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The impact of Information & Communication Technology (ICT) Adoption among Rural Based Small & Medium Enterprises (SMEs) in Bauchi Metropolis

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Abstract

Small and medium-sized Enterprises (SMEs) are crucial for the development of economies in the majority of nations. Even though SMEs make up 97% of all business establishments in Nigeria, this industry only contributes 10% or less to the GDP of the nation. The government has offered a number of supports including funding for development programs to address this disparity. Despite these efforts, many SMEs continue to struggle, largely because they lack the capacity to improve innovation performance. One of the factors affecting their performance and the competitiveness of SMEs may be the absence of an ICT adoption. In light of the foregoing, the purpose of this study was to examine the adoption of ICT among entrepreneurs and the performance of SMEs in Bauchi metropolis. A survey questionnaire would be used in a quantitative research design, and it would be given to 427 owners of SMEs. To ascertain the influence of ICT adoption entrepreneurs on the performance of small and medium firms, the Partial Least Squares (PLS) technique will be utilized. This study will make a unique contribution to ICT adoption and the performance of SMEs that will improve the success of strategic firm development.

Key Word : Entrepreneurs, ICT, Entreprises, Bauchi & Nigeria

1. Introduction

Since gaining its independence, Nigeria has made enormous strides toward becoming a rapidly developing country by working to enhance its economy, which is mostly dependent on oil and agriculture, through industrialization. The economy, which is characterized by primary products, is dominated by agriculture and the extraction of crude oil. The sector is responsible for over 80% of budgetary income, 95% of total foreign exchange earnings, and more than 90% of all exports. 79% of federal revenue and 71% of export revenue in 2011 came from the petroleum industry. In 2011, the industry provided 14.7% of GDP, while in the second quarter of 2013, it contributed 12.9%. (African Development Bank, 2013). Between January and March 2021, agriculture contributed 22.35 percent of the total Gross Domestic Product. The majority of Nigerians who labor in agriculture do so for subsistence.

The concept of attaining the status of a fully developed nation, a country that is wholly competitive, dynamic, and resilient, and a vision known as vision 2020 were proposed in 2007. (Abanikannda & Omobuwa, 2021). According to the vision statement, Nigeria will have a

sizable, robust, diverse, sustainable, and competitive economy that successfully taps into the skills and energies of its populace and responsibly utilizes its natural resources to ensure a high standard of living and high quality of life for its citizens (Abanikannda & Omobuwa, 2021). Consequently, the development of an economy based on innovation is crucial to the competitiveness, vitality, and robustness of the nation (Aghion et al., 2021). Nigeria must act now to create a more knowledge-intensive and innovation-driven economy in order to compete with other wealthy nations.

To that goal, the Nigerian government implemented several financial measures aimed at enhancing both the performance and survival of SMEs since it was extremely concerned about transforming, developing, and supporting the SMEs sector (Alabi et al., 2019). (Abiodun, 2014). For instance, since 1970, the Nigerian government has used a variety of plans, programs, organizations, and laws to support SMEs. These comprises the Small Scale Industries Credit Guarantee Scheme (1971); Rural Banking Scheme (1977); Peoples Bank (1989); Bank of Industry (BOI); Nigerian Industrial Development Bank (NIDB); Small and Medium Enterprises Equity Investment Scheme (SMEEIS); Industrial Development Centre (IDC); Microfinance Bank Institutions (MFBIs) and finally, in 2004 Small and Medium Enterprises Development Agency of Nigeria (SMEDAN) (Alhaji et al., 2022) . Furthermore, the Nigerian government lately announced other programmes such as the Subsidy Re-investment and Empowerment Programme (Sure-P) in 2012; You Win in 2012; N-power in 2016 and Youth Entrepreneurship Support (YES) in 2016 (Alhaji et al., 2022; Omeje et al., 2020).

An interesting fact is SMEs in Nigeria has been an avenue for job creation and empowerment of citizens proving above 60% of all job opportunities (Dabo, 2022). As a major investing sector, the government has duly recognized the importance of the SMEs in the transformation of Nigeria. SMEs account for 97% of all businesses in the country. According to a recent survey in Nigeria, the MSMEs sector employs over 76% of the labor force and generates almost 50% of the country's GDP (GDP) Nigerian SMEs employ over 50% of the nation’s workforce and contribute about 47% to the Gross Domestic Product (ILO, 2019, 2022) (National MSME collaborative survey, 2010; Taiwo *et al*., 2012). Despite dominating 96% of the entire economy, SMEs impact on GDP growth is very low less than 10% (Ademosu, 2022).

Small and medium-sized enterprises (SMEs) have unquestionably contributed significantly to the economic development of both emerging and established nations. This is seen in both their ability to create jobs and their Gross Domestic Product (GDP). Small and medium-sized businesses (SMEs) account for 16% of the GDP in low-income nations and 51% in high-income nations. They also account for 78% of employment in low-income nations and 66% in high-income nations (Muiruri, 2017). SME job creators are also acknowledged in developing nations (Abdissa et al., 2022; Al-Haddad et al., 2019; Albalushi & Naqshbandi, 2022). Because of this, regardless of the economic system's structure, SMEs provide a substantial contribution to innovation, regional development, and social cohesion, all of which have a big impact on GDP and employment (Bayraktar & Algan, 2019). But given that Nigeria aims to be one of the world's major economies by 2020, the participation of SMEs remains a significant issue. Without a question, SMEs will be essential to achieving this objective. Because of this, it's

crucial to acknowledge the crucial part that SMEs play in adoption of ICT in Bauchi state for economic progress.

