THE PARADOX OF POVERTY IN PLENITUDE: X-RAYING THE IMPACT OF 2017 ECONOMIC RECOVERY AND GROWTH PLAN ON SOLID MINERALS INDUSTRY IN NIGERIA

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ABSTRACT
Socio-economic activities in the Nigerian mining industry which hitherto discovery of hydrocarbons contributed immensely to national economy, began to stifle from the mid-1970s following the outrageous dependence of the nation on crude oil as a major source of revenue and foreign exchange. Consequently, efforts made by various government administrations to revive the sector did yield the expected results. Sequel to global crises in the crude oil market which elicited economic recession in Nigeria, the Federal Government launched Economic Recovery and Growth Plan (ERGP) in 2017 to drive reforms in key areas of the economy including the mining sector. The paper therefore interrogates the impact of ERGP on the growth of Nigeria's mining industry. We relied on the qualitative data collected through secondary sources such as scholarly works, official documents, and media reports; and were analyzed descriptively. The study revealed among others that

dominance of informal artisanal mining and existence of loopholes for revenue losses have impacted negatively on growth of the Nigerian solid minerals industry. We recommended inter alia that the Federal Ministry of Mines and Steel Development should decentralize the Nigerian Cadastral Office to facilitate transition into a formalized mining economy and establish effective policing of the mining fields to curtail revenue thievery and leakages.

Keywords: Economy, Hydrocarbon, Growth, Industry, Market, Mining, Revenue, Sector.

JEL Codes: E02, L71, N1, L6, P23, L71, H2, O17.

1. INTRODUCTION

Nigeria is historically known to have plenteous human and material resources and has the potential to be a major power in the world. According to the Federal Ministry of Budget and National Planning (FMBNP) (2017, p. 10), "Nigeria has the potential to become a major player in the global economy by virtue of its human and natural resource endowments". Also, the United Nations (2017) cited in Onyeoma (2020) described Nigeria as the most densely populated country in Africa with huge natural resource endowments. Sadly, this potential has remained largely untapped. Olade (2019) described Nigeria as a nation with abundance of mineral resources, having over 40 different solid minerals deposits widely distributed in nearly 450 locations across the country. According to the World Bank (2007, p.38), "there is documentary evidence that not less than seventy five solid minerals have been identified by the Nigerian Geological Survey Association and found to be of industrial and commercial relevance".

Solid minerals industry is among the most promising and juicy sectors of the Nigerian economy. Solid minerals are identified in more than 500 locations of Nigeria (Federal Ministry of Mines and Steel Development, FMMSD, 2017). Some of the strategic minerals found in Nigeria include bitumen, barites, copper, iron and tin ores, columbite, gold, limestone, coal, salt, phosphate, lead-zinc, etc. Meanwhile, Nyabo (2001) noted that gold deposits are found in several locations in Nigeria (such as Anka, Bin Yauri, Birnin Gwari-Kwa, Gurmana, Malele, Maru, Tsohon, Okolom-Dogondaji and Iperindo in Kwara state). Nigeria has a huge reserve of iron ore deposits which inspired the establishment of Ajaokuta and Delta Steel Companies in 1979 to serve as a catalyst for the growth of other sectors of Nigerian economy especially the manufacturing sector.

However, before the discovery of crude oil in 1956 and a decade after the Nigerian independence in 1960, the nation's economy was dominated by large scale traditional agriculture (Akanmidu, 2015). This period of agro-economy coincided with gradual growth in the mining sector particularly between 1960 and 1970. For instance, coal mine became the driving force of Nigeria's energy sector which spurred rapid growth of transport (especially the rail system) and electric sectors. Transport and electric sectors provided the major domestic markets for coal production before and shortly after independence. It also accounted for a significant amount of Nigeria's revenues; provided employment to a sizable

number of the population; and made a huge contribution to development of the nation's critical infrastructures.

In spite of the enormity of solid minerals and good climate for agriculture, Nigeria has witnessed poor diversification index and slow growth in the mining industry since the emergence of petro-dollar economy. The structure of the Nigerian economy has remained largely import dependent, consumption-driven and undiversified, with petroleum industry accounting for about 95 percent of exports and foreign exchange earnings while manufacturing and mining account for less than 1 percent (FMBNP, 2017). Indeed, it is a chagrin that larger proportion of the Nigerian population (about 83 million people) is living within and below poverty lines amidst abundance of natural resources and good climate for productive socio-economic activities (World Bank, 2020).

