BRIDGING THE DIGITAL DIVIDE: EXAMINING THE IMPACT OF DIGITAL TECHNOLOGY ADOPTION ON SME PERFORMANCE IN KENYA

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Abstract

Governments across the globe recognize the important role played by small and medium enterprises (SMEs) in economic growth and development, yet many of these enterprises face operational challenges and early closure. While SMEs continue to adopt digital technologies to enhance performance, empirical evidence on that impact is mixed. Grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Balanced Scorecard Theory (BST), the study examined the impact of digital technology adoption on the performance of SMEs in Kenya. Using an explanatory research design, a cross-sectional approach, the study employed stratified, proportional, and random sampling techniques. Data were collected using a self-designed, closed-ended questionnaire and analyzed using descriptive analysis and regression analysis. Descriptive statistics revealed a moderate to high adoption of digital technologies (mean = 3.89, SD = 0.82), particularly in digital infrastructure and platform usage,

with relatively lower integration into internal processes and employee capabilities. SME performance was similarly moderate (mean = 3.78, SD = 0.82), with strengths observed in customer satisfaction and operational efficiency, but lower scores in innovation and market expansion. Further findings showed a significant and positive regression coefficient (β = 0.374, p < 0.001), indicating a positive effect of digital technology adoption and with diagnostic tests confirming the validity of the regression assumptions, leading to the rejection of the null hypothesis. The empirical evidence extends UTAUT's and BST's applicability to SMEs in a developing context, and supports policy recommendations to promote the adoption of digital technology as a pathway to improved SME performance.

Keywords: Digital Technology Adoption, SME Performance, Unified Theory of Acceptance and Use of Technology, Balanced Scorecard Theory

INTRODUCTION

Across the world, governments appreciate SMEs' role in attaining long-term and widespread shared economic development (Telukdarie et al., 2023) and their role in absorbing the estimated 600 million jobs by 2030 (World Bank Group, 2019). SMEs play a crucial role in driving sustainable global economic growth, and innovation as well as the creation of jobs. Specifically, in developing countries, SMEs drive poverty reduction, employment creation, innovation, and economic development (Telukdarie et al., 2023). Across the world, SMEs account for over 90% of the business population, making them the dominant form of business entities and over 50% of global employment (World Bank Group, 2019). In emerging economies, formal SMEs contribute 40% of GDP, and adding informal SMEs raise this number significantly. Formal SMEs create 7 of the 10 jobs in emerging economies.

In the European Union (EU), SMEs account for around 99% of all businesses providing over 67% of employment (Kádárová et al., 2023). In addition, they contribute significantly to its gross domestic product (GDP), making up over 50% of the added value of non-financial economy. According to the Organization for Economic Cooperation and Development (OECD, 2019), 37 of its member states have 99% of the enterprises made of SMEs which create over 50% of employment and contribute half of the business GDP.

In Africa, SMEs constitute over 90% of all enterprises and offer 80% of jobs, significantly contributing to inclusive economic growth. According to the World Economic Forum (2023), sub-Saharan Africa has over 44 million SMEs, forming over 95% of all businesses and contributing almost 50% of the GDP in the region. In Ghana, SMEs represent 92% of businesses contributing to around 70% of GDP (Amuzu et al., 2024). In Rwanda, Mukamanzi and

Ndikubwimana (2018) note that SMEs comprise 98% of total enterprises and contribute at least 41% of all private sector jobs. Similarly, in Kenya, SMEs constitute 98% of all business, create 30% of jobs annually, and add 33.8% to the national GDP (Kenya Association of Manufacturers, 2024; Kenya Institute for Public Policy Research and Analysis, 2023), highlighting their unassailable role as a driver for economic growth and development.

However, despite these immense contributions, SMEs, continue to experience various challenges resulting in operational problems and closure. These challenges include financing challenges through access and affordability, lack of entrepreneurship skills, contract enforcement problems, limited transport and energy, legal and technological barriers (Mukamanzi & Ndikubwimana, 2018; Telukdarie et al., 2023).

In Kenya, SMEs' performance has been declining, attracting attention from various stakeholders including the private sector, business practitioners, and government policymakers (Njoroge & Bett, 2019). It is, thus, important to assess the operating environment of these enterprises. SMEs operate in highly dynamic and competitive environments, continuously looking for survival and growth ways to be competitive (Rajala & Hautala-Kankaanpää, 2023). On this note, digital technology has become an imperative tool for attaining business goals (Masoud & Basahel, 2023). According to de Gooyert (2020), digital technologies are developing and offering access to new avenues to the creation of value. Ferreira et al. (2019) note that the managers' interest in digital technology adoption is on the rise as it is helping businesses gain differentiation and competitive advantage. Teng et al. (2022) state that under the fourth industrial revolution characterized by scientific and technological revolution, SMEs must adapt to gain the benefits of digital technology, improve their abilities towards rapid perception and agile response, and intelligent decision-making in the bid to harness opportunities, deal with risks and attain sustainable development. Through successful digital transformation, enterprises can improve their operational efficiency by 8-10 folds.

Unlike larger organizations, SMEs are flexible and can easily use digital technology as an approach to organizational change. However, SMEs are slow to adopting digital technologies due to several factors such as scarce resources and lack of sufficient technological skills (Cenamor et al., 2019; Matarazzo et al., 2021). Additionally, in academia, the role of DTA on firm performance has not been conclusive with studies establishing different findings. The studies by Roman and Rusu (2022), Weber (2024) and Olateju (2024) established a positive effect; Guo, at al. (2023) and Nambisan (2017) established negative effect; and Chen et al. (2024) found a u-shaped relationship. With such discrepancies and no identified works on the impact of DTA on the performance of Kenyan SMEs, this study was conducted to assess the relationship between these variables.

