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IMPACT OF GOVERNMENT INVESTMENT IN EDUCATION AND ENTREPRENEURSHIP ON NIGERIA'S INNOVATION PERFORMANCE

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Abstract

Nigeria is a developing country that is afflicted by many challenges including failing education system, infrastructural deficit and poor business environment especially for the entrepreneur. Nigeria's Government policies and programs should now focus on promoting quality, accessible education as well as social and entrepreneurship development with a view to achieve a better national innovation capacity and performance . This paper examines government investment in the area of education and entrepreneurship development in Nigeria and the effect it has on Nigeria's performance in Global innovation index ranking. Data from GII index were compared with Nigeria's government expenditure on education, social entrepreneurial investment and patenting output. The data obtained were processed using artificial intelligence and label encoding. Heat maps were plotted; principal component analysis and primarily correlations methods were used to establish relationship between variables.

Keywords: Education, Entrepreneurship, Innovation capacity, Investment, Policy.

Introduction

Nigeria is making enormous effort to position itself on the international scene, but it has not been very successful at that. However, Nigeria's strengths, potential and capabilities needs to be taken into account. It has the biggest domestic market in the region and its rich in natural resources particularly oil is of immense value. In Nigeria of today, there is a vast untapped human capacity of skill and potential that could be developed, strengthened and utilized. Nigeria, despite its vast potential and very rich natural resources is still often classified as a third world continent and Nation. In an article about extreme poverty, Carolina Sánchez (2020) asserts that Nigeria and India are showing diverging trends. Nigeria may have already overtaken India as the country with the most extreme poor while India has been rapidly reducing extreme poverty and estimates forecast that the country can achieve the extreme poverty goal. The challenge with Nigeria therefore is not the absence of resources but in fact the ability to harness and innovatively transform the resources. Entrepreneurship development and quality Education are key features in determining the innovation capacity and performance of any country.

Therefore, more than ever, now is the time for the Nigerian Government to investment significantly in Education and Entrepreneurship development. A better quality and accessible education system will enable Nigerians especially the young population to maximize and take advantage of the global economic opportunities. Within the last 10 years, the Nigerian Government has introduced a variety of social policies and entrepreneurship development

schemes aimed at improving social welfare and economic agility. Entrepreneurship and Education however are the bedrock of a knowledge driven economy, when properly invested in will ultimately lead to higher productivity and improved national innovation capacity.

The relationship between Investment in Education and government efforts in entrepreneurship development in Nigeria are discussed in this paper.

This paper seeks to answer the following research questions: 1) how does the government investment in education influences innovation capacity and patenting results? 2) Does government policy and efforts in entrepreneurship development improve its innovation performance?

Literature Review

Innovation

Innovation is known to be critical to technological and economic development judging by the experiences of the developed countries of Europe and America. Didero, Gareis, Marques and Ratzke (2008) in their publication assert that innovation opens the leeway to new technology and adoption by firms with a view to catching up with prevalent technology frontier for sustainable economic growth and development. The economic and technological contributions of innovation to national development have extensively been discussed theoretically and empirically in several studies. Lynn K (2000).

According to Rinne, Steel and Fairwheather (2012), a country's innovation system is the set of institutions, procedures, and processes that determine how it can create, acquire, disseminate, and use knowledge and information. In practice, this is the network of universities, research centers, think tanks, firms, business associations, and, more generally, producers and users of knowledge in the country. The Global Competitiveness Report (2009) also confirms that innovations are a necessity for the most advanced economies in the world, especially if they want to sustain high wages and a high standard of living. This is why factors and inputs of a country's innovativeness are a very important economic issue. A countries ability to build a culture of innovation, a high quality demand education and conducive business environment with adequate information technology will contribute to the countries capacity, competitiveness and overall performance, OECD (2016).

