

ASSESSMENT OF KNOWLEDGE ECONOMY ON ENTREPRENEURSHIP
DEVELOPMENT IN NIGERIA: THE MODERATING ROLE OF
INSTITUTIONAL MARKETING.

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ABSTRACT

This study examined the roll of institutional marketing (IQT) in the nexus between knowledge economy (KE) and entrepreneurial development. KE is proxied by human capital development (HCD) and entrepreneurial development by numbers of new business registered (NBR) in Nigeria, obtained from the World Bank data base. The study adopted eclectic research techniques comprising Generalized least square (GLS), Fully modified ordinary least square (FMOLS), Robust least square (RLS), and Autoregressive distributive lag (ARDL) from 1970 to 2021. The outcomes reveal that IQT drives HCD towards increased entrepreneurship, which implies that innovations and discoveries may be transformed into entrepreneurial products by employing institutional mechanics that could connect the real sector end-user to research institutions. Cost-of-starting business (CSB) adversely linked numbers of new business registered (NBR), that is, high cost of transaction frustrates entrepreneurship. Energy consumption per capita (ENC) produced missed result, while Research and development (R&D) expenditure does not drive entrepreneurship development. The energy factor testifies that energy insecurity mitigates entrepreneurial growth. The finding supports the underlying endogenous and institution theories. The study suggests policies that could fast-track research outputs to industry engagement, among others.

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1.0 Introduction

In the global context, wisdom has increasingly justified the adoption of knowledge economy (KE) for overriding growth and development paths. Serious economies are adopting the KE for poverty reduction and growth, rather than reliance on natural resources economics (Tchamyou, 2015), as it has become the major platform of national transformation and competitiveness. Paul Romer earlier theorized that ideas are more important for national greatness than natural resources, citing evidence from great strides of Japan and the Asian tigers. In contemporary times, given increasing socio-economic crises in many developing economies and the United Nation's sustainable development goal (SDGs) agenda, the role of entrepreneurship to employment generation, may have become remarkable. To further optimize entrepreneurial potentials, African economies may require deepening creativity and innovations in the entrepreneurship ecosystem, and ensure that outputs of research, creativity, and innovations are effectively marketed to entrepreneurs, of which specialised development institutions need to be saddled. Oni (2025) opined that in Nigeria, knowledge, as a solution for the country's diverse challenges exists but hardly traversed beyond the university gates, as increasing rate of disconnect between academic's intellectual findings, the industry, and government is increasingly puzzling and expensive. Knowledge, being an instrument of national competitiveness, would be better actualized by institutionalizing its usage.

Given the rise of the fourth industrial revolution, the neo-classist school of thought believe that whatever human problem is intractable, has solution in technological knowhow, hence the required need to study the nexus between the state of knowledge economy and entrepreneurial development. Any economy that hopes to be transformed, may need being serious with knowledge and innovation. Such economy must therefore invest in knowledge capital, particularly in the disciplines of the sciences, technology, engineering and mathematics (STEM).

For instance, though currently relatively technologically uncompetitive against her peers, Nigeria's recent recognition of entrepreneurship, as the fourth pillar of tertiary institution researchers' engagements, namely teaching, research, entrepreneurship and, community (TREC) development, may have raised the role of innovation in human capital development and hence solutions to entrepreneurship and society's multi-dimension dilemma. The recent policy review may be in recognition that the increasing dimensions of unemployment and its social consequences required deploring more knowledge and innovative skills.

Nigeria's economy relies substantially on the existence and growth of micro, small, and medium enterprises (MSMEs) as source of and engine of growth and employment. Evidence as at 2025 say the MSMEs employment force is over 84%, and accounts for over 96% of all businesses (Akanji, 2025). However, little or no efforts exist to addressing its uncompetitive high transaction costs and weak state of entrepreneurship at the era of African continental free trade area (AfCFTA). The high operating cost has caused the sector's highest mortality rate globally. It may however, be transformed by KE, assisted by the TREC agenda. The sector may require deepening entrepreneurial prowess through innovation, which itself, is built on the strength of possessed

knowledge. It may imply that the experience of teaching and knowledge for research activities becomes the basis for innovation into entrepreneurship towards job creation and thereon proving solutions to communities' problems.

At the global stage, it has become a common knowledge that the marginal global growth rate being experienced in contemporary time, is too low to meeting respective economies development needs, as the marginal growth rates have been associated with very high level of debt, weak foreign investments, volatile currency markets, limited access to financial capital, geopolitical tensions, and fragmented trade, currency value erosion, among others across developing countries (Grynspar, 2024). Being a structural issue, that has limited the capacity of developing economies in the provisions of productive infrastructure and critical social services, the capability to manage and overcome underdevelopment may lie in pushing harder the TREC agenda. That is, the developing world must see knowledge and innovation to discovery and sustainable growth, rather than rely on foreign aids, grants, and debts (Alhassan, Ansah, Niyazbekova, Blokhina, 2024; United Nation, 2019).

Conceptual framework: The intercessory role of institutional marketing towards entrepreneurship development is presented in conceptual form in Figure 1. The linear linkage from knowledge economy (KE) to innovations, discovery, and entrepreneurship development has been discussed in extant literature by Schumpeter, Arrow, Lucas, Sargent, and others. The facilitation marketing institution lies between innovation cum discovery and putting entrepreneurship into action for production and output. Information happens to be the key component of successful marketing ideas, innovation, and strategies critical to any development. Its range of activities involve general data required, assess to research and innovation output opportunities, specific market information for decisions about product, promotion, distribution, and the price (Cateora, Graham, & Salwan, 2008).