2. Problem Statement

Nigeria is developing into an economy that is focused on innovation in order to become a high-income country by 2020. However, 97% of all business enterprises in Nigeria fall under the category of small and medium firms (Ogunode et al., 2020). Although the government has taken numerous steps to boost the productivity of SMEs, these businesses are still underperforming and still make up less than 10% of the GDP of the country (Bangudu, 2017; Ndumanya, 2019). Additionally, Nigerian SMEs lack innovation and competitiveness in how they run their enterprises (Ogunode et al., 2020). Nigerian businesspeople take a while to respond to environmental changes, fierce rivalry, and new innovations. Since innovation leads to the creation of new businesses, it is clear that innovation is the path to economic growth. The fundamental engine for business growth and the survival of SMEs is the development of new innovations. SMEs must develop and implement their strategy by adopting ICT in order to thrive in a dynamic business environment. The competitive climate has placed restrictions on SMEs ICT adoption, which is the main cause of their poor innovation performance (Baum et al., 2017; Shehu and Mahmood, 2017; Ogunode et al., 2020). SMEs need ICT adoption innovation to help them develop new products and services and raise the standard of existing ones (Khalili et al., 2013; Nursal et al., 2022).

It goes without saying that relying on the innovation skills and creativity of the entrepreneur is one of the methods for SMEs to become innovative. However, the sector has faced several difficulties in Nigeria, contributing to the high percentage of startup business mortality. For instance, in Nigeria, 60% of SMEs fail at this stage (Harash et al., 2014) and 80% do so early in their lifecycles (Gbandi & Amissah, 2018). The Nigerian government recognizes the value of innovation in advancing the national economy.

Nigerian SMEs' present innovation performance falls short of expectations (Aigboduwa, 2017). Due of the particular limitations and restrictions that SMEs confront, attempts are always being made to understand how ICT adoption their innovation could be improved. These initiatives are significant because it is known that this industry is one of the key drivers of economic growth for a nation (Mubaraki & Aruna, 2019). Small and medium-sized businesses, not huge corporations, are driving the world's leading economies in today's fast-changing business environment (SMEs). SMEs have attracted more and more attention globally over the years. This is due to how important SMEs are to a nation's economic development and progress (Mubaraki & Aruna, 2019). SMEs significantly contribute to bettering economic growth and development, from reducing poverty to generating jobs. As a result, SMEs are increasingly seen as one of the key forces behind and contributors to economic growth in many nations (Gulumser et al., 2018). It is argued that a number of factors contributed to the SME's poor innovation performance, including those already mentioned: the competitive environment (CE), entrepreneurial orientation (EO), and innovation performance (IP), as well as many others that have been established in the literature as having significant effects on SMEs (Mohammed and Obeleagu-Nzelibe, 2018; Udenka, 2019). The resource base view (RBV) of organizations,

created by Penrose in 1959, acknowledges the significance of particular strategic resources for boosting innovative performance, including brand names, technological prowess, and effective procedures (Tokuda, 2017).

The performance of SMEs in Nigeria has not significantly improved, and the interventions' effects have only been marginally felt, despite the Federal Government of Nigeria having implemented numerous financial measures aimed at improving both the performance and survival of SMEs (Abiodun, 2016). All Nigerians and other stakeholders take the poor performance of Nigerian SMEs very seriously (Ibru, 2016). The CEO of SMEDAN, Nadada (2019), acknowledged that SMEs in Nigeria, particularly in the state of Bauchi, face a number of issues, including poor market orientation, a lack of managerial experience, poor marketing abilities, a lack of entrepreneurial spirit, a lack of workable business plans, difficulty in obtaining financing, a lack of equity capital, a high rate of enterprise mortality, poor infrastructure, and a shortage of skilled labor.

Only 5 to 10% of SMEs in the North of Nigeria survive, thrive, and reach maturity after their first five years of operation (Agwu and Emeti, 2018). This restricts SMEs' capacity to carry out their duties, such as encouraging entrepreneurship in the area of ICT adoption. SMEs can stay up with the rapid changes and difficulties in the global business environment by adopting ICT adoption (Isichei et al., 2020). Some of the issues facing SMEs are thought to be resolved via EO (Jebna and Bahurudin, 2018). Even while Nigerian SMEs are motivated by the potential available, ICT adoption is still lacking for a variety of reasons, such as: a lack of skills, inadequate infrastructure, restricted access, etc (Agwu and Emeti, 2018). These were further highlighted as the causes of SMEs' poor performance in Nigeria, which caught the attention of both scholars and industry professionals there (Shehu and Mahmood, 2017; Ogunode et al., 2020)

3. Research Objectives

1. To identify the factors of ICT adoption on the performance of SMEs in Bauchi Metropolic.
2. To examine the influence of ICT adoption on the performance of SMEs in Bauchi Metropolic.
3. To propose the framework that can be used to improve ICT adoption and SMEs performance in Bauchi Metropolic.

4. Research Questions

1. What are the factors of ICT adoption on the performance of SMEs in Bauchi metropolis?
2. What influence those factors on ICT adoption on the performance of SMEs in Bauchi Metropolis?
3. What framework can be use to improve ICT adoption and SMEs performance in Bauchi Metropolis?.

