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Effect Of Entrepreneurship Growth On Infrastructure Development In Emerging Economies

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ABSTRACT

The study investigated the effect of entrepreneurship growth on infrastructure development in emerging economies of Nigeria, Brazil and Malaysia. Data were sourced from World Development Indicator for the selected economies of Nigeria, Brazil and Malaysia for 25 years ranging from 1989 to 2013. Variables such as communication proxied by Telephone lines per 100 people (COM), and Power proxied by electric power transmission and distribution losses (POW) *served as independent variables and entrepreneurship growth (EG) as dependent variable were incorporated into the model. The data were analyzed using multiple regression analysis of Ordinary Least Square (OLS) and cointegration technique. The conintegration analysed showed that there is a long run relationship between Entrepreneurial Development and Infrastructural Development in Emerging Economies. The OLS result revealed that only in Brazil that infrastructure has significant effect on entrepreneurial development indicating that mixed finding exist on the effect of entrepreneurial development on infrastructure development in emerging economies. The study thus recommend that entrepreneurial growth and infrastructure development should be encouraged through incentives such as tax holiday and through integration, communication, computer services and hi-tech firms as these variables are some of the world acclaimed economic indicators.*

KEYWORDS

Entrepreneurship growth, infrastructure, development, emerging economies,

1 INTRODUCTION

Infrastructure facilities are necessary to propel economic development in the economy and infrastructure facilities include establishment of dams and power stations to meet the energy needs of industry; transportation system to move resources and finished products to desired destination and communication system to facilitate business operations, among others (Amaeshi, 2005). The author also stated that infrastructures cover health, education and social welfare for sustainable economic development. Infrastructure reforms are critical to economic development. No one size reform fits all; it depends on economic and political frameworks in each country. Reforms are known to be essential, if not implemented would dampen the spirit of the people (IMF President, 2014).

Awujo (1996:142) state that the business subsystem as part of the larger system called the Nigerian society is modeled by the Nigerian environment. The environment is usually conceptualized in terms of factors inherent in the environment that affect the sub system. The Nigerian environment has been characterized by instability in political and economic sub-sectors. The Nation experienced frequent leadership changes that

have resulted in inconsistencies and lack of continuity in government policies and programmes. The nation has never had a well planned economy. The uncertainty in the environment is not conducive for economic development. World Bank representative identified the slow pace of economic reforms in the economy as the obstacle to foreign investment (The Guardian Newspaper March 22, 1996).

The challenge for entrepreneurship in emerging economies is how to provide sustainable employment that both allows for the employed to satisfy their basic human needs through their salary and that which respects the ecological sustainability criteria, that is, jobs that do not destroy the environment. The other obvious contribution that entrepreneurship can make to satisfy basic human needs is to deploy in innovative less damaging and more effective new ways those basic services and goods like energy, sanitation, food, housing, healthcare etcetera needed by the poor societies (Holden & Linnerud, 2006).

Many enterprises, especially small enterprises have closed shops due to lack of public power supply, transportation, logistics, quality of institutions and lack of cheap credit facility. Insecurity challenges have forced many business persons to go into hiding or take refuge in other countries. Other challenges include inconsistency in government policies, system of taxation and lack of attractiveness in the economy when compared with other economics (Lin, 2013).

Infrastructure facilitates and constraints individual entrepreneurs and infrastructure does not emerge and change all at once by the actions of one or even a few key entrepreneurs. Rather, it emerges through the accretion of numerous institutional resources and proprietary events that co-produce each other over an extended period. Cooperative and competitive relationships between populations of organizations affect the distribution of resources available to entrepreneurs in the environment. Suffice it to say that institutional factors such as government policies, political events, cultural norms among others shape the macro content within which these population processes occur (Aldrich, 1990).