Education and Human Capacity Development as a Driver of Growth and Innovation

Radwan and Pellegrini (2010) explain that the Nigerian Education system is similar to that of many Anglophone African countries. It comprises nine years of basic education, six years of primary school, three years of junior secondary school, and three years of senior secondary school. To these, generally four years of tertiary education are to be added. The responsibility of providing education is divided among the federal, state, and local governments, along with a growing number of private providers. In today's world highly skilled and flexible human capital is essential to compete effectively and it is a key building block of innovation capacity. Quality and accessible education is a factor in high skill acquisition and development. A highly skillful human capital enables a nation to adopt, adapt, use, and produce knowledge, and becomes central to its development. Rui Baptista and Peter Swann(1998) in their study links human capital to new technology creation and adoption, while Nelson and Phelps (1966) argues that a larger human capital stock aids technological catch-up between lagging nations

and more advanced economies. Artadi and Sala-i-Martin (2003) find that primary school enrollment rates are positively correlated with GDP growth rates in African countries .This in the long run impacts entrepreneurship capacity. Therefore achieving universal primary education is in itself a challenge that many developing countries are grappling with in the context of the Millennium Development Goals (MDGs). Damanpour.(1987) suggests that many countries, particularly developing ones like Nigeria must improve the access to, quality and relevance of, and funding for education in order to produce the skilled and flexible labor force that is required to project them into the realm of better innovation capacity and knowledge economies .

Lucas (1988) asserts that endogenous growth theory has shown that countries with a larger stock of human capital experience higher growth rates. Investment in education improves human capital and the capacity to innovate. It's imperative, looking at the countries with Ivy leagues universities and educational centers, they obviously are no behind when it comes to knowledge and innovation. The opposite is also true, when you look at the countries with low performance in innovation. For example in the case of Nigeria the best university in Nigeria is ranked 1258 in the world according to webometrics info (2020).

Social Policy and Entrepreneurship

According to Semiu A (2019 the liberalization of Nigeria's polity in 1999, successive governments have come up various empowerment schemes to cater for the aspirations of unemployed youths and to fulfill their campaign pledge to party loyalists. During the administration of President Olusegun Obasanjo (1999 – 2003 and 2003 – 2007), Poverty Alleviation Programme (PAP) and the National Poverty Eradication Programme (NAPEP) were launched to rescue some of the country's youth from abject poverty while the presidency of Goodluck Jonathan (2010 – 2015) set in motion the Subsidy Reinvestment Program (SURE-P) to empower the teeming army of unemployed youths. Typical of every previous government before his, the government of Muhammadu Buhari (2015 – 2019) developed the National Social Investment Programme (NSIP) to train Nigerian youths in marketable skills while providing a means of livelihood for unemployed qualified youths. Apart from the Federal youth empowerment schemes, states like Osun and Oyo have also come up with state-financed empowerment schemes to fulfill their campaign pledge. Some state governors have even gone as far as creating a database for the unemployed youths in their state, like the Osun State Job Centre.2 Interestingly, due to the nature of all these schemes, none of the youth empowerment schemes have been able to survive regime change. Semiu Adefemi (2019)

In 1934, Schumpeter stressed the role entrepreneurship plays in the development and spreading of innovation. Entrepreneurial development has been conceived by successive governments as a program of activities to enhance the knowledge, skill, behavior and attitudes of individual and groups to assume the role of entrepreneurs. They have put in place confidence for building successful programs in different parts of Nigeria, Owualah (1999). Waziri (2012) finds that the Nigerian government promotes entrepreneurial culture through initiatives that builds business confidence, positive attitude, pride in success, support and encouragement of new ideas, social responsibility, providing technological supports, encouraging inter-firm linkages and promotion of Research & Development.

A study by Monday (2012) reveals that most of the institutions and agencies established by the Federal Government to ensure appropriate entrepreneurial development skills are plagued with drawbacks such as inadequate of start-up loans, delays in loan disbursement, and loan diversion by participants, poor loan repayment performance and lack of requisite skills among the beneficiaries.

Data and Methodology

This study covers the 11 years between 2009 and 2019. The study explores data from Global innovation index, Nigerian budget on education, entrepreneurship policy and patenting output. The data relating to global innovation index was obtained from the GII website and the data relating to the Nigerian government was also obtained from the national bureau of statistics of Nigeria. Principal component analysis was used to reduce the dimensionality to 2 orthogonal components in order to see the trend along the line of which we can drive our analysis and validation of our observation.