5. Literature Review

This chapter examines the associated literature to offer context for the relationship between entrepreneurial orientation and the performance of SMEs in Nigeria in terms of innovation. It discusses related issues such as the concept of SMEs, the development of SMEs in Nigeria, the performance of SMEs in terms of innovation, the main problems confronting SMEs in Nigeria particularly in Bauchi State, the concepts of EO and SMEs, and previous empirical studies on the constructs/variables of the conceptual model. The suitable hypotheses and conceptual framework are offered based on the review to guide the overall procedure of this investigation.

5.1 Definitions of SMEs

The innovation performance and growth of SMEs is a major driver and indices for the level of development; innovation; growth, profitable and important employment for all those who are able and willing to work, fair distribution of income, the welfare, and quality of life enjoyed by the citizenry (Makinde, 2019; Nnaji, 2020), SMEs contribute to employment growth at a higher rate than larger firms (Nnaji, 2020) So far, there has been no standard, and universally acceptable definition of what indicates small and medium enterprise. Within the same country, the definition varies from one institution to the next, from one state or region to another. Also, one particular government or industries may define SMEs in one way, another government or industries elsewhere may define the same SMEs in a different way (Blake, 2022).

Different studies in different economies and institutions set their own guidelines for defining SMEs, usually based on the number of employees, assets and sales, as well as the legal status and methods of production in some cases (Abor and Quartey, 2018). Literature suggests multiple criteria of defining Small and Medium Enterprises worldwide (Mgeni, 2017; Mgeni and Nayak, 2018). For example, the European Union has defined SMEs as any firm that satisfies three of the following criteria: a small firm is one that has an annual turnover and balance sheet totaling no more than £10 million; employees number fewer than 50. The medium firm has a turnover not exceeding £50 million, a balance sheet totaling not more than £43 million, and employees numbering fewer than 250. In this definition, to qualify as an SME the turnover, balance sheet and employee criteria must all be fulfilled (PWC, 2020).

However, SMEs are classified by the World Bank as companies with fewer than 300 employees, $15 million in annual revenue, and $15 million in assets. SMEs, according to the Inter-American Development Bank, are companies with up to 100 employees and annual sales of less than $3 million (Naveed et al., 2022). Manufacturing and services and other sectors make up Malaysia's definition of SMEs. Sales turnover must not exceed RM 50 million in the manufacturing sector, and there cannot be more than 200 full-time employees. In contrast, in the services and other sectors, sales turnover must not exceed RM 20 million, and there cannot be more than 75 full-time employees (Elhassen et al., 2019).

Various factors, such as sales turnover, the number of workers, investments, asset base, or a combination of some or all of these, are used to categorize SMEs in Nigeria (Ogunode et al., 2020). SMEDAN suggested the current definition of SMEs in Nigeria is any business that employs ten to 49 people and has total assets of five million Naira (NGN5 million) or fifty

million Naira (NGN50 million), including working capital but excluding the cost of land, is considered small scale. Medium-sized businesses are those with between 50 and 199 employees and total assets between NGN50 million and NGN500 million, including working capital but excluding the cost of land.

Whatever their exact definition, SMEs are seen as the main driver of economic growth and development, particularly in developing and underdeveloped nations. The promotion of sustainable economic development in Nigeria, as in any other nation, through wealth creation, employment generation, and poverty reduction, calls for a vibrant SME sector (Ozo et al., 2019). For the purposes of this study, SMEs are defined as any company with 10 to 199 people and total assets between NGN5 million and NGN500 million, excluding land and buildings. Whatever their exact definition, SMEs are seen as the main driver of economic growth and development, particularly in developing and underdeveloped nations. The promotion of sustainable economic development in Nigeria, as in any other nation, through wealth creation, employment generation, and poverty reduction, calls for a vibrant SME sector (Ozo et al., 2019).