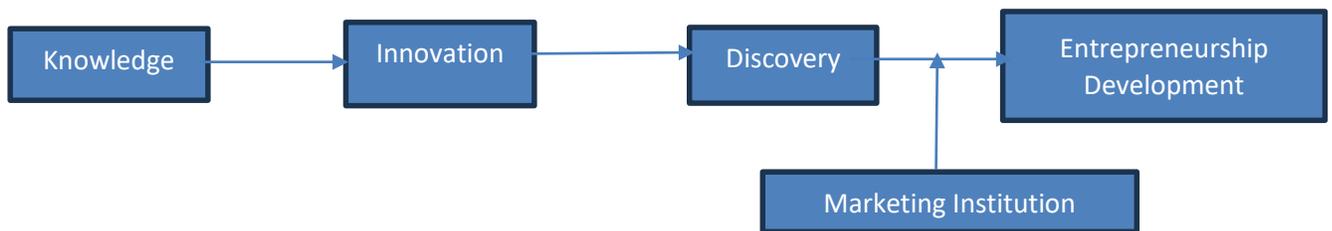


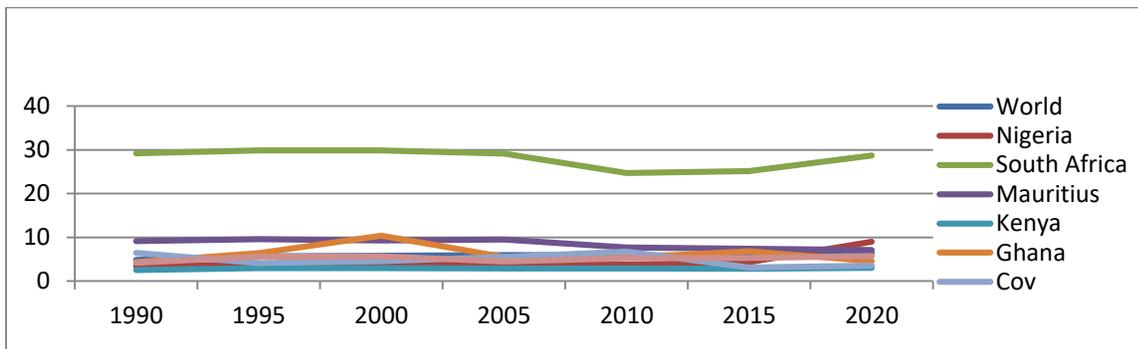
Figure 1: Conceptual framework: KE is aided for entrepreneurship development via institutional marketing

The weak capacity for entrepreneurship development and job creation, perhaps attributed to lack of tertiary institutions' marketing research outputs, innovations, and discoveries for agro-allied and industrial development, may have been responsible for increasing unemployment risks in Nigeria. Oni (2025) posited that universities are memories and compass that preserves what has

been learnt and illuminating next directions and development, lamenting that in Nigeria, however, the intellectual store and powerhouse have been largely unvisited archive.

With a population of over 200 million people, the economy has been, perhaps, weakly structured towards manufacturing, mechanized agriculture, and reliance on importation of finished goods (Eke, Soyebo, and Anifowose, 2022). Nigerian’s economy is structurally faulty, as its employment base is largely dominated by services and distributive sectors (IMF, 2025). The trend of unemployment rate in Nigeria relative to Africa and global peers is highlighted in Figure 1. Compared to South Africa, the Nigeria’s official unemployment rates may have been below 10%. However, perhaps due to very weak aptitude and capacity for innovation, the quality of employments and job engagements have much to be desired, as many millions of Nigerians are informally and menial engaged, earning far below living wage; a paradox of citizens trapped in poverty, with jobs that offer just little income, no benefits, no social security, and no part to advancement (Nwanma, 2025).

Figure 1: Unemployment in top African economies



Source: By the authors, with data obtained from world development indicator (WDI) data base

This paper explores the role of marketing institutional research, innovation, and discovery of the knowledge economy for entrepreneurship development. The objective examined the effect of marketing institutions on the nexus between KE and entrepreneurship development. The tested hypothesis was that there is no significant relationship between KE and entrepreneurship development proxied by the numbers of registered business (NBR) in Nigeria. For robust test, it used four regression techniques to produce an outcome which suggests that institutionalizing research outcome could foster entrepreneurship, proxied by numbers of new-business set-up.

2.0 Literature review

2.1 Theoretical review: Joseph Schumpeter pioneered economic development theory by means of creative disruption and innovation. His theory connects innovations in technique of production, to new product, and its continued improvement brought about by quality knowledge. For an economy to break from its channel of circular flow (stationary equilibrium), it requires development, which results from spontaneous discontinuity of the equilibrium state. Endogenous theorists’ emphases

that the long-run sustainable growth of developing economies must be by endogenous factors-human capital development, capital accumulation, etc. Romer (1990) theorizes that technological change could be endogenized as firms create research sector which should specialize in the production of ideas.