LITERATURE REVIEW

Theoretical Review

Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT was proposed by Venkatech et al. (2003) after arguing that researchers explaining the acceptance and use of technology adopted theories that offered a large number of common constructs. They would pick and choose constructs from these models or opt for a favourable model. These theories are used in user technological acceptance and behavioural research (Ma & Luo, 2022). They include theory of reasoned action (TRA), technology acceptance model (TAM), theory of planned behaviour (TPB), social cognitive theory (SCT), innovation diffusion theory (IDT). Model of PC utilisation (MPCU), decomposed theory of planned behaviour (DTPB) and combined model of TAM and TPB (C-TAM-TPB) (Dwivedi et al. 2019). The key components of this model include performance expectancy, effort expectancy, social influence, and facilitating conditions (Dewi et al., 2023; Wang et al., 2021). The performance expectancy is concerned about the perceived benefits of using technology in performing tasks. The effort expectancy addresses the easiness of use of technology while social influence covers the influence of others towards the use of technology. The facilitating conditions include the supports and resources for effective use of the technology. Besides these key components, UTAUT identified four major moderating variables that moderate the relationship between these components and the behavioural intention to use and actual usage and include the age, experience, gender, and voluntariness of use (Wang et al., 2021).

Balanced Scorecard Theory

It was developed in 1992 by Robert Kaplan and David Norton as a set of measures, which permits for holistic and integrated view of the performance of business. Besides the financial measures criterion, it includes the performance in the perspectives of internal business processes, customers, and learning/innovation and growth (Ngure, 2022; Terziev et al., 2020). It is an important tool for strategic management of businesses as it supports conversion of objectives into detailed operational tasks. It is also used for the broader assessment and measurement of results in an organisation (Bochenek, 2019). Through the inclusion of non-financial metrics, the management are able to improve the planning, control and performance functions in an entity. According to Ngure (2022), while the financial measures help in the short term evaluation of the organisation, the non-financial assist in the long run evaluation. The non-financial metrics can be descriptives or measurable and identify and stress on what needs to be done, the parameters as well as the deficiencies noted. Therefore, this theory was important in

explaining the performance of SME variable, which covered both financial and non-financial dimensions of performance.

Empirical Review

Kádárová et al. (2023) conducted a study in the European Union (EU) to assess the effect of digitalisation on the performance of SMEs. Data was collected from 27 EU countries for a period of five years. A panel regression model was adopted to analyse the 135 observations. Results showed that digitalisation was associated with a positive effect on SMEs' performance through productivity improvement, process streamlining, and enhanced customer experience. These empirical findings offer imperative evidence on the adoption of digital technologies and its effect on SMEs performance. However, being conducted in EU nations, these findings cannot be assumed to the case in different jurisdictions such as Kenya, which is different in terms of economic development, legal and political environment and technological advancement; all which have an effect on the utilisation of technologies. Therefore, there was a need for a new study focusing on the same variables, but in a different location; thus the case for the current study.

Fan et al. (2021) conducted a study in Pakistan to examine the factors affecting the performance of SMEs, including the mediating role of adoption of social media. Data was collected using a closed-ended questionnaire and analysed through structural equation modelling. The results showed that the use of technology positively and significantly influenced SME performance. While these findings offer important insights on the role of technology adoption on SMEs, they might not be generalised across the world. Specifically, this study having been conducted in Pakistan may be different from one carried out in Kenya due to differences in contextual factors. Additionally, while Fan et al. (2021) used structural equation modelling, the current study used a simple linear regression model for analysis.

A study by Affandi (2024) sought to establish the link between digital adoption, financial literacy, and performance of Indonesian SMEs. Data was analysed through regression technique. The findings indicated that digital adoption had a positive and significant effect on the performance (sales growth) of SMEs. The study, however, was conducted in Indonesia, which has significant fundamental differences from Kenya where the current studied was conducted. For instance, the two countries differ in business environment, firm-specific factors, owner demographic characteristics, connectivity infrastructure quality, and culture. Such differences made it difficult for Affandi (2024)'s findings to be assumed to be the case for Kenya. In addition, Affandi (2024) limited the performance measure to sales growth, but the current study expanded

this measure to include financial performance, internal business processes, customer satisfaction, and innovation and learning.

Iskandar (2023) also conducted a study in Indonesia to assess the association between the adoption of technology and performance of SMEs. Technology adoption was measured through the use of software, hardware, automation, digital marketing strategies and internet-based solutions while performance took the forms of market share, customer satisfaction, revenue growth, profitability, and employee productivity. A cross-sectional research design and regression analysis technique were adopted with results indicating that SMEs that embraced digital technology posted better performance. There is a contextual gap as the reviewed work was conducted in Indonesia which has a different business environment from the Kenyan. Similar to Iskandar (2023), the current study adopted explanatory, cross-sectional research design and regression analysis.

Through a systematic search strategy, Dimoso and Utonga (2024) reviewed the effect of digital technology adoption on performance of SMEs in developing economies. They examined articles from electronic databases over the period 2017 to 2023. They found that adopting digital technology enhanced the performance of SMEs across financial, market, operational and customer relationship metrics. This study formed an important ground for the current study, especially on the SMEs' performance measures to include both financial and non-financial metrics.