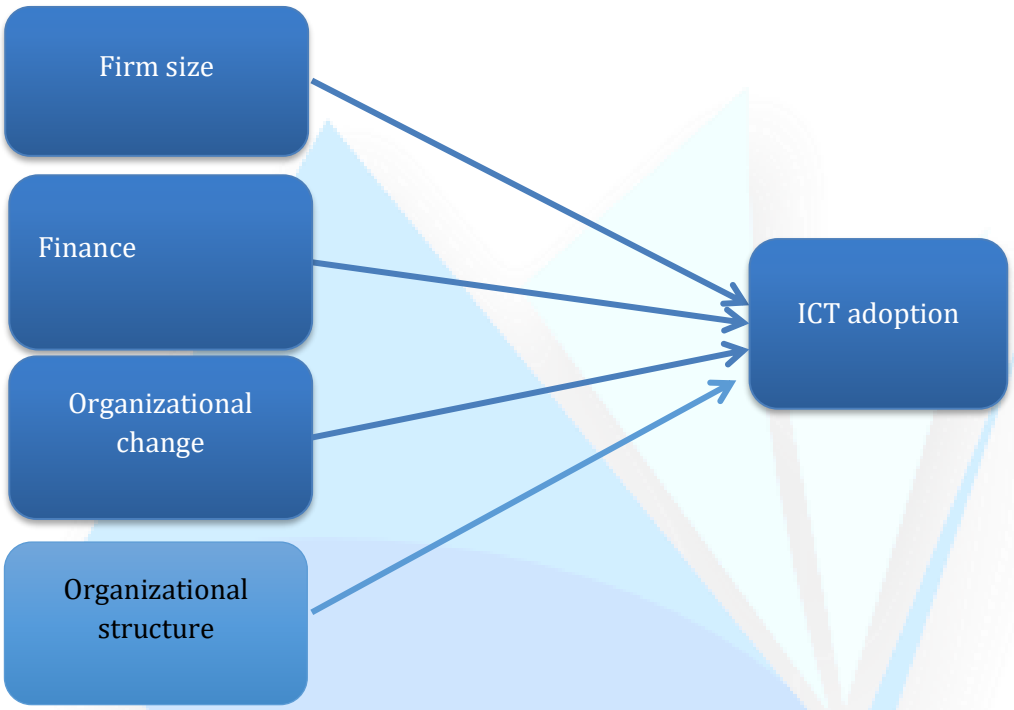
5.2 Entrepreneurial Orientation

An important factor that should be implemented for a successful entrepreneurship is entrepreneurial orientation (EO). This study's emphasis on SMEs led to a close examination of EO. The term "EO" first appeared in the 1970s (James & Josephine, 2022), and numerous investigations have subsequently been inspired by it (Ploychompoo, 2020). According to Udum et al. (2022), EO is often found to be favorably associated to firm innovation performance and to closely reflect genuine entrepreneurial business behavior. Research on EO has expanded quickly and has addressed a wide range of topics. In 256 scholarly journal articles by the end of 2010 (Petković & Sorak, 2019), EO had already been cited in more than 600 scholarly journals. Despite the increased scholarly attention, the literature has a number of unanswered questions. The EO notion is conceptualized through a variety of competing methods (Basco et al., 2019; Isichei et al., 2020; Mansi, 2021; Olubiyi et al., 2019).

EO is a dynamic process for generating money. People acquire riches by taking significant risks, including those involving their careers, finances, and social lives (Ronning, 2016). EO is seen as a higher order construct that measures entrepreneurship in SMEs on a variety of dimensions, including inventiveness, proactivity, risk-taking, competitive aggressiveness, and autonomy. It is possible to think of EO's development as occurring in stages. The majority of academics agree that the evolution of EO occurs in four stages (see e.g. Anderson et al., 2015; Basso et al., 2019; Edmond and Wiklund, 2020; Miller, 2018; Wales, Gupta et al., 2017). The pre-EO phase, on which EO research would be built, comes first. The majority of academics claimed that Miller (2018) had laid the groundwork first, followed by Covin and Slevin (2019), who refined it, and Lumpkin and Dess, who reconceptualized it.

According to Irobewaye et al. (2022) perceived entrepreneurial orientation as “the entrepreneurial strategy making processes which key decision makers apply to act out their firms reason to sustains its vision and create competitive advantage to the firm. Entrepreneurial orientation (EO) can therefore be seen as firms’ decision-making processes and styles of taking actions on entrepreneurial conditioning. Lumpkin and Dess (1996) suggested

that entrepreneurial behavior of firms is underpinned by five processes within an organization, referred to as entrepreneurial orientation. They suggested five dimensions of entrepreneurial orientation namely autonomy, innovativeness, risk taking, pro-activeness and competitiveness. These are the major dimensions that characterized entrepreneurial orientation.



6. Research methodology

Introduction

This section was methodology used in the study research, is designed to survey and determine the SME's perception towards ICT adoption among SMEs. The essence of this section is to describe the techniques and procedure that was used in this research in gathering the required information for the study. This section comprises research designed, population of the study, sample techniques, sample size, method of data collection, method of data analysis.

6.1 Research design

Research design is an overall plan for conducting a research Jongbo (2014). Daniel (2016) defined research design as arrangement of conditions for data collection and data analysis in a manner that aim to combine relevance to the research purpose as well with economy in procedure. Similarly, the research designed it depends on the nature of the research problem or the issues that are being addressed as well as the audiences for the research Thelwall snd Mas-Bleda (2020). This research is survey design. This type of research design is normally use to observe natural behaviors without affecting them in any way. The Researcher will ensure that the questions to be asked are precise and concise and not probe into the respondents' private life. This research is positivism for data collection, whereby quantitative approach would be

used, that is survey and structured questionnaire will be used to improve for better validity of this research to guarantee that no leak from any data or information gathered (Saunders & Lewis, 2012).

6.2 Population of the Study

A population is a group of individuals, objects, or items from which samples are taken for measurement. It refers to an entire group of persons or elements that have at least one thing in common (Mbewe et al., 2022). The population of the study will consist of all the SMEs registered in SMEDAN in Bauchi metropolis totally to 59,148. The choice of this group of SMEs is necessitated by the fact they are registered SMEs. Different type of businesses will be selected across different SMEs within the study area. This will enable the findings to be more generalizable across different sectors than when the study concentrates on one sector.

6.3 Sample Size

Sample size is the number of items involved in the study (Läkens, 2022). The study therefore, adopted The Krejcie Table to determining the sample size for the research activities with have 95% confidence level and 5% level of precision. Samples will be taken from the two polytechnics. The Krejcie Table was used to determine the sample size for the research activities. Based on the application of the Krejcie and Morgan (1970), the sample size for this study is three hundred and eighty eight (388).

7. Sampling Technique

According to Sekaran (2016) sampling techniques is categorized as two discrete probability and non-probability sampling. When the population component under examinations has a non-zero chance or the likelihood of been choose as a sample object, is what is called probability sampling. The simple random sample means that every case of the population has an equal chance of selected in the sample. The simple random will be used in selecting the registered SMEs in Bauchi metropolis.

7.1 Purposive sampling

This research employs a purposive sampling technique, since it fits the purpose of this research, on the influence of entrepreneurial orientation on the performance of small and medium enterprises in Bauchi Metropolis. The entire registered SMEs would be purposively sampled. The group was chosen because they are registered and would be more composed to provide suitable answers to the questionnaire. The selection of the purposive sampling is in consonant with the studies of (Ashari et al., 2021; Lackéus, 2020; Ugwu & Ezeani, 2012).

