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Correlational Study of the Influence of ICT Use on Technological Innovations among Small and Medium-Scale Enterprises in Ilorin, Kwara State, Nigeria

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Abstract

The paper examines factors influencing ICT use in SMEs and proposes a qualitative approach to infuse ICT into SMEs operations. Kwara, State Nigeria. SMEs businesses were randomly selected in three areas of the state capital, Ilorin. They are Baaboko, Challenge and Tanke. These areas are known for large presence of small and medium businesses. Fifty business firms was selected for this study, but only thirty-five respondents return their questionnaire. Analysis was done with Statistical Package for Service Solution (SPSS) version 21.0 using the descriptive frequency counts, percentages and regression tests. The result shows that service innovation was influenced by ICT use but not the same with product innovation. However, the ICT use was highly significant on both product and service which is regarded jointly as technological innovation. The study recommended an improvement in the use of ICT by the SMEs.

Keywords: Information Communication Technology, e-commerce, technological innovations, products, services, SMEs, economic development etc.

Introduction

In the knowledge-based and globalized economy, information provides value to firms and Information Technology (IT) is the mechanism through which this can be achieved. Firms that exploit these possibilities, obtain the capacity to overcome future challenges (Voulgaris, Lemonakis & Vassakis, 2015). ICT has brought about changes in the way businesses are conducted amongst SMEs as they play major roles in storing, retrieving, processing and disseminating information. Apulu and Latham (2017) reported that Information and Communication Technology (ICT) is regarded as a driver and enabler of economic development in most economies including Nigeria.

In the same vein, Ghobakhloo, Hong, Sabouri and Zulkifli (2019), established that IT has critically become an indispensable tool for the daily operations of organizations and this has led SMEs to invest significant amounts of financial resources in IT. The aim was to strengthen their competitive positions due to the large-scale application of IT among their peers. Based on the report, SMEs have been exposed to several risks within the scope of adoption and development of IT solutions to the extent that a number of prior studies have attempted to gain a clear understanding of numerous pitfalls and challenges associated with it. The influencing factors was categorised into two: internal and external (Okundaye, Fan & Dwyer, 2019)

Typically, the ICT portfolio thus includes hardware, software, telecommunications, electronically stored data, devices to collect and represent that data, and the people who provide IT service (Kordha, Gorica & Ahmetai, 2019). Similarly, Igbaekemen (2020) observed that

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many organisations use computer systems to manage their inventory, accounting and humasn resources. Meanwhile, ICT policies are evolving fast from a focus on infrastructure requirement such as broadband, or spectrum to other enabling conditions such as new pillars based on innovation and entrepreneurship. Traditional innovation policies, based on a linear understanding of innovation have not fully transformed or supported the ecosystem and in order to accelerate socio-economic transformation and promote inclusive development. New strategies and tactics are needed to enable ICT policies in-line with the changing telecommunication/ICT environment and the development landscape. According to Gono *et al* (2015). The role of government was found to be a defining factor in encouraging adoption of ICT through policy requiring firms to adopt specific technologies.

Among the basic ICT tools that most SMEs adopt includes basic communication gadgets with a fixed line or mobile phone, or whichever that is more economical or most convenient for the business. This allows the SMEs operators to communicate with its suppliers and customers without having to pay a personal visit. After acquiring basic communication capabilities, the next ICT upgrade is usually a PC with basic software. Even without Internet connectivity, SMEs can use PCs for basic word processing, accounting, and other business practices. With the Internet, SMEs are able to use more advanced communications capabilities such as email, file sharing, creating websites, and e-commerce. Like any firm, an SME decides which type of ICT products to adopt based on the concrete benefits they can bring to its core business, the ICT capacity of its employees, and the financial resources available. Most people are familiar with basic ICT such as fixed phone lines, mobile phones, fax, computers, and basic document processing software –like: Microsoft Office. Advanced communication technology, however, is more complex. Advanced communication technology relies primarily on the Internet and the intranet, which allow people within the firm to share files with each other over the same network. Having Internet connectivity enables firms to do faster research, set up websites, conduct e-commerce, and set up video conferences. (Irefin, Abdul-Azeez, & Tijani, 2017) In addition, Tassabehji, Mishra and Dominguez-Perythe observed that the use of social media in Knowledge Sharing is increasing, while emerging studies have tended to focus on customer knowledge acquisition from social media to enhance customer relationship management in large organisations to improve their product innovation.