The Socio-economic activities in the mining industry are dominated by artisanal mining. Organized mining in Nigeria began in 1903 following the discoveries of high premium solid minerals both in the northern and southern protectorates by the British colonial administration. This pre-independence development was accompanied by the influx of the British and German foreign mining companies such as the amalgamated Tin Mining Company of Nigeria, Exlands, Gold and Base Metals, etc. (Mallo, 2012).

The current state of mines in Nigeria is a paradox. As of last quarter of 2020, the solid minerals industry was unable to contribute up to 1 percent to the national GDP (National Bureau of Statistics, NBS, 2020). This report reflects the deplorable state of the Nigeria's mining and quarrying sector. Unlike Nigeria, solid minerals have continued to play significant role in economic growth and development of some of her African economies such as Zambia, Ghana, South Africa, Zimbabwe, and Tanzania, among others. In Zambia, mining and quarrying dominates the foreign direct investment (FDI) and accounts for about 66 percent of total FDI inflows into the country (Anyanwu, 2012). Anyanwu further highlighted the multiplier effects of unprecedented growth in the Zambian mining sector in the areas of social security nets (such as employment, healthcare, education, etc.), forward linkages (in terms of inputs into other industries such as energy generation), backward integration (such as purchase of goods and services from domestic industries), capital formation (in terms of attraction of domestic and foreign capital), income terms and trade multipliers (i.e. effects on foreign exchange earnings and balance of payments), etc.

Furthermore, during the colonial escapades in Africa, Ghana was christened the Gold Coast following the discovery of large deposits of solid minerals especially gold which always has high commercial value in the country. Notwithstanding the challenges associated with the Ghana's mining sector governance, the industry has contributed immensely to the overall development of the country with gold outputs increasing from 94 tons in 2016 to 102 tons in 2017 (Ghana Chamber of Mines, 2018). The mines apex body noted that the industry boasts of a number of multipliers' effects in the areas of communication technology, banking, electricity, health, education, human resource development, and technology transfers. Similarly, in South Africa, the mining sector enjoys large scale investments and

has for several decades provided clement investment climate to the foreign investors. From the historical lens, Antin (2013, p.1) averred:

> *"Historically, South Africa's mining industry has been at the heart of the economy's development, given the country's competitive position as one of the most naturally resource-rich nations in the world. In fact, the industry has played a key role in attracting foreign investment and creating leading global enterprises, and remains South Africa's most critically observed economic sector".*

In Nigeria, the discovery of hydrocarbons in the 1950s laid the conduit that eventually plummeted all the previous successes recorded in its mining industry. With the discovery of crude oil in 1956, oil windfall of the 1970s and 1980s left the solid minerals industry in a state of oblivion to an extent that its contribution to GDP has been recessive (FMMSD, 2017; Olalekan, Afees&Ayodele, 2016; NBS, 2015). Uzoigwe (2007) argued that the discovery of crude oil in large and commercial quantities earned Nigeria a fortune of about $8.62 and $25.3 billion between 1974 and 1980 respectively. Also, Adeola, (1994) cited in Uzoigwe (2007) insisted that in spite of the global oil market crackdown, which started in the 1980s, Nigeria still went ahead to earn about $200 billion from oil exports between 1970 and 1990. Consequently, this new inventory in the Nigerian economy occasioned a sporadic transition from agro/solid mineral based to petro-dollar economy. According to Merem, Tyumasi, Wesley, Shenge&Isokpehi et al (2017, p.4), "by the time oil and gas production took center stage, and became a major earner of foreign currency, the solid mineral sector declined substantially". This is remarkable as the petroleum sector began to account for 65 and 88 percents respectively of government revenue and foreign exchange earnings (Ajayi, 2019).This is further amplified in Edo&Ikelegbe (2014, p.5) stressing that:

> *"After witnessing a shift from agriculture to crude oil and gas, as the central driver of growth by the late 1960s, all efforts to diversify the economy and provide a better basis for broad, stable and productive growth have met with very limited success. Huge oil revenues since the late 1960s, have not translated into prosperity and development, and the country still ranks among the poorest in the world in terms of major indicators of development. In spite of the numerous plans, policy frameworks and reforms, economic growth remains epileptic, lacking sustained or consistent growth and subjected to the vagaries of crude oil and gas prices. Each plan, programme, vision and reforms generates much hopes but actually produces little impact while mismanagement, corruption and poor performance continue to underline economic management".*

