

REVISITING ENTREPRENEURSHIP AND ECONOMIC GROWTH IN NIGERIA: THE INTERPLAY OF INSTITUTIONS, EDUCATION AND POLICY STABILITY

Yusuf Bala Zaria

Department of Economics, Ibrahim Badamasi Babangida University, Lapai Niger State

Corresponding Author's email: yusufbalazaria@ibbu.edu.ng



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Abstract

This study investigates the relationship between entrepreneurship and economic growth in Nigeria by examining the roles of institutional quality, educational attainment, state policy uncertainty, and access to finance within an Autoregressive Distributed Lag (ARDL) framework over the period 2002–2024. The study is anchored on the Constant Returns to Scale (CRS) framework derived from the augmented Cobb–Douglas Production Function and the Robert Solow growth model, which conceptualise entrepreneurship as a productive input influenced by institutional and human capital conditions. Preliminary correlation results reveal statistically significant positive relationships among entrepreneurship (SMEs), educational attainment, unstable policies, and access to finance at the 1% significance level, while regulatory quality exhibits a significant negative correlation. The ARDL bounds cointegration results further confirm the existence of a statistically significant and stable long-run equilibrium relationship between GDP and the explanatory variables. Long-run estimates indicate that SMEs exert a positive and significant effect on GDP, underscoring the importance of entrepreneurship in promoting innovation, productivity, employment generation, and structural transformation. In contrast, educational attainment and state policy uncertainty demonstrate significant negative effects on economic growth, while institutional quality exerts a negative but statistically insignificant influence. Access to finance also reveals a marginally significant negative effect, reflecting persistent structural, governance, and financial inefficiencies within the Nigerian economy. Furthermore, the negative and highly significant error correction term confirms strong adjustment toward long-run equilibrium following short-run disequilibria. The study concludes that entrepreneurship-driven growth in Nigeria depends substantially on effective institutions, quality education, stable policies, and inclusive financial systems, and therefore recommends institutional reforms, educational restructuring, policy consistency, and improved financial accessibility to enhance sustainable economic growth.

Keywords: Entrepreneurship, Education, Institutional quality, Policy uncertainty

Introduction

Particularly in developing nations like Nigeria, entrepreneurship is widely acknowledged as a major force behind economic growth and development (Acs & Szerb, 2007; Audretsch & Keilbach, 2004). The entrepreneurial environment and economic consequences are significantly shaped by the historical factors of entrepreneurship, such as educational availability and institutional quality (Acemogul et al., 2001; North, 1990). The entrepreneurial environment is shaped by the historical factors of entrepreneurship, especially educational availability and institutional quality, which in turn affects wider economic consequences. By lowering uncertainty and transaction costs, strong institutions—which are defined by efficient legal frameworks, property rights protection, and

high-quality regulations—create an atmosphere that encourages entrepreneurial activity (North, 1990; Acemoglu, Johnson, & Robinson, 2001).

Figure 1 illustrates how access to education simultaneously increases entrepreneurial capacity and economic productivity by providing people with the necessary human capital, skills, and knowledge for innovation, opportunity recognition, and business management (Becker, 1993; Minniti & Bygrave, 2001). Numerous empirical analyses offer indicative estimates of the impact of institutional quality and educational access on entrepreneurial outcomes and economic growth, even though exact percentage figures specifically quantifying their impact on entrepreneurship in Nigeria are scarce and differ across studies. For example, research indicates that by reducing entry barriers and transaction costs, improvements in institutional quality—which includes property rights, legal frameworks, and regulatory efficiency—can boost formal entrepreneurial activity by roughly 15% to 25% in developing economies, including Nigeria (World Bank, 2020; Aremu & Adeyemi, 2021). In a similar vein, having access to education—especially secondary and tertiary education—has been linked to a 20% to 30% increased chance of people engaging in successful entrepreneurship. This is because education improves the human capital, capacity for innovation, and managerial skills necessary for business success (National Bureau of Statistics Nigeria, 2019; Okonkwo & Chukwuemeka, 2022).

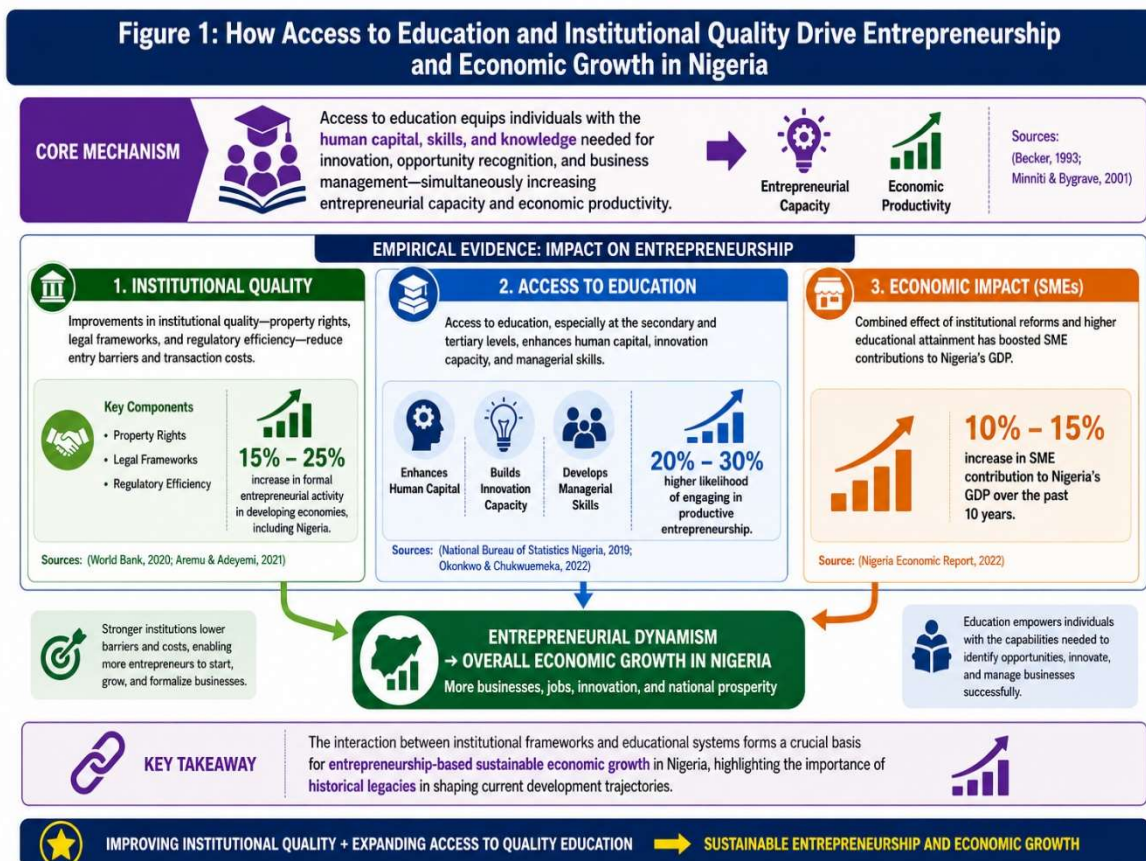


Figure 1 shows how increased access to education and better institutional quality work together to boost entrepreneurship in Nigeria by enhancing human capital, lowering obstacles to enterprise, and raising economic production.