To understand about the process and components of an infrastructure for entrepreneurship requires historical study of the temporal sequence of events and activities that occur to create and transform basic scientific knowledge into a commercially viable, set of products delivered to customers. Numerous case histories demonstrated that new technologies are seldom if ever developed by a single firm alone in the vacuum of an institutional environment (Constant, 1980; Chandler, 1990). Many complimentary innovations in technical and organizational arrangements are usually required before a particular technology is suitable for commercial application (Hughes, 1983; Rosenberg & Birdzell, 1986). Commercial success or failure of a technological innovation is a great measure as reflection of institutional innovations that the social, economic and political infrastructure that any community needs to sustain its members. Van de Van and

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Garud (1989) propound the framework of components of industrial infrastructure for entrepreneurship growth and development.

Cressy (2000); Poutziouris (2000), and Curran and Storey (2002) opine that it is important to be clear that entrepreneurs and managers, not governments create business and operate in private sector, but government can have a profound effect on how all firms operate their opportunities to grow. Government policy and its influence on the 'institutional environment of a country, locality or region has become a key focus of efforts to help improve the private sector. There are three main dimensions to the role of government in providing enabling and competitive environment.

(1) Government as regulator. Government and legal rules determine how trade rules operate nationally and internationally and the legal form of companies, the extent of legal limits on company liabilities, restrictive practices and anti-monopoly regulations. Government also influences regulations on conditions at work, consumer protection, food, health. Safety. Environmental and planning regulations and licensing.

(2) Government as economic agent. Government taxes, charge fees, raises debts and spends. The way in which this operates has far-reaching effect on business finance and risk-taking:

* Taxation and fee levels affect entrepreneurial incentives and market entry, government debt levels severely affect the economic climate.

* Spending influences the competitive environment procurement rules, for government contracts influence markets. The growth of government services such as education, health and transport services influence factor inputs for businesses.

* As a significant employer, government wage rates and employment conditions impact on local and national pay system, the role of trade unions and employment conditions.

* Government redistribution policies and social engineering influence market incentives and the labour market.

(3) Government as strategic and promoter. Government finance can be used to offer grants, subsidies, loans and other intervention initiatives or information or advisory support to all categories of businesses and can seek to improve the infrastructure of business factor inputs such as:

- education and skills
- research and development
- marketing and productivity initiatives
- International trade protection or barriers

Government action can be most effective where it improves the generic environment for entrepreneurship and sustainable economic development. Two often government initiatives disadvantage economic development because of the diseconomies of scale that the sector experiences in being able to cope with

compliances with government procedures, hence, better regulation and improved government policies and services is usually the main action that government can take to help the general business environment.

However, Holden and Linnerud (2006) examined the effect of entrepreneurship on infrastructure facilities for economic development on surveys of businesses for fifty developing countries. The variables of the study included power, communication, information, transportation. The result showed that firms with functional infrastructure experience faster sales growth, faster employee growth and higher development.

The findings from Holden and Linnerud (2006) suggests that provision of infrastructures spurs firm growth and firm growth grossly depends on the level of infrastructure development. However, in an emerging economies where the infrastructure is lacking, the study intends to investigate the extent to which entrepreneurship growth leads to infrastructure development.

2 METHODOLOGY

2.1 Nature and Sources of Data Collection

This study employed the secondary data sources from the World Development Indicators (WDI, 2013). The data covered macroeconomic variables for Nigeria, Brazil and Malaysia covering 25 years (1989 – 2013). This period was used because the data on the selected variables are available for all the countries from 1989 till 2013. The series are expressed in US dollar currency.

The variables used in this study included the variables of entrepreneurship education which served as the dependent variable and the variables of sustainable development as the explanatory (independent) variables. As all the data (variables) were collected from the World Development Indicator (WDI), the description to these variables is in line with those of the WDI metadata indicator source notes.

