Adopted Technology And Performance Of Micro And Small Enterprises In Nairobi

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Abstract:

Background: Micro and small enterprises around the world were acknowledged for their indelible part in spurring economic development. In Kenya, the government introduced numerous policy approaches that targeted the growth and promotion of Micro and Small Enterprises, most notably the Micro and Small Enterprises Act of 2012, which established the Micro and Small Enterprises Authority and introduced the Kenya Industrial Estate. Despite numerous initiatives by the government and other statutory organizations, studies revealed that 70 percent of Micro and Small Enterprises failed within their initial three years of existence, rendering their survival in the market space low. This was despite the efforts put in by the government of Kenya and other stakeholders to promote Micro and Small Enterprises in the country. Micro and Small Enterprises were faced with many challenges, including inadequate funding, low levels of skill, infrastructure, political instability, and operating expenses. Technology and innovations were directly proportional to improvements in micro and small enterprises. This study was conducted in Nairobi Central Business District. The study, therefore, tried to find out the effect of adopted technology on the performance of Micro and Small Enterprises in the Nairobi Central Business District. The objective of the study was to establish the effect of marketing innovation on the performance of Micro and Small Enterprises in Nairobi Central Business District. The empirical model of the study was based on the Cobb-Douglas production function. A sample of 270 Micro and Small Enterprises from a target population of 752 in Nairobi Central Business District was selected, and a self-administered questionnaire was administered to the entrepreneurs. The reliability of the questionnaire was determined using Cronbach's alpha and was found to be 0.72. Collected data was analyzed. Some moderator variables, such as Business management skills, gender, education, and the number of years of operation, were analyzed, and descriptive statistics were used to illustrate their effect on the performance of the enterprise. Data analysis results showed that marketing technology had a positive influence on the performance of Micro and Small Enterprises in Nairobi Central Business District. Therefore, Policymakers were encouraged to encourage Micro and Small Enterprises to adopt technology-enabled marketing strategies. Providing incentives, training programs, and resources to help them establish and maintain an online presence was recommended.

Key Word: Micro and Small Enterprises; Marketing technology; Nairobi.

I. Introduction

Background of the Study.

Micro and Small enterprises (MSE) around the globe today have emerged as an avenue for gainful employment. It has been seen as a means for entrepreneurs to be recognized socially and economically in society. In Sub-Saharan Africa, the MSE sector is recognized for its enormous contribution to manufacturing, the balance of trade, employment, development, and the growth of economies (Abisuga-Oyekunle *et al.,* 2020). The governments and donors have recognized the important part the MSE plays in the development and growth of economies in emerging markets (Kuuya, 2015). The 2020 World Bank report on doing business showed that the overall climate of business in Sub-Saharan Africa had improved. The report also exhibited that levels of internet access, adoption of technology, and innovation improved although MSEs battled with other challenges linked to technology such as unreliable electricity supply (World Bank, 2020). MSEs in Africa are embracing digital services to improve their productivity. In South Africa for example, the State of Small Business Report showed that 78 percent of small businesses interviewed preferred accounting software to manage their financial records (Xero, 2019).

The last two decades have seen rapid growth in the MSE sector. The success can be attributed to the internet penetration in the country which stands at 42 percent share of users (Kamer, 2022). The growth of mobile money in Kenya has also uplifted MSEs which directly contributes to economic growth. Kendall (2012) found

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out that 99.5 percent of MSE owners used mobile money in their personal or business dealings and 67 percent used it for business.

Marketing technology.

Technology is the application of scientifically attained information to the practicality of our daily living to manipulate or bring change to the human environment (Augustyn., 2020). Technological innovations are a set of activities that better the development and design of products, services, and the techniques involved in improving and redesigning existing products. Technology has been considered a critical factor in MSEs' market accessibility (Rosli & Sidek, 2013). It has also become an unavoidable requirement for businesses that seek to grow and retain an upper edge in terms of competition by incorporating technology and innovation in accessing new markets (Liu *et al.,* 2020). Access to market and other resources as a result of enhanced technology boosts firm growth and creates employment as well as expansion into new markets.

There is intense economic competition globally requiring MSEs to reconsider their competitive position with their rivals both locally and globally. Thus, according to Rugman (1992), firms better their competitiveness by designing, producing, and marketing products and services that are superior to those being offered by their competitors. Due to this, there is growing competition globally which has led to increased innovativeness by MSEs. Malaysia for example is economically dominated by a large proportion of MSEs. 98.5 percent of the business establishments are MSEs cutting across all sectors and sizes, constituting about 907,065 MSE establishments in the country and contributing to 36.6 percent of Malaysian GDP as of 2016 (Glodec, 2020).

Technology and Micro and Small Enterprises.

Technology has become an important part of the world and MSEs are not left behind in embracing technology. MSEs that have embraced it realize better returns in their businesses. Technology assists these businesses in making them more efficient through improvements in value addition, payment of goods and services, and aiding marketing and distribution of goods and services (Kithae, 2012). The need for technology is its ability to make work easier and improve productivity through the creation of better goods and reduction in time taken to produce goods and services. When used effectively, the positive effects from it enable more wealth creation, increased productivity of labor, and greater living standards in the society. In many cases, when society adopts a specific technology, it causes a positive effect if it is adopted widely by individuals, firms, and institutions. Coombs, Saviotti, & Walsh, (1987) assert that the effect of technology on an economic sector hinge on the level of diffusion of technology in a sector.

