

Strathmore

UNIVERSITY

THE ROLE OF INNOVATION IN RESEARCH AND DEVELOPMENT (R&D) IN THE
GROWTH AND SUCCESS OF SMALL AND MEDIUM-SIZED ENTERPRISES (SMES): A
CASE OF NAIROBI COUNTY

136343 James Waweru Ndungu

Submitted in partial fulfillment of the requirements for the Degree of Bachelor of Business
Science Financial Economics at Strathmore University

Strathmore Institute of Mathematical Sciences Strathmore University
Nairobi, Kenya

January 2025

This Research Project is available for Library use because it is copyright material, and no quotation from the Research Project may be published without proper acknowledgment.

DECLARATION

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

© No part of this Research Project may be reproduced without the permission of the author and Strathmore University

James Waweru [*Name of Candidate*]

Jan 28th, 2025

This Research Project has been submitted for examination with my approval as the Supervisor.

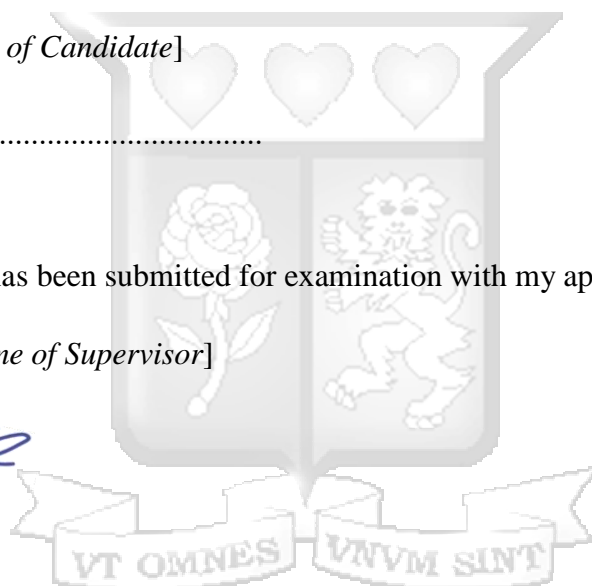
Dr. Hillary Ekisa [*Name of Supervisor*]



Jan 28th, 2025

Strathmore Institute of Mathematical Sciences

Strathmore University



ABSTRACT

In a world where businesses are set amidst dynamic and competitive landscapes, innovation is the cornerstone of organizational survival and growth. It enables firms to refine processes, enhance products, and unlock efficiencies that drive sustainable success. For resource-constrained small and medium enterprises, innovation is not an advantage but a necessity to thrive in today's market. The study investigates innovation strategies that influence the performance of SMEs in Nairobi County, such as product innovation, refinement of processes, strategic marketing, and managerial transformation. Based on the Schumpeterian Theory of Innovation, the Resource-Based View, and the Pecking Order Theory, the work employed a mixed-method approach to show how SMEs leverage innovation to get around their incapacities for growth. A sample of 398 SMEs was obtained using a structured questionnaire, and the data was analyzed using descriptive and inferential statistical methods. Descriptive statistics showed that for 42.6% of the firms, product innovation has a very high influence on performance, while for 52.9%, improved processes were fundamental. Regression analysis confirmed that the significant antecedents of innovation strategies were SME performance; the model R^2 is 0.775, showing that innovation activities explain 77.5% of the variance in performance. Product innovation, with a β of 0.227 ($p < 0.001$); process innovation, with a β of 0.235 ($p < 0.001$); and addressing key challenges, with a β of 0.534 ($p < 0.001$), further underscores such factors as genuinely transformative. The study concluded that innovation is critical to SME success, providing a competitive advantage in a fast-changing economic environment. It suggested that SMEs must invest in technology, innovate product lines occasionally, and adopt customer-oriented marketing strategies. In addition, the culture of continuous improvement and benchmarking against industry leaders help SMEs emerge as agile, forward-looking players in the marketplace.

TABLE OF CONTENTS

DECLARATION.....	2
ABSTRACT.....	3
TABLE OF CONTENTS	4
LIST OF TABLES	8
LIST OF FIGURES.....	9
LIST OF ABBREVIATIONS	10
CHAPTER ONE	11
INTRODUCTION.....	11
1.0 Background of the study	11
1.2 Statement of the Problem.....	12
1.3 Objective of the study	13
1.4 Research Questions	13
1.5 Significance of the Study.....	13
1.6 Scope of the Study.....	14
1.7 Definitions of Terms	14
1.8 Chapter Summary.....	14
CHAPTER TWO	15
LITERATURE REVIEW	15
2.1 Introduction.....	15
2.1 Theoretical framework.....	15
2.1.1 Schumpeterian Theory of Innovation	15
2.1.2 A Resource-Based View (RBV) of the Firm.....	16
2.1.3 Pecking Order Theory.....	16

2.2 Empirical Studies on Innovation in SMEs	16
2.2.1 Approaches to Innovation and R&D	17
2.2.2 Key challenges facing SMEs in embracing Innovation and R&D	18
2.2.3 Innovation and R&D efforts	19
2.2.4 The Relevance of Literature Review to Research Objectives	21
2.3 Research / Knowledge Gap	21
2.4 Conceptual Framework.	22
2.5 Chapter Summary.....	24
CHAPTER THREE	25
RESEARCH METHODOLOGY	25
3.0 Introduction.	25
3.1 Research Design.....	25
3.2 Population and Sampling Techniques	26
3.2.1 Population.....	26
3.2.2 Sampling Technique	26
3.3 Data Collection Methods.....	27
3.3.1 Quantitative Data Collection	27
3.4 Data Analytical Procedures.....	27
3.4.1 Quantitative Data Analysis.....	27
3.4.2 Qualitative Data Analysis.....	28
3.5 Pilot Test	28
3.6 Validity and Reliability	29
3.7 Diagnostic Tests	29
3.7.1 Multicollinearity	29
3.7.2 Heteroscedasticity.....	30
3.7.3 Normality Test.....	30
3.5 Ethical Considerations.....	30
3.6 Chapter Summary.....	31

CHAPTER FOUR.....	32
RESEARCH FINDINGS AND DISCUSSION.....	32
4.0 Introduction	32
4.1 Presentation	32
4.1.1 Response Rate.....	32
4.1.2 Gender Distribution	33
4.1.3 Age Distribution	33
4.1.4 Level of Education.....	34
4.1.5 Years of Experience in the sector	35
4.2 Descriptive Statistics	35
4.2.1 Descriptive SME Approach to Innovation and R&D.....	35
4.2.2 Descriptive on SMEs Key Challenges.....	37
4.2.3 Innovation and R&D efforts	39
4.2.4 Effect of innovation and R&D on market performance	40
4.3 Diagnostic tests	42
4.3.1 Multicollinearity Test.....	42
4.3.2 Breusch Pagan Test.....	43
4.3.3 Normality Test.....	43
4.4 Correlation Analysis.....	44
4.5 Regression Analysis	46
4.6 ANOVA Analysis	46
4.7 Coefficients	47
4.8 Research Limitations	48
4.9 Chapter Summary.....	48
CHAPTER FIVE	49
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS	49
5.0 Introduction	49
5.1 Summary of Findings	49

5.2 Conclusion..... 50

5.3 Recommendations 51

5.4 Suggestion for further research 52

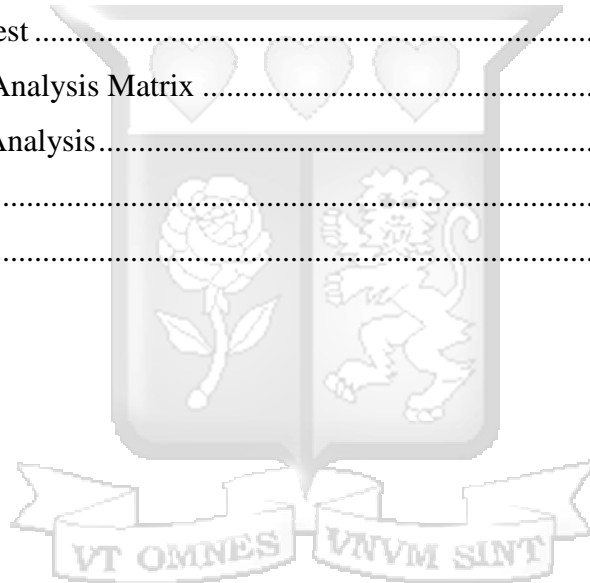
REFERENCES..... 53

QUESTIONNAIRE..... 55



LIST OF TABLES

Table 1: Reliability.....	29
Table 2: Response Rate.....	32
Table 3: Age Distribution	33
Table 4: Years of Experience in the sector	35
Table 5: Descriptive statistics on SMEs approach to innovation and R&D	36
Table 6: Descriptive on SMEs Key Challenges.....	38
Table 7: Effect of innovation and R&D on market performance.....	41
Table 8: Multicollinearity Test.....	42
Table 9: Breusch Pagan Test.....	43
Table 10: Normality Test	44
Table 11: Correlation Analysis Matrix	45
Table 12: Regression Analysis.....	46
Table 13: ANOVA	46
Table 14: Coefficients.....	47



LIST OF FIGURES

Figure 1: Conceptual Framework.....	23
Figure 2: Gender Distribution.....	33
Figure 3: Level of Education	34
Figure 4: Customer Retention.....	40



LIST OF ABBREVIATION

R&D:	Research and Development
SMEs:	Small and Medium-sized Enterprises
GDP:	Gross Domestic Product
RBV:	Resource-Based View
VIF:	Variance Inflation Factor
ANOVA:	Analysis of Variance
CBD:	Central Business District



CHAPTER ONE

INTRODUCTION

1.0 Background of the study

Small and medium enterprises (SMEs) are recognized as a component of the world's economy, particularly in developing countries. They have significant impacts on economic growth, industrialization, and employment creation. The Kenya National Bureau of Statistics (2016) explains that SMEs are crucial to the country's economic growth, as they account for almost 40% of the country's gross domestic product (GDP) and occupy approximately 80% of the employment. The inherent dexterity of SMEs and their capacity to respond promptly to market changes make them an important element in Kenya's overall economic growth strategy. Nevertheless, despite their significant contribution to the economy, SMEs in Nairobi County, like many others in Kenya, are subject to many problems that stifle their growth and long-term viability. These noted limitations are diverse and encompass limited access to finance, poor infrastructure, unavailability of skilled labor, and the frustrations of coping with a regulatory environment that is evolving so rapidly.

One very real but frequently ignored concern for such companies is their ability to innovate and spend on Research and Development (R&D). In the current era of globalization, innovation is increasingly considered a vital force behind competitive advantage. Innovation gives organizations the bargaining power to differentiate, drive operational efficiency, and respond better to the changing needs of their customers. To SMEs, innovation is more than a tool for expansion; it is a matter of survival in the face of growing competition. In contrast, research and development (R&D) is the building block for innovation. It involves systematic activities aimed at developing new products, enhancing current services, and discovering new technologies that can be used to gain a competitive edge.

