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TECHNOLOGICAL INNOVATION AND SMALL AND MEDIUM SCALE ENTERPRISES (SMEs) COMPETITIVENESS IN ADAMAWA STATE

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Abstract

The study examine the effect of technological innovation on small and medium scale enterprises (SMEs) competitiveness using analysis of some selected enterprises in Adamawa state, Nigeria. The study used computer, point of sale, mobile phone, e-marketing and internet banking as dimensions of technological innovation SMEs competitiveness in Adamawa State Nigeria. Descriptive survey research design was adopted and primary data using structured questionnaires distributed to the various employees of the enterprise were selected. The data collected was analyzed using descriptive statistics and multiple regression analysis. The result of the multiple regression showed that computer, point of sale, mobile phone, internet banking and e-marketing have significant effect SMEs competitiveness in Adamawa state Nigeria. Base on the fundings, the study recommends that enterprise should encouraged by the government to adopt technological innovation and SMEs competitiveness strategy to enhance their competitiveness in the study.

Keywords: Technological, Innovation, Small and Medium Enterprises, Competitiveness

1. Introduction

Small and Medium -sized Enterprises (SMEs) is invaluable to economic success of any region, and technological innovations have equipped these businesses with tools and avenues which facilitate productivity. For instance, network devices and services coupled with specialized computer software have allowed SMEs to communicate with potential and active customers, store company data at low cost, and carry out internal operations with higher efficiency. These innovations were first adopted by larger businesses before technological resources trickled down to small and medium-sized enterprises. This innovation has sparked harsher competition amongst these businesses as customers are attracted to ventures with more convenient infrastructure. Small and Medium-sized Enterprises simply defined as business ventures whose employee personnel numbers are below a particular level. Small and medium scale enterprises (SMEs) are important to the Nigerian economy as they not only contribute to economic growth through financial operations but small and medium scale enterprises (SMEs) also provide communal services that increase the standard of living in their local vicinities.

According to the Nigeria Bureau of Statistics, (NBS, 2024) small and medium scale enterprises (SMEs) form a large part of the country's economy, with about 17.4 million of them constituting about 48% of Nigeria's GDP. Convenience store chains, cement manufacturing plants, hotel chains, and telecommunication companies are instances of active small and medium scale enterprises (SMEs) in Nigeria registered under the Companies and Allied Matters Act. Particularly in Adamawa State LGA, small and medium scale enterprises (SMEs) make up most of the active business ventures, including restaurants, transportation companies, and Internet Service Providers (ISPs). With

the advent of technologies such as mobile communication, digital and electronic banking, advanced business software, and digital and online advertising, businesses are able to conduct operations more efficiently and communicate with active and potential customers with ease. Mobile communication, for instance, allowed customer care units to receive complaints from customers and relay them to appropriate teams for rectification.

Competitiveness is on the rise among business owners of different shades. For any business to survive in Adamawa state, it has to be able to compete profusely. A positive competition urges a business owner to look for better ways to improve the quality of services to their customers. Decades ago, small and medium scale enterprises (SMEs) were rendered the same way for several years and are accepted as rendered. Today, the same SMEs, now render different services such as point of Sales (POS) for easy payment, a computer for record-keeping purposes, mobile phones, and e-marketing for buying and selling online. To ensure the effectiveness of the survey, face- to-face method of a survey will be employed for accuracy.

Therefore, this study examines technological innovation and small and medium scale enterprises (SMES) competitiveness in Adamawa state with the proposed hypotheses:

H_1: the computer has a significant effect on SMEs competitiveness

H_2: the mobile phone has a significant effect on SMEs competitiveness

H_3: Point of Sale machine has significant effect on SMEs competitiveness

H_4: E-marketing is positively related with SMEs competitiveness

H_5: the Internet Banking has a significant effect on SMEs competitiveness

2. Literature Review

Outcomes from these studies forthcoming that technology is the constituent of Small and Medium Scale Enterprises (SMEs) achievement among others. Hallberg (2000) describe fruitful SMEs as those who innovate by applying technologies with the goal of providing them with a market struggle advantage. In additional confrontations, they attracted SMEs that performs innovation fortified development and payment presentation associated to those enterprises who do not like technologies.