8. Data Collection

The instrument (Questionnaire) for collection of data will be in two section A, B,C,and D Section A will be information relating the demographic of the respondents, while section B to D would contains the questions related to independent and dependent variables. The data would

be measured using five points likert scale structure questionnaire title "Questionnaire on the "owners manager's perception on Entrepreneurial orientation" this questionnaire will be adopted and adapted from the existing literature. Therefore, an instrument to measure owner's manager's perception on entrepreneurial orientation and the other variables in the model is needed. It is based on the existing theories and empirical literature about the application of the theory Barney's (1991) Resource Based Theory (RBT). Thus, it has been carefully checked with those instruments used by other researchers, such as Social Network (Gaudici, 2013; Stam, 2010), Risk-taking (RTK) (Chua, 2014; Piraala, 2012; Mahmood and Hafani 2013; Oscar, et al., 2013) and Proactiveness (PRA) (Joshi et al., 2015; Yeniaras & Unver, 2016; Dai et al., 2014; Covin & Miller 2014)work has been carefully revised to solve any discrepancy that might have arisen between the different instruments. The rating scale is 5 points likert scale option as follows; strongly Agree (SA) =5, Agree (A) =4, Neutral (N) =3, Disagree (D) =2, Strongly Disagree (SD) =1.

9. Data Analysis

The research will cover the entire registered SMEs in Bauchi metropolis. The research will adopt the quantitative approach where quantitative data will be used. The quantitative data will be sourced through survey questionnaire that will be specially designed for the purpose of the research. The collected data will be analysed through the use analysis software such as and SPSS, and Smart-PLS (SEM).

10. Findings:

Factors influencing adoption of ICT among SME Performance

In order to assess the important factors that influence ICT adoption SMEs performance, Relative Importance Index (RII) of the factors was analysed. Interpretation of the RII was done based on the criteria presented in Table 2. The RII criterion decision rule used involved computing an index that shows the relative importance of a factor or questionnaire item relative to other factors or items under investigation. The RII was computed using the formular:

$$RII = \sum \frac{wn}{pN}$$

Where:

w = is the weight given to each item by the respondents, which range from 1 to 5; such that 1 the least implying (inferior) and 5 the highest implying (superior) position/opinion;

n = number of respondents that select particular option;

p = is the highest weight (5 in 5-point Likert scale); and

N = total number of respondents.

Table 2: Decision criteria for interpreting RII
(Akadiri, 2011)

RII value	Importance level	
$0.8 \leq RII \leq 1$	Very Important	VI
$0.6 \leq RII \leq 0.8$	Important	IM
$0.4 \leq RII \leq 0.6$	Moderately important	MI
$0.2 \leq RII \leq 0.4$	Somewhat Important	SI
$0 \leq RII \leq 0.2$	Not Important	NI

Table 3 shows the result of the analysis on the important factors influencing SME Performance. As indicated at individual items level, all items reported high RII ranging from .783 to .902 suggesting that the items are rated important to very important. At construct level, the analysis shows that all the three factors are very important. Specifically, proactiveness reported an RII of .873; Risk Taking, RII = .847; Social Network, RII = .859. This suggests that all the three factors are very important in influencing SME Performance.

	N	Min	Max	Mean	Std. Deviation	RII
Firmsize						
In dealing with competition, our firm is often the first to initiate action, to which competitors then respond.	205	1	5	4.2195	.83173	.856
In dealing with competition and changing market conditions, our firm continually seeks out new business opportunities	205	2	5	4.2341	.81878	.859
Our firm actively observes and adopts the best practices in our sector to enhance our presence in the market.	205	1	5	4.37	.791	.886
Our firm cooperates with solutions to unarticulated customer needs in our products and services.	205	2	5	4.44	.702	.902
Our firm continuously tries to introduce new products and technologies ahead of the competition.	205	1	5	4.26	.790	.864
						.873
Finance						
Our firm has a strong preference for high-risk projects with new ideas with chances for a very high return.	205	2	5	4.33	.790	.879

Our firm's strategy can be characterized by a strong tendency to take risks.	205	1	5	4.28	.815	.869
Our firms is more risk affine or risk averse regarding business, financial and personal issues even if we are not certain that they will always work.	205	1	5	3.86	.972	.783
Our firms engage in risky investments e.g. new employees, facilities, debt, and stock options to stimulate future growth do you agree?	205	1	5	4.06	.950	.825
Our firm believes taking risks is necessary to achieve the firm's objectives, especially when confronted with making decisions that involve uncertainty.	205	2	5	4.34	.780	.881
						.847
Organization change						
The use of Social networking provide our firm with a diverse information and access to large pool of resources, business opportunities, and markets.	205	2	5	4.23	.799	.858
The use of social networking facilitates an entrepreneurial orientation by increasing a firm's capacity to quickly identify, access, and mobilize external resources.	205	2	5	4.24	.855	.860
I like Social Networking Sites advertisement, the use of social networking involves the social ties, the influence of friends and famie models and advisors.	205	2	5	4.34	.780	.881
I like communicating with my clients through social media, the success of our firm depends on its collaboration with other organizations that influence the creation and delivery of its products or services.	205	2	5	4.16	.839	.845
I like viewing SMEs updates through social media. A challenge for SMEs is to use networks in a proper way and to profit from organizations within these networks.	205	1	5	4.19	.827	.850
						.859

11. Effects of ICT adoption on SME performance

The overall objective of the study is to determine the effect of the identified factors on SME performance. In order to achieve the objective, the data was analysed using structural equation model. Figure 1 shows the measurement model of the research framework. SME performance is the dependent variable while proactiveness, risk-taking and social networks are the independent variables. The recommended procedure of evaluating partial least squares structural equation models is to assess the measurement model for convergent and discriminant validity and the structural model where the model quality metrics are measured.