Analysis

	Year	GII ranking	Education allocation fraction	Number of patents	Investment
1	2009.0	96.0	8.00	0.0	MNDA
2	2010.0	96.0	6.00	0.0	O-YES
3	2011.0	96.0	8.00	64.0	O-YES
4	2012.0	123.0	10.00	42.0	SURE-P
5	2013.0	120.0	8.70	50.0	SURE-P
6	2014.0	110.0	10.63	0.0	SURE-P
7	2015.0	128.0	9.50	0.0	SURE-P
8	2016.0	114.0	8.44	85.0	NSIP
9	2017.0	119.0	6.00	100.0	NSIP
10	2018.0	118.0	7.04	120.0	NSIP
11	2019.0	114.0	7.02	0.0	NSIP

Fig 1: Complete data set of Nigerians GII ranking, Nigeria government's expenditure on education, Number of patenting and social entrepreneurship investment.

	Year	GII ranking	Education allocation fraction	Number of patents	Investment
1	2009.0	96.0	8.00	0.0	0
2	2010.0	96.0	6.00	0.0	2
3	2011.0	96.0	8.00	64.0	2
4	2012.0	123.0	10.00	42.0	3
5	2013.0	120.0	8.70	50.0	3
6	2014.0	110.0	10.63	0.0	3
7	2015.0	128.0	9.50	0.0	3
8	2016.0	114.0	8.44	85.0	1
9	2017.0	119.0	6.00	100.0	1
10	2018.0	118.0	7.04	120.0	1
11	2019.0	114.0	7.02	0.0	1

Fig 2: Shows the numeric value of government social -entrepreneurship investment This has been label encoded to numerize its entry. The label encoding is a technique used in data analysis in order to apply artificial intelligence methods to draw the insight from the data sets.

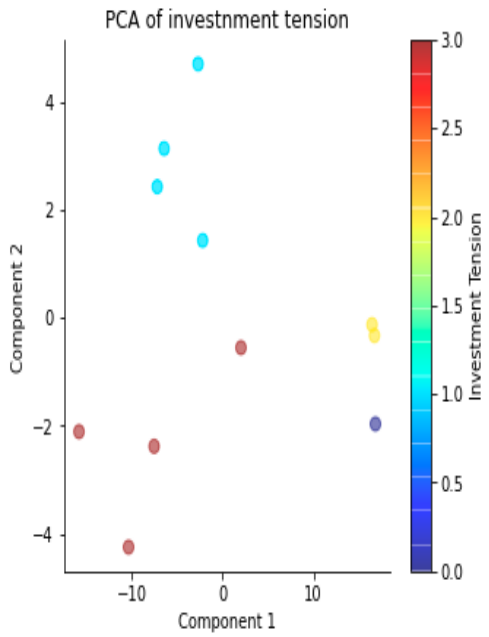


Fig 3

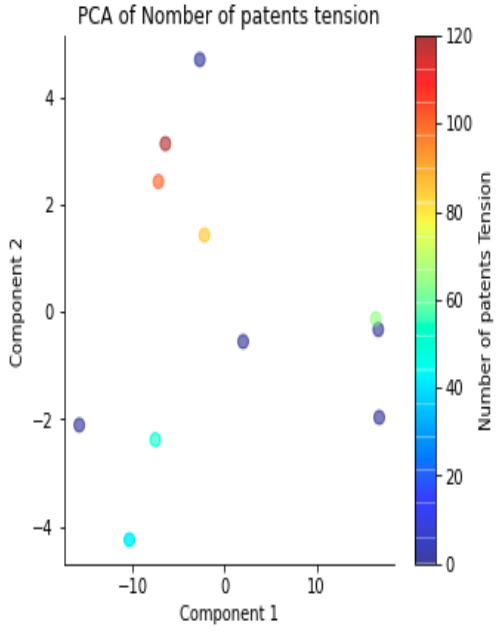
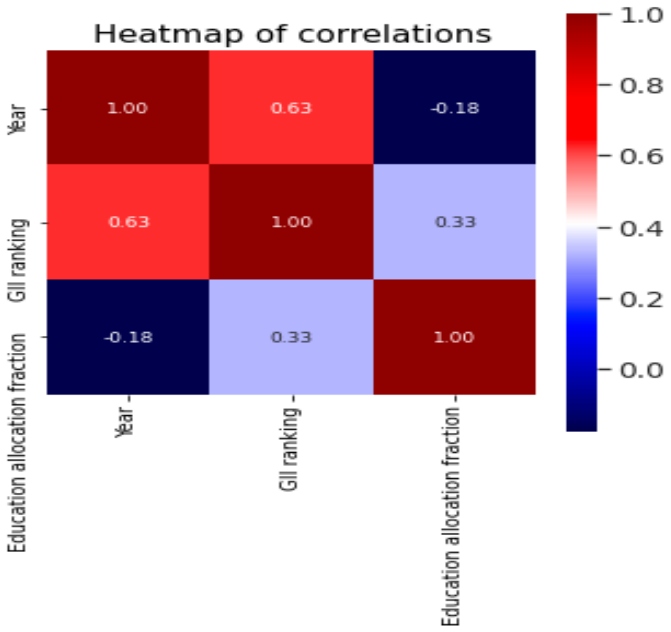