2.1 Conceptual Review

A computer

A computer is a mechanism that be able to stock and process information; greatest processers trust on a two scheme that uses two variables, 0 and 1, to whole a job such as storage data, manipulative and algorithms, and showing information (Ikpefan & Ehimare 2012). In each manufacturing computer have leftward their scripts on the whole places, altering the method persons do their jobs, they brand extremely help helping labors to achieve information additional efficiently and mechanize recurrence errands attach employees across the office or across the globe and they connect business with customers in the same way they standardized the routine of work, sometimes trading individuality efficiency.

Point of Sales

POS refers to the location or system where a transaction occurs, typically involving payment for goods or services. Founded on CBN policy on cash lodgment and removal all commercial that receive cash up to 0.5 m individual up to 3m for business clients for their everyday commercial contract need a fatal to evade ben emotional from 2% in extra of accepted allowed lodgment limit, this comprises supermarkets, hotels, restaurants, electronic shops, pharmacists, boutiques, hospitals, distributorship airline, etc. A point-of-sale system has allowed everybody from business-savvy entrepreneurs' artist who want to turn their passion into their profession to open a retail store and grow (Okey & Ovat 2012).

Electronic Marketing (e-Marketing)

Electronic marketing is a new marketing miracle and boldness that remnants rapidly increasing in an actual lively way. In the retro of globalization and technology,

the way of communication amongst people has dissimilar (Olorusegun 2010). Use the period e-marketing than the digital marketing and careful that it is the use of both web and intuitive innovation to create connection amongst firms and its clients.

Mobile Phone

Mobile phone use has warped a state in which subjects disbursing moveable devices have admission to communal substructure allowed of their bodily site and which deliver them with elastic communication with other people and admission to network services ling (Adewoye 2013). Notwithstanding an cumulative awareness in an investigation for a mobile phone for SMEs in the growth setting slight is recognized around their use in contemporary group and enterprises in Adamawa State hence, there is a essential to discovery available that mobile phone practice has had an influence in to economic growth of SMEs in Adamawa primary similar other developing countries, has comprised ICT and SMEs as a catalyst for development (Hallberg 2000).

Internet Banking

Electronic banking can be defined as the motorized, flat and sound-prepared distribution of existing and ancient-style banking facilities finished electronic and outgoing channels.it comprises the schemes clienteles rummage-sale toward evaluate accounts manage trades and learnt information finished networks, counting the internet. This network can be isolated or public. Electronic banking is, therefore, an over-all period recital the entire procedure of achievement such deal deprived of the essential to bodily call the financial institution (Olorunsegun 2010). It is the distribution of novel or old-style banking products and services straight to customer over an electronic, communicating message channel (Adewoye 2013).

The small-scale sector therefore remains high on the government's agenda, policymaking, and academics. Existing literature demonstrates that small enterprises contribute significantly in terms of innovation, and again, the on innovation tend to concentrate on high-tech industries such as computer, software, and engineering industries (Hallberg 2000).

The concept of competitiveness, even after many years of its existence has remained elusive. One of the main resources for this is that writers on this subject have frequently avoided defining the term precisely in their discussions. They have invariable left it to be interpreted by readers. To discuss and understand any concept meaningfully, it is extremely important to start with an explicit definition, competitiveness is a complex, multi-dimension, and relative concept.

Theories

Innovation diffusion theory is a technology related theory that tries to describe how, what, and at what rate knowledge or concept, and even technological are spread (Kothari, 2012). The theory gives an explanation of how innovation spreads and takes place in a community or population. An innovation can be as a concept, idea, subject of behavior considered to be new by the evidence. Innovation a diffusion takes a different approach as compared to other theories of changes. Innovation diffusion theory considered change as a key in reinventions or evolution of behaviors or products so as to better addressed the need and requirement of groups and individuals. (Kothari, 2012).

Actor-network theory attempts to integrate technology into social process and explains how technology is accepted within a network Ant focuses on the network building and formation process, and this explain alliances or network and developed in how they compete with each other (Olatokun & Igbinedion 2009). Widespread process in technology as the increasing technological base develops difficulties in SMEs.

Michael Potters theory of the competitive advantage of nations provides sophistical tools for evaluating competitiveness in all its portals. Theory contributes to the understanding the competitive advantage of nations, international trade and production its core. However, focuses upon individual industries, or a cluster of industries in which the principles of competitive advantage are applied.