As a result, large firms have been the focus of research into innovation and R&D in many industrialized economies because they can potentially spend widely on such areas. On the other hand, a significant gap needs to be filled regarding how SMEs, especially those in developing countries like Nairobi County, engage in innovation and R&D activities. These SMEs face different problems: fewer financial resources, less access to sophisticated technologies, and a challenging economic environment compared with larger enterprises in more developed economies.

In addition, the specific value of innovations is their market performance. The in-depth Analysis of those challenges in this work is intended to develop valuable insights that may serve as a source of building proper policies and strategies for stimulating the development of SMEs within the region. This work is structured around several key sections to treat those topics consistently. This will be followed by a literature review chapter that will critically investigate existing studies concerned with the role of innovation and R&D in the growth of SMEs, with a special emphasis on identifying the lacuna in existing information. The following methodology chapter describes the research design, data collection, and Analysis procedures. Finally, the interpretation of facts will be done to present conclusions and recommendations to better the innovation capabilities of SMEs in Kenya.

1.2 Statement of the Problem

Innovation and R&D are crucial components in the success equation of both firms and economies. Even though SMEs play a crucial role in the economy, little or no research has been conducted into how these enterprises in Nairobi County undertake innovation, and R&D. Most research work available to date focuses on major businesses' experiences emanating from the developed economies where resources and infrastructure that support innovation are easily accessible. This has, in effect, underrepresented the unique challenges and opportunities SMEs face in developing locations like Nairobi County. Targeted research has left a gap in knowledge regarding how Nairobi County SMEs can effectively leverage innovation and R&D to enhance market performance. Policymakers, business leaders, and other stakeholders do not understand the peculiar problems facing small businesses or how this affect or support the impact of their innovative activities. They, therefore, cannot be well-placed to construct successful policies that could assist SME growth and innovation in the region.

The paper tried to fill this gap by investigating the role of innovation and R&D in the growth and success of SMEs in Nairobi County. The present study, therefore, tried to draw valuable lessons from how SMEs in this region approach innovation and R&D, identify the main obstacles they face and analyze the impact of these activities on market performance. The research added value to knowledge that could help inform sound policies and strategies in developing effective ways to support the growth and innovation of SMEs.

1.3 Objective of the study

The fundamental goal of this research is to investigate and comprehend the role of innovation and R&D in the expansion and success of SMEs in Nairobi County. The study intended to achieve the following objectives:

1. Investigate how SMEs approach innovation and R&D and its effect on SMEs' Performance in Nairobi County.
2. Identify key challenges for SMEs when performing R&D and their Effect on SMEs' Performance in Nairobi County.
3. Analyze how innovation and R&D efforts affect the market performance of SMEs in Nairobi County.

1.4 Research Questions

To fulfill the objectives, this study will strive to address the following research questions:

1. How does SMEs' approach to innovation in R&D Affect SMEs' Performance in Nairobi County?
2. What are the primary challenges affecting SMEs' performance in Nairobi County when involved in R&D?
3. How does innovation improve the market performance of SMEs in Nairobi County?

1.5 Significance of the Study

These findings were helpful to a broad category of stakeholders, including policymakers, owners, and managers of SMEs, investors, and academic researchers. The utility to each category is described below: Policymakers used the evidence-based findings of the study in building policies that encouraged innovation and growth in SMEs. Understanding specific problems and opportunities regarding SMEs in Nairobi County enabled policymakers to implement programs that met such needs, providing a better climate for SME development. The report provided practical recommendations on how to surmount innovation and R&D challenges. Identifying key elements of successful innovation practices enabled owners and managers of SMEs to take appropriate measures to enhance their competitiveness and market performance. The study identified elements contributing to SME performance in Nairobi; thus, it was easy for investors to identify opportunities. Also, it helped the investor appreciate the importance of innovation and R&D in driving business success as an important factor in making

resource allocation decisions towards SMEs. The study added to the literature on SME innovation and R&D, but most importantly, in developing economies. The study laid a foundation for future research in this area by filling the vacuum in the literature regarding how SMEs in Nairobi County engage in innovation and R&D.

1.6 Scope of the Study

The study focused on SMEs in Nairobi County by investigating their innovation strategies, R&D activities, problems faced, and the subsequent impact on their market performance. This study did not cover SMEs outside Nairobi County and all other factors contributing to the success of SMEs other than innovation and R&D. The research was limited to SMEs within various industries in Nairobi County, with data gathered from surveys for a comprehensive grasp of the challenges presented.

1.7 Definitions of Terms

Small and Medium-sized Enterprises: Those businesses with a limited scale of employees and revenues. The exact definition may differ in various industries and countries, but generally, SMEs are characterized by having fewer employees and lower turnover than larger companies.

Innovation: This refers to translating ideas into valuable goods, services, or processes. Innovation can be in the form of a new product, an improvement of an existing product, or even a new process to advance business operations. **Research and Development:** Businesses do activities for innovation, such as introducing new products and services or improving existing products and services. While R&D is strongly associated with basic scientific research, it also involves the application of new knowledge in practical ways to develop novel solutions.

1.8 Chapter Summary

This chapter provided a detailed overview of the research background, emphasizing the importance of innovation and R&D to the growth and success of SMEs in Nairobi County. This chapter also highlighted the problem statement, research aims, and questions, as well as the significance and scope of the study. In addition, keywords have been defined to clarify the issues presented throughout the paper. The next chapter reviewed related literature by examining meaningful theories and models of empirical investigations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction.

Innovation and R&D are significant concerns in the study of the growth and performance of SMEs within the literature on financial economics. Since SMEs remain a vital engine of economic growth, especially for developing economies, there is an increasing need to understand the financial and economic underpinning of their innovation processes. This chapter reviews the existing literature, relating it to some of the key concepts in financial economics and pointing out omissions that this research will try to fill.

2.1 Theoretical framework

From a financial economics perspective, innovation in SMEs has roots in several well-known economic theories. These set a framework to analyze the dynamics of innovation, the role of financial restrictions, and the economic factors that influence SMEs. In the next section, I discuss some key theoretical standpoints underpinning this research, referring to essential works and state-of-the-art research.

2.1.1 Schumpeterian Theory of Innovation

Joseph Schumpeter's innovation theory is indispensable to explaining the relationship between innovation and economic development. According to Schumpeter, economic growth is based on creative destruction, where new inventions disrupt current markets, replacing old products and services with new ones. This would mean that, from Schumpeter's point of view, SMEs may spur economic growth by introducing new products, methods, or services that compete with existing market participants. Schumpeter viewed innovations under five heads: new products, new manufacturing processes, new supply sources, market discovery, and new business models. In the above context, SMEs, with their speed and flexibility, have been more capable of such resourcefulness, often in developing economies where large enterprises shy away from innovating. Thus, innovation means having a competitive advantage in market dynamics that are rapidly changing, such as the case in Nairobi County, and sustaining Schumpeter's argument that without innovation, long-term economic success is impossible.

2.1.2 A Resource-Based View (RBV) of the Firm

Barney introduced, in 1991, the Resource-Based View (RBV) of the firm, which provides another theoretical lens through which to understand SMEs' innovation. According to RBV, a company's competitive advantage is based on a firm's ability to acquire and manage valuable, rare, unique, and not easily substitutable resources. The innovation that arises in the context of SMEs often means exploiting a firm's unique resources and competencies in situations characterized by small-scale and less access to finance than large enterprises. This is why contingency theory is best explained when innovation in a study of SMEs focuses on the development based on internal resources and competencies. Financial economics also cuts across the RBV by emphasizing that financial resources are important to enterprises in enabling their investment. This paper, therefore, will investigate how SMEs in Nairobi County use their resources to innovate and how financial constraints bind their ability to innovate.

2.1.3 Pecking Order Theory.

The Pecking Order Theory, developed by Myers and Majluf in 1984, describes a firm's capital structure choice. Simply put, the theory suggests corporations like to finance their investments with internal money, such as retained earnings, instead of going for external financing options, such as debt or equity. This concept of choice is based on knowledge asymmetry and the higher costs of external finance. Therefore, this pecking order theory is particularly relevant to small and medium-sized enterprises that often face restricted access to external capital markets. Financial constraints may significantly hamper their investing in innovation and result in underinvestment in R&D. The study will investigate how the capital structure decisions of SMEs in Nairobi County impact their innovative activities and whether financial constraints act as a barrier to innovation.

2.2 Empirical Studies on Innovation in SMEs

Empirical studies have consistently shown a positive relationship between innovation and firm performance. Audretsch (1995) found that innovative SMEs have higher growth rates and are more resistant to economic recessions. This result is significant in financial economics, where innovation is often considered an important determinant of corporate value and long-term profitability. Other works by Acs and Audretsch (1988) confirm that SMEs disproportionately

contribute to innovative activity, given their size. Innovation is a prime means for SME growth and competitiveness.

2.2.1 Approaches to innovation and R&D

McDermott and Prajogo 2012 examined the effects of exploration and exploitation innovation orientations on business performance in SMEs. They followed a quantitative approach with their work based upon the empirical gathering from 180 Australian service organization managers. The main finding, controlling for size, was that neither of these orientations could exhibit any significant direct effect on firm performance. However, the combination of both orientations, so-called ambidextrous innovation, was positively related to enhanced business performance, indicating a synergistic effect. Further Analysis showed that the impact of these innovation orientations on performance was moderated by firm size among the subsample of small firms. The findings suggested that simultaneously exploiting and exploring innovations are most beneficial for service SMEs. It suggested that these companies balance and integrate both innovations to enhance business performance.

Credit constraints and information asymmetry are just two of the monetary frictions that are vital in sourcing the barriers to the financing of innovation by SMEs. The financial constraints may hamper the ability of SMEs to obtain the necessary finance for R&D activities and, in this way, may lead to under-investment in innovation. This research investigates how financial frictions impact SMEs' innovation, mainly how these bottlenecks could be reduced with the support of financial policy measures and new financial instruments, including fintech solutions. Rekarti and Doktoralina 2017 proposed a theoretical model for improving business performance in SMEs by analyzing the direct and indirect impacts of entrepreneurial and market orientations on performance, using adaptability as a mediating variable. They developed their model through a thorough literature review and suggested that entrepreneurial and market orientations positively impact SME performance. This model further suggests that the relationship between the two orientations and performance is mediated by adaptability, insinuating that SMEs could improve performance by cultivating adaptability due to changes in their environments. An SME should enhance entrepreneurial, market orientations, and adaptability to ensure better business results.