Toward the development of a knowledge-based economy, the World Bank potential's KE initiative could be accomplished via its four-part, namely right education, innovation, institution regime, and ICT, of which desirable KE is theoretically achievable by the quality of governance. Furthermore, given the pioneered works of Douglas North; Acemoglu, Johnson, & Robinson (2005), and other institutional economists, the role of quality governance has become critical for global competitiveness, economic transformation, and development. Quality institutions have been effectively and diversely practiced, and hence globally acclaimed, partly as the strength of countries greatness and sources of growth-differences between nations. Institution theory maintains that potential development requires that governments institutionalize discipline in the following endeavors: regulatory quality, rule of law, control of corruption, political stability, government effectiveness, and voice and accountability. It suggests that quality institutions may have the mediation influence on KE for entrepreneurship development.

In a study that inter-linked institutions, entrepreneurship, and economic growth across-different disciplines Bjørnskov & Foss (2018) established the existence of conceptual, theoretical and empirical gaps, which should be explored toward a knowledge-based economy. Many studies in the literature identified entrepreneurship with start-ups and self-employment, but often narrowly avoid its potential multi-level linkages and mechanics towards increased and diversifiable productivity. In the Rostow's five (5) stages of economic development, each stage requires KE and innovation in the areas of cost of labour, the technical capability, scale of operations, interest rate, and level of product sophistication towards transiting to the next growth state (Cateora et al., 2008).

This obvious gap calls for additional research for policy intervention towards functional knowledge-entrepreneurship partnership in developing economies. The study explored the catalytic role of marketing the outcomes of higher educations' institutional research in the nexus between KE and the economy's entrepreneurship.

2.2 Empirical review: In furtherance to the advancement of sustainable development goals (SDGs) via human capital development, Nor, Mohamed, Barre, & Hussein (2025) examined the role of higher educational institutions in driving entrepreneurship development. With the assistance of respondents obtained from questionnaire circularized in three Somalia universities, and the application of structural equation modelling, the outcome reveals positive influence from higher education institutions to entrepreneurship development. Towards effective outcome, the study classified the economy's entrepreneurship engagements as entrepreneurial education and training, entrepreneurial community engagement, and entrepreneurial network and partnership.

In a 2024 study on the nexus between institutional quality and capital market development on unemployment in seven selected sub-Saharan African (SSA) economies, Eke and Busari (2024) applied the ARDL pooled mean group to conclude that though the capital market induces employment generation, however, institutional quality exacerbates unemployment in Africa's capital market economies. It implies that quality institutions are required to drive meaningful employment related development such as the linkage of innovative findings to required industrial-base for usage in Africa.

Amavilah & Andrés (2024) examined the nexus between KE and economic performance in forty-six (46) African economies using the seemingly unrelated regression (SURE) and recursive simultaneous equation approaches. The study implicitly assumed the role of modern information communication and technology. It revealed that there is a dynamic relationship between KE and economic performance in the respective African economies.

Alaeddine (2022) examined the role of KE in the diversification and growth of the eleven Arab regional economies namely Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Morocco, Oman, Qatar, Saudi Arabia, and Tunisia from 2000 to 2020. The study adopted panel -generalized least square, of the fixed and random effects models. The result of the fixed effect reveals that KE stimulates economic growth in the region. The random effect model revealed that knowledge pillars such as innovations, ICT, economic institutions and social economic stability index assert positive and significant impact on Arab world economic growth, while, education pillar has negative and significant impact on growth.

Adeyemi (2021) examined the role of entrepreneurial development initiatives (EDI) as determinants of entrepreneurship in Nigeria. It specifically examined the role of these initiatives in the sustenance of the micro, small, and medium enterprises (MSME) in the enterprises' life cycle (ELC) and thereon address its challenges. It conceptualises the EDI as an institutional intermediation mechanism by which entrepreneurship could evolve, increase capacity, and survive in the ecosystem. The study applied qualitative method consisting of interviews, participating observations, and write-ups from executors of EDIs, which then focused on the role of EDI in the determinants of entrepreneurship. The findings revealed that early business enterprise mortality results from contextual, intermediation, and individual inhibiting factors.

Eke, Okoye, Evbuomwan (2018) applied Toda-Yamamoto (TY) technique to examine the nexus between human capital development, entrepreneurship, and financial deepening in thirteen African economies from 1995 to 2014. The study revealed that human capital development has no causal effects on entrepreneurship development and financial deepening. It suggested low quality human capital towards entrepreneurship development in the thirteen economies.

Asongu and Tchamyou (2016) examined the effect of entrepreneurship on KE in fifty-three (53) African economies, using the four indicators of KE by the World Bank from 1996 to 2010. The study applied a panel fixed effect methodology to discover that a well orchestrated doing business

environment can boost development of KE; that doing business through trade globalization can effectively develop KE through sectors not directly linked to ICT or high-tech oriented. Thirdly, the time required to end business is negatively related to KE.

Amavilah, Asongu, & Andrés (2017) studied how globalization indirectly affects the KE in African economies. The study argued that as globalization affects governance, then, through its peace and stability impact it definitely will impact the KE. The study adopted a three-stage regression on four tested hypotheses to conclude that the impact on African KE through trade (globalization) is stronger than through foreign direct investments.