Technology in businesses enables efficient production and easier distribution of goods and services. This will also lead to faster consumption of goods and hence better turnover which is an indicator of growth for the MSEs. It, therefore, means that technology enables faster growth (Kuuya, 2015). Technology also alters marketing as it helps in the operationalization of products to target specific audiences creating an environment for specific customers. This leads to the establishment of a brand and growth within an entrepreneur's sector through the development of new customers and customer loyalty with existing customers. The usefulness of technology is enhanced when products acquire increased market value compared to their competitors.

Technology may also affect levels of unemployment as it leads to structural unemployment as well as creating new jobs in the market. In Kenya where unemployment is a major problem, new technology is appealing if it enables MSEs to create employment and aid in income distribution. If there is a rise in demand for a product because of an introduction of new technology or innovation, then firm output and other economic effects within the industry will be greater (Terzi, 2016). Thus, with the help of technology, the country has begun to transform from the third industrial revolution to the fourth, where emerging technology such as artificial intelligence (AI) used in the communications industry by Safaricom through chatbots to communicate to customers, and the internet of things have been adopted in a product such as car trackers. Through this, Kenya is among the countries with more technology hubs in Africa (World bank, 2016).

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Problem Statement

Micro and Small enterprises play a critical part in the social and economic development of Kenya. They play a part in the economy through employment creation, boosting revenue, and fostering innovation thus driving economic growth and development (Mwangi, 2020). KNBS report (2020) stated that a survey by the Ministry of trade, industry, and cooperatives shows that MSEs in Kenya employ more than 80 percent of the working population and therefore play a key role in the country's economic growth. Therefore, there was consequently a necessity to eliminate hindrances that deter their input to the growth of the country (Republic of Kenya, 2007).

Seventy percent of small and medium-scale enterprises in Kenya fail in their first three years of existence (Barus *et al.,* 2017). These failures result in job losses, low liquidity, and increased insecurity and affect economic growth negatively. MSEs are faced with many challenges which include inadequate funding, low levels of skill, infrastructure, political instability, and operating expenses (Khan *et al.,* 2014). Other factors that led to the closure

of businesses were; losses incurred from businesses, and decreasing levels of income generated. Therefore, MSEs must adopt innovative measures for survival in the competitive environment (Robbins *et al.*, 2009).

The government of Kenya as a sole regulator and licensor plays a critical role in MSE advancement. Since the 1980s, the government aided by donor agencies has sought to increase productivity in the MSE sector. The strategy was to replace the use of outdated technology with new ones. Despite the potential benefits of technological innovations, it is not clear whether or how the use of technology has enhanced organizational performance (Abir & Chokri, 2010).

Consequently, MSEs are turning to innovation and technology to stay afloat. Senge, Carstedt, & Porter (2001) argued that the adoption and use of technology is a basic technique used by entrepreneurs to ensure sustainable growth while addressing challenges borne by MSEs in a competitive environment. Therefore, the need for knowledge of how different MSEs categorized by different factors such as education level, business experience, and age, among others are performing due to the influence of technology is needed for effective policy making.

Studies have delved into this area; Kuuya (2015) aimed to investigate the factors that influenced the adoption of adopted technology in the informal sector, Anjum, (2018) studied on performance of technology adoption by SMEs, and Mutwiri (2018) conducted a study that aimed at investigating the effect of technology on entry into markets by SME. Past studies have centered on market entry, and adoption of technology by MSEs and little on the effects technology has had on performance. The study, therefore, aimed to investigate the effect that the use of technology has had on MSE performance in Nairobi City.

Significance of the Study

The major significance of the research was to the national governments and other stakeholders for example the donors. The study hoped to offer a foundation for almost all government policies in the economic system regarding MSEs. The policymakers would be able to identify the various areas and types of technology to make policy improvements on as well as encourage its usage. This would lead to swift growth of MSEs as technological improvements will shed light on the potency of the MSEs thus a smooth transition to its growth. Existing and potential entrepreneurs would find information from this research useful to them. They will be able to gather useful information on the technology adoption and usage that other performing MSEs use and therefore take advantage of it.

Lastly, the study hoped to be of great significance to the potential donors on the transfer of suitable technology to locals wherever possible. Donors will be able to know the suitability of various technologies that can aid in the growth of the sector. Thus, the study will fill an important research gap.

II. Literature Review

Theoretical Literature

This provides economic theories that have been found to explain the economic growth of a country.

Theory of Production

Theory of production is a concept in microeconomics that explains a firm's principal on how much goods and services it sells will be produced from a certain number of inputs; raw materials, labour, and fixed capital. The theory shows the highest amount of output Q which a firm can produce from a given set of inputs while keeping technology constant. This explains the production possibility frontier from vector inputs.

A firm's costs are dependent on two factors which are the technical relationship among inputs and outputs, and factor prices (the price of technology). The concept of the theory is explained in the production function. A production function demonstrates the relationship of variations in inputs and outputs. The amount of production that can be obtained from each combination of factors in the production function. It is illustrated as follows;

$$Q = f(L, K)$$

Where; Q– Firms Output
L– Labour input
K- Capital input

The quantities of the factors that are used by the firm dictate the output realized per period. However, it depends on some assumptions like the law of diminishing returns. Production functions can take different formations; a linear production function, and a Cobb Douglass among others. The current study will find out how technological innovations in the capital (information technology innovations) affect performance.