2.2 Model Specification

The model is premised on the theoretical postulation that infrastructure encourages business development. The empirical model developed to capture this relationship is adapted from the work of (Holden & Linnerd, 2006; Curran & Storey, 2002). The function relationship can be written as follows:

$$EG = f(COM, POW) \quad (5)$$

In this relationship, EG is the dependent variable while COM and POW are the infrastructure variables which are the independent variables. The equation can be rewritten as follows:

$$EG_i = c_{0i} + c_1 LnCOM_i + c_2 LnPOW_i + \mu_i \quad (6)$$

Where:

EG = entrepreneurship growth

COM = communication proxied by Telephone lines per 100 people

POW = Power proxied by electric power transmission and distribution losses

The (i) in each coefficient represents the individual countries included in the study, viz, Nigeria, Brazil and Malaysia. μ is the error term. The coefficients are represented with $c_{0,}$ c_1 and c_2, which capture the relationships that exist between the dependent and the independent variables. c_0 is the constant. Ln is the natural logarithm used in this case to reduce the data to ratios. The appriori expectation of the model is that entrepreneurship should have positive relationship with sustainable development.

2.3 Techniques for Data Analysis

The analytical tools used were co-integration technique and ordinary least square regression technique. The analyses involved country-specific study. The study employed country by country analyses for comparison of the country situations.

3 RESULTS AND INTERPRETATION

3.1 Statistical Properties

The mean, median and standard deviation of the other variables (COM, POW, ICT and HI-TECH) suggest that the variables are well behaved.

The analysis carried out in the study began with the summary statistics of the variables employed which involved analyses of the mean, median, minimum, maximum, standard deviation and the Jarque-Bera. The stationary of the variables were also confirmed with the aids of ADF and PP unit root test.

Thereafter, co-integration relations among the variables were verified using Johansson co-integration test. The four specified models were estimated through the ordinary least square estimation technique to ascertain the extent of the effect of the independent variables on the dependent variables.

The probability values of the Jarque-Bera Statistics as presented in the table show probability less than 5% level which indicate that they are normally distributed. This suggests that the variables employed in this study are normally distributed. All the employed variables have 25 data point observations which means that the thesis is a long term study.

Table 1: Summary Statistics Properties of the Variables Employed

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	NIGERIA			BRAZIL			MALAYSIA		
	EG	COM	POW	EG	COM	POW	EG	COM	POW
Mean	0.63	0.53	1.74	1.74	15.68	16.38	2.33	15.82	8.48
Median	0.59	0.40	1.75	1.75	20.62	16.64	2.29	16.30	8.00
Maximum	0.99	1.18	2.76	2.76	22.30	17.66	2.84	19.76	14.04
Minimum	0.25	0.21	0.54	0.54	5.98	14.20	1.64	7.84	5.91
Std. Dev.	0.22	0.28	0.58	0.58	6.67	0.97	0.22	3.47	1.78
Jarque-Bera	1.79	4.12	0.50	0.50	3.52	4.26	13.56	3.84	13.87
Probability	0.41	0.13	0.78	0.78	0.17	0.12	0.00	0.15	0.00
Observations	25	25	25	25	25	25	25	25	25

Source: Author's Computation

3.2 Unit Root/ Stationarity Test

The variables employed in the analysis are tested for stationarity using two unit root tests, namely, Augmented Dickey-Fuller test and Phillips-Perron test, to determine whether they are stationary or non-stationary series. The two tests are employed to reinforce one another, to ensure their robustness and boost confidence in their reliability. The tested null hypotheses for both unit root tests are the presence of a unit root. The results of the unit root tests as presented in Table 4.2, 4.3 and 4.4 for Nigeria, Brazil and Malaysia respectively. The interpretation of the unit root result is done below.

All the variables for Nigeria are stationary at 5% at level (for KBE, GDP_{-1}, and HI-TECH), first difference (EDU: FUND, FDU, SE, INFLR, POW, and ICT) and second difference for COM.

For Brazil, the variables are stationary at 5% in their levels for GDP_{-1}, first difference for EDU, KBE, EG, FUND, FDI, SE, INFLR, POW, ICT, and HI-TECH and second difference for COM.

For variables in Malaysia, EG and GDP_{-1} are stationary at level; EDU, KBE, FUND, FDI, SE, INFLR, POW, ICT and HI-TECH are stationary at first difference while COM is stationary at second difference.