Focusing on Nigeria, Khairuddin and Olowosuyi (2020) carried out a study to explore the relationship between digital adoption and performance of SMEs. They conceptualised digital adoption through e-commerce, mobile-commerce, cloud computing, company website, and microblogging. Business performance, on the other hand, was measured as efficiency, sales, and profitability. Results revealed that adoption of digital technology had positive and significant effect on business performance. This study helped the current study in the choice of the study variables and their measures such as the performance but added more non-financial metrics such as customer satisfaction. Also, while these findings are important in showing the relationship between these variables, it may not be generalised to other jurisdictions such as Kenya because Nigeria differs in various fronts including business environment. Therefore, the current study served to bridge this contextual gap.

Olateju (2024) also conducted a study in Nigeria to examine the effect of digital technology on SMEs' performance. The author used a sample of 320 SMEs where 150 firms adopted technology in their operations while 170 acted as a control as they had no digital technologies in place. Data was analysed through propensity score matching (PSM) technique. Results were that SMEs with digital technologies were able to expand their operations more

than the control group. However, further results showed that adoption of digital technology did not have significant effect on their profitability compared to non-adopters. Such an effect on profits could be attributed to the costs involved in adopting technology. These results called for the need to explore more on this area and in a different region, such as the focus of the current study, Kenya, to see whether the effect would be different bearing in mind the underlying differences between the two countries, especially around government subsidies, grants, and tax holidays that would lower the implementation costs and increase profits.

In Saudi Arabia, Masoud and Basahel (2023) investigated the effect that digital transformation had on the performance of firms. The performance was measured in respect with customer satisfaction and innovation. The authors collected data from 164 representatives (IT managers, chief transformation officers, and chief information officers) of the service sector firms using questionnaires. Data was analysed through correlation analysis, t-test, and regression analysis techniques. They established that digital transformation had the greatest effect on customer experience. The reviewed study focused on Saudi Arabia which has a different economic status (high income economy) from that of Kenya (low income), which may impact differently on the level of digitalisation of business operations. Additionally, Masoud and Basahel (2023) only focused on service firms, which may not be generalised to other sectors pf the economy. Therefore, the current study focused on various sectors including manufacturing, technology, retail, agriculture, and service.

Despite the immense contribution of digitalisation on the SMEs performance, negative effects have also been established. For instance, Rajala and Hautala-Kankaanpää (2023) explored the effect of digital technologies and platforms on manufacturing SMEs performance in Finland. Data was analysed using the moderated regression technique with results showing that the adoption of platform-based digital connectivity had no direct effect on operational performance of SMEs. They also found that the effect on performance varied based on the level of environmental turbulence. Kenya being different from Finland and given its environment that is sometimes characterised by political and macroeconomic instabilities, it was important to carry out a different study; thus, the current study was conducted focusing on Kenya.

Amuzu et al. (2024) study determined the effect of digitalization on SMEs performance in Ghana. The sample was dominated by firms from services, trading and retail sectors. The cause-effect was established by conducting a regression analysis. Results indicated that the adoption of digital technologies such as social platforms for business transactions boosted promotion initiatives, enhanced good customer relationships, and increased sales. However, further results showed that not all SMEs that had websites indicated an increase in sales, customers and revenues, and a reduction in costs. The study focused on only three sectors and

the current study covered five sectors. In addition, it limited the measurement of performance to qualitative metrics covering only customer satisfaction. Additionally, the study was conducted in Accra, Ghana, which a different location from the focus of the current study, which covers Kenya, and SMEs across the country and not one region. Overall, the findings by Amuzu cannot be generalised; therefore, the need for this study.

Chen et al. (2024) focused on the digitalisation paradox in assessing the effect of digital adoption of performance of Chinese SMEs. The study was based on the social capital theory and strategic alignment theory. They collected data from 352 SMEs using questionnaires. Data was analysed through hierarchical regression to appreciate the boundaries of its influence. The authors established a U-shaped relationship between digital technology adoption and performance. In other words, digitalisation supported performance up to a certain threshold, above which it resulted into negative effects. With such mixed findings, it calls for further investigation into this area. Additionally, the reviewed study was conducted in China, which has fundamental differences with Kenya (the focus of the current study).

METHODOLOGY

Research Philosophy and Design

The study was guided by the positivist research philosophy, which relies on observable, measurable facts and emphasises empirical evidence through structured methods such as surveys, experiments and longitudinal studies (Park et al., 2020). It supports the use of quantitative methods useful for data measurement and analysis in a bid to discover the general laws as well as principles governing a certain phenomenon, which can be generalizable and replicable. Therefore, it supports the acquisition of valid knowledge with an aim of uncovering causal relationships governing a phenomenon (Ali, 2024). This paradigm suited this study as it sought to examine the cause-effect of DTA on SMEs performance. On this note, the explanatory research design was used as it explains why a phenomenon occurs and predicts future occurrences. Explanatory research is suited for studies with research hypotheses and that establish relationships (Bentouhami et al., 2021).

Study Population and Sampling

The focus of this study was the SMEs registered in Kenya. According to the Kenyan Micro and Small Enterprises Authority (MSEA, 2020), there are over 45,000 registered SMEs. This study used enterprises listed in the Kenya Association Manufacturers (KAM, 2023) SME directory and as classified by the UN Industrial Development Organization. A total of 708 enterprises was considered as indicated in Table 1.