Empirical Literature

. Tarutèa & Gatautis, (2013) analyzed the effect of ICT on the performance of MSEs. The research aimed to analyze the literature on the possible effects of ICT on the performance of MSE and to find the ones that

determine business success. The research established that ICT had an impact on the external and internal improvements of communications and to have top performance, it is paramount to bring in ICT investment to the organization's goal.

Gathogo & Ragui, (2014) conducted a study on the effects of capital and technology on the performance of MSEs in Kenya's manufacturing sector. The study wanted to determine the factors contributing to the failure of small businesses. Capital, technology, management, and government policy were the main factors investigated. The primary data was collected from Thika municipality which was analyzed using descriptive and inferential statistics. The study observed that technology was important though the MSEs were mostly manually driven.

Oduori (2016) found that a higher level of innovation was realized among firms that targeted improving organizational competency and customer service through skills and knowledge. The study found that many firms are obliged to respond and adapt to the changing environment by being innovative to endure the competence pressure. The conclusion was satisfying customer needs as well as continuous improvements in the skills of employees was key to MSEs in Kenya.

Anjum (2018) examined the impact of technology adoption on the performance of SMEs in India. Primary and secondary data were gathered from a sample size of 300 and examined with logistic regression and linear regression. Factors including supplier relationship, formal strategy, organizational size, customer, innovation capability, innovation cost, and innovation sustenance were taken as variables that influence performance. The study showed that business performance is associated with the implementation of a good strategy relating to sales, profit earnings, and growth. It also showed that organizational size played an important role in explaining business performance. Business performance is noted to be influenced by organization size. Therefore, it can be determined that drivers of technology usage such as organization size influence MSE performance. The present study will establish if organization size impacts the performance of MSE.

Mutwiri, (2018) did a study on the effects of technology innovations on access to the market by MSEs in Nairobi County. The study intended to establish the effects of technological innovations on access to markets. The population targeted was 1050 MSEs in Nairobi City County. The study established that the value of product innovation contributes to market access. The study concluded that improved customer relations have improved market understanding among MSEs. The current study aimed at collecting data in Nairobi city and analyzing the effects of the adoption of technology on performance.

Overview of Literature

It has been proven through literature that many factors aid the performance of MSEs. Rono (2008) in her study found that the most significant factor was market size. The importance of technology on the performance of these MSEs will be understated if it is not considered to be a factor. Adopter's age, education level, and marital status were found to be important factors in adopting a technology (Kuuya, 2015). There however exists a limitation if the study is not examined further to determine the positivity or negativity that the adoption of technology might have come with.

Anjum (2018) found out in his study on the performance of MSEs due to the adoption of technology in India that business performance was due to business owners having a good strategy relating to sales, profit earnings, growth, and size of the business. In Kenya, the issue of underperformance and performance of MSEs continues thus calling for further study in the area.

From the literature reviewed, a lot can be deduced from the roles played by technology and innovations. Beaver (2002) believes that innovation and technology are important elements for economic development and competitiveness in the industry. De Jong & Vermeulen (2006) assert that technological know-how is significant to large firms and MSEs. The studies reviewed revealed little innovations and MSE performance in Nairobi City. Thus, this research aimed to fill the gap.

The performance of the firm is the outcome of meeting in internal and external objectives of the firm (Tan *et al.,* 2009). Thus, for the study, financial indicators were good as a measure of performance but non-financial indicators are also good and rarely studied and can be used to judge the performance of the firms. The study used financial and non-financial indicators.

III. Methodology

Research design

The study used a non-experimental research design. Qualitative and quantitative techniques were used to analyse the cross-sectional data collected. The type of sampling method used was random sampling, and the interview schedule was used to collect data. Inferential and descriptive statistics were estimated.

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Data type and Source

A questionnaire was used for data collection. It was administered to the MSEs in Nairobi City. Data was collected from the MSE owners within the area of study. A questionnaire was administered to collect primary data.

Theoretical Framework

This study was anchored on the theory of production, specifically a Cobb-Douglas production function. Technology, labor, and capital were considered as inputs

A Cobb-Douglas production function for an MSE firm *i* is expressed as follows:

$$Y_i = (A_i L_i)^\alpha K_i^\beta \quad i = 1, 2, \ldots, n \qquad (3.1)$$

Where:

n – The total number of MSE firms

Y – Measure of Output/Sales

A – Technology

L – Labour

K – Capital

A L – effective labour

α and β – elasticities of effective labor and capital respectively.

Equation 3.1 can be linearized so that regression techniques can be applied.

$$\ln Y_i = \alpha \ln A_i + \alpha \ln L_i + \beta \ln K_i \qquad (3.2)$$

Where; ln Y is the natural log of output, ln A is the natural log of technology or innovation adopted, ln L is the natural log of labor employed, and ln K is the natural log of capital in place. α and β are coefficients of natural logarithms of labor and capital respectively.

According to Romer (2019), the effectiveness of labour A captures other factors other than labour and capital which affect output. This includes knowledge and different types of technology that firms can use in production. In this regard, A in equation 3.2 can be disaggregated into different components including technology and other firms' characteristics.