Conceptual Model

The conception frame Work was built to clarify the association amid the dissimilar variables in production in a study. Afterward studying this works, theoretical replicas conceptual perfect conceptual frame Work designates the association among the dissimilar variables in the table below:

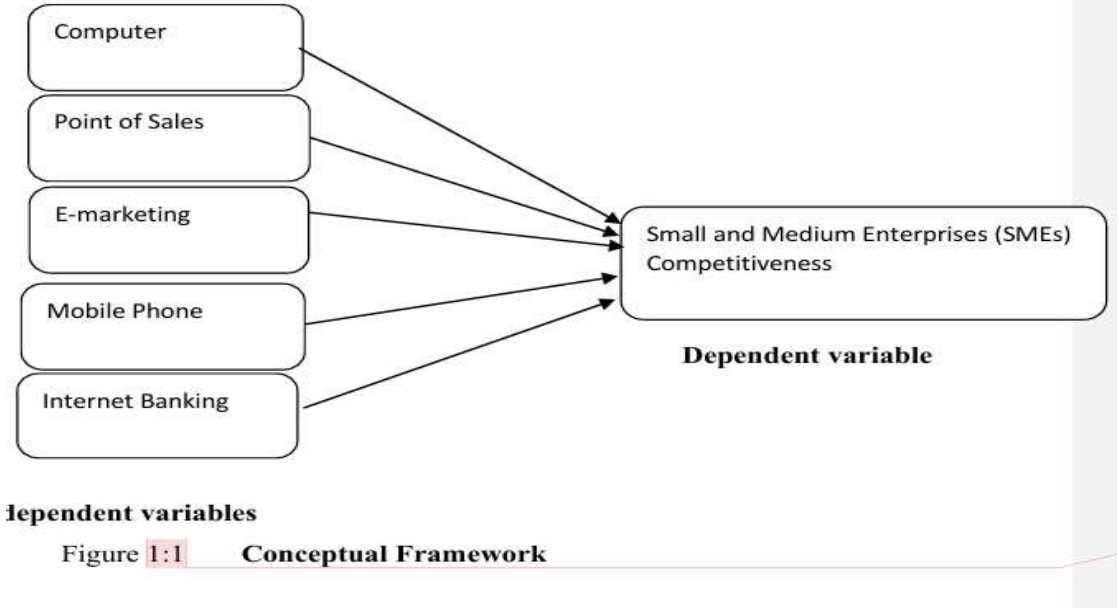


Figure 1:1 **Conceptual Framework**

3. Methodology

Descriptive survey was adopted for the study and therefore required the use of survey method. The research design was chosen because it seeks to provide an accurate description of observation of the phenomena. The study is based on conceptual framework and includes two main variables and five dimensions: the independent variable is technological innovation (Computer, Point on Sale, E-marketing, mobile phone and Internet Banking) and the dependent variable is competitiveness in SMEs. Carry out in Adamawa State Nigeria. A structured, self-administered questionnaire developed from literature used as instrument for data collection. 350 questionnaires were administered to owners of SMEs within the senatorial zone. 310 were retrieved and for analysis.

4. Results and Discussion

The study used multiple regression analysis to assess affiliation among the dependent variable, being technological innovation and SMEs competitiveness and the independents variables used for the study. The result has showed that the coefficient of determination (R) is 64.3%. This estimate that about 64% of the factors influencing the dependent variable were captured in the model, while the remaining 36% variability be could be due to error or other uncaptured variables. The model has an ANOVA score with an F-value of 76.435 which was important at 1% (p-value =0.0000). This recommended in Table 1, the significance of the F-value suggested the model used has a good fit.

Table 1: Investigation of Alteration (ANOVA) Examination for Hypothesis

Model	Amount of Square	Df	Means Square	F	Sig
Regression	**423.510**	**5**	**105.877**	**76.435**	**.000**
Residual	**235.484**	**170**	**1.385**		
Total	**658.994**	**174**			

Source: Field Survey, (2025)