Table 1: Study Population

	Sectors	Total
1	Agroprocessing	4
2	Automotive	47
3	Building, mining & construction	29
4	Chemical and allied	85
5	Energy, Electronics and Electricals	33
6	Food and Beverage	142
7	Leather & Footwear	11
8	Metal & Allied	65
9	Paper & Paperwood	33
10	Pharmaceuticals	17
11	Plastics & Rubber	64
12	Service & Consultancy	103
13	Textile & Apparel	55
14	Timber, wood & Furniture	20
	Total	**708**

Source: Kenya Manufacturers and Exporters Directory 2022-2023

In the determination of the sample, Yamane formula was adopted and is noted as:

$n = N/(1+N(e)2$

Where:

N is the population size (708)

e is the desired margin of error (0.05 for 5%).

The sample was found to be 256 but following the advice of Bartlett et al. (2001) that the sample can be adjusted up to 25% to cater for non-response, this study added 64 more units to have a total sample of 320. The stratified sampling technique was adopted where each of the 14 sectors in Table 1 were considered. Additionally, as advised by Cheung (2021), proportional sampling was used to allow for the selection of a proportionate number of units from each subgroup. Finally, the simple random sampling was applied to give each item of the population an equal selection chance for inclusion in the sample (Rahi, 2017).

Data Collection

Research Instrument

Data was collected through a self-designed closed-ended questionnaire that was divided into section A to E. section A gathered data on the profile of the SMEs while Sections B-E covered the dependent, independent, mediator, and moderator variables where respondents were required to respond to statements under each in a 5 point Likert scale: where; 1 - Not at all 2 - To a slight extent 3 - To a moderate extent 4 - To a considerable extent 5 - To a great extent.

Reliability and Validity of Research Instrument

Reliability is the degree to which the data collection instrument is able to yield consistent results (Matheson, 2019). This study adopted Cronbach's alpha (α) and tested for reliability after the pilot study that involved 60 SMEs drawn from the Nairobi Country Chapter of the Kenya National Chamber of Commerce (KNCCI). Hussey et al. (2023) note that a value of 0.7 and more indicates that the instrument is reliable.

On the other hand, validity refers to the extent of accuracy of the research or measuring instrument in executing its measuring function (Rahardja et al., 2019). The researcher ensured that criterion, construct, and content validity were met. Construct validity was assessed through factor analysis while content validity was measured through content validity index (CVI) following expert responses. The experts were required to rate the items on a four-scale: 1 = not relevant, 2= somewhat relevant, 3= quite relevant, and 4 = very relevant. The CVI ratio was expressed as:

$$CVI = \frac{Quite\ relevant + very\ relevant\ responses}{Total\ responses}$$

Data Analysis

Descriptive as well as inferential statistics were computed, with descriptive statistics serving to provide summary of response in form of means, standard deviations, percentages and frequencies. Inferential statistics, computed through regression analysis helped in answering the research hypothesis and making generalisations and conclusions (Stapor & Stapor, 2020).

The regression analysis took the form of:

SMEP = β_0 + β_1DTA + e …………………………………………………………………. 1

Where:

β_0 = constant

β_1 - coefficient

DTA = Digital technology adoption

SMEP = SME performance

e = error term

The analysis was aided by the Statistical Package for Social Sciences (SPSS) Version 25.0 and at 5% significance level. Before conducting the regression analysis, diagnostic tests

were performed to ensure that the assumption of normality, linearity, homoscedasticity, and multicollinearity were met.

RESULTS AND FINDINGS

Analysis of SMEs Profile

A majority of SMEs, 217 (68.7%) operated in the manufacturing sector followed by 75 (23.7%) in the service sector. Agriculture, retail and technology had 12 (3.8%), 7 (2.2%) and 5 (1.6%) respectively. Further results showed that half of SMEs (158) had been in operation for 4-6 years, 70 (22.2%) for 7-10 years, 67 (21.2%) for 1-3 years, 11 (3.5%) for less than one year, and 10 (3.2%) for over 10 years. A majority of these SMEs (102, 32.3%) had annual revenues of Ksh. 5-50 million. 28.2% (89) of SMEs made Ksh. 50-100 million and 18% (57) had Ksh. 100-500 million. The SMEs with less than Ksh. 5 million of revenues were 29 (9.2%). In terms of employees, a majority of SMEs (131, 41.8%) had below 50 workers and those with over 200 employees were 19% (60).

Reliability Analysis

Table 2 and Table 3 show the corrected item-total correlation (CITC) and their respective Cronbach's Alpha values for the items of DTA and SMEs performance respectively. It is seen that the CITC values are all above 0.30, which Larsso et al. (2021) recommends as being satisfactory. Additionally, the CAID values are above 0.7, which Hussey et al. (2023) terms an indication of high reliability.

Table 2. Reliability Analysis for Digital Technology Adoption

Code	Item	CITC	CAID
X1	Digital used by the firm	.731	.907
X2	To what extent does your company use digital tools and platforms in operations? (Extent of Use)	.714	.773
X3	To what extent are digital technologies integrated into your products or 2? (Level of Integration)	.747	.764
X4	To what extent has your company invested in digital infrastructure? (Infrastructure)	.780	.755
X5	To what extent are employees in your company effectively trained and developed in digital skills? (Capability and skills)	.743	.765
X6	To what extent are digital technologies integrated into your company's business processes? (Integration of tech into business processes)	.742	.766
	CI-TC = Corrected Item-Total Correlation; CAID = Cronbach's Alpha if Item Deleted		