Products and services innovations are though grouped as technological innovation, they however differ in some certain aspects due to their respective peculiarities, for example, the labour-intensive nature of services innovations require much less capital investment compared to the product innovation. Again, service innovations usually require less research and development inputs, less fixed assets, as well as less investment on patents and licenses for the development of new services. However, the closeness in the nature of both make them to be often ranked as technological innovations. The classification of innovation idea was brought about by the Organisation for Economic Cooperation and Development (2015) which sorted innovation into two (2), namely, technological and non-technological. Technological comprises of product or process and services innovation, while the non-technological comprises organisational and administrative innovations. It was the most followed description of innovation by the extant literature.

Customers' expectations of the experience of services are increasing due to the growing abilities of the fast-moving consumer goods and service cycles. In most cases, service is about rendering additional features and functions to those already given by just owning or leasing a product to better satisfy customer needs and this will eventually have a positive impact on the financial

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status of the firm because of repeat purchases by the customer, and recommendations that might have been given to other potential customers.

The end products of manufacturing SMEs usually includes the Fast Moving Consumer Goods (FMCG) such as daily needs provisions, toiletries, hand wash, disinfectants, perfume, home furniture, plastics, agricultural bye-products, foods and confectioneries, industrial raw materials like palm kernel oil, kernel mesh, palm oil, groundnut oil, poultry feeds, home accessories, toys, jewelries, health and pharmaceutical products like tissue paper, cotton wool, methylation etc. The ideology behind the service innovation was necessitated by the need to render a quality but affordable services to the citizenry, but unlike the product innovation which is manufacturing minded, service innovation brings about the developments and improvements in the activities of the service-oriented SMEs through the process of supporting the intangible as compared to the product that could be seen, but yet a necessity with quality and touch of expertise that makes a difference than hitherto in terms of serving.

The list of services available in most SMEs may include, but not limited to financial and insurance services, wholesale and retail trade, construction, accommodation, and food services, information media and telecommunications, technical services, public administration and safety, education and training, healthcare and social work, transportation, postal and courier, warehousing, estate agency, electricity, gas, water, and waste services, arts and recreation services, garment and fashion, salon services, event and party organisation, as well as other services. The advent of technological innovation offers some degree of relevance to the issue at hand. Basically, adoption of innovation to product and services of the SMEs means a kind of rejuvenation of ideas and blending of new methods that are capable of leapfrogging the enterprises through the introduction of new products and services that are capable of enhancing the consumer status positively and as such bringing about increase in the turnover of the firms and additional growth to the national economy. It has also been established that development of Micro and Small Enterprises (MSEs) helps to alleviate poverty, generate employment and generally promote economic growth and advancement.

Statement of Problem

These days, the activities of the manufacturing sector of the SMEs is not bringing in much of the anticipated results in terms of outputs expected from their (SMEs) activities. For instance, the mix of products released by most of these firms are either short of quality or durability and it cannot be established whether these products could yield enough profit to sustain the respective firms, let alone, adding the much-needed value to economic development of the state and country at large, neither does it contribute to increase the employment opportunities for the teeming population as part of the core values of the SMEs. Igbaekemen (2020) established that SMEs in Nigeria did not achieve high levels of productivity and capacity due to their low state of ICT use, and this has led to their low services and less contribution to the economy. Similarly, Customers' expectations of the experience of services are increasing due to the growing abilities of the fast-moving consumer goods and service cycles. In most cases, service is about rendering additional features and functions to those already given by just owning or leasing a product to better satisfy customer needs and this will eventually have a positive impact on the financial status of the firm because of repeat purchases by the customer, and recommendations that might have been given to other potential customers. These might be probably because of their inability to fully deploy ICT in their business activities. To this end, the paper aim to examine factors influencing ICT use in SMEs and then propose a qualitative approach to infuse ICT into SMEs operations.

