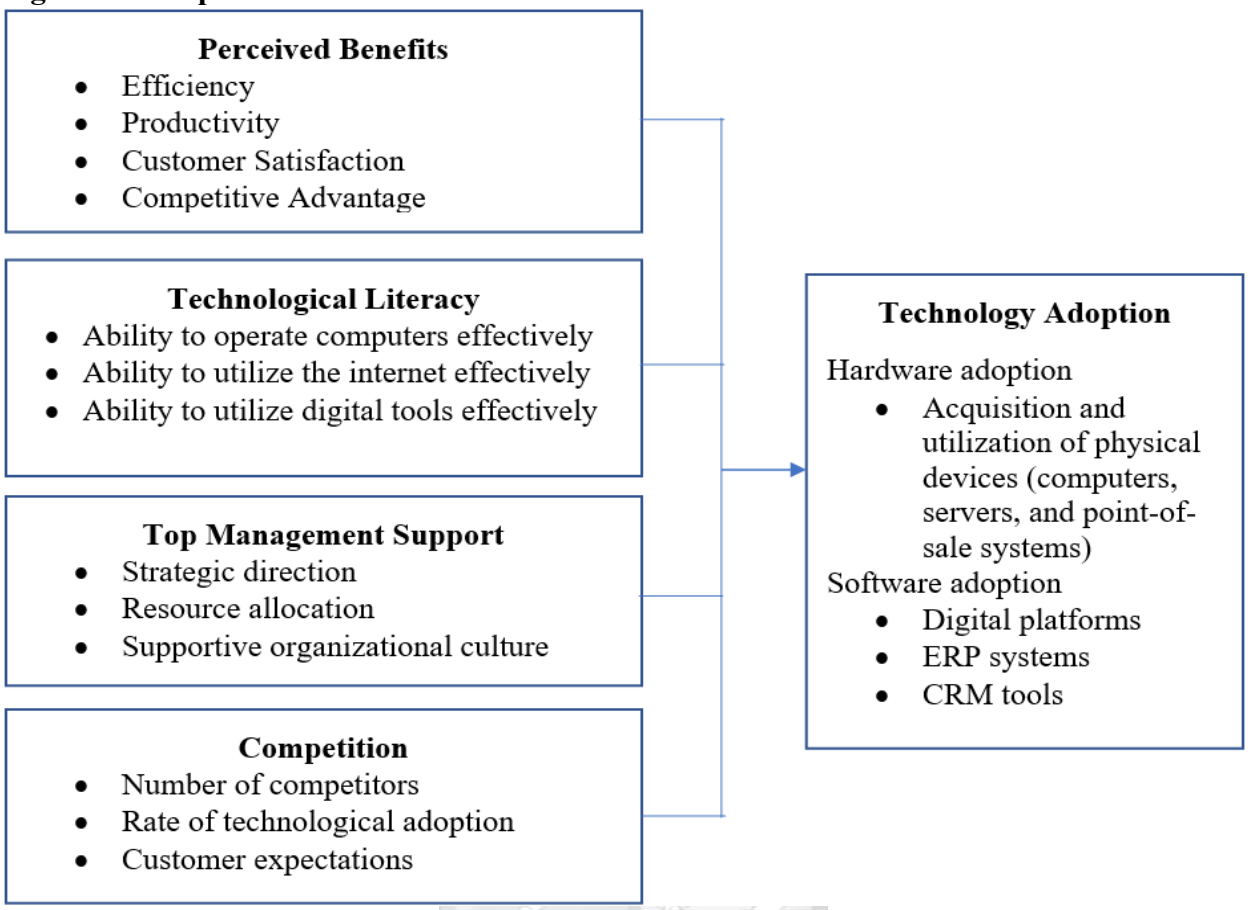
Several scholars, including Shahadat et al. (2019) and Onyedimekwu and Oruan (2023), emphasized the importance of top management support in the adoption process, using theoretical lenses such as TOE and TAM. While their findings confirm the role of leadership, the focus has largely been on SMEs in general, and their sample sizes and regional scopes were often limited. This study extended the understanding of leadership's role by assessing how top management support—rooted in family ownership structures—shapes adoption decisions in Kenya's urban SME landscape.

Finally, studies such as Porter and Heppelmann (2024), Beck et al. (2020), and Adebayo and Adesina (2021) have extensively examined the role of competitive pressure in driving technology uptake. However, their industry-specific and geography-bound designs (e.g., U.S. manufacturing, German tech SMEs, or Nigerian digital marketing) limit the applicability of their findings to Kenya's mixed-sector environment. This research explored how competitive dynamics across diverse sectors—trade, services, and light manufacturing—affect technology adoption among family-owned SMEs in Nairobi.

2.5 Conceptual Framework

Figure 2.1 integrates key theoretical constructs to explore the factors affecting the uptake of technology among SMEs. Rooted in the DOI theory, it examines how technological literacy, perceived benefits, top management support, and competitive pressure drive the adoption and utilization of technology among family-owned SMEs.

Fig 2.1: Conceptual Framework



Independent Variables **Dependent Variable**

Source: Researcher (2025)

The conceptual framework of this study explored the relationships between key factors bearing on the uptake of technology in family-owned SMEs, focusing on perceived benefits, technological literacy, top management support, and competition as independent variables and technology adoption as the dependent variable. Perceived benefits encompass efficiency, productivity, customer satisfaction, and competitive advantage, highlighting the expected positive outcomes of technology use. Technological literacy evaluated the workforce's ability to use computers, the internet, and digital tools effectively. Top management support assessed leadership's role through strategic direction, resource allocation, and fostering a supportive culture for technology integration. Competition examined market dynamics, including competitor actions and customer expectations, that drive SMEs to adopt technology. Technology adoption was measured through the presence and effective use of hardware and software solutions, reflecting SMEs' capacity to

enhance efficiency, performance, and competitiveness. The foregoing variables were operationalized as per Table 2.1 below:

Table 2.1: Operationalization of Variables

Variables Type	Variable	Indicator	Measurement	Sources
Independent Variable	Perceived Benefits	Efficiency Productivity Customer Satisfaction Competitive Advantage	Likert scale	Ceipek et al., 2020
	Technological Literacy	Ability to operate computers effectively Ability to utilize the internet effectively Ability to utilize digital tools effectively	Likert scale	Kotlar et al., 2020
	Top Management Support	Strategic direction Resource allocation Supportive organizational culture	Likert scale	Chouki et al., 2020
	Competition	Number of competitors Rate of technological adoption Customer expectations	Likert scale	Vimal et al., 2023
Dependent variable	Technology Adoption	Hardware and software	Likert scale	Farida & Setiawan, 2022

Source: Researcher (2025)

2.6 Chapter Summary

In this chapter, the theoretical framework outlines the foundational theories that form the basis for understanding the dynamics of technology adoption in this context. The empirical review synthesizes findings from recent studies, offering insights into trends, challenges, and factors

impacting technology uptake among family-owned SMEs. Finally, the conceptual framework presents a structured representation of the study's primary variables and hypothesized relationships, offering a visual and narrative guide to the research's focus and expected outcomes.

Chapter Three: Research Methodology

3.1 Introduction

This chapter outlines the methodology employed in this study to examine the factors influencing the adoption of technology by SMEs in Kenya. It details population estimation and sample design, study methodology, collecting information techniques, and data methods for analysis used to achieve the study's objectives.

3.2 Research Philosophy

The research philosophy used in this study was positivist**,** which speaks to the objective of examining the influence of competitive pressure on the adoption of various technologies by SMEs. Positivism is characterized by a systematic approach to understanding phenomena through observable and measurable data, emphasizing the importance of empirical evidence and statistical analysis (Creswell, 2014). This philosophy assumes that reality is external and independent of the researcher, making it possible to identify cause-and-effect relationships. Employing positivism enabled the study to objectively analyze the impact of competition on technology adoption, allowing for the generalization of findings across various SME sectors. The adoption of this philosophy was particularly appropriate as the study aims to test hypotheses derived from established theoretical frameworks, such as the DOI theory.

The choice of positivism is further justified by its focus on quantitative methods, which enable the researcher to gather numerical data, analyze relationships, and make inferences based on statistical evidence (Saunders et al., 2019). The structured nature of positivist research supports the use of surveys and regression analysis to identify patterns and correlations between competitive pressures and technology adoption. This approach ensures objectivity and replicability, crucial for validating findings across different contexts and sectors. Positivism also facilitates the development of actionable recommendations for policymakers and SME managers grounded in empirical evidence.

3.3 Research Design

Kumar (2019) defines research design as the structured plan or framework that outlines the techniques and protocols for gathering and evaluating information to investigate. A descriptive cross-sectional research design was used in this investigation, defined by Bryman (2016) as a research approach aimed at systematically describing a population's phenomenon or characteristics without manipulating variables. (Creswell & Creswell, 2017). The methodology used in the present investigation was descriptive a cross-section, meaning that data was gathered all at once to describe and analyze relationships among variables of interest (Creswell, 2014). This design was particularly relevant as it allowed the researcher to assess the influence of competitive pressures on technology adoption among SMEs at a given moment, providing a snapshot of current practices and trends.

The cross-sectional approach facilitates the efficient collection and analysis of data from a diverse sample by focusing on a specific timeframe, enabling the identification of patterns and correlations (Saunders et al., 2019). The descriptive aspect ensures that the study not only quantifies the extent of technology adoption but also explores contextual factors, such as firm size and industry dynamics, which are critical for a comprehensive understanding of the phenomenon. This approach was well-suited for the study's objectives as it supports using structured surveys and statistical analysis to derive actionable insights and generalizable findings.

3.4 Target Population

According to Creswell (2014), a target population refers to the entire group of individuals or entities about which a researcher seeks to conclude. This study's target population comprised family-owned small and medium-sized enterprises (SMEs) in Nairobi County, Kenya. Their distinct operational characteristics inform the focus on family-owned SMEs, where ownership and decision-making are often closely tied to familial relationships. Unlike other SMEs, family-owned businesses are influenced by business goals and family values, which significantly affect strategic decisions—including technology adoption (Nwuke, 2024; Kallmuenzer, 2024). These enterprises typically emphasize legacy preservation, trust-based governance, and long-term planning, which create a unique context for assessing how technological innovations are evaluated, adopted, or resisted (Zhu et al., 2022).

As reported by the Kenya National Bureau of Statistics (KNBS, 2016), there were approximately 170,197 licensed SMEs in Nairobi County as of 2016. Despite business lifecycle fluctuations due to new entries and high closure rates, this figure remains a reasonable estimate of the current population, considering national trends (OECD, 2017). Based on studies by PwC (2021) and KNBS (2016), approximately 80% of SMEs in Kenya are family-owned. Applying this proportion to Nairobi County, the estimated number of family-owned SMEs is 136,157.

It is important to note that not all family-owned businesses fall within the SME category. Family-owned businesses vary widely in size—from informal microenterprises to large corporations. While SMEs form the majority of family-owned firms in Kenya, particularly due to lower entry barriers and localized management structures, a segment of family-owned enterprises does exist outside the SME classification—especially in sectors such as manufacturing, real estate, and finance, where some firms grow beyond SME thresholds. However, this study focused specifically on family-owned businesses that meet the SME criteria as outlined in the Micro and Small Enterprises Act (2012): Micro-enterprises: Fewer than 10 employees, with annual turnover below KES 500,000; Small enterprises: Between 10–50 employees, with annual turnover between KES 500,000 and 5 million; and Medium enterprises: Between 51–100 employees, with turnover ranging from KES 5 million to 50 million.

3.5 Sample Size and Sampling Design

Sampling is defined by Bryman and Bell (2015) as the procedure for choosing a small number of people or things to take part in an investigation from a broader group. Given the large population, a sample was determined, which was typical of the intended audience. In this context, Yamane's formula for determining the number of samples was used to figure out the number of samples in large populations (Yamane, 1967), hereby illustrated:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = Required sample
N = Total population = 170,197
e = Margin of error, set at 0.05

Therefore:

$$n = \frac{136{,}157}{1 + 136{,}157(0.05)^2}$$

n= 399

As such, the formula yields a sample size of 399 family-owned SMEs, with the units of analysis being individual family-owned SMEs and the units of observation being designated persons responsible for technology adoption.

This study employed a combination of stratified random sampling and purposive sampling techniques to ensure a representative and relevant sample. Stratified random sampling was used to capture the diversity of the SME population across Nairobi's economic landscape. As Kumar (2019) explains, this technique divides the population into distinct strata (groups) based on meaningful characteristics—such as industry sector—and then randomly selects from each stratum. This ensures proportional representation and enhances the generalizability of findings.

The 14 sectors used for stratification were derived from the Kenya National Bureau of Statistics (KNBS, 2016), including retail trade, manufacturing, construction, transportation, and professional services. The rationale for incorporating multiple sectors is that technology adoption varies significantly across industries due to differences in digital needs, market exposure, and operational models. For example, manufacturing firms may invest in automation and ERP systems, while retail SMEs may prioritize e-commerce and mobile payments. Including a range of sectors allows for a more nuanced analysis of technology adoption dynamics across Nairobi's SME landscape. Within each sector, purposive sampling was applied to ensure that only family-owned SMEs were included in the sample. A short screening questionnaire was used to confirm whether an enterprise met the criteria of being family-owned—defined as one where family members have significant ownership and decision-making power. Firms that did not meet this criterion were excluded from the study.

Although many respondents were owners of family-owned SMEs, including top management support as a variable remained critical for two reasons: In family businesses, owners often serve as de facto top management. Their level of involvement, willingness to allocate resources, and

openness to innovation directly shape whether and how technology is adopted (Nambisan et al., 2019). Measuring their strategic support was vital to understanding the internal drivers of digital transformation. In medium-sized or more structured family firms, non-family managers or professional administrators may be involved in day-to-day operations. In such cases, the owner's strategic guidance and approval still represent top management support, particularly in resource allocation, policy direction, and risk tolerance. Hence, the top management support variable captures the behavior of owner-managers in smaller firms and the strategic influence of family leadership in more complex enterprises, aligning with the study's objective to assess internal organizational readiness for technology adoption.

Table 3.1: Sample Distribution

Industry	% proportion	Sample
Manufacturing	11.2	45
Construction	0.5	2
Wholesale and retail trade; repair of motor vehicles & motorcycles	57.1	228
Transportation and storage	1.0	4
Accommodation and food service activities	8.8	35
Information and communication	0.8	3
Financial and insurance activities	4.2	17
Real estate activities	0.4	2
Professional, scientific and technical activities	1.1	4
Administrative and support service activities,	1.6	6
Education	2.4	10
Human health and social work activities	0.8	3
Arts, entertainment and recreation	0.9	4
Other service activities	8.7	35
Total	**100.0**	**399**

Source: Computed using data from KNBS (2016)

3.6 Data Collection Methods

This study relied on primary data, which was collected using a structured questionnaire comprising closed-ended questions. The data collected was entirely quantitative in nature, with the aim of generating numerical, objective, and standardized responses that could be statistically analyzed to

uncover patterns, relationships, and trends among the variables under investigation. The exclusive focus on quantitative data provided a high level of precision and reliability, enabling the study to draw generalizable conclusions (Creswell & Creswell, 2017; Bryman, 2016). The questionnaire was designed to measure key constructs aligned with the study's objectives and theoretical framework, particularly factors influencing technology adoption among family-owned SMEs in Nairobi County. These constructs included: perceived benefits, technological literacy, top management support, and competition.

To collect data, the study employed the "drop and pick" technique, whereby printed questionnaires were physically delivered to respondents—typically owners or senior managers of family-owned SMEs—and collected at an agreed-upon time. This method allowed busy respondents sufficient flexibility to complete the questionnaire at their convenience. It also facilitated face-to-face interaction during questionnaire delivery, which helped clarify any ambiguities and ensured that respondents clearly understood the purpose and scope of the study (Babbie, 2020). Additionally, this approach minimized disruptions to respondents' work routines, increased participation, and improved overall response rates.

The structured questionnaire was organized into five key sections**:** Section A covered Background Information**.** This section captured general information about the SME, including business sector, age of the business, number of employees, ownership structure, and respondent's role within the business. It also served to screen and confirm whether the SME met the criteria for a family-owned enterprise.

Section B included questions designed to measure respondents' perceptions of the advantages associated with adopting technology in their business. Indicators covered areas such as operational efficiency, productivity, customer satisfaction, and competitive advantage. Section C assessed the digital proficiency of the firm's workforce, including the ability to use computers and digital tools, familiarity with business software, and participation in digital skills training. Section D measured the level of support and commitment provided by the business leadership toward technology adoption. Key aspects included resource allocation, strategic direction, encouragement of innovation, and involvement in technology-related decisions. Section E explored the external

market environment, focusing on competitive pressure, technological advancements by rival firms, customer expectations, and how these factors influence the SME's adoption of technology.

Each question within these sections was closed-ended and based on a 5-point Likert scale, enabling respondents to express the degree of agreement or frequency of behavior regarding each statement. The design ensured the collection of consistent and quantifiable data suitable for inferential statistical analysis.

3.7 Research Quality

To ensure the quality and reliability of the research, a pilot study was conducted prior to the main data collection phase. The pilot study involved administering the semi-structured questionnaire to a small, representative sample of SME managers within Nairobi County. In this regard, a 10% proportion (40 family owned-SMEs) was extracted from the population, in line with Kumar (2019). The sample population was not part of the final data collection.

3.7.1 Reliability

Reliability analysis was used to assess the internal consistency of measurement scales used in the study. Cronbach's Alpha (α) was used for evaluating reliability, with a value above 0.7 generally considered acceptable for social science research (Hair et al., 2019). This part of the report displays the reliability results for the attributes in this investigation: perceived benefits, technological literacy, top management support, competition, and technology adoption.