Table 3. Reliability Analysis for SMEs Performance

Code	Item	CITC	CAID
FP1	To what extent has your company achieved profitability in the last fiscal year or the last 12 months?	.620	.867
FP2	How would you rate the extent of improvement in your company's return on investment (ROI) over the past three years?	.601	.868
FP3	To what extent has your company seen revenue growth over the past year?	.700	.863
FP4	To what extent have your financial goals been met?	.639	.866
CS1	To what extent are your customers satisfied with your products?	.484	.873
CS2	To what extent has your company improved on customer retention over the past three years	.568	.869
CS3	To what extent have you seen improvements in customer feedback and reviews in the past 3 years? (Improvement in Customer Feedback and Reviews)	.609	.867
CS4	To what extent have customer complaints been reduced through improved processes? (Reduction in customer complaints)	.625	.867
IBP1	To what extent does your company effectively utilize its resources to achieve its objectives?	.673	.866
IBP2	To what extent have operational costs been reduced through process improvements or automation in the past year?	.660	.866
IBP3	To what extent is your company effectively managing its internal processes?	.650	.866
IBP4	To what extent have you streamlined operations to improve process efficiency?	.637	.867
IL1	How 4 does your company engage in new product development or introduce innovative solutions to the market?	.343	.891
IL2	Has your company expanded its operations to new geographical locations in the last two years?	.479	.892
IL3	To what extent has your company invested in employee training and development related to digital 5?	.427	.875
IL4	How would you rate improvements in your company's ability to innovate in the past 3 years?	.576	.869

Validity Analysis

Factor Analysis

Exploratory Factor Analysis for Digital Technology Adoption

Principal component analysis for the five items that represented the adoption of digital technology was conducted through varimax rotation and as per the results presented in Table 4., it was observed that all the loadings were high: extent of use = 0.824, level of integration = 0.854, infrastructure= 0.867, and capability and skills = 0.862 and as advised by Samuels (2017) that items with values above 0.5 should be retained. The Kaiser-Meyer-Olkin (KMO) measure was found to be 0.885, which denotes exceptionally good sample adequacy as also

does model fit. In addition, as noted by Hindasah, and Nuryakin (2020), Bartlett's Sphericity Test confirmed the data's suitability for factor analysis with significance level = 0.000 < 0.05. The Eigenvalue was 4.138 and the digital technology adoption explained 51.724% of variability in data.

Table 4. Component Matrix representing the factor loading of
the component digital technology adoption

Code	Variable	DTA
X2	To what extent does your company use digital tools and platforms in operations? (Extent of Use)	.824
X3	To what extent are digital technologies integrated into your products or 2? (Level of Integration)	.854
X4	To what extent has your company invested in digital infrastructure? (Infrastructure)	.867
X5	To what extent are employees in your company effectively trained and developed in digital skills? (Capability and skills)	.862
X6	To what extent does your company use digital tools and platforms in operations? (Extent of Use)	.851
	Eigenvalues	4.138
	% variance	51.724

Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization. a. No Rotation. Kaiser-Meyer-Olkin measure of sampling adequacy =.885
Bartlett's test for Sphericity: Approx. Chi-Square =980.058, do =15, Sig. = .000

Exploratory Factor Analysis for Performance

Initially, SMEs performance had four constructs, each with four items. Under the first order construct, three factors were retained after dropping the internal business factor as it had lower factor loading.

As observed in Table 5, all the variables for customer satisfaction were above 0.5 indicating they strongly loaded on this component, as noted by Samuels (2017). Similar results are observed for the aspects of measuring the components of innovation and learning and financial performance. Financial performance had an Eigenvalue of 6.744 and variance of 42.155%, which indicate that this factor is the most critical as it explains the largest proportion of variance. The customer satisfaction was second with a variance of 11.391% and Eigenvalue of 1.823 while innovation and learning had a variance of 10.14% and Eigenvalue of 1.622. In other words, all the three components add meaningful value to the SME performance construct.

Table 5. Component Matrix Representing the Factor Loading
of the Component Digital Technology Adoption

Code	Variable	Customer satisfaction	Financial Performance	Innovation and Learning
FP1	To what extent has your company achieved profitability in the last fiscal year or the last 12 months?		.880	
FP2	How would you rate the extent of improvement in your company's return on investment (ROI) over the past three years?		.819	
FP3	To what extent has your company seen revenue growth over the past year?		.795	
FP3	To what extent have your financial goals been met?		.829	
CS1	To what extent are your customers satisfied with your products?	.716		
CS2	To what extent has your company improved on customer retention over the past three years	.778		
CS3	To what extent have you seen improvements in customer feedback and reviews in the past 3 years? (Improvement in Customer Feedback and Reviews)	.846		
CS4	To what extent have customer complaints been reduced through improved processes? (Reduction in customer complaints)	.800		
IL1	How 4 does your company engage in new product development or introduce innovative solutions to the market?			.749
IL2	Has your company expanded its operations to new geographical locations in the last two years?			.614
1L3	To what extent has your company invested in employee training and development related to digital 5?			.726
1L4	How would you rate improvements in your company's ability to innovate in the past years?			.500
	Eigenvalue	1.823	6.744	1.622
	% variance	11.391	42.155	10.140
	Extraction Method: Principal Component Analysis Rotation Method: Varimax with Kaiser Normalization. a. No Rotation. Kaiser-Meyer-Olkin measure of sampling adequacy =.899 Bartlett's test for Sphericity: Approx. Chi-Square =2728.240, df =120, Sig. = .000			