Additionally, during the previous ten years, small and medium enterprises (SMEs) contributions to Nigeria's GDP have grown by an estimated 10% to 15% due to a combination of institutional

changes and higher educational attainment (Nigeria Economic Report, 2022). These results highlight the importance of improving educational access and institutional quality in fostering entrepreneurial dynamism, which in turn spurs Nigeria's overall economic growth. As a result, the interaction between institutional frameworks and educational systems forms a crucial basis for entrepreneurship-based sustainable economic growth, highlighting the significance of historical legacies in current economic development trajectories.

Although entrepreneurship is still a vital tool for promoting economic growth, job creation, and innovation in developing nations like Nigeria, its efficacy is heavily impacted by historical variables, especially the accessibility and calibre of educational institutions. Strong institutions lower uncertainty, safeguard property rights, and foster an atmosphere that is conducive to the establishment and viability of businesses, while education increases entrepreneurial capability through the development of human capital. Even while small and medium-sized businesses (SMEs) are increasingly contributing to Nigeria's economy, poor institutional frameworks, a lack of access to high-quality education, inconsistent policies, and a high incidence of company failure continue to limit entrepreneurial output. Because it fills in the knowledge vacuum on how these historical factors interact to influence entrepreneurial results and overall economic performance, this study is significant. However, the analysis may be impacted by restrictions including data limits, measurement difficulties, and causality issues. Thus, the study intends to investigate the degree to which institutional quality and educational availability impact entrepreneurship and how their combination promotes sustainable economic growth in Nigeria.

Critical review between historical determinants of entrepreneurship and economic growth

Particularly in developing nations like Nigeria, entrepreneurship is widely recognised as a crucial accelerator for economic growth, innovation, and job creation (Acs et al., 2013; Audretsch & Belitski, 2017). In these situations, entrepreneurship's capacity to create new markets, diversify economic activity, and enhance societal welfare highlights its revolutionary potential (Naudé, 2010). However, a complex interplay of historical, structural, and institutional factors, with a focus on the quality and accessibility of educational systems and the dominant institutional environment, is closely linked to the sustainability and efficacy of entrepreneurial activities (Welter, 2011; Aidis, Oestrin, & Mickiewicz, 2008). According to North (1990), institutional quality includes both formal and informal standards that govern economic transactions, such as property rights, legal frameworks, and systems that guarantee contract enforcement. Strong institutions minimise transaction costs and entrepreneurial risks by fostering a climate of regulatory stability, transparency, and decreased uncertainty (North, 1990; Acemoglu & Robinson, 2012; Baumol, 1990). In emerging nations, where institutional gaps frequently inhibit entrepreneurial dynamism, this institutional resilience is essential (Khanna & Palepu, 2010). Research has repeatedly shown that institutional flaws, such as corruption, ineffective bureaucracy, and unpredictable laws, have a detrimental effect on the rates of entrepreneurial entrance and survival (Aidis et al., 2008; Oestrin & Mickiewicz, 2011).

The significance of education in boosting entrepreneurial capacity complements institutional quality. According to human capital theory, education gives people the technical know-how, problem-solving skills, and cognitive talents necessary for innovation and successful entrepreneurship (Becker, 1993; Ucbasaran, Westhead, & Wright, 2008). Additionally, entrepreneurial education especially promotes business management skills, inventiveness, and opportunity detection (Fayolle & Gailly, 2015). Even though the number of small and medium-sized businesses (SMEs) in Nigeria is increasing and making a substantial contribution to GDP and

employment, problems still exist because of poor educational infrastructure, a lack of entrepreneurial and vocational training, and a lack of connections between education and business development (Oladele, 2018; Eze, 2020; Adegbite & Aremu, 2021). Additionally, uneven legislative frameworks, institutional enforcement, and infrastructure deficiencies often damage Nigeria's entrepreneurial environment, increasing firm failure rates and limiting development potential (Aremu & Adeyemi, 2011; Obaji & Chukwuemeka, 2019). These elements limit the conversion of entrepreneurial aspirations into profitable endeavors, hence limiting the wider economic advantages that entrepreneurship may provide. Notably, there are substantial interdependencies between the institutional and educational aspects rather than them operating independently. While education creates demand for institutional reforms through an informed populace and entrepreneurial class, high-quality institutions promote educational achievements by guaranteeing accountability and resource allocation (Rodrik, Subramanian, & Trebbi, 2004; Naudé, 2011).

Because it fills important knowledge gaps on how this synergy affects entrepreneurial results and economic growth trajectories, research on the relationship between historical institutional variables and educational quality is essential (Rodrik et al., 2004; Hall & Soskice, 2001). However, there are methodological issues with such research, such as the challenge of accurately measuring educational effectiveness and institutional quality, separating causality from correlation, and dealing with data limitations, particularly in developing country contexts (Acemoglu, Johnson, & Robinson, 2001; Glaeser et al., 2004). Thus, the goal of this study is to experimentally investigate the degree to which educational accessibility and institutional quality together impact entrepreneurial activity and how their interplay might promote sustainable economic growth in Nigeria. The study offers a comprehensive knowledge of the factors supporting entrepreneurial success in Nigeria by placing the investigation within the larger institutional economics and human capital frameworks. In order to promote sustainable development and equitable economic growth, the results are intended to guide policy actions intended to fortify institutional frameworks, upgrade educational systems, and eventually boost the entrepreneurial environment (World Bank, 2020; UNDP, 2021).