Empirical Model

Equation 3.2 is then specified to account for the different components of A as follows for the ith firm

$$\ln y_i = \alpha_0 + \alpha_1 Mrt_i + \alpha_2 Py_i + \alpha_3 Ps_i + \alpha_4 Pd_i + \alpha_5 Bm_i + \alpha_6 Pr_i + \alpha_7 Sec_i + \alpha_8 Ter_i + \alpha_9 \ln Fa_i$$
$$+ \alpha_{10} \ln Ne_i + \alpha_{11} M_i + \alpha_{12} F_i + \alpha_{13} \ln K_i + \varepsilon_i$$

$i = 1, 2, \ldots, n$

$$(3.3)$$

Where:

n – the total number of firms in the sample

Definition and measurement of variables
Dependent Variable

Micro and Small Enterprise Performance (Y) – this variable used MSE's total output in terms of firm turnover in Kenyan shillings over the past one year.

Independent Variable

Marketing technology (Mrt) - it is a dummy variable which refers to whether an MSE has adopted a form of marketing technology pr have not. Measured as follows, Mrt = 1 for Marketing innovations and 0 for not adopted.

Payment Method technology (Py) – it is a dummy variable which refers to whether an MSE has adopted a form of payment technology or not. Measured as follows Py = 1 for payment method technology and 0 for not adopted.

Process and service innovations (Ps) - it is a dummy variable which refers to whether an MSE has adopted a form of Process and service innovations or not. Measured as follows, Ps = 1 for Process and service innovations and 0 for not adopted

Product distribution innovation (Pd) - it is a dummy variable which refers to whether an MSE has adopted a form of Product distribution innovation or not. Measured as follows, Pd = 1 for Product distribution innovations and 0 for not adopted

Capital stock of the firm (K) – it refers to the value of physical capital of the MSE in Shillings.

Male gender (M) – it is a dummy variable which refers to the owner or manager of the MSE being a male or not. Measured as follows, M = 1 for male ownership and 0 for female or joint ownership.

Female Gender (F) - it is a dummy variable which refers to the owner or manager of the MSE being a female or not. Measured as follows, F = 1 for female ownership and 0 for male or joint ownership.

Joint ownership – this was the reference category for the gender variable of male and female. It refers to MSE where both genders jointly own and manage the business.

Number of Employees (Ne) – it refers to the number of employees the business has employed. It is measured by the number of employees in an MSE.

Primary education (Pr) – it is a dummy variable that refers to Primary education as Maximum level of education attained by the owner. Measured as follows, Pr = 1 for primary education and 0 for Secondary, tertiary or none.

Secondary education (Sec) – it is a dummy variable that refers to secondary education as a maximum level of education attained by the owner. Measured as follows, Sec = 1 for secondary education and 0 for primary, tertiary or none.

Tertiary education (Ter) – it is a dummy variable that refers to tertiary education as a maximum level of education attained by the owner. Measured as follows, Ter = 1 for Tertiary education and 0 for primary, secondary or none.

None – it is a reference category for the education variables where it measured by MSE owners who have not attained any level of education.

Business management skills (Bm) – it is a dummy variable that refers to whether the owner of the MSE has either attained a business management skill or not. Measured as follows, Bm = 1 studied and 0 for not studied.

Firm age (Fa) – it refers to the number of years that an MSE has been running.

Data Analysis and Diagnostic tests

The collected data was coded appropriately and entered for analysis. Before the responses were processed, data preparation had been conducted on the completed questionnaires, which involved tasks such as editing, coding, entering, and cleaning the data. The reliability of the questionnaire was assessed using Cronbach alpha and was found to be 0.72, which was considered reasonably adequate for this study. To accomplish the objectives of the study, a cross-sectional regression equation was estimated. Diagnostics were carried out on the estimated regression model, consisting of heteroskedasticity, multicollinearity and normality.

IV. Results and Discussion

Descriptive statistics

Table 4.1 presents descriptive statistics of the MSEs in Nairobi City CBD. The variables are the number of years in operation, number of employees, turnover and capital.

Table 4.1: Descriptive Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Sales in the last one year (KSh)	1,621,004	2,202,734	30,000	16,000,000
Physical capital (KSh)	1,201,571	2,413,696	10,000	30,000,000
Years in operation	5.52	3.82	1	20
Number of Employees	2.55	2.13	1	10

Source: Constructed from the Data

The table 4.1 shows the sales variable which was a crucial variable in this study had a mean sales value of 1,621,004 KSh provided an understanding of the average sales performance of the businesses under study. The standard deviation of 2,202,734 KSh showed the extent of variability in sales among these enterprises. Importantly, the minimum and maximum sales figures of 30,000 KSh and 16,000,000 KSh, respectively, represented the lower and upper bounds of sales performance. This variable was of paramount importance as it helps assess the financial health and performance of these businesses. It provided insights into their revenue generation capacity, which is vital for identifying their economic contributions and evaluating their growth potential.

The physical capital which had a mean value of 1,201,571 KSh, signified the average investment businesses had made in tangible assets. The standard deviation of 2,413,696 KSh indicated the variability in physical capital among the enterprises. Notably, the minimum and maximum values of 10,000 KSh and 30,000,000 KSh respectively, revealed the range of investments in tangible assets. This variable held significance in assessing the capacity and potential of these businesses. This was crucial in understanding their ability to scale operations, expand, and compete in their respective markets. Businesses with higher physical capital may have a competitive advantage, while those with lower capital may face challenges in growth and development.

Years in Operation, with an average of 5.52 years, provided insights into the experience and stability of these businesses. The standard deviation of 3.82 underscored the variation in the years of operation. The minimum of 1 year represented newly established businesses, while the maximum of 20 years signified well-established,

long-standing enterprises. This variable was instrumental in assessing the resilience and longevity of these businesses. It offered valuable information about factors contributing to their survival, growth, and competitiveness. Newer businesses may encounter different challenges and have distinct needs compared to well-established ones.