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Literature Review

Lin, Alam, Ho, Al-Shaikh and Sultan (2020) applied both descriptive and correlational techniques to a survey on Adoption of Green Supply Chain Management among SMEs in Klang Valley, Malaysia. The study also adopted the measurements of TOE and DOI theories for its constructs and indicators. Results established that the perceived relative advantage, perceived cost, top management support, complexity, compatibility, firms size, customer pressure, regulatory pressure and the quality of human resources were significant factors to the adoption of GSCM among SMEs in Malaysia.

Choi, Kim and Park (2018) contributed to the empirical study on the factors influencing process innovation when adopting intelligent robots at Small and Medium-Sized Enterprises citing the role of organizational supports in Basel, Switzerland. A survey design was adopted and questionnaires were sent to respondents in SMEs that have introduced intelligent robots online through their representatives. Only managers were selected for the survey and a total number of 269 responses were obtained, 257 were found useful for the SEM analysis of data. Findings suggested that both the direct and indirect usefulness of technological benefits had a positive impact on the innovation process. It established that organizational support is an important factor that affects the relationship between the usefulness of IT and its acceptance.

Nor, Juhanab and Nor (2013) at the International Conference on Innovation, Management and Technology Research, Malaysia found that knowledge transfer in IT outsourcing context is multidimensional in terms construct. The study opined that knowledge transfer measurement is enhanced by incorporating the changes in skill or knowledge based among the IT staff. It then outlined the procedures involved in the development and validation of an instrument to measure the knowledge transfer of IT project team. The population of this study is ICT scheme personnel of three government agencies in Malaysia. Non-probability purposive sampling was adopted due to the limited numbers of personnel involved with the project and A total of 200 purified questionnaires were distributed to the potential respondents. A cross sectional self-administered survey approach was actualised while the process lasted for a period of 3 months. The returned 180 effective responses were obtained from the survey and this translates to 40.27% response rate.

Ndekwa (2017) conducted a study on Factors Influencing Adoption of Mobile Money Services among Small and Medium Enterprises (SMEs) In Tanzania using Tourism Sector as a case study in three (3) Cities; Arusha, Unguja and Dar es Salaam. Mixed method design was adopted. First a case study approach applied for in depth about MMS and second, Stratified Random Sampling technique which was employed to select 349 respondents. Findings of the study revealed that technological and environmental characteristics have significance influence on SMEs use of mobile money services (MMS) while organizational characteristics were found to be insignificant.

Gono, Harindranath, and Ozcan (2015) examined the impact of ICT adoption and use by South African SMEs. The study is a quantitative and qualitative research that adopted the FMR framework as a theoretical guide. The population contains a sum of 130 firms in Johannesburg

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in which 66 logistics and 64 manufacturing were surveyed. In addition, 52 interviews were also conducted where 46 owner-managers and other 6 staff represented their firms.

Focusing on answering the question regarding the relevance of ICT adoption and use in South African SMEs, this study found a strong evidence supporting the positive impact of a number of firm level factors such as owner-manager's level of education, top management support and the availability of internal expertise. The study highlighted the critical role of owner-managers and employees in South African SMEs especially in relation to their ICT expertise. The finding equally established that SMEs continued to depended their association with large organisations that had a major influence on their ICT adoption initiatives.

Objectives of the Study

The main aim of this research is to find the influence of ICT use on technological innovations. Other specifics objectives are to:

1. determine the technological innovations of SMEs in Kwara State, Nigeria;
2. identify the purposes of ICT use by the Small and Medium Scale Enterprises in Kwara State, Nigeria;
3. find the influence of ICT Use on product innovation among the SMEs in Kwara State, Nigeria;
4. determine the influence of ICT Use on service innovations in Small and Medium Scale businesses in Kwara state, Nigeria;
5. examine the influence of ICT Use on Technological Innovations in Small and Medium Scale businesses in Kwara state, Nigeria

Research Questions

The following questions were raised in other to guide the line of discussion of this work.

