Exploring the Relationship Between Infrastructural Development and Improved Internally Generated Revenue in Nigeria

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Abstract
Due to the low revenue collection performance and poor infrastructural development in Nigeria, this study investigated the relationship between Infrastructural Development and Improved Internally Generated Revenue in Nigeria. The data was collected from the Central Bank of Nigeria and the Joint Tax Board. The Real Gross Domestic Product (dependent variable) was used as a proxy for Economic Growth. By extension, it is manifested in Infrastructural Development and Internally Generated Revenue (Independent Variable) of all the States and Federal Government of Nigeria. The data were subjected to various tests: Descriptive Statistics, the Augmented Dickey-Fuller unit root test, the correlation matrix, and ordinary least squares, the Generalized Method of Moments, and Vector Autoregressive (VAR). After the analysis, it was discovered that internally generated revenue significantly relates to infrastructural development. This study also found a unidirectional causality from infrastructural development to internally generated revenue. Furthermore, the result of the impulse responses found that infrastructural development responds to the long-run equilibrium after the shock of internally generated revenue. The variance decomposition reveals that infrastructural development responds to IGR whenever a change occurs. The findings of Vector Auto-Regressive -VAR (1) could forecast the IGR in Nigeria with a high degree of accuracy, and this shows the relevance of the results of this empirical exposition for fiscal policy formulation as it forms the basis for tax bodies and related agencies to consider the IGR threshold for Nigeria in the process of targeting adequate infrastructural development.

Keywords: *Infrastructural Development, Internally Generated Revenue, GMM, Nigeria*

1. Introduction

1.1 Background

Infrastructural development and Internally Generated Revenue in Nigeria have been contemporary issues in Nigeria recently. While it seems Infrastructural development is not moving at the rate it should, thereby impeding economic growth, it occurred to me that there could be a relationship between infrastructural development and improved revenue generation hence this topic. From our personal experiences, we all know that no one pays tax smiling, not to talk of when there is nothing to show for the revenue already collected from the citizenry. Ogbonna (2021) defined the Internally Generated Revenue of a country as all the funds generated from taxes and services due to the government of a country for a particular period. In Nigeria, internally generated revenue can be tax-based, or service-based. The tax-based revenue accrue to the Government based on mandatory

levies paid by the nationals and non-nationals of the country. These categories of revenues are backed up by law and are clearly state how they should be calculated and collected and are not subject to any change by the authorities without amending the laws creating them. Examples of tax-based IGRs are petroleum profit tax, company income tax, personal income tax, etc. On the other hand, the service-based IGR is money paid by the citizens seeking the services of the Government in their transactions. These revenues can be determined administratively, though some states are trying to pass laws guiding the management and collection of these types of revenue. Examples of these revenues are fees for land registration, approval of building plans, registration of private schools, and registration of private hospitals, etc. These revenues help the government to pilot its affairs, be it capital or recurrent expenditure-based.
Adam (2006) defined internally generated revenue as all monies collected within the boundaries of that nation or state to handle state matters. Such monies come from tax and non-tax items. Tax items are obligatory, while non-tax items are service-based. In Nigeria, the Taxes and Levies Approved Taxes and Levies' List for Collection Act 1998 No. 21, as amended, was enacted to give legal backing to all taxes to be collected by various tiers of government.

However, the State and Federal Governments are free to enact laws and/or policies that will guide the collection of service charges for all services rendered. Obiechina (2010) defines Infrastructure as a large scale of public systems, services, and facilities of countries necessary for economic activities. Infrastructural development can only be actualized with finance. The government needs funds for Infrastructure development, and high revenue needs to be generated to plan, execute, and maintain infrastructures in a country. Consequently, revenue generation for infrastructural development, such as the construction of accessible roads, the building of public schools, healthcare, and the construction of bridges, among others, becomes important. On the other hand, people must see the government utilizing the taxes they pay properly as an incentive for further payment of taxes. Infrastructural developments are mostly financed from internally generated revenues or aid and grants from international organizations, which may not be enough or embezzled by corrupt public officeholders. Thus, the Government cannot embark on infrastructural development, execute, and conduct the maintenance and services of these projects and other responsibilities without sufficient revenue generation. The functions of government, as recorded in the 1999 constitution of the Federal Republic of Nigeria, include the concurrent responsibilities that both the state and federal governments are required to implement. The government is responsible for providing education, healthcare, potable water, and roads, linking states, local governments, and communities within the country, among other responsibilities. The constitution has empowered all levels of government in Nigeria to generate revenue through various sources (external and internal). These sources are the statutory allocation, Internally Generated Revenue (IGR), grants, and fines, among others.

1.2 Statement of Problem

The government has been the main player in the area of Infrastructural development, which is financed with public funds according to the Organization of Economic Co-operation and Development (OECD). This indicates that the government has a key role in actualizing infrastructural development. Infrastructural development in Nigeria has been neglected by the state

and federal governments, while the funds allocated for financing infrastructure in the government budget are inadequate. The cause of the poor infrastructural development financing has been traced to insufficient revenue generation, whole attachment to statutory allocation, Corruption and misappropriation of public funds, and lack of will for revenue enforcement. These may be the basic reasons why infrastructural development is poor in Nigeria. However, it may also be the other way around, i.e., the problem of poor internally generated revenue could be a result of poor infrastructural development. Infrastructural development is associated with a high demand for funds, which can only be actualized with finance. Consequently, commensurate internally generated revenue is required for the maintenance, planning, and execution of infrastructural projects in Nigeria. For infrastructural development, such as the construction of accessible roads, the building of public schools, healthcare, and the construction of bridges, among others, revenue generation must be improved. Most revenues the government uses to finance infrastructures are either generated from internal sources, allocation from the federation accounts, or grants and aid from international organizations, which may not be adequate. Hence, insufficient generation of funds (revenue) will hinder the execution and maintenance of infrastructural development projects and other Government responsibilities. Infrastructural development has been financed with public funds. According to the Organization of Economic Co-operation and Development (OECD), the government was the main player in this field. This indicates that the government has a key role in actualizing infrastructural development. The government has failed to monitor and evaluate infrastructural projects to ascertain the budget performance and the adequacy of funds for such projects. The issue of poor revenue generation and poor Infrastructure is common in Nigeria, and this is a challenge that needs to be tackled.