Literature review

Theoretical foundation between entrepreneurship, economic growth and constant return to scale model

Entrepreneurship is widely regarded as a key driver of economic growth, innovation, and employment creation, particularly in developing economies such as Nigeria, where structural transformation and economic diversification remain essential development goals (Acs et al., 2013; Audretsch & Belitski, 2017). It facilitates the creation of new markets, improves resource allocation, and enhances societal welfare (Naudé, 2010). However, its effectiveness is strongly shaped by institutional quality, which refers to the formal and informal rules governing economic interactions, including property rights protection, regulatory efficiency, and contract enforcement (North, 1990; Acemoglu & Robinson, 2012). Weak institutional environments characterized by corruption, bureaucratic inefficiency, and legal uncertainty often constrain entrepreneurial entry, survival, and expansion in developing economies. Education complements institutional quality by strengthening human capital, which is essential for entrepreneurial success. Human capital theory argues that education enhances individuals' cognitive abilities, technical knowledge, and managerial competencies, thereby improving innovation capacity and business performance (Becker, 1993; Ucbasaran, Westhead, & Wright, 2008). In Nigeria, despite the growing contribution of small and medium-sized enterprises (SMEs) to employment and GDP,

entrepreneurial outcomes remain limited due to inadequate educational infrastructure and weak linkages between education systems and enterprise development. Importantly, education and institutions interact synergistically, as education fosters demand for better governance while strong institutions enhance educational effectiveness and economic participation.

Figure 2 depicts the Constant Returns to Scale (CRS) framework, which offers a theoretical foundation for understanding how entrepreneurship contributes to economic growth by assuming that proportionate increases in inputs result in proportional increases in output. Within this approach, entrepreneurship boosts total factor productivity by encouraging innovation and improved resource allocation, moving the production frontier upward. However, in developing economies such as Nigeria, the realization of these gains depends critically on institutional robustness, human capital quality, and macroeconomic stability. Weak institutions and poor education systems reduce the efficiency of entrepreneurial inputs, while policy uncertainty increases investment risk, collectively limiting entrepreneurship's capacity to generate sustained and proportional economic growth.

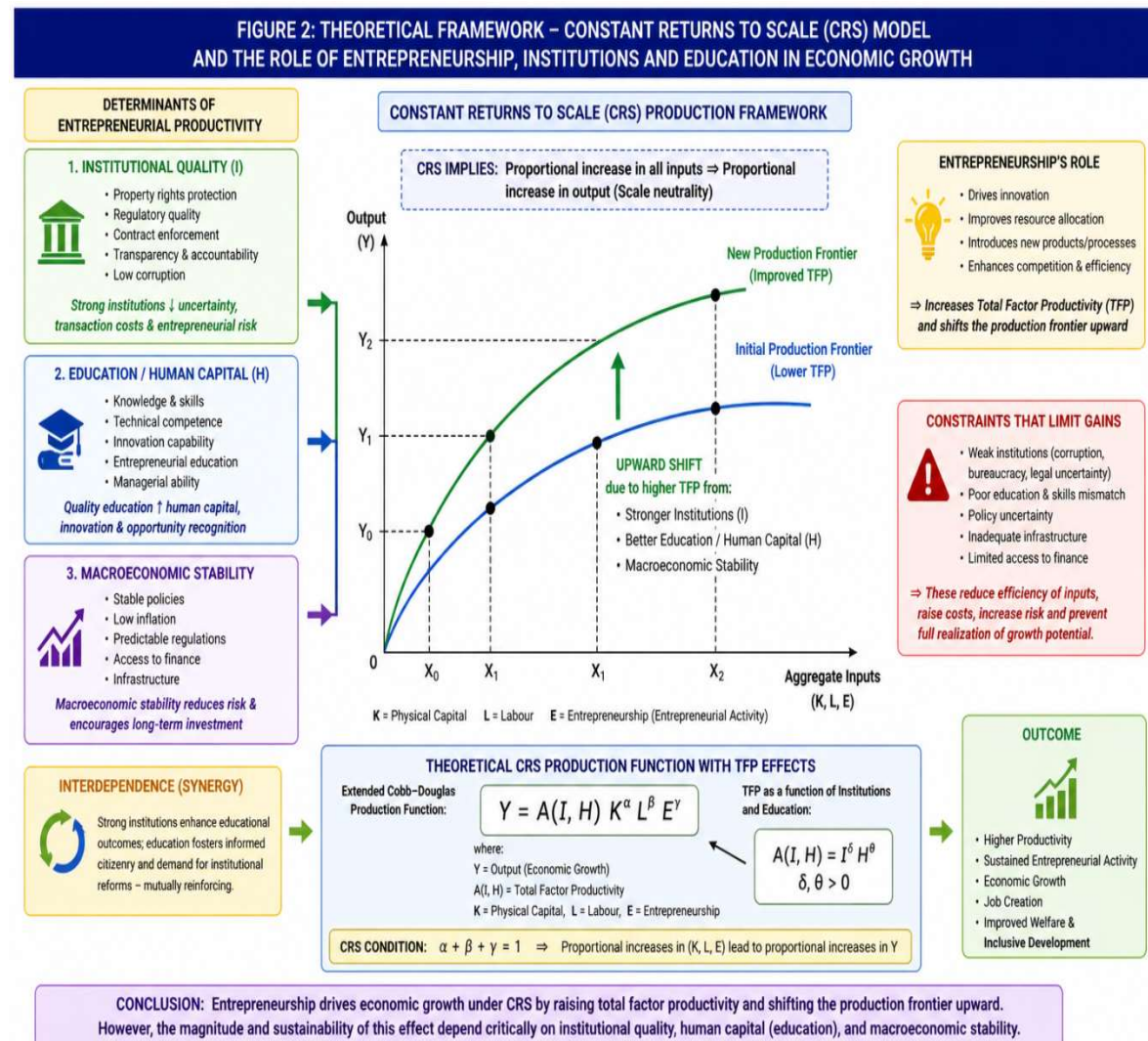


Figure 2 illustrates the Constant Returns to Scale (CRS) production framework in which entrepreneurship operates as a key driver of economic growth through its contribution to total factor productivity.

The diagram shows that proportional increases in inputs—capital, labour, and entrepreneurial activity—lead to proportional increases in output, consistent with the CRS assumption. It further demonstrates how improvements in institutional quality, human capital (education), and macroeconomic stability enhance productivity by increasing total factor productivity (TFP), thereby shifting the production frontier upward. The upward shift from a lower to a higher production frontier indicates that, although the scale properties of the production function remain unchanged, economies with stronger institutions and better education systems achieve higher output levels for the same quantity of inputs. Conversely, weak institutions, poor educational systems, and policy uncertainty reduce input efficiency, constrain entrepreneurial performance, and limit the economy's ability to reach its potential output path.