1. What are the technological innovations among the SMEs in Kwara State, Nigeria?
2. What are the purposes of ICT use by the Small and Medium Scale Enterprises in Kwara State, Nigeria?

Hypothesis

The following null hypotheses will be tested at 0.05 level of significance:

H_{01}: ICT use has no significant influence on product innovations among SMEs in, Kwara State, Nigeria.

H_{02}: ICT use has no significant influence on service innovations among SMEs in, Kwara State, Nigeria.

H_{03}: ICT use has no significant influence on technological innovations among SMEs in, Kwara State, Nigeria.

Justification of Research

The involvement of ICT in the economy as reviewed by this study will assist the SMEs to make remarkable improvement in their operations and also align them with the current global trends in digital economy, through which they remained competitive and also maintain their presence in the market.

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Results

Table 1a. Age Distribution of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-27 yrs	7	20.0	20.0	20.0
	28-37 yrs	8	22.9	22.9	42.9
	38-47yrs	14	40.0	40.0	82.9
	48-57 yrs	4	11.4	11.4	94.3
	58-67 yrs	1	2.9	2.9	97.1
	Above 67 yrs	1	2.9	2.9	100.0
	Total	**35**	**100.0**	**100.0**	

Table 1b. Educational Qualifications of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	School Cert	2	5.7	5.7	5.7
	National Diploma	3	8.6	8.6	14.3
	HND	3	8.6	8.6	22.9
	NCE	4	11.4	11.4	34.3
	Bachelor Degree	15	42.9	42.9	77.1
	Post Graduate	8	22.9	22.9	100.0
	Total	**35**	**100.0**	**100.0**	

Table 2.0 technological Innovations

S/N	**Technological Innovation**				
	Products Innovation	**A**	**%**	**D**	**%**
1	Our company frequently tries out new ideas for products making	35	100	-	-
2	Our firm seeks new ways of modifying our products	31	88.6	-	-
3	Our company is creative in its approach and methods	29	82.9	4	11.4
4	Our company is frequently the first to market new products	34	97.2	1	2.8
5	Our business is ready to use new ideas for our products	34	97.2	1	2.8
6	Our organization is quick in problem solving as compared to key competitors.	35	100	-	-
7	In our business, there is continuous improvement in the production process.	35	100	-	-
8	Compared with our major competitors our new product development program is more successful.	35	100	-	-
9	Quality development of our products is better as compared to what was on ground before.	33	94.0	2	6.0
10	Our customers feel more satisfied with our products	33	94.0	2	6.0
	Service Innovation				
1	Our company is frequently the first to market new services	30	85.7	5	14.3
2	Compared to the services available in the market, we develop services that provide more benefits to consumers	35	100	-	-
3	Our business is ready to use new ideas for our services	34	97.2	1	2.8
4	Ways of delivery of existing services to consumers are often changed	34	97.2	1	2.8
5	We have business policy to guide innovation of our services	32	91.4	3	8.6

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6	Our company accepts demands that go beyond existing services	32	91.4	3	8.6
7	We frequently refine the provision of existing services	34	97.2	1	2.8
8	We introduce the improved version of our existing services in our local market	34	97.2	1	2.8
9	We try to find new ways of building and improving relationships with consumers	35	100	-	-
10.	We receive advice from our customers to offer new services.	34	97.2	1	2.8

From table 2.0 it was shown here that all the SMEs are following the same line in terms of innovations in their products and services and they obviously agree with the trends of innovation of both product and services with 100% answers to most of the pretested statements about technological innovations.