A. Dependent Variable: Technological Innovation.

B. Independent Variables (Constant) Computer, Point of Sale, Mobile Phone, Internet banking, e-marketing.

There are some assumptions of the ordinary least square regression, violations of any of these assumptions invalidates the regression result. This research tested many assumptions of the OLS to satisfy that relationship adapt to it. The result of the Durbin-Watson tested for autocorrelation was 1-822, implying near absence value ranges between 1.5 and 2.5. Similarly, the study for collinearity in the data using many indicators as can show in Table 4.2. The indicators used were Tolerance, Variance Inflation Factors, Eigenvalue, and Condition index. The Tolerances of data degree the amount of alteration of the variables not clarified by regression on the residual descriptive variables with lesser value that designated sturdier relationship. The tolerance scores were 0.979,0.959,0.963,0.958, and 0.957 for computer, mobile phone, point of sales, e-marketing, internet banking collectively. The variance inflations factors (VIF) procedures the rise of the variance of the variables of regression coefficient and it is predictable to be fewer than 10 as a rule of thumb. As expected, all the VIF score were in the acceptable manner and the score were 1.021,1.043,1.038,1.044, and 1-055 for computer, Mobile Phone, Point of Sale, e-Marketing, and internet Banking collectively. In the same strain, the condition index scores were also within the acceptable range. Base on the result of these tests, there is near absence of collinearity assumption was not violated in anyway.

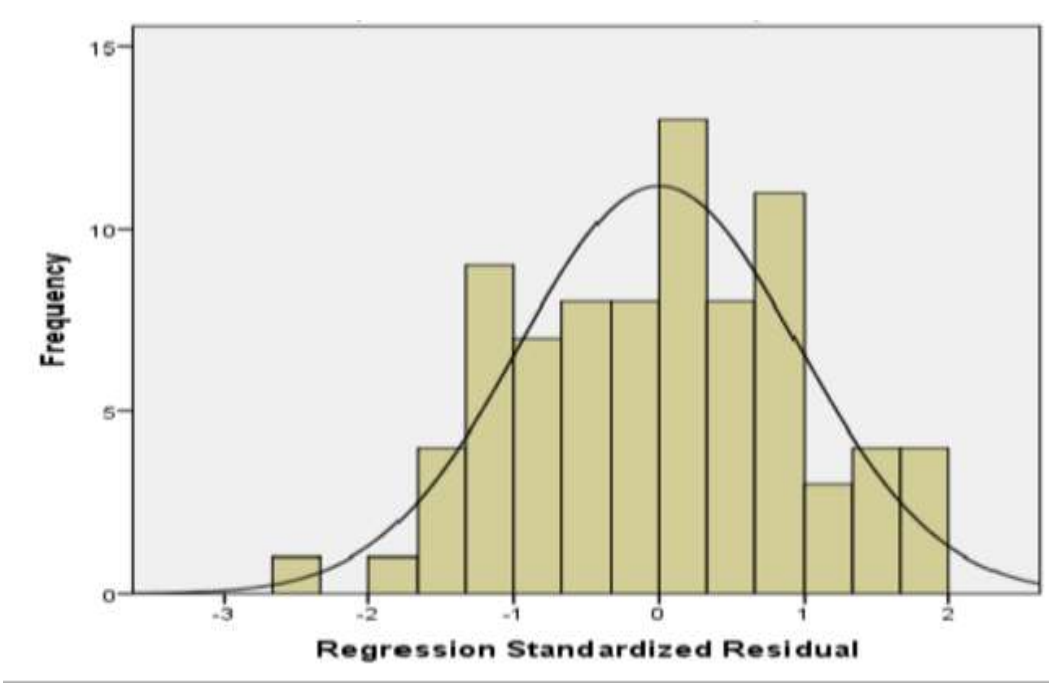
Table 2: Collinearity Statistics

Variable	Tolerance	VIF	Eigen Value	Condition Index
(constant)			4.355	1.000
Computer	.979	1.021	437	3.157
Point of Sale	.959	1.043	.138	5.612
Mobile Phone	.963	1.038	.059	8.586
e-Marketing	.958	1.044	.010	20.504
Internet Banking	.957	1.045	.064	

Source; Field survey (2025)

a. Dependent Variable: Technological Innovation.

The study also tested for ordinariness of the delivery of the data. The test result was obtainable in Number 2-4. The histogram portrayed in Number 2 indicated that the data was symmetric around mean. Similarly, the normal p-plot shows that points fairly placed in a straight line. In Figure 4, the residual plot of standardized residual against standardized predicted value suggests that the underlying assumptions were not violate