Obokoh and Goldman 2016 studied the effect of infrastructure deficiency on the performance

of manufacturing SMEs in Nigeria. In this study, the authors adopted a panel research design in surveying 500 SMEs, supplemented by semi-structured interviews conducted in 2007 and 2011. The Analysis found that infrastructural deficiency negatively influenced SME profitability and performance due to the high costs involved in providing one's infrastructure and distributing final products. The privatization of electricity generation in 2013 did not result in any appreciable improvement in power supply. The study remarked that the inadequacy of infrastructure imposes formidable challenges on SMEs in Nigeria and recommended increased investment in infrastructure by the government to support SME development.

Al Suwaidi et al. (2020) systematically reviewed the influence of innovation management on SMEs regarding their performances. The paper reviewed 17 research articles dated between 2015 and 2019; it mentions that all the targeted research articles used questionnaires, survey approaches, and case analyses from multiple states such as Pakistan, Mexico, Kuwait, Indonesia, and Italy. Product and process innovations are found in his study to positively impact the firm's SME results. It was concluded that effective innovation management is key in driving the improvement of competitiveness and performance of SMEs. The authors suggested that SMEs undertake structured innovation management practices for performance improvement.

2.2.2 Key challenges facing SMEs in embracing Innovation and R&D

Gompers and Lerner (2001) referred to venture capital as a vital source of finance for high-risk, high-reward innovation projects in SMEs. Empirical evidence also shows that venture capital-backed firms invest significantly more in R&D and are more likely to introduce new products and processes. In this direction, government policies may help SMEs also overcome some of their financial barriers, such as subsidies and tax breaks on R&D. For instance, Czarnitzki and Hottenrott (2011) found that government funding for R&D can significantly enhance the innovation capability of SMEs, particularly in industries characterized by high technological uncertainty.

Indrawati et al. (2020) identified inhibiting factors in applying technological innovation in small and medium enterprises within the province of Riau in Indonesia. This is a mixed-methods research design wherein 277 SMEs responded to the surveys, FGDs, IDIs, and observation. The key five significant obstacles were a lack of government support, low human resource quality, shortage of finance, unfavorable economic situation, and business partners. The most significant

among them was the lack of sufficient funding. The study recommended that SMEs develop more consumer-oriented services and foster a more proactive attitude towards innovation to realize these challenges. In return, the authors suggested that SMEs collaborate closely with the government and financial sectors in securing support and resources necessary for technological innovation.

Gachara and Munjuri (2018) conducted a study to establish SMEs' innovation challenges in Nairobi, Kenya. The target population consisted of 100 SMEs listed among the top 100 medium-sized companies in East Africa in 2016, with a descriptive study approach using purposive sampling. Data was collected using questionnaires and analyzed using descriptive statistics, including percentages, means, and standard deviations. It reveals five significant issues concerning innovation: knowledge-based challenges, resource-based challenges, technological, legal, policy-based, and environmental challenges. This is summarized by the fact that 45% of the SMEs perceived it as a challenging area for innovation, 37% as relatively, and 18% as not an issue. From these findings, SMEs have been advised to work jointly with bigger businesses concerning investment into innovation activities due to the potential cost reduction or attaining set objectives. The authors indicated that partnerships between SMEs and large enterprises would facilitate resource sharing and innovative capability.

Sharfaei et al. (2023) investigated how the uncertainty of a market influences the performance of international small and medium-sized firms operating in Iran. This was a quantitative study in which data were gathered from 166 foreign SMEs in Iran. The PLS method was used in analyzing the results, which showed that market uncertainty significantly influences the performance of SMEs but not through competitive advantage. Hence, the authors indicated that international SMEs should focus on developing an all-round view of market uncertainty to improve performance in developing markets. They said that "SMEs should keep abreast of how the various uncertainties affect them for high performance," particularly for countries with a high "ambiguity."

2.2.3 Innovation and R&D efforts

Nguyen et al. (2022) explored innovation's effect on SMEs' performance in Vietnam. The empirical Analysis was conducted using data from 7,729 Vietnamese SMEs. The results showed

that innovation positively affects SMEs' performance, and product innovation is more influential than process innovation. So, the authors concluded that promoting innovation is the key factor for enhancing the performance of SMEs in emerging economies. They called for policymakers and business leaders to create enabling environments and provide necessary resources to spur innovation in SMEs.

In one of the most recent research analyses, Chalmers et al. (2020) studied how research and development and internationalization have affected the efficiency of companies that belonged to non-high technology industry sectors for their SME groups. Their sample was taken from 128 Italian SMEs from Amadeus, following a stratified random sampling technique; they collected empirical information through structured questionnaires. Results indicated that R&D investments were positively related to SME performance but with diminishing benefits beyond optimal. In addition, internationalization was found to reinforce performance, implying that involvement in foreign markets increases the advantages of R&D activities. The authors concluded that non-high-technology SMEs could enhance their performance through investment in R&D and internationalization strategies. They recommended that SMEs carefully manage their R&D investment to avoid diminishing returns and expand into international markets where the performance gains can be optimized.

Gong et al. (2023) explored the relations between emerging technologies and the R&D activities of leading global companies. The authors have proposed a new approach that fully utilizes the power of integrating different data sources and analytic tools to map emerging technologies with top R&D-spending companies globally. The results indicated that the method was verified by a significant positive correlation between their mapping of technology companies and related patent data. The authors drew on their model as a good framework to understand the inter-relationships between companies and emerging technologies. They recommended applying it to future research for an in-depth study of specific technology themes, competitive landscapes, and concerns about national interests.

Zaman and Tanewski (2023) drew on an analysis of the association between R&D investment, innovation, and export performance by SMEs and large firms. They investigated the empirical evidence at the firm level using data from a sample of Tunisian manufacturing firms from 2004 to 2006. The results showed that R&D investment positively affects innovation positively affects innovation, enhancing export performance. The authors have, therefore, concluded that promoting R&D activities is essential in stimulating innovation and export performance at firms of varying sizes. The authors have thus suggested that policymakers and business leaders promote R&D activities to enhance innovation and international competitiveness.

2.2.4 The Relevance of Literature Review to Research Objectives

The literature reviewed provided a comprehensive understanding of SMEs' innovation drivers. The objectives of this research are directly related to the important themes mentioned in the literature. Therefore, this study sought to investigate and understand the role of innovation and R&D in the expansion and success of SMEs in Nairobi County, with particular emphasis on how such constraints might be mitigated to enhance the innovation capability of SMEs. It also intended to shed more light on the role of financial variables in innovation processes, drawing from existing academic literature, and thus provide valuable and practical insights to policymakers and business executives.

2.3 Research / Knowledge Gap

Despite considerable research into innovation in SMEs, there is still some lacuna, and the current study sought to fill this gap. First, most empirical studies have focused on developed economies, with few attempts to investigate the unique constraints and opportunities SMEs face in developing nations such as Kenya. This geographical skew shows that further, more specialized research is necessary, acknowledging developing economies' specific economic, financial, and institutional features. The literature on the interaction of financial economics and innovation in SMEs is still developing. Despite a significant volume of research into the financial, social, technological, and political constraints facing SMEs, few comprehensive studies have combined the theories of financial economics and innovation to provide a more holistic view of how SMEs

deal with financial problems and stimulate creativity.

The study aimed to fill this research gap by exploring and understanding the contribution of innovation and R&D on the growth and performance of SMEs in Nairobi County. Further, the role of fintech in facilitating SMEs' innovation and the contribution of digital innovation have been explored less. The growing momentum of digital financial services hence opens an avenue to shift the focus toward how fintech solutions can bridge this gap and help SMEs innovate more effectively. This new field was studied, and the insights on how fintech helps SMEs improve their innovation capability were helpful in research.

2.4 Conceptual Framework.

A conceptual framework is a systematic and organized representation of concepts, variables, and the relationships among them that define the basis of a research study. It serves as the basis for identifying the most influential factors in the problem and guides the research process like a map or navigator. The study's conceptual framework was founded on the relationship between the role of innovation and R&D play in ensuring SMEs' performance.

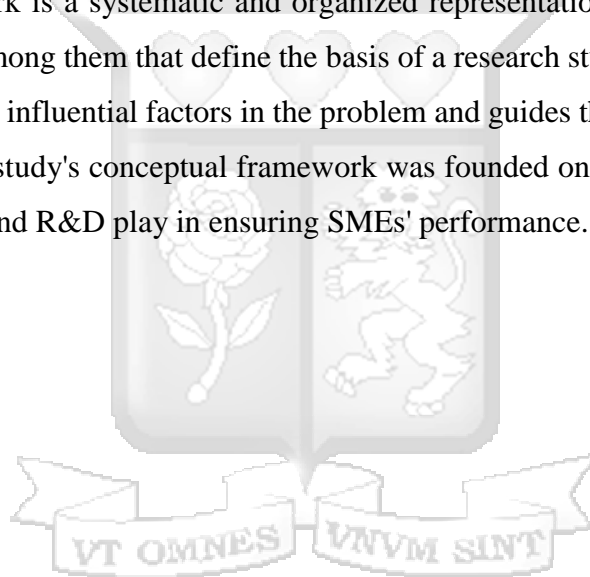
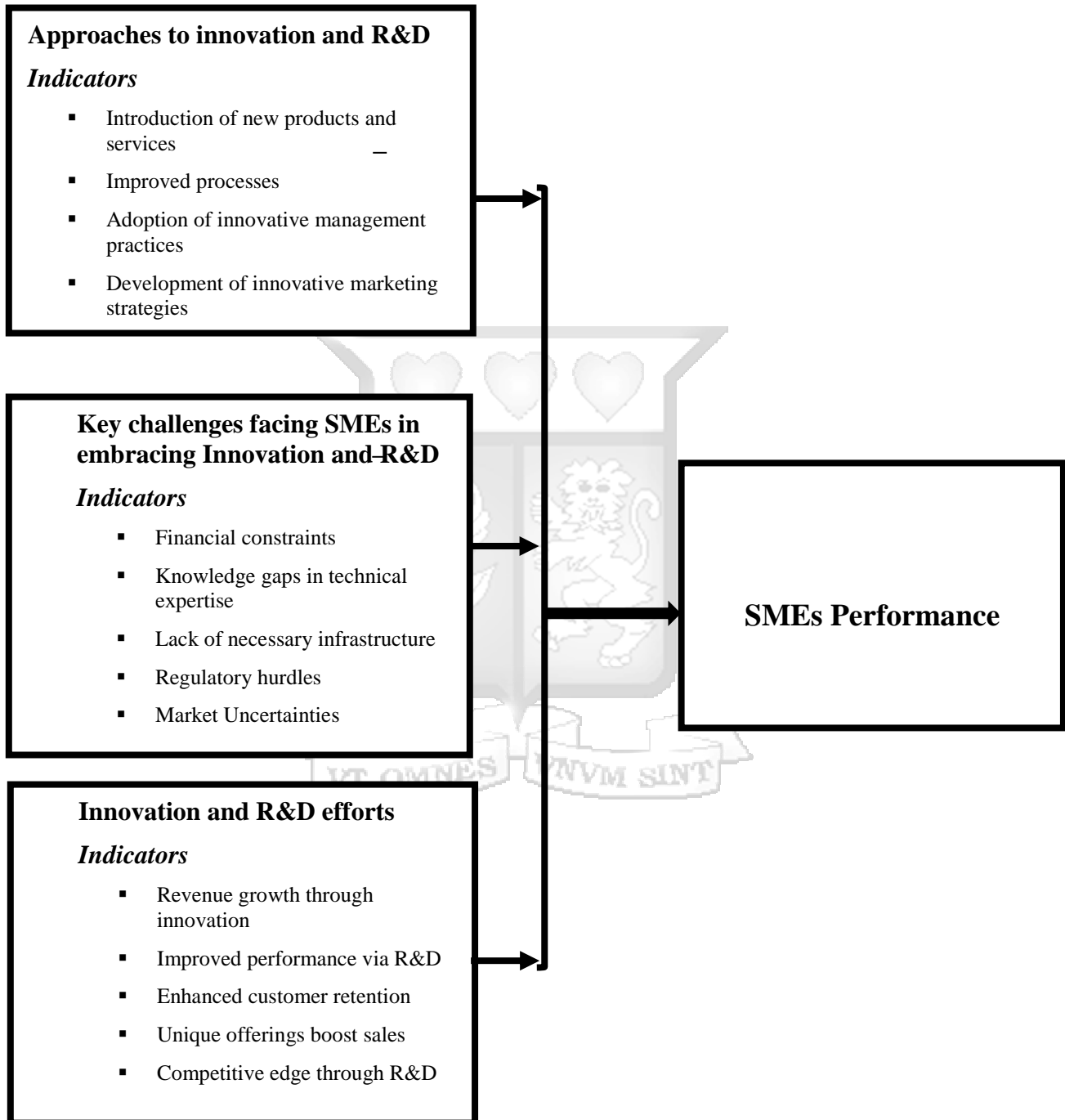