Based on the above reasons, adduced to the poor generation of revenue, it is now clear that the execution and maintenance of Infrastructure, even in the future, will be a serious problem. This now brings us to whether its Infrastructural development causes Improved Internally Generated Revenue or vice-versa.

2. Review of Related Literature

2.1 Theoretical Support

The essence of theoretical support in a lecture like this is important at this stage. The theoretical framework connects the researcher to existing knowledge, while theoretical significance deals with how your theory will gain new understanding when applied to the study. This is accomplished by looking at earlier studies similar to the study to establish the gap in the literature the study attempts to fill. In this Lecture, the gaps have been embedded while the basis for my inference at the end of the day will be established. Having initiated the essence of the study, the theories selected for this purpose are the Endogenous Growth Model and Unified Economic growth theory.

2.1.1 Endogenous Growth Model

Endogenous growth theory opines that economic expansion is generated from within a system as a direct result of internal processes. The theory states that only internal forces foster the economic

growth of a country. Furthermore, the endogenous theory opines that productivity will increase when institutions (including government and the public) invest in human development and innovations. The application of the endogenous growth theory emerged not too long ago from the works of Barro (2010). He used the endogenous growth model to find a linkage between public revenues/spending and economic growth which was linked with the relationship between non-oil export and economic development in Nigeria.

This research, consequently, is anchored on the Endogenous growth theory, which is the appropriate theory for this study because it talks about taking advantage of the internal opportunities available to a nation, like technology, human resources, capital, and population, to grow the nation's economy. Premised on this, applying the endogenous growth theory is considered the most suitable theory for investigating Nigeria's revenue and economic growth (which is proxied by Infrastructural Development).

2.1.2 Unified Economic Growth Theory

The Unified Economic growth theory is a combination of various models of economic growth ranging from the period of slow economic growth to the first industrial revolution and the beginning of economic growth to the period of human capital formation in economic development to the period of economic growth divergence across different countries. When put to empirical test, this theory shows that the technological environment generated a higher income level and, hence, higher productive successes. In light of the above, the theoretical underpinning builds on the political economy theory of fiscal policy. This theory opines that governments generate revenues for investment in targeted development projects and public goods. The government makes policy decisions, which decide how best to allocate the collected limited resources to alternative competing sectors (Hassler, 2007; Battaglini & Coate, 2008). In developing countries, governments accept the task of providing and maintaining public goods and services. As a sequel to the enormous task faced by governments, proper allocation of limited resources becomes necessary, as such governments face tradeoffs. The tradeoffs that governments often face in public expenditure management were succinctly summarized by Khattry (2003) in three forms. The first involves the tradeoff between public spending on physical Infrastructure and human capital. Based on the substantial costs involved in capital investment, the involvement of the private sector is limited. Thus, the government takes a large share of the burden of undertaking such an investment. However, governments also emphasize allocating substantial resources to human capital investment to maintain social cohesion and political legitimacy. According to Khattry (2003), the second challenge is the allocation of resources between expenditure in defense and that of physical and human capital development. It is contended that governments in developing countries facing deteriorating political and social conditions tend to invest in military apparatus to maintain political authority while compromising physical and human capital investment. The third concern is allocating resources between public investment in physical and human capital infrastructure and interest payments on accumulated debt. Sequel to too much borrowing by developing countries, they have sacrificed spending on capital investment for debt servicing to borrow more. You and I know this is what we face in Nigeria today, where in 2022, Nigeria's debt service to revenue ratio stood at 80.6%.

2.2 Conceptual Review

2.2.1 Revenue Generation Defined

Many scholars have interpreted and defined revenue in diverse ways. Samuel and Gabriel (2016) said that revenue is the required resource by the government for the sole aim or objective of governance. Revenue can also be considered as income that accrues to an entity. Consequently, the Federal and State Government revenues are induced from taxing her citizens, external sources, and the sale of public properties. Ishola (2005) sees revenue as resources that the government of a country uses to finance its activities. Federal and State governments in Nigeria can generate revenue from various sources such as mining, taxes, vehicle haulages, royalties, grant, and aids etc. Otunbala (2011) suggests that sources of revenue of government are the total funds realized from non-oil and oil sources such as rates, fines, taxes, grants, and other incomes, which include but are not limited to the issue of debt instruments in the capital market.

Based on the above definitions, the total cash inflows to the government derive from internal and external sources for a period. Osisami (1994) in Adesoji and Chike (2013) revealed that the government generates its income through internal and external sources. While state and local governments see the federally distributed revenue, grants, and aids as external, the revenue they collect, as stipulated in the constitution, constitutes internally generated revenue. Internally generated revenue is generated within the state, including taxes, motor vehicle licensing, and royalties.

2.2.2 Concept of Infrastructural Development

According to the Readers Digest Universal Dictionary, infrastructure refers to the fundamental buildings, tools, services, and installations required for a nation to thrive, expand, and function. Gianpiero (2009) specified that infrastructure refers to the physical, institutional, and social resources made available to economic agents and help a nation thrive. For transportation, telecommunications, and basic needs of a community, local government, state, and a country as a whole, as well as serving the functions for public administration, education, research institutes, healthcare, and social welfare of the citizens, infrastructure development can be thought of as assets, equipment, structures, and basic amenities, among others. Economic infrastructure may be a component of infrastructure development.

2.2.3 How Infrastructural Development will help Nigeria.

2.2.3.1 Infrastructural Development Will Increase Agricultural Production and Productivity:

Infrastructure development can potentially increase the nation's agricultural output and productivity because more Nigerians are turning to farming. If infrastructure investment is made available, infrastructure development can boost the comparative advantage of different states. Assuming the Nigerian government can build good roads and other infrastructure so that people may easily transport their farm produce to markets and other states. In that instance, the country's GDP will rise because of increased agricultural productivity. The government will offer tractors and 1 water supply channel, along with other aid to farmers, to enable cultivating throughout the

dry season, increasing agricultural output. All of these will lead to an increase in the GDP of the country.

2.2.3.2 Infrastructural Development Accelerates Industrial Growth

Industrial activities require not only raw materials, machinery, and equipment but also Infrastructure to aid the movement of products. Private investors will only establish an industry with good and sound Infrastructure in a particular location. Infrastructure facilities like transport, good roads, and machinery, among others, serve as boosters for industrial development, which brings about increased Gross Domestic Product of the country.