An extended Cobb-Douglas production function is a good approach to depict the theoretical connection within a Constant Returns to Scale (CRS) paradigm that includes entrepreneurship, institutional quality, and education (human capital) function in equation 1:

$$Y = A(I, H)K^{\alpha}L^{\beta}E^{\epsilon} \quad \text{Equation (1)}$$

Subject to the CRS condition in equation 2:

$$\alpha + \beta + \gamma = 1 \quad \text{Equation (2)}$$

Where Y represents aggregate output (economic growth), K represents physical capital, L labour, and E represents entrepreneurship (entrepreneurial activity/effort), and $A(I, H)$ represents total factor productivity (TFP), which increases with institutional quality I and human capital/education H .

Furthermore, α, β, γ = output elasticities of inputs to explicitly capture the institutional and educational effects on productivity, TFP can be specified as in equation 3:

$$A(I, H) = I^{\theta}H^{\delta}, \theta, \delta > 0 \quad \text{Equation (3)}$$

Substituting into the production function in equation 4 gives:

$$Y = I^{\theta}H^{\delta}K^{\alpha}L^{\beta}E^{\epsilon} \quad \text{Equation (4)}$$

These formulations demonstrates that, while output has constant returns to scale in the input factors (K, L , and E), Institutional quality and education improve total factor productivity, lifting the production function and increasing the effectiveness of entrepreneurial activity in generating economic growth. This occurs despite the fact that production exhibits continuous returns to scale in terms of input components such as capital, labour, and entrepreneurship.

Empirical literature review

Entrepreneurship is widely acknowledged as a fundamental engine of economic growth and structural transformation. However, contemporary scholarship increasingly argues that entrepreneurial outcomes are not merely spontaneous market phenomena but are historically conditioned by deeper structural determinants. Among these determinants, institutional quality and educational attainment remain two of the most critical and mutually reinforcing factors shaping entrepreneurial ecosystems. Institutional theory, particularly as advanced by Douglass North (1990), conceptualises institutions as the “rules of the game” that structure economic interactions by reducing uncertainty, enforcing contracts, and lowering transaction costs. This theoretical perspective contrasts with neoclassical growth models, which traditionally treat entrepreneurship as an exogenous productivity-enhancing factor without sufficiently accounting

for institutional path dependency. Empirical evidence supports the institutional perspective, demonstrating that strong property rights, effective regulatory frameworks, and rule-of-law mechanisms significantly enhance entrepreneurial activity and economic performance (Acemoglu & James A. Robinson, 2012; William J. Baumol, 2010). Nevertheless, despite this consensus, the literature remains fragmented regarding how historical institutional legacies—particularly colonial and post-colonial institutional arrangements—continue to shape entrepreneurial capacities in developing economies. While Acemoglu, Johnson, & Robinson (2001) established the long-run persistence of institutional quality on economic outcomes, the mechanisms through which these historical institutions affect innovation-driven entrepreneurship, productivity, and firm survival remain insufficiently theorised and empirically tested. However, as Djankov et al. (2006) note, more study is needed to disaggregate the processes by which these historical institutions impact other characteristics of entrepreneurship, such as innovation and productivity development. This gap is important because neglecting historical institutional persistence risks producing policy prescriptions that are institutionally misaligned and contextually ineffective.

Parallel to institutional foundations, human capital theory positions education as a critical determinant of entrepreneurial capability and economic performance. Unlike institutional models that focus on external governance structures, education-based models emphasise internal capability formation, including skills acquisition, innovation capacity, and risk management competencies. Empirical studies consistently demonstrate that higher educational attainment improves entrepreneurial entry, business survival, and firm productivity (David McKenzie et al., 2014). In a similar vein, Eric Hanushek & Ludger Woessmann (2015) demonstrates that by improving labour productivity and technology adaptability, education quality has a major impact on long-term growth. However, the literature remains limited in examining the interaction between educational attainment and institutional quality in shaping entrepreneurial outcomes. Existing studies often model these variables independently, thereby overlooking their complementary effects. For instance, Oestrin, Mickiewicz, & Stephan (2013) argue that education improves individuals' ability to navigate institutional complexities, suggesting an important interaction mechanism between human capital and governance quality. Yet this relationship remains underexplored, particularly in developing economies such as Nigeria, where institutional weaknesses and educational disparities coexist. According to Smith & Lee's (2023) study of entrepreneurial ecosystems in developed countries, robust ecosystems with resources for funding, education, and supportive legislation boost entrepreneurship's contribution to economic growth. Their study highlights the connection between institutional quality and successful entrepreneurship.

Additionally, government interventions aimed at expanding access to finance, reducing regulatory constraints, and strengthening entrepreneurial education significantly enhance the contribution of entrepreneurship to economic growth by improving business formation, innovation capacity, and enterprise sustainability (Alvarez & Barney, 2024). This policy-oriented perspective reinforces the institutional argument that entrepreneurship thrives more effectively within enabling governance and financial environments. Supporting this view, Nayak & Pradhan (2024) examined 47 Asian countries over the period 1981 to 2021 using six governance indicators to construct a composite institutional quality index. Their findings reveal that improvements in institutional quality exert a significant positive effect on real GDP, GDP per capita, and the Human Development Index (HDI), with the magnitude of impact being more pronounced in high-income economies. This underscores the pivotal role of governance quality as a structural determinant of economic expansion and developmental outcomes. Similarly, Karabou (2024), in a study of eight West African Economic and Monetary Union member states covering the period 2005 to 2020,

employed the Dynamic Ordinary Least Squares (DOLS) estimation technique and found that both public investment and governance indicators significantly influence GDP per capita. More importantly, the study demonstrates that governance quality moderates the effectiveness of public investment, suggesting that institutional strength is indispensable for maximising the growth-enhancing effects of capital investment.