3.0 Theoretical framework & Methodology

3.1 Theoretical framework: This study adopts eclectic approach. It combines Schumpeter creative disruption and endogenous growth models. Schumpeter's framework adduces the act of creative disruption (innovation) for discontinuity in an economy's circular flow (stationary state) to the ingenuity of the entrepreneur. Furthermore, endogenous growth theory extends the neoclassical growth models. It incorporates endogenous technical progress, developed by Arrow (1962), Romer (1986, 1990), and Lucas (1988). The summary of the growth framework is that technical knowhow results from rate of growth of investments in capital stock and human capital (Jhingan, 2016). Arrow attributed endogenous knowledge towards advanced productivity by 'learning by doing'. The simplified model is stated in equation 1:

$$Y_i = A(K)F(K_i, L_i) \quad (1)$$

Y_i represents firm's output, K_i denotes capital stock, L_i is the stock of labour, while K is the aggregate stock of capital and A stands for overall technology factor. The model assumes constant investment in L , such that if held constant, growth would ultimately be halted. Romer's 1986 theorized a variant of Arrow's model by introducing 'learning by investing' coefficient in the production function of equation 1. Stock of knowledge from research and development is a critical input in any production process as follows:

$$Y = A(R)F(R_i, K_i, L_i) \quad (2)$$

A denotes the stock of knowledge from research and development R , while R_i is the outcome of expenditure on research and development (R&D) deplored by firm i , but treated as a rival good. K_i and L_i denote capital and labour stocks of the firm i respectively. F is homogenous of degree one for all of firm inputs R_i, K_i, L_i . Lucas (1988) extended the investment in knowledge further based on 'investment in human capital'. Lucas opines that the productivity of human capital is a function of investment in education, a crucial determinant in the economy's growth process. The framework distinguishes internal and external sources of human capital effects, as presented:

$$Y_i = A(K_i).(H_i).H^e \quad (3)$$

H_i stands for internal source of human capital of firm i acquired through constant training, while H^e is external source, parameter e is the strength of external human capital effect, due to each firm's productivity. Furthermore, Romer (1990) theorized the endogenous technical change that identifies the creation of a research sector which should specialize in the production of ideas. Essentially, it is to ensure that new ideas or new stock of knowledge from human capital are not scarce in the firm's growth process, presented as follows:

$$\Delta A = F(K_A, H_A, A) \quad (4)$$

ΔA denotes increasing technology, K_A is the amount of capital invested in producing new technology or design, while H_A is the labour employed in R&D towards the new design. A denotes existing level of technology. F is the technology production function (TPF) which explain that the TPF is endogenous if more human capital in the economy is employed for R&D of new design, which results in greater ΔA . Romer (1990) concludes that nations' technological advancement via knowledge or idea can only be obtained through use of physical capital, human capital, and existing technology.

3.2 Data & Methodology: Information of the data used for the regression are presented in tabular form in Table 1. The variables include entrepreneurship proxied by numbers of new business registered (NBR); human capital development (HCD) is proxied by government expenditure on education; Cost of doing business (CSB) proxied by Cost of business start-up procedure; Energy (ENC) is proxied by energy consumption per capita. Institutional quality (IQT) is the proxy for institutional marketing. It is the index for government effectiveness, rule of law; regulatory quality and control of corruption. Finally, GDP is gross domestic product as at current control variable.

Table 1: Data Description and Source

Variable description	Proxy / Source	Literature justification
ENRT: Entrepreneurship Dev.	Numbers of New businesses Registered annually (Nbr)/ WDI	Bjørnskov & Foss (2018)
HCD: Human capital dev.	% of Govt. expenditure on education/ WDI	Eke, Adetiloye & Taiwo (2018) Nor <i>et al.</i> (2025)
CSB: Cost of starting business	Cost of business start-up procedure, % of GNI per capita/ WDI	Bjørnskov & Foss (2018)
ENC: Energy cons. per capita	Energy use (kg of oil equivalent per capita)/WDI	Eke, Adetiloye, & Adegbite (2020)
IQT: Institutional quality	Government effectiveness, Rule of law, Regulatory quality, & Control of corruption/ WGI	Eke and Busari (2024); Acemoglu et al. (2005)
R&D: Research & Development	R&D % of GDP/ WDI	Eke, Adetiloye & Taiwo (2018)
GDP: Goss Domestic Product	Gdp at market price	Lucas (1988)

Source: Compiled by the authors; WDI stand for World Development indicators, www.data.worldbank.org/indicator; WGI stands for World-wide governance indicators, www.govindicators.org

3.3 Model specification: The study's model specification is implicitly presented in equation (5), while the sources and description of the data are presented in Table 1.

$$\text{Entr} = f(\text{Hcd}, \text{Csb}, \text{Eng}, \text{Iqt}, \text{Rd}, \text{Gdp}) \quad (5)$$

Entrepreneurship (Entr) is proxied by numbers of new business registered (NBR) per annum. In explicit and semi-logged form, Equation 5 is represented along with the *a-priori* expectations as follows:

$$\ln br_t = \alpha + \beta_1 lHcd_t + \beta_2 lCsb_t + \beta_3 lEng_t + \beta_4 lqt_t + \beta_5 lRd_t + \beta_6 lGdp_t + \mu_t \quad (6)$$