12. validity and reliability

Convergent validity is the measure of the degree to which measurement items of a construct correlates with the construct. Convergent validity is assessed by establishing indicator reliability which involves achieving at least 0.50 indicator loading; at least 0.70 composite reliability (CR) and at least 0.5 Average variance extracted (AVE) (Nicholas, Mohammed, Ufere, and Kuna, 2022; Mohammed & Sulaiman, 2018). Table 3 shows the convergent validity result.

As shown in the Table, all outer loadings have values greater than 0.50. Similarly, the CR reported values greater than the recommended benchmark of 0.70 while AVE of all constructs yielded values higher than the recommended minimum value of .50. This suggests that convergent validity and reliability is achieved.

Table 3: Convergent validity

	Outer Loadings	Standard Deviation	T Statistics	P Values	CR	AVE
pro1 <- Firm size	0.813	0.030	26.945	0.000	0.875	0.584
pro2 <- Firm size	0.734	0.048	15.292	0.000		
pro3 <- Firm size	0.778	0.041	18.965	0.000		
pro4 <- Firm size	0.785	0.037	20.992	0.000		
pro5 <- Firm size	0.707	0.047	15.100	0.000		
rt1 <- Org struc.	0.722	0.047	15.488	0.000	0.813	0.521
rt2 <- Org struc	0.695	0.061	11.441	0.000		
rt4 <- Org struc	0.684	0.049	14.054	0.000		
rt5 <- Org struc	0.782	0.041	19.073	0.000		
sn1 <- Finance	0.728	0.040	18.370	0.000	0.865	0.562
sn2 <- Finance	0.696	0.053	13.119	0.000		
sn3 <- Finance	0.791	0.034	22.942	0.000		
sn4 <- Finance	0.785	0.033	23.804	0.000		
sn5 <- Finance	0.739	0.034	21.800	0.000		
sp1 <- Org change	0.725	0.045	16.164	0.000	0.864	0.560
sp2 <- Org change	0.745	0.040	18.729	0.000		
sp3 <- Org change	0.807	0.032	25.600	0.000		
sp4 <- Org change	0.720	0.048	14.969	0.000		
sp5 <- Org change	0.749	0.041	18.366	0.000		

13. Discriminant validity

The next step of the measurement model assessment involves checking the discriminant validity. According to Hair, Hult, Ringle and Sarstedt (2022), discriminant validity is the measure of the uniqueness of a construct in relation to other constructs in the model. In order to assess discriminant validity, the heterotrait-monotrait (HTMT) ratio of correlations was used.

The HTMT is adjudged the most reliable measure of discriminant validity (Henseler, Ringle, Sarstedt, 2015). The decision rule for establishing discriminant validity is for correlations among constructs to fall within more conservative ($HTMT_{0.85}$) to more lenient ($HTMT_{0.90}$). The result shown in Table 4 shows that all correlations are within the acceptable limits of 0.85 to 0.90. This suggests that each construct of the research model is unique, thus achieving discriminant validity.

Table 4: Discriminant validity using HTMT Criterion

	Firm size	Finance	Org change	Org structure
Firm size				
Finance	0.900			
Org change	0.654	0.731		
Org structure	0.779	0.891	0.841	

14. Structural model evaluation

The structural model evaluation involves assessing the path coefficients, the R^2 value and its magnitude f^2 statistics, and the predictive relevance. The path coefficients show the relationship between each independent variable and the dependent variable in the research model. On the other hand, the R^2 measures the overall model performance. The f^2 measures the specific individual contribution of each independent variables on the overall model performance while Q^2 measures the predictive relevance of the research. Figure 2 shows the structural model of the research where the significance of the outer loadings and path coefficients is shown.

Table 5 shows the path coefficients, R^2, f-, and Q^2. As shown in the Table Proactiveness reported a significant positive effect on SME Performance ($\beta = 0.136$; $t = 2.104$; $p < 0.05$). Similarly, the effect of Social Network on SME Performance reported a statistically significant effect ($\beta = 0.579$; $t = 8.9231$; $p < 0.05$). However, Risk Taking shows non-statistically significant effect on SME Performance ($\beta = 0.055$; $t = 0.657$; $p > 0.05$).

The R^2, which measures the overall performance of the model reported a value of 0.510. In accordance with the recommended benchmark for interpreting r-square in social and management sciences the R^2 of 0.579 is considered moderate (Mohammed & Sulaiman, 2018). The R^2 value of 0.510 implies that about 51% variation in SME Performance is explained by the Proactiveness, Risk Taking and Social Network.

The f^2 statistics measures the contribution of individual independent variable on the R^2. The magnitude of the contribution is assessed using the effect size proposed by Cohen (1998). Effect sizes of 0.02, 0.15 and 0.35 are considered small, medium and large respectfully. The result of the effect sizes of the respective independent variables is shown in Table 5. As shown in the Table only Social Network shows large effect size on the model's R^2. The other two variables have negligeable or small effect sizes.