2.2.3.3 The Flow of Foreign Capital Increases as a Result of Infrastructure Development

The globe is becoming a global village; in this globalized and technologically advanced generation in which we currently live, the necessary infrastructure must be in place for efficient globalization. Foreign investors are drawn to infrastructure facilities. Any state or nation with sufficient infrastructure facilities for use would attract foreign direct investment as well as portfolio investment**.**

2.2.3.4 Infrastructure Supports the Growth of the Tourism Industry

This is a new sector of the economy that contributes to the internally generated revenues of the Government. Nigeria has a lot of tourism centers that could generate revenue for the country but has yet to be addressed and abandoned by the government. For proper development of tourism centers, infrastructure development is very much required, therefore, infrastructure development is crucial to the growth of the tourism industry.

2.4 Relationship between Study Variables

2.4.1. Statutory Allocation and Development of Infrastructure

The state government, which is the second level of government, is given a statutory allocation from the federation account. The Federal Republic of Nigeria's constitution, Article 16, Section 42, addresses this portion of revenue.

The present sharing formula of 52.68% to the Federal Government, 26.72% to the State, and 20.60% to the local governments excluding the 13% derivation for the oil-producing states (Oseni, 2013), can aid Federal, State, and Local Governments to finance the execution of infrastructural projects in the country that will bring rapid economic growth in the country. However, these allocations are being misappropriated, thereby eluding the purpose for which they have been allocated.

2.4.2. Internally Generated Revenue and Infrastructural Development

The internally generated revenue is revenue generated by states and Federal governments within the system. This is revenue that does not come from grants and statutory allocations to the government. IGR encompasses taxes, fines and fees, licenses, sales earnings, and rent on government properties (Agu, 2010). States and Federal governments use IGR to finance infrastructural development in the Country. However, the Internally Generated Revenue in the

country has not been properly harnessed to take care of infrastructural development in the Country, and this has affected the execution and maintenance of projects in Nigeria.

2.4.3. Grants and Infrastructural Development

International agencies provide grants to Federal and State Governments to aid the execution of certain specific projects, to enable them to execute specific projects, particularly in the provision and upkeep of some essential facilities and infrastructure for the populace. Among these fundamental comforts are access to water and power, the building of educational and health facilities, and the construction of roads.

2.4.4. Revenue Generation and Infrastructural Development

The Federal and State Governments have constitutional responsibilities for delivering social services like effective roads, healthcare, schools, and potable water, among others. In Nigeria, Governments (Local, State, and Federal) are saddled with the responsibilities of meeting the needs of the masses in terms of infrastructural development and provision of social amenities. However, they are unable to do this unless they are given sufficient financial and personnel resources to perform these mandated duties. The government will be prepared for rural changes in terms of infrastructure development, such as road construction, with enhanced revenue production and maintenance, provision of portable pipe-borne water, the building of health centers and maternity homes, as well as educational facilities and vocational training centers for the citizens. All these will add to the economic growth of the country. Mr. Vice Chancellor sir, poor revenue generation, as well as corruption, have been the major problems hindering the efficient performance of the functions of the Government and the infrastructural development in Nigeria.

2.5 Bane of Revenue Administration in Nigeria

Revenue administration is bedeviled by a lot of challenges that have hindered the improvement of revenue generation and collection in Nigeria. Based on my experience as a tax administrator, I have taken time to note the following issues as the bane of Revenue administration in Nigeria:

2.5.1 Lack of Tax Culture in Nigeria

Most Citizens of Nigeria have not imbibed the culture of paying their taxes as and when due. This could be attributed to the late emphasis on tax compliance by the government due to the oil boom. At that time, one President of Nigeria was quoted as having boasted that the problem of Nigeria wasn't money but what to do with it. Tax revenue was neglected because there was "too much money." Consequently, no conscious effort was made to persuade Nigerians to be tax-compliant.

2.5.2. Non-Provision of Adequate Infrastructure by Government

In my years of serving as the Chief Executive of the Internal Revenue Service of Abia State, I discovered that people will always relate going to pay their taxes to infrastructural development. Taxpayers will pay more taxes when they see that the government uses the previous taxes paid for infrastructural development. For instance, those who live in the area where their roads are built will, though, not willingly pay their taxes than those whose roads are bad. In his research, Wardana

(2017) discovered that most infrastructure variables have a positive impact on tax performance indicators which include compliance with tax reporting and tax payment.

2.5.3 Advise by Tax Consultants

My experience for several years as the Executive Chairman of the Internal Revenue Service exposed a lot of unethical practices by consultants, who confuse their clients and come to argue the tax laws to assist their clients in evading tax payments. There are situations where tax consultants even come to 'pass the ball' to the IRS to bring down the tax liabilities of their clients.

2.5.4 Lack of Patriotism

The lack of love for the country/state is one of the things that hamper adequate tax compliance. Lack of care for the country's development and selfish interests affect full tax compliance. People latch in on the non-provision of amenities by the Government to hold back their civic responsibilities/obligations to the State.

2.5.5 Ignorance of Officials of Organizations

Most organization officials ignore calls from tax authorities for tax compliance. Letters from the tax authorities encouraging individuals and organizations alike are trashed without knowing the implications of such in law.

2.5.6 Engagement of Non-Professionals/Lack of Training of Tax Officers

Most organizations extend tax responsibilities to those that do not know anything about tax laws. A situation where nontax professionals are engaged to conduct tax functions is unacceptable. It is equally instructive to state that training is a *sine-qua-non* for tax and nontax persons. Organizations need to know about tax laws and their rights concerning tax compliance. Hence frequent training is recommended for individuals and organizations alike.

2.5.7 Non-Monitoring of Compliance by Tax Authorities

Tax authorities most times wait for tax audits before demanding adequate compliance. It is instructive to note that monitoring of organizations has been neglected for audit. The tax authorities must put things in place to make individuals comply without being punished. Teams should be dispatched monthly to make sure that organizations and individuals comply with tax laws rather than wait for a year or two for a tax audit.