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On the dynamic model, the equation is specified after Shin *et al.* (2011); that is the relationship between human capital development and entrepreneurship development in a time-series ARDL takes a form as:

$$\begin{aligned} \Delta \ln br_t = & \alpha_i + \beta_1 lHcd_{t-1} + \beta_2 lCsb_{t-1} + \beta_3 lEng_{t-1} + \beta_4 lqt_{t-1} + \beta_5 lRd_{t-1} + \beta_6 lGdp_{t-1} \\ & + \sum_{i=1}^{\eta} \alpha_i \Delta lHcd_{t-1} + \sum_{i=1}^{\rho} \chi_i \Delta lCsb_{t-1} + \sum_{i=1}^{\delta} \varphi_i \Delta lEng_{t-1} + \sum_{i=1}^{\sigma} \phi_i \Delta lqt_{t-1} + \sum_{i=1}^{\nu} \varpi_i \Delta lRd_{t-1} + \sum_{i=1}^{\kappa} \pi_i \Delta lGdp_{t-1} + u_t \end{aligned} \quad (7)$$

The long-run coefficients are $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \& \beta_6$, while the short-run coefficients are $\alpha_i, \chi_i, \varphi_i, \phi_i, \varpi_i$ and π_i . If cointegration is established then Eq. (7) can be written in an error correction model (PECM) form as follows:

$$\begin{aligned} \Delta \ln br_t = & \alpha_i + \sum_{i=1}^{\eta} \alpha \Delta lHcd_{t-1} + \sum_{i=1}^{\rho} \chi \Delta lCsb_{t-1} + \sum_{i=1}^{\delta} \varphi \Delta lEng_{t-1} + \sum_{i=1}^{\sigma} \phi \Delta lqt_{t-1} \\ & + \sum_{i=1}^{\nu} \varpi \Delta lRd_{t-1} + \sum_{i=1}^{\kappa} \pi \Delta lGdp_{t-1} + \theta ecm_{t-1} + \mu_t \end{aligned} \quad (8)$$

Where ecm_{it-1} the error correction is part and θ is the speed of adjustment

4.0 Results and Discussion

4.1 Descriptive statistics: The numbers of businesses registered annually (NBR), the proxy for entrepreneurship, has highest number of 136,961 in 2022, and least number of 34,521 in 2006. The highest cost of starting business (CSB) procedure (as % of gross national income (GNI)), is 90.8% occurred in 2004, and the lowest 26.1% occurred in 2019. The highest expenditure on human capital development (HCD) proxied by government expenditure on education was 9.20% in 2015, while the lowest is 5.8% in 2019. Energy consumption per capita (Energy use (kg of oil equivalent per capita)) (ENC) has value of 685.14 kg in 1983 while the least value of 260.36 kg occurred in 2009. The highest index for instructional quality (annual average of combination of indices of rule of law, regulatory quality, government effectiveness, and control of corruption) of -0.93 was achieved in 2014, while the lowest occurred in 1992 at -1.93. Gross domestic product (GDP) produced highest value of \$5.466 billion in 2014, while its lowest values of \$2.777 billion occurred in 1993.

The standard deviation (SD), which provides indication of volatility of the studied variables reveals that R&D is most volatile, next is the output growth, while the rest variables are moderately

volatile. It thus revealed weak priority for Research and development (R&D) expenditure towards national development. Correspondingly, in relation to the correlation statistics in Table 2, the high GDP's standard deviation may be related to the poor fortune of R&D in Nigeria, as they are strongly and positively correlated by 64%. With respect to the Jarque -Bera test for normality of the residuals, four (4) variables were normally distributed, that is, HCD, IQT, R&D and GDP. 5.46676E+11

Table 2: Descriptive statistics table

	Nbr	Csb	Hcd	Iqt	Rd	Enc	Gdp
Max.	136,961	90.8	9.20	-0.93	0.66	685.14	5.46676E+11
Min.	34,521	26.10	5.80	-1.38	-4.47	260.36	2.77522E+10
S.D.	0.45	0.27	0.19	0.12	1.88	0.10	1.12
J.B. Stat.	7.04	32.18	2.01	5.66	5.70	21.08	2.22
Pro. Val.	0.02	0.00	0.36	0.06	0.06	0.00	0.33
Observ.	52	52	52	52	52	52	52
Normality	No	No	Yes	Yes	Yes	No	Yes

Source: by the authors. S.D. indicates standard deviation; J.B. indicates Jarque-Bera test.

4.2 Correlation results: Presented in Table 3 is the correlation statistics. All the correlation results between the explanatory variables and the dependent variable, that is, number of business registered (NBR) comply with a-priori, except for Human capital development (HCD). The result suggests that there is strong negative correlation between numbers of new businesses registered (NBR, the proxy for entrepreneurship) and cost of business set-up (CSB) procedure at -0.75%. It may suggest that cost of doing business is strategic to the growth of entrepreneurship in Nigeria, hence conforms to the study's a-priori expectation, and Coase (1937) theorizing. Coase theorizes that the extent of an economy's efficiency is a negative function of its cost of transaction. Next, there is weak negative correlation between human capital development (HCD) and NBR, which may suggest that the quality of HCD is rather weak in promoting entrepreneurial mindset among Nigerians. Institutional quality (IQT) a proxy for institutional marketing is strongly, positively correlated with entrepreneurship (NBR) at about 58%. It suggests that in line with the objective of study, research and academic institutions have the capacity to push-through research output for entrepreneurial take-up. Research and Development (R&D) expenditure is on average positively correlated with entrepreneurship (NBR) at 51%. It suggests that entrepreneurship can be deepened in Nigeria should appropriate encouragement be provided through effective research. Energy consumption per capita (ENC) is positively associated with NBR at moderated correlation level of 33%, which may suggest, that in line with generic phenomenon in every economy, very close connection exists between business start-up, the existence, and survival and energy availability.