Number of Employees played a vital role in understanding the sizes of these businesses. The mean number of employees, which is 2.55, offered insight into the average workforce size. The standard deviation of 2.13 revealed the variation in the number of employees among the businesses. With a minimum of 1 employee and a maximum of 10 employees representing businesses with larger workforces, this variable was essential for assessing the size of the business as well as the contribution of these enterprises to job creation and the local economy. In conclusion, these variables were pivotal in providing valuable insights into the performance of the businesses under study. Wanjiru (2020) found out that performance of the business can be indicated by the employment capacity of business.

Table 4.2 shows the percentage of MSEs in Nairobi City that had adopted marketing innovation as a form of technology to improve the performance of the enterprise.

Table 4.2: Distribution of Marketing Innovation

Marketing Technology Adoption		Respondents	Percentage
	Yes	183	67.78
	No	87	32.22
	Total	**270**	**100.00**

Source: Constructed from the Data

Table 4.2 shows that 67.78 percent of MSEs had adopted marketing innovation as a form of technology to improve the performance of their MSES compared to 32.22 percent that had not adopted it. This implies that MSE products had penetrated the market since the adoption of marketing technology, this might have a positive impact on the performance of MSEs. The findings also revealed that many MSEs had adopted a payment method technology to improve their ease of doing business. 84.44 percent of the MSEs in Nairobi City CBD have adopted a payment method technology as opposed to only 15.56 percent who have not introduced a payment method technology. Marketing innovation is essential for businesses as it reflects their capacity to develop new strategies and approaches to reach and engage customers. Mutwiri (2018) found out that enhanced marketing increased understanding on customer needs and hence market penetration by MSEs.

Diagnostic Tests
Normality
The study used the Jarque-Bera test to test the normality of the data collected. The Jarque-Bera test serves as a goodness-of-fit assessment, determining the conformity of sample data's skewness and kurtosis to that of a normal distribution.

Jarque-Bera normality test: 6.615 Chi (2)   .0566
Jarque-Bera test for Ho: normality:

The results of the test indicate that Jarque-Bera statistic is 6.615 and p-value is 0.0566, the p-value is greater than significance level of 0.05. As a result, the null hypothesis was not rejected, therefore data does not deviate from a normal distribution.

Heteroscedasticity
To test for heteroskedasticity, the study adopted a White's test to check whether the data was homoscedastic.
White's test for Heteroskedasticity:
Ho: homoskedasticity
Ha: unrestricted heteroskedasticity
$chi2(68)$ =   78.77
$Prob > chi2 =$ 0.1748

Table 4.3: Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	78.77	68	0.1748
Skewness	18.70	11	0.0667
Kurtosis	4.17	1	0.0412
Total	**101.64**	**80**	**0.0517**

Source: Constructed from the Data

The White's test results present a chi-squared statistic of 78.77 with a corresponding p-value of 0.1748. Given the p-value of 0.1748, which is greater than the significance level of 0.05, and thus the null hypothesis was not rejected. From the White's test results, the variance of the errors does not vary significantly across different levels of the independent variables in the regression model.

Multicollinearity

The study employed variance inflation factors (VIF) to examine Multicollinearity. Following Field's (2009) guidelines, VIF values exceeding 10 signal the existence of Multicollinearity. The outcomes in Table 4.4 display VIF outcomes, which was under 10 signaling that there was no multicollinearity.

Table 4.4: Variance Inflation Factor

Variable	VIF	1/VIF
Secondary	15.32	0.065268
Tertiary	13.95	0.071668
Male	3.23	0.309751
Female	3.08	0.324194
Primary	3.01	0.332474
Marketing Innovation	1.92	0.521245
Logarithm of Capital	1.88	0.533111
Process and Service Innovation	1.64	0.611066
Logarithm of Number of Employees	1.48	0.676925
Logarithm of Firm Age	1.35	0.740910
Payment Methods	1.27	0.789798
Product distribution	1.24	0.809394
Business Management Skills	1.16	0.859430
Mean VIF	**3.90**	

Source: Constructed from the Data

Regression Results

The linear regression analysis was used to determine the effect of technology on the performance of Micro and Small Enterprises in Nairobi CBD. The dependent variable for the study was the performance of MSE measured by turnover. The independent variables for the study were; Tertiary education, Secondary education, Primary education, gender, firm age, capital, marketing innovation, product distribution innovation, payment technology, process and innovation, number of employees, and business management skills. Capital, Number of employees, and firm age. The gender and education variables were categorical variables with three categories for gender; male, female, and jointly owned by a man and a woman. Education had tertiary, Secondary, Primary variable and none. Thus, the study used both genders and None categories as a reference category gender and education respectively. The reference category for Education was none. Table 4.5 shows the regression results from the analysis.