As most of the variables are stationary at first differences, this implies that the variables do not have unit roots at least, in their first differences and at 5% level of significance. Having established that, at most, all the variables in all cases of Nigeria, Brazil and Malaysia were stationary at first difference or 1(1). We then applied the Johansson co-integration to determine presence of long run relationship in the models.

Table 2: The Unit Root Test Results for the Selected Variables

Variables		Augmented Dickey-Fuller test	Phillips-Perron test	Conclusion
	Nigeria			
EG	Level	-3.400512**	-2.979960	1(1)

	First Diff	-5.366556*	-4.630019*	
COM	Level	-1.502982	-1.355629	
	First Diff	-2.128007	-3.153540**	1(2)
	Second Diff	-5.888023*	-8.039254*	
POW	Level	-0.143637	-0.562858	1(1)
	First Diff	-3.410900**	-7.000106*	
		Brazil		
EG	Level	-2.449503	-2.117711	1(1)
	First Diff	-5.291412*	-6.561968*	
COM	Level	-1.624984	-1.093545	
	First Diff	-2.101154	-1.961162	1(2)
	Second Diff	-3.236463**	-3.978142*	
POW	Level	-2.929203	-2.571541	1(1)
	First Diff	-3.652260**	-5.341085*	
		Malaysia		
EG	Level	-4.585180*	-5.999559*	1(0)
COM	Level	-2.945809	-2.600868	
	First Diff	-1.136053	-1.220404	1(2)
	Second Diff	-3.025891**	-4.930051*	
POW	Level	-1.393039	-3.725793**	1(1)
	First Diff	-6.016106*	-15.96941*	

Notes:

- The null Hypothesis is the presence of unit root. All unit roots analyses included a constant (no linear trend). *, **, *** denotes significance at 1%, 5% and 10% respectively.
- For ADF test (Lags were selected based on Modified Schwartz Information Criterion for all variables); for PP test (The Bandwith was chosen using Newey-West method with Barttlet Kernel spectral estimation.)
- The Critical values for ADF test are -3.7497 (1%); -2.9969 (5%) and -2.6381 (10%) at level; and -3.7667 (1%); --3.0038 (5%) and -2.6417 (10%) at first differences
- The Critical values for PP test are -3.7343 (1%); -2.9907 (5%) and -2.6348 (10%) at level; and -3.7667 (1%); --3.0038 (5%) and -2.6417 (10%) at first differences
- Decision rule -The critical value should be larger than the test statistical value for unit root to exist

TESTS FOR CO-INTEGRATION

Co-integration tests are carried out to ascertain the existence of long run relationship among the variables employed for each model. The results of the cointegration analyses were validated using the Johansen (1991, 1995) approach. The Johansen's framework provides a number of cointegrating equations and estimates of all cointegrating vectors in the multivariate cases.

Table 3: Test of Co-integration among EG, COM. POW

Hypothesized No. of CE(s)	**Likelihood Ratio**			**Critical Values**	
	Nigeria	**Brazil**	**Malaysia**	5 Percent	1 Percent
None	33.04762*	32.11685*	38.35570*	29.68	35.65
At most 1	8.948229	17.76562*	17.67815*	15.41	20.04
At most 2	2.468677	6.640345*	4.909904*	3.76	6.65

*(**) denotes rejection of the hypothesis at 5%(1%) significance level
For Nigeria: L.R. test indicates 1 cointegrating equation(s) at 5% significance level
For Brazil: L.R. test indicates 3 cointegrating equation(s) at 5% significance level
For Malaysia: L.R. test indicates 3 cointegrating equation(s) at 5% significance level

The presence of long run relationship between Entrepreneurial Growth and Infrastructural Development in Emerging Economies is investigated with the Johansson Cointegration Technique. The variables of the

model are EG, COM, POW. The results of the cointegration test for Nigeria, Brazil and Malaysia are shown on Table 3. The Likelihood Ratio statistic indicates that the model as one (1) cointegration equation for Nigeria, and three (3) cointegration equation s for Brazil and Malaysia respectively. This indicates that there are long run relations among the variables employed in the model. Thus, the study concludes that there is a long run relationship between Entrepreneurial Growth and Infrastructural Development in Emerging Economies.