Finally, Gross domestic product (GDP) is positively correlated with NBR, which suggests that the performance of the economy dictates the level of success of entrepreneurship.

Table 3: Correlation matrix table

	LNbr	LCsb	LHcd	lqt	LRd	LEnc	LGdp
LNbr	1.00						
LCsb	-0.75	1.00					
LHcd	-0.07	0.26	1.00				
lqt	0.58	-0.42	-0.03	1.00			
LRd	0.51	-0.41	0.29	0.11	1.00		
LEnc	0.33	-0.18	0.17	0.07	0.49	1.00	
LGdp	0.75	-0.50	-0.14	0.31	0.64	0.48	1.00

Source: authors' computation (2025)

4.3 Pre-estimation Diagnostics

4.3.1 The serial correlation and heteroscedasticity tests results are presented in Table 4. Serial correlation tests the null hypothesis that the error terms of variable series are collinear. The Breusch-Godfrey LM test result suggests that the study fails to reject the hypothesis that serial correlation does not exist among the series. Similarly, heteroscedasticity test, using the Breusch-Godfrey LM statistics results suggests that the study failed to reject the null hypothesis that the series are homoscedastic.

Table 4: Serial correlation & Heteroscedasticity tests

Tests	F. stat.[p.v.]	Obs*R-squared[p.v.]	Scaled explained SS [p.v]	Remark
Serial Correlation Breusch-Godfrey LM:	0.64 [0.42]	0.92 [0.33]	-	Failed to reject the null
Heteroskedasticity: Breusch-Pagan-Godfrey:	0.99 [0.47]	14.22 [0.43]	23.23 [0.06]	Failed to reject the null

Source: authors' computation (2025)

4.3.2: Unit root test: The test of the variables for the level of stationarity is presented in Table 5. The test was carried out using three (3) criteria, namely the Augmented Dickey-fuller, Dickey-fuller- GLS, and Philip-Parron (PP) test. The results revealed that four (4) variables were trended variable, that became stationary at first difference. They are LNBR, LCSB, LHCD, IQT, and RD. The other two variables, LENC and LGDP were mixed stationary. The results of the test s

ultimately determined the adoption of four regression techniques for genuine regression outcome, by evidence of their robustness.

Table 5: Unit root results

Variables	ADF Test		DF-GLS Test			PP Test			Remark	
	T.Stat.	Prob.	Stat.	T.Stat.	Prob.	Stat.	T.Stat.	Prob.		Stat.
LNbr	-7.26	0.00	I(1)	-7.40	0.00	I(1)	-7.29	0.00	I(1)	Integ.
LCsb	-6.32	0.00	I(1)	-6.32	0.00	I(1)	-6.30	0.00	I(1)	Integ.
LHcd	-7.56	0.00	I(1)	-7.71	0.00	I(1)	-7.56	0.00	I(1)	Integ.
LEnc	-3.56	0.04	I(0)	-2.98	0.00	I(0)	-8.41	0.00	I(1)	Mix.Integ.
Iqt	-7.05	0.00	I(1)	-7.17	0.00	I(1)	-9.34	0.00	I(1)	Integ
LRd	-6.87	0.00	I(1)	-6.66	0.00	I(1)	-6.95	0.00	I(1)	Integ
LGdp	-5.72	0.00	I(1)	-4.99	0.00	I(0)	-5.78	0.00	I(1)	Mix.Integ.

Source: By the researchers (2025). Integ. indicates integrated variable, Mix. Intry means Mixed integrated variable.

4.3.3 Ramsey's RESET: The model general mis-specification test statistics was carried out using Regression Specification Error Test (RESET) as shown in Table 6. The outcome suggests that the study failed to reject the null hypothesis that the model is fit, that is, it is of right regressors, free of measurement errors and wrong functional form (Asteriou & Hall, 2011). The probability values of 0.73 for T. statistics, 0.73 for F. statistics, and 0.71 for likelihood ratio attests

Table 6: Diagnostics statistics: Ramsey RESET Test

Test Statistics	T. Stat.	F. Stat.	Likelihood ratio
Functional form	0.34(44); [0.73]	0.119 (1,44) [0.73]	0.141 (1) [0.71]

Source: authors' computation (2025). Items (...) are degree of freedom; [...] repr. probability values; S.R. stands for standard residuals; ** stands for J.B. Statistics.

4.4: Regression results & Discussion: Given the unit root tests' mixed stationarity outcome, four regression methods were applied, the Generalized least square (GLS), Fully modified ordinary least square (FMOLS), the Robust least squared (RLS), and Autoregressive distributive lag (ARDL) techniques of analyses presented in Table 7. In the diagnostic test results, the coefficient

of determination of the regression (R^2) suggest very fair outcomes, by 82%, 52%, and 95% from FMOLS, RLS and ARDL techniques respectively.