Confirmatory Factor Analysis

After the exploratory factor analysis (EFA), confirmatory factor analysis (CFA) is done to validate as well as test the fitness of the items in a component. According to Hox (2021), CFA has two main uses. First, CFA evaluates how well a certain model fits the data. Secondly, it estimates the residual error variances of the observed variables as well as the factor loadings, variances, and covariances of the factor or factors. EFA was conducted with the aid of Analysis of Moment Structure (AMOS version 24). Several indices were used to define the fitness of the model and include: Root Mean Square Error of Approximation (RMSEA), Tucker-Lewis Index (TLI), Incremental Fit Index (IFI), Relative Fit Index (RFI), Adjusted Goodness of Fit Index (AGFI), Goodness of Fit Index (GFI) and Chi-Square Minimum to degrees of freedom (CMIN/DF). To produce a good fit, Nandal et al. (2021) proposes the following thresholds: CMIN/DF < 5.0, CFI, GFI, AGFI, IFI, RFI, and TLI ≥ 0.90 while RMSEA < 0.08.

Confirmatory Factor Analysis for Digital Technology Adoption

After subjecting the items of the DTA to CFA, the results are shown in Table 6 and the model displayed in Figure 1 was obtained. Table 4 shows that both the standardised and unstandardized beta values were over 0.5 and had low standard errors. Strong relationships between the DTA and the items that load into this factor are indicated by a highly significant p, and the critical ratio (C.R.) varied between 15.054 and 7.080, which is higher than the critical value of 1.96.

Table 6. The Standardized and Unstandardized CFA Model Estimate
of Digital Technology Adoption

Paths	Unstandardized Estimate	Standardized Estimate	SE	C.R	p-value
X6<--DTA	1.00	0.813	-	-	-
X5<--DTA	1.056	0.826	0.064	16.591	***
X4<--DTA	1.087	0.844	0.064	17.080	***
X3<--DTA	1.019	0.810	0.063	16.153	***
X<--DTA	0.902	0.768	0.060	15.054	***
Note: *** =p<.001, ** =p<.01, * =p<.05, C.R =Critical Ratio, S.E =Standard error					

The model was also fit considering the various metrics outputs which confirm each other as indicated: CMIN (χ^2) = 15.915; DF = 5; P-Value = .007; CMIN/DF = 3.183; PGFI = .326; NFI = .984; RFI = .967; GFI = .979; AGFI = .938; IFI = .989; TLI = .977; CFI = .989; RMSEA = .083
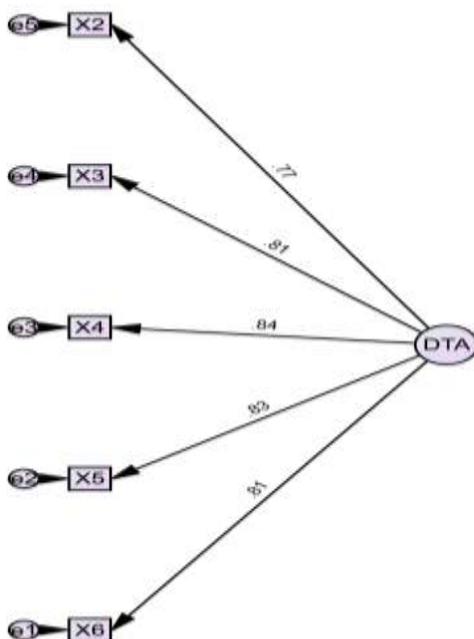
Figure 1. The Confirmatory Model for Digital Technology Adoption

Confirmatory Factor Analysis for Financial Performance

Results for CFA for the performance construct are shown in Table 7 and its model in Figure 2. The standardised values are indicated in the model and it is observed they are all over 0.5 and with a relatively lower standard error, indicating that they are valid and reliable measures of DTA. The model is also fit as confirmed by: CMIN (χ^2) = 122.769; DF = 49; P-Value = .144; CMIN/DF = 2.505; RMR = .023; IFI = .968; TLI = .957; GFI = .942; NFI = .948; RFI = .930; CFI = .968; AGFI = .907; PGFI = .592; RMSEA = .069.