Another criterion for evaluating structural equation model is assessment of predictive relevance which is assessed using the Stone-Geisser's Predictive relevance (Q^2). The decision rule for testing Q^2 is for the Cross-validated redundancy value to be greater than 0. As sown in Table 5, he Q^2 value reported is 0.277 which is greater than 0, hence indicative of the achievement of predictive relevance.

Table 5: Structural model evaluation

Quality Criteria	Statistics
Path coefficients	
Firm size→ICTSME Performance	0.136* (2.104)
Finance→ICTSME Performance	0.055 (0.657)
Org change→ICTSME Performance	0.579* (8.923)
R^2	
SME Performance	0.510
f^2	
Firm size	0.019
Finance	0.003
Org change	0.324
Q^2	0.277

15. Conclusion:

The impact of Information and Communication Technology adoption among Small & Medium Enterprises in Bauchi state tends to investigate the significance of ICT adoption and tackle its problem, efficient operation to gain competitive advantage and sale their products beyond borders, competitiveness, enhance operational efficiency, market share and unemployment. The study created a framework to measure readiness or intention of SMEs in the ICT adoption. However, the study outlined the characteristics of SMEs to implement a more well organized and implement a successful process of ICT by SMEs in a future studies

The research study provided a policy suggestion that would enable SMEs to adopt ICT into their day-to-day schedules. It would prevent further losses suffered by SMEs because of lack of

ICT improvement in the business especially in rural area. The study discovered whether the satisfaction of customers as well as business enterprises on the use and benefits of ICT adoption in rural areas.

References

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks, Califonia: Sage Publications,

Mohammed I.M. and Sulaiman, N. (2018) Determinants of reverse mortgage usage in Malaysia, Real Estate Management and Valuation, 26(3) 5-23.

Yusuf, N. Mohammed, M. I. Ufere, k. J., Ibrahim, A. K. (2022) Effect of facilities management service quality on user satisfaction and institutional image, International Journal of Real Estate Studies, 16(2), 1-19.

Abanikannda, M. O., & Omobuwa, O. (2021). Nigeria's development process, methodology and milestones planned for VISION 20:2020 - 13 years after. *Research Journal of Health Sciences*, *9*(2), 169–175. https://doi.org/10.4314/rejhs.v9i2.7

Ademosu, A. (2022). *The Impact of the Financial System and its Channels on SMES ' Access to Financing : A Nigerian Perspective* [Georgia State University]. https://doi.org/10.57709/29108748

Alhaji, I. A., Abdulsalam, Y., Merlinda, F., & Muharram, B. (2022). The Milestones of Entrepreneurship Programme Financing in Nigeria. *International Journal of Management & Entrepreneurship Research*, *4*(X), 1–14.

Ashari, H., Abbas, I., Abdul-talib, A. N., & Mohd Zamani, S. N. (2021). Entrepreneurship and Sustainable Development Goals: A Multigroup Analysis of the Moderating Effects of Entrepreneurship Education on Entrepreneurial Intention. *Sustainability*, *14*(1). https://doi.org/10.3390/su14010431

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99–120.

Basco, R., Hernández-perlines, F., & Rodríguez-garcía, M. (2019). The effect of entrepreneurial orientation on firm performance : A multigroup analysis comparing China , Mexico , and Spain. *Journal of Business Research*, *September*, 1–13. https://doi.org/10.1016/j.jbusres.2019.09.020

Blake, F. A. (2022). Exploring the Covid-19 Pandemic Impact on Hawai'Ian Small Businesses. In *Liberty University, School of Business* (Issue March).

Dabo, S. A. (2022). *Role of Entrepreneurial Characteristics of Micro and Small Enterprise Owners in Poverty Reduction in Nigeria*. Jomo Kenyatta University of Agriculture and Technology.

Daniel, E. (2016). The Usefulness of Qualitative and Quantitative Approaches and Methods in Researching Problem-Solving Ability in Science Education Curriculum. *Journal of Education and Practice*, *7*(15), 91–100. https://doi.org/2222-288X

Elhassen, A. mohammed, Chemseddine, T., & Bachir, O. (2019). A Comparative Study on Development of Small and Medium Enterprises (SMEs) in Japan and Malaysia. *Saudi Journal of Business and Management Studies*, *2*(4), 357–374. https://doi.org/10.21276/sjbms

Harash, E., Al-Tamimi, K., & Al-Timimi, S. (2014). The Relationship Between Government Policy and Financial Performance: A Study on the SMEs in Iraq. *China-USA Business Review*, *13*(4), 290–295.

ILO. (2019). World economic situation and prospects Monthly Briefing. In *GEMB* (Issue 125).

ILO. (2022). *World Employment and Social Outlook*. https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_834081.pdf

Irobewaye, I. P., Dangana, E. A., Ameh, A. A., & Olaiye, O. G. (2022). Entrepreneurial Orientation and Sustainable Job Creation A Study Of Small and Medium Enterprises in South-South, Nigeria. *Journal of Business Management, Innovation and Creativity*, *1*(1), 258.

Isichei, E. E., Agbaeze, K. E., & Odiba, M. O. (2020). Entrepreneurial orientation and performance in SMEs. *International Journal of Emerging Markets*, *15*(6), 1219–1241. https://doi.org/10.1108/IJOEM-08-2019-0671

James, M. N., & Josephine, M. (2022). Technological Innovation on Success of Coconut Small and Medium Enterprises in Kilifi and Kwale Counties. *International Journal of Entrepreneurship and Innovation*, *5*(2).