Table 3.0 Purpose of ICT Use

S/N	Purpose of ICT Use by the SMEs	A	%	D	%
1	Our business use email to communicate with external trading partners (e.g. customers, government agencies, etc)	33	94.0	2	6.0
2	We use company website to communicate basic company information such as contact details, location, goods & services etc.	35	100	-	-
3	Our firm develops and publish business catalogues in websites, WhatsApp, skype etc.	32	91.4	3	8.6
4	We receive enquiries from, or sending requests, to customers (visitors) through its website, e-mail, text messages etc	33	94.0	2	6.0
5	It is a normal routine to receive orders from customers online	34	97.2	1	2.8
6	Our company Sends invoices/bills to customers online	32	91.4	3	8.6
7	We receive payments online from customers.	34	97.2	1	2.8
8	In our business, accepting payments online via electronic transfer, POS terminals etc is a norm.	33	94.0	2	6.0
9	We use social sites like Facebook, WhatsApp etc to communicate with staff and customers.	34	97.2	1	2.8
10	Our firm uses Account Management System for staff salary	32	91.4	3	8.6
11	Account Management Systems is used for business financial transactions.	33	94.0	2	6.0
12	We use Office Management Applications like word processing application, Excel, Publishers, Power points etc	30	85.7	5	14.3
13	All our office computers uses passwords for security check	30	85.7	5	14.3
14	Our business premises is fortified with CCTV monitors	29	82.9	6	17.1

As shown on table 3.0, the use of ICT by SMEs ranges from the use of simple office applications to the complex security systems. However, SMEs largely shown more interest in web applications especially using website for information dissemination 35 (100%) and also using electronic fund transfers 33 (94%). This finding is a reflection of the facts that SMEs are very interested in adopting and applying ICT use for their innovative development.

Hypothesis

H_{01}: ICT use has no significant influence on product innovations among SMEs in Ilorin, Kwara State, Nigeria.

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Table 4.0: Regression on influence of ICT use on product innovation among SMEs.

Table 4.1(a) Model Summary

					Change Statistics				
Model	**R**	**R Square**	**Adjusted R.Square**	**Std.error of. estimate**	**R.square change**	**F. change**	**df1**	**df2**	**Sig.of change**
1	1	.112	.13	-.077	.62302	.013	1	33	.522

a. Predictor: ICT Use
b. Dependent variable is product innovation

Source: Field Survey Result, 2021

Table 4.1(b) ANOVA

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig. (p valu**	**Remark**
1	Regression	.162	1	.162	.418	.522	Not Significant
	Residual	12.809	33	.388	(4.139)		
	Total	12.971	34				

Source: Field Survey Result, 2021

Table 4.1(c) Coefficients

		Unstandardized Coefficients		**Standardized Coefficients**	**T**	**Sig.**
Model		**B**	**Std. Error**	**Beta**	**B**	**Std. Error**
	(Constant)	1.895	.440		4.312	.000
1	ICT USE	.114	.176	.112	.647	.522

a. Dependent Variable: PRODUCT INNOVATION

Source: Field Survey Result, 2021

The null hypothesis is accepted, (β =.112, t= .647, p =.522 > 0.05). Therefore, ICT use has no significant influence on product innovation.

H_{02}: ICT use has no significant influence on service innovations among SMEs in Kwara State, Nigeria.

Table 5.2: Regression on influence of ICT use on service innovation among SMEs.

Table 5.2:(a) Model Summary

					Change Statistics				
Model	**R**	**R Square**	**Adjusted R.Square**	**Std.error of. estimate**	**R.square change**	**F. change**	**df1**	**df2**	**Sig.of change**
1	1	.451	.203	.179	.44412	8.428	1	33	.007

a. Predictor: ICT Use
b. Dependent variable is service innovation

Source: Field Survey Result, 2021

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Table 5.2(b) ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.662	1	1.662	8.428	.007(a)
	Residual	6.509	33	.197	(4.139)	
	Total	8.171	34			

Source: Field Survey Result, 2021

Table 5.2(c) Coefficients

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model		B	Std. Error	Beta	B	Std. Error
1	(Constant)	1.345	.313		4.294	.000
	ICT USE	.364	.125	.451	2.903	.007

a Dependent Variable: SERVICE INNOVATION

The null hypothesis is rejected, (β =.451, t= 2.90, p =.007 < 0.05 significance). Therefore, ICT use has significant influence on service innovation.

H_{03}: ICT use has no significant influence on technological innovations among SMEs in Kwara State, Nigeria.

Table 6.3: Summary of regression on influence of ICT use on technological innovation among SMEs.