Table 3.2: Reliability Analysis

Variable	Cronbach Alpha	Items	Decision
Perceived benefits	0.703	10	Reliable
Technological literacy	0.754	10	Reliable
Top management support	0.723	10	Reliable
Competition	0.775	10	Reliable
Adoption of technology	0.765	10	Reliable

Source: Research Data (2025)

As per Table 3.2, Cronbach's Alpha values for all variables range between 0.703 and 0.775, indicating acceptable internal consistency. According to Nunnally and Bernstein (1994), an Alpha rating greater than 0.7 is dependable, indicating that the survey questions measuring each construct

consistently capture the intended concept. For Perceived Benefits, the Alpha value ($\alpha = 0.703$) indicates that the scale used to measure perceived benefits of technology adoption has adequate reliability. A higher alpha would indicate stronger consistency, but the current value is within the acceptable threshold (Tavakol & Dennick, 2011). For Technological Literacy, the Alpha coefficient ($\alpha = 0.754$) shows good internal consistency, suggesting that the people surveyed consistently interpreted the technological literacy questions. Prior studies have linked technological literacy to higher reliability scores due to its well-defined nature (Park et al., 2015).

For Top Management Support ($\alpha = 0.723$), the scale indicates high reliability, in line with previous research suggesting that management-related constructs generally yield acceptable reliability scores (Davis, 1989). The Competition ($\alpha = 0.775$) construct has the highest reliability, implying that the items effectively capture the role of competition in having a bearing on technology uptake. Studies on competitive pressure and technological innovation have similarly recorded high-reliability scores (Porter, 2008). The scale for technology adoption ($\alpha = 0.765$) demonstrates strong internal consistency, reflecting previous findings that technology adoption constructs tend to have stable reliability due to well-defined measurement frameworks (Venkatesh & Davis, 2000).

3.7.2 Validity

The study assessed content validity by consulting a subject-matter expert, specifically the university supervisor, to ensure the questionnaire accurately reflected the main concepts being studied. The degree to which the contents of a measurement tool include all pertinent elements is known as the content validity of the concept being studied (Polit & Beck, 2006). The supervisor reviewed the questionnaire for clarity, relevance, and completeness, ensuring that the items effectively represented the attributes in this investigation. Based on the expert's feedback, necessary adjustments were made to enhance the accuracy and comprehensiveness of the instrument. This approach speaks to Lawshe's (1975) Content Validity Ratio (CVR) framework, which emphasizes expert evaluation in determining the adequacy of survey instruments. Content validation through expert review is a widely recognized practice in research, as it enhances the credibility and applicability of the findings (Haynes et al., 1995).

3.8 Data Analysis Methods

The data analysis process for this study followed a structured and systematic approach to ensure the results' reliability, validity, and accuracy. The process began with data cleaning, followed by data coding, and then statistical analysis—both descriptive and inferential—using Statistical Package for the Social Sciences (SPSS) version 26. Immediately after data collection, all returned questionnaires were subjected to a data cleaning process, which involved reviewing each response for completeness, consistency, and accuracy. Incomplete questionnaires or those with substantial missing data were excluded from further analysis. For questionnaires with minor missing values, appropriate methods such as mean substitution or pairwise deletion were used, depending on the nature and extent of the missing information. Next, the data was coded**,** particularly for closed-ended questions that used Likert scales. Each response was assigned a numerical value to facilitate computational analysis. Coding ensured standardization and prepared the dataset for accurate application of statistical techniques.

Once the data was cleaned and coded, descriptive statistics were computed to summarize the general characteristics and patterns within the dataset. This included Frequencies and percentages to describe the distribution of categorical variables such as business sector, size, and ownership type and means and standard deviations to measure central tendencies and variability of continuous variables, especially those related to perceived benefits, technological literacy, top management support, and competition. Descriptive statistics provided a snapshot of the data, helping to understand the demographic and operational profile of the sampled family-owned SMEs in Nairobi County. This foundation was critical for contextualizing the findings and setting the stage for deeper inferential analysis.

The data analysis process began with data cleaning, where the collected questionnaires were reviewed to identify and address any errors or incompleteness, ensuring that only valid and reliable data was used in the analysis. Missing or unclear responses were handled using appropriate techniques, such as imputing missing values or excluding incomplete entries if necessary. Next, the data was coded, and qualitative responses were converted into numerical or categorical data for easy analysis. Coding ensured uniformity and facilitated the application of statistical techniques.

Following the descriptive analysis, inferential statistics were employed to test the relationships hypothesized in the study's conceptual framework. Specifically, the study utilized multiple linear regression analysis to examine the influence of four independent variables—perceived benefits, technological literacy, top management support, and competition—on the dependent variable, technology adoption. The following regression model was employed:

$$Y = \beta_0 + \beta_1 Benefits + \beta_2 Literacy + \beta_3 Support + \beta_4 Competition + \varepsilon$$

β_0 is the intercept.

β_1, β_2, β_3, β_4 are the coefficients representing the effects of perceived benefits, technological literacy, top management support and competition.

ε_{it} is the error term.

3.9 Diagnostic Tests

Several diagnostic tests were performed to guarantee the robustness and validity of the statistical analyses conducted in this investigation. These tests included normality, multicollinearity, and heteroskedasticity tests, each addressing different aspects of data quality and model assumptions.

3.9.1 Normality

The Shapiro-Wilk examination was used to determine whether the data dispersion was regular (Field, 2013). The Shapiro-Wilk test was particularly effective for small to moderate sample sizes. It will help determine whether the information is substantially different from a typical dispersion. For normally distributed data, the remainder of the inferential models should also approximate a normal distribution, ensuring valid inference and hypothesis testing.

3.9.2 Multicollinearity

Tolerance thresholds and Variance Inflation Factor (VIF) measurements were used to evaluate multiple correlations. VIF values above 10 or tolerance levels below 0.1 indicate problematic multicollinearity, suggesting that some predictors are extremely connected with one another

(Kutner et al., 2004). Multiple correlations must be addressed to guarantee that the regression coefficients are estimated accurately and to avoid issues with interpretation.

3.9.3 Heteroskedasticity

Levine's test was employed to test for heteroskedasticity. This test checked if the leftovers' variance remained consistent at every level of the separate variables. If heteroskedasticity is detected, robust standard errors would have been used to adjust for the unequal variance, thereby improving the reliability of the regression estimates.

3.10 Ethical Considerations

Ethical considerations were paramount in this study as it ensured that research practices upheld the highest integrity and respect for participants. Before data collection, the university's ethics review board was consulted for approval, and permission was obtained from NACOSTI for the investigation. Informed consent was secured from every participant, guaranteeing they were thoroughly informed about the study's goals, methods, and rights, including the freedom to discontinue participation at any moment without incurring fees. Privatizing comments and safely storing information ensured anonymity to prevent unauthorized access. In addition, the study ensured that no personal or sensitive information was disclosed without explicit permission, adhering to ethical guidelines for conducting research involving human subjects (Creswell, 2014; Neuman, 2014).

3.11 Chapter Summary

This chapter outlines the research methodology used to investigate the factors affecting the uptake of technology by SMEs in Kenya. A descriptive research design was adopted, with a stratified random sample of 399 family-owned SMEs selected for the study. Data was collected using a quantitative approach, adopting a structured questionnaire. The research procedures ensured the reliability and validity of the data, while data analysis employs both descriptive and inferential statistical techniques and thematic analysis.

Chapter Four: Presentation of Research Findings

4.1 Introduction

The present chapter outlines the study's outcomes. It is structured into five main sections: the demographic profile of the people surveyed, descriptive analysis of key study variables, diagnostic tests, inferential analysis, and interpretation of findings. The results are analyzed and interpreted to provide insights into the factors affecting technology uptake among family-owned SMEs in Nairobi. The discussions are linked to relevant theories and previous research to contextualize the findings.

4.2 Response Rate

The response rate is a critical factor in determining the reliability and validity of a study. The response pool is more diverse, and there is less chance of non-response bias when the response rate is high (Baruch & Holtom, 2008). Table 4.1 presents the study's response rate, showing that out of the targeted 399 people surveyed, 283 successfully participated, yielding a response rate of 70.9%. The remaining 116 people surveyed (29.1%) did not participate for various reasons, including unavailability or unwillingness to respond.

Table 4.1: Response Rate

	n	**%**
Response	283	70.9
Non-response	116	29.1
Total	**399**	**100.0**

Source: Research Data (2025)

A response rate of 70.9% is considered satisfactory for survey research. According to Babbie (2020), a response rate greater than 50% is considered appropriate for conducting analytical operations, while a rate above 70% is considered very good and ensures meaningful generalizability. Similarly, Mugenda and Mugenda (2003) suggest that a rate of reaction of 60% and greater is adequate for social science research. Given this benchmark, the response rate in this study is robust and allows for reliable statistical inferences.

This study's high feedback rate can be ascribed to applying the drop-and-pick method for questionnaire administration, facilitating better engagement with the people surveyed. Further, follow-up efforts, such as reminders and clarifications provided to the people surveyed, likely improved participation. The acceptable response rate ensures that this study's findings are reflective of the broader population of family-owned SMEs in Nairobi and can be used to draw valid conclusions about technology adoption trends in this sector.

4.3 Demographic Profile

The demographic profile of the people surveyed provides essential background information about the characteristics of the study sample. This part of the report presents data on the people surveyed' age, position in the business, years with the business, level of education, size of the organization, and years of business operation. Understanding these demographics helps contextualize the findings and assess their representativeness within the broader population of family-owned SMEs in Nairobi. The results are analyzed and discussed in line with the existing literature.

4.3.1 Response by Age

As per Figure 4.1, the outcomes indicate that most of the people surveyed fall within the 36-55 age range, with 36.7% in the 46-55 bracket and 28.3% in the 36-45 bracket. Only 9.9% of the people surveyed are below 35, while 25.1% are 56 years and above. These findings speak to previous studies that suggest that older business owners and managers are more involved in decision-making, particularly in family-owned businesses, where leadership is often passed down through generations (Chrisman et al., 2018). The relatively lower participation of younger individuals may indicate delayed succession planning or generational gaps in technology adoption (Zellweger, 2017).

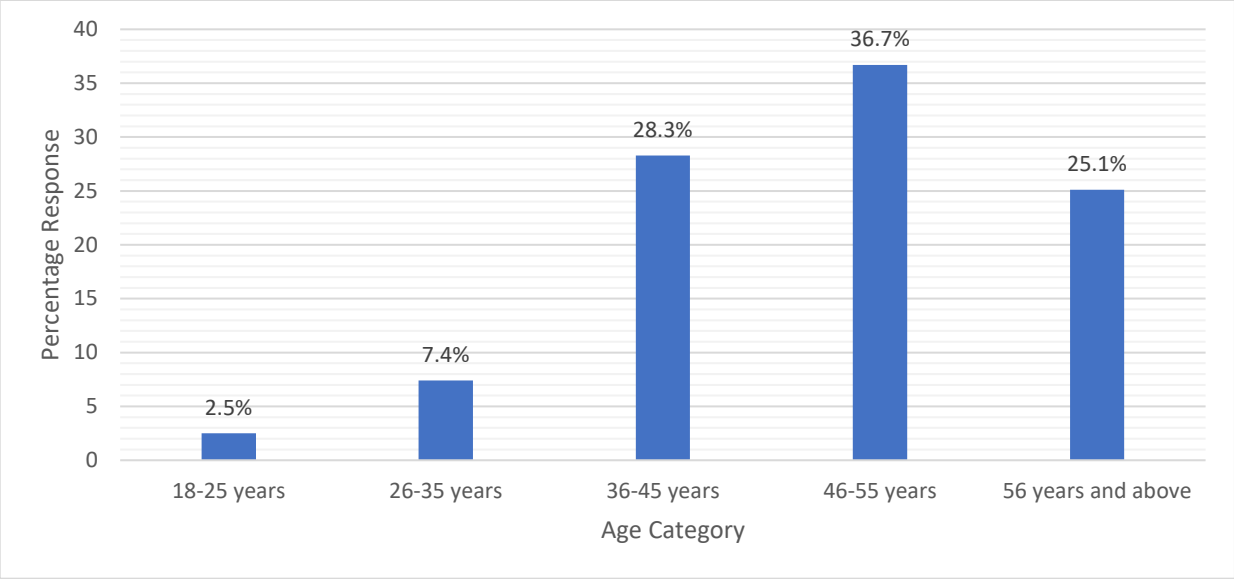


Figure 4.1: Response by Age
Source: Research Data (2025)

4.3.2 Response by Position

As per Figure 4.2, the study reveals that 54.1% of the people surveyed are managers, while 45.9% are business owners. This speaks to research by Sirmon and Hitt (2003), which suggests that in family-owned businesses, while ownership is often retained within the family, professional managers may be appointed to oversee operations, especially in more structured SMEs. The presence of managers as key decision-makers highlights the importance of managerial competencies in influencing the uptake of technology within family firms.

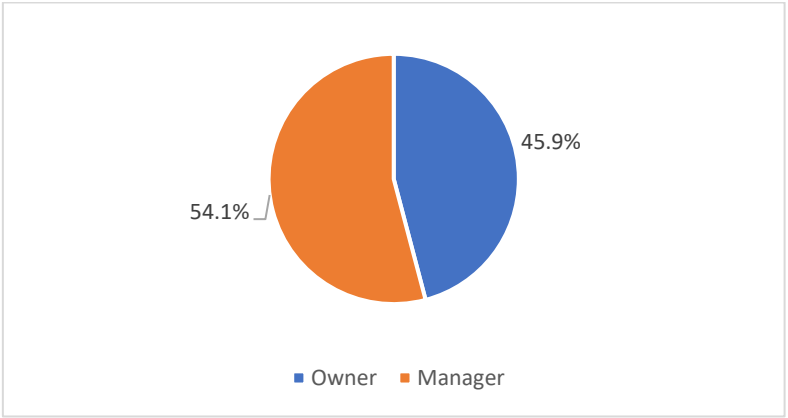


Figure 4.2: Response by Position
Source: Research Data (2025)

4.3.3 Number of Years with the Business

Outcomes as per Figure 4.3, a most of the people surveyed (79.5%) have been with the business for over 7 years, with 41.0% having 7-9 years of experience and 38.5% having 10 years or more. This suggests that most decision-makers have substantial industry experience, which could positively influence their willingness to adopt new technologies (Rogers, 2003). However, as highlighted by Duh (2012), long tenure in family businesses can also lead to resistance to change, particularly in adopting new technologies.

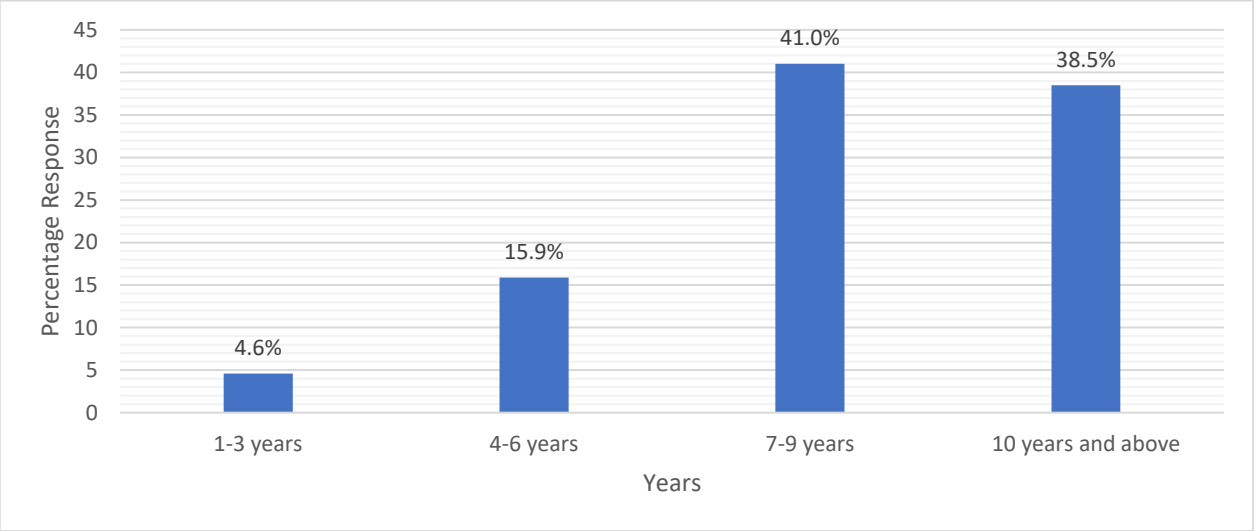


Figure 4.3: Duration
Source: Research Data (2025)

4.3.4 Level of Education

As displayed in Figure 4.4, the most of the people surveyed have at least a bachelor's degree (45.6%), while 24.7% hold a master's degree. Only 4.6% have a secondary education level. This finding speaks to previous research indicating that education positively correlates with technology adoption, as higher education levels are associated with better technological literacy and openness to innovation (Al-Qirim, 2007). Moreover, previous studies suggest that SME owners with advanced education levels are more likely to implement strategic changes, including technology integration (Fadahunsi, 2012).