Table 7. CFA Model Estimates for Performance

| Path	Unstandardized Estimate	Standardized estimates	S. E	C.R	P
FP4<---FP	1.000	.857			
FP3<---FP	1.037	.867	.053	19.556	***
FP2<---FP	.918	.791	.054	16.896	***
FP1<---FP	1.035	.860	.054	19.294	***
CS4<---CS	1.000	.827	0.22	19.333	***
CS3<---CS	1.168	.860	.068	17.305	***
CS2<---CS	1.001	.784	.065	15.442	***
CS1<---CS	.709	.658	.057	12.338	***
IBP4<---IBP	1.000	.678	0.04	11.33	***
IBP3<---IBP	1.091	.708	.083	13.173	***
IBP2<---IBP	1.113	.718	.103	10.832	***
IBP1`<---IBP	1.176	.788	.101	11.626	***
Note: *** =p<.001, ** =p<.01, * =p<.05, C.R =Critical Ratio, S.E =Standard error					
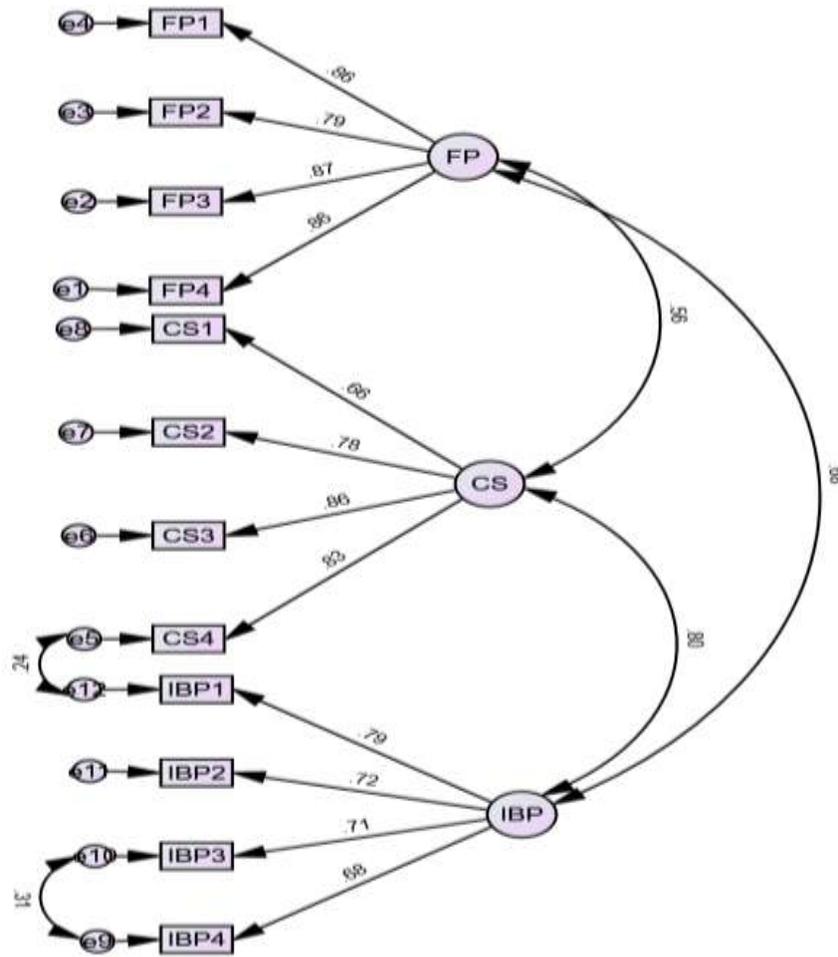
Figure 2. The CFA Measurement Model for Performance

Descriptive Statistics

Table 8 shows the respondents' responses regarding the adoption of digital technology by SMEs. The overall mean is 3.89 with a standard deviation of 0.82, and indication that a majority of participants' agreed that the adoption was to a considerable extent.

Table 8. Descriptive Statistics for Digital Technology Adoption

	Mean	Mode	Standard Deviation	Minimum	Maximum
Digital use by the firm	4.24	4	0.61	1	4
Extent of use of digital tools and platforms	4.01	4	0.81	1	5
Level of integration of digital technologies	3.88	4	0.87	1	5
Company invested in digital infrastructure	3.80	4	0.89	1	5
Employee digital capability and skills	3.64	4	0.88	1	5
Integration of tech into business processes	3.74	4	0.85	1	5
Composite	**3.89**		**0.82**		

The results in Table 9 present the responses of participants regarding their perceptions of SMEs performance following the adoption of digital technology. Innovation and learning had the lowest mean values, being less than 3. Profitability also had values below 4 meaning that a majority of respondents viewed the effect of digital adoption on profitability as being moderate. Overall, the mean of performance is 3.78 and a standard deviation of 0.82 and indication they supported performance improved to a considerable extent.

Table 9. Descriptive Statistics for SMEs Performance

	Mean	Mode	Standard Deviation	Minimum	Maximum
Profitability					
Profitability achievability	3.76	4	0.81	1	5
Improvement in company's return on investment (ROI)	3.72	4	0.79	1	5
Revenue growth	3.78	4	0.81	1	5
Financial goals met	3.76	4	0.79	1	5
Customer Satisfaction					
Customers satisfaction with offerings	4.57	5	0.65	1	5
Improved in customer retention	4.32	5	0.77	1	5
Improvement in customer feedback and reviews	4.18	4	0.82	1	5
Reduction in customer complaints	4.26	4	0.73	1	5
Internal Business Processes					
Resources use to achieve objectives	4.17	4	0.71	1	5
Operational costs reduction through process improvements or automation	3.93	4	0.74	1	5
Management of internal processes	4.13	4	0.74	1	5
Streamlined operations to improve process efficiency	4.07	4	0.70	1	5
Innovation and Learning					
New product development or innovative solutions	3.08	3	1.07	1	5
Expansion to new geographical locations	2.33	1	1.35	1	5
Employee training on digital skills	3.56	4	0.93	1	5
Company's ability to innovate	2.86	3	0.69	1	5
Composite mean	**3.78**		**0.82**		

Digital Technology Adoption and SMEs Performance

The study analysed the hypothesis (H_0) that digital technology adoption had no statistically significant effect on the performance of Kenyan SMEs. This was done through a simple regression analysis and results are presented in Table 10.

Table 10. Simple Regression Output on effect of DTA on SMEs Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.952	.160		12.198**	.000
	DTA	.374	.047	.407	7.906**	.000
		R = 0.407	R^2 = 0.166	F = 62.500**		
		Note: **t-test statistics and F-statistics are significant at 0.05.				