Fig 4

Fig 3 represents the PCA analysis of the data set in Fig 2. This PCA was mapped with respect to the investment span which we call investment tension. The observation is that data set is spread out all over the color range. This implies that our data set in Fig 2 is reliable.

The PCA in Fig 4 which is mapped over the number of patents also indicates that our date is reliable.



The heat map in fig 5 represents the table of correlations and in this case the heat map was computed using the 3 Independent variables. Here we can clearly see that there is weak correlation between these 3 columns and therefore using them as Independent variables to drive home the observation for this study is valid.

A fig 6 show captures the interdependence between each pair of columns in the data set. It helps to have an overview on the general behaviour of the data.

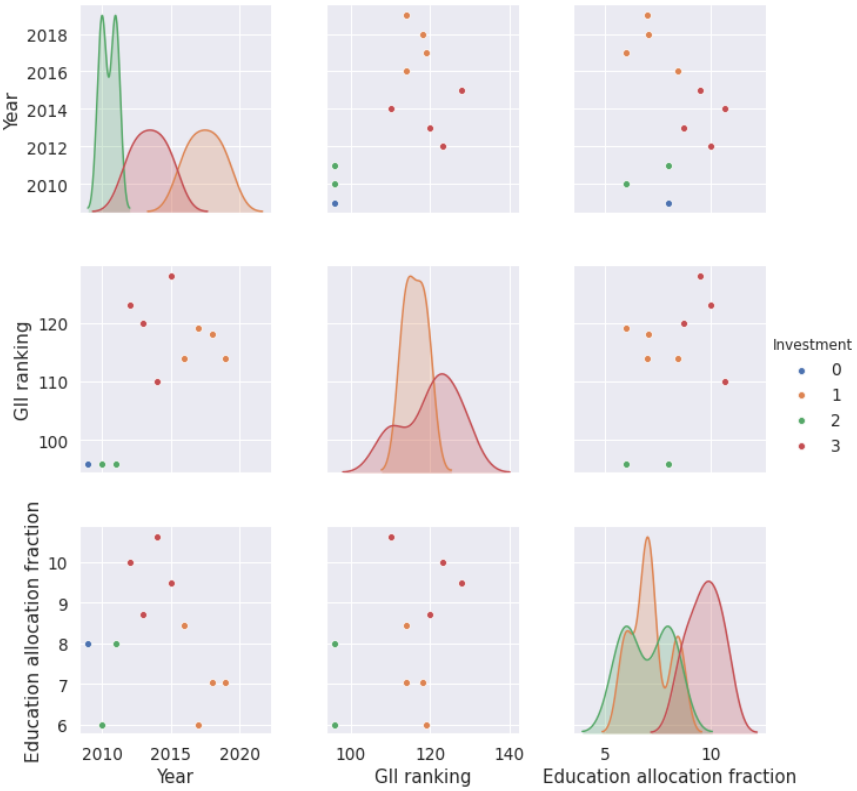


Fig 6

Fig 7

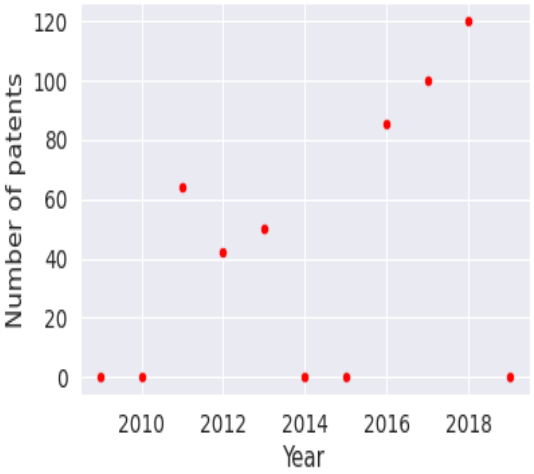
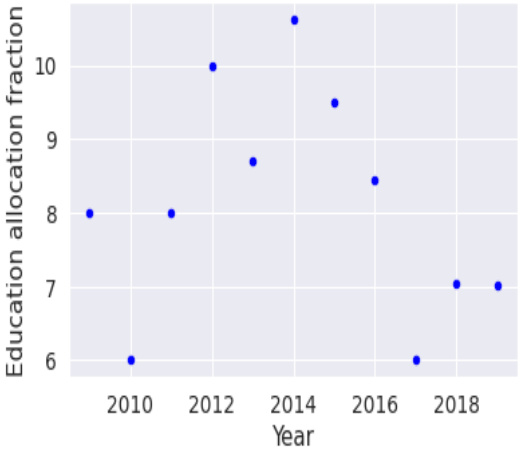
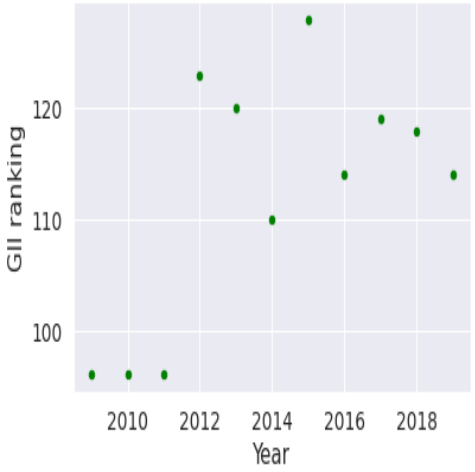
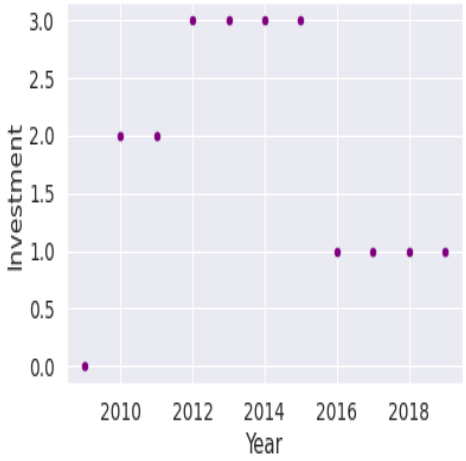


Fig 8







Observations

