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Institutionalizing information communication technology competences among Nigerian entrepreneurs in a global economy

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Abstract
The study examined the institutionalization of ICT competences among entrepreneurship in Nigeria. Specifically, to determine the relationship between ICT and globalization as well as ascertain the effect of ICT on entrepreneurial business performance. The data for this study is a yearly range from 2001 - 2022. The study used time series data obtained from world development indicator (WDI) using both Augmented Dicky-Fuller (ADF) and Johansen Co-integration analysis to check for stationary of the variable of the time series data. From the stationarity result, all variables were found to be stationary at level. Johansen Co-integration test was also employed whereby existence of long run relationship among variables was established. Ordinary least square method was used to estimate the parameters of the model. The regression result revealed that ICTge, ICTgi and ICTse has positive significant impact on the economic growth (GDP) in Nigeria over the period of study in both short run and long run, though our main focus is in the constant term. Government should put systems in place to create an environment that encourages entrepreneurial education and practices to flourish in all educational institutions and ICT is a tool to teach entrepreneurship skills.

Keywords: Entrepreneurship, Globalization, ICT, Information Technology, Nigeria

1. Introduction

The role of Information and Communication Technologies (ICTs) in fostering economic development has been widely acknowledged, particularly in the context of developing nations. However, despite various reforms aimed at integrating ICTs into their economies, many developing countries, including Nigeria, have seen limited benefits compared to their developed counterparts. The significance of technological advancement in driving economic growth cannot be overstated, as evidenced by its substantial contribution to the economies of developed countries such as Canada and the United States (Harchaoui, 2002). Similarly, emerging economic powers like China, Korea, Taiwan, India, and South Africa have experienced notable economic development facilitated by advancements in ICT (Mafe, 2000).

The World Bank acknowledges Nigeria's vast potential as one of Africa's largest economies, yet highlights the urgent need for enhanced ICT adoption and utilization among entrepreneurs to unlock growth opportunities and address developmental disparities. According to the World Bank's Nigeria Digital Economy Diagnostic Report (2020), only a fraction of Nigerian businesses fully leverages ICT tools and digital platforms, thereby limiting their ability to compete effectively in the global market. Moreover, a study by the Nigerian

Communications Commission (NCC) underscores the widening digital divide within the entrepreneurial landscape, with many small and medium-sized enterprises (SMEs) lacking the necessary ICT infrastructure, skills, and resources to harness digital technologies for business growth (NCC, 2021).

Research by Lia, et al. (2023) emphasizes the critical role of entrepreneurship education in equipping Nigerian entrepreneurs with the requisite ICT skills and digital literacy to thrive in the global economy. By integrating ICT training into entrepreneurship curricula and providing targeted capacity-building programs, educational institutions can empower aspiring entrepreneurs to leverage technology for innovation and business success. Furthermore, the Nigerian government's Digital Economy Policy and Strategy (2020-2030) underscores the importance of creating an enabling ecosystem for ICT-enabled entrepreneurship through policy reforms, infrastructure investments, and public-private partnerships (Federal Ministry of Communications and Digital Economy, 2020).

The rapid evolution and convergence of ICTs have transformed societies into information-driven entities, where the management and utilization of information are crucial for development (Olatunji, 2015). Organizations across various sectors have leveraged ICTs to enhance productivity, efficiency, and service delivery, leading to a paradigm shift from traditional paper-based processes to computerized systems (Brown, 2000). In the realm of education, ICTs have revolutionized teaching and learning methodologies, enabling global access to information and reshaping educational practices (Iwu & Ike, 2009). However, despite the recognition of ICT skills as essential components of core education, there remain challenges in integrating ICT into the educational curriculum effectively.

The Federal Government of Nigeria has formulated policies to guide education, including entrepreneurship education, as part of efforts to develop human resources and drive economic growth. Entrepreneurship skills, including ICT proficiency, are increasingly recognized as critical for empowering individuals and fostering economic development (Okereke & Okoroafor, 2011). However, challenges such as inadequate political will, policy implementation gaps, and the mismatch between educational outputs and market demands hinder the effective integration of entrepreneurship skills, including ICT proficiency, into the Nigerian educational system (Ogonor, 2019). To address these challenges and enhance global relevance, entrepreneurship education in Nigeria must focus on equipping students and graduates with the necessary skills, including ICT proficiency, to thrive in the contemporary global landscape.