The regression coefficient results indicate that three estimation techniques except RLS supports the *a-priori* argument, which suggest that human capital development (HCD) substantially promotes entrepreneurship development, proxied by NBR in Nigeria. The outcome negates the result of Eke et al. (2018) on the African context. The study applied the Toda-Yamamoto technique to discover that HCD did not support entrepreneurship development among thirteen African economies from 1995 to 2014.

Conversely, the four techniques were unanimous in their suggestion that cost of business start-up (CSB) procedure is negatively related to encouraging entrepreneurship in Nigeria. This result perfectly complied with the *a-priori* expectation of negative nexus between cost of business processing and numbers of businesses set-up, i.e. entrepreneurship. It thus implies that in line with extant literature, economies are competitively defined based on volume of economic activities, productivity, and entrepreneurship (Bjørnskov & Foss, 2018). Since set-up cost is a factor of enterprise development, the Nigeria's result may provide indication why the economy is sluggish to absorb its growing army of labour (particularly youth unemployment), since it is unattractive to business start-ups. Thirdly, Energy consumption per capita (ENC) as a driver or otherwise of NBR is balanced by two techniques each (two in support and two against), which may inform the weak support that businesses and households have encountered from the Nigeria's energy system. Energy consumption defines the capacity of any enterprises; without it production would be discouraging. Over the years Nigeria's enterprises and potential business entrants have been frustrated by lack of sustainable energy supply.

The study's major gap-variable, marketing institutional quality records positive regression outcome against entrepreneurship (NBR). The result is fully supported by the four techniques as possible driver of entrepreneurship, that is, a one percent rise in IQT could proportionately generate 82%, 112%, 25%, and 27% increase in NBR produced by the GLS, FMOLS, RLS and ARDL techniques respectively. It underscores the role of institutions, and indeed that institutional marketing could play definitive role towards linking innovation discoveries of research institutions to entrepreneurship. Over the years, research institutions in Nigeria and many developing economies, produce research outcomes that could be of interest to innovators, entrepreneurs and enterprises, but are often not marketed or patronized. Consequently, the economy finds itself deep in extroversion, and continually depend on imports of same product what could have been produced locally (Eke, Soyebó, & Anifowose, 2022). Oni (2025) notes that when research outputs are shelved rather than applied, development becomes slower, more expensive, and more fragile.

The WALD tests result reveals that IQT and HCD jointly drive entrepreneurship in Nigeria, as presented in Table 9. This further attests to the critical role of quality marketing at a driver of the nexus between HCD and NBR. The quality of institution often determines the fortune of economic and non-economic activities in developing economies. It implies that Nigeria should prioritize the

marketing of her research institutions innovations and discoveries if she wants to deepening the philosophy of endogenous theorizing towards economic growth and development.

The R&D's weak impact on entrepreneurship is highlighted in the study. While three techniques record negative relationship, the RLS result suggests that a one percent rise in R&D proportionately generates 1 percent rise in numbers of new business, the proxy for entrepreneurship. It further suggests the consequence of the impact of low budgetary allocation to R&D whose maximum ratio of GDP in the 52 years period of study is 6.6%, as presented in Table 2. It may also imply that current R&Ds are not being targeted to entrepreneurial needs. Research may not be originating from the field, i.e. the real sector, such that what is being researched is not what industry requires.

Overall, been a control variable, less expectedly, GDP results show weak positive support toward entrepreneurship development. Three techniques, namely GLS, FMOLS, and ARDL produces coefficient of 21%, 19%, and 0.00% respectively to drive number of start-up business (NBR). The outcome implies that the economy may be providing limited capacity for entrepreneurial growth or risk-taking attitude for self-employment in Nigeria. The weak support may be responsible for increasing rate of unemployment, low quality jobs, and the preponderance of informer employment opportunities, such the high percentage engagement in the distributive sector of the economy, rather than credible small and medium scale enterprises (SMEs), manufacturing, craftsmanship, and mechanized agriculture. Nwanma (2025) opine that Nigeria's unemployment crisis is systemic; that perhaps due to lack of governance supports, the nation itself seemed to naturally wired the citizens to be perpetually impoverished.

Table 7: Regression Result: Dep. Variable-Nbr

	Gen. Least Squared			FMOLS			Robust Least Squared			ARDL		
Variables	Coef.	S.E.	Prob.	Coef.	S.E.	Prob.	Coef.	S.E.	Prob.	Coef.	S.E.	Prob.
LHcd	0.38	0.18	0.04	0.52	0.24	0.03	-0.02	0.07	0.75	0.04	0.12	0.75
LCsb	-0.81	0.14	0.00	-0.82	0.20	0.00	-1.39	0.06	0.00	-0.03	0.10	0.74
LEnc.	0.03	0.33	0.93	0.19	0.68	0.77	-0.13	0.13	0.33	-0.00	0.10	0.99
Iqt	0.82	0.25	0.00	1.12	0.36	0.00	0.25	0.99	0.01	0.27	0.14	0.05
LRd	-0.02	0.03	0.32	-0.07	0.05	0.16	0.01	0.01	0.20	-0.02	0.02	0.37
LGdp	0.21	0.04	0.00	0.19	0.09	0.06	-0.00	0.02	0.75	0.00	0.03	0.96
Diagnostics:												
R ²				0.82			0.58			0.95		
Adj. R ²				0.78			0.53			0.95		
S.E.R				0.21			0.33			0.10		
S.D.D.V				0.46			0.45			0.46		
F. Stat.				-			-			124.70		
Prob.(F.stat)				-			-			0.00		