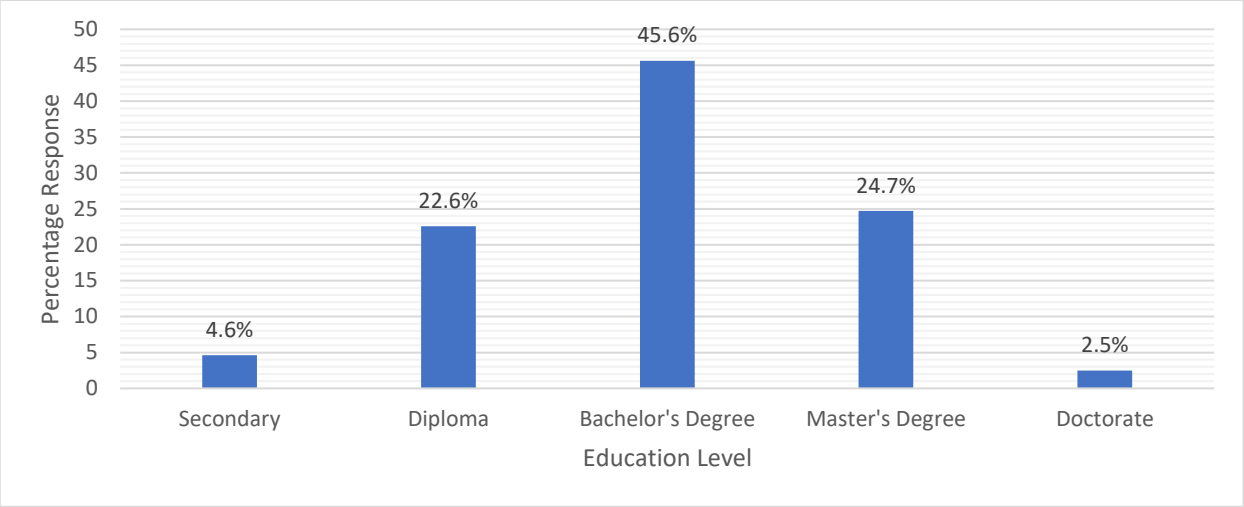


Figure 4.4: Academic Level
Source: Research Data (2025)

4.3.5 Size of Organization (Number of Employees)

Most of the surveyed family-owned SMEs (63.3%) fall within the 10-49 employee category, while 30.4% have 50-99 employees. Only 6.4% have fewer than 10 employees. This distribution speaks to the Kenyan SME classification, which defines small enterprises as having 10-49 employees and medium-sized enterprises as having 50-99 employees (KIPPRA, 2020). Firm size has been identified as a critical determinant of technology adoption, with larger SMEs more likely to invest in digital transformation due to resource availability (Arendt, 2008).

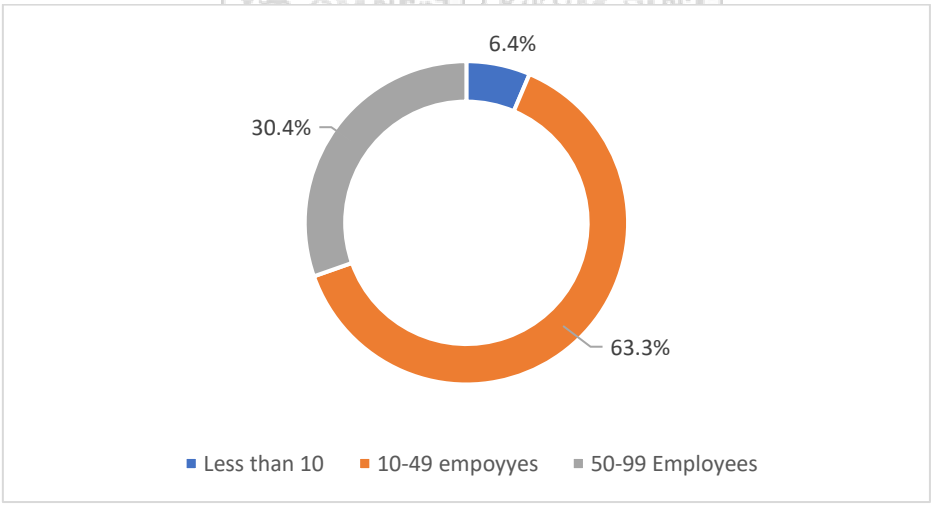


Figure 4.5: Size of Organization (Number of Employees)
Source: Research Data (2025)

4.3.6 Years of the Business has Been in Operation

The findings show that 81.6% of the businesses have been in operation for over 10 years, with 41.0% having been active for 16 years or more. This suggests that most businesses in the sample are well-established, which could influence their approach to technology adoption. Established businesses often have the financial and managerial capacity to invest in technological innovations but may also face structural inertia that limits rapid adoption (Tornatzky & Fleischer, 1990).

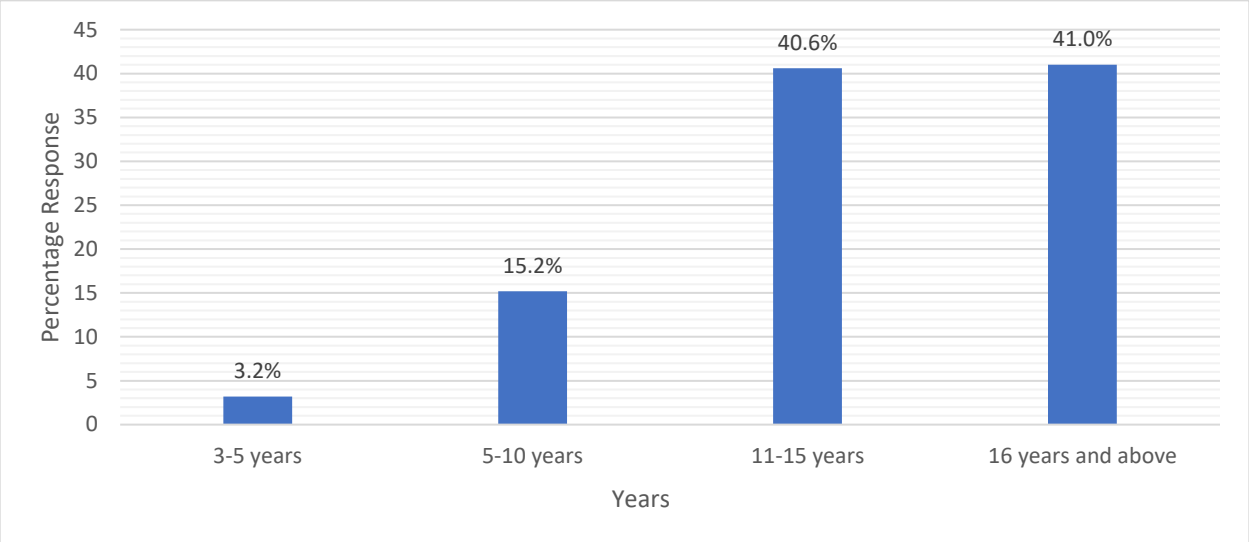


Figure 4.6: Years the Business has Been in Operation
Source: Research Data (2025)

4.4 Descriptive Analysis

This part of the report presents a summary of the key characteristics of the attributes in this investigation, offering insights into the patterns and trends observed among family-owned SMEs in Kenya. It provides an overview of the business characteristics, and the extent to which they perceive competition, benefits, technology literacy, and top management support as having a bearing on the uptake of technology.

4.4.1 Perceived Benefits of Technology Adoption

The study set out to establish the influence of perceived benefits on the adoption of technology by family-owned SMEs in Kenya. The people surveyed were thus asked to rate their respective levels

of affirmation or disapproval with items posed in relation to perceived benefits of technology adoption. Feedback was given along a scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree." Table 4.2 lays out the outcomes.

Table 4.2: Perceived Benefits

	Mean	Std. Dev
The use of technology in our business processes has significantly reduced the time required to complete tasks	3.816	.534
Technology has streamlined our operational workflows, leading to faster completion of routine activities	3.350	.809
Our technology tools enable us to manage and process information more efficiently compared to traditional methods	3.703	.655
Technology adoption has increased the overall productivity of our employees	3.675	.630
We have observed a notable improvement in work output and efficiency as a result of integrating technology into our operations	3.583	.681
The use of advanced technology tools has allowed us to achieve more tasks in a shorter amount of time	3.293	.711
Technology has improved the quality of service we provide to our customers	3.823	.495
Our customers are more satisfied with our services due to the technological enhancements in our business operations	3.583	.632
Adopting new technologies has given us a competitive edge over other businesses in our industry	3.530	.670
Technology has enabled us to offer unique products or services that differentiate us from our competitors	3.244	.795
Overall	3.560	0.661

Source: Research Data (2025)

As per Table 4.2, the outcomes indicate that the people surveyed generally perceive technology adoption as beneficial to their business operations. The overall mean score of 3.560 (SD=0.661) suggests a positive but moderate perception of the benefits of technology adoption among family-owned SMEs. While respondents generally agreed that technology enhances business operations, the ratings indicate room for growth in awareness and exploitation of full technological potential. The highest-rated statement was "Technology has improved the quality of service we provide to our customers" (Mean = 3.823, SD = 0.495), suggesting that technology is crucial in enhancing customer service delivery. This finding speaks to prior studies that emphasize the importance of technology in improving customer experiences and service quality (Tajudeen et al., 2019).

Similarly, "The use of technology in our business processes has significantly reduced the time required to complete tasks" had a mean score of 3.816 (SD = 0.534), indicating that SMEs recognize time efficiency as a key benefit of technology. This speaks to Rogers' Diffusion of Innovations Theory (1995), which posits that organizations adopt technology when they perceive it as helpful in improving operational efficiency. Further, statements related to productivity and workflow efficiency also received high ratings. For example, "Technology adoption has increased the overall productivity of our employees" had a mean of 3.675 (SD = 0.630). In contrast "Our technology tools enable us to manage and process information more efficiently compared to traditional methods" had a mean of 3.703 (SD = 0.655). These results speak to the Technology Acceptance Model (Davis, 1989), which suggests that perceived usefulness significantly influences an organization's decision to adopt technology.

Overall, these results reveal a cautiously optimistic stance towards technology adoption within family-owned SMEs. While there is a general consensus on the benefits, especially concerning customer service and time efficiency, the moderate overall mean suggests that some businesses may still be underutilizing the full potential of technological advancements.

4.3.2 Technology Literacy

The study also sought to determine the influence of technological literacy on the adoption of technology by family-owned SMEs in Kenya. To this end, the people surveyed were asked to rate their respective levels of affirmation or disapproval with items posed concerning technological literacy. Feedback was given along a scale: “1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly agree.” Table 4.3 lays out the outcomes.

Table 4.3: Technology Literacy

	Mean	Std. Dev
I am comfortable using various software applications on my computer	3.187	1.281
I can troubleshoot and resolve common computer issues independently	3.421	1.281
I am proficient in performing essential tasks such as file management and software installation on my computer	3.396	1.196
I can efficiently search for and retrieve information from the Internet	3.474	1.212
I am skilled at using online tools and platforms to enhance my work processes	3.961	1.066
I can use online communication tools (e.g., email, chat) effectively for professional purposes	4.021	1.017
I am adept at using digital productivity tools (e.g., spreadsheets, word processors) to complete tasks	3.735	1.122
I can integrate various digital tools and software to improve workflow and productivity	3.852	1.194
I am knowledgeable about using digital tools for data analysis and reporting	3.845	1.110
I am confident in utilizing digital collaboration tools (e.g., project management software, cloud storage) to work with others	3.156	1.426
Overall	3.605	1.191

Source: Research Data (2025)

The outcomes as per Table 4.3 suggest a moderate to high level of technological literacy among the people surveyed. The overall mean score of 3.605 (SD=1.191) suggests a moderate to moderately high level of technological literacy among owners and managers of family-owned SMEs in Nairobi County. This indicates that while a majority of respondents are relatively confident in basic and intermediate digital skills, there are still noticeable gaps in advanced and collaborative technology use. The highest-rated statement, "I can use online communication tools (e.g., email, chat) effectively for professional purposes" (Mean = 4.021, SD = 1.017), indicates that most the people surveyed are proficient in using digital communication tools for business interactions. This finding speaks to previous research that highlights the role of online communication in improving SME efficiency and customer engagement (Cruz-Jesus et al., 2018).

Similarly, the people surveyed demonstrated confidence in using online tools to enhance work processes (Mean = 3.961, SD = 1.066) and digital productivity tools such as spreadsheets and word processors (Mean = 3.735, SD = 1.122). These findings speak to the Technology Acceptance Model (Davis, 1989), which posits that familiarity and ease of use influence an individual's

willingness to adopt technology. However, some aspects of technological literacy remain relatively low. The statement "I am comfortable using various software applications on my computer" had a lower mean (3.187, SD = 1.281), suggesting that some SME owners and managers still struggle with software usage. Similarly, "I am confident in utilizing digital collaboration tools (e.g., project management software, cloud storage) to work with others" had a mean score of 3.156 (SD = 1.426), indicating a gap in the adoption of collaborative digital platforms. This supports the argument by Rahayu and Day (2017) that SMEs often underutilize advanced digital tools due to limited skills and exposure.

In summary, while the respondents have a solid foundation of basic digital skills, there is a clear need to enhance proficiency in more advanced technological applications, particularly those related to software usage and collaborative tools. Addressing these gaps could significantly improve family-owned SMEs' digital integration and operational efficiency.

4.3.3 Top Management Support

The study further sought to examine the influence of top management support on the adoption of technology by family-owned SMEs in Kenya. In this regard, the people surveyed were asked to rate their respective levels of affirmation or disapproval with items posed in relation to top management support. Feedback was given along a scale: “1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree.” Table 4.4 lays out the outcomes.

Table 4.4: Top Management Support

	Mean	Std. Dev
Top management provides a clear vision and strategic goals for the organization's technology adoption	3.647	1.213
The technology strategy speaks to the overall strategic objectives of the organization	3.799	1.107
Top management actively communicates the importance of technology in achieving organizational goals	4.163	1.046
Adequate financial resources are allocated for the acquisition and implementation of new technologies	3.894	1.067
The organization invests in necessary technology infrastructure to support its operations	4.050	.948
Sufficient time and personnel are allocated to technology-related projects and initiatives	3.915	.960

Top management fosters an organizational culture that encourages the use of new technologies	4.166	.894
There is a positive attitude towards technology adoption and innovation within the organization	3.919	1.023
Top management provides necessary training and support to employees for effective technology use	4.410	.864
The organization promotes a collaborative environment where employees are encouraged to share ideas about technology improvements	3.449	.942
Overall	3.941	1.006

Source: Research Data (2025)

The results suggest strong top management support for technology adoption in family-owned SMEs, with several indicators scoring above the neutral mark (mean > 3.5). The overall mean score of 3.941 reflects a high level of top management support for technology adoption in family-owned SMEs. This suggests that in most of the sampled enterprises, senior leadership plays an active and positive role in promoting technological advancement. The responses indicate that management not only sets the strategic tone for adoption but also provides the resources and cultural environment necessary for digital transformation to occur. The highest-rated statement, "Top management provides necessary training and support to employees for effective technology use" (Mean = 4.410, SD = .864), highlights a significant emphasis on capacity building. This finding speaks to previous studies that emphasize the role of training in overcoming technological barriers in SMEs (MacGregor & Vrazalic, 2005). In addition, "Top management fosters an organizational culture that encourages the use of new technologies" (Mean = 4.166, SD = .894) and "Top management actively communicates the importance of technology in achieving organizational goals" (Mean = 4.163, SD = 1.046) indicate that leadership commitment is evident in most organizations.

These findings speak to the Diffusion of Innovations Theory (Rogers, 2003), which states that the successful adoption of technology is largely influenced by organizational culture and the role of change agents, such as top management. On the other hand, some aspects of top management support were rated slightly lower. The statement "The organization promotes a collaborative environment where employees are encouraged to share ideas about technology improvements" had the lowest mean (3.449, SD = .942). This suggests that while management supports technology adoption, collaborative innovation efforts are relatively weaker. Prior research by Premkumar and

Roberts (1999) highlights that effective collaboration and feedback mechanisms are essential for optimizing technology integration in SMEs.

4.3.4 Competition

The study further set out to evaluate the influence of competition on the adoption of technology by family-owned SMEs in Kenya. The people surveyed were thus asked to rate their respective levels of affirmation or disapproval with items posed in relation to competition. Feedback was given along a scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree." Table 4.5 lays out the outcomes.

Table 4.5: Competition

	Mean	Std. Dev
The number of competitors in my industry significantly influences our technology adoption decisions	2.134	1.290
Increased competition within the industry pressures us to adopt new technologies	2.689	1.517
The presence of numerous competitors has led us to prioritize technology upgrades	3.258	1.514
Our competitors' rate of technology adoption affects our own technology investment decisions	2.110	1.274
Keeping up with the technological advancements adopted by competitors is crucial for maintaining market position	2.385	1.309
Observing rapid technological advancements among competitors motivates us to enhance our technology capabilities	2.450	1.198
Our customers' expectations drive our need to adopt the latest technology	2.449	1.350
The demand for innovative technology from our customers influences our technology adoption strategies	2.505	1.335
Meeting customer expectations for technological capabilities is a key factor in our decision to invest in new technology	2.262	1.259
High customer expectations for technology performance impact our choice of technological solutions	2.520	2.187
Overall	2.476	1.423

Source: Research Data (2025)

The outcomes are apparent that competition has a relatively weak influence on technology adoption among family-owned SMEs in Kenya, with most mean scores falling below 3.0. The overall mean score of 2.476 indicates that competition exerts a relatively weak influence on the technology adoption decisions of family-owned SMEs in Nairobi County. Most of the statements

recorded mean scores below the neutral midpoint (3.0), suggesting that competitive pressure—whether from industry peers or customer demands—is not a primary motivator for these businesses to invest in or upgrade their technological capabilities. The highest-rated statement, "The presence of numerous competitors has led us to prioritize technology upgrades" (Mean = 3.258, SD = 1.514), suggests that some SMEs feel a moderate need to modernize their technological infrastructure due to competitive forces. However, since this score remains slightly above the neutral point, it can be inferred that such competitive influence is limited and not broadly acknowledged across the sector. In contrast, the lowest-rated statement, "Our competitors' rate of technology adoption affects our own technology investment decisions" (Mean = 2.110, SD = 1.274), suggests that most businesses do not directly base their technology investment decisions on what competitors are doing. This finding speaks to studies by Hwang et al. (2016), which found that SMEs in developing economies often prioritize internal business needs and resource availability over external competitive pressures when adopting new technologies.