Statement of the Problem

The entrepreneurial landscape in Nigeria faces significant challenges, primarily stemming from inadequate infrastructure, insufficient financial support and poor implementation of entrepreneurial policies, and widespread insecurity. These issues hinder the growth and success of entrepreneurial ventures, affecting the overall economic development of the country. Insufficient infrastructure, including unreliable transportation and power systems, increases production costs and limits business operations. Moreover, despite existing financial support mechanisms, such as entrepreneurial intervention funds, a mere fraction of business owners receive the necessary funding. High interest rates on loans further discourage entrepreneurship, leading to a preference for lending to salary earners over business owners. Additionally, pervasive insecurity, exemplified by crises like Boko Haram attacks and frequent kidnappings, deters both local and international investment, hampering entrepreneurial

activities and impeding Nigeria's integration into the global economy. Against this backdrop, it is imperative to explore strategies for institutionalizing ICT competencies among Nigerian entrepreneurs to foster inclusive economic development and sustainable growth. This entails not only addressing infrastructure challenges but also investing in human capital development and creating an enabling policy environment conducive to ICT-driven entrepreneurship.

2. Literature Review

2.1 IT Enablers

This refers to the items or processes that will help transform data into information that is useful. This covers every kind of hardware, software, and technological innovation that makes data or information modification easier. Typical examples are data maintenance equipment and machine and software technologies (IT Standards, 2012). The information technology sector has changed dramatically over the past few decades to become what it is today. New developments like Twitter, Facebook, WhatsApp, and the Google search engine have greatly benefited research and entrepreneurial endeavors. The globe has undoubtedly become a global village as a result of it. Prominent businessmen such as Elon Musk, Bill Gates, and Mark Zuckerberg, among others, have spearheaded the revolution in IT and entrepreneurship in recent decades. They produced numerous of these enablers and presently provide funding for IT hubs worldwide, including those in Nigeria. On an individual and organizational level, modern IT enablers can save expenses while also increasing productivity and effectiveness (Hengst & Henk, 2001). These days, training and education are conducted using both IT and in-person learning resources. However, IT is viewed as a threat by educators.

2.2 ICT and ICT Competences

ICT refers to the collection of technological tools and resources utilized for data and information management, storage, distribution, and communication (Tukur, Hyacinth, Samson, Christiana & Aliyu, 2021). Any communication device, including computers, hardware and software, smartphones, satellites, televisions, radios, and so on, falls under this umbrella. ICT also includes a range of related services and applications. According to UNESCO (2008), NICS (2010), Albirini (2006), and the European Commission (2004), ICT competency is the knowledge, skills, and capacity to use ICT for the collection, processing, and presentation of information in support of activities among various groups of people for working, unwinding, and communicating. In the information-based culture, it also functions as a fundamental ability (Cha et al., 2011).

ICT competencies include, but are not limited to, using an online catalog to find and identify resources for a particular information need, refining an operational situation using keyword search techniques, locating and retrieving appropriate information using a browser and search engine, and using other ICTs to create instructional materials that support learning and teaching scenarios. ICT competencies refer to the ability to create acceptable technology-based resources that may be used in teaching and learning processes, which requires having sufficient knowledge of both technology and the teaching sector. ICT entrepreneurship techniques are accessible through internet marketing, generating value and exchange for clients. The foundation of an entrepreneur's value creation is their development of information, competencies, and abilities. Through both individual and group learning strategies, ICT owners and businesses can build the competencies and abilities they want. The entrepreneur can access information and knowledge banks at their

own pace and the usage of information and communication technologies allows for the updating of instructional pedagogies (Hussain, 2008).

2.3 Entrepreneurship and ICT

Considering how important ICT is to many aspects of our lives, both personal and professional (Muhammad, 2015). The IT entrepreneur's development is crucial. For example, in the current globalization period, ICT entrepreneurship makes it possible for countries such as Nigeria to become producers and creators in the high-value sectors of the knowledge economy. ICTs comprise the infrastructure of the digital global economy (Muhammad, 2015). They are necessary for the global village to continue to exist. However, programs in entrepreneurial learning are offered by the majority of business and economics departments and institutions. Learning about ICT entrepreneurship is required to make this scenario better. Entrepreneurship needs to concentrate on the industries that propel change in today's digital world, especially ICT (Muhammad, 2015). The advancement of ICT has made many tasks easier and more productive to finish. For example, ICT simplifies the process of evaluating various decision-making scenarios. As a result, a lot of people believe that ICT should be used to encourage and advance entrepreneurial skills. ICT will provide managerial resources, firm preparation programs, strategic planning techniques, and training opportunities with the use of business plan simulators. Moreover, ICT will support the development of social networks and improve their connectedness (Jagodi & Dermol, 2015; Suleiman & B/Zuwo, 2020).