The results show that R^2 is 0.166, implying that the adoption of digital technology explained 16.6% of variability in the performance of SMEs. Further, F-statistics is 62.500 and statistically significant, p<0.05. It implies that all other factors remaining unchanged, the chosen model was fit for DTA to effectively predict variability in the performance of SMEs. Additional results show regression coefficient of DTA to be 0.374 indicating that one unit increase in DTA led to 0.374 units rise in performance. This positive effect is also statistically significant as p<0.05. Therefore, this study rejected the H_0 and concluded that DTA had statistically significant effect on the performance of Kenyan SMEs.

DISCUSSION

The study sought to assess the effect of digital technology adoption (DTA) on the performance of Kenyan SMEs. Results have shown that DTA has positive and significant effect on the performance of Kenyan SMEs. These findings support past studies (Affandi, 2024; Kádárová et al., 2023; Khairuddin & Olowosuyi, 2020; Fan et al., 2021). The results also support Roman and Rusu's (2022) study, which found that SMEs' adoption of digital technology improved their value added and, eventually, their performance in a positive and statistically significant way.

With a mean score of 3.64, the respondents agreed that their SMEs had made investments in staff training and development in relation to digital technology. Dimoso and Utonga (2024) emphasize that SMEs' decisions to adopt and employ digital technologies for improved performance were influenced by digital literacy. These results lend credence to the notion that adopting digital technology necessitates having digital aptitude or competence, which takes into account the adaptability of digital technology and the capacity to effectively handle information in order to improve corporate performance (Khin & Ho, 2019).

Digital competence is required in addition to familiarity with digital platforms and technologies. This includes expertise in digitalization, information communication, technology, and legal, privacy, ethical, and security issues (Prakasa & Jumani, 2024). These results also

show that SMEs that are dedicated to organizational learning acquire the necessary skills to use technology, adjust to the business environment, and attain competitive advantage and superior performance (Igashi et al., 2022). Indeed, according to a study by Kallmuenzer et al. (2024), SMEs cannot achieve better performance unless their workforce has the necessary digital skills and the right technologies. Additionally, these results corroborate a previous study by Todorovic et al. (2022) that found that adopting digital technology required not only recognizing and accepting new technologies but also using them and mobilizing the human resources needed to develop and provide new goods and services. The findings also corroborate the research of Khairuddin and Olowosuyi (2020), who discovered that SMEs' performance was statistically significantly enhanced by the adoption of digital technology and the development of technical competence.

SMEs have come to understand that innovation and learning are key to better use of digital technologies. Respondents reported that their SMEs developed new products or offered creative solutions to the market more frequently, with a mean score of 3.48. The results align with Radicic and Petković's (2023) study, which demonstrated that the use of digital technology could impact innovation inputs and outputs at any step of the process. Innovation outputs include the creation of new goods and procedures. Adoption of digital technology thus gives SMEs access to both internal and external knowledge, improving both new and current knowledge based on their ability to absorb it, resulting in new products and processes. As a result, they may satisfy consumer needs and penetrate new areas.

This study adds credence to the findings of Barba-Sánchez et al. (2024), who found that adopting digital technologies enhanced performance by transforming an organization and fostering a digital mind-set. It also supports Weber's (2024) research, which found that adopting digital technology was linked to better business performance as measured by increased productivity, efficiency, and innovation as well as increased customer reach, revenue, and profitability. One way that digital transformation enhances business success is through the customer experience (Masoud & Basahel, 2023). Businesses can regularly create client experiences that result in favourable organizational outcomes by utilizing digital capabilities. The findings support a study by Olateju (2024) that discovered SMEs increased business expansion through the adoption of digital technologies.

The study did discover, however, that in the previous two years, SMEs had hardly ever extended their activities to new regions as indicated by a mean of 2.33. This may be explained by the different difficulties that SMEs encounter, including lack of capital, lack of digital skills, and a lower level of available resources (Abed, 2020; Mwangi, et al., 2023). In fact, SMEs had budgetary limitations when adopting sophisticated technology, unlike their larger competitors,

and required to develop their employees' digital competencies, according to a study by Bradač and Huđek (2023). Additionally, Olateju's (2024) study discovered that the higher investment and management expenses associated with digital adoption did not raise entrepreneurs' earnings. The results of the current study are in conflict with those of Guo et al. (2023), who found that while the adoption of digital technology was linked to better total factor production, it also lowered firm performance by increasing management expenses, operational costs, and total asset turnover.

CONCLUSION AND RECOMMENDATIONS

It is concluded that digital technology adoption has statistically significant effect on the performance of Kenyan SMEs. In the current competitive business environment, SMEs must align themselves to leverage the benefits of the new digital technologies and transform their businesses digitally. SME performance has improved through digitalization of operations, use of digital tools and platforms, integration of digital technologies into offerings, investment in digital infrastructure, and training of digital skills for staff.

Inadequate financial resources and lack of technical expertise define the majority of SMEs in Kenya, calling the government develop policies that assist and promote SMEs' attempts to embrace and use digital technology through the Ministry of Cooperatives and Micro, Small, and Medium Enterprises Development and the Ministry of Information, Communication, and the Digital Economy. Additionally, to lessen the financial burden associated with SMEs' adoption of digital technologies, the government could, for example, enact policies and legislation that promote tax exemptions and incentives, tax holidays, subsidies, grants, and loans with lower interest rates. Additionally, government assistance and grants have the ability to enable SMEs' digitalization research and development projects for the creation of cutting-edge digital services and goods.

Future studies can focus on a larger sample, given that there are over 45,000 SMEs in Kenya establish the effect that DTA has on their performance. In addition, a comparative study of SMEs could be carried out focusing on the various sectors as opposed to the current study that aggregated them altogether.

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