These results suggest that, for family-owned SMEs in this context, the decision to adopt technology is primarily internally driven rather than influenced by competitive factors. As such, strategies aimed at increasing technology adoption should focus more on highlighting internal efficiency gains and resource optimization rather than emphasizing competitive pressures.

4.3.5 Technology Adoption

The study sought to assess technology adoption. To this end, the people surveyed were further asked to rate their respective level of affirmation or disapproval with items posed in relation to technology adoption as applies to their respective businesses. Please utilize the scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree." Table 4.6 lays out the outcomes.

Table 4.6: Technology Adoption

	Mean	Std. Dev
Our organization has adopted advanced hardware systems to improve operational efficiency	3.919	1.408
The latest hardware technology significantly enhances our company's performance	3.905	1.235
We invest in up-to-date hardware to ensure compatibility with industry standards	3.117	1.428
The quality and reliability of our hardware have positively impacted our business operations	3.887	1.152
Upgrading hardware is a priority for us to keep pace with technological advancements	4.280	2.006
We have implemented the latest software solutions to streamline our business processes	3.601	1.197
Our choice of software is driven by its ability to enhance productivity and efficiency	3.438	1.280
The integration of new software has led to measurable improvements in our business performance	3.919	1.317
We regularly update our software to ensure it meets current industry requirements	3.689	1.351
Adopting advanced software solutions has provided us with a competitive edge in the market	4.163	1.417
Overall	3.792	1.379

Source: Research Data (2025)

The outcomes are apparent: a moderate to high level of technology adoption among family-owned SMEs in Kenya, with most mean scores between 3.1 and 4.3. The overall mean score of 3.792 indicates a moderate to high level of technology adoption among the surveyed family-owned SMEs. This score reflects a generally positive attitude toward digital transformation, with evidence of ongoing investment in hardware and software systems to improve operational efficiency and competitiveness. The highest-rated statement, "Upgrading hardware is a priority for us to keep pace with technological advancements" (Mean = 4.280, SD = 2.006), suggests that many SMEs recognize the importance of maintaining updated hardware. Similarly, "Our organization has adopted advanced hardware systems to improve operational efficiency" (Mean = 3.919, SD = 1.408) and "The latest hardware technology significantly enhances our company's performance" (Mean = 3.905, SD = 1.235) reinforce the finding that hardware investment is seen as a driver of operational efficiency. However, "We invest in up-to-date hardware to ensure compatibility with

industry standards" received a relatively lower mean (3.117, SD = 1.428), suggesting that not all SMEs prioritize aligning their hardware with industry standards. This could be due to budget constraints or a lack of awareness regarding industry requirements, a challenge previously documented by Oliveira and Martins (2011).

On the software side, "Adopting advanced software solutions has provided us with a competitive edge in the market" received a high mean score (4.163, SD = 1.417), indicating that many SMEs perceive software as a valuable asset in gaining a market advantage. Likewise, "The integration of new software has led to measurable improvements in our business performance" (Mean = 3.919, SD = 1.317) highlights the positive impact of software adoption on business outcomes. However, statements related to regular software updates and productivity-driven software choices received slightly lower means (3.438 - 3.689), suggesting that while software adoption is acknowledged as beneficial, consistent updating and strategic selection may still be challenges. This speaks to previous research by Chau and Tam (1997), which found that SMEs often lack structured IT policies and tend to make reactive rather than proactive technology investments**.**

The results speak to Rogers' (2003) Diffusion of Innovation Theory, which suggests that businesses adopt technology in stages, with early adopters demonstrating higher levels of integration. The study's findings also reflect Tornatzky and Fleischer's (1990) Technology-Organization-Environment (TOE) framework, which highlights technological capability and organizational factors as key determinants of technology adoption in SMEs. However, some differences emerge when compared to findings from developed economies. Studies conducted in the US and Europe indicate that technology adoption is often driven by regulatory compliance and competitive pressure (Venkatesh et al., 2012). In contrast, the present study suggests that family-owned SMEs in Kenya prioritize operational efficiency over external pressures, reinforcing the idea that internal business needs drive technology adoption more than industry trends or competition.

4.4 Diagnostic Tests

Before proceeding with inferential analysis, it is crucial to assess the assumptions underlying parametric tests to ascertain how dependable the study findings are. This part of the report presents three key diagnostic tests—normality, multicollinearity, homogeneity of variances and linearity—

conducted to determine whether the dataset meets the requirements for statistical modeling. These tests are necessary to confirm the suitability of regression analysis and other parametric techniques (Field, 2013).

4.4.1 Test of Normality

Normality testing evaluates whether the data follows a normal distribution, a fundamental assumption for parametric tests such as linear regression and ANOVA (Gujarati & Porter, 2009). In this study, normality was assessed using the Kolmogorov-Smirnov (K-S) and Shapiro-Wilk (S-W) tests, which are commonly used for large and small sample sizes, respectively (Razali & Wah, 2011). Outcomes are apparent in Table 4.7.

Table 4.7: Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Technology Adoption	.054	283	.042	.992	283	.124
Technology Literacy	.215	283	.089	.895	283	.342
Top Management Support	.196	283	.092	.915	283	.373
Competition	.237	283	.091	.889	283	.323

Source: Research Data (2025)

The Kolmogorov-Smirnov test shows that Technology Adoption has a significance level ($p = 0.042$), which is below the conventional 0.05 threshold, suggesting mild deviation from normality. However, the Shapiro-Wilk test for the same variable returns $p = 0.124$, which is above 0.05, indicating that the data is approximately normal (Ghasemi & Zahediasl, 2012). For Technology Literacy, Top Management Support, and Competition, both tests yield significance values above 0.05, confirming that these variables follow a normal distribution (Field, 2013). Since Shapiro-Wilk is preferred for small to moderate sample sizes, and all variables except Technology Adoption meet normality criteria, the data can be considered suitable for parametric analysis (Razali & Wah, 2011).

4.4.2 Test of Multicollinearity

When attributes that are autonomous in the model of regression have a high degree of correlation, it's known as multicollinearity and can cause distortion, the estimated coefficients and leading to unstable statistical inferences (Gujarati & Porter, 2009). To detect multicollinearity, the study utilized Variance Inflation Factor (VIF) and Tolerance values, presented in Table 4.8.

Table 4.8: Test of Multicollinearity

	Tolerance	VIF
Perceived Benefits	.995	1.005
Technology Literacy	.596	1.677
Top Management Support	.735	1.361
Competition	.746	1.341

Source: Research Data (2025)

Tolerance values greater than 0.1 and VIF values below 10 indicate the absence of serious multicollinearity (Hair et al., 2010). The highest VIF is 1.677 (Technology Literacy), which is well below the recommended cutoff of 5, indicating no multicollinearity concerns (O'Brien, 2007). The Tolerance values range between 0.596 and 0.995, further confirming that none of the independent variables are excessively correlated. These results indicate that all predictor variables can be included in the regression model without concerns of redundancy (Tabachnick & Fidell, 2013).

4.4.3 Homogeneity of Variances

The assumption of homogeneity of variances (homoscedasticity) states that the variance of residuals should be constant across all levels of an independent variable in regression analysis (Levene, 1960). This study applied Levene's Test for Equality of Variances, with results presented in Table 4.9.

Table 4.9: Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Perceived Benefits	1.326	18	263	.171
Technology Literacy	1.357	27	249	.119
Top Management Support	1.500	21	258	.077
Competition	1.203	32	245	.219

Source: Research Data (2025)

Levene's test assesses whether group variances are equal; a p-value above 0.05 indicates that variances are not significantly different, meaning the homogeneity assumption is satisfied (Levene, 1960). The significance levels for all four variables (0.077 to 0.219) are above 0.05, confirming that variances are approximately equal across groups. Homoscedasticity is an essential assumption for multiple regression and ANOVA, and these results support the validity of parametric statistical analyses (Field, 2013).

4.4.4 Test of Linearity

Linearity is a fundamental assumption in multiple regression analysis, indicating there is a linear pattern in the interaction between the two kinds of variables (Hair et al., 2010). In this study, a scatterplot was used to visually assess linearity. Outcomes as per Figure 4.7, the scatterplot demonstrated a linear spread of data points, indicating that the assumption of linearity was not violated. The attributes thus exhibit a proportional relationship, making linear regression an appropriate analytical approach.

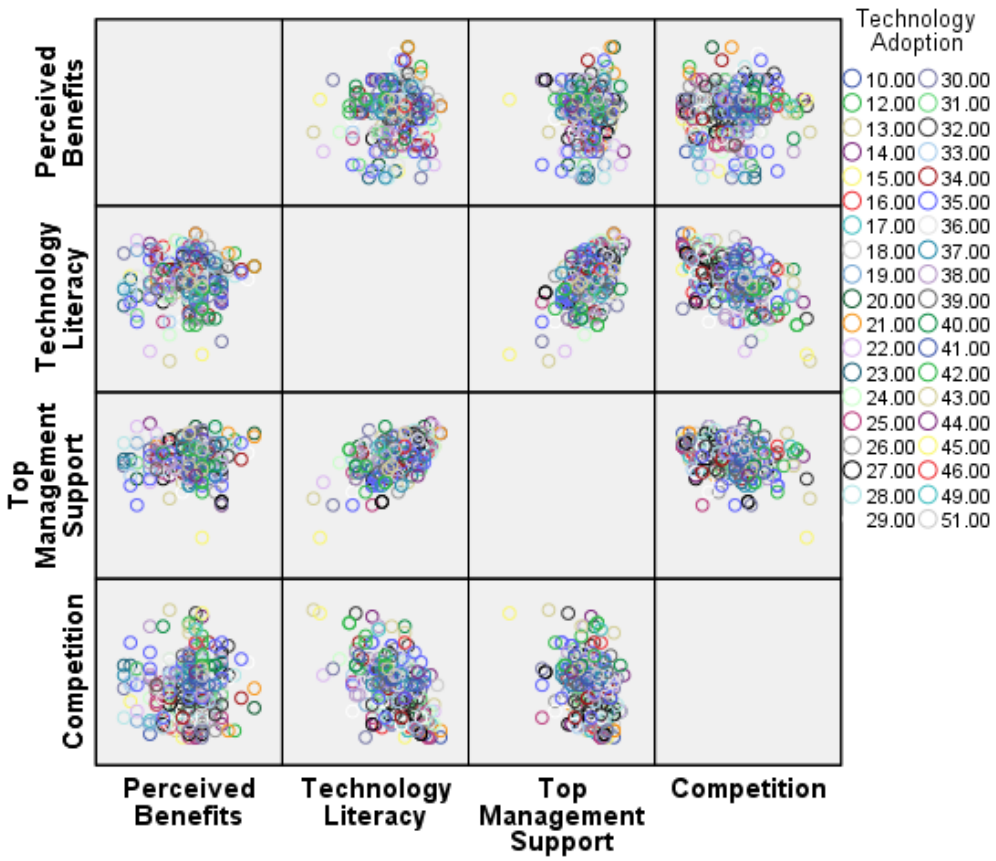


Figure 4.7: Test of Linearity
Source: Research Data (2025)

A linear pattern in the scatterplot confirms that changes in independent variables correspond proportionally to changes in the dependent variable (Field, 2013). This is a key assumption for ordinary least squares (OLS) regression, which assumes a linear relationship between predictor and outcome variables (Gujarati & Porter, 2009). The presence of linearity in the dataset enhances the reliability of the regression model, ensuring that coefficient estimates accurately reflect the relationship between technology adoption and its predictors (Cohen et al., 2013).

4.5 Pearson Correlation Analysis

Pearson correlation analysis measures the strength and direction of linear relationships between variables (Field, 2013). This statistical technique helps assess whether independent variables significantly correlate with the dependent variable, i.e., technology adoption and the relationship

among independent variables (Tabachnick & Fidell, 2013). Table 4.10 presents the Pearson correlation coefficient (R-values) between Technology Adoption, Perceived Benefits, Technology Literacy, Top Management Support, and Competition. The significance levels (p-values) determine whether the correlation is statistically significant. This study's correlations with p-values ≤ 0.05 are considered significant at the 95% confidence level.

Table 4.10: Pearson Correlation Analysis

		Technology Adoption	Perceived Benefits	Technology Literacy	Top Management Support	Competition
Technology Adoption	r	1	.104	-.365**	-.245**	.601**
	Sig. (2-tailed)		.081	.000	.000	.000
	N	283	283	283	283	283
Perceived Benefits	r	.104	1	.043	.013	.027
	Sig. (2-tailed)	.081		.471	.825	.655
	N	283	283	283	283	283
Technology Literacy	r	-.365**	.043	1	.514**	-.501**
	Sig. (2-tailed)	.000	.471		.000	.000
	N	283	283	283	283	283
Top Management Support	r	-.245**	.013	.514**	1	-.284**
	Sig. (2-tailed)	.000	.825	.000		.000
	N	283	283	283	283	283
Competition	r	.601**	.027	-.501**	-.284**	1
	Sig. (2-tailed)	.000	.655	.000	.000	
	N	283	283	283	283	283

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

Source: Research Data (2025)

The results of the Pearson correlation analysis in Table 4.10 reveal several significant relationships between the study variables and technology adoption among family-owned SMEs. Most notably, competition exhibited a strong and statistically significant positive correlation with technology adoption ($r = .601$, $p < .01$), suggesting that as competitive pressure increases, so does the likelihood of adopting new technologies—a finding that reinforces the idea that market forces can

act as a catalyst for digital transformation in this context. Conversely, technology literacy showed a significant negative correlation with technology adoption ($r = –.365$, $p < .01$), which is counterintuitive and may suggest that while employees or management may possess technical skills, this does not necessarily translate into adoption—potentially due to resource constraints, strategic misalignment, or overreliance on manual systems despite digital familiarity.

Similarly, top management support was also negatively correlated with technology adoption ($r = –.245$, $p < .01$), indicating a potential disconnect between leadership intentions and actual implementation, possibly due to limited investment follow-through or competing business priorities. Interestingly, perceived benefits had a weak and non-significant correlation with technology adoption ($r = .104$, $p = .081$), implying that although SMEs may acknowledge the advantages of technology, this perception alone does not significantly influence adoption behavior. These findings reflect the complex interplay of internal and external factors and underscore the need for deeper investigation into why supportive environments and digital capabilities may not always lead to adoption, particularly in the nuanced context of family-owned businesses.

4.6 Regression Analysis

The extent to which competition, perceived benefits, top management support, and technology literacy influence technology adoption among family-owned SMEs in Kenya was determined using regression. The results of the model summary, ANOVA, and regression coefficients are hereto presented.

Table 4.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.615[a]	.378	.369	6.29265

a. Predictors: (Constant), Competition, Perceived Benefits, Top Management Support, Technology Literacy

Source: Research Data (2025)

The model summary in Table 4.11 shows that the coefficient of determination ($R^2 = 0.378$) indicates that approximately 37.8% of the variance in technology adoption can be explained by competition, perceived benefits, top management support, and technology literacy. The adjusted R^2 value (0.369) confirms that after adjusting for the number of predictors, the explanatory power

of the model remains substantial. The R value (0.615) suggests a moderately strong relationship between the predictors and technology adoption.

Table 4.12: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6695.871	4	1673.968	42.275	.000[b]
	Residual	11008.094	278	39.597		
	Total	17703.965	282			

a. Dependent Variable: Technology Adoption

b. Predictors: (Constant), Competition, Perceived Benefits, Top Management Support, Technology Literacy

Source: Research Data (2025)

According to Table 4.12's ANOVA results, the model of regression is statistically noteworthy ($F = 42.275$, $p < 0.001$), meaning that the combination of competition, perceived benefits, top management support, and technology literacy provides a significantly better prediction of technology adoption than a model with no predictors.

Table 4.13: Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	15.239	5.131		2.970	.003
	Perceived Benefits	.198	.102	.093	1.955	.050
	Technology Literacy	-.076	.073	-.064	-1.039	.300
	Top Management Support	-.091	.086	-.058	-1.047	.296
	Competition	.524	.052	.551	10.054	.000

Source: Research Data (2025)

Table 4.13 provides insight into the individual effects of each predictor on technology adoption. Competition ($\beta = 0.551$, $p < 0.05$) has a strong and statistically significant positive effect on technology adoption. This suggests that as competition intensifies, SMEs are more likely to invest in new technologies to remain competitive. The positive and marginally significant effect of perceived benefits ($\beta = 0.093$, $p = 0.050$) on technology adoption suggests that perceived benefits also contribute to technology adoption. While its impact is weaker than competition, businesses

that recognize the advantages of technology are more inclined to adopt it. The negative but statistically insignificant effect of Technology Literacy (β = -0.064, p = 0.300) on technology adoption suggests that technology literacy does not have a direct effect on technology adoption. The weak and statistically insignificant negative effect of top management support (β = -0.058, p = 0.296) on technology adoption suggests that managerial involvement alone is not a strong predictor. In some cases, managerial oversight may introduce bureaucracy, delaying technology adoption. The model can thus be fitted as follows:

Y = 15.239 + .093 (Perceived Benefits) + -.064 (Technology Literacy) + -.058 (Top Management Support) + .551 (Competition) + 5.131

4.7 Chapter Summary

This chapter examines the influence of perceived benefits, top management support, technology literacy, and competition on technology adoption among family-owned SMEs in Nairobi County. Achieving a response rate of 70.9%, the study guarantees a representative sample and the reliability of its findings. The results demonstrate that competition and perceived benefits significantly and positively impact technology adoption. In contrast, when considered independently, top management support and technology literacy do not sufficiently drive technology adoption in family-owned SMEs. Descriptive analysis indicates that internal business requirements are more influential in motivating technology adoption than external pressures. The regression analysis reveals that the model accounts for approximately 37.8% of the variance in technology adoption. The chapter concludes that competition exerts the most substantial positive effect on technology adoption.