2.5.8. Non-enforcement of the Tax Laws by Tax Authorities

Enforcement of the tax laws is the fulcrum of tax compliance. Knowing fully well that no man pays tax smiling, there should be proper machinery put in place for enforcement of the tax laws. This includes a handshake between the tax authorities and the Judiciary, as no enforcement can take place without the courts. There must be collaborations in training, and provision of tools like tax laws to the revenue courts for quick dispensation of tax matters. It is noted that most tax cases stay in court for a minimum of two years before decisions are taken. This doesn't encourage tax compliance by the tax-paying public. A judgment against tax evaders will encourage compliance by not less than ten people.

2.5.9 Obsolete Tax Laws

In many countries, amendments to tax laws go along with the budgets for passage into law to enable the implementation of that year's budget. In the case of Nigeria, tax laws are not amended till after eight to ten years. By so doing, so many tax laws will be obsolete and cannot drive the present realities on the ground. Tax law is a fiscal tool and should be made to align with fiscal policies regularly.

2.5.10. Archaic Ways of Collection/Assessment

It is unfortunate that tax authorities (Local Governments inclusive) still use barbaric means of tax assessment and collection. A situation where tax collectors use clubs and stick with roadblocks to collect money from people on the road is condemnable. There should be modern ways of tax collection. Tax authorities must adopt automation as a veritable means of collection. Tax authorities must reduce the sale of revenue windows to tax collection agents. They must have a platform for the collection of taxes themselves, and all collections must be channeled into the authorities' collection accounts. Government must do everything possible to provide power for the automation of all tax activities, ranging from assessment and collection to accounting (end to end).

2.5.11. Bribery and Corruption

My experience reveals that people have the impression that money can buy anything in Nigeria. Doing the right thing is not a norm anymore. Falsification of records is common in taxation issues. Reduction in the income of taxpayers to pay lower taxes is common among taxpayers. Tax officers and taxpayers collude to fleece the government of legitimate revenue. The understanding that issues can always be 'sorted' makes tax compliance difficult.

2.5.12. Multiple/Double Taxation

Multiple and double taxation repels compliance. Taxpayers will want to know what to pay collectively in a year to enable them to pay. A situation where many demand notices come from various sources for collection could be healthier. There must be a way of consolidating tax collection for ease of collection. The amount of taxes to be paid should be compressed if the money enters one purse.

2.5.13. Rivalry among Government Agencies

The various arms of Government have their list of taxes to be collected from various categories of taxpayers. It is observed that most of these taxes are the same. For instance, the operational permit collected by the local government is the same as the business premises levy from the state. The haulage fee is the same as loading and offloading. In some States, agencies are created and charged with the responsibility of collecting the same taxes and levies collected by some Ministries. The worst aspect is that the payment burden is shifted to the same taxpayers. There is equal contention on who collects revenue between the Internal Revenue Service of various States and Ministries/ agencies. The government must put a proper collection platform in place for ease of compliance.

2.5.14 Lack of Political Will on the Path of Government

Amongst all the observed points above, the political will of the Chief Executive (Majorly the Governors in the States and The President at the Federal level) is very paramount. If the revenue authorities don't get the support of the CEOs, then all other efforts will be in futility. Inconsistency in tax policies does not make for ease of compliance. The political will encourage the revenue authorities to enforce compliance. The CEO is the chief revenue officer and must discharge this responsibility without fear or favor. No legal person must be shielded from tax payment. Tax is law, and the law must take its course.

2.5.15. Advocacy/Communication Gap.

Since nobody pays tax smiling, every strategy must be put in place to woo taxpayers for total compliance. Advocacy is one of the veritable means of persuading taxpayers to comply with tax laws. The tax-paying public must know what obtains in the tax system. They must know their rights and obligations. New ideas must be communicated to them. There must be tax advocacy and education. The things that the taxes are used for must be laid bare in the public domain to encourage compliance. If people must comply voluntarily, they must know.

2.5.16. The level of Tax Structure

As the economy expands, the tax structure grows, and this reduces the level of indirect tax revenue generated while the direct tax element increases. The level of indirect tax grows in an economy with a heavy presence of the informal sector. The theory of tax structure development suggests that at the early stages of economic development, the economic structure imposes severe limitations on the structure of the tax system, and this affects the level of revenue generation from taxation.

2.5.17. Poor maintenance culture and obsolete equipment

Investing heavily in infrastructures is especially important, but equally necessary is making adequate provision for their maintenance and replacement of obsolete ones. One of the challenges of infrastructural facilities in Nigeria is the lack of maintenance culture. Maintaining and extending the life span of Infrastructure requires the commitment of enormous resources and the patriotic zeal to ensure that resources meant for facility maintenance are not diverted. In infrastructure management, poor maintenance culture and obsolete equipment have often been identified as central to the dearth of infrastructural development.

2.5.18. Monoculture Economy

The continued reliance on oil revenue as the major source of revenue for the government has affected the revenue generation capacity of the economy as well as the financing ability of the government. Government programs are abandoned due to inadequate revenue to finance them. The monoculture nature of the Nigerian economy predisposes government revenue and expenditure to oil price volatility. There is a need to diversify and develop other sectors of the economy that have the potential to generate revenue for the government

2.5.19. Institutional Development

There is a need for the development of government agencies and parastatals vested with the responsibility of collecting and administering revenues on behalf of the government. This includes manpower development and the provision of relevant work tools that would facilitate their work. Institutional development includes reforms that would meet the challenges of time.

2.5.20. Transparency and Accountability

One of the greatest obstacles to socio-economic development in Nigeria is bribery and corruption. This has permeated the system that most infrastructural projects suffer from allegations of lack of transparency and accountability in its award and execution. Even when finances tied to projects are provided, they are not adequately made available to contractors.

2.5.21. Quality of Leadership

The quality of leadership in any organization is especially important in determining the success rate of achieving organizational goals and objectives. Nigeria urgently needs a resolute and selfless leader who would drive the country's entire process of socio-economic transformation. A quality leader who has transcended beyond ethnic and political proclivity is what Nigeria needs.

2.5.22. Improvement in Infrastructural Facilities

Improving infrastructural facilities is necessary for the economic development of any country. Apart from reducing the cost of doing business, it provides a country with a platform for socioeconomic development as well as enhanced potential for reduced competitiveness. Considering the enormous resources involved in infrastructural development and sustainability, prioritizing critical.

Infrastructure could be a major step in the right direction and needs to be given a push by increased Public Private Partnership (PPP) arrangements and effective monitoring mechanisms.