Table 4: Estimated Results of the OLS Regression for Entrepreneurial Growth and Infrastructural Development Model in Nigeria, Brazil and Malaysia

Variable	Nigeria	Brazil	Malaysia
	Coefficient	Coefficient	Coefficient
COM	-0.226179	0.067297*	-0.015078
POW	-0.005446	0.105165	-0.000667
C	0.903810*	-1.033313	2.574785**
R^2	0.112369	0.784310	0.056762
F-stat.	1.392542	39.99917*	0.525814
D-W stat.	1.081817	0.668356	2.028621

Dependent Variable: EG
Note: * denotes significant at 1%, ** denotes significant at 5%; *** denote significant at 10%

Table 4 estimated effect of Entrepreneurial Growth and Infrastructural Development in emerging economies of Nigeria, Brazil and Malaysia. The result of the model as presented in the table show that both COM and POW have negative effect on entrepreneurship growth in Nigeria. This indicates that a one percent increase in COM leads to 22.6% fall in entrepreneurship growth in Nigeria. Likewise, a one percent increase on POW has 0.05% fall in entrepreneurship growth in Nigeria. The results are not statistically significant at 5% level for both COM and POW.

For Malaysia, as in Nigeria, both COM and POW have negative effect on entrepreneurship growth. This indicate that a one percent increase in COM leads to 0.15%% fall in entrepreneurship growth in Malaysia; and a one percent increase on POW has 0.0067% fall in entrepreneurship growth in Malaysia. The results are not statistically significant at 5% level for both COM and POW.

On the contrary, the result for Brazil showed that the variables of infrastructure (COM and POW) have positive effect on entrepreneurship growth. This means that a percent increase in COM contributes 6.73% and POW contributes 10.51% to entrepreneurship growth in Brazil. The results are statistically significant at 5% level for COM but not significant for POW in Brazil.

The coefficients of determination (R2) for the model are 0.112 for Nigeria, 0.784 for Brazil and 0.057 for Malaysia. The result indicates that 11.2% of changes in entrepreneurship growth in Nigeria are explained by the model. For Brazil, about 78.43% is explained and 0nly 5.67% explained in Malaysia.

The F-statistic at 5% significance indicate that it is only in Brazil that infrastructure has significant effect on entrepreneurial growth. In Nigeria and Malaysia, infrastructure does not have significant effect on entrepreneurial growth.

Summary, Conclusions and Recommendations

There is a long run relationship between Entrepreneurial Development and Infrastructural Development in Emerging Economies. The OLS analysis showed that only in Brazil that infrastructure has significant effect on entrepreneurial development indicating that mixed finding exist on the effect of entrepreneurial development on infrastructure development in emerging economies. The research results of this study is in line with earlier research findings which indicated that entrepreneurship plays significant role in economic growth, innovation and poverty alleviation in developed economies (ACS & Audretsch, 2005) and that growth and productivity in an economy is driven by positive infrastructure environment (Wenneikers *et al*, 2005). Numerous case histories demonstrated that new technologies are seldom if ever developed by a single firm alone in the vacuum of an institutional environment (Chandler, 1990; Cressy, 2000, and Curran & Storey, 2002).

The challenge for entrepreneurship development in emerging economies is how to provide the needed enabling business environment such as security, infrastructure, keeping pace with technological advancement, stabilizing the economy and reducing cost and procedures in start-ups; that would attract foreign investors into an economy to merge with the home-based entrepreneurs for enduring economic development. Government is both regulator and economic agent but government could undermine economic growth through policy inconsistencies, inaccurate economic statistics, corruption, misgovernance and neglect of the private sector which is the hallmark of sustainable economic development.

The organized private sector should partner with the government in providing infrastructure facilities, enabling environment, offer labour tax breaks, subsidize petrol, lower electricity tariff and lessen the stress inherent in start-up procedures. Entrepreneurial growth and infrastructure development should be encouraged through incentives such as tax holiday and through integration, communication, computer services and hi-tech firms as these variables are some of the world acclaimed economic indicators.

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