The four figures above present the full scope of observations made from this data set. The above analysis shows that the number of recorded patents in Fig 7 seems not to influence the GII ranking in Fig 9. Patenting is linked to entrepreneurship activities and quality national innovation system as well as effective patenting policies Omotosho D. (2020). According to Schumpeter, innovation would not occur in the absence of patent protection or alternative mechanism for protection. It is expected that the more patents awarded at a given time in a country, the better the GII rank for that period of time. Data analysis from this study shows otherwise. However, it is necessary to find a different explanation as to why this is the case. The conjecture here is that: The patenting policy in Nigeria is not effective and transparent. An earlier research by Omotosho D (2020) shows that:

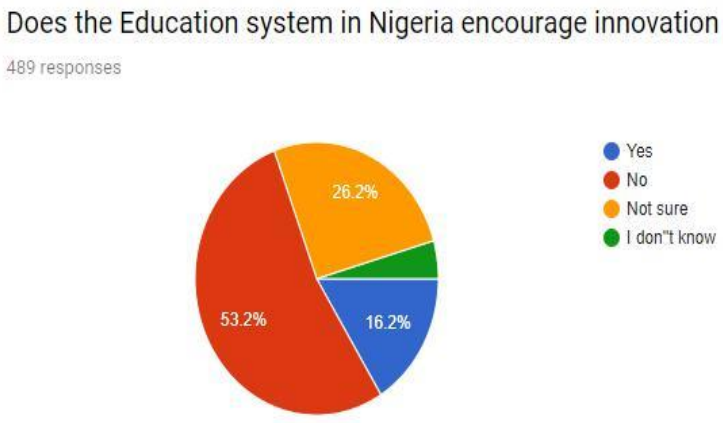
- The patenting awarding in Nigeria is not globalized and synchronize with the international recording system as there is a huge lack of patent data /record
- The patenting awarding is not rigorous enough to earn global acclamation because of corruption.
- The patenting awarding doesn't show genuine originality