Jongbo, O. . (2014). The Role of Research Design in a Purpose Driven Enquiry. *Review of Public Administration and Management*, *3*(6), 87–94. www.arabianjbmr.com/RPAM_index.php

Khalili, H., nejadhussein, syyedhamzeh, & Fazel, A. (2013). The influence of entrepreneurial orientation on innovative performance. *Journal of Knowledge-Based Innovation in China*, *5*(3), 262–278. https://doi.org/10.1108/jkic-09-2013-0017

Lackéus, M. (2020). Comparing the impact of three different experiential approaches to entrepreneurship in education. *International Journal of Entrepreneurial Behaviour and Research*, *26*(5), 937–971. https://doi.org/10.1108/IJEBR-04-2018-0236

Läkens, D. (2022). Sample Size Justification. *Collabra: Psychology*, *8*(1), 33267. https://psyarxiv.com/9d3yf/

Makinde, W. A. (2019). Assessment of Government Policies on Small and Medium Scale Enterprises ' Productivity in Ibadan Metropolis, Oyo State : an Empirical Survey. *International Journal of Research in Business Studies and Management*, *6*(9), 30–39.

Mansi, N. E. (2021). *Entrepreneurial Orientation and Performance of SMEs in Nigeria. The Role of Managerial Experience and Network Ties*. Manchester Metropolitan.

Mbewe, A., Alh, M. A., & Alexander, M. (2022). Attitude towards skills training: The case of final year adult education female students at the University of Zambia, Lusaka, Zambia. *International Journal of Advanced Multidisciplinary Research and Studies Attitude*, *2*(3), 287–292.

Naveed, R. T., Rehmani, M., Khokhar, M. N., Shah, S. R. U., Ali, A., Shahzadi, S., & Irshad, H. (2022). Small and medium-sized enterprises failure in providing workers' rights concerning Sustainable Development Goals-2030 in Pakistan. *Frontiers in Psychology*, *13*(October), 1–9. https://doi.org/10.3389/fpsyg.2022.927707

Nnaji, L. (2020). *An Investigation of Small And Medium Scale Enterprises (SMEs) of Agro-Allied And Livestock Business on Nigerian Economy: A Case Study of Selected Smes In Ikorodu Local Government Area of Lagos State* (Issue August).

Nursal, M. F., Rianto, M. R., & Bukhari, E. (2022). The Influence of Market Orientation , Entrepreneurial Orientation , Knowledge Management and Learning Organization on Performa nce Mediated by Innovation in Culinary SME ' s i n Bekasi. *East Asian Journal of Multidisciplinary Research*, *1*(8), 1691–1702.

Ogunode, P. O., Abereola, S. N., & Oloyede, A. O. (2020). Entrepreneurship Marketing and Performance of SMEs in Nigeria. *International Journal of Small Business and Entrepreneurship Research*, *8*(1), 39–52.

Olubiyi, O., Smiley, G., Luckel, H., & Melaragno, R. (2019). A qualitative case study of employee turnover in retail business. *Heliyon*, *5*(November 2018), e01796. https://doi.org/10.1016/j.heliyon.2019.e01796

Omeje, A. N., Jideofor, A., & Ugwu, M. O. (2020). Youth Empowerment and Entrepreneurship in Nigeria: Implication for Economic Diversification. *SAGE Open*, *10*(4). https://doi.org/10.1177/2158244020982996

Ozo, O. O., Elem, S. N., & Ebonyi. (2019). Small and Medium Scale Enterprises and Corporate Social Responsibility Practice in Nigeria: A Theoretical Review. *IAA Journal of School Science*, *5*(1), 35–59. https://www.iaajournals.org/wp-content/uploads/2020/02/IAA-JSS-5135-59-2019..pdf

Petković, S., & Sorak, S. (2019). Effects of the Establishment of Entrepreneurial Orientation on the Performances of Small and Medium Enterprises in Transition Countries:

Empirical Evidences from Bosnia and Herzegovina. *Zagreb International Review of Economics and Business*, *22*(s1), 37–67. https://doi.org/10.2478/zireb-2019-0004

Ploychompoo, K. (2020). The Roles of Organizational Learning Capability and Firm Innovation in the Relationship between Entrepreneurial Orientation and Firm Performance. *Journal of Asian Finance, Economics and Business*, *7*(10), 551–561. https://doi.org/10.13106/jafeb.2020.vol7.no10.651

PWC. (2020). PwC's MSME Survey 2020 Building to Last. In *MSME Survey* (Vol. 3, Issue June).

Saunders, M., & Lewis, P. (2012). *Doing Research in Business & Management: An Essential Guide to Planning Your Project* (5th ed.). Pearson, Harlow.

Sekaran, U. (2016). *Research Methods for Business* (J. Marshal & P. McFadden (eds.); 4th ed.). Hermitage Publishing Services.

Thelwall, M., & Mas-Bleda, A. (2020). How common are explicit research questions in journal articles? *Quantitative Science Studies*, *1*(2), 730–748. https://doi.org/10.1162/qss_a_00041

Udum, F., Emmanuel, C., & Nwosu, S. (2022). Entrepreneurial Orientation and the Performance of Auto Spare Parts and Machineries Dealers' Association in Lagos State Nigeria. *International Journal of Development and Management Review*, *17*(1), 216–234.

Ugwu, F. N., & Ezeani, C. N. (2012). Evaluation of entrepreneurship awareness and skills among LIS students in universities in South East Nigeria. *Library Philosophy and Practice*, *2012*(1).