2.5.23. Manual Collection of Revenue

One of the areas of revenue collection leakage is through manual revenue collection methods. The time has come when all revenue collection methods will be automated to make for checks and blockage of leakages. Automation of revenue collection processes will improve revenue collection in the country.

2.5.24. Autonomy of the Revenue Board

The Revenue Board must be empowered by law to be autonomous. Being autonomous does not mean not to checked, rather to help remove all bureaucratic bottle necks to enable quick decision making in order to increase revenue

2.5.25 Funding of the Board

The Revenue board must be properly funded to carry on their operations. They shouldn’t be seen cap in hand begging for funds to run the organization. The powers that be must come up with a formula that will properly fund the Board

3. Materials and methods

3.1 Data and Tools

Data for the study is obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin of 2022, representing Economic growth was proxied by the Real Gross Domestic Product (RGDP) as the dependent variable and the explanatory variable is Internal Generated Revenue (IGR) from 2007 to 2021. The data were subjected to these various tests; Descriptive Statistics, for stationarity of the variables, the Augmented Dickey-Fuller (ADF) unit root test is used, to determine if a long-run relationship exists between the dependent and independent variables in this study, Johansen Co-integration is used. In testing for multicollinearity and global utility of specified models, the correlation matrix and ordinary least squares (OLS) are engaged. Generalized Method of Moments (GMM) and Vector Autoregressive (VAR) were employed in testing the models due to the dynamic nature of the variables.

3.2. Model Specification

Starting from the ***functional form;***

Real Gross Domestic Product = f (Internal Generated Revenue) (1)

RGDP = f (IGR) (2)

Then, the ***explicit form;***

The GMM explicit form in first difference is

$RGDP_t = b_0+b_1RGDP_{t-1}+bIGR +b_3IGR_{t-1} + U_t$

The reduced VAR model, incorporating Real Gross Domestic Product (RGDP), and Internal Generated Revenue (IGR) is stated as below;

$RGDP_t = \alpha_{01}+\alpha_{11}RGDP_{t-1} + \alpha_{12}IGR_{t-1} + U_{t1}$ (3)

$IGR_t = \beta_{02}+\beta_{21}RGDP_{t-1}+ \beta_{22}IGR_{t-1} + U_{t2}$ (4)

Where $U_{t\ are}$ white noises that capture the innovations or shocks to the VAR system.

3.3 Operational form (Apriori Expectation)

α_1 **>0<0**, is the coefficient of IGR. It is expected that macroeconomic variables will either positively or negatively influence Real Gross Domestic Product or vice versa

4. Data Analysis and Interpretation

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

	IGR	RGDP
Mean	7.73E+11	6.27E+13
Median	6.83E+11	6.67E+13

Maximum	1.84E+12	7.34E+13
Minimum	1.88E+09	4.38E+13
Std. Dev.	5.53E+11	9.63E+12
Skewness	0.456776	-0.739013
Kurtosis	2.346454	2.204919
Jarque-Bera	0.788562	1.760448
Probability	0.674165	0.414690
Sum	1.16E+13	9.40E+14
Sum Sq. Dev.	4.27E+24	1.30E+27
Observations	15	15

The table above shows the descriptive statistics of RGDP and IGR. The IGR is positively skewed, whereas the RGDP is negatively skewed. All the variables show Kurtosis less than 3, suggesting a platykurtic distribution. The coefficient of variation statistics was computed to reveal the unitless dispersion comparison of the two variables, showing less variation in IGR. The probability value of the Jarque-Bera normality distribution test revealed that all the variables were normally distributed.

4.2 Trend Analysis

Before the formal test, it is advisable in final metric analysis of this nature to plot a time series analysis as it could show the integrating nature of the series. The variables IGR and RGDP used in this study are graphically examined below.

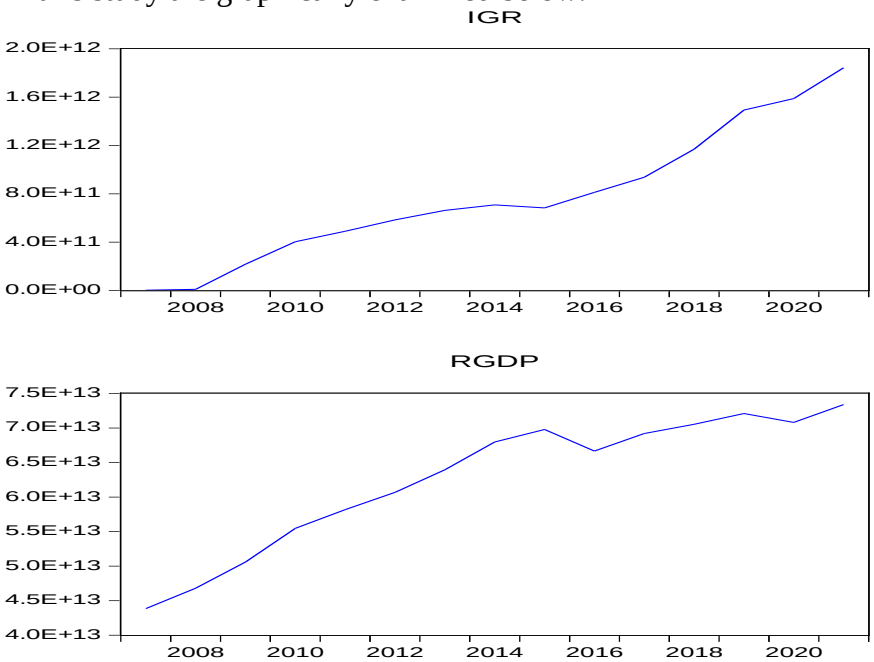


Figure 1and 2: Trend Analysis

The graphs above show that all variables are upward trending with some peaks and troughs throughout the study, indicating the non-stationarity of the variables as expected.

4.3 Global Utility Test:

In the macroeconomic analysis, it is pertinent to check the global utility or usefulness of the specified models. To achieve this, the researcher used a correlation matrix and ordinary least squares.

4.3.1: Multicollinearity Test

Table 2 below shows the summary of the correlation of the variables. The correlation between IGR and RGDPR is 0.882256, suggesting that the variables are not linearly correlated. Therefore, the researcher has sufficient evidence to announce no presence of multicollinearity in the model.