Figure 1: Conceptual Framework

Independent Variables

Dependent Variables



2.5 Chapter Summary

A literature review showed how important innovation and R&D are for SME growth and performance. The different theoretical frameworks and empirical studies presented in this chapter laid a potentially sound foundation for the dynamics of innovation in SMEs. However, there are still some very significant gaps. Considering these gaps in the literature, this study has sought to investigate the influence of innovation and R&D on SMEs within Nairobi County. This research aims to add to the literature on this topic and provide practical insights to help SMEs in developing economies improve their innovation potential.



CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction.

The current chapter describes the research methodology for the study in great detail: its design, demographics, sample strategy, procedures for data gathering, and its processing regarding ethical issues. It presented a complete overview of the methodologies and tactics used to accomplish the goals outlined in the study, as stated in previous chapters. The design ensures that the findings of this study are valid, reliable, and generalizable to a broader context of SMEs in Nairobi County, hence helpful in providing insights into the influence of innovation and R&D activities on the growth and performance of SMEs.

3.1 Research Design

The research design offered a plan for the study in a manner that all the elements logically and coherently fit together in such a way as to answer the research questions correctly. This research has applied a mixed-methodology strategy incorporating quantitative and qualitative research methods. This was justified by its capability of embedding the strengths of both methodologies into one, yielding a richer understanding of the subject matter. Quantitative approach: The cross-sectional survey design of the study encompassed numerical data on the scope of R&D activities, innovation practices, and growth indicators among SMEs. It allowed for statistical testing of correlations between variables and sets of hypotheses deducible from a theoretical framework. Cross-sectional design: The cross-sectional design allowed for an overview of SMEs' current state of innovation and R&D activity. Consequently, this qualitative part allowed an intense investigation into the barriers to and enablers of innovation and R&D in Nairobi County, with contexts rich in helping to interpret some quantitative results. The approach was particularly invaluable in showing how those kinds of complicated phenomena, such as expressing a cultural influence, could make differences in creativity not measurable. In discussing the results, the quantitative and qualitative findings will be integrated and used to understand the research questions comprehensively. This was achieved through triangulation, a method whereby statistical patterns of quantitative data are contextualized and explained using qualitative insights. For instance, quantitative findings about the relationship between R&D

investment and growth among SMEs were justified by qualitative findings on challenges and strategies related to R&D, as identified by owners and managers of SMEs. Unexpected results or discrepancies in the quantitative data will be investigated through the qualitative data to allow for further interpretation of these findings. The mixed-methods approach would ensure that the study covers not only the measurable impacts of innovation and R&D but also the lived experiences and perceptions of the stakeholders of the SMEs, thus giving a holistic view of the subject matter.

3.2 Population and Sampling Techniques

3.2.1 Population

The target population for this study was SMEs operating within Nairobi County. According to estimates by the Nairobi City County Government, there are more than 100,000 registered SMEs across different manufacturing, services, trade, and technology sectors, among others. Therefore, the innovation and R&D activities are targeted at SMEs with more than three years of operation since these would likely engage in the subject matter of the study. This is justified because newly established SMEs may not have had the opportunity or resources to invest in such activities; hence, their inclusion could distort the findings.

3.2.2 Sampling Technique

Stratified random selection was applied to ensure that the sample was representative of the diverse industries within which SMEs are found. This was done by dividing the Population into several strata based on industry sectors and then drawing a random sample from each stratum. The stratification ensured that the findings were generalizable to the rest of the types of SMEs in Nairobi County, thereby increasing the study's external validity.

The sample size for finite populations was estimated using Yamane's (1967) formula.

$$N= n \times (1+n (e^2))$$

$$100,000 = n \times (1 + (100,000 \times 0.05^2))$$

$$100,000 = n \times (1 + (100,000 \times 0.0025))$$

$$100,000 = n \times (1+250)$$

$$100,000= n \times 251$$

$$100,000 = 251$$

$$100,000 = \frac{251}{251}n$$

$$n = 398$$

Using this formula, the sample size was determined to be 398 SMEs. The sample size was sufficient to produce statistically significant results while considering practical time and resource restrictions.

3.3 Data Collection Methods

3.3.1 Quantitative Data Collection

Quantitative data was collected through a structured questionnaire addressed to the owners and managers of the selected SMEs via WhatsApp and email. It consists of closed questions to capture numerical data on the following important variables: the firm's degree of innovation and R&D activity and types of innovations according to products, processes, and marketing. To ensure the reliability and validity of the questionnaire, it was first piloted among 10 SMEs. This would bring out the ambiguities or flaws in the questions and thus enable appropriate changes before the full-scale survey was undertaken. The data collection took two months to complete, during which the field researchers visited the SMEs and delivered the questionnaires to the respondents, assisting them whenever necessary.

3.4 Data Analytical Procedures

3.4.1 Quantitative Data Analysis.

Quantitative data from the survey were analyzed using statistical techniques. The statistical Analysis was executed in two significant steps: Descriptive statistics, which are the mean, median, mode, and standard deviation of the data, and summarizing and showing key variables. These measures describe the main trends and dispersion in the data, enabling pattern identification and determination of trends in innovation and R&D activities among SMEs. This research's quantitative approach employed descriptive and inferential statistics to test hypotheses on the correlation between innovation, R&D, and SME growth. The innovative efforts and SME growth metrics were correlated through a correlation analysis. Regression analysis was undertaken to explore how spending on R&D influences SME growth across firm size and industry sectors. The same Analysis gave an overview of the contribution of R&D activities to the performance of corporations, enabling more information-rich decisions and

suggestions. All the data were analyzed with the help of statistical tools like R to ensure appropriate accuracy and reliability of the results. Quantitative Analysis has shown some trends and connections that had been studied in more detail with qualitative Analysis.

3.4.2 Qualitative Data Analysis.

The data from the questionnaires were analyzed thematically. Thematic Analysis is a method for detecting, interpreting, and reporting themes or patterns of data. The steps are as follows: Familiarization with data: The researcher reads and rereads transcripts to develop familiarity with data and notes preliminary ideas and observations. Coding: Data was coded rigorously enough to uncover important aspects that will link to the concerns of the study. Coding involves highlighting fragments of text that are important or interesting and then developing these into broader themes. Themes were developed by combining codes and collecting data relevant to the Analysis. This involved the identification of patterns and relationships in the data, linking different codes to form coherent themes. Themes were checked to see whether they accurately reflect the data and relate to the study's aims. This included comparing the themes with the coded extracts and the complete dataset to guarantee consistency and coherence. Themes were created and named with explicit reference to the study aims. The themes were named to represent their essence and significance to the study's findings. Qualitative Analysis further deepened the contextual elements that drive innovation and R&D in SMEs, complementing the quantitative Analysis by allowing a more subtle interpretation of the data.

3.5 Pilot Test

A pilot test is a small-scale preliminary investigation conducted to evaluate the feasibility of time, cost, risk, and possible problems associated with the full-scale research project. This helps the researcher identify the problems and refine the study design before conducting the primary research in 2017. Whitehead et al. (2016) suggested that 10% of the total sample size be used to test for the reliability and validity of research instruments. This guideline was followed in the study by selecting 10% of the sampled SMEs to carry out the pilot test for the clarity of the survey questions, the effectiveness of the data collection, and any adjustments necessary before the main study.

3.6 Validity and Reliability

Validity and reliability denote the accuracy and consistency of research instruments. Reliability describes the instrument's consistency in producing stable and repeatable results, whereas validity signifies that the instrument measures what it is intended to measure (Taherdoost, 2016). To show content validity, the questionnaire was subjected to rigorous scrutiny by the project supervisor. He was approached to review the statements in the questionnaire regarding relevance, clarity, and appropriateness for the study's objectives. His recommendations were used to develop the final tool to increase its validity and suitability.

Cronbach's Alpha was used to test the reliability of the research instrument. The acceptance level of the reliability coefficient is 0.70 and above, showing that the instrument is reliable for research. This is as recommended by (Tavakol and Dennick, 2011).

Table 1: Reliability

Variables	Items	Cronbach's Alpha
Innovation_RnD	7	0.751
Challenges	7	0.790
Innovation_RnD_Efforts	7	0.735
SMEs_Performance	7	0.803

These showed that all variables had a Cronbach's Alpha above 0.70, hence being highly internally consistent and maintaining reliability for the research tool applied. It could be inferred that the questionnaire was valid and reliable enough to collect data in this study.

3.7 Diagnostic Tests

3.7.1 Multicollinearity test

Multicollinearity refers to a statistical condition where, in a regression model, two or more independent variables are highly correlated to the extent that the individual effect of each independent variable on the dependent variable cannot be determined. According to Gujarati & Porter (2009), high multicollinearity results in inflated standard errors of the coefficients, which

gives unreliable statistical inferences. The detection of Multicollinearity was done using Variance Inflation Factor and Tolerance values. A VIF value greater than 10 showed a high degree of Multicollinearity.