Source: authors' computation (2025)

4.5: Error correction results: The short-run adjustment towards long-run equilibrium regression is presented in Table 8. The standard negative outcome suggests that 14% of the disequilibrium in the short-run is adjustable towards long-run equilibrium annually, and significant at 2 percent. Its diagnostics results of the R² reveal somewhat good determination of the regression outcome. However, the study could not establish cointegration among the variables studied as the hypothesis of no-level relationship (cointegration) conducted using the ARDL bound test could not be rejected. Hence, the study is limited to the short-run outcomes.

Table 8: ECM Regression

Variables	Coeff.	Std. Error	Prob.
Coint. Eq(-1)	-0.14	0.05	0.02
R ²	0.20	SDDV	0.10
Adj. R ²	0.17	F. Stat.	6.12
S.E. of Reg.	0.09	Prob.	0.00

Source: authors' computation (2025)

4.6: WALD test result: The Wald test statistics was carried out to determine if institutional marketing (IQT) could significantly combine with human capital development (HCD) as joint influencer of entrepreneurship (NBR) in Nigeria. The results presented in Table 9, suggest that the joint coefficients are not equal to zero. The study rejects the null hypothesis that the coefficients of HCD= IQT = 0, as proved by three of the regression techniques- GLS, FMOLS, and RLS, other than the ARDL. Thus, the study's gap hypothesis is here affirmed that institutional marketing could combine with human capital development to deepening the cause of entrepreneurship in Nigeria.

Table 9: WALD test result: Dept. Variable: Nbr

Null hypothesis	Value	Df.	Prob.	Implication & Decision
(i)GLS: LHCD=IQT=0				
F- statistics	9.53	(2,45)	0.00	Reject the Null
Chi-Squared Stat.	19.07	2	0.00	Reject the Null
(ii) FMOLS: LHCD=IQT=0				
F- statistics	9.92	(2,43)	0.00	Reject the Null
Chi-squared Stat.	19.84	2	0.00	Reject the Null
(iii) Robust Least Square: LHCD=IQT=0				
F- statistics	3.32	(2,45)	0.05	Reject the Null
Chi-squared Stat.	6.44	2	0.04	Reject the Null
iv. ARDL: LHCD=IQT=0				
F- statistics	2.07	(2,45)	0.13	Failed to reject the Null
Chi-squared Stat.	4.14	2	0.12	Failed to reject the Null

Source: authors' computation (2025)

5. Summary, Conclusion and Recommendations

The study examined the role of institutional marketing in the linkage between human capital development (HCD) and entrepreneurship. Entrepreneurship is proxied by numbers of registered businesses annually in Nigeria. The study is supported by the endogenous theory and an eclectic theoretical framework. The outcome of the regression results, using four techniques of estimations, suggests that institutional marketing could drive HCD towards optimizing the outputs of entrepreneurship. It implies that innovations and discoveries from research institutions may be transformed into entrepreneurial products by employing right information reportage that could connect the real sector end-user to research institutions. Other subsidiary results suggest that cost-of-starting business (CSB) was adversely related to the numbers-of-new business registered (NBR). Secondly energy consumption per capita (ENC) produced missed result, via the four regression techniques; while Research and development (R&D) expenditure does not drive entrepreneurship development. The CSB's outcome underscores the findings of Coase (1937) on transaction cost theory, which claim that, transaction cost defines competitiveness of comparative economies globally, and hence defines the extent of their economic efficiency. The energy factor testifies that Nigeria's entrepreneurial growth is being hindered by weak energy infrastructure.

Following the empirical results that allies with the a-priori, the study concludes that the findings are in line with the propositions of the underlying endogenous and institutions theories. Based on the finding, the study therefore recommends as follows. First, human capital development should be urgently prioritized by governments, by benchmarking global standards to develop relevant curricula towards innovative ideas and skill production. Educators should be equipped with right practical tools to combine entrepreneurship with theoretical learning.

Secondly, cost-of-starting business is negatively related to entrepreneurship. The government policy choice should refocus on the review of doing business initiatives which was launched in 2015. Factors such as multiple business registration charges, the bureaucracy from complimentary layer of official protocols, the numbers of days of registration, etc. should end forthwith.

Thirdly, institutional marketing quality drives the nexus between HCD and entrepreneurship. Institutional marketing would link inventions and discoveries to needed organizational usage. Government is advised to create dedicated agency center on academic's research & innovations – industry- government linkages. Research institutions should establish research & innovation output marketing units that would also link their discoveries to industrial outlets. Moreover, research institutions' leadership should be given targets to drive research and discoveries and see the outputs marketed to industries to improve community outlooks, and solve problems. Appointments of leadership of academic and research institutions should be on merit; track record of quality research that have solved the society and community's problems should be the bases of leadership engagement. Furthermore, regulators should ensure periodic audit of institutional leadership to meeting organizational objectives and targets.

Fourthly, R&D expenditure does not promote entrepreneurship, such that policy choice that increased budgetary allocation be spared for R&D at all levels of government and corporate institutions.

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