Chapter Five: Discussions, Conclusion and Recommendations

5.1 Introduction

This chapter presents a summary of the study's key findings, drawing conclusions based on the results and providing recommendations for policy, practice, and future research. The study aimed to examine the factors having a bearing on the uptake of technology among family-owned SMEs in Kenya, focusing on competition, perceived benefits, technology literacy, and top management support. The chapter synthesizes the results, highlighting the most significant drivers of technology adoption, and offers practical insights for SMEs, policymakers, and stakeholders seeking to enhance technological integration in the sector. It further suggests areas for further research to deepen the understanding of technology adoption dynamics in family-owned businesses.

5.2 Summary of Findings

Perceived benefits and their effects on the adoption of technology by family-owned SMEs in Kenya were studied. Results indicate that the positive and marginally significant effect of perceived benefits on technology adoption suggests that perceived benefits also contribute to technology adoption. While their impact is weaker than competition, businesses that recognize the advantages of technology are more inclined to adopt it. Technological literacy and its effects on the adoption of technology by family-owned SMEs in Kenya. Results indicate that the negative but statistically insignificant effect of technology literacy on technology adoption suggests that technology literacy does not have a direct effect on technology adoption.

The study further sought to examine the influence of top management support on the adoption of technology by family-owned SMEs in Kenya. The weak and statistically insignificant negative effect of top management support ($\beta = -0.058$, $p = 0.296$) on technology adoption suggests that managerial involvement alone is not a strong predictor. In some cases, managerial oversight may introduce bureaucracy, delaying technology adoption.

The study finally sought to evaluate the influence of competition on the adoption of technology by family-owned SMEs in Kenya. Results indicate that competition ($\beta = 0.551$, $p < 0.05$) has a strong

and statistically significant positive effect on technology adoption. This suggests that as competition intensifies, SMEs are more likely to invest in new technologies to remain competitive.

5.3 Discussions

This part of the report provides an in-depth analysis of the study's findings, linking them to existing literature and theoretical frameworks. The discussion explores the significance of competition, perceived benefits, technology literacy, and top management support in having a bearing on the uptake of technology among family-owned SMEs in Kenya.

5.3.1 Perceived Benefits and Technology Adoption

The study findings reveal that those perceived benefits positively and marginally significantly affect technology adoption among family-owned SMEs. The results suggest that businesses that recognize the advantages of technology—such as operational efficiency, cost savings, and improved customer satisfaction—are more inclined to adopt it. These findings speak to existing literature that points to the role of perceived benefits in shaping technology adoption decisions. According to Tornatzky and Fleischer (2020), organizations adopt technologies primarily when the perceived benefits outweigh the costs. Empirical studies, such as those by Davis (1989) and Kuan and Chau (2021), have operationalized perceived benefits using indicators like increased productivity, improved customer service, and streamlined operations. In the context of family-owned SMEs, this study speaks to previous research by adopting cost savings, operational efficiency, and improved satisfaction of customers as key perceived benefits. Often operating with limited resources, these businesses are likely to weigh these factors carefully before adopting technology.

A mixed-methods study by Tornatzky and Fleischer (2019) on SMEs in the United States found that perceived benefits—including increased efficiency, competitive advantage, and improved customer satisfaction—play a significant role in technology adoption. However, the study did not focus on family-owned SMEs, which may have distinct decision-making processes influenced by generational leadership and resource constraints. The current study extends this knowledge by showing that perceived benefits are still relevant in family-owned businesses, even though their impact is secondary to competitive pressure.

Similarly, Abdullah et al. (2021) explored how perceived usefulness moderates the relationship between entrepreneurial behavior, culture, and technology adoption in SMEs across Malaysia and Nigeria. While the study highlighted the diverse influences on technology adoption across countries, it did not specifically address family-owned SMEs with more nuanced managerial structures. The current study's findings suggest that while perceived benefits play a role, they are not the dominant factor driving adoption, particularly in intensely competitive environments.

A systematic literature review by Zamani (2022) identified 11 influential categories related to technology adoption but noted that the literature is fragmented and lacks a cohesive framework. The study also highlighted that the research predominantly uses desktop review designs, which do not fully capture the regional and contextual factors influencing SMEs' decision-making. This limitation is particularly relevant for family-owned businesses, as their adoption patterns may differ due to long-term strategic outlooks, generational leadership influences, and financial conservatism. The current study filled this gap by providing empirical insights into how perceived benefits influence technology adoption within this business category.

In the Kenyan context, Kimana (2020) explored e-commerce adoption among retail SMEs and found that businesses recognize cost reduction, operational efficiency, and market expansion as key benefits. However, the study narrowly focused on e-commerce, overlooking broader technological adoption trends. The current study builds on these insights by examining perceived benefits across a broader range of technologies, reinforcing that while SMEs acknowledge the advantages of technology, other factors—such as competition—may have a more substantial influence on adoption decisions.

Similarly, Otieno (2015) found that the perceived usefulness of ICT systems positively influenced their adoption among SMEs in Kenya. The study emphasized that businesses are more likely to adopt technology when they can measure its impact on productivity and cost reduction. However, Otieno’s study did not focus on family-owned SMEs, whose adoption decisions may be influenced by additional factors such as succession planning**,** risk aversion, and long-term stability rather than short-term gains.

5.3.2 Technology Literacy and Technology Adoption

The study outcomes show that technology literacy (β = -0.064, p = 0.300) has a negative but statistically insignificant effect on technology adoption, suggesting that technological literacy does not directly influence adoption among family-owned SMEs. This contradicts conventional wisdom that higher technological literacy leads to increased technology adoption, as existing literature suggests. However, it also highlights the context-specific nature of technology adoption, where other factors—such as competition, cost considerations, and managerial support—may dominate.

Zhao et al. (2024) argue that technological literacy is a crucial determinant of technology adoption, particularly in SMEs where resource constraints limit access to skilled personnel. Existing studies operationalize this factor using metrics such as employee familiarity with technology, availability of training programs, and the capacity to troubleshoot technological issues (Venkatesh et al., 2022). The current study measures technology literacy using the proportion of trained employees, management's technological expertise, and access to external technical support—key aspects in family-owned SMEs, where the workforce is typically smaller and may lack formal training. Despite these insights, the study's statistically insignificant findings suggest that merely having technology-literate employees does not guarantee adoption. One possible explanation is that technology adoption is not just about knowledge but also organizational willingness, resource allocation, and strategic priorities.

Almashawreh et al. (2024) explored AI adoption in Jordanian SMEs, emphasizing that employee IT knowledge, managerial commitment, and IT infrastructure significantly impact attitudes toward AI adoption. Their findings show that technology literacy alone is insufficient—other factors, such as managerial commitment and reward systems, influence adoption. This supports the current study's findings that technology literacy does not directly lead to technology adoption in family-owned SMEs unless coupled with strong managerial support and organizational readiness. Similarly, Siyami and Rusmiyatun (2023) found that technological literacy did not directly affect the financial performance of MSMEs in Indonesia. Their study suggests that financial literacy is more dominant in financial performance, while technology literacy may only be impactful when combined with financial inclusion or external support structures. This speaks to the current

findings, indicating that technology literacy alone cannot drive technology adoption unless SMEs perceive clear financial or operational advantages.

The COVID-19 pandemic accelerated technology adoption in many sectors. Mishrif and Khan (2023) found that digitally skilled employees played a critical role in Oman's technology adoption by SMEs, particularly in logistics and supply chain management. However, the study's pandemic-specific context suggests that adoption may have been driven by necessity rather than a direct effect of technological literacy. This raises the question of whether technology literacy influences adoption in crisis scenarios rather than normal business conditions. Similarly, Mabula and Dong (2018) examined the relationship between financial literacy, technology use, and risk management practices in Sub-Saharan Africa. They found that financial literacy enhanced risk management practices, but its impact on record-keeping was insignificant. This speaks to the current study's findings—simply possessing knowledge about technology does not automatically translate into practical adoption, particularly if there are other financial, strategic, or operational barriers.

5.3.3 Top Management Support and Technology Adoption

The study finds that top management support has a weak and statistically insignificant negative effect on technology adoption in family-owned SMEs in Kenya. This suggests that managerial involvement alone is not a strong predictor of technology adoption, contradicting the belief that top management support is a key driver of technological change. In family-owned SMEs, where decision-making is often centralized, and leadership is intertwined with ownership, the assumption has been that management's commitment directly influences adoption. However, the findings of this study challenge this assumption, indicating that other factors, such as financial capacity, technological readiness, and external pressures, may play a more significant role.

Hambrick and Mason's (1984) Upper Echelons Theory posits that organizational outcomes, including technology adoption, are shaped by top leaders' values, experiences, and strategic decisions. Empirical studies often measure top management support through indicators such as financial commitment, involvement in technology-related decision-making, and prioritization of technology in strategic planning (Ifinedo, 2021). The current study operationalized top management support using similar measures, including allocation of funds for technology, direct involvement in adoption decisions, and the establishment of technology-focused policies.

Despite these measures, the outcomes suggest that managerial involvement alone does not necessarily translate into adoption. This suggests that other organizational and external factors may moderate the relationship between top management support and technology adoption, meaning that even if management is supportive, practical barriers—such as financial constraints, lack of infrastructure, or perceived complexity—may hinder implementation.

Empirical research on technology adoption provides a nuanced perspective on the role of top management support. Hasani et al. (2023) studied the adoption of Privacy-Enhancing Technologies (PETs) in Canadian SMEs and found that while managerial readiness positively influenced adoption intent, technological readiness was a stronger predictor. This speaks to the current study's findings—management support alone may not be enough to drive adoption unless technological and financial readiness is also present.

Similarly, Al Busaidi et al. (2019) examined ICT adoption in Omani SMEs. They identified several managerial and environmental barriers, including poor management skills, limited market access, lack of awareness of global trends, outdated technology, and bureaucratic challenges. These barriers suggest that even if top management is willing to support adoption, broader structural and market-related factors may inhibit progress. This supports the current study's findings that top management support does not directly lead to adoption unless complemented by favorable external conditions.

Financial constraints are one of the most significant challenges facing SMEs, particularly in developing economies. Onyedimekwu and Oruan (2023) studied ICT adoption in Nigerian SMEs and found that cost was the most significant barrier. Even among businesses willing to adopt technology, many lacked the financial resources. The study found that 54.1% of SMEs used computers, only 18.9% had corporate websites, and just 13.5% used bulk SMS marketing. These findings suggest that financial realities may overrule managerial intent even if top management supports adoption.

In Kenya, Otieno (2015) found that top management support positively affected ICT adoption in SMEs. However, the study did not focus specifically on family-owned businesses, which often have different decision-making structures. The current study's findings challenge Otieno's

conclusions by suggesting that managerial support alone does not lead to adoption in family-owned SMEs unless supported by other factors such as financial and technological readiness.

5.3.4 Competition and Technology Adoption

The study's outcomes show that competition has a strong and statistically significant positive effect on technology adoption among family-owned SMEs in Kenya. This suggests that SMEs are more likely to invest in new technologies to remain competitive as competition intensifies. These findings speak to Porter's (1980) Competitive Forces Model, which highlights competition as a key external driver of strategic decision-making, including technology adoption.

In competitive environments, SMEs face constant pressure to differentiate themselves, improve efficiency, and enhance customer satisfaction. Unlike large corporations with vast financial resources, family-owned SMEs often operate with limited capital and rely on agility and innovation. Thus, when competitors embrace new technologies such as digital marketing, mobile payments, or automation, SMEs must follow suit to avoid being left behind.

Empirical research has consistently demonstrated the relationship between competitive pressure and technology adoption. Porter and Heppelmann (2024) found that SMEs in the U.S. manufacturing sector invested heavily in advanced technologies, such as automation and the Internet of Things (IoT), in response to industry competition. Similarly, Beck et al. (2020) observed that SMEs in the German technology sector were more likely to adopt cloud computing and data analytics in highly competitive markets. These findings parallel the current study, suggesting that family-owned SMEs in Kenya adopt technology for innovation and as a survival strategy in competitive industries.

Competition also influences SMEs by shaping customer expectations and market trends. In today's digital economy, customers expect businesses to offer seamless digital experiences, including online engagement, digital payments, and fast service delivery. Adebayo and Adesina (2021) noted that SMEs in Lagos, Nigeria, were driven by competitive pressure to adopt digital marketing technologies such as social media marketing and search engine optimization (SEO) to maintain their market visibility. Likewise, Nyaga and Okeyo (2020) found that SMEs in Nairobi embraced mobile technologies such as mobile payments and communication tools due to competitive

pressures. These studies reinforce the notion that SMEs do not merely adopt technology proactively but often do so reactively—to keep up with industry trends and avoid being displaced by competitors.

Beyond competitive survival, technology adoption enables SMEs to enhance efficiency and reduce operational costs. Molla and Licker (2021) studied Ethiopian SMEs. They found that, while competitive pressure significantly influenced e-commerce adoption, businesses still faced barriers such as inadequate infrastructure and a lack of skilled personnel. This suggests that competition alone is not always enough to drive technology adoption—external factors such as financial resources and technical know-how also play a role. The current study acknowledges this complexity, incorporating external economic conditions to provide a more holistic understanding of SME technology adoption in Kenya.

5.4 Conclusion

It is concluded that perceived benefits have a constructive and marginally significant effect on technology adoption among family-owned SMEs in Kenya. While this effect is weaker than that of competition, it is apparent that SMEs that recognize the advantages of technology—such as improved efficiency, cost reduction, and enhanced customer engagement—are more inclined to adopt it. However, the marginal significance suggests that perceived benefits alone may not be a strong enough motivator for adoption unless supported by other enabling factors, such as financial capacity, infrastructure, and external pressures. This highlights the need for SMEs to understand the benefits of technology and have the necessary resources and readiness to implement it effectively.

The study further finds that technological literacy does not directly affect technology adoption among family-owned SMEs in Kenya. The negative but statistically insignificant relationship suggests that knowing technology does not necessarily translate into adoption. This could be due to other limiting factors such as high implementation costs, resistance to change, or lack of alignment between technological skills and business needs. It is possible that while SMEs may have some level of technological awareness, the perceived complexity of integrating new systems, coupled with financial constraints, may deter actual adoption. These findings imply that efforts to enhance technology adoption should go beyond training and literacy programs. Instead, they

should address structural and economic barriers preventing SMEs from leveraging their technological knowledge.

The findings also challenge the conventional belief that top management support is a key driver of technology adoption. The weak and statistically insignificant negative effect of top management support suggests that managerial involvement alone does not guarantee adoption and, in some cases, may even introduce bureaucracy, delaying implementation. This is particularly relevant in family-owned SMEs, where decision-making is often centralized, and leadership is risk-averse. While managerial commitment remains important, it must be complemented by external factors such as market competition, financial incentives, and government support to facilitate meaningful technology adoption. These results suggest that top management should focus on supporting technology adoption in principle and creating a conducive environment for its implementation by ensuring sufficient financial resources and minimizing bureaucratic obstacles.

Finally, the study highlights that competition is the strongest determinant of technology adoption among family-owned SMEs in Kenya. The strong and statistically significant positive effect of competition suggests that as market rivalry intensifies, SMEs must adopt new technologies to enhance productivity, reduce costs, and maintain their competitive edge. This finding points to the role of external pressures in driving technological change, indicating that SMEs are more likely to invest in innovation when they face the risk of losing market share to competitors who have embraced modern technologies. Consequently, policies to enhance technology adoption among SMEs should leverage competitive dynamics by promoting market transparency, access to industry best practices, and incentives for innovation. Encouraging collaboration and knowledge-sharing within industry networks could also help SMEs navigate technological transitions more effectively.

5.5 Recommendations

Based on the findings, this study offers targeted recommendations under three main categories: policy implications, managerial actions, and theoretical contributions, each aimed at addressing the key factors influencing technology adoption among family-owned SMEs in Nairobi County.

5.5.1 Policy Recommendations

The study revealed that competition is the strongest positive driver of technology adoption. Therefore, policymakers should leverage this dynamic by fostering open, competitive, and innovation-driven markets. Government institutions such as the Ministry of Trade and Industry, ICT Authority, and county-level economic development offices should promote competitive benchmarking, digital certification programs, and publicly accessible technology adoption indices to stimulate modernization. In addition: Introduce tax incentives, grants, or low-interest financing schemes specifically targeted at family-owned SMEs investing in hardware and software upgrades; expand access to affordable digital infrastructure, particularly cloud-based systems and mobile platforms tailored to small business contexts; and support the creation of industry-specific innovation hubs, digital marketplaces, and technology-sharing platforms to lower the cost of experimentation and implementation for SMEs. While perceived benefits had only a marginal influence on adoption, policies should aim to raise awareness by embedding digital success case studies into national SME support strategies. Public-private partnerships can fund demonstration projects showcasing how technology improves efficiency, reduces operational costs, and expands market reach.