Beyond institutional and financial determinants, emerging evidence highlights the role of economic policy uncertainty (EPU) as a critical mediating factor in the entrepreneurship–growth nexus. According to Gu et al. (2022), an empirical investigation across 22 countries between 2005 and 2018 reveals that EPU can stimulate social, environmental, and economic development under specific entrepreneurial conditions. Their findings show that while conventional (non-green) entrepreneurship may constrain social progress under heightened uncertainty, green entrepreneurship positively moderates this relationship and contributes to broader developmental outcomes. Furthermore, recent studies have introduced new dimensions such as digital entrepreneurship and economic policy uncertainty (EPU) into entrepreneurship-growth models. For example, Nguyen & Vu (2022) highlight digital infrastructure as a modern institutional enabler of entrepreneurial growth, while Paule-Vianez et al. (2023) find that policy uncertainty may stimulate entrepreneurial activity, although with ambiguous effects on business feasibility. These emerging perspectives contrast with traditional entrepreneurship-growth models by incorporating policy volatility and technological transformation as dynamic determinants. Despite these advancements, empirical literature still lacks an integrated framework that jointly examines institutional quality, educational attainment, economic policy uncertainty, and access to finance as historical and structural determinants of entrepreneurship-driven growth. Addressing this evidence gap is both theoretically and practically significant. Theoretically, it advances entrepreneurship literature by moving beyond isolated explanatory models toward a more comprehensive institutional-human capital-policy uncertainty framework. Practically, it provides policymakers with context-specific evidence for designing integrated interventions aimed at strengthening governance systems, improving educational outcomes, reducing policy uncertainty, and expanding financial access to enhance entrepreneurial productivity and sustainable economic growth in Nigeria.

Data and model specification

Data

Table 1 provides a detailed description of all research variables, including their measurements and data sources. Data on these variables is consistently obtained from the World Development Indicators, with all measurements given as yearly percentages from 2000 to 2024 (WDI, 2025).

Table 1: variables description

Variables/acronym		Indicators/measurement/proxy	Source
Gross Domestic Product (GDP)		GDP per capita growth (annual %)	WDI
Entrepreneurship (SMEs)		Age dependency ratio (% of working-age population) proxy for entrepreneurship/business operation.	WDI
Institutional quality (INQTY)		Institutional quality proxy for governance, rule of law, regulatory quality).	WDI
Educational (EDATM)	Attainment	Educational attainment (human capital development annual %)	WDI
Economic Uncertainty/unstable (USPOL)	Policy policies	Economic policy uncertainty (unstable policies annual %)	WDI

Access to finance (ACTFN)	Domestic credit to private sector by banks (% of GDP) to explain access to finance.	WDI
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Source: World Development Index, (2026)

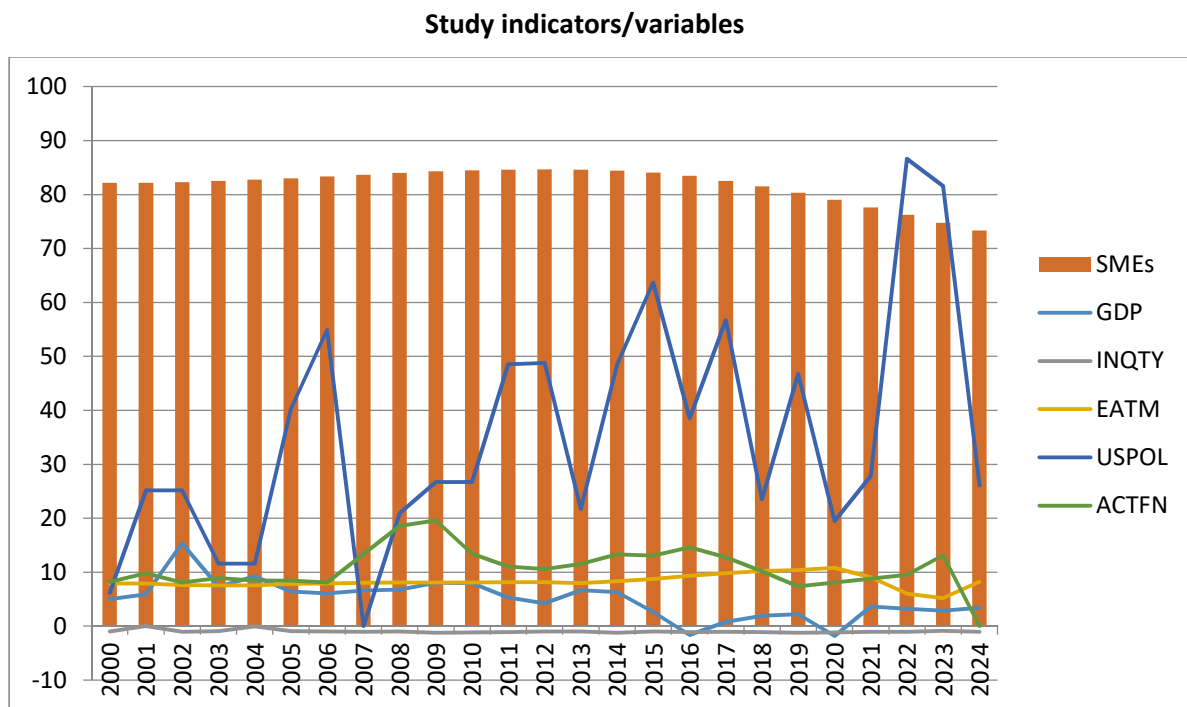


Figure 3: illustrates the trend of the historical determinants of entrepreneurship on economic growth from 2000 to 2024

Figure 3 demonstrates the percentage relationship among the selected indicators from 2000 to 2024, revealing that SMEs maintain the highest proportional contribution, averaging above 80%, which reflects their dominant role in economic activities and productive engagement. GDP, however, records relatively low and fluctuating percentages, suggesting that the strong presence of SMEs has not translated into consistent aggregate economic growth. Economic policy uncertainty (USPOL) exhibits the highest volatility, with significant percentage spikes across several periods, indicating recurrent policy instability capable of constraining investment and economic performance. Access to finance (ACTFN) shows moderate fluctuations, reflecting inconsistent financial accessibility, while educational attainment (EATM) remains relatively stable, indicating gradual improvements in human capital development. In contrast, institutional quality (INQTY) remains persistently weak with low or negative percentage values, highlighting governance and institutional inefficiencies. Overall, the percentage dynamics suggest that although entrepreneurship and education remain relatively strong drivers, policy uncertainty and weak institutional quality continue to undermine sustainable economic growth outcomes.