2.4 Concept of Globalization

Globalization is a multifaceted phenomenon that has transformed the economic, social, cultural, and political landscape of the world in the 21st century. Defined as the increasing interconnectedness and interdependence of countries through the exchange of goods, services, capital, technology, and ideas, globalization has reshaped the way nations conduct business, interact with one another, and address global challenges (Rodrik, 2018). In recent years, globalization has been characterized by several key trends and dynamics that underscore its evolving nature and far-reaching implications. One prominent trend is the rise of digital globalization, driven by advancements in information and communication technologies (ICTs) that have facilitated seamless cross-border transactions, communication, and collaboration (McKinsey Global Institute, 2021).

Another notable trend is the growing integration of emerging markets into the global economy, as countries such as China, India, and Brazil emerge as major players in trade, investment, and innovation (World Economic Forum, 2022). This trend has led to shifts in global economic power dynamics and sparked debates about the implications of a multipolar world order. Furthermore, globalization has spurred increased mobility of labor, capital, and knowledge, leading to the rise of global supply chains, transnational corporations, and multicultural societies (UNCTAD, 2020). While this has brought about economic growth and development opportunities, it has also raised concerns about income inequality, social polarization, and cultural homogenization.

$H0_1$: There is no significant relationship between ICT and globalization.

$H0_2$: There is no significant effect of ICT on entrepreneurial business performance.

3. Methodology

The study developed the following econometric model.

3.1 Model Specification

$GDP_i = \beta_0 + \beta_1 ICTGE_i + \beta_2 ICTGI_i + \beta_3 ICTSE_i + \beta_4 ICTSEBOP_i + \epsilon_i$

$ICTGE_i$ = Information communication technology goods export by entrepreneur

$ICTGI_i$ = Information communication technology goods import by entrepreneur

ICTSE $_i$ = Information communication technology service export by entrepreneur
GDP $_i$ = Gross domestic Product proxy globalization

3.2 Sources of data and Variables

The Word Development Indicators (WDI) database provides the information for the variables. The research also made use of time series data covering the 22-year span from 2001 to 2022. This matches Gujarati & Porter's (2009) explanation of the required minimum number of observations for a time series analysis. Thus, given the data at hand, the study time is sufficient to give the government, stakeholders, and other relevant authorities a foundation for policy recommendations.

4. Results and Discussion

4.1 Unit Root Tests

A unit root test is used to verify that each and every variable is stationary. The findings of the Augmented Dicky – Fuller (ADF) unit root test are shown in Tables 1, 2, 3, and 4, in that order. The majority of the variables are stationary, according to the unit root test findings shown in tables 1, 2, 3, and 4. It does this by comparing the data's observed trend to what would be predicted by a unit root as the null hypothesis. Because of this, the Dickey-Fuller test's null hypothesis indicates that the time series is non-stationary because it has a unit root. The time series may be stationary, which is the alternate theory. Nonetheless, at varying levels of significance (1%, 5%, and 10%), the test statistics of -3.419, -2.507, -2.069, and -3.936, in Tables 1, 2, 3, and 4 are below the critical values. At the significance threshold of 0.05, the p-values of 0.0014, 0.0105, 0.0259, and 0.0008 are less than the findings of the Dickey-Fuller test provide evidence against the null hypothesis that a unit root exists. The time series "gdp," "ictge," "ictgi," and "ictse" are all stationary.

Table 1: Dickey-fuller test for unit root (ictge)

Dickey-Fuller test for unit root				**Number of obs = 22**		
Test Statistics	1% Critical Value	Z(t) has t-distribution 5% Critical Value	10% Critical Value			P-Value for Z(t)
Z(t)	-3.419	-2.528	-1.725	-1.325		0.0014
D.ictge	Coef.	Std. Err.	T	P > t	[95% Conf. Interval]	
L1	-.7395126	.2163121	-3.42	0.003	-1.190732	-.2882936
_cons	.0020402	.0011319	1.80	0.087	-.0003209	.0044014

Source: Authors Computation, 2024 using STATA 11

Table 2: Dickey-fuller test for unit root (ictgi)

Dickey-Fuller test for unit root				**Number of obs = 22**		
		Z(t) has t-distribution				

Test Statistics	1% Critical Value	5% Critical Value	10% Critical Value			P-Value for Z(t)
Z(t)	-2.507	-2.528	-1.725	-1.325		0.0105
D.ictgi	Coef.	Std. Err.	T	P > t	[95% Conf. Interval]	
L1	-.5244466	.209233	-2.51	0.021	-.960899	-.0879941
_cons	1.868508	.929298	2.01	0.058	-.0699736	3.80699

Source: Authors Computation, 2024 using STATA 11

Table 3: Dickey-fuller test for unit root (ictse)