Table 4.5: Regression Analysis

Variable	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Log of Number of Employees	.3535332	.0873235	4.05	0.000	.1815757	.5254907
Log of Years in Operation	-.1329461	.0861052	-1.54	0.124	-.3025045	.0366124
Log of Capital	.2701133	.0408997	6.60	0.000	.1895736	.350653
Business management Skills	-.0632726	.1110931	-0.57	0.569	-.2820372	.155492
Process and Service Innovation	.3208985	.1303894	2.46	0.015	.0641355	.5776616
Payment Methods	.3698337	.1571081	2.35	0.019	.0604562	.6792111
Product Distribution	.2761561	.1157955	2.38	0.018	.0481315	.5041808
Marketing Innovation	.7783317	.1499832	5.19	0.000	.4829847	1.073679
Female	-.052762	.1946366	-0.27	0.787	-.4360407	.3305167
Male	.0966111	.1858903	0.52	0.604	-.2694444	.4626666
Tertiary	.4741027	.5026588	0.94	0.346	-.5157701	1.463975
Primary	.0241644	.5952256	0.04	0.968	1.147998	1.196327
Linear regression				Observations	=270	
				F (13, 256)	=38.88	
				Prob > F	=0.0000	
				R-squared	=0.6254	
				Adj R-squared	=0.6064	
				Root MSE	=.8313	

Source: Constructed from the Data

According to the regression results from Table 4.5, the linear regression model specifies that the number of employees, capital, process and service innovation, payment methods technology, marketing innovation, and product distribution technology variables were statistically significant in explaining the performance of MSEs with P-values of less than 0.05 at 95 percent level of significance. Consequently, independent variables such as tertiary education, secondary education, primary education, firm age, business management training, and gender dummy variables for males and females were found to be statistically insignificant at 5 percent level of significance with p-values being greater than 0.05.

The coefficient of log of capital was positive and statistically significant at one percent level. This means that when capital use is increased by one percent performance in terms of turnover would increase by 0.27 percent. The study was consistent with Gathogo and Ragui (2014) who found out that capital played a crucial role in enhancing performance and boosting the competitiveness of businesses.

The coefficient of log of the number of employees was positive and statistically significant at one percent. This meant that with an increase in the number of employees by one percent, the performance of MSE increased by 0.354 percent. This is consistent with the findings of Rono (2008) who found out that the number of employees in a business had a positive influence on the performance of MSEs.

A marketing innovation technology adopted had a positive influence on the performance of MSE because its coefficient was positive and statistically significant at one percent. Marketing innovation technology could encompass various tools and strategies used for marketing purposes, such as digital advertising, social media marketing, or data analytics. When MSEs adopt such technology, it may lead to better market visibility, improved customer targeting, and more effective marketing campaigns. This was consistent with Waithaka (2017) who found out that in success of Small and Medium-sized Enterprises (SMEs), innovation plays an indispensable role as a vital driver that helps SMEs adapt to changing market dynamics, enhance competitiveness, and ensure long-term sustainability.

The ownerships of MSE in terms of male only ownership and female ownership in relation to joint ownership were not important in determining performance of MSE. The result was contrary to Karadag (2017) who did a study on the impact of industry, education level and the age of the firm on financial performance of Small and medium-sized enterprises in Turkey found out that the education level of small business owner demonstrated a robust and favorable relationship with their performance. This was also seen in Education where, tertiary level, secondary level and primary level in relation to none were not significant in determining the performance of MSEs. It doesn't necessarily mean that these variables are unimportant in all situations, but rather that within the scope of this study and dataset, they did not show a significant effect on MSE performance.

This study sheds light on the valuable role that technological innovation plays in the improvement of MSEs performance. For instance, the online market emerged as a significant channel for placing orders and conducting transactions through the Internet. According to Becheikh et al. (2006), technological innovation plays a crucial role in giving companies a competitive advantage when it comes to accessing markets. The World Wide Web serves as an exceptional platform for MSEs to expand and explore new market opportunities. Meanwhile, the Internet plays a fundamental role in enhancing both market access and operational efficiency for organizations. The study is consistent with the theory of production where it argues that the performance of MSEs is well explained by capital and technology. This research aligns with the findings of various other researchers, including Mutwiri (2018), Waithaka (2014), and Rosli, M. M., & Sidek, S. (2013), who observed that the integration of technology by small business owners led to enhanced business performance. The incorporation of technological innovation is widely believed to not only enhance an organization's performance but also drive growth and ensure its survival (Anjum, 2018).

V. Summary, Conclusions and Policy Implications

Summary of the findings

This study aimed to assess the effect of adopted technology on the performance of micro and small enterprises in Nairobi City. Through data analysis, valuable insights were gained regarding how these factors affect the performance of such businesses in the Central Business District of Nairobi City. In particular, the research findings highlighted the notable influence of process and service innovation, product distribution, payment technology, and marketing innovation as key drivers of performance for MSEs in the CBD of Nairobi City. These findings were subsequently summarized according to the predefined research objective.

The objective of the study was to determine the effect of marketing innovation on the performance of micro and small enterprises (MSEs) located in Nairobi City. The research yielded notable outcomes, indicating that marketing innovation held significant importance as a variable. The empirical evidence pointed to a positive and significant effect of marketing innovation on the performance of the sampled MSEs. This suggests that having a technology-enabled approach to marketing goods and services is crucial for effectively implementing a business idea and plan among small entrepreneurs. On the other hand, the more a business engages in marketing technology or finds an online presence for its business, the better the success of the MSE.

Conclusion

In conclusion, the effects of various technological innovations on the performance of MSEs within Nairobi City revealed significant associations between technology adoption and MSE performance across different dimensions. The study's findings underscore the pivotal role of technology in shaping the success of micro and small enterprises, emphasizing the benefits of embracing innovative approaches to marketing, payment, production, and distribution to achieve enhanced performance and growth This implies that adopting technology-driven methods can play a pivotal role in driving positive outcomes for these businesses, underscoring the importance of keeping up with technological advancements in business operations.