The adverse effects of over dependency on oil revenues have necessitated the need to revive other sectors of the Nigerian economy towards the direction of non-oil export trade following the uncertainty associated with the future of hydrocarbon products. This is why Onwualu (2012) argued in his "magnus opus" that the value-chain approach to agriculture alone has the potentials to open up the economy and generate various activities which are capable of creating jobs and enhancing industrialization and thus makes the non-oil sub-sector to hold

the pegs for future Nigerian sustainable economic growth. Similarly, Imoughele&Ismaila (2015) maintained that investment in non-oil sector and expansion of its export to counteract one-product economy is a sure solution for economic development in most oil producing countries of the world; especially in the oil economies which appear to suffer from the paradox of plenty syndrome.

Consequently, several efforts have been made by the successive government administrations in Nigeria to revamp the mining industry. Some of these strides include the 1903/1904 commissioning of mineral surveys in the northern and southern protectorates of Nigeria, formalized mining policy of 1924, the 1972 review of Nigeria's minerals policy, the institution of Mining Act in 1999, the Nigeria Minerals and Mining Act of 2007, the Minerals and Mining Regulations of 2011, among others. Sequel to economic recession in 2016 caused by the twin problems of severely impaired crude oil production and collapse of oil price in the global market, the Federal Government of Nigeria launched an economic blueprint titled "the Nigeria Economic Recovery and Growth Plan (ERGP) which was designed to serve as a catalyst for economic diversification with agriculture and mining considered as priority areas. Economic diversification will help Nigeria overcome pending dangers of oil dependence (Okonkwo, Sunday&Nwosu, 2019). The ERGP for the mining sector was designed to grow the industry's contribution to national GDP from N103 billion in 2015 to N141 billion by 2020. To facilitate this growth, ERGP was aimed at integrating artisanal miners into a formal sector of the Nigerian economy. Yet, these interventions by the successive administrations at federal level to transform the mining sector have not yielded expected outputs. However, none of the existing studies have assessed the nexus between ERGP and growth of the Nigerian mining sector. This paper therefore, examined the impact of the Economic Recovery and Growth Plan on the growth of Nigeria's solid minerals industry from 2015 to 2021.

2. LITERATURE REVIEW

The study shall overview the state of the mining sector before and after crude oil boom in Nigeria; various prospects that the industry represents and government interventions in the sector.

Overview of the Nigeria Mining Sector: Before and After Discovery of Crude Oil

Nigeria has both proven metallic and non metallic mineral deposits across its geographical contiguity. These minerals have played pivotal role in the development and industrialization of both the medium and large scale economies across the globe at different historical stages. The negligence of this sector of the economy is tantamount to rejection of life. Metallic and non-metallic materials (solid minerals) are so important that they set the milestones for the civilization and industrialization of man (Obikwelu, 2014). Solid minerals formed the defining decibels for every stage of human civilization; namely, the Stone Age, Bronze Age and Steel Age (which ushered in the era of industrial revolution and globalization). Also, the exploitation and exploration of solid minerals marked the world's technological trends, namely,

- 1740-1840: Industrial Revolution in the 18th Century England in which iron and steel works from iron ore were pivotal.
- 1850-1900: Railways creation resulting from the transformation of solid minerals to steel works.
- 1900-1950: Electricity, internal combustion engine, etc. were being driven by the mineral materials.
- 1950-1980: Petrochemicals, electronics, computing, aerospace, etc. were driven by materials generated from both liquid and solid minerals.
- 2010-2015: Nanotechnology with Nano materials driving the new material (Obikwelu, 2014, p.6).

Corroborating the vitality of solid minerals in the development of societies, Githiria&Onifade (2020) maintained that mining served as stimulus in the development of advanced economies such as the United States, Canada and Australia. They stressed that the availability of minerals can affect the nature of industrial development and help raise standard of living. They alluded that nations with huge mineral deposits are at vantage position for growth take off and eventual development. In this light, Aboyade (1980) cited in Maduaka (2014) observed that in the nascent stages of economic growth of nations, the readily available natural resources especially solid and liquid minerals contributed directly to forward and backward integration and meeting the requirements for food, shelter, fuel and metals.