Dickey-Fuller test for unit root				**Number of obs = 22**		
Test Statistics	1% Critical Value	Z(t) has t-distribution 5% Critical Value	10% Critical Value			P-Value for Z(t)
Z(t)	-2.069	-2.528	-1.725	-1.325		0.0259
D.ictse	Coef.	Std. Err.	T	P > t	[95% Conf. Interval]	
L1	-.4070879	.19675	-2.07	0.052	-.8175014	.0033255
_cons	1.012984	.4930588	2.05	0.053	-.0155182	2.041487

Source: Authors Computation, 2024 using STATA 11

Table 4: Dickey-fuller test for unit root (gdp)

Dickey-Fuller test for unit root				**Number of obs = 22**		
Test Statistics	1% Critical Value	Z(t) has t-distribution 5% Critical Value	10% Critical Value			P-Value for Z(t)
Z(t)	-3.936	-2.528	-1.725	-1.325		0.0008
D.gdp	Coef.	Std. Err.	T	P > t	[95% Conf. Interval]	
L1	-.7397126	.2163121	-3.42	0.001	-1.190732	-.2882936
_cons	.0020302	.0011319	1.80	0.089	-.0003209	.0044014

Source: Authors Computation, 2024 using STATA 11

Regression Analysis

Table 5: Regression Analysis showing the relationship between ICT entrepreneurial competencies and globalization

Gdp	Coef.	Std. Err.	T	P > /t/	[95% Conf. Interval]	
Ictge	26.96593	88.2845	0.31	0.764	-158.5129	212.4448
Ictgi	.1960734	.2172278	0.90	0.379	-.2603053	.6524521
Ictse	-.648775	.6457927	-1.00	0.328	-2.005535	.707985
_cons	6.843011	1.500749	4.56	0.000	3.690055	9.995968

Source: Authors Computation, 2024 using STATA 11

Using the independent variables ictge, ictgi, and ictse, the regression model seeks to explain variation in the dependent variable gdp. The joint significance of each and every coefficient in the model is tested using the F-statistic. The total model has a probability (Prob > /t/) of 0.000, indicating statistical significance. This suggests that entrepreneurial ICT competencies and globalization have a favorable and significant link.

Co-integration Result

Table 6: Johansen tests for Co-integration Result

Trend: constant					**Number of obs = 22**
Sample: 2001 – 2022					Lags = 1
5% maximum rank	**Parms**	**LL**	**Eigenvalue**	**Trace statistics**	**Critical value**
0	4	-66.840508		50.8555	47.21
1	11	-55.424877	0.64576	28.0242*	29.68
2	16	-45.603752	0.59050	8.3820	15.41
3	19	-42.697632	0.23217	2.5697	3.76
4	20	-41.412763	0.11024		

Note: The asterisk (*) next to the trace statistic indicates that the statistic is greater than the critical value at the 5% significance level, suggesting rejection of the null hypothesis
Source: Authors Computation, 2024 using STATA 11

The next step after finishing the unit root test is to perform a cointegration test to see if the variables—globalization (GDP), export and import of ICT commodities, and ICT services—have a log run relationship.

After the cointegration test is performed, Table 6 displays the outcome. In the case of a single cointegrating vector (Rank 1), the outcome indicates that cointegration between the variables is supported at the 5% significant level.

Table 7: mvtest normality ictge ictgi ictse gdp

Test for multivariate normality	Df	Chi2	p-value
Doornik-Hansen	10	80.764	0.0000

Source: Authors Computation, 2024 using STATA 11

A chi-square distribution with ten degrees of freedom characterizes the test statistic. For the test statistic, the probability (p-value) is 0.0000. The results showed that the data has a multivariate normal distribution, which is the null hypothesis for the Doornik-Hansen test. With a low p-value of 0.0000, the null hypothesis is strongly supported by the evidence. Put differently, the Doornik-Hansen test indicates that the set of variables (ictge, ictgi, ictse, and gdp) does not follow a multivariate normal distribution.

5. Conclusion and Recommendations

Therefore, the findings from various econometric techniques used for this study indicate that there is a long run relationship between ICT competencies of entrepreneurship and gross domestic product (GDP). A favorable atmosphere for exchanging information, expertise, and experience has been created by globalization. The age of information technology and globalization is the twenty-first century. These have improved and given entrepreneurs additional opportunities to compete globally in difficult environments. International competition and connectivity have benefited from globalization despite the security challenges. ICT has aided in the presentation of content and facilitated education for business owners. This study examines how information and communication technology is used in Nigeria to teach entrepreneurial skills. Government should put systems in place to create an environment that encourages entrepreneurial education to flourish in all educational institutions, particularly in business education programs. Teaching about entrepreneurship in schools needs to go beyond the norm. This suggests that ICT is used as a tool to teach entrepreneurship skills.

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