Policy Implication

The study's findings lead to the following suggested actions for the stakeholders within the MSE sector. Policymakers could encourage MSEs to adopt technology-enabled marketing strategies. Providing incentives, training programs, and resources to help MSEs establish and maintain an online presence such as using online advertisement could enhance their visibility, customer reach, and overall performance. With appropriate government investment in this area, the sector could witness a narrowing of the gap, particularly between struggling and prosperous MSEs. Governmental bodies providing entrepreneurship training, such as the Kenya National Chamber of Commerce and Industry (KNCCI), the Kenya Institute of Business Training (KIBT), and Kenya Industrial Research (KIR), should extend their services to micro and small enterprises. These enterprises constitute a substantial portion of the sector and are currently underrepresented. A deficiency in skills and business knowledge has resulted in a significant number of these enterprises struggling to progress from micro to small or larger scales

The Micro and Small Enterprise Authority (MSEA) should take additional steps to launch initiatives aimed at fostering innovation in production processes, which could significantly bolster the growth of MSEs. Implementing funding mechanisms, fostering research collaborations, and establishing innovation hubs could assist MSEs in seamlessly incorporating technology into their operations, ultimately enhancing the quality and efficiency of their products.

The mobile banking industry has gained significant popularity among entrepreneurs in Nairobi due to its convenience and extensive accessibility. Introducing payment policies aimed at reducing charges and expenses related to its usage, whether for customers or business owners, could serve as an effective strategy for encouraging greater technology integration into business operations. By enabling them to harness technology more efficiently in their businesses, entrepreneurs would have improved financial management tools at their disposal.

Areas for Further Study

The primary focus of this research was to analyze how adopted technology influences the performance of micro and small enterprises in Nairobi City. However, various factors such as geographical location, infrastructure availability, social media presence, and the accessibility of business support services could potentially impact their performance as well. Consequently, there is a need for additional research to delve into the specific effects of each of these factors on the performance of micro and small enterprises.

Secondly, the scope of this study was limited to MSEs within Nairobi City CBD, excluding medium and large enterprises. Consequently, there is a need for subsequent research to investigate the effect of adopted technology on the performance of large enterprises. This would enable meaningful comparisons across different enterprise sizes.

Rosuvastatin 20 mg on every other regimen had equal effect when compared to daily dose regimen of atorvastatin 40 mg &rosuvastatin 20mg.

References

[1]. Abir, M., & Chokri, M. (2010). Is Financial Innovation Influenced By Financial Liberalization? Evidence From The Tunisian Banking Industry. Banks & Bank Systems.
[2]. Abisuga-Oyekunle, O. A., Patra, S. K., & Muchie, M. (2020). Smes In Sustainable Development: Their Role In Poverty Reduction And Employment Generation In Sub-Saharan Africa. African Journal Of Science, Technology, Innovation And Development.
[3]. Anjum, A. (2011). Impact Of Technology Adoption On The Performance Of Small And Medium Enterprises In India. Academic Research Publishing.
[4]. Augustyn., A. (2020). Technology. Retrieved From Britannica: Https://Www.Britannica.Com/Technology/Technology
[5]. Barus, J. J., Muturi, W., Kibati, P., & Koima, J. (2017). Effect Of Capital Adequacy On The Financial Performance Of Savings And Credit Societies In Kenya. American Journal Of Finance.
[6]. Beaver, G. (2002). Small Business, Entrepreneurship And Enterprise Development. Pearson Education.
[7]. Bowen, M., Morara, M., & Mureithi, M. (2009). Management Of Business Challenges Among Small And Micro Enterprises In Nairobi-Kenya. . KCA Journal Of Business Management.
[8]. Brooks, C. (2008). Introductory Econometrics Of Finance. Cambridge University Press.
[9]. Coombs, R., Saviotti, P., & Walsh, V. (1987). Economics And Technological Change.
[10]. De Jong, J. P., & Vermeulen, P. A. (2006). Determinants Of Product Innovation In Small Firms: A Comparison Across Industries. International Small Business Journal.

[11].   Gathogo, G., & Ragui, D. M. (2014). Effects Of Capital And Technology On The Performance Of Smes In The Manufacturing Sector In Kenya - Case Of Selected Firms In Thika Municipality. European Journal Of Business And Management.

[12].   Gibbs, J. L., & Kraemer, K. L. (2004). A Cross-Country Investigation Of The Determinants Of Scope Of E-Commerce Use: An Institutional Approach.

[13].   Glodec. (2020, April 18). Digital Transformation For SME Manufacturers In Malaysia. Retrieved From Glodec: Https://Glodec.Com/Digital-Transformation-For-Sme-Manufacturers-In-Malaysia/

[14].   Kamer, L. (2022, July). Internet Penetration In Africa January 2022, By Country. Retrieved From Statista: Https://Www.Statista.Com/Statistics/1124283/Internet-Penetration-In-Africa-By-Country/

[15].   Karadag, H. (2017). The Impact Of Industry, Firm Age And Education Level On Financial Management Performance In Small And Medium-Sized Enterprises (Smes) Evidence From Turkey. . Journal Of Entrepreneurship In Emerging Economies.

[16].   Kendall, J. (2012). Local Financial Development And Growth. Journal Of Banking & Finance.