means=-5.77E-17

Std.Dev.=0.988

Figure 2: Histogram of Standardized

Residual

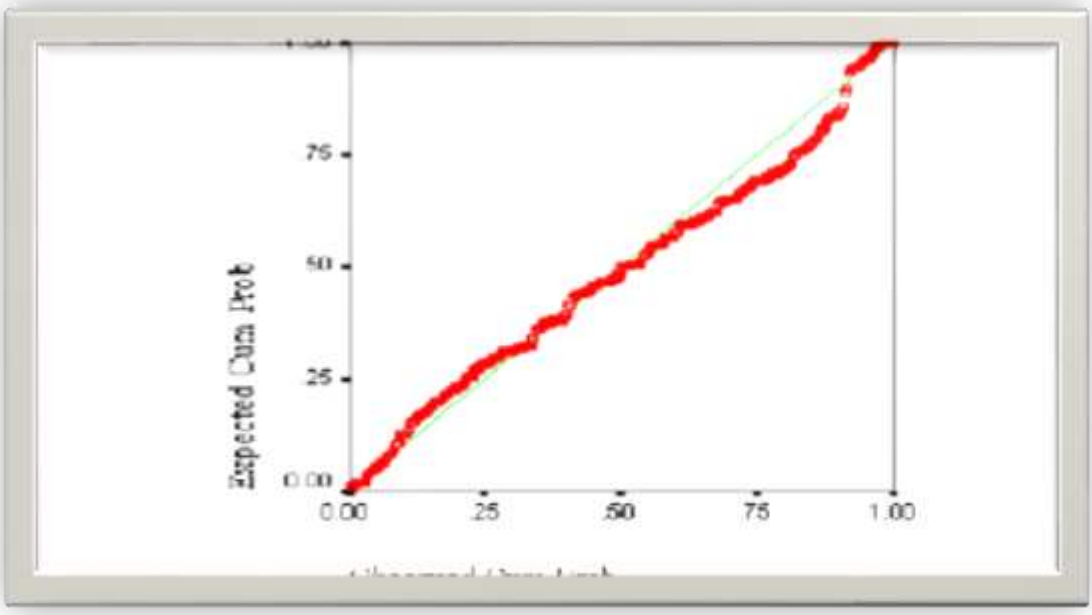


Figure 3: Normal P-P Plot of Regression Standardized Residual

Scatterplot

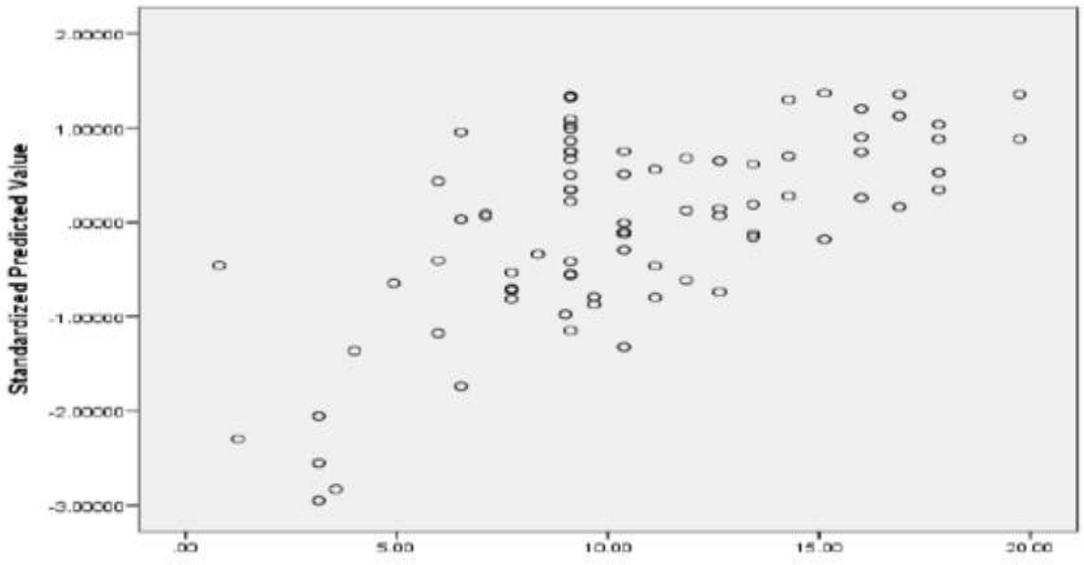


Figure 4. Scatter plot of the Regression Standardized Residual

Hypothesis Testing

The study tested five (5) hypotheses and the result is presented in Table 3.