Table 2: Correlation Matrix

Variables	IGR	RGDP
IGR	1.000000	0.882256
RGDP	0.882256	1.000000

Furthermore, table 3 below shows the Ordinary Least Square (OLS) estimated model for the relationship between IGR and RGDP. From the table below F-statistic value is 45.65790 with a p-value of .000013 showing that the null hypothesis is rejected; there is overall significance and valid for comparison, but the table shows that the Durbin-Watson statistics is 0.306482, showing the presence of autocorrelation, consequently, it cannot be used for further analysis and policy formulation.

Table 3: Ordinary Least Square (OLS) Methods

Dependent Variable: RGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
IGR	15.37976	2.276102	6.757063	0.0000
C	5.08E+13	2.14E+12	23.74220	0.0000
R-squared	0.778376	Mean dependent var		6.27E+13
Adjusted R-squared	0.761328	S.D. dependent var		9.63E+12
F-statistic	45.65790	Durbin-Watson stat		0.306482
Prob(F-statistic)	0.000013			

4.3.2 Unit Root Test

Sequel to the peculiarities of time series data, this is a statistically valid procedure in finametrics analysis that assists in determining the best estimation method for the data. Here, the popular Augmented Dickey-Fuller (ADF) unit root test is employed as shown in table 4 below.
Table 4 below reveals the summary of the stationary test for both level and first difference data. The results indicate that IGR and RGDP are integrated at the level.

Table 4: Augmented Dickey-Fuller Unit Root Test

Variables	Max lag	LEVEL			1st DIFFERENCE			Remark
		ADF Stat/Prob.	Critical Values		ADF Stat/Prob.	Critical Values		
			5%	10%		5%	10%	
LnRGDP	3	-3.732829(0.0163)	-3.098896	-2.690439	-2.328480 (0.1780)	-3.119910	-2.701103	@1(0)
LnIGR	3	-5.472040 (0.0008)	-3.098896	-2.690439	--2.164224 (0.2261)	-3.119910	-2.701103	@1(0)

4.4 Relationship between IGR and RGDP

It was recorded above that OLS exhibits unsatisfactory global utility and was therefore dropped. Going further to determine the relationship between IGR and RGDP, Generalized Method of Moments (GMM) was used.

4.4.1 Generalized Method of Moments

Due to the dynamic nature of the variables, the researcher employed the General Method of Moments (GMM). The table shows the estimation of the model using the Generalized Method of Moments (GMM). J-statistic has a coefficient of 1.119233 with a probability value of 0.290084, which shows the model is significant and suitable to adduce the contemporaneous Relationship between IGR and RGDP. The table shows that IGR has a positive and significant relationship with RGDP. The value of the adjusted R-square is 0.74, suggesting that the IGR variable explained 74% of the observed variations in RGDP.

Table 5: Generalized Method Moments

Dependent Variable: LNRGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIGR	0.098411	0.012960	7.593354	0.0000
C	29.12924	0.355745	81.88244	0.0000
R-squared	0.767003	Mean dependent var		31.78126
Adjusted R-squared	0.747586	S.D. dependent var		0.140321
S.E. of regression	0.070499	Sum squared resid		0.059641
Durbin-Watson stat	1.136285	J-statistic		1.119233
Instrument rank	3	Prob(J-statistic)		0.290084

4.5 Causal Relationship between IGR and RGDP

In finametrics analysis, a causality test is a common tool used to check if causality exists or otherwise, between any two variables. Table 6 below, shows RGDP granger causes IGR, whereas IGR does not granger-cause RGDP, suggesting that causality runs from RGDP to IGR, which is a unidirectional relationship. In essence, RGDP's past could be used to forecast IGR.

Table 6: Pairwise Granger Causality Test Results

Null Hypothesis:	Obs	F-Statistic	Prob.
LNRGDP does not Granger Cause LNIGR	13	5.64990	0.0295
LNIGR does not Granger Cause LNRGDP		0.80639	0.4797

4.6: Unrestricted Vector Auto-Regression (VAR) Analysis

4.6.1. VAR Lag Length Selection:

As statistically established, the first step in estimating the VAR model is to determine the lag length for a parsimonious specification. To achieve this, the researcher engaged all the automatic lag selection criteria as shown below; The VAR lag order selection criteria on the table reveals that a lag length of 1 is selected at a 5% level based on sequential modified Likelihood Ratio (LR) test statistic, Final prediction error (FPE), Akaike information criterion (AIC), and Hannan-Quinn information criterion (HQ), indicating that VAR (1) specification is the parsimonious model and the plausible description of the data used. The researcher boldly proceeds to estimate a VAR (1) model for the relationship between the IGR and RGDP.

Table 7: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-4.614208	NA	0.008823	0.944887	1.036181	0.936436
1	26.00331	48.11325*	0.000199*	-2.857616*	-2.583735*	-2.882969*

4.6.2: Residual Diagnostic Test*:*

The researcher proceeds with residual diagnostic tests, such as VAR Residual Serial Correlation Lagrange Multiplier (LM), VAR Residual Heteroscedasticity, and Inverse Roots of Autoregressive Characteristic Polynomial. In Table 8 below, VAR Residual Serial Correlation LM Tests P-value is 0.3395, which is an indication of rejection of the null hypothesis, indicating evidence of no serial correlation.

Table 8: VAR Residual Serial Correlation LM Tests

Lag		LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1		4.608848	4	0.3298	1.397569	(4, 6.0)	0.3395

Similarly, table 9 below shows that Chi-sq is 23.33227 with a P-value of 0.5003. This is enough evidence to suggest of homoscedasticity of the model.

Table 9: VAR Residual Heteroscedasticity Test

Joint test:			
Chi-sq	df	Prob.	
23.33227	24	0.5003	

4.6.3: Stability check:

To examine the stability of the estimated VAR (1) model, the researcher plots the inverted roots to the unit circle. It is statistically known that the estimated VAR model is stable if all the inverted points are inside the unit circle as shown below; Figure 3 below shows the inverse roots of the characteristics Autoregressive (AR) polynomial. It suggests that all roots fall or lie within the unit imaginary circle (modulus), an indication that the VAR (1) model is stable.