Methodology and model specification

A suitable methodology for examining the relationship between the historical determinants of entrepreneurship and economic growth using cointegration analysis would adopt a time-series econometric framework, particularly where the variables exhibit long-run equilibrium relationships. The analysis begins by specifying an extended growth model in which economic growth (Y_t) is modeled as a function of entrepreneurship (E_t), institutional quality (I_t),

educational availability or human capital (H_t), and other control variables such as physical capital (H_t) and labour (L_t).

The functional form can be expressed as:

$$Y_t = f(E_t, I_t, H_t, K_t, L_t) \quad \text{Equation (5)}$$

To estimate this relationship empirically, the variables are transformed into their logarithmic forms to stabilize variance and interpret coefficients as elasticities. The first step involves testing for stationarity using unit root tests such as the Augmented Dickey–Fuller test (ADF) and Phillips–Perron test (PP) to determine the order of integration of the variables. Once the variables are confirmed to be integrated of order one, $I(1)$, cointegration techniques such as the Johansen cointegration test or the Autoregressive distributed lag model (ARDL) Bounds Test can be employed to examine whether a long-run equilibrium relationship exists among entrepreneurship, institutional quality, education, policy uncertainty, access to finance and economic growth.

Where cointegration is established, the long-run and short-run dynamics can be estimated using an Error Correction Model (ECM), which captures the speed of adjustment toward equilibrium after short-run shocks. The ECM can be specified as:

$$\Delta Y_t = \alpha_0 + \sum \beta_i \Delta X_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \quad \text{Equation (5)}$$

Where ECM_{t-1} represents the lagged error correction term, λ that measures the speed of adjustment, and X includes entrepreneurship, institutional quality, and education variables.

The general ARDL model of economic growth (Y_t) depends on explanatory variables X_{1t} and X_{2t} . Then, ARDL (p, q_1, q_2) specification as:

$$Y_t = \alpha_0 + \sum_{i=1}^p \alpha_i Y_{t-i} + \sum_{j=0}^{q_1} \beta^j X_{1,t-j} + \sum_{k=0}^{q_2} \gamma_k X_{2,t-k} + \varepsilon_t \quad \text{Equation (6)}$$

Where, Y_t denotes the dependent variable, $X_{1t}X_{2t}$ connotes the explanatory variables, and (p, q_1, q_2) are the lag lengths, whereas, the ε_t is the error term. Therefore, long-run ARDL equation is obtained after normalising the lagged variables as in equation (7):

$$Y_t = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 X_{2t} + \varepsilon_t \quad \text{Equation (7)}$$

Where:

$$\alpha_1 = \frac{\sum \beta_j}{1 - \sum \alpha_i} \text{ and } \alpha_2 = \frac{\sum \gamma_k}{1 - \sum \alpha_i} \quad \text{Equation (8)}$$

This methodology is particularly suitable because it distinguishes between short-run fluctuations and long-run structural relationships, making it effective for capturing how historical determinants of entrepreneurship influence sustainable economic growth over time, especially in developing economies such as Nigeria.

The model specification is grounded in the extended neoclassical growth perspective and the Constant Returns to Scale (CRS) production function, where economic growth is modeled as a function of entrepreneurship and its historical determinants, particularly institutional quality and educational availability. Following the augmented Cobb–Douglas production framework developed by Robert Solow (1956) and extended in endogenous growth literature, the functional relationship can be specified as:

$$Y_t = A_t K_t^\theta L_t^\beta E_t^\gamma \quad \text{Equation (9)}$$

Where total factor productivity (A_t) is determined by institutional quality and human capital:

$$A_t = T_t^\alpha H_t^\theta \quad \text{Equation (11)}$$

Substituting this into the production function gives the estimable model:

$$Y_t = E_t^\gamma I_t^\delta H_t^\theta S_t^\alpha A_t^\sigma \quad \text{Equation (12)}$$

In linear form for econometric estimation:

$$GDP_t = \beta_0 + \beta_1 SMEs_t + \beta_2 INQTY_t + \beta_3 EDATM_t + \beta_4 STPOL_t + \beta_5 ACTFN_t + \varepsilon_t \quad \text{Equation (13)}$$

Where GDP_t denotes economic growth (rate), $SMEs_t$ entrepreneurship or business operation, $INQTY_t$ institutional quality (governance, rule of law, regulatory quality), $EDATM_t$ educational attainment (human capital development), $STPOL_t$ is the economic policy uncertainty (unstable policies), and $ACTFN_t$ the access to finance (Domestic credit to private sector by banks (% of GDP)), and ε_t stochastic error term.

Theoretically, small and medium enterprises, and institutional quality and education are expected to have positive effects on economic growth because stronger institutions reduce transaction costs and improve productivity (Douglass North, 1990; Gary Becker, 1993). Access to finance is also expected to positively influence growth by easing capital constraints on entrepreneurial ventures (Ross Levine, 1997). In contrast, access to finance and economic policy uncertainty is generally expected to exert a negative effect by discouraging investment and entrepreneurial decision-making (Baker, Bloom, & Davis, 2016). This model is suitable for cointegration analysis to capture both long-run equilibrium and short-run adjustment dynamics.

Result and discussion

Correlation

The findings of a correlation study are shown in Table 1, which shows statistically significant positive correlations at the 1% significance level between entrepreneurship or business operation (SMEs), education attainment, unstable policies, and access to financing. Additionally, a negative correlation with regulatory quality is demonstrated at the 1% significance level. Zaria et al. (2022) found substantial correlations between unemployment and policy uncertainty in Nigeria using the standard Pearson correlation test, which supports these findings.

Table 1: Test for correlation matrix

	GDP	SMEs	INQTY	EDATM	STPOL	ACTFN
GDP	1.00 -					
SMEs	0.825503 7.165384***	1.00 -				
INQTY	-0.740559 -5.398857***	-0.956082 -15.98041***	1.00 -			
EDATM	0.771518 (5.940911)***	0.990015 34.40617***	-0.959566 -16.70042***	1.00 -		
STPOL	0.602135 3.694721***	0.848636 7.859398***	-0.846779- 7.798458***	0.823850 7.120612***	1.00 -	
ACTFN	0.045663 0.219219***	0.541136 3.086088***	-0.186214 -0.908950***	-0.072334 -0.347814***	0.076286 0.366924***	1.00 -

Note: ***, ** and * indicate 1%, 5% and 10% significant level. While the second values are the t-statistics

Source: Author compilation, (2026)

Unit root: ADF and PP

The findings from the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) unit root tests in Table 2 reveal a mixed order of integration among the variables under investigation. Specifically, certain variables, such as Small and Medium Enterprises (SMEs) and unstable policy measures (STPOL), were found to be stationary at level, $I(0)$, whereas others, including Gross Domestic Product (GDP), institutional quality (INQTY), educational attainment (EDATM), and access to finance (ACTFN), exhibited non-stationarity at level but attained stationarity after first differencing, thereby becoming integrated of order one, $I(1)$. Consistent with the proposition of Pesaran et al. (2001), the existence of variables integrated at different orders supports the application of first-difference transformations where necessary in econometric analysis. The coexistence of $I(0)$ and $I(1)$ variables therefore validates the suitability of cointegration analysis, particularly the Autoregressive Distributed Lag (ARDL) framework, to examine the existence of a long-run equilibrium relationship among the variables despite their individual non-stationary characteristics at level.