3.7.2 Heteroscedasticity

This is a condition whereby the error terms across all levels of the independent variables are not constant; hence, Heteroscedasticity is the violation of homoscedasticity in the regression model (Gujarati & Porter, 2009). The Breusch-Pagan/Cook-Weisberg test was used to test for Heteroscedasticity. The p-value, less than 0.05, was significant, indicating Heteroscedasticity (Greene, 2012).

3.7.3 Normality test

The normality of the residuals from the regression model has been tested. The normality of the residuals is a fundamental assumption in any regression analysis, as any violation results in biased estimates and may affect the validity of hypothesis testing itself. Wooldridge, 2013 has supported it.

3.5 Ethical considerations

Ethical issues were taken seriously during research; thus, the study was conducted with integrity and respect for participants. The following ethical considerations have been taken into account: The participants were informed about the purpose of the study and the procedures, roles, and rights of the participants. Informed consent was obtained prior to collecting the data. Anonymity was ensured by anonymizing data to ensure participant confidentiality. Personal information was identified from the transcripts and questionnaires, and the final report ensured no personal information was divulged. Voluntary participation was strictly voluntary. The participants were assured that they might withdraw from the study at any time without adverse consequences. This principle was emphasized to ensure that participation was voluntarily free of duress. Harm minimization: The study did not expose participants to physical, psychological, or emotional harm. Sensitive themes were avoided in the study, and the research process was polite, considerate, and supportive toward the well-being of the participants.

3.6 Chapter Summary.

This chapter focused on the methods employed in carrying out this study: the research design, Population and sample strategies, data collection methods, methods for data analysis, and dealing with ethical issues. This mixed-methods approach- blends quantitative and qualitative methods methods- is designed quite knowledge of how innovation and R&D affect the growth and performances of SMEs in Nairobi County. The next chapter presented the study's findings, followed by a discussion of the results in light of the theoretical framework and existing literature.



CHAPTER FOUR
RESEARCH FINDINGS AND DISCUSSION

4.0 Introduction

This section included an analysis of the outcomes of the role of R&D in the growth of SMEs within the Nairobi County CBD. Tools used in the investigation were questionnaires. This chapter presents and analyses the results of the Analysis of data gathered.

4.1 Presentation

4.1.1 Response Rate

Table 2: Response Rate

Particulars	Frequency	Percentage (%)
Returned and Completed	340	85.5%
Returned and Incomplete	32	8.0%
Incomplete	16	4.0%
Not Returned	10	2.5%
Total	398	100

Table 2 shows the response rate assessment for the sample participants. Of the 398 questionnaires distributed, 340, 85.5%, were completed and returned, while 32, 8.0%, were returned incomplete. The questionnaires not returned but incomplete amount to 16, which is 4.0%, and those not returned at all amount to 10, which is 2.5%. Therefore, this means an 85.5% response rate, which is considered highly adequate for the investigation. Mugenda and Mugenda (2013) stated that a 60% response rate is adequate to make conclusions, but the response rate should be 70% and above for analyses and conclusions from the results.

4.1.2 Gender Distribution

Figure 2: Gender Distribution

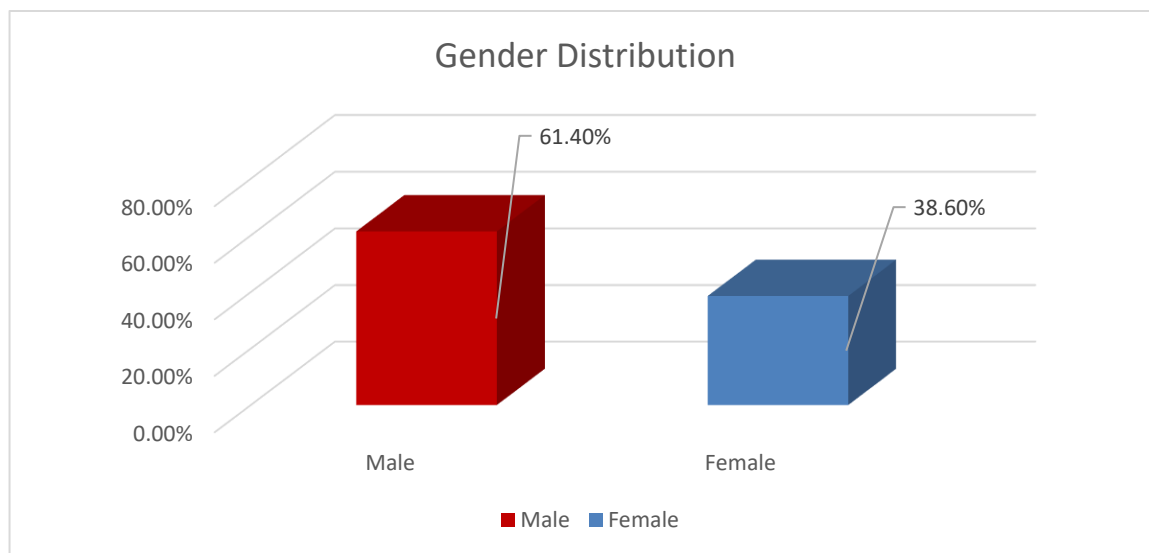


Figure 2 shows the distribution of participants' gender, and the response rate indicated that 61.3% of the respondents were male and 38.7% female. The findings indicated that the majority of the participants were males. Such findings showed that the SME sector in Nairobi County had a gender balance set out in Kenya's 2010 Constitution.

4.1.3 Age Distribution

Table 3: Age Distribution

Age bracket	Frequency	Percentage (%)
18-25	90	26.5
26-35	102	30
36-45	130	38.2
46 and above	18	5.3
Total	340	100

Table 3 represents the age of the participants in the survey. From the results, 26.5% of the participants were aged between 18 and 25 years, 30% between 26 and 35 years, 38.2% between 36 and 45 years, and 5.3% were aged 46 years and above. These results showed that the age bracket of 36-45 years dominated the SME industry within Nairobi County, holding the highest proportion of the participants at 38.2%.

4.1.4 Level of Education

Figure 3: Level of Education

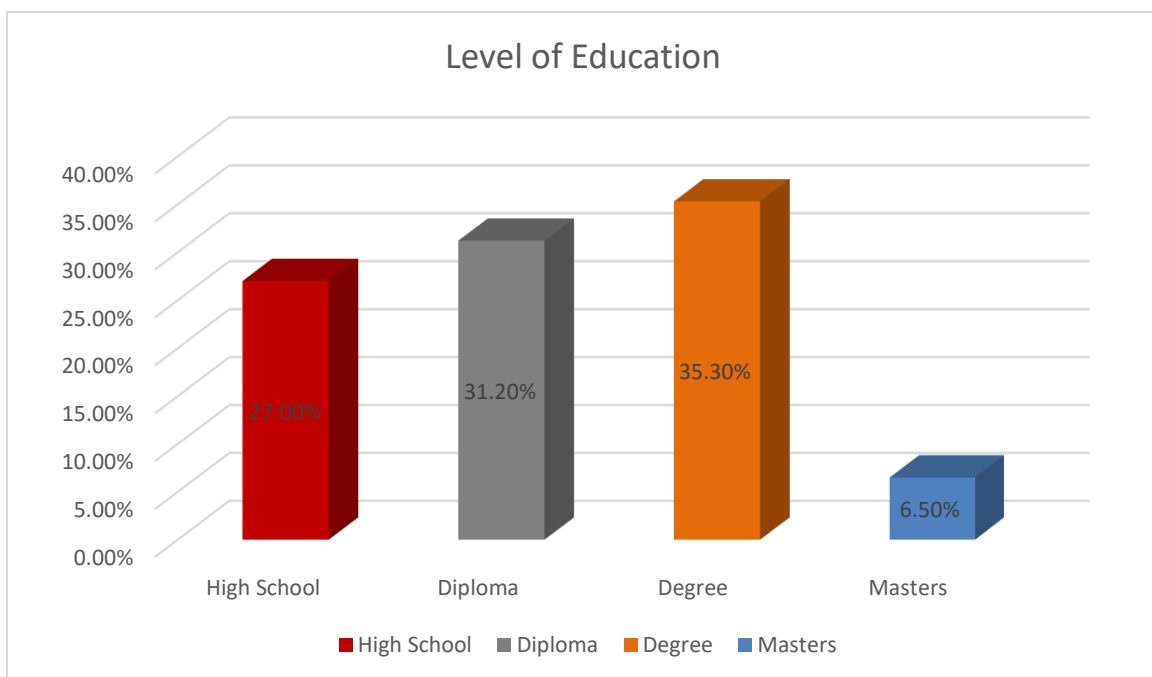


Figure 3 presents the educational attainment of the research participants. From the results, 35.3% were degree holders, while 31.2% were diploma holders. 27% had a high school education, while 6.5% were master's degree holders. This indicated that more than 66% of the respondents had at least a diploma level of education and thus a relatively high educational attainment rate.

4.1.5 Years of Experience in the Sector

Table 4: Years of Experience in the Sector

Work Experience	Frequency	Percentage (%)
0 – 5 Years	112	33.0
6 – 11 Years	132	38.8
12 and above Years	96	28.2
Total	340	100

Table 4. Respondents' years of experience in the SME sector. From the above results, 33% of the respondents had experience in the sector for 0–5 years, 38.8% had experience in the sector for 6–11 years, whereas 28.2% had experience in the sector for 12 or more years. The above results thus indicate that most of the respondents, at 38.8%, had experience falling within a moderate class of 6-11 years in the SME sector.

4.2 Descriptive statistics

This section provides an in-depth Analysis of the independent variables. It analyzes descriptive statistics concerning the SME's approach to R&D, key challenges facing SMEs in adopting innovation and embracing R&D, and how R&D efforts affect the market performance of SMEs. Respondents have grouped the responses concerning the magnitude of the impact they think the said factor has on their SME. The responses ranged from Very High, High, Moderate, Low, and None, corresponding to a Likert scale from 5 to 1, with five being Very High and 1 being None.

4.2.1 Descriptive SME Approach to Innovation and R&D

The study results show that innovation and R&D significantly influence the performance of SMEs. All these factors were measured using a 1–5 Likert-type scale, where 5 meant to a great extent, 4 to a great extent, 3 to a moderate extent, 2 to a low extent, and one meant not at all. Cooper & Schindler, 2012 say that a mean score of less than 3.00 indicates a disagreement with

the statements, whereas 3.00 and above shows agreement.

Table 5: Descriptive statistics on SMEs approach to innovation and R&D

Statements	Very High	High	Moderate	Low	None	Mean	Std. Dev.
	F	F	F	F	F		
	%	%	%	%	%		
Introducing new products and services due to embracing innovation and R&D improves SMEs' performance.	145 42.64	120 35.29	65 19.12	10 2.94	0 0	4.18	3.74
Implementing new or improved processes due to embracing innovation and R&D enhances SME performance.	60 17.65	115 33.82	130 38.24	25 7.35	10 2.94	3.56	3.17
Adopting new management practices or organizational structures due to embracing innovation and R&D boosts SMEs' performance.	100 29.41	150 44.12	70 20.59	15 4.41	5 1.47	3.96	3.54
Developing and applying new marketing strategies due to embracing innovation and R&D improves SMEs' performance.	110 32.35	100 29.41	105 2.94	10 2.94	15 4.41	3.82	3.45

The findings indicated that because of embracing innovation and R&D, the introduction of new products and services dramatically improves SMEs' performance. As many as 42.64% of the respondents reported this to a very high extent, while 35.29% reported this to a high extent. The mean for this statement was 4.18, with a standard deviation of 3.74, reflecting remarkable consensus among the participants. Similarly, introducing new or improved processes enhanced SMEs' performance: 17.65% of the participants showed a very high extent, 33.82% high, and

38.24% moderate. The mean for this aspect of the study was 3.56 with a standard deviation of 3.17, which means that the level of agreement with the statement is average, with quite a variation in the respondents' responses.

Other factors that influence performance include introducing new management practices or organizational structures. In support, 29.41% of the respondents indicated a very high extent, while 44.12% reported a high extent, with a mean score of 3.96 and a standard deviation of 3.54. Hence, there is broad agreement that management innovation is an important booster of SME performance. Other aspects that were seen to enhance performance include the development and application of new marketing strategies. Some 32.35% reported this to a great extent, while 29.41% reported a great extent. The mean score was 3.82, and the standard deviation was 3.45, indicating a consistent agreement from the respondents.

It emerged from these findings that the adoption of innovation through new product introduction, the application of new process technologies, the adoption of innovative management practices, and the adoption of marketing strategies have an uptick in the better performance of SMEs. With all the mean scores above 3.00 for all statements, agreement among the respondents was well identified, though some differences in variation on this aspect are captured in the standard deviations.

4.2.2 Descriptive on SMEs Key challenges

There were many critical challenges facing SMEs' performances, with financial limitations, knowledge about technical know-how, infrastructure constraints, regulatory barriers, and market insecurities being the dominant constraining forces. These challenges were rated on a 5–1 Likert-type scale; thus, a mean score greater than 3.00 implied that participants agreed to those items being the areas of their impact.

Of all the factors, financial constraint was one major obstacle noted, as 27.64% said it affects performance to a very great extent and 41.18% reported it as affecting their business to a great extent. This is underpinned by a mean of 3.88 and a standard deviation of 3.47, showing consensus that low finances prevent SMEs from growing and performing.

Table 6: Descriptive on SMEs Key challenges

Statements	Very High	High	Moderate	Low	None	Mean	Std. Dev.
	F	F	F	F	F		
	%	%	%	%	%		
Financial Constraints Affect SMEs' Performance	95	140	80	20	5	3.88	3.47
	27.64	41.18	23.53	5.88	1.47		
Knowledge gaps in technical expertise affect SMEs' Performance.	90	125	70	35	20	3.68	3.34
	26.47	36.76	20.59	10.29	5.88		
Lack of Necessary Infrastructure Effect on SMEs' Performance	70	180	50	25	15	3.78	3.39
	20.59	52.94	14.71	7.35	4.41		
Regulatory Hurdles Effect on SMEs' Performance	104	100	85	40	11	3.72	3.37
	30.59	29.41	25.00	11.76	3.24		
Market Uncertainties Effect on SMEs' Performance	85	201	20	20	14	3.95	3.54
	25.00	59.12	5.88	5.88	4.12		

The knowledge gaps in technical expertise were also one of the significant challenges. This factor was rated as having a very high impact by 26.47% of the respondents and as high by 36.76%. With an average of 3.68 and a standard deviation of 3.34, the findings underscore the dire need for capacity-building initiatives to equip SMEs with the relevant skills for improved

performance suitably. Infrastructure limitation issues were extreme, and respondents reported being impacted to a high extent by this particular constraint at 52.94% and to a very high extent at 20.59%. With a mean of 3.78 and a standard deviation of 3.39, there is a high need to improve the infrastructure that can support SMEs' operational efficiency and competitiveness.

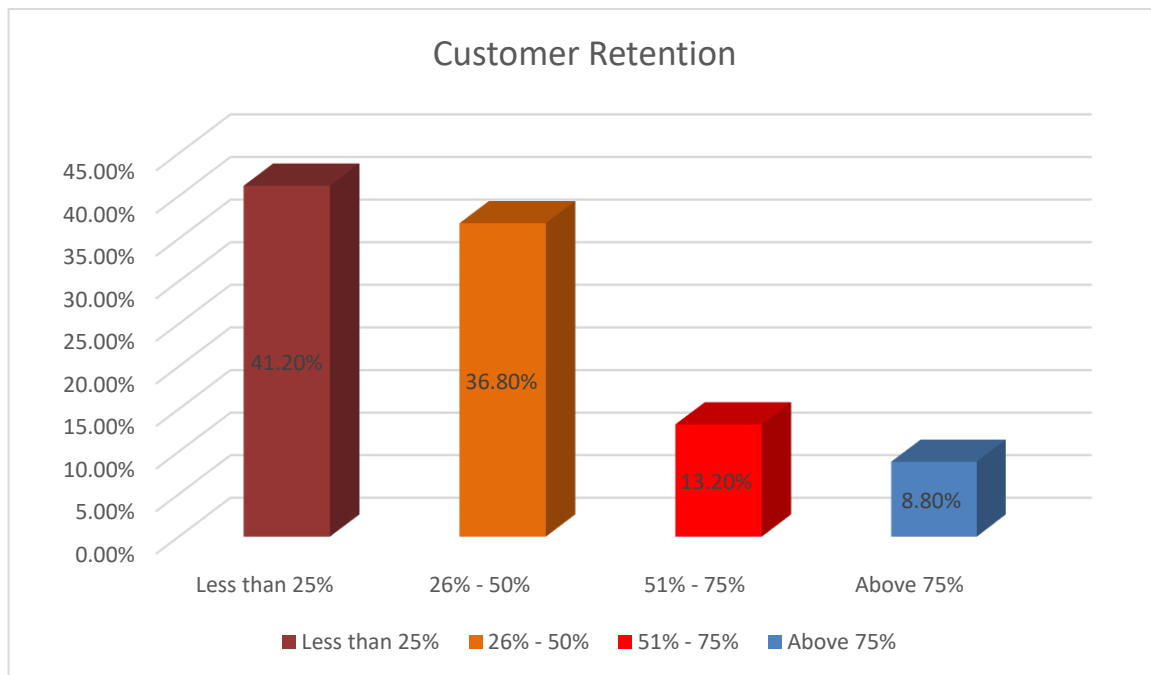
Regulatory hurdles were also immense, while 30.59% of the surveyed viewed this impact as very high, and another segment of 29.41% perceived it as high. The same is suggested by the mean of 3.72 and the standard deviation of 3.37- a dire need for clear regulatory frameworks that will not only support enterprise but also simplify obstacles to overall SME growth. The respondents reported market uncertainties as a considerable challenge, with 59.12% reporting a high impact and 25.00% a very high extent. This factor attained the highest mean score of 3.95 with a standard deviation of 3.54, showing that unpredictable market conditions surround SMEs. The Analysis portrayed SMEs' different dimensions with several obstacles, but the main ones included were financial, infrastructural limits, and uncertainty of the markets. All the challenges recorded their mean scores above 3.00; thus, they could be relevant but differed in strength. Such a finding brings the need for intervention programs to address such barriers so that an enabling environment can also allow SMEs to thrive.

4.2.3 Innovation and R&D efforts

The researcher sought to determine the percentage of repeat customers as a result of embracing innovations and indulging in R&D. The responses received were presented in Figure 4:

Out of these, 41.20% of total responses claimed that less than 25% of customers were return customers. In most cases, the aftereffects of innovation and R&D showed a relatively lower level of customer loyalty and reflected further potential for improvement using innovative practices for retention. A further 36.80% said this comprised 26% to 50% of their clientele. This means a decent success in driving loyalty through innovation, showing the reasonable influence of R&D in retaining customers for the same group.

Figure 4: Customer Retention



However, it was also found that 13.20% of the respondents witnessed repeat customer levels between 51% and 75%, showing that a smaller fraction of the group has gained substantial benefits from innovation and R&D in achieving significant loyalty enhancement. Further, 8.80% reported customer retention rates above 75%.

4.2.4 Effect of innovation and R&D on market performance

Innovation and R&D efforts were measured against their impact on revenues, performance, customer retention, uniqueness of product offerings, and competitive advantage. Statements were rated on a 1–5 Likert-type scale, where five means to a great extent, four is to a great extent, three is to a fair extent, two is to a limited extent, and one is to no extent. The results showed that innovation and R&D efforts have significantly helped increase revenue and overall performance, with the mean standing at 3.82. Most respondents agreed to a great extent at 40.59%, while 27.06% felt it was very high. There is some disparity in the data, as shown by a standard deviation 3.43.

Table 7: Effect of innovation and R&D on market performance

Statements	Very High	High	Moderate	Low	None	Mean	Std. Dev.
	F	F	F	F	F		
	%	%	%	%	%		
Innovation and R&D efforts have helped me improve my revenue and overall performance.	92 27.06	138 40.59	78 22.94	22 6.47	10 2.94	3.82	3.43
Innovation & R&D has enhanced customer retention, thus Improving my Business Performance.	123 36.18	105 30.88	54 15.88	38 11.18	20 5.88	3.80	3.48
Innovation and R&D have enabled me to introduce unique products/services, thus improving the sales of my Business.	95 27.94	139 40.88	50 14.71	35 10.29	21 6.18	3.74	3.40
Innovation and R&D have strengthened my competitive advantage, thus improved performance.	85 25.00	184 54.12	42 12.35	20 5.88	9 2.65	3.93	3.51

Similarly, the role of research and development (R&D) and innovation in supporting customer retention and business performance was also emphasized, with a mean score of 3.80. A significant percentage of the respondents (36.18%) assessed this to a considerable extent, followed by 30.88% who assessed it to a large extent. This reflects the critical role of R&D in sustaining customer loyalty, as indicated by a standard deviation of 3.48. R&D and innovation were also found to facilitate companies in developing innovative products and services, thus increasing sales. A mean of 3.74 indicates agreement, with 40.88% of the respondents attributing a very high success rate to R&D activities, while 27.94% said it was very high. The

standard deviation of 3.40 indicates moderate variability in responses. The stakeholders agreed that R&D and innovation have enhanced their competitive position, which improved performance. With the highest mean score of 3.93, 54.12% of the respondents rated this statement as high, and 25.00% said it was a very high degree. The standard deviation 3.51 reflects diverse experiences on the part of respondents to this advantage. The evidence confirms that R&D and innovation are significant drivers of customer retention, product differentiation, revenue growth, and competitive superiority and thus contribute an important part towards business performance.

4.3 Diagnostic tests

The diagnostics test conducted for this paper included the multicollinearity test (Shapiro-Wilk test), Dublin Watson test, Breusch Pagan test, and Normality test.

4.3.1 Multicollinearity Test

Table 8: Multicollinearity Test

Model		Collinearity Statistics	
		Tolerance	VIF
1	Innovation_RnD	.619	1.616
	Challenges	.502	1.991
	Innovation_RnD_Efforts	.612	1.635

From the results below, all the variables presented tolerance values greater than 0.2 and VIF values less than 10, as highlighted in Table 8. According to Myres, 2015, VIF values above 10 indicate the presence of Multicollinearity. Therefore, the results guarantee the absence of Multicollinearity among the study's independent variables. Innovation_RnD had a tolerance of 0.619 and a VIF of 1.616, while Challenges had a tolerance of 0.502 and a VIF of 1.991, with Innovation_RnD_Efforts having a tolerance of 0.612 and a VIF of 1.635. The metrics confirm that the variables are suitable for regression analysis without any possibility of redundancy or inflated relationships.

4.3.2 Breusch Pagan Test

Table 9: Breusch Pagan Test

Breusch Pagan Test	
LM	Sig
1.2386	.7438

Heteroscedasticity is a condition whereby the dependent variable is projected to be of unequal variability for any one value of the independent variable throughout the latter variable's range. The absence of Heteroscedasticity in a regression model may render the estimates of parameters inefficient and unreliable. The Breusch-Pagan/Cook-Weisberg test was carried out, as suggested by Greene, 2012, to test for Heteroscedasticity. The result of the Breusch-Pagan test was an LM statistic of 1.2386 with a significance level of 0.7438. Since the p-value was above 0.05, one failed to reject the null hypothesis of homoscedasticity. This showed no heteroscedasticity. Hence, it confirmed that homoscedasticity was assumed in the dataset.

4.3.3 Normality Test

In the normality test from Shapiro-Wilk, all data proved to be normally distributed. Similarly, with the same variables, p-values of more than 0.05 have shown that all these variables did not deviate much from normality. The Shapiro-Wilk statistic for Innovation_RnD is 0.9946 p-value: 0.2723, Challenges is 0.9941 with a p-value of 0.2084, the Innovation_RnD_Efforts statistic results are 0.9968 with a resulting p-value of 0.7467, and lastly, the SMEs_Performance is 0.9961 with a resulting p-value of 0.5691. These are represented in Table 10, which confirms that all the variables were normally distributed, justifying the use of parametric statistical methods in subsequent analyses.

Table 10: Normality Test

	Variable	Test	Statistic	P Value
1	Innovation_RnD	Shapiro-Wilk	0.9946	0.2723
2	Challenges	Shapiro-Wilk	0.9941	0.2084
3	Innovation_RnD_Efforts	Shapiro-Wilk	0.9968	0.7467
4	SMEs_Performance	Shapiro-Wilk	0.9961	0.5691

4.4 Correlation Analysis

Outcomes in Table 11 established significant correlations between the variables under investigation, which were tested. Innovation R&D significantly and positively correlated with SMEs' performance ($r = .671^{**}$, $p < 0.001$). It established that as innovation R&D activities increased, SMEs' performance improved. In the same vein, challenges also demonstrated a positive and significant correlation with SMEs' performance ($r = .836^{**}$, $p < 0.001$), indicating that successful resolution of challenges led to improved organizational performance. In addition, innovation R&D activities also demonstrated a positive and significant correlation with SMEs' performance ($r = .679^{**}$, $p < 0.001$), indicating that increased research and development activities contributed to improved performance. Moreover, challenges showed a significant and positive relationship with innovation R&D activities ($r = .609^{**}$, $p < 0.001$), highlighting the connection between challenge overcoming and research and development efforts building up. The findings evidenced that innovation R&D enhancement, challenges, and R&D effort reinforcement all work in synergy to impact the performance of small and medium-sized enterprises (SMEs).

Table 11: Correlation Analysis Matrix

Correlations					
		Innovation_RnD	Challenges	Innovation_RnD_Efforts	SMEs_Performance
Innovation_RnD	Pearson Correlation	1	.602**	.474**	.671**
	Sig. (2-tailed)		<.001	<.001	<.001
	N	340	340	340	340
Challenges	Pearson Correlation	.602**	1	.609**	.836**
	Sig. (2-tailed)	<.001		<.001	<.001
	N	340	340	340	340
Innovation_RnD_Efforts	Pearson Correlation	.474**	.609**	1	.679**
	Sig. (2-tailed)	<.001	<.001		<.001
	N	340	340	340	340
SMEs_Performance	Pearson Correlation	.671**	.836**	.679**	1
	Sig. (2-tailed)	<.001	<.001	<.001	
	N	340	340	340	340
**. Correlation is significant at the 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed).					

4.5 Regression Analysis

Table 12: Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	Sig. F Change
1	.880 ^a	.775	.773	4.78	.775	386.38	<.001

As seen in Table 12, the findings validate the model's sufficiency in explaining study phenomena. The model summary showed a strong correlation ($R = 0.880$) of independent variables with SMEs' performance. The value of R Square as 0.775 implies that about 77.5% of the variation in SMEs' performance is explained by Innovation R&D, Challenges, and Innovation R&D Efforts. Adjusted R Square of 0.773 is also evidence of the model's strength. The findings demonstrate the significant role of innovation R&D in effectively addressing major challenges confronting SMEs and enhancing R&D efforts to enhance their performance. The high R Square value indicates the substantial impact these factors have on organizational success, which aligns with the arguments provided by Jarantow et al. (2023) for the appropriateness of regression analysis in explaining complex relationships between variables.

4.6 ANOVA Analysis

Table 13: ANOVA

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26519.166	3	8839.722	386.379	<.001 ^b
	Residual	7687.137	336	22.878		
	Total	34206.303	339			

These results have verified that the regression model was significant, with an F-value of 386.379 and a p-value less than 0.001, thus showing the model's effectiveness in explaining variation in SME performance. The mean square for the regression was very high as opposed to the residual,

indicating how strongly the independent variables had affected the dependent variable.

4.7 Coefficients

Table 14: Coefficients

Coefficients						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10.536	1.165		9.040	<.001
	Innovation_RnD	.227	.033	.225	6.830	<.001
	Challenges	.534	.035	.559	15.323	<.001
	Innovation_RnD_Efforts	.235	.034	.232	7.013	<.001

The results of the coefficients led to the formulation of the following regression equation:

$$Y = 10.536 + 0.227X_1 + 0.534X_2 + 0.235X_3$$

Where:

Y = Performance of SMEs

10.536 = Constant term

X₁ = Innovation R&D (β = 0.227)

X₂ = Challenges (β = 0.534)

X₃ = Innovation R&D Efforts (β = 0.235)

These findings showed that Innovation R&D had a beta coefficient of 0.227 unstandardized, indicating that *ceteris paribus*, a unit increase in Innovation R&D would increase the performance of SMEs by 0.227 units. The key challenges affecting SMEs were observed to have the highest positive impact, with a beta coefficient of 0.534. If there is a unit increase in

addressing these Challenges *ceteris paribus*, SME performance will improve by 0.534 units. Innovation R&D efforts also had a positive effect, with a coefficient of 0.235, meaning that *ceteris paribus*, a one-unit increase in the efforts will lead to a 0.235-unit improvement in SME performance. The constant term was 10.536, which means the baseline performance of SMEs when all other variables are held constant. All coefficients were statistically significant, at p -values < 0.001 , hence reliable in explaining the performance of SMEs.

4.8 Research Limitations

Two limitations are evident in this study, which influenced its scope and findings. The study targeted only SMEs within Nairobi County, excluding other SMEs in other parts of Kenya that might have different innovation and R&D dynamics. The study targeted only the SMEs' owners, managers, and R&D teams and excluded the customers and policymakers

4.9 Chapter Summary

This chapter deals with results and a discussion based on data collected from SMEs in Nairobi County. The response rate, demographic profile, and characteristics of SMEs are presented here. This section has elaborated on descriptive statistics showing the influence that innovation and R&D practices have on performance among SMEs. The regression and correlation test indicated a significant positive relationship between the innovation variables and organizational performance to assert the crucial role of R&D efforts firmly. These factors include financial constraints, market uncertainties, and regulatory hurdles. Results pointed out the transformative role played by innovation and R&D in increasing SMEs' competitiveness and growth.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter summarized the findings from the study, went further to make actionable recommendations, and presented a conclusion. It also critically evaluated the findings to ensure they aligned with the aims of the study and the research questions. The Analysis was further enhanced by relating the findings to insights from the literature review, which made informed inferences possible. Equally, this chapter interpreted implications for the study, provided ways forward for further research, and gave practical ways through which innovation and R&D could be promoted among SMEs.

5.1 Summary of Findings

Effect of Innovation and R&D on the Performance of SMEs

The study examined the influence of innovation on the performance of SMEs, considering new product introductions, improvements in processes, and the adoption of new business strategies. The correlation analysis showed that innovation and SME performance are significantly related at $r = 0.671$, $p < 0.001$. The regression result shows that at constant (10.536), *ceteris paribus*, a unit increase in innovation contributes 0.227 to SME performance. The ANOVA results have confirmed that innovation significantly affects the performance of SMEs indeed, $F = 386.379$, $p < 0.001$. This finding indicates that SMEs with active innovations have high revenue growth, improved customer retention, and a good competitive advantage.

Effect of Key Challenges on the Performance of SMEs

The study, however, isolated some of the significant issues that deter SMEs from growing: financial constraints, knowledge gaps in technical know-how, lack of essential devices or infrastructures, uncertainties within the marketplace, and regulatory challenges. Using the Pearson correlation model, a strong positive association was observed between addressing these challenges and the performance of SMEs ($r = 0.836$, $p < 0.001$). Regression results showed that

at constant (10.536), *ceteris paribus*, a unit increase in mitigating these challenges leads to a 0.534 improvement in SME performance. The results of ANOVA verified that overcoming challenges significantly impacts performance: $F = 386.379$, $p < 0.001$. These findings suggest that increased finance, infrastructure improvement, and policy reforms can allow SMEs to prosper.

Effect of R&D Efforts on the Performance of SMEs

This study has investigated the impact of investment in R&D, such as technology adoption and product development, on SME performance. The correlation analysis indicated that R&D efforts are significantly and positively related to the performance of SMEs, with a correlation coefficient of 0.679 significant at $p < 0.001$. Regression coefficient: Constant 10.536; *ceteris paribus*, there is a 0.235 increase in SME performance for every unit increase in R&D efforts. The results of ANOVA confirm that the R&D efforts significantly influence SME growth and competitiveness, with $p < 0.001$. These results highlight the importance of continuous R&D investments in enhancing SMEs' sustainability for long-term success.

5.2 Conclusion

The study established a conclusion from the findings that innovation strategies had innovation strategies significantly influenced performance in SMEs within Nairobi County, Kenya. Innovation allows an enterprise to meet customer needs and preferences, as it enhances the product and service quality, given that consumers' demands keep changing over time. Further, innovation gives SMEs a competitive advantage through differentiation and operational efficiency enhancement. In fact, from the regression results, it can be seen that innovation is significantly related to SME performance because product, service, marketing, and process innovation all contribute to business growth. Therefore, in the current study, innovation significantly helps to raise revenue, expand market share, and improve customer retention among SMEs.

The study again finds that challenges, financial constraints, market uncertainties, and regulatory barriers are significant deterrents to SME performance. Overcoming the challenges contributes much to business growth, as indicated by the strong positive relationship between overcoming obstacles and SME performance. Discussing the capability approach has demonstrated a call for

financial support, infrastructure development, and policy reforms to create an enabling environment for business.

In addition, the R&D drive was one of the leading factors in SME performance. Investing in R&D improves product development, service delivery, and innovation in the business. Eventually, it enhances competitiveness. SMEs that actively invest in R&D show increased sales revenue, improved market positioning, and sustainability in their business growth. Therefore, the study concludes that innovation, overcoming key challenges, and R&D efforts are cumulative ingredients for SMEs' long-term success and sustainability.

5.3 Recommendations

The study recommended the following:

The study suggested that SMEs should be interested in investing in innovative technologies to compete in the dynamic business environment. This includes adopting automation to reduce operations costs and enhance efficiency. SMEs must be interested in continuously developing new products and refining existing ones to extend their product life cycle and increase returns. This will spread the market risk and help the business continue to exist.

It suggested addressing the financial constraints SMEs face by considering various alternative sources of finance like venture capital, crowdfunding, and grants offered by the government. Secondly, it urged SMEs to undertake training on financial literacy that helps improve budgeting, investments, and resource management. Regarding the regulatory challenge, SMEs need to actively get involved in industrial associations advocating SME-friendly policies for them and offering training on regulatory matters. The study recommended that SMEs increase market research to improve their knowledge of consumer trends and lessen uncertainties. It is recommended that a portion of revenue be plowed back to R&D to drive innovation and competitiveness in the long run. Investments in research shall enable SMEs to enhance the existing products, have smooth operations, and improve service delivery. The SMEs need to implement strategies for benchmarking by studying the industry leaders and thereafter incorporate best practices into their organizations.

5.4 Suggestion for further research

Future research should focus on the impact of digital technologies, including AI, cloud computing, and big data analytics, on SME performance. Digital transformation will help explain how SMEs use technologies to make themselves more efficient and competitive.



REFERENCES

- Acs, Z. J., & Audretsch, D. B. (1988). Innovation in large and small firms: An empirical analysis. *American Economic Review*, 78(4), 678-690.
- Al Suwaidi, F., Alshurideh, M., Al Kurdi, B., & Salloum, S. A. (2020). The Impact of Innovation Management in SMEs Performance: A Systematic Review. *Lecture Notes in Computer Science*, 122–134.
- Audretsch, D. B. (1995). *Innovation and industry evolution*. MIT Press.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120.
- Czarnitzki, D., & Hottenrott, H. (2011). Financial constraints: Routine versus cutting-edge R&D investment. *Journal of Economics & Management Strategy*, 20(1), 121-157.
- Gachara, H. N., & Munjuri, M. G. (2018). Innovation Challenges Encountered by Small and Medium Enterprises in Nairobi, Kenya. *International Journal of Economics, Commerce and Management*, 6(6), 717-730.
- Gompers, P., & Lerner, J. (2001). The venture capital revolution. *Journal of Economic Perspectives*, 15(2), 145-168.
- Gong, X., McFarland, C., McCarthy, P., Griffith, C., & Rizoiu, M.-A. (2023). *Informing Innovation Management: Linking Leading R&D Firms and Emerging Technologies*. Retrieved January 24, 2025, from arXiv preprint arXiv:2305.02476.
- Greene, W. H. (2012). *Econometric Analysis* (7th ed. ed.). Boston, MA: Pearson Education.
- Gujarati, D., & Porter, D. (2009). *Basic Econometrics*. (5th Edition, ed.). New York.: McGraw Hill Inc.
- In, J. (2017, December). *Introduction of a pilot study*. *Korean J Anesthesiol*. Retrieved January 23, 2025, from doi: 10.4097/kjae.2017.70.6.601.
- Indrawati, H. C. (2020). Barriers to technological innovations of SMEs: How to solve them? *International Journal of Innovation Science*, 12(5), 545–564.
- Jarantow, S. W., Pisors, E. D., & Chiu, M. L. (2023). *Introduction to Using Linear and Nonlinear Regression Analysis in Quantitative Biological Assays*. Wiley Periodicals LLC.
- Kenya National Bureau of Statistics. (2016). *Micro, small, and medium establishments (MSME) survey 2016*. KNBS.

- McDermott, C. M., & Prajogo, D. I. (2012). Service Innovation and Performance in SMEs. *International Journal of Operations & Production Management*, 32(2), 216-237.
- Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187–221.
- Nguyen, T. V., Pham, T. T., & Le, T. B. (2022). Innovation and SMEs performance: evidence from Vietnam. *Asian Education and Development Studies*, 11(4), 573-586.
- Obokoh, L. O., & Goldman, G. (2016). Infrastructure Deficiency and the Performance of Small and Medium-Sized Enterprises in Nigeria's Liberalised Economy. *Acta Commercii*, 16(1), 1-10.
- Rekarti, E., & Doktoralina, C. M. (2017). Improving Business Performance: A Proposed Model for SMEs. *European Research Studies Journal*, 20(3), 613-623.
- Schumpeter, J. A. (1934). *The theory of economic development: An inquiry into profits, capital, credit, interest, and the business cycle*. Harvard University Press.
- Sharfaei, S., Ong, J. W., & Ojo, A. O. (2023). The impact of market uncertainty on international SME performance. *Cogent Business & Management*, 10(1).
- Taherdoost, H. (2016). Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey. *International Journal of Academic Research in Management*, 5(3), 28-36.
- Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's Alpha. *International Journal of Medical Education*, 2, 53-55.
- Whitehead, A., Julius, S., Cooper, C., & Campbell, M. (2016, June 25). *Estimating the sample size for a pilot randomized trial to minimize the overall trial sample size for the external pilot and main trial for a continuous outcome variable*. Retrieved January 23, 2025, from doi: 10.1177/0962280215588241.
- Wooldridge, J. M. (2013). *Introductory econometrics: A modern approach* (5th ed. ed.). South-Western Cengage Learning.
- Zaman, M., & Tanewski, G. (2023). R&D investment, innovation, and export performance: An SME and large firms analysis. *Journal of Small Business Management*, 1–34.

QUESTIONNAIRE

SECTION (A): GENERAL INFORMATION

Kindly indicate your response by ticking appropriately in the box provided.

What is your gender?

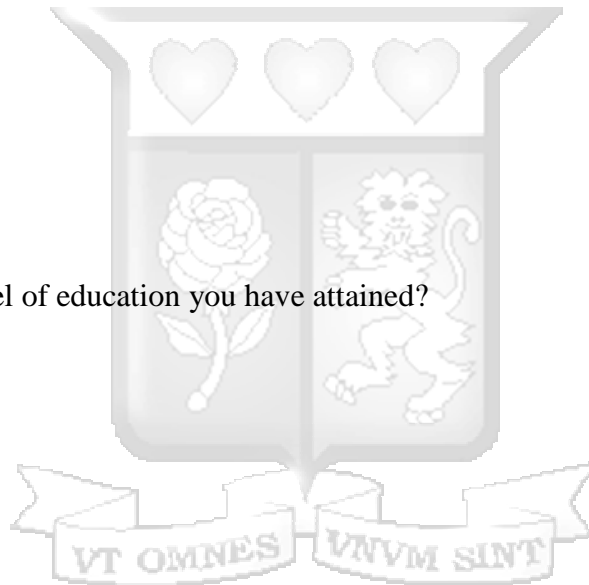
- Male
- Female

What is your age group?

- 18–25 years
- 26–35 years
- 36–45 years
- 46 years and above

What is the highest level of education you have attained?

- High School
- Diploma
- Bachelor's Degree
- Master's Degree



How long have you been in business?

- 0–5 years
- 6–10 years
- 11 years and above

SECTION (B): APPROACHES TO INNOVATION AND R&D

To what extent do the following innovation practices, resulting from embracing R&D, improve your SME's performance?

Likert Scale: 5 – Very High, 4 – High, 3 – Moderate, 2 – Low, 1 – None

Statements	5 – Very High	4 – High	3 – Moderate	2 – Low	1 – None
Introducing new products and services due to embracing innovation and R&D improves SMEs' performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Implementing new or improved processes due to embracing innovation and R&D enhances SMEs' performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adopting new management practices or organizational structures due to embracing innovation and R&D boosts SMEs' performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developing and applying new marketing strategies due to embracing innovation and R&D improves SMEs' performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION (C): CHALLENGES IN R&D

To what extent does your SME face the following challenges in conducting R&D?

Likert Scale: 5 – Very High, 4 – High, 3 – Moderate, 2 – Low, 1 – None

Challenges	5	4	3	2	1
Financial constraints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Knowledge gaps in technical expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of necessary infrastructure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Regulatory hurdles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Market uncertainties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Kindly elaborate on the most significant challenge your SME faces in R&D

.....

SECTION (D): IMPACT OF INNOVATION AND R&D ON MARKET PERFORMANCE

What percentage of your customers are repeat customers?

- Less than 25%
- 26–50%
- 51–75%
- Above 75%

To what extent do you agree with the following statements?

Likert Scale: 5 – Strongly Agree, 4 – Agree, 3 – Neutral, 2 – Disagree, 1 – Strongly Disagree

Statements	5	4	3	2	1
Innovation and R&D efforts have helped me improve my revenue and overall performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation & R&D has enhanced customer retention, thus Improving my Business Performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation and R&D have enabled me to introduce unique products/services, thus improving the sales of my Business.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Innovation and R&D have strengthened my competitive advantage, thus improved performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