This independent study finding corroborates that earlier observation.
The global innovation index also appears to be somehow independent of the education budget allocation as shown in Fig 8. It seems the education budget does not necessarily impact on the GII index. It would have been expected that the more investment injected into education the better the education quality and access and in turn improved GII index. However the observation in this study shows otherwise. This trend can lead to some further issues and query. The first is whether the education system in Nigeria supports or encourages innovative attitude? The second is whether the education budget allocation is been effectively managed in order to drive the country towards quality education and knowledge economy?

What we observe in figure 8, 9, and 10 leads us to making the following assumptions:
• The funds allocated to education budget is being invested more into infrastructure building not necessarily in intellectual capacity.
• The funds allocated to education is being misused under other disguised as the quality of the outcome is nowhere near the expected result. Further investigations might give us a better grasp on this.
• The funds allocated to education is being mismanaged in various other ways having nothing to do with improving the accessibility and quality of education. Further studies might bring more light.

We can therefore opine that the investment in education is linked to improvement in infrastructure but not necessarily improvement in intellectual capacity. Better school buildings but poor teachers will be counter-productive. There must be a balance, focus should be on intellectual capacity not just infrastructure.

An earlier research by Omotade, D .(2020) also shows that the Nigeria Education system does not support innovation. This observation above is consistent with the previous study. Education is a critical factor and a catalyst toward human innovation capacity. The poor performance of Nigeria on the global innovation index is a result of a number of factors along with severe case of under human capital development in terms of science, technology, research and funding is a major one.



Source: Omotade. D , Assessment of Nigeria's Innovation capacity, 2020 PhD Thesis

It is also worth noting that the funding of education at all levels in Nigeria is below the benchmark recommended by the United Nations Educational Scientific and Cultural Organization (UNESCO). While UNESCO's benchmark for funding of education was 26 per cent of the national budget and 6 per cent of the gross domestic products (GDP), Nigeria has been allocating 6 per cent of the national budget to the funding of its education. This day Newspaper (2018)

The Investment efforts of Nigeria government as shown in Fig 10 appear to be driven by education budget allocation. In others words, we can observe that an increase in education budget in fig 8 shows an increase in investment as shown in fig 10 . Therefore one can say that the Nigerian Government's investment in social and entrepreneurship development does not have significant impact on the GII index ranking. As shown in Fig 9 and Fig 10. This analysis further suggests that there is a clear case of investment diversion, mismanagement of funds and corruption. The government is investment money into education and entrepreneurship, however based on the analysis above there is no significant impact of such investment. The impact of government investment is not seen positively on the GII index ranking as shown in Fig 9.

Conclusion

Nigeria shows traits of great weaknesses when it comes to its industrial, education and entrepreneurship capabilities as well as policies. There is no doubt that Nigeria has a very low degree of competitiveness when it comes to global economic performance. Critical look at the snapshot of Nigeria's competitiveness by pillar in the Global Competitiveness Index as noted by the global competitiveness report 2015-2016 shows that Nigeria performance in each of the twelve pillars shows nothing to be desired. Nigeria's global innovation index and competitiveness ranking is a reflection poor investment of government in entrepreneurship and education, lack of sustainable social entrepreneurship policy and endemic corruption at all levels. Hence the results are in the inability to compete, poor economic growth, high unemployment rate, poor quality of life and ultimately poor ranking in global innovation index. The Unconditional government support to oil extraction (as the main means for the government to earn foreign exchange) has somehow meant the Neglect of human capacity building and other productive sectors of the economy that can drive innovation. Egbetokun et al (2008). More than ever, now is the time the Nigeria government investment in National innovation system that will allow the flows of technology and information among people, enterprises and institutions. In this study It has been established that entrepreneurship activities are linked to product patenting and the ability to be effective as an entrepreneur is linked to knowledge acquisition through formal or non formal education, where the latter is enhanced primarily through government investment and sustainability. It is therefore recommended that the Nigerian government focus on building a knowledge economy linked with entrepreneurial endeavour as it continues to provide funding and resource. It also needs to enforce laws that will mitigate corruption and uphold regulations that will sustain its policy and programs.

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