Table 2.3(a) Model Summary

						Change Statistics			
Model	R	R Square	Adjusted R.Square	Std.error of. Estimate	R.square change	F. change	df1	df2	Sig.of change
1	1	.337	.114	.087	.45005	4.240	1	33	.047

a. Predictor: ICT Use
b. Dependent variable is technological innovation

Source: Field Survey Result, 2021

Table 6.3(b) ANOVA

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.859	1	.859	4.240	.047(a)
	Residual	6.684	33	.203	(4.139)	
	Total	7.543	34			

a. Predictors: (Constant), ICT USE
b. Dependent Variable: TECHNOLOGICAL INNOVATION

Source: Field Survey Result, 2021

Table 6.3(c) Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta	B	Std. Error
1	(Constant)	1.680	.318		5.290	.000
	ICT USE	.261	.127	.337	2.059	.047

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a Dependent Variable: TECHNOLOGICAL INNOVATION

The null hypothesis is rejected, (F (4.139) = 4.240, Adj.R^2=.114, p<.0.05 significance level). Therefore, ICT use has significant influence on technological innovation.

Discussion of findings

The outcome of this study revealed that SMEs are interested in adopting innovation in their activities and also applying the use of ICT for their desired purposes. Onileowo and Fasiku (2021) also found that SMEs need to embrace ICT in terms of resources and skills.

This study also established that there is relationship between the independent variable of this research, that is ICT use and the dependent, technological innovation in SMEs, although the dependent variable is grouped into two (2), products and services innovations. The similarity and the differences in the mode of operation of these two was actually corroborated by the findings of this study. The inference drawn from this point is that, what affects innovation in products may not necessarily affects innovation in service because they share both similarities and differences as well. Based on the results presented, it was seen that ICT use was not significant on product innovation, but it was on service innovations, this might be saying that the nature of service-oriented organisation required a very large deployment of ICT use as this will offer a lot of benefits which in turn simplifies operation and bring about ease of doing the business with enhanced productivity and high efficiency. This was similar to the findings of Corso, Martini, Pellegrini and Paolucci (2015) which discovered that cause-effect relationship between use of ICT and Product Innovation while performance is dependent on company perception about systems and not about data. In another related development. OECD 2004 had earlier submitted that the adoption and use of Internet and e-business processes has to do with the sector characteristics, and in most cases, where firms anticipate a higher level of market opportunities, they are seen to commit more resources to ICT. For instance, products of services like tourism have a high information content, and can be well-adapted for online purchases and bookings based on the findings.

The study of Wiggins (2017) equally posited that ICT use can influence innovation in SMEs. Similarly, Obeidat (2019) arrived that influence of information technology was significant on all the knowledge conversion processes in the make-up of technological innovations, while ICT use was also found to have great importance for the assessment of information and has also help to increase the knowledge, thinking and innovation skills among the SMEs.

Conclusions and Recommendations

The findings of this study aligned with some factors that of great relevance to the study of ICT Use among the SMEs and as such these factors must be considered seriously at every stage involved in SMEs activities and the associated related research work. Technological innovations were seen to be influenced by the ICT use and this is an indication that deployment of ICT is very crucial in this sector of the economy and as such every effort must be targeted at improving access to this technology by all and sundry. SMEs must imbibe the use of ICT in Product innovation in order to improve on their production. Government must come to rescue the SMEs through their different intervention and platforms offered by respective agencies such as the Nigerian Communication Commission (NCC), National Information Technology Development Authority (NITDA), and Federal Ministry of Communication and Digital Economy among others. The support can either be in kind or cash depending on the kind of approach they, that is, (Government agency) adopts.

However, SMEs should always endevour to make themselves available their different groups and associations whenever an opportunity beacons, they must continue to press home their

demand through their different bodies such as National Association of Small and Medium-Scaled Businesses Association of Nigeria (NASME), National and states Chambers of Commerce and Industries, Mines and Agriculture NACCIMA, council of different business associations etc. They (SMEs) must also engage in development activities by organising training that could result well as other innovative activities among themselves.

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