5.5.2 Managerial Recommendations

From a managerial perspective, although top management support was high in sentiment, it did not significantly translate into adoption outcomes. This suggests a need for more action-oriented leadership within family-owned SMEs. Business owners and leaders should: Develop clear digital strategies aligned with business goals, including defined budgets, timelines, and performance indicators for technology investments; delegate decision-making authority to digitally skilled staff and invest in creating cross-functional teams to drive implementation; and foster a culture of innovation and experimentation, encouraging employees at all levels to propose and test technology-based improvements without fear of failure. In light of the disconnect between technological literacy and adoption, managerial focus should shift from merely training employees to providing access to simplified, business-relevant tools. Managers should also prioritize technology fit in addition to functionality, ensuring adopted systems align with internal capacities, customer needs, and sector-specific realities.

5.5.3 Theoretical Contributions

The study contributes to existing literature by offering a nuanced perspective on the assumption that higher technological literacy or top-level endorsement automatically leads to increased adoption, especially in family-owned SMEs in developing economies. While traditional models such as the Technology Acceptance Model (TAM) and Diffusion of Innovations (DOI) emphasize perceived usefulness and leadership as adoption enablers, this study suggests that in resource-constrained contexts, external market dynamics (as captured in the TOE framework) exert a more substantial influence.

Hence, researchers and theorists should consider updating existing models to include context-specific constraints such as informal decision-making, family dynamics, and resource conservatism—factors uniquely prominent in family-owned enterprises. Further, the study underlines the need for integrative frameworks that combine internal capabilities (like technological literacy) with competitive responsiveness to better predict adoption behavior in similar business environments.

5.6 Limitations of the Study

While this study provides valuable insights into the factors influencing technology adoption among family-owned SMEs in Nairobi County, several limitations should be acknowledged: The study was limited to family-owned SMEs operating in Nairobi County. While Nairobi is a major commercial hub, its infrastructure, access to digital tools, and exposure to competitive markets may differ significantly from other counties in Kenya. As such, the findings may not be fully generalizable to rural or underserved regions where technological constraints are more pronounced. Secondly, while the study targeted all sub-counties within Nairobi County, the response rates were not evenly distributed. This uneven distribution may have introduced some bias, potentially affecting the representativeness of the findings. As such, the conclusions drawn may be more reflective of areas with higher response rates than of Nairobi County as a whole. Thirdly, the study employed a cross-sectional research design, which captures data at a single time. This limits the ability to assess how technology adoption evolves over time or to establish causal relationships between the identified factors and adoption outcomes.

The findings are further based on self-reported responses from SME owners or managers, which may be subject to social desirability bias or recall inaccuracies. Respondents might have overstated their level of technology use or underreported organizational barriers. The study primarily targeted licensed and registered SMEs. Informal family-owned enterprises—a significant portion of Kenya's entrepreneurial ecosystem—were not included, potentially excluding key insights from more resource-constrained businesses. Although the study examined key variables—perceived benefits, technological literacy, top management support, and competition—other important factors such as organizational culture, regulatory influences, access to finance, and industry-specific technological demands were not explored. While including SMEs from multiple sectors enriched the study's generalizability, it also limited the ability to deeply analyze sector-specific technology adoption dynamics, which may vary significantly across industries like manufacturing, services, or retail. Further research is needed to overcome these limitations.

5.7 Suggestions for Future Studies

Future studies should explore the moderating and mediating factors having a bearing on the uptake of technology in family-owned SMEs, particularly the role of financial constraints, regulatory environments, and organizational culture. Given the weak impact of top management support and technological literacy, future research should examine how external pressures, such as government incentives, digital infrastructure, and credit access shape adoption decisions. Further, comparative studies between family-owned and non-family-owned SMEs could provide deeper insights into how ownership structures affect technology uptake. Longitudinal studies should also assess how competition and perceived benefits evolve over time and their long-term impact on technology adoption. Lastly, sector-specific analyses could help determine whether certain industries within the SME sector face unique challenges or opportunities in embracing digital transformation.

5.8 Chapter Summary

In this chapter, the findings and conclusions were examined, and recommendations were discussed. The study concludes that external pressures influence technology adoption more than internal factors. It is recommended that policymakers promote open, competitive, and innovation-driven markets to enhance adoption. Additionally, management should focus on aligning

technology with organizational needs rather than solely emphasizing functionality. Future research should investigate the mediating and moderating variables that shape technology adoption.

References

Abdullah, H.H., Abdullah, S.S., Ramanchandram, R. and Ibrahim, M. (2021). The moderating influence of perceived usefulness in the adoption of technology by small and medium enterprises (SMEs): a comparative analysis between Malaysia and Nigeria. *J. Global Business Advancement*, 14(5): 705–728.

Adebayo, O., & Adesina, A. (2021). The role of competition in driving digital marketing technology adoption by SMEs in Lagos, Nigeria. *African Journal of Business Management,* 15(2), 34-45.

Adegbite, W. M. (2021). Emerging Roles of Small and Medium Enterprises in the Fourth Industrial Revolution in Africa. *Mediterranean Journal of Social Sciences*, Vol. 12(6).

Adegbite, W.M. & Govender, C.M. (2021). Emerging Roles of Small and Medium Enterprises in the Fourth Industrial Revolution in Africa. *Mediterranean Journal of Social Sciences, 12(6): 151-166* DOI: https://doi.org/10.36941/mjss-2021-0065

Afenta, B., Tawiah, M., & Osei, A. (2019). Adoption of Information Technology and SME Performance: Evidence from Ghana. *Journal of Global Information Technology Management,* 22(2), 129-145.

Afenya, M., Aphu, E. S., Ayishetu, A. R., Comfort, A., Stanley, A., Amezado, S., Ebenezer, G., & Gyan-Acquah. (2019). Impact of Technology Adoption and Its Utilization on SMEs in Ghana. *International Journal of Small and Medium Enterprises*, 2, 1-13. https://doi.org/10.46281/ijsmes.v2i2.382.

Akpan, I.J., Udoh, E.A.P. & Adebisi, B. (2022). Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic. *J Small Bus Entrepreneurship,* 34(2):123–140

Al Busaidi, N.S., Bhuiyan, A.B. & Zulkifli, N. (2019). The Critical Review on the Adoption of ICTs in the Small and Medium Enterprises (SMEs) in the Developing Countries. *International Journal of Small and Medium Enterprises*, 2(2); 33-40

Albaz, A., Dondi, M., Rida, T., & Schubert, J. (2020). Unlocking growth in small and medium-sized enterprises. McKinsey & Company

Almashawreh, R., Talukder, M., Charath, S. K., & Khan, M. I. (2024). AI Adoption in Jordanian SMEs: The Influence of Technological and Organizational Orientations. *Global Business Review*, 0(0). https://doi.org/10.1177/09721509241250273

Al-Qirim, N. A. (2007). The adoption and diffusion of e-commerce in developing countries: The case of an NGO in Jordan. *Information Technology for Development, 13*(2), 107-131.

Alsharief, R. Y., & Alsharief, R. H. (2021). Technological self-efficacy and digital adoption among SMEs: A systematic review. *Journal of Business & Technology, 16*(2), 78-95.

Anderson, R. C., & Reeb, D. M. (2003). Founding-family ownership and firm performance: Evidence from the S&P 500. *The Journal of Finance, 58*(3), 1301–1328. https://doi.org/10.1111/1540-6261.00567

Arendt, L. (2008). Barriers to ICT adoption in SMEs: How to bridge the digital divide? *Journal of Systems and Information Technology, 10*(2), 93-108.

Arzubiaga, U., A. Maseda, & Iturralde, T. (2019). Exploratory and exploitative innovation in family businesses: The moderating role of the family firm image and family involvement in top management. *Review of Managerial Science* 13 (1): 1–31.

Arzubiaga, U., J. Kotlar, A. De Massis, A. Maseda, & Iturralde, T. (2018). Entrepreneurial orientation and innovation in family SMEs: Unveiling the (actual) impact of the Board of Directors. *Journal of Business Venturing* 33 (4): 455–69.

Astuti, E.S., Sanawiri, B. and Iqbal, M. (2020). Attributes of innovation, digital technology and their impact on SME performance in Indonesia. *International Journal of Entrepreneurship*, Vol. 24 No. 1, pp. 1-14

Auch, E. (2021). Helping SMEs deal with growth, operational challenges and reduce failure rate. *Business Daily*. Available at https://www.businessdailyafrica.com/bd/lifestyle/personal-finance/helping-smes-growth-operational-challenges-reduce-failure-rate--3471116. Accessed on 10th July, 2024

Avgerou, C. (2008). Information systems in developing countries: A critical research review. *Journal of Information Technology*, 23(3), 133–146. doi: 10.1057/palgrave.jit.2000136.

Babandi, I. G. & Barjoyai, B. B. (2023). A Review of Critical Success Factors Influencing the Success of SMEs. SEISENSE Business Review, 3 (1): 37-61. ff10.33215/sbr.v3i1.906ff.

Babbie, E. (2020). *The Practice of Social Research* (15th ed.). Cengage Learning.

Babbie, E. (2020). *The Practice of Social Research* (15th ed.). Cengage Learning.

Bagozzi, R. P. (2007). The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems*, 8(4), 244-254.

Bahrini, R. & Qaffas, A.A. (2019). Impact of Information and Communication Technology on Economic Growth: Evidence from Developing Countries. *Economies*. 2019; 7(1):21. https://doi.org/10.3390/economies7010021

Baker, J. (2012). The technology–organization–environment framework. *Information Systems Theory: Explaining and Predicting Our Digital Society, 1*(2), 231-245.

Bakhtiari, S., Breunig, R., Magnani, L. Zhang, J. (2020). Financial Constraints and Small and Medium Enterprises: A Review. *Discussion Paper Series.* Institute of Labor Economics

Baller, S., Dutta, S., & Lanvin, B. (2016). *The Global Information Technology Report 2016: Innovating in the Digital Economy*. World Economic Forum.

Bannerman, S. (2020). Regulation and Digital Transformation: Opportunities and Challenges. *Digital Policy, Regulation and Governance*, 22(4), 301-316.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99-120.

Baruch, Y., & Holtom, B. C. (2008). Survey response rate levels and trends in organizational research. *Human Relations, 61*(8), 1139-1160.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2020). SMEs, growth, and poverty: Cross-country evidence. *Journal of Economic Growth*, 10(3), 199-229.

Becker, T., & Schmid, G. (2020). The right digital strategy for your business: an empirical analysis of the design and implementation of digital strategies in SMEs and LSEs. *Journal of Business Research,* 13(6-7), 1-22. DOI:10.1007/s40685-020-00124-y

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.

Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroskedasticity and random coefficient variation. *Econometrica,* 47(5), 1287-1294.

Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.

Bryman, A., & Bell, E. (2015). *Business Research Methods* (4th ed.). Oxford University Press.

Calabrò, A., M. Vecchiarini, J. Gast, G. Campopiano, A. De Massis, and S. Kraus. (2019). Innovation in family firms: A systematic literature review and guidance for future research. *International Journal of Management Reviews* 21 (3): 317–55.

Çalışkan, H. K. (2015). Technological Change and Economic Growth. *Procedia Social and Behavioral Sciences*, 195, 649–654. doi: 10.1016/j.sbspro.2015.06.174

Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management*, 30(6), 749-778.

Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management,* 30(6), 749-778.

Carter, L., & Bélanger, F. (2005). The utilization of e-government services: Citizen trust, innovation, and acceptance factors. *Information Systems Journal*, 15(1), 5–25.

Ceipek, R., Hautz, J., De Massis, A. & Matzler, K. (2020). Digital Transformation Through Exploratory and Exploitative Internet of Things Innovations: The Impact of Family Management and Technological Diversification. *Journal of Product Innovation Management,* 38(4): 142-165 DOI:10.1111/jpim.12551

Ceipek, R., J. Hautz, A. M. Petruzelli, A. De Massis, & Matzler, K. (2020). A motivation and ability perspective on engagement in emerging digital technologies: The case of Internet of things solutions. *Long Range Planning*. https://doi.org/10.1016/j.lrp.2020.101991

Chatterjee, D., Grewal, R., & Sambamurthy, V. (2002). Shaping up for e-commerce: Institutional enablers of the organizational assimilation of web technologies. *MIS Quarterly, 26*(2), 65-89.

Chau, P. Y., & Tam, K. Y. (1997). Factors affecting the adoption of open systems: An exploratory study. *MIS Quarterly, 21*(1), 1–24. https://doi.org/10.2307/249740

Chen, Q., Zhang, W., Jin, N.; Wang, X. & Dai, P. (2022). Digital Transformation Evaluation for Small- and Medium-Sized Manufacturing Enterprises Using the Fuzzy Synthetic Method DEMATEL-ANP. *Sustainability*, *14(1)*, 13038. https://doi.org/10.3390/su142013038

Chilembo, T. (2021) A Study of the Factors Affecting Small and Medium Enterprises (SMEs) Access to Finance. A Case of Lusaka Based SMEs. *American Journal of Industrial and Business Management*, 11, 437-460. doi: 10.4236/ajibm.2021.115028.

Chouki, M., Talea, M., Okar, C. & Chroqui, R. (2020). Barriers to information technology adoption within small and medium enterprises: a systematic literature review. *Int J Innov Technol Manage,* 17(01):2050007

Chrisman, J. J., Chua, J. H., & Sharma, P. (2012). Trends and directions in the development of a strategic management theory of the family firm. *Entrepreneurship Theory and Practice,* 29(5), 555-576.

Chrisman, J. J., Chua, J. H., & Steier, L. P. (2018). Economic, socioemotional, and social capital perspectives on family business entrepreneurship. *Entrepreneurship Theory and Practice, 42*(3), 355-368.

Chrisman, J. J., Chua, J. H., Pearson, A. W., & Barnett, T. (2015). Family involvement, family influence, and family-centered non-economic goals in small firms. *Entrepreneurship Theory and Practice,* 36(2), 267-293.

Chrisman, J. J., Chua, J. H., Pearson, A. W., & Barnett, T. (2015). Family involvement, family influence, and family-centered non-economic goals in small firms. *Entrepreneurship Theory and Practice, 39*(2), 237-261.

Cochran, W. G. (1977). *Sampling Techniques* (3rd ed.). John Wiley & Sons.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2013). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Routledge.

Correani, A., A. De Massis, F. Frattini, A. Messeni Petruzzelli, & Natalicchio, A. (2020). Forthcoming. Implementing a digital strategy: Learning from the experience of three digital transformation projects. *California Management Review*, 62(4), 37–56. https://doi.org/10.1177/0008125620934864

Cotrino, A., Sebastián, M.A. & González-Gaya, C. (2020). Industry 4.0 Roadmap: implementation for small and medium-sized enterprises. *Appl Sci* 10(23):8566

Creswell, J. W. (2014). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (4th ed.). Sage Publications.

Creswell, J. W., & Creswell, J. D. (2017). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). Sage Publications.

Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and Conducting Mixed Methods Research* (3rd ed.). Sage Publications.

Cruz-Jesus, F., Oliveira, T., & Bacao, F. (2018). Digital divide in SMEs: A multi-dimensional approach. *Technological Forecasting and Social Change, 132*, 46-56.

D'Allura, G. M. & Bannò, M. (2019). Family firm types based on the level of professionalism of the top management team. In *The Palgrave handbook of heterogeneity among family firms*, ed. E. Memili and C. Dibrell, 747–69. Cham: Springer International Publishing.

Dakduk, S., Van der Woude, D. & Alarcon Nieto, C. (2024). Technological Adoption in Emerging Economies: Insights from Latin America and the Caribbean with a Focus on Low-Income Consumers. *IntechOpen*. doi: 10.5772/intechopen.112004

Das, S., Kundu, A., & Bhattacharya, A. (2020). Technology Adaptation and Survival of SMEs: A Longitudinal Study of Developing Countries. *Technology Innovation Management Review*, 10(6), 64-72. http://doi.org/10.22215/timreview/1369

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.

De Massis, A., Frattini, F., & Lichtenthaler, U. (2013). Research on technological innovation in family firms: Present debates and future directions. *Family Business Review, 26*(1), 10-31.

De Massis, A., Frattini, F., Kotlar, J., Petruzzelli, A. M., & Wright, M. (2018). Innovation through tradition in family firms. *Academy of Management Perspectives, 32*(4), 423–438. https://doi.org/10.5465/amp.2016.0166

Dearing, J. W., & Cox, J. G. (2018). Diffusion of innovations theory, principles, and practice. *Health Affairs*, 37(2), 183-190.

Denzin, N. K. (1978). *The Research Act: A Theoretical Introduction to Sociological Methods*. McGraw-Hill.

Donbesuur, F., Adongo, R., & Ampomah, E. (2020). The effect of entrepreneurial orientation on new venture performance: Contingency roles of entrepreneurial actions. *Journal of Business Research, 112,* 183-195.

Duh, M. (2012). Family business succession: A review of the literature. *Annals of the University of Oradea, Economic Science Series, 21*(1), 288-296.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10-11), 1105-1121.

Eller, R., Alford, P., Kallmünzer, A., & Peters, M. (2020). *Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization*. *Journal of Business Research, 112,* 119–127.

Erdogan, I., Rondi, E. & Massis, A. D. (2020). Managing the tradition and innovation paradox in family firms: A family imprinting perspective. *Entrepreneurship Theory and Practice* 44 (1): 20–54.