Table 3: Coefficient output for Hypothesis

Model	Unstandardized B	Coefficients Std.error	Standardized Coefficients Beta	T	Sig
(constant)	**10.353**	**.656**		**15.788**	**.000**
Computer	**.070**	**.054**	**.060**	**1.292**	**.198**
Point of Sale	**.006**	**.005**	**.0551**	**1.183**	**.238**
Mobile Phone	**.378**	**.067**	**.265**	**5.683**	**.000**
e-Marketing	**.296**	**.020**	**.703**	**15.014**	**.000**
Internet Banking	**.335**	**0.70**	**.347**	**4.607**	**.000**

Source: Field Survey Result 2025

Technological Innovation and small and medium scale enterprises (SMEs) competitiveness is the method of internal monitoring, management and external communication, which allows enterprise of all sizes to meet the growing information needs of internal and external stakeholders. In essence, it conveys information about an enterprise's economic, environment, and social operation, the related impacts it has through everyday activities; and the study has proved that technological innovation has a significant impact on the performance of small and medium scale enterprise in Adamawa state. This goes with findings of Olatokun and Igbindion (2012) who's found out that constraint such as relative advantage, complexity, observability, and compatibility and tradability were positively related to attitude to the use of computer machine. Oyetade and Ofoelue (2012) discovered that, computer machines are mostly used, much frequently for making purposes of online payments such as utility bills, TV subscription, GSM recharge by small and medium scale enterprises. The study also found out that point of sale has a great capacity on the development small and medium scale enterprise in Adamawa State. This also explains what the finding of Ikpefan and

Elimaue (2012), that point-of-sale terminals is deployed to merchant locations where uses slot their electronic cards through point of sale in order to make payments for purchase or services instead of using raw cash. The study also revealed that mobile phone has significantly impacted on small and medium scale enterprises in Adamawa State. The study has showed with the findings of Siyanbola (2013) that mobile phone is popular and exciting to the customers given low infrastructure requirements and a rapidly increasing mobile phone penetration Adamawa State. Services covered by this product, include account enquiry, funds transfer, phone vending, changing password, and. bill payment

The study shows that; internet banking has significant impact on the development small and medium scale enterprise in Adamawa State. This agrees with findings of Moefu and Taibat (2012) that the used internet banking as tool for minimizing inconvenience, reducing transaction cost, altering customer queuing pattern and saving customers banking lives. The study also observed that, increasing presence of internet in our daily lives has resulted in the internet an essential media in marketing communication. To gain competitiveness in demanding market, it is important nowadays for a company especially small and medium scale enterprise to have it website, promote its products through social network and mobile application, use e-mail as a channel of communication with business partners and customers, and apply all available information communication Technology (ICT).

5. Conclusions and Recommendations

This study attraction its conclusions based on the empirical and statistical evidence arrived upon after the analysis and discussions of the result from the proceeding chapter as showed below; the study has proved on the indication that computer machines and other variable such as mobile phone has positively impact for the development of small and medium scale enterprises in Adamawa State. Secondly, it established that, point of sale has significant impact on (SMEs) competitiveness in Adamawa State. The study also decided that, the importance of acceptance of e-marketing to presentation of small and medium scale enterprise is encourage. Aside emphasizing the importance of acceptability in substructure which was recognized to be obligatory for application of e-marketing in Adamawa State, there are known variable that contributed positively, which include internet banking; it has been recognized that, the implementation of internet banking in an enterprises was encouraged mode of payment.

Based on the findings, the study recommends:

i. To enhance the competitiveness of Small and Medium Enterprises (SMEs) in Adamawa State, adopting technological innovation is crucial. Focusing on dimensions such s computer, mobile phone, point of sale (POS) machine, e-marketing and internet banking can drive growth.

ii. SMEs should leverage computers for efficient dada management, inventory tracking, and basic accounting. Organizing workshops to enhance digital skill on computer usage and proving access to affordable computers and essential software can boost productivity. Mobile phones can be utilized for business operations, customer engagement, and mobile application for inventor management and using SMS for marketing can expand their reach.

iii. Integrating POS machines can facilitate cashless transactions, enhancing customer convenience and sales. Incentives of adopting POS machines and training on digital payment best practices can increase adoption rates. E-marketing strategies, such as creating basic websites and social media pages, can help SMEs showcase products ad reach wider audiences. Educating SMEs on leveraging social media, email marketing, and online advertising can drive sales growth.

iv. Internet banking can simply transactions, reduce costs, and provide access to financial services. Collaborating wit banks to promote internet banking benefits and offering tailored financial products with online application processes cn support SMEs. Public-private partnerships can provide resources and funding for these initiatives. Establishing a task force to monitor progress and provide ongoing support can ensure the success of these technological innovations.

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