Table 2: stationary test (ADF and PP)

Variables	ADF and Unit Root Test				P-Perron Unit Root Test				
	Level intercept	and 1 st Diff Intercept	and lag		Level Intercept	and 1 st Diff Intercept	and bandwi dth		
GDP	-2.457566**	-6.885474***	1		-2.361728**	-8.932337***	2		
SMEs	-6.014653***	-1.147257**	1		-2.183064**	-0.460924**	2		
INQTY	-1.608523**	-9.044676***	1		-4.141287***	-13.44402***	2		
EDATM	-1.572843**	-6.502844***	1		-2.328111**	-1.020627**	2		
STPOL	-3.901145***	-6.087676***	1		-3.848507***	-10.08703***	2		
ACTFN	-1.817423**	-3.075994***	1		-1.817423**	-2.949236***	2		
1% critical value	-3.737853								
5% critical value	-2.991878								
10% critical value	-2.635542								

Note: ***, ** and * indicate 1%, 5% and 10% significant level. While the values in bracket are the t-statistics

Source: Author compilation, (2026)

Cointegration test

The Autoregressive Distributed Lag (ARDL) bounds testing approach, developed by M. Pesaran & Shin (2001) and Johansen, S. (1991), is extensively employed to examine the existence of a long-run equilibrium relationship among variables irrespective of whether the variables are integrated of order zero, $I(0)$, order one, $I(1)$, or exhibit a combination of both integration orders. The ARDL bounds testing procedure evaluates cointegration by comparing the computed F-statistic (or t-statistic) with the corresponding lower and upper critical bound values. When the estimated statistic exceeds the upper bound critical value, the null hypothesis of no cointegration is rejected, thereby confirming the existence of a long-run relationship among the variables. Conversely, if the statistic falls below the lower bound critical value, the null hypothesis cannot be rejected, indicating the absence of cointegration. However, when the estimated statistic lies between the lower and upper critical bounds, the results are considered inconclusive. The outcomes of the bounds testing procedure are presented in Table 3.

Table 3(a): Cointegration (ARDLM) test

Model	F-statistics	Conclusion
GDP= SMEs, INQTY, EDATM, STPOL, ACTFN	4.061995	Cointegration
Critical bound values (Significance)	Lower Bound	Upper Bound
1%	3.06	4.15
5%	2.39	3.38
10%	2.08	3

Table 3(b) Long- and short-run coefficients using ARDL

Model	Coefficient	Prob.
SMEs	0.625417	0.0029
INQTY	-1.724658	0.3125
EDATM	-2.304393	0.0000
STPOL	-0.074257	0.0065
ACTFN	-0.301559	0.0515
Model	Coefficient	Prob
CointEq (-1)*	-1.158270	0.0000

Source: Authors compilation, (2026)

The findings from Table 3(a & b) confirm the existence of a statistically significant and stable long-run equilibrium relationship between GDP and the explanatory variables—SMEs, institutional quality (INQTY), educational attainment (EDATM), state policy uncertainty (STPOL), and access to finance (ACTFN)—as evidenced by the ARDL bounds cointegration test and the significant negative error correction term. The positive and significant effect of SMEs on GDP supports the theoretical proposition of the augmented Cobb–Douglas Production Function and the Robert Solow that entrepreneurship functions as a productive input capable of stimulating innovation, productivity, employment generation, and long-run economic growth. This result corroborates the empirical literature, including William J. Baumol (2010), Smith & Lee (2023), and Alvarez & Barney (2024), which emphasise that entrepreneurial expansion significantly contributes to economic performance when supported by conducive institutional and financial environments.

Conversely, the negative and statistically insignificant effect of institutional quality suggests that weak governance structures, regulatory inefficiencies, and historical institutional constraints may limit the effectiveness of entrepreneurship in promoting sustainable growth in Nigeria. This finding partially contrasts with the institutional theory advanced by Douglass North (1990) and the empirical evidence of Daron Acemoglu & James A. Robinson (2012), Nayak & Pradhan (2024), and Karabou (2024), all of whom highlight the critical role of strong institutions in enhancing economic performance and entrepreneurial productivity. Similarly, the significant negative effect of educational attainment deviates from conventional human capital theory and studies by David McKenzie et al. (2014) and Eric Hanushek & Ludger Woessmann (2015), which argue that education improves productivity, innovation capacity, and entrepreneurial outcomes. The result may therefore reflect structural deficiencies within Nigeria's educational system, including weak skill acquisition, inadequate entrepreneurial training, and limited alignment between educational outcomes and labour market demands.

Furthermore, the significant negative effect of state policy uncertainty supports emerging literature that associates unstable policy environments with reduced entrepreneurial performance, investment confidence, and long-run growth sustainability. Although studies such as Gu et al., (2022) and Paule-Vianez et al., (2023) suggest that uncertainty may occasionally stimulate entrepreneurial adaptation, the Nigerian evidence indicates that policy instability predominantly constrains business expansion and economic performance. Likewise, the marginally significant negative effect of access to finance implies that financial constraints, high borrowing costs, and weak financial inclusion continue to undermine the growth potential of SMEs despite the recognised importance of finance in entrepreneurial development. Overall, the study contributes to the literature by integrating institutional quality, educational attainment, policy uncertainty, and financial access within a unified entrepreneurship-growth framework, thereby demonstrating that the effectiveness of entrepreneurship in driving sustainable economic growth depends substantially on supportive governance structures, quality human capital, stable policies, and efficient financial systems.

Diagnostic test

The ARDL model showed cointegration in both the long and short run. The research then calculates diagnostic tests such as Heteroscedasticity using the ARDL normality and stability tests for serial correlation, which will rectify any irregularities in the near term.