European Investment Bank. (2022). *Digitalisation in SMEs: Evidence from the EIB Investment Survey*. European Investment Bank. Available at https://www.eib.org/attachments/publications/digitalisation_in_europe_2021_2022_en.pdf)

Exposito, A. & Sanchis-Llopis, J. (2018). Innovation and business performance for Spanish SMEs: New evidence from a multi-dimensional approach. *Int. Small Bus. J. Res. Entrep,* 36, 911–931.

Fadahunsi, A. (2012). The growth of small businesses: Towards a research agenda. *American Journal of Economics and Business Administration, 4*(1), 105-115.

Farida, I. & Setiawan, D. (2022). Business Strategies and Competitive Advantage: The Role of Performance and Innovation. *Journal of Open Innovation: Technology, Market, and Complexity*.; 8(3):163. https://doi.org/10.3390/joitmc8030163

Fichman, R. G. (1992). Information technology diffusion: A review of empirical research. *In Proceedings of the Thirteenth International Conference on Information Systems* (pp. 195-206).

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). SAGE Publications.

Field, A. (2018). *Discovering Statistics Using IBM SPSS Statistics* (5th ed.). Sage Publications.

Finkelstein, S., Hambrick, D. C., & Cannella, A. A. (2009). *Strategic Leadership: Theory and Research on Executives, Top Management Teams, and Boards*. Oxford University Press.

Foss, N. J., & Knudsen, T. (2003). The resource-based tangle: Towards a sustainable explanation of competitive advantage. *Managerial and Decision Economics*, 24(4), 291-307.

Fraillon, J., Ainley, J., Schulz, W., Friedman, T., & Gebhardt, E. (2014). *Preparing for life in a digital age: The IEA International Computer and Information Literacy Study international report*. Springer.

Fu, H.P., Chang, T.H., Ku, C.Y., Chang, T.S., & Huang, C.H. (2014). The critical success factors affecting the adoption of inter-organization systems by SMEs. *Journal of Business and Industrial Marketing, 29*(5), 400-416.

Gagnon, M. P., Orruño, E., Asua, J., Abdeljelil, A. B., & Emparanza, J. (2016). Using a modified Technology Acceptance Model to evaluate healthcare professionals' adoption of a telemonitoring system. *International Journal of Medical Informatics*, 82(3), 81–94.

Garg, A., & Choeu, T. (2020). The adoption of digital technology by South African SMEs: The role of perceived benefits and perceived ease of use. *Journal of Business Research, 120*, 243-252.

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism, 10*(2), 486-489.

Ghobakhloo, M. & Ching, N.T. (2019). Adoption of digital technologies of smart manufacturing in SMEs. J Industrial Inform Integr 16:100107

Ghobakhloo, M. & Iranmanesh, M. (2021). Digital transformation success under Industry 4.0: a strategic guideline for manufacturing SMEs. *Journal of Manufacturing Technology Management*, 1-25

Gikandi, J., & Bloor, C. (2021). Digital transformation in family-owned SMEs: Exploring adoption barriers. *International Journal of Entrepreneurship and Small Business*, 43(2), 121–138.

Gomez-Mejia, L. R., M. Larraza-Kintana, J. Moyano-Fuentes, & Firfiray, S. (2018). Managerial family ties and employee risk bearing in family firms: Evidence from Spanish car dealers. *Human Resource Management* 57 (5): 993–1007.

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2005). Diffusion of innovations in service organizations: Systematic review and recommendations. Milb*ank Quarterly*, 82(4), 581-629.

Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5th ed.). McGraw-Hill.

Gutierrez, E., Klepikova, E., & Levitanskaya, K. (2019). World Bank. 2019. Expanding Access to Financing for Micro, Small and Medium-Size Enterprises in Russia by Leveraging Innovative Financial Solutions. World Bank. https://doi.org/10.1596/32405

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Pearson.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate Data Analysis* (8th ed.). Cengage Learning.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193–206. https://doi.org/10.5465/amr.1984.4277628

Hasani, T., Rezania, D., Levallet, N., O'Reilly, N. & Mohammadi, M. (2023). Privacy enhancing technology adoption and its impact on SMEs' performance. *International Journal of Engineering Business Management,* 15(1): 1–26. DOI: 10.1177/18479790231172874

Haynes, B. I., Richard, H. E., & Kubany, E. S. (1995). Content validity in psychological assessment: A review of theory and applications. *Clinical Psychology Review*, 15(3), 237-247.

Holden, R. J., & Karsh, B. T. (2010). The Technology Acceptance Model: Its past and its future in health care. *Journal of Biomedical Informatics*, 43(1), 159–172.

Hussain, M., Zeadally, S., & Hassan, S. (2022). Digital transformation and technology adoption in SMEs: Challenges and opportunities. *Journal of Innovation & Knowledge, 7*(1), 100-120.

Hwang, J., Al-Arabiat, M., & Shin, D. H. (2016). Understanding technology adoption in small business: The influence of external pressure and competitive intensity. *Information Systems Frontiers, 18*(2), 303-314.

Ifinedo, P. (2021). An empirical analysis of factors influencing Internet/e-business technologies adoption by SMEs in Canada. *International Journal of Information Technology and Decision Making, 10*(4), 731–766. https://doi.org/10.1142/S0219622011004543

Indrawati, H., Caska, & Suarman. (2020). Barriers to technological innovations of SMEs: How to solve them? *International Journal of Innovation Science, 12*(5), 545–564. https://doi.org/10.1108/IJIS-04-2020-0049

International Trade Centre, (2022). *Small Businesses in Fragility: From Survival to Growth.* ITC

Isensee, C., Teuteberg, F., Griese, K.M. & Topi, C. (2020). The relationship between organizational culture, sustainability, and digitalization in SMEs: a systematic review. *J Clean Prod,* 275:122944

Jaskiewicz, P., Combs, J. G., & Rau, S. B. (2017). Entrepreneurial legacy: Toward a theory of how some family firms nurture transgenerational entrepreneurship. *Journal of Business Venturing*, 32(1), 29-49.

Jeyaraj, A., Rottman, J. W., & Lacity, M. C. (2006). A review of the predictors, linkages, and biases in IT innovation adoption research. *Journal of Information Technology, 21*(1), 1-23.

Jordão, R.V.D. & Novas, J.C. (2017). Knowledge management and intellectual capital in networks of small- and medium-sized enterprises. *J. Intellect. Cap,* 18, 667–692.

Jorissen, A., Laveren, E., Martens, R., & Reheul, A.-M. (2005). Real versus sample-based differences in comparative family business research. *Family Business Review*, 18(3), 229–246.

Kallmuenzer, A., Mikhaylov, A., Chelaru, M., & Czakon, W. (2024). Adoption and performance outcome of digitalization in small and medium-sized enterprises. *Review of Managerial Science.* Advance online publication. https://doi.org/10.1007/s11846-024-00744-21

Kalumendo, R. (August 2023). An Integrative Literature Review on Technology Adoption by African SMEs. *Texila International Journal of Academic Research*. DOI: 10.21522/TIJAR.2014.SE.23.01. Art001

Kamau, P. N., & Njagi, L. W. (2021). Factors influencing the adoption of digital transformation in Kenyan SMEs: A case study approach. *Journal of Business and Management, 9*(2), 47-61. doi:10.1108/JBM-02-2021-0004.

Kanana, D. (2022). *Effect of financial technology usage on growth of small and medium enterprises in Nairobi County, Kenya* (Masters Dissertation)

Kariuki, M., & Kimani, W. (2022). The impact of competition on technology adoption in small enterprises: A Kenyan perspective. *Journal of Business and Economic Development*, 7(1), 22–30.

Kasych, A., Vochozka, M., & Suler, P. (2019). Technological adoption and its impact on business performance. *Economic Research*, 32(1), 1162-1178.

Kenya Institute for Public Policy Research and Analysis (KIPPRA). (2020). *Kenya Economic Report: Empowering SMEs for Economic Growth.*

Kenya Micro and Small Enterprises Act. (2012). National Council for Law Reporting.

Kenya National Bureau of Statistics (KNBS). (2016). *Micro, Small and Medium Enterprises (MSME) Survey Basic Report*. KNBS.

Kenya National Bureau of Statistics (KNBS). (2020). *Economic Survey 2020*. Kenya National Bureau of Statistics.

Kenya National Bureau of Statistics (KNBS). (2020). *Economic Survey 2020*. Nairobi: KNBS.

Kenya Private Sector Alliance (KEPSA). (2024). *Ajira Digital's Platform Accelerator Program: Empowering Jobtech Platforms For Growth.* KEPSA

Kim, W. C., & Mauborgne, R. (2005). *Blue ocean strategy: How to create uncontested market space and make the competition irrelevant.* Harvard Business Press.

Kimana, V. (2020). *Factors affecting E-commerce adoption among Small and Medium Enterprises (SMEs) in Developing Countries: The Context of Kenya*. Masters Thesis, Mid Sweden University

KIPPRA (2024). Rethinking Youth Employment Initiatives in Kenya: Lessons and Policy Alternatives. KIPPRA

KNBS. (2016). *Micro, Small, and Medium Establishments (MSME) Survey*. Kenya National Bureau of Statistics.

Kotlar, J., De Massis, A., Frattini, F. & Kammerlander, N. (2020). Motivation gaps and implementation traps: The paradoxical and time-varying effects of family ownership on firm absorptive capacity. *Journal of Product Innovation Management* 37 (1): 2–25. https://doi.org/10.1111/jpim.12503

KPMG (2017). *Family businesses in the digital economy*. Available at: https://assets.kpmg/content/dam/kpmg/sg/pdf/2017/05/Family-Businesses-in-the-Digital-Economy.pdf

Kraus, S., Jones, P., Kailer, N., Weinmann, A., Chaparro-Banegas, N., & Roig-Tierno, N. (2021). Digital Transformation: An Overview of the Current State of the Art of Research. *Sage Open*, 11(3). https://doi.org/10.1177/21582440211047576

Kuan, K. K. Y., & Chau, P. Y. K. (2021). A perception-based model for EDI adoption in small businesses using a technology-organization-environment framework. *Information & Management, 38*(8), 507–521. https://doi.org/10.1016/S0378-7206(01)00073-8

Kumar, R. (2019). Research Methodology: A Step-by-Step Guide for Beginners (Vol. 4). Sage Publications Limited.

Kurniasari, F., Lestari, E. D., & Tannady, H. (2023). Pursuing long-term business performance: Investigating the effects of financial and technological factors on digital adoption to leverage SME performance and business sustainability—Evidence from Indonesian SMEs in the traditional market. *Sustainability, 15*(16), 12–29. https://doi.org/10.3390/su151612668

Kurniawati, F. (2022a). The Impact of ICT on SME Performance in Developing Countries. *Journal of Global Information Management,* 30(3), 1-19.

Kurniawati, M. A. (2022b). Analysis of the impact of information communication technology on economic growth: empirical evidence from Asian countries. *Journal of Asian Business and Economic Studies,* 29(1), 2–18. doi: 10.1108/jabes-07-2020-0082.

Kutner, M. H., Nachtsheim, C. J., Neter, J., & Li, W. (2004). *Applied Linear Statistical Models* (5th ed.). McGraw-Hill.

Latifah, L., Setiawan, D. & Aryani, Y.A. (2020). Rahmawati, R. Business strategy–MSMEs' performance relationship: Innovation and accounting information system as mediators. *J. Small Bus. Enterp. Dev*, 28(1): 1–21

Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology, 28*(4), 563-575.

Le Breton-Miller, I., & Miller, D. (2018). Beyond the firm: Business families as entrepreneurs. *Entrepreneurship Theory and Practice*, 42(4), 527-536.

Lee, J., & Choi, B. (2020). Understanding top management support in technology adoption: A review and synthesis of literature. *Information Systems Frontiers*, 22(4), 1015-1033.

Levene, H. (1960). Contributions to probability and statistics: Essays in honor of Harold Hotelling. *Stanford University Press*.

Lyytinen, K., & Damsgaard, J. (2001). What's wrong with the diffusion of innovation theory? *In Working Conference on Diffusing Software Product and Process Innovations* (pp. 173-190). Springer.

Mabula, J.B. & Dong, H. (2018). Use of Technology and Financial Literacy on SMEs Practices and Performance in Developing Economies. *International Journal of Advanced Computer Science and Applications,* 9(1): 1-21. DOI:10.14569/ijacsa.2018.090611

MacGregor, R. C., & Vrazalic, L. (2005). The role of small business managers in e-commerce adoption: A case study approach. *Journal of Information Technology & People, 18*(2), 217-235.

Martin, B., & Omrani, N. (2022). Digital transformation in SMEs: How technology adoption affects competitive advantage. *Small Business Economics, 58*(2), 123-145.

McKinsey & Company (2020). *How COVID-19 Has Pushed Companies over the Technology Tipping Point- and Transformed Business Forever*. McKinsey & Company. https://www.mckinsey.com › capabilities › our-insights

Miller, D., & Le Breton-Miller, I. (2005). *Managing for the long run: Lessons in competitive advantage from great family businesses.* Boston: Harvard Business School Press.

Mishrif, A. & Khan, A. (2023). Technology adoption as survival strategy for small and medium enterprises during COVID-19. *J Innov Entrep* 12, 53. https://doi.org/10.1186/s13731-023-00317-9

Mittal, S., Khan, M.A., Romero, D., and Wuest, T., (2018), A critical review of smart manufacturing & Industry 4.0 maturity models: Implications for small and medium-sized enterprises (SMEs). *Journal of Manufacturing Systems*, vol. 49, pp. 194-214

Molla, A., & Licker, P. S. (2021). Perceived e-readiness factors in e-commerce adoption: An empirical investigation in a developing country. *International Journal of Electronic Commerce*, 10(1), 83-110.

Muchiri, J. W. (2018). Effect of Mobile Banking Adoption on the Performance of Small and Medium Enterprises in Nairobi County. *International Journal of Economics, Business and Management Research*, 2(04), ISSN: 2456-7760.

Mugenda, O. M., & Mugenda, A. G. (2003). *Research Methods: Quantitative and Qualitative Approaches.* Acts Press.

Muhia, J., & Mwiti, C. (2019a). Challenges facing the adoption of ICT in SMEs in Kenya. *International Journal of Information Technology and Business Management*, 29(1), 12-19.

Muhia, M. K., & Mwiti, C. J. (2019b). Exploring the challenges of digital transformation in Kenyan SMEs. *Journal of Business and Management Sciences, 7*(1), 1-9. doi:10.11648/j.jbms.20190701.11.

Muñoz-Bullon, F., Sanchez-Bueno, M. J. & De Massis, A. (2020). Forthcoming. Combining internal and external R&D: The effects on innovation performance in family and non-family firms. *Entrepreneurship Theory and Practice*, 44(5), 996–1031. https://doi.org/10.1177/1042258719879674

Mwangi, H., & Ngugi, P. (2014). Generational transition and its impact on technology adoption in family-owned businesses. *Journal of Family Business Management*, 4(3), 260-278.

Nambisan, S., Wright, M., & Feldman, M. (2019). The Digital Transformation of Innovation and Entrepreneurship: Progress, Challenges and Key Themes. *Research Policy*, 48(8), 103773.

Nandwa, N. A., & Fatoki, O. I. (2021). Effect of digital financial services on the growth of SMEs in Kenya. *African Journal of Empirical Research*, 2(1), 79–94. https://ajernet.net. ISSN 2709-2607. DOI: https://doi.org/10.51867/ajer.v2i1.16

Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches* (7th ed.). Pearson.

Ngugi, P. K., Mungai, M., & Gitobu, J. (2019). Challenges affecting the growth of family businesses in Kenya. *Journal of Business and Management,* 21(3), 45-59.

Nguyen, A. H., Ha, H. H., & Nguyen, S. La. (2020). Determinants of Information Technology Audit Quality: Evidence from Vietnam. *Journal of Asian Finance, Economics and Business, 7*(4), 41-50. https://doi.org/10.13106/jafeb.2020.vol7.no4.41

Njeri, H.V. (2022). *Relationship Between Family-Owned Firms Operational Strategy on Organizational Performance of Businesses in Nairobi County*. Unpublished Masters Thesis, Kenya Methodist University

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric Theory* (3rd ed.). McGraw-Hill.

Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill

Nwuke, K. (February 6, 2024). Family-owned businesses as incubators of entrepreneurs for Africa's structural transformation. *Brookings.* https://www.brookings.edu/articles/family-owned-businesses-as-incubators-of-entrepreneurs-for-africas-structural-transformation/

Nyaga, R. N., & Okeyo, W. (2020). Competitive pressure and mobile technology adoption among SMEs in Nairobi, Kenya. *Journal of Business and Management*, 22(3), 45-55.

Nyamu, M.M. (2014). *Factors Influencing Adoption of Information Communication Technology Among Small and Medium Enterprises in Nairobi County (Kenya*). Doctoral Thesis, Kabarak University

Nyamwanza, T. (2020). Technology adoption among SMEs in Sub-Saharan Africa: Challenges and opportunities. *African Journal of Business Management*, 14(4), 55–67.

O'Brien, R. M. (2007). A caution regarding rules of thumb for variance inflation factors. *Quality & Quantity, 41*(5), 673–690.

Ochieng, L. (2023). How SMEs can deliver, hasten sustainability economic growth goals. *Business Daily*. Available at https://www.businessdailyafrica.com/bd/opinion-analysis/columnists/how-smes-can-deliver-hasten-sustainability-goals--4157112

OECD. (2021). *Digital transformation of SMEs: Policy perspectives and recommendations*. Organisation for Economic Co-operation and Development.

Ogot, M. (2014). The role of family businesses in the Kenyan economy. *Journal of African Business*, 15(3), 197–213.

Oliveira, T., & Martins, M. F. (2011). Literature review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation, 14*(1), 110-121.