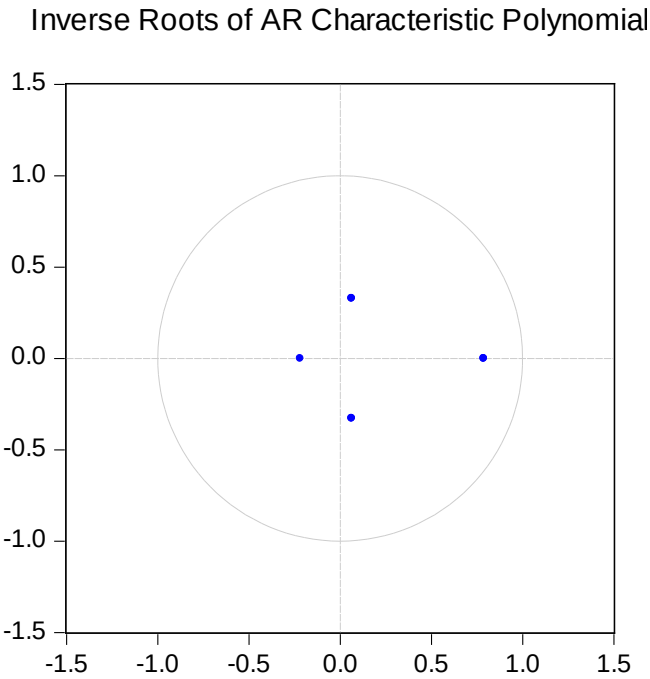


Figure 3: Graphical Representation of Inverse Roots of AR Characteristic Polynomial

4.7 Error Correction and Long Run Causality Test

Having established the relationship of the variables, there is the likelihood of adjustment from short-run to long-run equilibrium. That is to say that errors encountered in the short run can be corrected or adjusted in the long run. To achieve consistency, the researcher estimated the model with Vector Error Correction Estimates as shown below.

The analysis in Table 10 below reveals that the error correction equation (CointEq1) has a coefficient of --0.618229 and a t-statistic of -2.93199, which implies that the error correction parameter is negative and significant, satisfying the apriori expectation. The speed of adjustment is 61.8%, which indicates that short-term errors can be corrected in the long run with an annual speed of adjustment of 61.8%%.

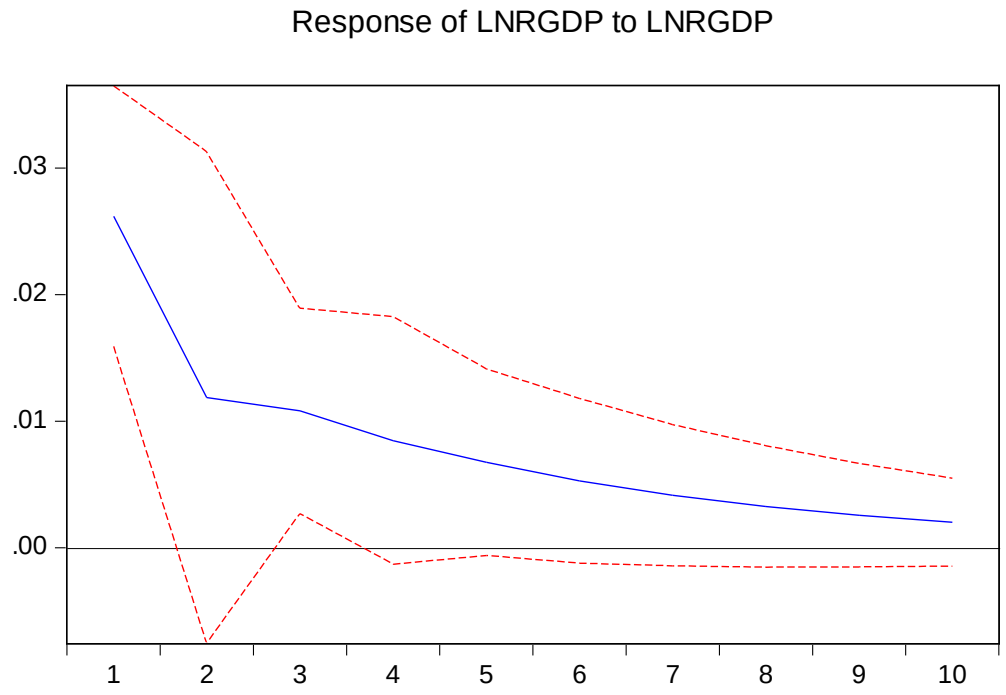
Table 10: Vector Error Correction Estimates

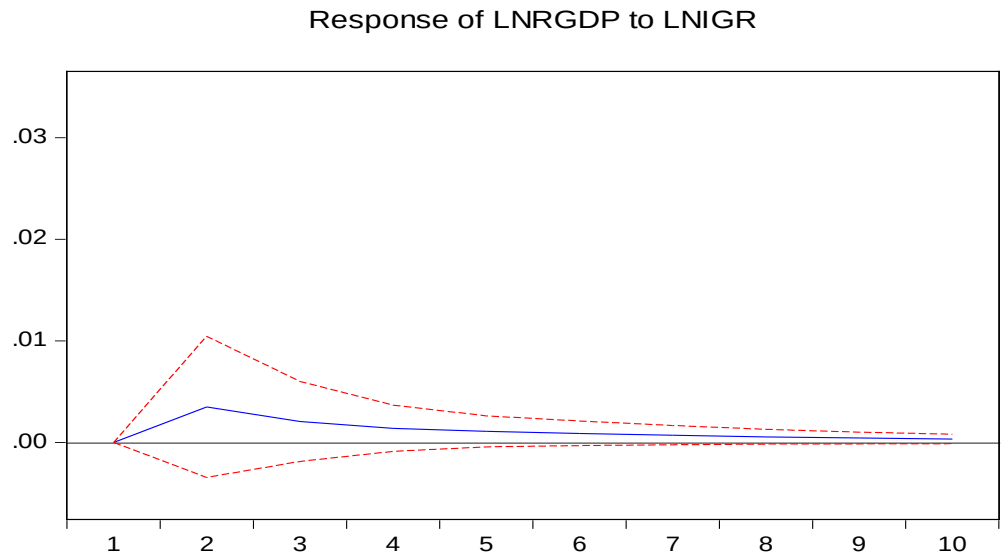
Error Correction:	D(LNRGDP)	D(LNIGR)
CointEq1	-0.618229	-0.142684
	(0.21086)	(0.79059)
	[-2.93199]	[-0.18048]
R-squared	0.736165	0.812845

Adj. R-squared	0.516303	0.656883

4.8 Impulse Response of RGDP to its Shock and Shocks from IGR

In this section, there is a need to examine the shocks or innovations of RGDP from itself and IGR and to examine the dynamic impacts or shocks of IGR variations on RGDP. This is achieved with impulse responses and variance decomposition as shown in Figure 4 below. From the figures, the impulse response function is a one-time shock to the variables, showing that RGDP responds positively to its own shock from the first until the tenth year. RGDP responded significantly in the first three periods and gradually tilted towards the threshold, though positive until the final period.