[17].   Khan, M. W., Khalique, M., & Nor, R. M. (2014). Exploring The Measurements Of Organizational Performance: Small And Medium Enterprises (Smes) Perspective.

[18].   Kiggima, C. W. (2017). Technological Innovation And Performance Of Micro And Small Enterprises In Nairobi County.

[19].   Kithae, P. (2012). Effect Of Technology Adoption On Performance Of Youth Led Micro And Small Enterprises.

[20].   Kuuya, P. M. (2015). ADOPTION OF ADAPTED TECHNOLOGY BY MICRO AND SMALL ENTERPRISES IN THE INFORMAL SECTOR IN KENYA.

[21].   Liu, W. L., H., R., Chen, H., & Mboga, J. (2020). Perspectives On Disruptive Technology And Innovation: Exploring Conflicts, Characteristics In Emerging Economies. International Journal Of Conflict Management.

[22].   Mbiti, F. M. (2015). The Influence Of Socio-Cultural Factors On Growth Of Women-Owned Micro And Small Enterprises In Kitui County, Kenya.

[23].   Mutwiri, G. (2018). Effects Of Technology Innovation On Access To Markets By Small And Medium Enterprises In Nairobi.

[24].   Mwangi, R. W. (2020). Credit, Entrepreneurship Training And Performance Of Micro And Small Enterprises In Nakuru County, Kenya.

[25].   Oduori, F. N. (2016). Strategic Adaptability And Innovation In The Travel Industry In Nairobi.

[26].   Orr, G. (2003). Diffusion Of Innovations, By Everett Rogers (1995).

[27].   Pelham, A. M. (2000). Market Orientation And Other Potential Influences On Performance In Small And Medium-Sized Manufacturing Firms. Journal Of Small Business Management.

[28].   Republic Of Kenya. (1965). Sessional Paper No. 10 Of 1965 On African Socialism And Its Application To Planning In Kenya. Government Printers.

[29].   Republic Of Kenya. (1986). Sessional Paper No. 01 Of 1986 On Economic Management For Renewed Growth. Nairobi: Republic Of Kenya.

[30].   Republic Of Kenya. (2005). Sessional Paper No 2 Of 2005 On Development Of Micro And Small Enterprises For Wealth And Employment Creation For Poverty Reduction.

[31].   Republic Of Kenya. (2005). Sessional Paper No. 02 Of 2005 On Development Of Micro And Small Enterprises For Wealth And Employment Creation For Poverty Reduction. Nairobi: Republic Of Kenya.

[32].   Republic Of Kenya. (2017). National Broadband Strategy 2018-2023. Nairobi: Republic Of Kenya.

[33].   Republic Of Kenya. (2020). Sessional Paper No. 05 Of 2020 On Kenya Micro And Small Enterprises Policy For Promoting Micro And Small Enterprises (Mses) For Wealth And. Nairobi: Republic Of Kenya.

[34].   Robbins, S. P., Coulter, M., & Vohra, N. (2009). Introduction To Management And Organizations. Publishing Prentice Hall Publications.

[35].   Rono, G. J. (2009). Performance Of Micro And Small Enterprises Supported By Women Enterprise And Development Fund In Eldoret Town, Kenya.

[36].   Rosli, M. M., & Sidek, S. (2013). The Impact Of Innovation On The Performance Of Small And Medium Manufacturing Enterprises. Journal Of Innovation Management In Small & Medium Enterprises.

[37].   Senge, P. M., Carstedt, G., & Porter, P. L. (2001). Next Industrial Revolution. MIT Sloan Management Review.

[38].   Tan, K. S., Chong, S. C., Lin, B., & Eze, U. C. (2009). Internet-Based ICT Adoption: Evidence From Malaysian Smes. Industrial Management & Data Systems.

[39].   Tarutèa, A., & Gatautis, R. (2013). ICT Impact On Smes Performance.

[40].   Terzi, N. (2016). The Impact Of E-Commerce On International Trade And Employment. N Encyclopaedia Of E-Commerce Development, Implementation, And Management.

[41].   Thirtle, C. G., & Ruttan, V. W. (1987). The Role Of Demand And Supply In The Generation And Diffusion Of Technical Change.

[42].   Tornatzky, L. G., Fleischer, M., & Chakrabarti, A. K. (1990). Processes Of Technological Innovation. Lexington Books.

[43].   Waithaka, E. (2017). A Study Of Critical Success Factors Affecting Small And Medium Enterprises In Nairobi County: A Case Study Of Small And Medium-Sized Enterprises In Nairobi City Central Business District.

[44].   Wakiaga, P. (2020). The Focus On Smes Is A Welcome Intervention. Retrieved From KAM: Https://Kam.Co.Ke/The-Focus-On-Smes-Is-A-Welcome-Intervention/

[45].   Wanjohi, A. M. (2010). Sustainability Of Community Based Projects In Developing Countries: A Study Of Sustainability Issues Facing Community Based Projects In Rural Areas Of Mbeere District In Kenya. LAP Lambert Academic Publishing, Forthcoming.

[46].   World Bank. (2016). Tech Hubs In Africa. Retrieved From The World Bank: Http://Wbgfiles.Worldbank.Org/Documents/Dec/Tech-Hubs-In-Africa.Html

[47].   World Bank. (2020). Trading For Development In The Age Of Global Value Chain. Washington DC.

[48].   Xero. (2019). The State Of South African Small Business. Cape Town.

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