The most crucial descriptive statistics that characterize data are shown by the normality test in Figure 4, which is more significant than the standard deviation and displays a normal distribution. Additionally, it shows a strong Jarque-Bera and the lack of outliers.

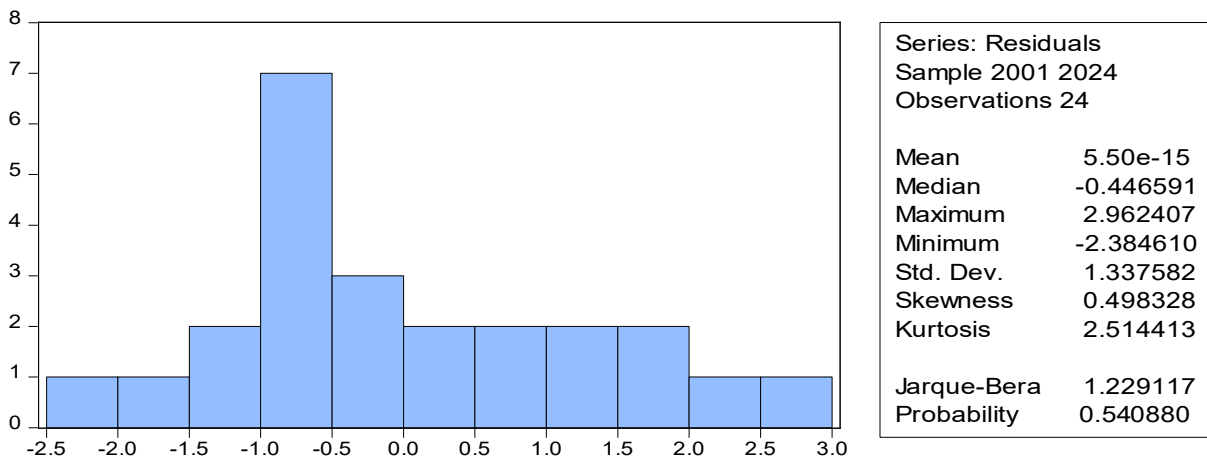


Figure 4: Plot of normality test

Stability Test

The CUSUM and CUSUMSQ are used in Figure 5, and the estimated model is anticipated to investigate the parameter stability at a 5% significant level inside the two crucial limits.

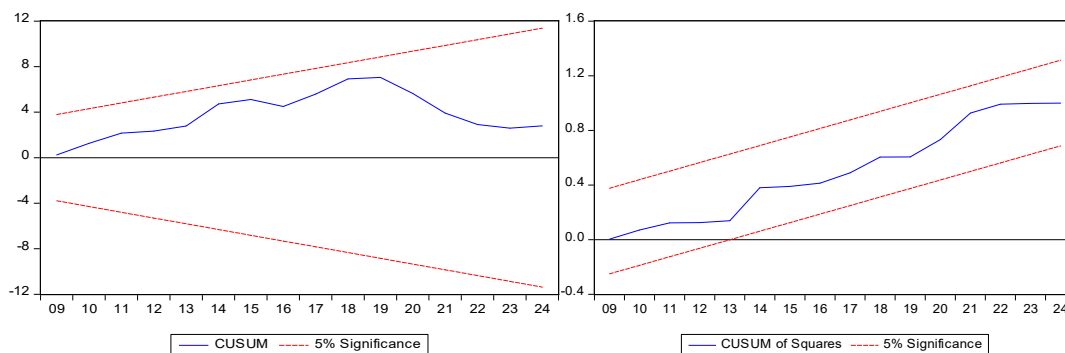


Figure 5: Plots of CUSUM and CUSUMSQ

The aforementioned figures show that all of the model's CUSUM and CUSUMSQ plots fall inside the 5% critical constraint, indicating that the ECM (short-run) and coefficients are stable. Thus, this study comes to the conclusion that there was no serial correlation at all throughout that time.

Conclusion and policy implication

The study examined the long-run relationship between GDP and key explanatory variables—SMEs, institutional quality (INQTY), educational attainment (EDATM), state policy stability (STPOL), and access to finance (ACTFN)—in Nigeria from 2002 to 2024 using the Autoregressive Distributed Lag (ARDL) model and bounds cointegration approach. The empirical findings confirmed the existence of a stable long-run equilibrium relationship among the variables, as evidenced by the significant bounds F-statistic and the negative, highly significant error correction term. The results further revealed that SMEs exert a positive and statistically significant effect on

GDP, underscoring the critical role of entrepreneurship in promoting productivity, innovation, employment generation, and structural transformation. However, educational attainment, state policy instability, and limited financial accessibility exhibited negative effects on economic growth, while institutional quality remained statistically insignificant, reflecting persistent structural and governance deficiencies that undermine the effectiveness of entrepreneurial activities and broader economic performance. These findings are consistent with the Constant Returns to Scale (CRS) framework embedded within the augmented Cobb–Douglas Production Function and the Robert Solow, which emphasise that entrepreneurship, institutional efficiency, and human capital development are essential drivers of long-run economic growth.

The study contributes to the empirical and theoretical literature by integrating entrepreneurship, institutional quality, educational development, policy stability, and financial accessibility within a unified growth framework for Nigeria, while employing the ARDL methodology to capture both short-run dynamics and long-run relationships among variables integrated at different orders. The findings imply that entrepreneurship alone may not guarantee sustainable economic growth unless supported by effective institutions, stable macroeconomic policies, quality education, and improved access to productive finance. Consequently, policymakers should prioritise institutional reforms aimed at strengthening governance quality, regulatory efficiency, transparency, and policy consistency in order to create an enabling environment for SME expansion and private-sector productivity. In addition, greater investment in education, entrepreneurial training, digital skills acquisition, and innovation-driven capacity building is necessary to improve human capital productivity and enhance the competitiveness of SMEs in Nigeria. Financial sector reforms that expand affordable credit facilities, reduce borrowing constraints, and strengthen financial inclusion for small and medium-scale enterprises are equally essential for stimulating inclusive and sustainable growth. Future research may further explore sector-specific entrepreneurial performance, regional disparities, digital entrepreneurship, and nonlinear institutional interactions using advanced econometric techniques such as nonlinear ARDL, panel ARDL, or structural equation modelling to provide deeper insights into the mechanisms linking entrepreneurship and economic growth in developing economies.

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