4.8.1 Variance Decomposition

In Table 14 below, RGDP's own shock caused 100 percent variations in the first period and slightly diminished to 98.14% in the 10 tenth. That suggests that own shock exerted a huge influence in the cause of variation on RGDP, whereas IGR slightly caused the variations in the RGDP with a range of 0% to 1.85% variations.

Table 14: Variance Decomposition Results

Period	S.E.	LNRGDP	LNIGR
1	0.026206	100.0000	0.000000
2	0.028982	98.54911	1.450892
3	0.031002	98.29332	1.706678
4	0.032168	98.22943	1.770570
5	0.032888	98.19751	1.802493
6	0.033320	98.17272	1.827278
7	0.033584	98.15763	1.842371
8	0.033747	98.14884	1.851159
9	0.033847	98.14356	1.856442
10	0.033909	98.14030	1.859697

4.9 Discussion of Findings

From the analysis above, it can be seen that a significant relationship exists between infrastructural development and improved internally generated revenue in Nigeria. This signpost the level of relationship between internally generated revenue that can propel or sustain the infrastructural

development of the Nigerian economy. This attracts the attention of policymakers on the need to stimulate various revenue windows to geometrically increase internally generated revenue to meet the desired infrastructural development of respective states and Nigeria in general. Although this exposition revealed internally generated revenue as a veritable tool to enhance infrastructural development, however, most states, are faced with problems that tend to inhibit the efficacy of internally generated revenue and infrastructural development relationship as already established.

This study also found a unidirectional causality that runs from infrastructural development to internally generated revenue. This shows that a robust infrastructural development of any state or Nigeria at large will assure consistency in IGR growth. Furthermore, the result of the impulse responses found that infrastructural development responds to the long-run equilibrium after the shock of internally generated revenue. The variance decomposition reveals that infrastructural development responds to IGR whenever there is a change. This implies that there is a strong link between infrastructural development and IGR both in the short run and long run across the states. However, increasing IGR can only impact the infrastructural development if there is a strong and reliable institution in the various states or Nigeria that will encourage the collection, effective, and efficient disbursement of the IGR.

The findings of Vector Auto-Regressive -VAR (1) could forecast the IGR in Nigeria with a high degree of accuracy. This shows the relevance of the results of this empirical exposition for fiscal policy formulation as it forms the basis for tax bodies and related agencies to consider the IGR threshold for Nigeria in the process of targeting adequate infrastructural development.
This empirical exposition has prominently revealed that the established relationship between IGR and infrastructural development is a flexible one. This is because any error encountered in the process of policy formulation and implementation could be corrected at a high speed, with VAR-suggested speed of adjustment at 61.8%

5. Conclusion and Recommendations

5.1 Conclusion

Having established that Infrastructural Development and Improved Internally Generated Revenue are companions in Nigeria. It has also been exposed that the more Infrastructure we develop in Nigeria, the more revenue we generate. Similarly, this paper revealed that internally generated revenue is a veritable tool for enhancing infrastructural development and that there is a strong link between infrastructural development and IGR both in the short-run and long-run across all the states of Nigeria. Similarly, this paper shows the relevance of the results of the empirical exposition for fiscal policy formulation as it forms the basis for tax bodies and related agencies to consider the IGR threshold for Nigeria in the process of targeting adequate infrastructural development. The empirical exposition prominently revealed that the established relationship between IGR and infrastructural development is flexible because any error encountered in the process of policy formulation and implementation could be corrected at high speed, with a VAR-suggested speed of adjustment at 61.8%.

In light of the above, the study made a series of recommendations that will help generate more revenue and, at the same time, develop more Infrastructure, which will, at the end of the day, enhance economic growth in Nigeria.

5.2 Recommendation

Having established the relationship between Infrastructural Development and improved Internally Generated Revenue, the following recommendations are made;

1. Conscientious efforts should be made to generate more revenue. In doing that focus should be on:

(a) Automation of all the avenues of revenue generation and collection to improve Internally Generated Revenue which will, in turn, improve Infrastructural development in Nigeria. The implication of this is the blockage of all leakages in the revenue generation and collection system.

(b) Review tax policies regularly. The dependence on direct taxes should also be investigated to tilt more towards indirect taxes.

(c) Improvement in and review of tax administration strategies

(d) Motivation of staff of revenue agencies of Government by some incentive schemes such as payment of bonuses for achieved targets, regular performance appraisal of staff of revenue authorities to encourage those that have done well through promotions.

2. The government should allocate more funds to Infrastructural development, as it has been established that Infrastructural Development Granger Causes Internally Generated Revenue. The implication of this is that the more Infrastructure we develop in Nigeria, the more people will be encouraged to pay taxes.

3. To aid the contribution of the tax system to the economy and, by extension, infrastructural development, there is a need for more political will to improve tax performance. One such support is in the form of adequate and extensive tax administration and policy reforms.

4. Various levels of Government, particularly in the States (states and Local Governments) should have a synergy in revenue administration. The implication of this is that both levels of Government should merge revenue administration and let one level of government manage it. The revenue administrator must ensure that revenue due to each level goes to them in real-time online.

5. Capacity development in the tax system is a sine-qua-non in revenue generation and growth. This will impact an increase in economic growth and, by extension, infrastructural development.

6. The government should make sure that infrastructural development is up to standard by deploying a well-constituted and non-compromising monitoring group to ensure that work done is equivalent to the specification

7. Revenue Advocacy/Public Enlightenment is very key in revenue administration. If citizens are expected to comply with the revenue laws, the tax authorities must ensure that the citizenry is adequately educated in such laws and encouraged to comply.

8. The States and the Federal Government must establish a good, strong, and reliable institution in the various states or Nigeria that will encourage the collection, effective, and efficient disbursement of the IGR in the Country.

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