Omoga, C. O. (2019). Challenges in E-Marketing Adoption Among Small Businesses in the Hospitality Industry in Kenya. *International Journal of Advanced Research in Computer and Communication Engineering*, 8(5), ISSN (Online) 2278–1021.

Omonga, E. (2019). The impact of digital transformation on SMEs in Kenya. *Journal of Technology Management & Innovation,* 14(3), 67–79.

Onyedimekwu, O. & Oruan, K. M. (2023). Factors Influencing the Adoption and Use of ICT. *Academy of Management Review*, 9(1), 203-236.

Organisation for Economic Co-operation and Development (OECD). (2017). *Enhancing the contributions of SMEs in a global and digitalised economy*. OECD Publishing.

Organisation for Economic Co-operation and Development (OECD). (2019). *OECD SME and Entrepreneurship Outlook 2019 Policy Highlights*. Paris: OECD

Organisation for Economic Co-operation and Development (OECD). (2021). *SMEs and entrepreneurship: Strengthening the digital transition*. OECD.

Osano, H.M. (2019). Global expansion of SMEs: role of global market strategy for Kenyan SMEs. *J Innov Entrep* 8(13): 61–72. DOI: https://doi.org/10.1186/s13731-019-0109-8**.**

Osborne, J. W., & Waters, E. (2002). Four assumptions of multiple regression that researchers should always test. *Practical Assessment, Research, and Evaluation, 8*(1), 1–5.

Otieno, A.P. (2015). *Factors Influencing ICT Adoption and Usage by Small and Medium Sized Enterprises: The Case of Nairobi Based SMEs.* Masters Thesis, United States International University Africa

Park, S. Y. (2009). An analysis of the Technology Acceptance Model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society*, 12(3), 150–162.

Park, S. Y., Nam, M. W., & Cha, S. B. (2015). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology, 46*(4), 721–733.

Petrovsky, N., James, O., & Boyne, G. A. (2015). New leaders' managerial background and the performance of public organizations: The theory of publicness fit. *Journal of Public Administration Research and Theory*, 25(1), 217–236.

Pfeffer, J. (1983). Organizational demography. In L. L. Cummings & B. M. Staw (Eds.), Research in Organizational Behavior (Vol. 5, pp. 299–357). JAI Press.

Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health, 29*(5), 489–497.

Popović-Pantić, S., Semencenko, D., & Vasilić, N. (2019). The influence of digital transformation on business performance: Evidence of the women-owned companies. *Ekonomika Preduzeća, 3*(3), 1–19. https://doi.org/10.5937/ekopre1908397p

Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors.* Free Press.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review, 86*(1), 25-40.

Porter, M. E., & Heppelmann, J. E. (2024). How smart, connected products are transforming competition. *Harvard Business Review*, 92(11), 64-88.

Premkumar, G., & Roberts, M. (1999). Adoption of new information technologies in rural small businesses. *Omega, 27*(4), 467-484.

Priem, R. L., & Butler, J. E. (2001). Is the resource-based "view" a useful perspective for strategic management research? *Academy of Management Review*, 26(1), 22-40.

PwC. (2021). *Family Business Survey 2021: The values that bind*. PricewaterhouseCoopers.

PwC. (2021). *PwC Family Business Survey: The values effect*. PwC Global Family Business Report. Retrieved from https://www.pwc.com

Rahayu, R., & Day, J. (2017). E-commerce adoption by SMEs in developing countries: The case of Indonesia. *Telematics and Informatics, 34*(1), 19-35.

Ray, S., Mondal, A., & Ramachandran, K. (2017). How does family involvement affect a firm's internationalization? An investigation of Indian family firms. *Global Strategy Journal*. https://doi.org/10.1002/gsj.1196

Razali, N. M., & Wah, Y. B. (2011). Power comparisons of Shapiro-Wilk, Kolmogorov-Smirnov, Lilliefors, and Anderson-Darling tests. *Journal of Statistical Modeling and Analytics, 2*(1), 21-33.

Rogers, E. M. (1962). *Diffusion of innovations*. Free Press.

Rogers, E. M. (1995). *Diffusion of Innovations* (4th ed.). The Free Press.

Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.

Rogers, E. M. (2003). *Diffusion of Innovations* (5th ed.). Free Press.

Saunders, M., Lewis, P., & Thornhill, A. (2019). *Research Methods for Business Students* (8th ed.). Pearson Education.

Schulze, W. S., Lubatkin, M. H., & Dino, R. N. (2001). Altruism and agency in family firms. *Academy of Management Review*, 26(1), 73-92.

Shahadat, M. M. H., Nekmahmud., Ebrahimi, P. & Fekete-Farkas, M. (2023). Digital Technology Adoption in SMEs: What Technological, Environmental and Organizational Factors Influence in Emerging Countries? *Global Business Review,* 1–27. DOI: 10.1177/09721509221137199

Sirmon, D. G., & Hitt, M. A. (2003). Managing resources: Linking unique resources, management, and wealth creation in family firms. *Entrepreneurship Theory and Practice, 27*(4), 339-358.

Siyami, N. & Rusmiyatun, N. (2023). The Effect of Technology Literature, Financial Literature and Financial Technology on the Financial Performance of MSMEs in Purworejo Regency Moderated by Financial Inclusion. *SSEHR,* 667(1): 942–947,

Son, H. S., & Han, S. L. (2021). Technological literacy in SMEs: Measuring the impact on business performance. *Journal of Small Business Management*, 59(4), 671–690.

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Tabachnick, B. G., & Fidell, L. S. (2019). *Using Multivariate Statistics* (7th ed.). Pearson.

Tajudeen, F. P., Jaafar, N. I., & Ainin, S. (2019). Understanding the impact of social media usage among SMEs. *Technological Forecasting & Social Change, 144*, 120-129.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53-55.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education,* 2, 53-55.

Teece, D. J. (2014). A dynamic capabilities-based entrepreneurial theory of the multinational enterprise. *Journal of International Business Studies,* 45(1), 8–37.

Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.

Thong, J. Y. L. (1999). An integrated model of information systems adoption in small businesses. *Journal of Management Information Systems, 15*(4), 187–214. https://doi.org/10.1080/07421222.1999.11518227

Thong, J. Y., Yap, C. S., & Raman, K. S. (1996). Top management support, external expertise, and information systems implementation in small businesses. *Information Systems Research, 7*(2), 248-267.

Tornatzky, L. G., & Fleischer, M. (1990). *The Processes of Technological Innovation.* Lexington Books.

Tornatzky, L. G., & Fleischer, M. (2020). *The processes of technological innovation.* Lexington Books.

Tornatzky, L. G., & Klein, K. J. (1982). Innovation characteristics and innovation adoption: A meta-analysis. *IEEE Transactions on Engineering Management, 29*(1), 28-45.

United Nations Economic Commission for Africa (UNECA). (2022). *The role of technology in SME development under the AfCFTA*. UNECA.

Valente, T. W. (1996). Social network thresholds in the diffusion of innovations. *Social Networks,* 18(1), 69–89.

Vassilakopoulou, P. & Hustad, E. (2023). Bridging Digital Divides: A Literature Review and Research Agenda for Information Systems Research. *Inf Syst Front*, 25(3):955-969. doi: 10.1007/s10796-020-10096-3

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*(2), 186–204.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425–478. https://doi.org/10.2307/30036540

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.

Venkatesh, V., Thong, J. Y., & Xu, X. (2022). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly*, 36(1), 157-178.

Vimal, K.E., Kandasamy, K.S., Venkat, J. & Mani, R.S.V. (2023). Barriers to the adoption of digital technologies in a functional circular economy network. Oper Manag Res. 2023 Apr 25:1–21. doi: 10.1007/s12063-023-00375-y. Epub ahead of print. PMCID: PMC10126552.

Wachira, G. & Njuguna, A. (2023). Enhancing Growth and Productivity Through Mobile Money Financial Technology Services: The Case of M-Pesa in Kenya. *International Journal of Economics and Finance, Canadian Center of Science and Education,* 15(12): 1-91

Wamuyu, P. K. (2019). Technology adoption in Kenyan SMEs: Challenges and opportunities. *Journal of Business and Management Sciences*, 7(3), 123–130.

White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica,* 48(4), 817-838.

Wichmann, J. R.K., Uppal, A., Sharma, A. & Dekimpe, M.G. (2022). A global perspective on the marketing mix across time and space. *International Journal of Research in Marketing*, 39(2): 502-521

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, 24(10), 991–995.

World Bank. (2020). *Digital Economy for Africa Report: Catalyzing growth and innovation*. World Bank.

World Bank. (2021). *Digital economy for Africa initiative*. World Bank Group.

Zamani, S.Z. (2022). Small and Medium Enterprises (SMEs) facing an evolving technological era: a systematic literature review on the adoption of technologies in SMEs. *European Journal of Innovation Management*, Vol. 25 No. 6, pp. 735–757. https://doi.org/10.1108/EJIM-07-2021-0360

Zellweger, T. (2017). *Managing the Family Business: Theory and Practice.* Edward Elgar Publishing.

Zhao, Z., Sarah, H., Munir, M. & Munir, M. (2024). Digital Driven Success: The Impact of Digitalization on SME Performance. *SSRN,* 1(1): *1-28*. Available at SSRN: https://ssrn.com/abstract=4761034 or http://dx.doi.org/10.2139/ssrn.4761034

Zhou, (2024). The Percentage of Businesses That Fail (Statistics & Failure Rates). *Lousa Zhou.* Available at https://luisazhou.com/blog/businesses-that-fail/#. Accessed on 10th July 2024

Zhu, K., Kraemer, K. L., & Xu, S. (2022). The process of innovation assimilation by firms in different countries: A technology diffusion perspective on e-business. *Management Science, 52*(10), 1557–1576. https://doi.org/10.1287/mnsc.1050.0487

Appendices

Appendix I: Introduction Letter

Joan Rono
Strathmore University
P.O. Box 59857-00200
City Square, Nairobi-Kenya

Dear Respondent,

Ref: Participation in Data Collection

I trust that this communication reaches you in good health. I am Joan Rono, and I am working on a research project for my academic work at Strathmore University. This investigation focuses on exploring "the Factors Influencing the Adoption of Technology by SMES: An Empirical Study of Family-Owned Businesses in Nairobi."

Your feedback is highly valued, as your insights and experiences will greatly contribute to our understanding of how technological advancements are integrated within family-owned SMEs. The study aims to provide actionable recommendations to improve technology adoption practices, ultimately benefiting businesses like yours.

The survey is designed to be brief and will take approximately 15 minutes to complete. We promise to keep your answers private and use them only for research. You are free to discontinue participation at any moment without consequence.

I appreciate you taking a look at this request. Your assistance is crucial to this study's accomplishment. Feel free to get in touch with me if you need more information or if you have any inquiries at joanrono@gmail.com or +254 728 144567.

Sincerely,

Joan Rono

Appendix II: Research Questionnaire

Part A: Introduction

Please answer the following questions based on your experiences and observations within your organization. Your responses will be kept confidential and used solely for the purpose of this research. The questionnaire is divided into sections that correspond to the key variables of interest in this study. Each section will include both closed-ended and open-ended questions. Under the closed-ended questions, tick (√) against the appropriate number; and write within the spaces provided under the open-ended questions.

Scale:
1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

Part A: Respondent Profile

1. Age:

18-25 [ ]

26-35 [ ]

36-45 [ ]

46-55 [ ]

56 and above [ ]

2. Position

Owner [ ]

Manager [ ]

3. Number of Years with the Business:

Less than 1 year	[ ]
1-3 years	[ ]
4-6 years	[ ]
7-9 years	[ ]
10 years and above	[ ]

4. Level of Education:

Secondary	[ ]
Diploma	[ ]
Bachelor's Degree	[ ]
Master's Degree	[ ]
Doctorate	[ ]

5. Size of Organization (Number of Employees):

Less than 10	[ ]
10-49	[ ]
50-99	[ ]

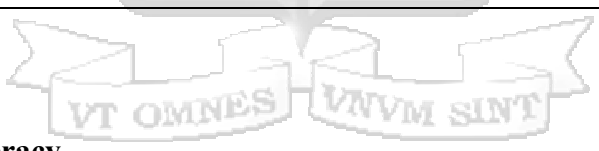
6. Years of the Business has Been in Operation:

Less than 3 year	[ ]
3-5 years	[ ]
5-10 years	[ ]
11-15 years	[ ]
16 years and above	[ ]

Part B: Perceived Benefits of Technology Adoption

7. Please rate your level or affirmation or disapproval with the following items, in relation to perceived benefits of technology adoption as applies to your business. Please utilize the scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree."

	1	2	3	4	5
The use of technology in our business processes has significantly reduced the time required to complete tasks					
Technology has streamlined our operational workflows, leading to faster completion of routine activities					
Our technology tools enable us to manage and process information more efficiently compared to traditional methods					
Technology adoption has increased the overall productivity of our employees					
We have observed a notable improvement in work output and efficiency as a result of integrating technology into our operations					
The use of advanced technology tools has allowed us to achieve more tasks in a shorter amount of time					
Technology has improved the quality of service we provide to our customers					
Our customers are more satisfied with our services due to the technological enhancements in our business operations					
Adopting new technologies has given us a competitive edge over other businesses in our industry					
Technology has enabled us to offer unique products or services that differentiate us from our competitors					



Part C: Technology Literacy

9. Please rate your level or affirmation or disapproval with the following items, in relation to technology literacy as applies to your business. Please utilize the scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree."

	1	2	3	4	5
I am comfortable using various software applications on my computer					
I can troubleshoot and resolve common computer issues independently					
I am proficient in performing essential tasks such as file management and software installation on my computer					
I can efficiently search for and retrieve information from the interne					
I am skilled at using online tools and platforms to enhance my work processes					
I can use online communication tools (e.g., email, chat) effectively for professional purposes					

I am adept at using digital productivity tools (e.g., spreadsheets, word processors) to complete tasks					
I can integrate various digital tools and software to improve workflow and productivity					
I am knowledgeable about using digital tools for data analysis and reporting					
I am confident in utilizing digital collaboration tools (e.g., project management software, cloud storage) to work with others					

Part D: Top Management Support

11. Please rate your level or affirmation or disapproval with the following items, in relation to top management support as applies to your business. Please utilize the scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree."

	1	2	3	4	5
Top management provides a clear vision and strategic goals for the organization's technology adoption					
The technology strategy speaks to the overall strategic objectives of the organization					
Top management actively communicates the importance of technology in achieving organizational goals					
Adequate financial resources are allocated for the acquisition and implementation of new technologies					
The organization invests in necessary technology infrastructure to support its operations					
Sufficient time and personnel are allocated to technology-related projects and initiatives					
Top management fosters an organizational culture that encourages the use of new technologies					
There is a positive attitude towards technology adoption and innovation within the organization					
Top management provides necessary training and support to employees for effective technology use					
The organization promotes a collaborative environment where employees are encouraged to share ideas about technology improvements					

Part E: Competition

13. Please rate your level or affirmation or disapproval with the following items, in relation to competition as applies to your business. Please utilize the scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree."

	1	2	3	4	5
The number of competitors in my industry significantly influences our technology adoption decisions					
Increased competition within the industry pressures us to adopt new technologies					
The presence of numerous competitors has led us to prioritize technology upgrades					
Our competitors' rate of technology adoption affects our own technology investment decisions					
Keeping up with the technological advancements adopted by competitors is crucial for maintaining market position					
Observing rapid technological advancements among competitors motivates us to enhance our technology capabilities					
Our customers' expectations drive our need to adopt latest technology					
The demand for innovative technology from our customers influences our technology adoption strategies					
Meeting customer expectations for technological capabilities is a key factor in our decision to invest in new technology					
High customer expectations for technology performance impact our choice of technological solutions					

Part F: Technology Adoption

15. Please rate your level or affirmation or disapproval with the following items, in relation to technology adoption as applies to your business. Please utilize the scale: "1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly agree."

	1	2	3	4	5
Our organization has adopted advanced hardware systems to improve operational efficiency					
The latest hardware technology significantly enhances our company's performance					
We invest in up-to-date hardware to ensure compatibility with industry standards					
The quality and reliability of our hardware have positively impacted our business operations					

Upgrading hardware is a priority for us to keep pace with technological advancements					
We have implemented the latest software solutions to streamline our business processes					
Our choice of software is driven by its ability to enhance productivity and efficiency					
The integration of new software has led to measurable improvements in our business performance					
We regularly update our software to ensure it meets current industry requirements					
Adopting advanced software solutions has provided us with a competitive edge in the market					

Appendix III: Ethical Approval

Strathmore UNIVERSITY

15th January 2025

Ms Rono Joan,
joanrono@gmail.com

Dear Ms Rono,

RE: Factors Influencing the Adoption of Technology by SMEs: An Empirical Study of Family-Owned Businesses in Nairobi County

This is to inform you that SU-ISERC has reviewed and **approved** your above SU-masters proposal. Your application reference number is **SU-ISERC2501/24**. The approval period is from **15th January 2025 to 14th 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

Ole Sangale Rd, Madaraka Estate. PO Box 59857-00200, Nairobi, Kenya. Tel +254 (0)703 034000
Email admissions@strathmore.edu www.strathmore.edu

Appendix IV: Research License

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **145322**

Date of Issue: **20/January/2025**

RESEARCH LICENSE

This is to Certify that Ms.. Joan Rono 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 on the topic: Factors Influencing the Adoption of Technology by SMEs: An Empirical Study of Family-Owned Businesses in Nairobi County for the period ending : 20/January/2026.

License No: **NACOSTI/P/25/415364**

145322

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions