

**INFORMATION COMMUNICATION TECHNOLOGY ADOPTION,
EXTERNAL ENVIRONMENT AND FIRM PERFORMANCE OF
SMALL AND MEDIUM ENTERPRISES IN KIAMBU COUNTY,
KENYA**

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DECLARATION

I declare that this project report is my original and has never been submitted for the award of any degree in any other university.



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This project report has been submitted for examination with my approval as the University supervisor.

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DEDICATION

I dedicate this Research to my entire family for their continued understanding and moral support.

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ACRONYMS AND ABBREVIATIONS

| | |
|---------------|---|
| ANOVA | Analysis of Variance |
| DOI | Diffusion of Innovations Theory |
| GDP | Gross Domestic Product |
| HDI | Human development Index |
| ICT | Information and Communications Technology |
| KIPPRA | Kenya Institute for Public Policy Research and Analysis |
| KNBS | Kenya National Bureau of Statistics |
| MSEs | Micro and Small Enterprises |
| SME | Small and Medium Enterprises |
| SPSS | Statistical Package for Social Sciences |
| TAM | Technology Acceptance Model |

ABSTRACT

The research aimed to explore the impact of Information Communication Technology (ICT) adoption on the performance of SMEs in Kiambu County. It assessed the link between ICT adoption and SMEs' performance in Kiambu County as well as the impacts of the external environment on the relationship between ICT adoption and the performance of SMEs in Kiambu County. The study was grounded in two theories: the diffusion of innovations and the technology acceptance model. The study utilized a cross-sectional survey reliant on questionnaires. The study population comprised all registered Small and Medium Sized Enterprises (SMEs) in Kiambu County. The study targeted a sample of 385 respondents; 286 respondents completed the questionnaire, equivalent to a 74.3% response rate. Data analysis was done, and correlation was calculated. The results showed a moderate positive correlation ($r=0.494$) between the relationship of ICT adoption (Frequency of usage of ICT tools) and SMEs' performance. The results also showed a weak positive correlation ($r=0.149$) between the external environment and SMEs' performance. The results show that an increased frequency of ICT tool usage would lead to increased SMEs' performance in Kiambu County by 0.188. The researcher proposes additional studies to assess the combined impact of ICT adoption and the external environment on SME's performance.

CHAPTER ONE

INTRODUCTION

1.1 Background

Small and Medium Enterprises (SMEs) are businesses that generate revenue, own assets, and employ employees below specific numbers that vary in each country. Globally, SMEs play a big part in many countries' economies, especially developing countries. World Bank (2022) estimates that SMEs constitute 90% of all businesses worldwide, account for more than 50% of total employment, and are thus critical to developing economies as they contribute to 40% of their GDP. These figures highlight their importance to the global economy and their pivotal role in local economies.

In Kenya, SMEs provide the largest source of employment as they have engaged about 14.9 million persons and recorded 33.8% of the Gross Domestic Product (GDP) in 2015 (KNBS, 2016). SMEs also accounted for 81.1 per cent of employment, with Nairobi County reporting the highest proportion of employment in SMEs (KNBS, 2016).

The current study examines the effect of adopting Information Communication Technology (ICT) on SME's performance. The study also explores the impact of external environment on SMEs' firm productivity.

1.1.1 Information Communication and Technology Adoption

Ghobakhloo et al. (2011) stated that ICT is a general term for a variety of technologies that digitally enable information management, while Zuppo (2012) defined it as devices and infrastructure that will allow the digital transfer of information. Machii and Kyalo

(2016) defined ICT as the technological tools for capturing, transforming, transmitting, and allowing information communication. The current study adopts the definition by Machii and Kyalo (2016).

ICT was measured based on the technological tools used in SMEs. ICT tools include mobile phones, radios, television, tablets, fax machine, digital/video cameras, computers, and printers (KNBS, 2016). Mobile Money, Paybill Use, and acceptance of check transfers were also used as the measures of ICT adoption.

ICT is relevant in SMEs as they affect their productivity and growth, hence their overall performance (Haller & Siedschlag, 2007). ICT complexity, observability, and security are also factors that make it relevant to SMEs (Tan, Chong, Lin, & Eze, 2009). ICT influences the relationships between SMEs, suppliers, and customers (Tan et al., 2009).

ICT adoption is the utilization of ICTs tools such as computer hardware, software, and networks necessary for Internet connection (Ghobakhloo et al., 2011). Mkalama, Ciambotti, and Ndemo (2022) defined digital adoption as the progressive state of acquiring the ability to use new digital tools and processes. In this paper, ICT adoption is defined as the use of all the networking components, systems, applications, and devices that allow SMEs to manage information and carry out processes digitally.

ICT adoption is measured by assessing the utilization of ICT tools in place to promote technological processes. For instance, a business firm that uses a computer or a smartphone is considered ICT-capable. This measurement approach was utilized by Haller and Siedschlag (2007) in assessing ICT adoption in firms.

ICT adoption is relevant to SMEs, given its efficiency as a communication tool for customers while also reducing business correspondence costs (Tan et al.,2009). It poses challenges related to security, training, and compatibility issues. ICT adoption may change the working environment, organizational structures, and administrative processes, ultimately impacting the firm's performance (Ghobakhloo et al., 2011).

1.1.2 External Environment

Gono, Harindranath, and Özcan (2016) defined the external environment as the industry's structure, regulatory settings, and the availability of unavailability of technology service providers. Awa, Ukoha, and Emecheta (2012) defined the external environment as a combination of the readiness of the consumers and trading partners amidst competitive pressure. Machuki and Aosa (2011) described the external environment as legal, socio-cultural, political, ecological, technological, and economic factors. This paper defines the external environment as suppliers' and consumers' demands, perception of competition, belief about losing the market share or customers, and government-driven incentives.

Gono et al. (2016) measured the external environment by assessing the perceived influence of the supply chain networks, the role of ICT consultants, and government incentives. This study adopts these measures and adds the role of consumers to assess the impact of the external environment. The external environment influences the SME's decision to adopt ICT. Government policies imploring firms to adopt certain technologies encourage the use of ICT (Gono et al., 2016). The external environment provides new opportunities and complex challenges that demand creative responses from firms (Gathungu, Aiko, and Machuki., 2014). External environmental factors influence ICT adoption and firm performance (Gono et al., 2016).

1.1.3 Firm Performance

Okeyo (2014) defined firm performance as the outcomes directly tied to the firm's strategic goals, its economic contributions, and customer satisfaction. Gathungu et al. (2014) defined firm performance as the value the business delivers to its stakeholders and customers and how well the organization is managed. The current paper adopts the definition by Okeyo (2014).

SME performance was measured by assessing relevant business metrics, including customer service, profitability, growth, and market value. The impact of ICT on these metrics was demonstrated. These metrics were further broken down, as shown in Table 1.1.

Firm performance is relevant in showing the impact of ICT adoption. ICT implementation generates a positive effect depending on the stage at which technologies are harnessed and the availability of competent ICT professionals (Sofiane, 2018). Okeyo (2014) argues that ICT positively affects SME performance. It enhances marketing ability via ICT systems such as social media marketing and access to greater quantity and quality of information (Okeyo, 2014).

Table 1.1: Performance Metrics

| Business Metric | Measurable Aspect |
|------------------------|--|
| Customer Service | Increased rate of purchase, increased rate of returning customers, increased sales |
| Profitability | Return on Investment, net income, added economic value |
| Growth | Increased hiring, increased market value, higher sales, more customers |
| Market Value | Opened more branches, purchased more assets, increased net income |

Table 1.1 provides information on business metrics that were measured to assess the firm's performance in regard to ICT adoption. The metrics assessed were customer service, market value, growth, and profitability. They indicate the performance of SMEs as a result of ICT adoption.

1.1.4 Small and Medium Enterprises in Kenya

Small and Medium Enterprises in Kenya definition are often relative to employment figures, economy, sales volumes, and fixed assets (Awa et al., 2012; Berisha & Pula, 2015). Berisha and Pula (2015) stated that there was no best way of defining SMEs due to macroeconomic indicators and statistical arbitrariness. SMEs are businesses with a number of employees not exceeding a given threshold, which varies depending on the country (Sofiane, 2018). Nyokabi (2021) described SMEs as commercial entities cooperating with formal and informal sectors. The current paper follows Nyokabi's (2021) definition of SMEs.

SMEs contributed 1.78 trillion Kenya shillings of the total 5.668 trillion Kenya shillings of the gross value added in 2015, contributing 24.7% of the national output (KIPPRRA, 2021). This heavy reliance on SMEs to create employment and improve the county's productivity highlights the importance of ICT adoption.

Okeyo (2014) estimated that 60% of all SMEs fail annually in Kenya, a number that has declined to 46%, according to Kenya Bankers Association (2021). Okeyo (2014) attributed this high failure rate to internal and external factors. SMEs can be improved if their access to and utilization of ICT was enhanced (Okeyo, 2014).

1.1.5 Kiambu County

Kiambu County is among the 47 counties of Kenya and is in the central area. It has twelve constituencies and sixty wards. It is conveniently located and easily accessible. Kiambu boasts a diverse population of SMEs, including general, wholesale and retail outlets, food kiosks, transport, communication, and industrial factories and workshops. This diversity allows Kiambu to be reflective of the Kenyan SME economy.

Kiambu is Kenya's third most productive county, with a GDP of 422 billion Kenya shillings (Kiambu County Government, 2018). SMEs in Kiambu employ a huge population, and improving their performance could address the unemployment problem in Kiambu. SMEs' vital role in Kiambu's economy makes the county economy ideal for this research.

Kiambu has a conducive environment for SMEs, with a 98% mobile network and electricity coverage (Kiambu County Government, 2018). Kiambu has high literacy levels since the gross enrolment rate is 86.4% for secondary schools and 98.4% for primary schools (Kiambu County Government, 2018). The county already has the appropriate infrastructure that can be critical in the adoption of ICT and economic improvement of the county.

1.2 Research Problem

Although SMEs are the economy's engine, their ICT adoption remains limited. The informal nature of most SMEs and lack of awareness, knowledge, and skills on ICT cause low ICT adoption among SMEs. High costs of implementing ICT and limited profitability also prevent SMEs from investing in ICT. SMEs' inability to capitalize on ICT fully limits their economic growth and profitability.

Researchers argue that poor ICT adoption limits SMEs' ability to cope with their competitive environment (Mkalama et al., 2018). The availability or lack of technology service providers, appropriate infrastructure, and the governing infrastructure are external factors limiting ICT adoption (Gono et al., 2016). Scholars such as Mkalama et al. (2018) suggested that Kenyan SMEs have low automation levels, limiting their value addition and innovation as consequences of low productivity.

ICT can significantly influence the growth of businesses, and its adoption by SMEs can reduce the high closure rate and enhance their growth (Gono et al., 2016). SMEs created employment, reduced poverty and increased income sources for Kenyans (KNBS, 2016). Despite its potential benefits, the low rate of ICT adoption by Kenyan SMEs raises the question of the connection between ICT implementation on the performance of SMEs in Kenya and the function of the external environment in this relationship. Despite these documented benefits, the low rate of ICT adoption by Kenyan SMEs is worth studying as it raises the question: what is the relationship between ICT implementation on the productivity of SMEs in Kenya, and what role does the external environment play in this relationship?

1.3 Objectives of the Study

The overall objective is to assess the influence of ICT adoption on the performance of SMEs in Kiambu County. In doing so, the research aims to:

- a) Assess the relationship between ICT adoption and SMEs' performance in Kiambu County
- b) Evaluate the effects of the external environment on the connection between ICT adoption and the performance of SMEs in Kiambu County.

1.4 Value of the Study

SMEs may profit from the research's findings because they can maximize the benefits of ICT resources to improve the firm performance. SMEs may benefit by gaining information on the value of ICT systems and the moderating function of the external environment in firm productivity. SMEs may benefit from this study by gaining information critical to creating business plans and competitive strategies.

Policymakers may also benefit by gaining information on the impact of current policies on ICT adoption. The study also hopes to provide policymakers with information that can direct policy-making decisions regarding ICT infrastructures and incentives to compel SMEs to adopt ICT. The study may benefit the county government by informing decisions linked to the creation of policies for the development of the economic environment.

Scholars may benefit from this research as it issues additional information, using the existing research as the foundation. The study hopes to further inform scholars in the field of ICT adoption and SME performance to inspire the need for learning. The study also hopes to provide the foundation for future research for scholars pursuing related topics.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter entails a theoretical basis section, which presents the theories on which the study is founded. It also contains a literature review in line with the study objectives. It presents an overview of the empirical literature on ICT and its relation to SMEs. It also explores the role of the external environment regarding SME performance. Factors of ICT adoption in the external environment and a summary of research gaps are also presented.

2.2 Theoretical Foundation

The current study is founded on two theories: the diffusion of innovations and the model of technology acceptance. These theories informed the evaluation of factors impacting ICT adoption. Rogers's diffusion of innovation theory helped to understand the distribution of technology adoption rates on a curve (Mwai, 2016). On the other hand, the technology acceptance model aids in explaining individuals' reasoned action to adopt the technology.

2.2.1 Diffusion Innovation Theory

The theory explains the factors that affect the diffusion of inventions within a social system. It was popularized by Everett Rogers in 1962 when he used the term diffusion to explain how innovation is spread to the participants within a social system over time. Rogers (2003) argued that the diffusion of innovation would highly depend on social capital, and wide adoption is necessary for the self-sustenance of the process.

One critique of this theory is its failure to account for individual resources and social support as moderating factors in adopting innovation. It may overlook the complex, networked, and learning-intensive features of technology and the impact of institutional regimes in enabling the implementation and dissemination of innovation. In assessing aspects that impact the uptake of ICT in SMEs, this study hopes to add to this theory by confirming it.

2.2.2 Technology Acceptance Model

The model was developed in 1986 by Fred Davis, which holds that two key factors influence a population's choice to accept a form of technology such as ICT. According to Fuentes-Martínez (2020), these factors include the supposed ease of use and the technology's usefulness. The theoretical worth of technology is defined as the level to which a user accepts the technology helps serve its intended purpose within the context of their needs. For instance, in the field of ICT, the perceived usefulness of a computer hinges on the user's perception of its ability to help them send an important email to consumers. If deemed useful, the user is likely to accept the new technology. A person's perception of technology is hinged on the ability to use it. These two factors carry a significant function in ICT adoption. The supposed worth and ease of use of ICT systems effect how SMEs use these systems and the overall impact of ICT adoption initiatives.

The theory has been critiqued for its low predictive power. In particular, it has been criticized due to its incapacity to explain an individual's decision to accept, buy, or reject technology (Ajibade, 2018). Some individuals fail to utilize technology, even on an open-source and free platform, which calls into question the definition of usefulness and ease

of use. Also, empirical investigations have failed to quantify the underlines of behaviour to explain subjective factors influencing technology adoption. Herein, this theory explains why some SMEs have adopted ICT, and others have not. The study hopes to identify and add to this theory the personal factors Influencing SMEs' ICT adoption in Kiambu County.

2.3 Review of Empirical Studies

2.3.1 Information Communication Technology Adoption and Firm Performance

ICT adoption is regarded as a means of arming businesses with tools for global competition that improve efficiency while bringing closer supplier and customer relationships. While it is evident that ICT increases economic activities, Mkalama et al. (2022) argued that entrepreneurs often decide whether to adopt ICT based on the net revenue return. ICT adoption and utilization are basics of economic growth and competitiveness for businesses, organizations, and even nations that can utilize them (Tan et al., 2009).

Nduati and Ombui (2015) argued that SMEs are compelled to adopt ICT to create the competitive activities necessary to produce superior firm performance due to the unstable digital business environments in which they operate. ICT significantly impacts SMEs by assisting them in generating new business prospects and fending off competitive pressure. Therefore, ICT adoption may help SMEs in minimizing costs by strengthening internal procedures and improving their product through quicker customer communication.

2.3.2 External Environment and Firm Performance

In organizations and management studies, measuring performance has been a contentious topic. Okeyo (2014) argued that, given its multidimensionality, it is required to look at several indicators to accurately comprehend the relationship between performance and the relevant underlying variables. Financial and non-financial output metrics have been employed in studies on organizational performance to gauge the phenomena (Okeyo, 2014). Concerns about the inadequacy and, in some cases, inaccuracy reported when utilizing financial indicators alone have been raised in previous research, necessitating non-financial factors (Okeyo, 2014). A firm's performance relies on both the internal and external environment (Kiveu & Ofafa, 2013).

Changes in the external business surrounding or environment, referred to as environment dynamism, significantly affecting a firm's decision to adopt the technology. Environmental dynamism can be seen through changes in demographics, the advancement of information technology, and the ultimate tastes and preferences shift of consumers and suppliers (Mkalama et al., 2018). Okeyo (2014) argued that SMEs' performance significantly depends on the environment's dynamism.

Machuki and Aosa (2011) argued for the impossibility of directly connecting organizational performance and the external environment. However, performance is best assured if an organization can match its strategy to the turbulence in the external environment. Machuki and Aosa (2011) examined the external environment influences on Kenya's publicly quoted companies. Environmental complexity and dynamism largely

impacted a firm's profit, total net assets, sales revenue, market share, and return on investment (Machuki and Aosa, 2011).

The intricacy and ambiguity associated with the external environment immensely impact a firm's success (Gathungu et al., 2014). Firms must consider the external environment in defining their strategies, which influences firm performance. The resources in the external environment will greatly impact how well a firm can generate and allocate slack resources, hence its performance (Gathungu et al., 2014). Okeyo (2014) argued that the influence and impact of the external environment are significant objectives that drive any business. Okeyo (2014) also established a rewarding connection between environmental dynamism and productivity.

This current study explores the impact of ICT and the external business environment on a firm's performance. The multidimensionality of the performance element needs to be addressed as determined by financial and non-financial performance indicators in a business. In addition, the role of technology as an internal factor influencing firm performance should be addressed, and this study hopes to address this research gap.

2.3.3 Information Communication Technology Adoption, External Environment and Firm Performance

Kiveu and Ofafa (2013) argue that the firm cannot fix external factors impacting SMEs' adoption of ICT, and the business has to find ways of working within the constraints. The external factors that can affect ICT adoption include limited internet penetration and low computer, telecommunication infrastructure, lack of timely and reliable systems, and limited availability of skilled staff to establish and support e-commerce sites (Kiveu & Ofafa, 2013). Exploring these external factors that affect ICT adoption and influence the firm's performance is critical in improving the survival rate of SMEs.

The ability to utilize the power of technology in business is founded on complementary adaptations in social institutions. The external environment is a substantial factor in influencing the adoption of ICTs in business since it provides the context within which these businesses operate (Mkalama et al., 2022). Ndemo and Weiss (2017) argued that introducing digital technologies should not be considered a separate event, for it relies on various constructs of an institution.

SMEs operating in an environment lacking infrastructural and financial resources to support ICT reflect psycho-biases based on their previous experience and preferences (Mkalama et al., 2022). ICT consultants and vendors shape ICT diffusion and can convince SMEs to adopt ICT (Gono et al., 2016).

Socio-cultural, political, and economic factors are among the factors that necessitate or limit ICT adoption. For instance, technological innovations are often met with scepticism and doubt. However, when enough people adopt them or are adopted via political

policies, they can be easily accepted in the community. Personal preferences, consumer demands, and pressure from supply chains can affect whether the firm adopts ICT.

2.4 Summary of Research Gaps

In most studies, such as Nduati and Ombui (2015) and Gono et al., (2016), ICT has been conceptualized as part of the external environment. This current research recognized the conceptualization as a research gap and hoped to explore the link between ICT, the external environment, and firm performance, with ICT being conceptualized as an internal element. As a result, the study assessed the multifaceted connection between ICT adoption and the external environment on the firm's performance simultaneously, hence addressing this empirical gap.

A methodological gap exists in measuring a firm's performance following the impact of ICT adoption. The study by Okeyo (2014) established a positive correlation between environmental dynamism and performance but identified shortcomings in measuring performance using only financial indicators. Most studies, such as Machuki and Aosa (2011), have used only financial means to gauge the impact of ICT on firm performance. However, firm performance is multidimensional and should be addressed using financial and non-financial factors. This research aimed to bridge this gap in linking firm performance to ICT adoption by adopting multiple non-financial elements.

A knowledge gap exists in linking the three variables explored in the current study. Most studies explore the link between two of the three variables that the current study wishes to evaluate. Machuki and Aosa (2011) examined the external environment and productivity of Kenya's publicly quoted companies and identified difficulties in linking

firm performance to the external environment. This study explores the multifaceted connection between ICT adoption, the external environment, and the firm's performance, adding to the existing literature in the field.

2.5 Conceptual Framework

The conceptual framework below served as a roadmap for research design, data collection, and analysis. It explicitly depicts the relationships between variables.

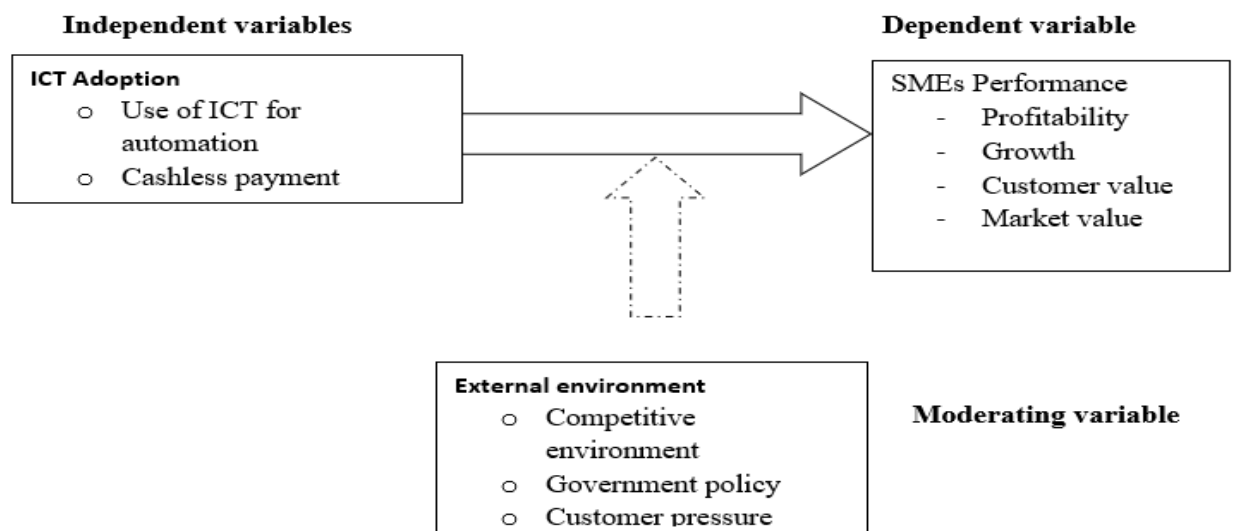


Figure 2.1: Conceptual Model

From the conceptual model above, ICT Adoption was the study's independent variable and encompassed two dimensions. These dimensions were the use of ICT cashless tools for cashless transactions and the use of ICT tools for information management. This variable is measured on a continuum to reflect the extent to which SMEs have integrated ICT into their business operations. Conversely, the dependent variable is SME performance, which captured multiple performance dimensions, including profitability, growth, customer value, and market value. These performance indicators were a representation of the general success and competitive advantage of SMEs. In this model,

the external environment serves as the moderating variable. It influences the connection between ICT and SME performance. It is measured in three dimensions: government policy, competitive environment, and customer pressure. These dimensions contextualize the impact that ICT adoption has on SME performance.

The study's theoretical framework is grounded in the Diffusion of Innovations theory, which explains the adoption and spread of innovations within a social system. ICT adoption is seen as an innovation, and the theory helps to gain knowledge on factors that influence its adoption and impact on SME performance. The Technology Acceptance Model (TAM) is also used as a theory that explains users' acceptance and adoption of technology, primarily focusing on their attitudes and behavioural intentions toward technology adoption. The TAM provides valuable insights into how and why individuals (or, in this case, SMEs) adopt or resist technology.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Here the process of gathering, storing and analysing data relevant to the project is discussed. It also outlines the study's targeted population, sampling methods, and sample size. This section also provides details on the research steps taken in generating data. The data analysis methods are outlined as per the study objectives.

3.2 Research Design

The current study utilized a cross-sectional survey reliant on observational study designs. During the cross-sectional survey, the researcher investigated the study participants' outcomes and interventions simultaneously (Setia, 2016). A cross-sectional study design was ideal for this research.

A cross-sectional survey ensured that at a single point in time, the researcher to investigate several variables simultaneously. There was no manipulation of variables, but it allowed the investigator to look at the prevailing traits of a given population (Setia, 2016). The data obtained allowed the investigator to make inferences about possible relationships.

The current study made inferences about the relationship between ICT adoption and the SMEs' performance and external environment. This method proved equally useful in the study by Mkalama (2020), as it enabled the observation of variables in an ex-post-facto design. This method was inexpensive and fast.

A common challenge with this method of research is social desirability bias. This happens when the respondents may be inclined to provide socially desirable answers rather than their true beliefs or behaviours, leading to response bias and inaccurate data. This was addressed by ensuring that the questionnaire responses were anonymous. Another challenge arose when some respondents were reluctant to respond to the questions. However, they become quite resourceful after establishing rapport with them and putting them at ease.

3.3 Population of the Study

Population is an aggregation of the people or objects possessing common features under study. On the other hand, the target population comprises all members of the group to which the results will be generalized. In contrast, accessible populations entail all the phenomena the researcher can realistically include in the sample (Borg & Gall, 2007). For this study, the population meant all registered Small and Medium Sized Enterprises (SMEs) in Kiambu County.

The SMEs play an enormous function in the Kenyan Economy. According to Kiambu County Government (2018), the number of registered SMEs in Kiambu County was 2647. These SME entities were the unit of analysis. The population distribution table is shown in Appendix 2. The table identifies Kiambu's 12 sub-counties and specifies the distribution of SMEs in each sub-county.

3.4 Sample of the Study

The current research used cluster sampling. Cluster sampling was ideal for large populations that are widely geographically dispersed. The current study used Kiambu's

12 sub-counties as its clusters. From these clusters, the researcher randomly selected SMEs to generate a sample. The sample size for this research was determined using Andrew Fisher's Formula (Jung, 2013):

$$\text{Sample Size} = \frac{(Z\text{-Score})^2 * \text{Std Dev} * (\text{Std Dev})}{(\text{Confidence Interval})^2}$$

This research worked with a 95% confidence level, a 5% confidence interval, and a 0.5 standard deviation, which was appropriate for stratified sampling.

$$\text{Sample Size} = \frac{(1.96)^2 * 0.5 * (1-0.5)}{(0.05)^2}$$

The size of the study sample was 385. This was taken as the sample size for a research study on a population of over 1,000 but less than 10,000.

3.5 Data Collection

Questionnaires were the primary technique employed in gathering data. After designing questionnaires, a pilot study was undertaken on 20 participants (SMEs) from Kiambu town to assess how accurate and clear the questionnaire was. This was done to guarantee the data collection instrument were reliable. The researcher purposively identified 20 SMEs to participate in this pilot test. The test results were then analysed, and the outcome was used to modify the questionnaire.

The modified questionnaires were physically used to interview owners of each of the randomly selected SME premises. The responses from the respondents were directly entered into the Kobo tool, an online data collection tool. The enumerator physically visited the SMEs premises and administered the questionnaires as it was fast and ensured

accurate data was entered. It also allowed one on one interactions with respondents. However, the demerit is that some respondents hesitated to participate in the exercise, which could have affected the sample size. This demerit was addressed as the researcher made it clear that the data collected was to be handled confidentially and used for school reasons only.

3.6 Response Rate

The study targeted 385 participants (SMEs) from Kiambu County. A questionnaire was administered to the selected SMEs using Computer Aided Personal Interviews (CAPI) technique. Of the 385 targeted respondents, 286 completed the questionnaire, contributing to a 74.3% response rate. The remaining 25.7% failed to respond to the questionnaire despite being informed that the data collection was for learning purposes. Saunders et al., (2003) pointed out that a response rate is satisfactory if it is at 50%, good at 60%, and very good at 70% and above.

Table 3.1: Questionnaire Return Rate

| Respondents | Frequency | Percentage |
|--------------------|------------------|-------------------|
| Responded | 286 | 74.3% |
| Non-response | 99 | 25.7% |
| Total | 385 | 100 |

The table above shows the survey response rate. To calculate the return rate, the researcher divides the number of survey respondents by the total number of survey recipients. The resulting figure is then multiplied by 100, and the percentage obtained.

3.7 Data Analysis

Data was gathered, coded and imported to Statistical Package for Social Sciences (SPSS) for analysis. Inferential and descriptive statistics were utilized. Cronbach alpha was utilized in testing the dependability of the questionnaire to indicate the degree to which the tool would be consistent over time when applied to similar samples. Thus, an instrument would be deemed reliable if it accurately and consistently produces similar results in similar situations regardless of timings (Saunders, Bishop & Barrett, 2003).

Descriptive and inferential statistics were used to scrutinise quantitative data, later summarizing the survey data. Descriptive statistics were presented in terms of means, percentages, frequencies, and standard deviation. On the other hand, inferential statistics included tests such as regression analysis, Spearman Correlation analysis, and ANOVA. Correlation analysis was vital in assessing the relationship between the adoption of ICT, the external environment, and the performance of SMEs.

The evaluation criteria were defined as follows: A correlation coefficient falls within the range of +1 to -1. A value of -1 indicates a perfect negative correlation, while a value of 0 implies no correlation, and a value of +1 signifies a perfect positive correlation. Schober, Boer and Schwarte (2018) interpret a correlation of 0.20 as very weak, 0.20-0.39 as weak, 0.40-0.59 as moderate, 0.60- 0.79 as strong and 0.80-1.00 as very strong.

Additional analysis was conducted to investigate how the external environment moderates the relationship between ICT adoption and SMEs' performance in Kiambu County. This investigation involved a multiple regression analysis using the following adopted model:

$$Y = \beta_0 + \beta_1 X + \beta_2 EE + \beta_3 EE + \varepsilon_1$$

Where:

Y = SME Performance

X = ICT adoption

Moderator = External Environmental (EE)

β_0 = Y value when all predictor variables are equal to zero.

β_1 = X coefficient (change in SMEs Performance expected for a one-unit increase in the ICT Adoption variable, while other variables are constant).

β_2 = EE coefficient (change in SMEs Performance expected for a one-unit increase in the External Environment variable, while other variables are constant).

β_3 = Mediation Effect coefficient (change in SMEs Performance expected for a one-unit increase in the Mediation Effect variable, while other variables are constant).

ε_1 = Error (the variability in SMEs Performance that cannot be explained by the predictor variables included in the model).

Interaction terms: External environmental*Adoption (frequencies of usage).

3.8 Diagnostics Tests

3.8.1 Reliability Tests

Reliability assesses the extent to which a research instrument (such as a survey, questionnaire, test, or scale) produces consistent and dependable results. If a research instrument is reliable, it means it can produce similar outcomes when administered to the

same group of participants or under similar conditions (Saunders, Bishop, & Barrett, 2003). According to reliability signifies the measuring instrument's ability to remain robust and unaffected throughout its usage, ensuring accuracy and precision. This study used Cronbach's alpha to assess the questions' reliability among different groups. When using Cronbach's alpha, consistency is implied at a value of alpha greater than 0.70. The summary of diagnostic tests is presented in Table 3.2.

Cronbach's alpha was utilized in testing the reliability of the questions asked under different groups—A value of alpha greater than 0.70 implies that our data are consistent in terms of measurements given.

Table 3.2: Cronbach's Alpha

| | Reliability Statistics | | |
|--|-------------------------------|---|---------------------|
| | Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | No. of Items |
| External environmental | 0.626 | 0.594 | 7 |
| Frequency of usage - ICT TOOLS | 0.721 | 0.759 | 7 |
| Frequency of usage - cashless tools (split half) | -0.803 | -0.808 | 5 |
| Frequency of usage- Internet tools | 0.686 | 0.723 | 3 |
| SMEs Performance | 0.921 | 0.917 | 5 |

From Table 3.2, the different constructs show that the questions asked under each construct were consistent except External Environment (Alpha = 0.626) and Frequency of usage (Alpha = 0.686) was within the acceptable levels.

3.8.2 Validity

Validity refers to the degree to which the instrument measures what it is designed to measure. It evaluates the accuracy and appropriateness of the inferences, conclusions, and interpretations drawn from the data collected using the instrument. Validity can imply

content validity and construct validity, according to Awino and Gituro (2011). Also, validity can be conceptualized as the proof that a tool is able to measure the concept is intended to measure, according to Sekaran (2007).

The research instrument underwent a thorough review by the University thesis supervisor to confirm its content validity in accurately assessing the impact of ICT adoption on SMEs' performance. This review involved examining the measures to be captured and identifying potential errors and omissions, such as unclear instructions and question phrasing, among other aspects. The research instrument was subsequently modified based on feedback to ensure the data gathered was validly measured.

3.8.3 Test for Normality

Normality tests were employed to ascertain whether variables follow a normal distribution. According to Osborne and Waters (2002), statistical analyses involving regression, correlation, t-tests, and variance analysis rely on the assumption that the dataset follows a normal distribution. To conduct inferential statistics, it is essential to assess the spread of all constructs in the research questionnaire to determine whether parametric or non-parametric tests should be employed. If the items are normally distributed, parametric approaches are utilized for further analysis. On the other hand, non-parametric methods are selected if the data does not meet the normality criteria.

After subjecting the primary data to a Kolmogorov-Smirnov test, it was revealed that none of the constructs followed a normal distribution, as indicated by the p-value < 0.05

(refer to Table 3.4). Due to the absence of normality in all the variables of interest, we opted for a non-parametric analysis method in conducting inferential statistics.

Table 3.3: One-Sample Shapiro Wilk Test

Descriptive Statistics

| | N | Mean | Std. Deviation | Skewness | Kurtosis | KS tests | Sig. |
|------------------------|----------|-------------|-----------------------|-----------------|-----------------|-----------------|-------------|
| SMEs Performance | 286 | 3.6112 | 0.51382 | 0.335 | 0.711 | 0.211 | 0.000 |
| External environmental | 286 | 3.4878 | 0.43966 | -0.350 | -0.188 | 0.137 | 0.000 |
| Frequency of usage - | 286 | 2.3135 | 0.53473 | 0.088 | -0.679 | 0.098 | 0.000 |
| ICT TOOLS | | | | | | | |
| Frequency of usage - | 286 | 2.5070 | 0.46839 | 1.319 | 2.874 | 0.198 | 0.000 |
| cashless tools | | | | | | | |
| Frequency of usage- | 286 | 2.8212 | 0.69419 | -0.100 | 0.494 | 0.087 | 0.000 |
| Internet tools | | | | | | | |
| Valid N (listwise) | 286 | | | | | | |

Diagnostics procedures were used to evaluate how well the assumptions of multiple linear regression (Hayes, 2013). The study used histograms and P-P plots to assess the normality of the residuals. Additionally, Shapiro-Wilk Test was utilized in assessing the normality. The assumption holds if the p-value > 0.05. Normality test evaluates whether the sample was attained from a normally distributed populace (Wagana, 2017).

In this study, a histogram was applied to assess the normality of the data. To do this, a normality curve was drawn on the histogram for the residuals. If the density curve covers the histogram well, it implies normal data.

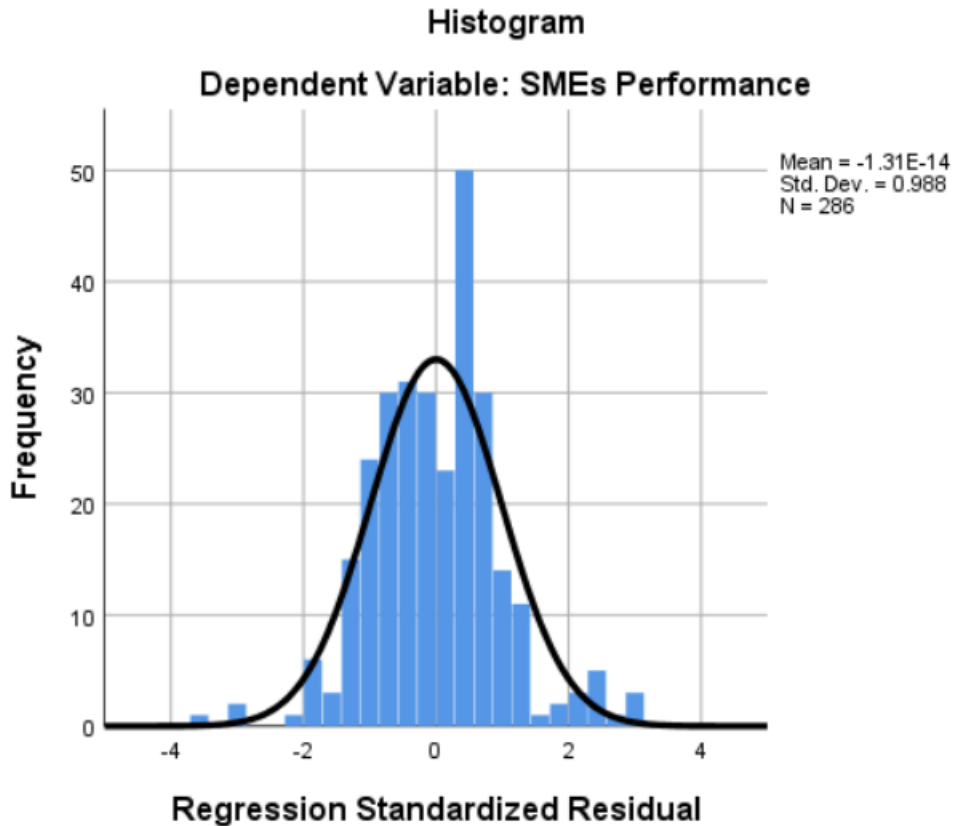


Figure 3.1: Histogram plot for Residuals

From Figure 3.1, the histogram seems to have a normal distribution since a bell-shaped curve can be fitted. Moreover, the normal P-P plot in Figure 3.1 displays that the variable has a normal distribution since it falls along a straight line.

3.8.4 Test for Heteroscedasticity

Heteroskedasticity was used to assess systematic patterns in the errors where the variances of the errors are not constant. Heteroscedasticity was tested using a scatter plot, and the assumption was $p \text{ value} > 0.05$ to show heteroscedasticity. Autocorrelation was tested using the Durbin-Watson test. The null hypothesis indicates that there is no autocorrelation while $DW = 2$ indicated autocorrelation. Multicollinearity test was used for both Variance Inflation Factor (VIF) and tolerance. The assumption holds if

VIF<10 and tolerance>0.1. Multi-collinearity test is a phenomenon involving over two predictor variables in a regression model. A further analysis using white tests confirms no presence of heteroscedasticity (LM stat = 0.05, $p > 0.05$).

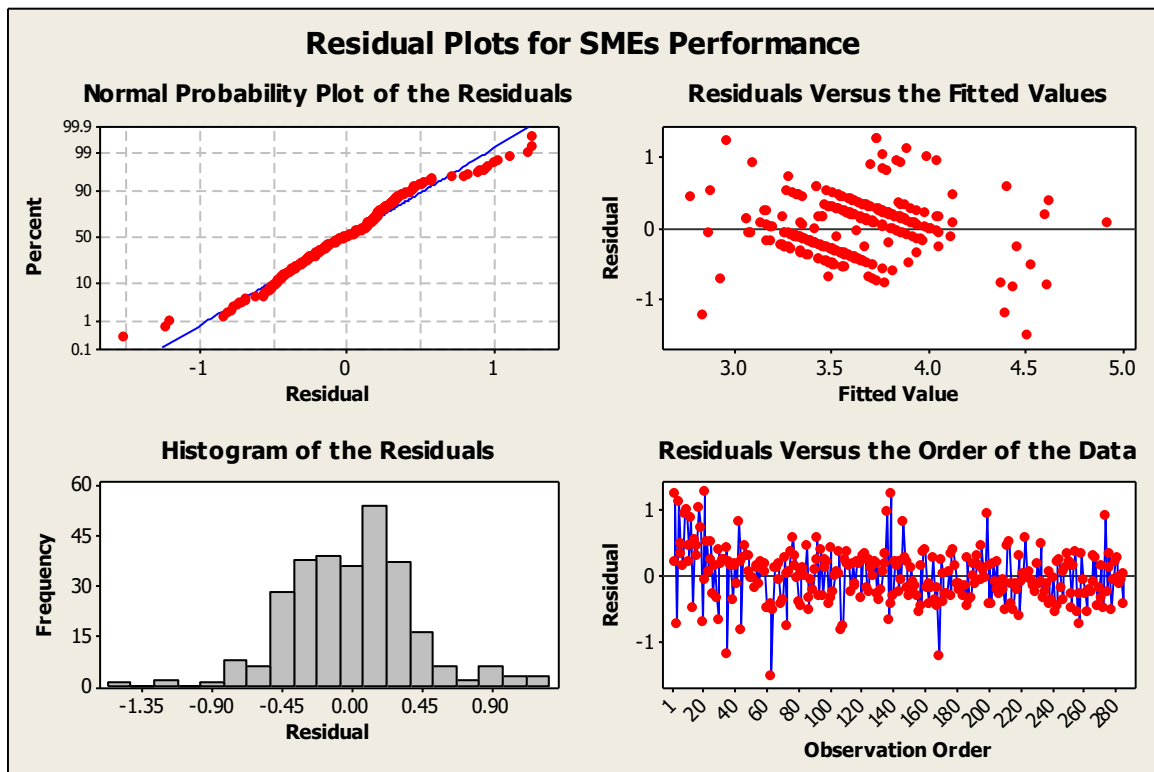


Figure 3.2: Residual Plots for Small and Medium Enterprises Performance

The above figure mirrors the differences between the observed values and the predicted values from the model. The scatter plot in Figure 3.2 suggests that there is no relationship existing between the residuals and the fitted values of the dependent variable; hence heteroscedasticity is not a concern.

3.8.5 Test for Autocorrelation

Autocorrelation implies a scenario in which the residuals within our model exhibit correlation, negatively impacting the model and rendering correct inference challenging. The null hypothesis assumes the absence of autocorrelation. To test for autocorrelation,

the researcher employed the Durbin-Watson statistic. If the calculated Durbin-Watson statistic is close to two, we reject the null hypothesis. Table 3.4 below displays the Durbin-Watson statistics.

Table 3.4: Durbin Watson Statistic

| Durbin-Watson Test | |
|---------------------------|---------------------------|
| Alpha | 0.05 |
| D-stat | 1.98813 |
| D-lower | 1.75622 |
| D-upper | 1.85643 |
| Sig | No autocorrelation |

The table shows that DW statistics = 1.988. $\cong 2$ hence we reject the null hypothesis and conclude that there is no autocorrelation.

3.8.6 Multi-Collinearity

The researcher conducted diagnostic tests for the multiple linear regressions to ascertain whether the model's assumptions were met. The four critical assumptions of the a linear regression model include normality, homoscedasticity, linearity, and statistical independence. A summarises the statistical test carried out, and the threshold is summarized in Table 3.5 below.

Table 3.5: Diagnostics Tests

| | Statistical tests | Threshold |
|-------------------|--|------------------|
| Multicollinearity | VIF test | VIF < 10 |
| Autocorrelation | Durbin-Watson Test | DW = 2 |
| Homoscedasticity | LM test, use of scatter plot | p value > 0.05 |
| Normality | Shapiro-Wilk Test, histogram plot of residuals | p value > 0.05 |

Multi-collinearity entails a circumstance where there exists a high correlation between independent variables in our model, which results in a high coefficient of determination. Variance Inflation Factor (VIF) was employed in testing whether the presence of multicollinearity is statistically significant. In statistics, VIF and Tolerance Level are used to identify multicollinearity in multiple regression analysis.

The VIF gauges how much multicollinearity has raised the variance of an estimated regression coefficient. The reciprocal of VIF, tolerance, offers a more logical way to measure multicollinearity. It shows the percentage of a predictor variable's variation unaccounted for by other predictor variables in the model. Table 3.6 outlines the results of the Multicollinearity Check Using Tolerance and VIFs.

Table 3.6: Variance Inflation Factor and Tolerance Level

| Model | Collinearity Statistics | |
|---|--------------------------------|------------|
| | Tolerance | VIF |
| 1 (Constant) | | |
| External environmental | 0.985 | 1.015 |
| Frequency of usage - ICT TOOLS | 0.864 | 1.157 |
| Frequency of usage - cashless tools | 0.823 | 1.215 |
| Frequency of usage- Internet tools | 0.869 | 1.151 |
| a. Dependent Variable: SMEs performance | | |

From the table above, The VIF < 10 (Cater & Lee, 2001); hence, multicollinearity is not statistically significant.

CHAPTER FOUR

DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter covers the data collected, analysis, and interpretation of the results. The first section of the chapter presents a descriptive profile of the respondent firms. These findings were relevant in providing a characterization of the firms. Such characteristics include the number of years the firm operated, type of organization, level of education of the owner, sector of operation, sub-county in which the firm operates, and the level of information communication technology adoption.

The second section of the chapter presents a quantitative data analysis in response to the study's two objectives. The first study objective assessed the relationship between ICT adoption and SMEs' performance in Kiambu County. The second objective examined the effects of the external surrounding on the relationship between ICT adoption and the performance of SMEs in Kiambu County. These two objectives informed the analysis of the findings.

4.2 Descriptive Profile of the Respondent Firms

4.2.1 Number of Years in Operation

The business owners were required to state the duration their organization has been under operation—the results are presented in Figure 4.1.

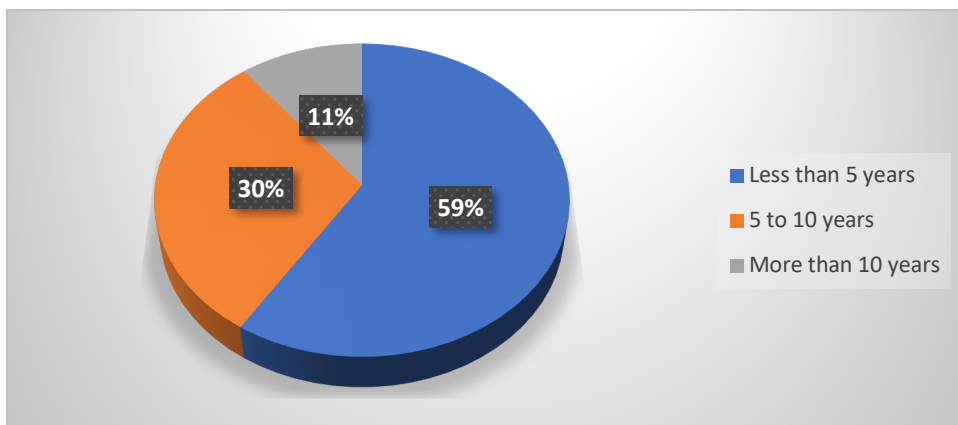


Figure 4.1: Number of Years in Operation

As per the results, 59% of the respondents were less than 5 years, 5 to 10 years were 30%, and more than 10 years were less than 11%. This shows that majority of respondents (SMEs) had operated for less than 5 years.

4.2.2 Type of Organization

The type of organization for these SMEs was also a subject of inquiry in the study—the participants were to specify the type of organization they owned on the questionnaire. The majority of the SMEs were Sole proprietorships (88.1%), while the other 12% was shared between limited liability Companies (7%), partnerships (8%) and Saccos (1%). The responses obtained were presented in Table 4.1.

Table 4.1: Type of Organization

| Type of Organisation | Frequency | Percent |
|---------------------------|-----------|---------|
| Limited Liability Company | 7 | 2.4 |
| Partnership | 22 | 7.7 |
| Sacco | 4 | 1.4 |
| Sole proprietorships | 252 | 88.1 |
| Other | 1 | 0.3 |
| Total | 286 | 100.0 |

The study revealed that most SMEs were sole proprietorships at 88.1% (252), while partnerships followed close at 22% (22) of all 286 respondents interviewed. Limited liability company, Sacco and others followed at 7%, 4%, and 1%, respectively. These findings could have serious implications for the study. For instance, it could affect the sample's representativeness; the high proportion of sole proprietorships (88.1%) in the sample suggests that this type of SME is overrepresented in the study. Additionally, it

might influence the findings on the impact of business structure on ICT adoption, variation in external environment factors, and policy support.

4.2.3 Level of Education

The participants were required to state their level of education. The obtained results were tabulated and presented in the table below.

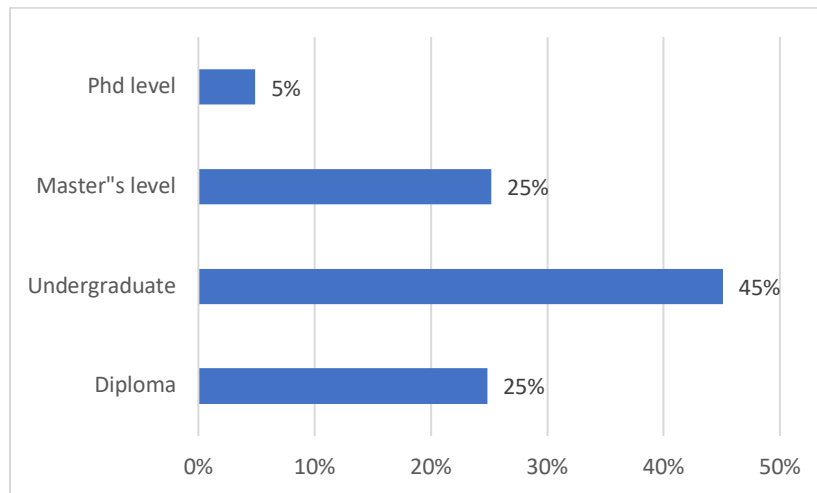


Figure 4.2: Education Level

The majority of respondents, 45%, had acquired a bachelor's degree. The lowest percentile of respondents, 5%, were those with a Ph.D. 25% had at least a certificate/diploma, whereas the other 25% had obtained a Master's degree. This shows that 75% of respondents, a significant majority, had received a University Degree. The respondents were highly educated and thus could be expected to give objective feedback based on understanding the questionnaire.

4.2.4 Industry Sector of the Small and Medium Enterprise

The partakers were to indicate the sector in which their SME fell. All the respondents answered the question. The question was meant to show descriptive information on the categorisation of the businesses according to the sector of operation—the results were as tabularised in Table 4.2.

Table 4.2: Sector of the Small and Medium Enterprise

| Sector | Frequency | Percent |
|--|------------------|----------------|
| Wholesale | 12 | 4.2 |
| Retail trade | 33 | 11.5 |
| Manufacturing | 2 | 0.7 |
| Accommodation and food service activities | 39 | 13.6 |
| Financial & insurance services | 24 | 8.4 |
| Education | 21 | 7.3 |
| Transportation & storage | 4 | 1.4 |
| Administrative & support services | 2 | 0.7 |
| Arts, entertainment, & recreation | 4 | 1.4 |
| Healthcare: Hospitals, dispensaries, and clinics | 11 | 3.8 |
| Processors | 1 | 0.3 |
| Other | 133 | 46.5 |
| Total | 286 | 100.0 |

As the results indicate, a significant portion of respondents, 46.5%, fall under the category of “other” SMEs, followed by 13.6% who indicated to be undertaking accommodation and food service activities, 11.5% of SMEs were retail traders, 8.4 % were providing financial and insurance services, 7.3 falls under education, 4.2% were wholesalers, 3.8% fall under healthcare sector, 1.4 was transport and storage similar to arts, entertainment and recreation, 0.7% were manufacturing same as administrative and support services, finally 0.3 fall under processors. This implies that the SMEs that fall under processors have not been fully exploited compared to other sectors. Therefore, there is still more room for expansion of processors.

4.2.5 Location of Business Operation

The partakers were to indicate the sub-county from which they hail and responses were as presented in Table 4.3.

Table 4.3: Sub County in which the Business Operates

| Kiambu Sub Counties | Frequency | Per cent |
|----------------------------|------------------|-----------------|
| Kiambu Town | 69 | 24.1 |
| Limuru | 23 | 8.0 |
| Thika | 44 | 15.4 |
| Kikuyu | 27 | 9.4 |
| Ruiru | 34 | 11.9 |
| Kiambaa | 6 | 2.1 |
| Kabete | 35 | 12.2 |
| Gatundu | 11 | 3.8 |
| Juja | 37 | 12.9 |
| Total | 286 | 100.0 |

As per the results, the majority, 24.1% of the respondents were from Kiambu town, followed by 15.4% who came from Thika, 12.9% from Juja, 12.2% were from Kabete, 11.9% of the participants indicated to be from Ruiru. Another 9.4% of participants were from Kikuyu, 8.0% from Limuru, 3.8% from Gatundu, and lastly 2.1% were from Kiambaa Sub County. This implies that most of the sampled SMEs were operated by people from Kiambu town.

4.2.6 Level of Information Communication Technology Adoption

The study also assessed how many of the participants had integrated ICT in their firms. While ICT integration was later assessed in-depth in terms of ICT tools, cashless tools, and internet tools, this question only asked for the general use of ICT tools. Those who

used a mobile phone, a printer, and had a webpage for their business were grouped together for this question. This question was important in identifying how many respondents had integrated ICT in their firms, which would affect the findings in the subsequent questions.

The respondents were to state if they had integrated ICT services in their SMEs. The findings showed that a significant portion of the respondents (98%) had integrated ICT services in the organizations, and only 2% had not. Additionally, 98% of the respondents confirmed they used the Internet for their businesses, and only 2% did not. Figure 4.3 shows the summarized results.

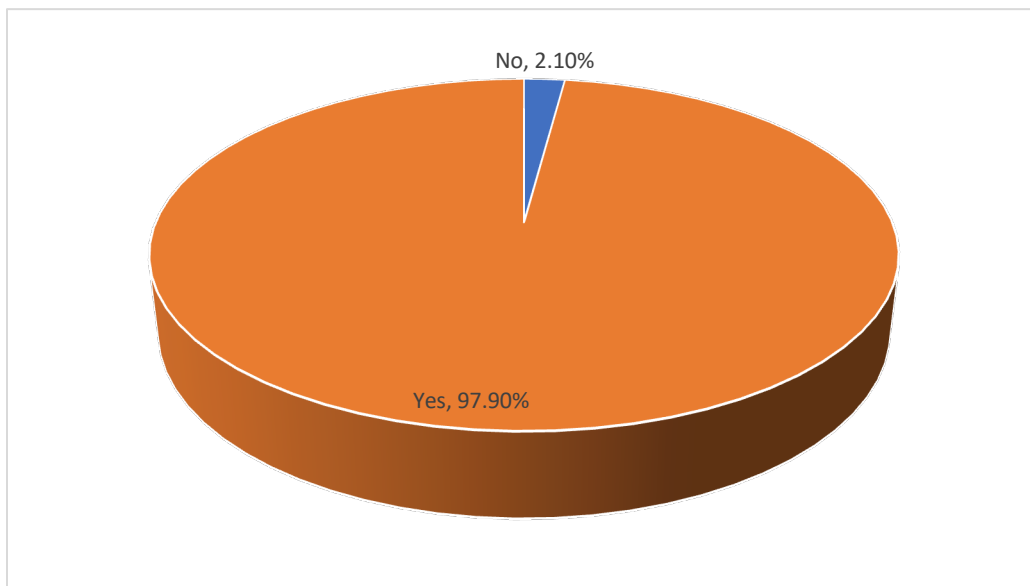


Figure 4.3: Level of ICT Services adoption by Small and Medium Enterprises

After identifying their level of ICT integration, the participants were required to show the agreement level regarding the frequency of usage of ICT tools. The respondents were presented with eight ICT tools mostly used in organizations. The results indicated that a significant percentage of respondents confirmed that they use mobile phones to a large

extent, as indicated by a mean of 4.62 and a standard deviation of 0.508. The use of tablets had the highest variability of 56%, which shows that the many of the participants were divided regarding this question.

Table 4.4 shows the obtained results.

Table 4.4: Frequency of Usage - Information Communication Technology Tools

| Items (Cronbach's Alpha=0.721) | N | Mean | Std. | |
|--------------------------------|-----|------|-----------|--------|
| | | | Deviation | CV (%) |
| 1. Mobile phone | 286 | 4.62 | 0.508 | 11% |
| 2. Radio | 286 | 1.16 | 0.483 | 42% |
| 3. Television set | 286 | 1.13 | 0.548 | 49% |
| 4. Tablet | 286 | 1.21 | 0.678 | 56% |
| 5. Fax machine | 286 | 1.04 | 0.233 | 22% |
| 6. Digital video camera | 286 | 2.70 | 1.461 | 54% |
| 7. Computer | 286 | 3.41 | 1.305 | 38% |
| 8. Printers | 286 | 3.22 | 1.448 | 45% |
| Valid N (listwise) | 286 | 2.31 | 0.83 | 40% |

ICT tools were divided into cashless tools and internet tools. On the one hand, the respondents were required to indicate the level of agreement regarding the frequency of usage of cashless tools. The respondents were presented with five cashless tools that they were to indicate the frequency of use. The tools included debit cards, Mpesa send money, Mpesa buy goods and services, and Mpesa pay bill. Table 4.5 shows the obtained results.

Table 4.5: Frequency of Usage - cashless tools

| Items (Cronbach's Alpha=-.803) | N | Mean | Std. Deviation | CV (%) |
|---------------------------------|-----|------|----------------|--------|
| 1. Mpesa Send money | 286 | 2.95 | 1.515 | 51% |
| 2. Mpesa Buy goods and services | 286 | 3.49 | 1.819 | 52% |
| 3. Mpesa Paybill | 286 | 2.50 | 1.819 | 73% |
| 4. Debit card | 286 | 1.59 | 1.107 | 69% |
| 5. Banker's cheque | 286 | 2.00 | 1.434 | 72% |
| Valid N (listwise) | 286 | 2.51 | 1.54 | 63% |

The findings showed that most respondents use Mpesa to buy goods and services to a moderate extent (Mean = 3.49, SD = 1.819), as presented in Table 4.5. The use of cashless tools in their organization to a moderate extent, as portrayed by an overall mean score of 2.51 with a standard deviation of 1.54.

On the other hand, the respondents were required to indicate the level of agreement regarding the frequency of usage of Internet tools. The respondents were presented with six Internet tools to predict the frequency of use. The tools included Facebook Page, Website, Instagram page, WhatsApp, Telegram, and Emails. Table 4.6 below shows the results obtained.

Table 4.6: Frequency of usage- Internet tools

| Items (Cronbach's Alpha=-.686) | N | Mean | Std. Deviation | CV (%) |
|--------------------------------|-----|------|----------------|--------|
| 1. Facebook Page | 286 | 3.91 | 1.190 | 30% |
| 2. Website | 286 | 2.59 | 1.479 | 57% |
| 3. Instagram page | 286 | 2.56 | 1.620 | 63% |
| 4. WhatsApp | 286 | 4.15 | 0.893 | 21% |
| 5. Telegram | 286 | 1.13 | 0.577 | 51% |
| 6. Emails | 286 | 2.58 | 1.389 | 54% |
| Valid N (listwise) | 286 | 2.82 | 1.19 | 46% |

The findings regarding Internet tools showed that most respondents used WhatsApp to a large extent, as shown by a mean of 4.15 and an SD of 0.893, as indicated in Table 4.6. On the other hand, Telegram had the least number of users, with a mean of 1.13 and SD of 0.577. The overall mean was 2.82, meaning that most respondents used internet tools for businesses to a moderate extent.

4.3 Inferential Manifestation of the Variables

The findings of this study were analysed in line with the two research objectives. This section analyses the direct impact of the ICT adoption on performance of SMEs. It does this by evaluating the growth in sales, employees' population, and the overall increase in performance as they pertain to ICT adoption. The section also analyses the impact that the external environment has on ICT and SME performance. The section first looks at the moderating effect of the external environment on ICT adoption and then examines the relationship between the external environment and the SME's performance.

Statistical estimation and statistical hypothesis testing are conducted, and the section presents findings summarized in tables and figures. Analysis of variance, correlation, and regression analysis are conducted to provide statistical inferences to attain the study's objectives. These tests emphasize the magnitude and direction of the relationships examined as well as the statistical significance of these tests.

4.3.1 Effect of Information Communication Technology Adoption on the Performance of Small and Medium-Sized Enterprises

The first study objective was to determine the effect of ICT on the the performance of SMEs. This was done by assessing the growth in sales, the upsurge in the population of

employees, and the overall increase in SME performance since the ICT introduction. To assess the sales performance, the respondents were to indicate the verifiable level of growth in sales in their organization since the integration of ICT in their operations. The respondents were to indicate the change in the number of sales witnessed following the integration of ICT in the SME. The respondents were asked to choose between the options “No Change,” “1 – 499,” “500 – 1000,” and “More than 1000.”

As per the findings, the majority, 59.4% (170) of partakers, experienced massive growth of over 1000 sales, followed by 23.4% (67) of the respondents who indicated to have experienced between 500-1000 sales. Another 14.3% (41) experienced some growth rate, while 2.8 % (8) of the participants indicated to have experienced the least growth rate in sales since the integration of ICT services. This implies that most organizations that integrated ICT services into their operations experienced increased sales. These findings are summarised in Table 4.7 below.

Table 4.7: Sales Performance Since Information Communication Technology Integration

| | Frequency | Percent |
|----------------|------------------|----------------|
| No Change | 8 | 2.8 |
| 1 - 499. | 170 | 59.4 |
| 500 - 1000. | 67 | 23.4 |
| More than 1000 | 41 | 14.3 |
| Total | 286 | 100.0 |

After assessing the change in the number of sales, the study also wanted to examine the change in the number of employees following the integration of ICT into the SME. The study assumed that full integration of ICT into SMEs would substantially impact the number of employees in the SME operations. To determine this, the respondents were

required to indicate how employees' population changed since integrating ICT services into their operations. The options to choose from were "No change," "1 – 5," "6 – 20," and "more than 21."

From the findings, the majority, 45.1% (129) of partakers, indicated to have experienced between 1-5 changes in employees' population since the integration of ICT in their operations, followed by 29.0% (83) of the respondents who indicated to have experienced no change at all. Another 19.2% (55) experienced a change of between 6-20 employees. In comparison, 6.6% (19) indicated to have experienced the highest change brought about by integrating ICT services in SME operations, as tabularised in Table 4.8 below.

Table 4.8: Change in number of employees following integration of Information Communication Technology services in the Small and Medium Enterprises Operations

| | Frequency | Percent |
|--------------|-----------|---------|
| No Change | 83 | 29.0 |
| 1 - 5. | 129 | 45.1 |
| 6 - 20. | 55 | 19.2 |
| More than 21 | 19 | 6.6 |
| Total | 286 | 100.0 |

The study also wanted to measure the impact of ICT integration on the company's overall performance. To achieve this, the study looked at how ICT services have helped SMEs in performance. The participants were required to indicate the level of agreement regarding the extent to which ICT has led to the enhancement of SMEs' performance. The respondents were presented with five statements that were to indicate their level of agreement on a scale of 1 to 5 (1= very small extent; 2 = Small Extent; 3 = Moderate Extent; 4 = to a large extent; 5 = to a very large extent).

The findings showed that most of the partakers, largely (Mean = 3.98, SD = 0.477), agree that ICT services have helped provide goods and services (Easy access to clients, easy access to payment), as shown in Table 4.10. The use of ICT services to increase market value had the lowest mean (Mean = 3.33, SD = 0.595), indicating that majority of them use ICT services to a moderate extent to increase market value. The overall mean was 3.61 means that most of the respondents felt that ICT contributed to business performance to a large extent, as tabulated in Table 4.9 below.

Table 4.9: Small and Medium-Sized Enterprises Performance

| Performance Metric's | N | Mean | Std. Deviation | CV |
|---|----------|-------------|-----------------------|-----------|
| Provision of goods and services. (Easy access to clients, easy access to payment) | 286 | 3.98 | 0.477 | 12% |
| Customer Service (increased rate of repurchase, increased rate of returning customers, Increased sales) | 286 | 3.62 | 0.620 | 17% |
| Profitability (Return on Investment, Net income, and added economic value) | 286 | 3.57 | 0.627 | 18% |
| Growth (Increased hiring, increased market value, higher sales, more customers) | 286 | 3.57 | 0.616 | 17% |
| Market value (Opened more branches, increased net income) | 286 | 3.33 | 0.595 | 18% |
| Valid N (listwise) | 286 | 3.61 | 0.59 | 16% |

Under the first objective, the researcher went ahead and determined the connection between ICT adoption and SME's performance. A correlation analysis was conducted. The Spearman Rank correlation analysis was used to determine the connection between ICT adoption and SMEs' performance in Kiambu County. The null hypothesis was that there is no connection between ICT adoption and SMEs' performance.

Data showed that there was a moderate positive correlation ($R(286) = 0.494, p < 0.05$) for the relationship between ICT adoption (Frequency of Usage of ICT tools) and SMEs' performance. Thus, the null hypothesis that there is no relationship between ICT adoption (Frequency of usage of ICT tools) and SMEs' performance is rejected at a 95% confidence level.

Similar findings were also observed with regard to the relationship between ICT adoption (Frequency of usage of cashless tools) and SMEs' performance ($R(286) = 0.393, p < 0.05$) and ICT adoption (Frequency of use of internet tools) and SMEs' performance ($R(286) = 0.383, p < 0.05$) even though it was a weak relationship. The findings of the correlation analysis are presented in Table 4.10 below.

Table 4.10: Correlation Analysis of Analysis

| | | Correlations | | | |
|---|-----------------|-----------------------------|---|--|---|
| | | SMEs Performance | Frequency of usage - ICT TOOLS | Frequency of usage - cashless tools | Frequency of usage- Internet tools |
| SMEs Performance | Correlation | 1 | .494** | .393** | .383** |
| | Sig. (2-tailed) | | 0.000 | 0.000 | 0.000 |
| | N | 286 | 286 | 286 | 286 |
| Frequency of usage - ICT TOOLS | Correlation | .494** | 1 | .332** | .253** |
| | Sig. (2-tailed) | 0.000 | | 0.000 | 0.000 |
| | N | 286 | 286 | 286 | 286 |
| Frequency of usage - cashless tools | Correlation | .393** | .332** | 1 | .317** |
| | Sig. (2-tailed) | 0.000 | 0.000 | | 0.000 |
| | N | 286 | 286 | 286 | 286 |
| Frequency of usage- Internet tools | Correlation | .383** | .253** | .317** | 1 |
| | Sig. (2-tailed) | 0.000 | 0.000 | 0.000 | |
| | N | 286 | 286 | 286 | 286 |

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

The relationship between ICT adoption and SMEs' performance in Kiambu County is statistically significant. Thus, there is a weak yet positive relationship between ICT adoption and the performance of SMEs in Kiambu County. The weak positive correlation indicates that ICT adoption is simply one factor influencing SMEs' performance.

4.3.2 Effect of External Environment on Information Communication Technology Adoption and SME Performance

The second study objective assessed the effects of the external environment on the relationship between ICT adoption and the performance of SMEs in Kiambu County. Firstly, the study assessed the moderating effect of the external environment on ICT adoption. The partakers were to state the level of agreement regarding statements that addressed the external environment on a 5-point scale (1= strongly disagree, 2= disagree, 3 – neutral, 4= agree, 5= strongly agree). The respondents were presented with seven statements addressing the external environment and its impact on ICT adoption. These statements attempted to assess the reasons why the respondents opted to adopt ICT. The external factors measured included pressure from suppliers, consumer demands, pressure from ICT consultants and vendors, high cost of adopting an ICT system, and competition.

The findings revealed that the overall mean for empowerment was 3.49, standard deviation of 0.76, and a coefficient of variation of 23%. This suggested that most participants, on average, agreed that external environment had an effect on the organisation's performance. The statement that “We believed we will lose our market share if we do not adopt ICT,” had the highest mean (Mean = 3.93, SD = 0.597 and CV = 15%), implying that most respondents believe that adoption of ICT has a big impact on their decision to adopt ICT. The statement that “Suppliers urged us to adopt ICT” had the

lowest mean below average (Mean = 2.60, SD = 0.97 and CV = 36%). This statement also had the highest variability with a coefficient of variation of 36%, implying that most respondents had divergent views regarding this statement regarding the adoption of ICT. These findings are tabularised in Table 4.11 below.

Table 4.11: Effect of External Environmental on Information Communication Technology Adoption

| Items (<i>Cronbach's Alpha=0.626</i>) | N | Mean | Std. Deviation | CV (%) |
|---|----------|-------------|-----------------------|---------------|
| 1. The were no subsidies for the high cost of adopting an ICT system | 286 | 3.86 | 0.573 | 15% |
| 2. ICT consultants and vendors convinced us to use ICT | 286 | 3.02 | 1.003 | 33% |
| 3. Suppliers urged us to adopt ICT | 286 | 2.60 | 0.927 | 36% |
| 4. Customers urged us to adopt ICT | 286 | 3.30 | 0.984 | 30% |
| 5. We believed we would lose our customers to our competitors if we did not adopt ICT | 286 | 3.67 | 0.845 | 23% |
| 6. We felt it is a strategic necessity to use ICT to compete in the marketplace | 286 | 4.04 | 0.408 | 10% |
| 7. We believed we will lose our market share if we do not adopt ICT | 286 | 3.93 | 0.597 | 15% |
| Valid N (listwise) | 286 | 3.49 | 0.76 | 0.23 |

The study also sought to assess the relationship between the external environment and performance. Given the already established relationship between external environment and ICT adoption, these external factors that affect ICT adoption also influence the firm's performance. The researcher conducted a correlational analysis to determine the association between external environmental and SMEs' performance.

Results showed a weak positive correlation ($r=0.149$) between external environmental and SMEs' performance. The null hypothesis that there is no relationship between the

external environment and SMEs' performance was rejected at a 95% confidence level where $R(286) = 0.149$, $p\text{-value} < 0.05$ at a 5% significance level. The findings of the correlation analysis are summarized in Table 4.12 below.

Table 4.12: Correlation Analysis
Spearman's Rho Correlations

| | | External SMEs Performanceenvironmental | |
|---------------------------|-------------------------|---|-------|
| SMEs Performance | Correlation Coefficient | 1 | .149* |
| | Sig. (2-tailed) | | 0.012 |
| | N | 286 | 286 |
| External environmental | Correlation Coefficient | .149* | 1 |
| | Sig. (2-tailed) | 0.012 | |
| | N | 286 | 286 |

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

Thus, the relationship between the external environment and SMEs' performance in Kiambu County was revealed to be statistically significant. This means there is a small yet significant tendency for the external environment to possess a show influence on the performance of small and medium-sized enterprises (SMEs). It is important to note that the strength of this relationship was found to be relatively weak.

4.4 Relationship between Information Communication Adoption, External Environment, and Small and Medium Enterprise Performance

The study sought to examine the association between the three variables by employing a statistical model. The mathematical model used was hierarchical regression, which allowed the investigator to evaluate and introduce variables in the regression equation in a specific sequence (hierarchy). It allowed for the examination of the unique contribution of variables after controlling for other variables. A hypothesis between variables was formulated for each model (three models in total). After that, hierarchical regression was used to assess whether the observed data supported or contradicted the hypothesis.

The first model (referred to as model 1) assessed the influence of external environment on SMEs performance SMEs in Kiambu County. The assumption was that the external environment would positively affect SMEs' performance. The findings showed that the external environment positively and significantly influenced SMEs performance as given by ($\beta=0.077$, $t=2.542$, $p<0.05$). These findings implied that a unit change in the external environment would lead to a change in SMEs' performance in Kiambu County by 0.077. The findings are summarized on Table 4.13.

Table 4.13: Regression Coefficients for Model 1

| Model | Unstandardized Coefficients | | | Sig. | Collinearity Statistics | |
|-------------------------------------|-----------------------------|------------|---------|-------|-------------------------|-------|
| | B | Std. Error | t | | Tolerance | VIF |
| 1 (Constant) | 3.611 | 0.030 | 119.988 | 0.000 | | |
| External environmental | 0.077 | 0.030 | 2.542 | 0.012 | 1.000 | 1.000 |
| 2 (Constant) | 3.611 | 0.024 | 148.311 | 0.000 | | |
| External environmental | 0.071 | 0.025 | 2.908 | 0.004 | 0.985 | 1.015 |
| Frequency of usage - ICT TOOLS | 0.188 | 0.026 | 7.161 | 0.000 | 0.864 | 1.157 |
| Frequency of usage - cashless tools | 0.110 | 0.027 | 4.074 | 0.000 | 0.823 | 1.215 |
| Frequency of usage- Internet tools | 0.110 | 0.026 | 4.190 | 0.000 | 0.869 | 1.151 |
| 3 (Constant) | 3.612 | 0.024 | 148.257 | 0.000 | | |
| External environmental | 0.060 | 0.026 | 2.311 | 0.022 | 0.868 | 1.152 |
| Frequency of usage - ICT TOOLS | 0.188 | 0.027 | 7.094 | 0.000 | 0.839 | 1.192 |
| Frequency of usage - cashless tools | 0.107 | 0.027 | 3.901 | 0.000 | 0.789 | 1.268 |
| Frequency of usage- Internet tools | 0.104 | 0.028 | 3.771 | 0.000 | 0.773 | 1.294 |
| Int_EX_FU1 | 0.050 | 0.026 | 1.899 | 0.059 | 0.713 | 1.402 |
| Int_EX_FU2 | -0.012 | 0.023 | -0.533 | 0.595 | 0.806 | 1.240 |
| Int_EX_FU3 | -0.041 | 0.022 | -1.872 | 0.062 | 0.682 | 1.465 |

Overall, the findings revealed that the external environment, positively and statistically, significantly impacts the performance of SMEs. This conclusion emphasizes how crucial it is for SMEs to evaluate external influences and make adjustments in order to enhance their performance and achieve sustainable growth.

Model 2 of the hierarchical regression assessed the combined effect of ICT adoption and external environment on SME's performance. The four predictors were entered into a simultaneous regression model for this model. Results indicated that external environment ($\beta=0.071$, $t = 2.908$, $p <.05$) Frequency of usage – ICT tools ($\beta=0.188$, $t = 7.161$, $p <.05$), frequency of usage – cashless tools ($\beta=0.110$, $t = 4.074$, $p<.05$) and frequency of usage – internet tools ($\beta=0.110$, $t = 4.190$, $p < .05$) unveiled a statistically significant positive effect on SMEs performance. These findings imply that a unit increase in the frequency of usage of ICT tools would cause an increase in SMEs' performance in Kiambu County by the respective units.

Model 3 assessed the moderating effect of external environment on the relationship between ICT adoption (frequency of usage of cashless tools) and SMEs performance. The results in model 3 indicated that the external environment ($\beta = 0.06$, $t =2.311$, $p<.05$) and frequency of usage of ICT tools ($\beta=0.188$, $t = 7.094$, $P<.05$) were both associated with SME's performance. The interaction between the external environment and ICT adoption was significant and given as follows $\beta =0.05$, $t=1.899$, and $p<0.10$.

Similar findings were observed between external environment ($\beta=0.06$, $t = 2.311$, $P<.05$) and frequency of usage of internet tools ($\beta=0.104$, $t = 3.771$, $P<.05$). The interaction of external environment and frequency of use of internet tools was significant ($\beta=-0.041$, $t=-1.872$, $p<.10$) but negative hence external environment moderates the relationship between ICT adoption (frequency of usage of internet tools) and SMEs performance negatively. The moderating effect external environment on the relationship between ICT adoption (frequency of use of cashless tools) and SMEs performance was found not to be significant ($\beta = -0.012$, $t = -0.533$, $p>.05$)

4.5 Summary of the Analytical Models

Following the analysis of the three models, the final regression model was given as follows.

$$\text{SME Performance} = 3.612 + 0.06 \times \text{external environment} + 0.188 \times \text{Frequency of usage_ICT} + 0.107 \times \text{Frequency of usage ICT cashless tools} + 0.104 \times \text{Frequency of usage_Internet tools} + 0.05 \times \text{interaction 1} - 0.041 \times \text{interaction 2}$$

Table 4.14 gives a summary of all three models. The coefficient of correlations (R) for the three models showed a weak relationship in the first model and a strong relationship in the other two models between dependent and independent variables, which increased with increase in independent. The relationship was positive, implying that an increase in the independent variables would result in an increase in SMEs' performance. R squared, which is the coefficient of determination indicates the percentage of the independent variables that could predict the dependent variable.

Table 4.14: Model Summary

| Model | R | R Squared | Adjusted R Squared | Std. Error of the Estimate | Change Statistics | | | | | |
|-------|-------------------|-----------|--------------------|----------------------------|-------------------|----------|-----|-----|-------------|-------|
| | | | | | R Squared Change | F Change | df1 | df2 | Sig. Change | F |
| 1 | .149 ^a | 0.022 | 0.019 | 0.50897 | 0.022 | 6.459 | 1 | 284 | 0.012 | |
| 2 | .606 ^b | 0.367 | 0.358 | 0.41177 | 0.345 | 50.966 | 3 | 281 | 0.000 | |
| 3 | .616 ^c | 0.379 | 0.363 | 0.41001 | 0.012 | 1.806 | 3 | 278 | 0.146 | 1.988 |

a. Independent variable: (Constant), External environmental

b. Dependent Variable: SMEs Performance

Based on the information in Table 4.14 above, Model 1 indicates that only 2% of the variance in SMEs' performance can be tied to the external environment, while unknown factors influence the majority. Therefore, the independent variable does not appear to be a strong predictor. However, in Model 2, the introduction of ICT adoption variables into the model is presented.

The change in R squared is statistically significant which showed that introduction of ICT adoption variables impacts the SMEs' performance. The impact increases by 0.345 which is also statistically significant at 1% (F change=50.966, p value = 0.001 < 0.01). Model 3 introduces interactions between ICT adoption and the external environment in the model.

Coefficient of determination is 37.9% which implies that the External environment performance can explain 37.9% of SMEs, Frequency of usage - ICT TOOLS, Frequency of use- Internet tools, Frequency of usage - cashless tools and interaction terms, and the rest is due to the errors (100%-37.9%).

After confirming that there is a relationship between ICT adoption and the performance of SMEs in Kiambu County, the next step determined whether the relationship was

statistically weighty. This was accomplished by evaluating the overall consequence of the model using an analysis of variance as shown in the Table 4.15 below.

Table 4.15: Analysis of Variance (ANOVA)

| Model | Sum of Squares | Df | Mean Squared | F | Sig. |
|--------------|-----------------------|-----------|---------------------|----------|-------------------|
| 1 Regression | 1.673 | 1 | 1.673 | 6.459 | .012 ^b |
| Residual | 73.571 | 284 | 0.259 | | |
| Total | 75.244 | 285 | | | |
| 2 Regression | 27.598 | 4 | 6.900 | 40.692 | .000 ^c |
| Residual | 47.646 | 281 | 0.170 | | |
| Total | 75.244 | 285 | | | |
| 3 Regression | 28.509 | 7 | 4.073 | 24.226 | .000 ^d |
| Residual | 46.735 | 278 | 0.168 | | |
| Total | 75.244 | 285 | | | |

a. Dependent Variable: SMEs Performance

b. Independent Variable: Adoption (Constant),

c. Moderator Variable: External environmental

From the table, model 1 showed an F statistic of 6.415 ($p = 0.012$) hence the null hypothesis was rejected ($F(1,284) = 6.415, p < 0.05$). The significant F-value ($F = 6.415$) directs that the hierarchical regression model as a whole is statistically weighty. This suggests that the model provides a better fit to the data compared to a reduced model without the included predictor variables.

Model 2, which has ($F(4,281) = 40.692, p < 0.05$), is statistically significant in predicting the outcome variable. The F-value, degrees of freedom, and p-value provide evidence of the the overall fitness of the model and imply that the included predictors significantly contribute to the prediction.

Lastly, model 3 is also statistically significant at ($F(7,278) = 24.226, p < 0.01$). The findings reveal that the predictor variables in the hierarchical regression model and the

outcome variable are statistically significant in predicting the outcome variable. The F-value, degrees of freedom, and p-value demonstrate the model's overall fit, which also implies that the included predictors significantly contribute to the prediction.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter covers a discussion of the results in reference to research questions and the objectives. The first part summarises the key findings, followed by the discussion and conclusion drawn from the major study findings. Finally, the recommendations for future research are given. The results obtained successfully answered all the research questions posed at the start of the study.

Results showed that 98% of respondents have incorporated ICT services into their enterprises, with only 2% not having done so. In addition, 98% of respondents said they used the Internet for their enterprises, with only 2% saying they did not. The results also showed that a significant portion of the respondents use their mobile phones to a very large level. Additionally, most of the respondents stated that they preferred Mpesa to buy goods and services to a large extent. Data showed that there was a moderate positive correlation for the relationship between ICT adoption and SMEs' performance. A weak positive correlation was also demonstrated between the external environmental and SMEs' performance.

5.2 Summary of the Findings

5.2.1 Information Communication Technology Adoption on Performance of Small and Medium-Sized Enterprises

The results show that 59.4% (170) of the respondents experienced massive growth of over 1000 sales, followed by 23.4% (67) of the respondents who experienced a 500-1000

increase in sales. Additionally, about 6.6% of the SMEs experienced a growth of over 20 employees brought by the integration of ICT services in SME operations. Many of participants strongly agreed that ICT services aided in providing goods and services (easy access to clients, easy access to payment), while most respondents utilized ICT services to boost market value to a limited extent. The aggregate mean of 3.61 indicates that the majority of respondents believed that ICT significantly influenced business performance.

These results align with those presented by Mkalama et al. (2022) and (Tan et al., 2009), as discussed in section 2.3.1. These scholars posited that entrepreneurs frequently base their decision to adopt ICT on the expected net revenue return. Additionally, ICT uptake and utilisation are fundamental to economic growth and competitiveness for firms, organizations, and even nations that can use them.

Data showed that there was a moderately positive correlation ($R(286) = 0.494, p < 0.05$) for the relationship between ICT adoption (Frequency of Usage of ICT tools) and SMEs' performance. The relationship between ICT and SME performance was shown to be statistically significant, implying that embracing and successfully utilizing ICT tools can help SMEs succeed overall. Effectively embracing ICT can confer competitive advantages, increase efficiency and productivity, enhance decision-making, and improve customer relations. On the other hand, SMEs that fail to adopt ICT effectively may experience barriers in entering certain markets or expanding their operations.

The frequency usage of ICT tools had a stronger correlation to SMEs' performance ($(R(286) = 0.494, p < 0.05)$) compared to Frequency of usage of cashless tools and Frequency of use of internet tools at a correlation of ($R(286) = 0.393, p < 0.05$) and ($R(286) = 0.383, p < 0.05$), respectively. Therefore, how frequently ICT tools are used is more impactful to the performance of SMEs regardless of what tools are used.

When considering the relationship between ICT adoption and SME performance, it is necessary to emphasize that the correlation indicates a positive relationship but does not imply causation. As such, other factors, such as the need for skill development and cost, will affect the ability of SMEs to leverage the benefits of ICT. Depending on the circumstances of each SME and the particular difficulties they confront, the precise implications of ICT adoption might change. To guarantee they get the most out of adopting ICT solutions, SMEs must thoroughly evaluate their needs, resources, and market expectations before doing so.

5.2.2 External Environment on Information Communication Technology

Adoption and Small and Medium Enterprises Performance

The study first assessed the link between the external environment and SME Performance. The results showed that the external environment and the performance of SMEs was a weakly positive correlation yet statistically significant at $R(286) = 0.149$, $p\text{-value} < 0.05$. Although the association is weak, the statistical significance shows that the external environment does have some bearing on how well SMEs function. Businesses must be conscious of external influences and take them into account when developing strategies and making choices. These findings confirm those presented by Mkalama et al. (2018) and Okeyo (2014), who claimed that the performance of SMEs tends to be impacted significantly by dynamism in the business environment.

However, since the external environment has a minimal impact on SMEs' performance, they should also concentrate on strengthening internal elements, including management procedures, operational effectiveness, innovation, and personnel competencies. This echoes the argument that Kiveu and Ofafa (2013) stated that a firm's performance

depends on both the internal and external environment. This conclusion echoes the sentiments raised by Machuki and Aosa (2011), who posited the impossibility of establishing a direct link between organizational performance and the outside environment.

The study further explored the impact of external environment and ICT Adoption. The results showed that on a scale of 1 to 5, there was a high consensus (Mean of 3.49, standard deviation of 0.76, and the coefficient of variation of 23%) on the impact of external environment ICT adoption. This paper defined the external environment as suppliers' and consumers' demands, perception of competition, belief about losing the market share or customers, and government-driven incentives. The results unveiled that these factors had an impact on the firm's performance and decision to adopt ICT.

The statement "We felt it is a strategic necessity to use ICT to compete in the marketplace" had the highest consensus with a mean of 4.04, SD of 0.408, and a CV of 10%. This indicates that businesses perceive ICT adoption as critical for their competitiveness. The low coefficient of variation (CV = 10%) indicates that respondents' opinions are relatively consistent and grouped around the mean. Thus, there is high agreement among the respondents in regard to the importance of ICT for strategic positioning. This perception of ICT adoption as a strategic necessity is similar to the sentiments aired through the statement, "We believed we would lose our customers to our competitors if we did not adopt ICT," which had a mean of 3.67, SD of 0.845, and CV of 23%. These results reflect those shared by Machuki and Aosa (2011), stating that performance is best assured if an organization can match its strategy to the turbulence in the external environment.

The statement "We believed we will lose our market share if we do not adopt ICT" had the highest consensus (Mean = 3.93, SD = 0.597 and CV = 15%), indicating that most respondents believed in the importance of ICT adoption in maintaining the market share or clients. The low coefficient of variation indicates the generally consistent and centered replies (CV = 15%). This implies that majority of respondents hold the same opinions about how ICT adoption and market share are related.

The statement "ICT consultants and vendors convinced us to use ICT" had a mean of 3.02 (SD = 1.003 and CV = 33%), indicating a favourable opinion of ICT consultants and vendors' role in persuading respondents to utilize ICT. This shows that outside forces greatly impact how respondents decide to adopt ICT. The high mean score implies that respondents understand how ICT consultants' and vendors' external expertise has influenced their decision to embrace ICT solutions. This suggests that firms rely on outside advice to lead them through the implementation of ICT. These results echo those presented by Gono et al., (2016) that ICT consultants and vendors shape ICT diffusion and can convince SMEs to adopt ICT.

With a mean of 2.60 (SD = 0.97 and CV = 36%), the statement "Suppliers urged us to adopt ICT" had the lowest consensus, implying that most respondents had divergent views regarding how suppliers affect ICT adoption. The high CV indicates that while some responders might strongly disagree with the statement, others may strongly agree. This demonstrates the respondents' ambivalence or lack of agreement over how ICT adoption will affect market share. The comparatively low mean suggests that some respondents may have doubts or misgivings about the correlation between ICT adoption and market share. These findings echo those of Gono et al. (2016), who measured the

external environment by assessing the perceived influence of the supply chain networks, the role of ICT consultants, and government incentives.

Customers also play a vital part in influencing SMEs to embrace ICT. The statement “customers urged us to adopt ICT” had a mean of 3.30, SD of 0.984, and CV of 30%. According to the findings, companies that use ICT solutions are sensitive to consumer wants and preferences. Businesses adopt a customer-centric mindset to remain competitive and satisfy changing client demands. The data is also indicative of customer-driven innovation. Customers' persuading for ICT adoption implies that businesses may be motivated to innovate and introduce new technologies to enhance customer experiences and satisfaction. These results reflect those presented by Mkalama et al. (2018), who conceptualized environmental dynamism in terms of consumers and suppliers.

According to the respondents' opinions, technical improvements may be seen as having a significant impact on market dynamics. This result suggests that companies are aware of how technology affects consumer expectations, operational effectiveness, and general business competitiveness. These results are similar to those presented by Machuki & Aosa (2011) and (Gathungu et al., 2014), who posited that environmental complexity and dynamism largely impacted a firm's profit, total net assets, sales revenue, market share, and return on investment.

The fact that the majority of respondents agreed on the importance of ICT adoption suggests that businesses saw ICT as a necessary tool for staying competitive. They think that if they do not adopt ICT, their market share may shrink and they may lose ground to rivals who have done so.

Through a hierarchical regression analysis model, the study explored the relationship between ICT adoption, external environment and small and medium enterprise performance. The hierarchical regression analysis model results indicated the relationship between the three variables studied. The model showed that the external environment had a positive and significant influence on SMEs performance as given by ($\beta=0.077$, $t=2.542$, $p<0.05$). The positive beta coefficient implies that SMEs' performance tends to grow when the external environment variable rises. This suggests that SMEs are more likely to do well if they are functioning in a more favourable or supportive external environment.

The combined effect of ICT adoption and the external environment on SMEs performance was also assessed using hierarchical regression. The results indicated that the ICT adoption and external environment exhibit statistical significance and positive impact on SMEs performance. The increase in the frequency of usage of all ICT tools, including cashless and internet tools, led to an increase in the performance of SMEs.

Results from a hierarchical regression model assessing the moderating effect of the external environment showed a positive and statistically weighty connection between ICT adoption and SME performance. The data suggested that the effect of the regularity of usage of ICT tools on organization performance depends on the external environment; hence external environment moderates the relationship between ICT adoption (frequency of use of ICT tools) and SMEs performance positively. This finding can be linked back to the statement “the were no subsidies for the high cost of adopting an ICT system,” which had a mean of 3.86, SD of 0.573, and a CV of 15%. The data implies that respondents

agree that no subsidies were available to offset the high cost of adopting an ICT system. Thus, many businesses perceive the cost of ICT adoption as a significant worry.

According to the findings presented in Table 4.14, only 2% of the external environment can be used to explain SMEs performance and the rest is due to unknown factors. It also shows that only 37.9% of SMEs performance can be explained by external environmental. The data also suggests that while businesses may seek external guidance, it is crucial for them to conduct internal assessments and feasibility studies to ensure that the proposed ICT solutions align with their unique requirements.

While ICT adoption positively impacts SME performance, the influence fluctuates due to external conditions. SMEs should consider contextual variables, be flexible in their ICT adoption methods, and base their decisions on thoroughly examining the external environment. By doing this, SMEs can put themselves in a position to take advantage of ICT adoption's advantages and improve their general performance in the market.

5.3 Conclusion

The goal of this research was to investigate how ICT use influenced SMEs' performance in in Kiambu County. It evaluated the relationship between the adoption of ICT and the performance of SMEs in Kiambu County and the effects of the external environment on that relationship. The study had two objectives i) to assess the relationship between ICT adoption and SMEs' performance in Kiambu County and ii) to evaluate the effects of the external environment on the relationship between ICT adoption and the performance of SMEs in Kiambu County.

The study was anchored in two theories: namely theory of diffusion of innovations and, secondly, the technology acceptance model. ICT adoption was conceptualized as having an impact on SME performance, while the external environment was conceptualized as having both an impact on SME performance and a moderating effect on the relationship between ICT adoption and SME performance. A cross-sectional survey reliant on questionnaires was adopted, and descriptive and inferential analyses were performed on the primary data obtained.

The study showed that ICT adoption significantly influences the performance of SMEs with regard to increased sales, increased number of employees and overall performance. The study also confirms a positive correlation between the external environment and ICT performance. A positive correlation between the external environment and ICT adoption was also established. Lastly, the moderating influence of the external environment on the connection between ICT adoption and firm performance was confirmed. The study deduces that implementing and effectively using ICT tools can contribute positively to SMEs' overall success. Before ICT adoption, SMEs must thoroughly evaluate their needs, resources, and market expectations to leap the full benefits of the technology.

5.4 Implications of the Study Findings

The study found a wide range of suggestions that may be taken into account and put into practice in three areas: knowledge, practice, and policy. The contribution to knowledge is based on what is already known. It strengthens and aims to broaden the many justifications across the study's various theoretical foundations. The policy contribution is derived from the perspectives and thoughts shared by the participants, combined with a review of preceding studies on related subjects. Conversely, the contribution to practice is drawn from observations made during the study of the participating firms. A comparison

is made with subsequent inferences from preceding but comparable studies that were carried out on SME innovativeness, and finally, a contribution is made to policy based on observation of the firms studied.

The study lends support to the theory of diffusion of innovations. The positive link between ICT adoption and SME performance supports the diffusion of innovations theory's notion of "relative advantage" is supported. According to this theory, innovations that give definite advantages over current practices are more likely to be implemented. In this situation, ICT adoption is linked to improved performance in SMEs, which can be considered a relative benefit over conventional, non-ICT-based approaches.

Additionally, the diffusion of innovations theory recognizes external influences on adoption, and the moderating impact of the external environment on the connection between ICT adoption and SME performance is consistent with this concept. Additionally, the theory admits that outside elements like social conventions, laws, and cultural values can influence the adoption process. Thus, Stakeholders can better understand the dynamics of ICT adoption and its consequences on SMEs within their unique external environment by taking the diffusion of innovations theory into consideration.

The study also lends additional evidence to support the technology acceptance model (TAM). The findings support the concept of perceived usefulness. The established positive correlation between ICT adoption and performance indicates that SMEs perceive ICT as useful in improving performance. The findings also support the concepts of perceived ease of use, external variables, behavioral intentions and actual use, and attitudes toward ICT adoption. The study holds that stakeholders can customize strategies

to encourage technology acceptance and effective implementation by taking into account the Technology Acceptance Model. The model provides useful insights into the elements impacting SMEs' decision-making processes around ICT adoption.

5.4.1 Contribution to Knowledge

The study results align with the body of research that indicates ICT adoption has a variety of positive effects on business performance. According to prior research, incorporating ICT tools and technologies into company operations can boost efficiency, productivity, cost savings, customer service, and competitive advantages—all of which can better the performance of SMEs.

As established in this study, the moderating effect of the external environment on the relationship between ICT adoption and SMEs' performance is also consistent with existing evidence. The external environment, which includes elements such as market conditions, industry trends, the regulatory environment, and the competitive landscape, is a crucial contextual component that might affect how ICT adoption for SMEs turns out. A variety of external factors can influence the efficiency of ICT adoption techniques and their effects on business performance. As a result, the relationship between ICT adoption and SME performance is greatly influenced by the external environment. Ultimately, this study's findings support theory and existing literature.

These results add to the expanding body of research about the value of ICT adoption for SMEs and the contextual elements affecting technology adoption campaigns' results. As with any study, the findings contribute important new information to the body of

evidence, and more research is needed to confirm and develop these conclusions in various contexts and populations of SMEs.

5.4.2 Recommendations for Practice

The study implies a moderate positive correlation between ICT adoption and SMEs' performance. However, causality is not implied. Other variables not accounted for in the study might influence ICT adoption and SMEs' performance. Regardless, the positive correlation does underscore the dynamic nature of technology and business. Thus, SMEs need to continually monitor the effectiveness of their ICT adoption and demonstrate a willingness to adapt and upgrade their digital strategies as technology evolves.

The study results could motivate businesses to adopt ICT if they have not already done so. The knowledge that ICT adoption correlates to market share may prompt businesses to invest in technology to stay competitive and retain or expand their market presence. Companies that recognize the value of ICT but have not fully embraced it may require support and training to implement these technologies successfully. There may be a demand for educational resources and training programs to help businesses leverage ICT effectively.

The study establishes a weak but positive correlation between external environment and SME performance. The weak positive correlation indicates that although the external environment (such as market trends, economic conditions, and regulatory issues) has some bearing on SMEs' performance, it is not a major impact. The performance of SMEs is presumably more heavily influenced by internal variables and managerial choices. The weak correlation indicates that caution should be exercised when extrapolating the findings to make sweeping generalizations. The relationship observed in this specific

sample may not hold in all contexts or industries. Thus, the study establishes a need to balance external input with internal analysis.

The variability in responses given in the study indicates that there may be an opportunity for education and awareness campaigns to inform SMEs about the potential benefits of ICT adoption in improving market share and overall competitiveness. The varying responses and lack of a clear consensus underscore the need for further investigation to understand the reasons behind differing perceptions. Conducting follow-up interviews or qualitative studies could shed light on factors influencing respondents' beliefs.

SMEs should perform rigorous cost-benefit evaluations before implementing ICT systems because the cost is a major factor. Making educated judgments can be aided by weighing the costs and potential advantages. Businesses may look for alternate funding options, such as loans or grants, to support ICT adoption projects in the absence of subsidies. Additionally, SMEs should create a well-defined ICT strategy aligned with the overall business strategy considering both short-term and long-term objectives.

5.4.3 Recommendations for Policy

The study findings indicate that there is a relatively high agreement among the respondents regarding the lack of subsidies for ICT adoption. The modest agreement suggests that firms may find it difficult to embrace ICT systems due to their high cost. Thus, SME's capacity to invest in cutting-edge ICT systems may be constrained by a lack of subsidies. This may affect their ability to compete effectively and take advantage of technological advances. The finding highlights the potential role of government and policymakers in supporting SMEs' ICT adoption efforts. Governments might consider providing incentives or subsidies to encourage more widespread technology adoption.

Businesses should be aware of any financial possibilities or subsidy programs offered by governmental or private groups to support the adoption of ICT.

Governments can provide financial incentives or subsidies to help SMEs with the costs of adopting ICT. ICT adoption can be made more accessible and inexpensive for SMEs by offering grants, low-interest loans, or tax benefits for investing in ICT infrastructure and technology. Governments can facilitate digital skills training programs tailored to the needs of SMEs. Giving business owners and staff the essential digital skills would enable SMEs to use ICT technologies more efficiently, improving performance and competitiveness.

Government can fund the construction and implementation of ICT infrastructure, such as high-speed internet connectivity, in underserved and rural areas. As a result, all SMEs will have access to the digital infrastructure they need to take advantage of ICT tools and services. Governments can form public-private partnerships that provide resources, information, and assistance to SMEs on their ICT adoption journey by working with private sector organizations, ICT providers, and industry groups.

5.5 Limitations of Study and Future Research Directions

A cross-sectional survey based on observational research methods was used in the current study. The researcher observed the variables at a single point in time. Future studies should consider conducting longitudinal studies to follow SMEs over an extended period, tracking their ICT adoption journey and performance outcomes. Longitudinal research would issue valuable comprehensions into the long-term effect of ICT adoption

on SMEs and how performance evolves over time. Additionally, the cross-sectional nature of the research method did not allow for the exploration of causal relationships.

The quantitative nature of the research design also limited the current study. Complementing quantitative research with qualitative studies can aid in gaining a deeper understanding of SMEs' perceptions, motivations, and challenges when adopting ICT. Qualitative methods can capture in-depth and contextualized information that quantitative data may not fully reveal.

The current study demonstrates that only a proportion (37%) of SMEs performance is influenced by the external environment and only 2% of the external environment has an impact on the performance of SMEs. As such, future studies could focus on investigating potential mediating factors that expound on the relationship between ICT adoption, external environment, and SME performance. For instance, studies could examine the role of organizational culture, leadership, or employee skills as mediators in the ICT adoption-performance relationship. Also, future research could investigate whether early adopters of ICT technologies experience different performance outcomes compared to late adopters or those who delay adoption.

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APPENDICES

Appendix I: Questionnaire

Dear Respondent,

Thank you for your interest in this survey. This is part of a research on the impact of ICT adoption on small and medium enterprises in Kiambu County. The responses from this form are anonymous and will be handled with confidentiality. Please give honest answers to the following questions.

Section 1: General Information

1. What is the name of your organization? (optional)
2. Which year was the organization established?
3. What is your position in the company?

Kindly tick (✓) in the bracket for the appropriate answer.

4. What is the age of the owner/operator of the organization?.....
5. What is the education level of the owner/operator of the organization?
6. Kindly indicate the type of organization
 - a) Limited Liability Company ()
 - b) Partnership ()
 - c) Sacco ()
 - d) Sole proprietorships ()
 - e) Other ()

Explain.....

7. Kindly indicate the sector of your SME
 - a) Wholesale ()
 - b) Retail trade ()
 - c) Manufacturing ()

- d) Accommodation and food service activities ()
- e) Education ()
- f) Financial & insurance services ()
- g) Transportation & storage ()
- h) Administrative & support services ()
- i) Arts, entertainment, & recreation ()
- j) Healthcare: Hospitals, dispensaries, and clinics ()
- k) General merchants & kiosks ()
- l) Auto repair shop ()
- m) Agricultural producers or processors ()
- n) Hawkers & another informal trader ()
- o) Other ()

Explain.....

8. Kindly indicate your subcounty

- a) Kiambu Town ()
- b) Limuru ()
- c) Thika ()
- d) Kikuyu ()
- e) Ruiru ()
- f) Kiambaa ()
- g) Kabete ()
- h) Gatundu North ()
- i) Gatundu South ()
- j) Githunguri ()
- k) Juja ()
- l) Lari ()

9. Have you integrated ICT services in your SME?

- a) NO ()
- b) YES ()

SECTION II: ICT Adoptions

External environmental Context

Kindly indicate to what extent these statements are true about your organization

10. There were no subsidies for the high cost of adopting an ICT system

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

11. ICT consultants and vendors convinced us to use ICT

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

12. Suppliers urged us to adopt ICT

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

13. Customers urged us to adopt ICT

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

14. We believed we would lose our customers to our competitors if we did not adopt ICT

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

15. We felt it is a strategic necessity to use ICT to compete in the marketplace

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

16. We believed we will lose our market share if we do not adopt ICT

- a) Strongly agree ()
- b) Agree ()
- c) Disagree ()
- d) Strongly Disagree ()

Section III: ICT Adoptions

17. Indicate the ICT tools your organization uses

- a) Mobile phone ()
- b) Radio ()
- c) Television ()
- d) Tablet ()
- e) Fax machine ()
- f) Digital/video camera ()
- g) Computer ()
- h) Printers ()

18. Which cashless method do you use.

- a) Mpesa Send money ()
- b) Mpesa Buy goods and services()
- c) Mpesa Paybill ()
- d) Debit card ()
- e) Banker's check ()
- f) Other (specify) _____
- g) None ()

19. Do you use the Internet for your business

a) Yes ()

b) No ()

20. Which Internet platform do you use for business

a) Facebook Page ()

b) Website ()

c) Instagram page ()

d) Whatsapp ()

e) Telegram ()

f) Emails ()

g) None ()

h) Other (specify) ()

Section IV: SMEs Performance

21. Indicate the verifiable level of growth in your sales since you integrated ICT services in your operations

| | Consumers | <0 | No Change | +1 - 499 | +500-1000 | >1000 |
|--|------------------|--------------|------------------|-----------------|------------------|-----------------|
| | | | | | | |

22. Indicate the change in number of employees since you integrated ICT services in your SME operations.

| | Employees | <0 | No Change | +1 - 5 | +6 - 20 | >21 |
|--|------------------|--------------|------------------|---------------|----------------|---------------|
| | | | | | | |

Kindly use the following Likert Scale (1= very small extent; 2 = Small Extent; 3 = Moderate Extent; 4 = to a large extent; 5 = to a very large extent)

23. To what extent do you think ICT services have helped improve your SME's performance in these areas?

| Rating | 1 | 2 | 3 | 4 | 5 |
|--|----------|----------|----------|----------|----------|
| Provision of goods and services (Easy access to clients, easy access to payment). | | | | | |
| Customer Service (increased rate of repurchase, increased rate of returning customers, Increased sales) | | | | | |
| Profitability (Return on Investment, Net income, and added economic value) | | | | | |
| Growth (Increased hiring, increased market value, higher sales, more customers) | | | | | |
| Market value (Opened more branches, increased net income) | | | | | |

Appendix II: Population Distribution

| SMEs | Population | Subcounty Population | | | | | | | | | | | |
|---|-------------|----------------------|------|-------|-------|--------|--------|--------|-------------|---------------|---------------|---------|------------|
| | | Lari | Juja | Thika | Ruiru | Kabete | Kikuyu | Limuru | Kiambu town | Gatundu North | Gatundu South | Kiambaa | Githunguri |
| Medium and small specialty retailers (i.e., bookshops, hardware's) | 503 | 25 | 50 | 65 | 65 | 36 | 36 | 40 | 45 | 35 | 35 | 30 | 41 |
| General Merchants and kiosks | 529 | 30 | 70 | 92 | 70 | 20 | 26 | 25 | 50 | 36 | 35 | 30 | 45 |
| Small sector service providers (i.e., cybercafe, beauticians) | 198 | 9 | 24 | 34 | 19 | 10 | 10 | 20 | 26 | 11 | 11 | 12 | 12 |
| Transport Operators | 345 | 28 | 26 | 45 | 35 | 20 | 27 | 31 | 35 | 23 | 24 | 26 | 25 |
| Agricultural producers | 371 | 20 | 30 | 40 | 36 | 25 | 25 | 40 | 30 | 20 | 22 | 22 | 61 |
| Entertainment-based (i.e., Hotels and Restaurants) | 132 | 8 | 10 | 26 | 25 | 6 | 9 | 8 | 10 | 8 | 7 | 7 | 8 |
| Education Services (i.e., driving schools, technical training facilities) | 264 | 10 | 24 | 32 | 30 | 22 | 20 | 22 | 30 | 12 | 21 | 23 | 18 |
| Health Services (i.e., clinics and mid-level private hospitals) | 305 | 20 | 25 | 30 | 30 | 29 | 25 | 25 | 28 | 20 | 25 | 23 | 25 |
| Total | 2647 | 150 | 259 | 364 | 310 | 168 | 178 | 211 | 254 | 165 | 180 | 173 | 235 |