Prior to the discovery of fossil fuel in Nigeria and commencement of its commercial production in the late 1950's at Oloibiri, agricultural production, the utilization and trade of solid minerals such as coal, gold, tin, iron ore, etc., sustained the Nigerian economy. From the proceeds of trades in agricultural products and solid minerals, urban centers, road networks, rail systems, seaports, aviation infrastructure, electricity and communication networks, among others were built in Nigeria by the colonial administration. For instance, the Nigerian Railway Corporation and the Electric Company of Nigeria formed the core domestic markets for coal production in the country (Baiyewu-Teru, 2015), while the export of tin yielded significant foreign exchange earnings for Nigeria. Seemingly, the extraction of these mineral resources offered employment opportunities to the teeming population of Nigerians. Baiyewu-Teru (2015) pointed out that coal mines alone employed about 8,000 people as of 1958. Similarly, Mustapha (2019) argued that the Nigerian economy experienced better days before independence and briefly after it, and was driven by agriculture and solid minerals as its backbone.

However, a cursory analysis shows that some of these solid mineral deposits contributed substantially to the socio-economic growth and development of Nigeria before the emergence of Dutch Disease (petro-dollar economy) in the country. The sector is said to have the potential to generate employment and wealth for over five million people (Transformation Agenda, 2013). For instance, Tin ore is one of Nigeria's major mineral endowments with high market value. Small scale production of tin began in Jos Plateau,

Nigeria and from 1902; the landscape of Jos was re-worked to supply tin ore and concentrates to smelters, refineries and fabricators in Europe (Bridge&Fredriksen, 2012). Bridge and Fredriksen stressed that at the climax of tin production in Nigeria, the country produced nearly one-tenth of the global tin. The Niger Company invested massively in tin production during this period. The trade of tin was coordinated by the Penang and London Tin Exchanges, and the tin market contributed immensely to the Nigerian economy with multiplier effects on job creation and infrastructures. Kogbe&Obialo (1976) highlighted the contribution of tin mining to the Nigerian economy and noted that the export value of tin alone far exceeded the export value of all the other solid minerals put together. At their heights, Gavin&Tomas (2012) argued that mines of the Northern Nigeria produced nearly one-tenth of the world tin.

Columbite on the other hand is among the mineral resources known to exist in commercial quantities in Nigeria. Baba, Jacob, Olaoluwa, Abubakar, Womiloju et al. (2018) observed that rapid advancement in the tech-sector of the world has resulted in increasing demand for products emanating from columbite ore processing and have widely been applied in the productions of capacitors, nuclear products, superconducting cavities, an electromagnetic radiation detectors, medical devices, and aerospace, among others. Its usefulness makes it strategic in the development of iron and steel, as well as other metallurgical industrial subsector of the economy where it is being used as alloying elements in strengthening the physical and chemical properties of the metallurgical materials (Alabi, Yaro, Dungka, Asuke&Dauda, 2015). Columbite is widely used as an additive in strengthening steel and in the manufacture of jet engines, turbines and allied products. Prior to 1980, Nigeria produced over 80 percent of the world columbite consumption (Bridge&Fredriksen, 2012; 1980; Shitar, 1984). Ifaturoti (1984) maintained that columbite was exported mainly to Europe until the early 1950s when the United States of America (USA) decided to store columbite and other strategic minerals not produced in USA. Regrettably, fortunes of this mineral to Nigeria have been reversed due to focus on the booming petroleum products.

Meanwhile, coal mining and exploration in Nigeria started in 1916 and was coordinated by the Nigerian Coal Corporation (NCC). Currently, the Nigeria's coal deposit is at estimation of 2.8 billion metric tons (Baiyewu-Teru, 2015). Aiyedun, (1996) noted that coal has been an important solid mineral in Nigeria's economic development since 1940s. He stressed that the first coal mines in Nigeria were opened in the Udi Hills, Enugu in the 1940s. Since the 1970s, new mines have been opened in the Okaba area of Benue State and Lafiagi-Obi in Kwara State. Between 1916 and 1987, the average coal production per annum peaked at 565,681 tons in 1960 and declined geometrically with annual production of 117,159 tons in 1987 (Merem, Tyumasi, Wesley, Shenge, Isokpehi et al, 2017) following the ascendancy of a new bridal oil and gas economy. According to Baiyewu-Teru (2015), coal production in Nigeria hit all-time records of 790,030 metric tons in a year before the eventual decline in production due to discovery of crude oil in a commercial quantity which provided energy alternatives to coal. The major consumers of coal were the Nigerian Railways and the

electricity sector. The tide has over the past four decades changed to other energy sources such as diesel, gas, petroleum and water.

Iron ore is another solid mineral with widespread deposits in Nigeria. Umar, Ali&Muhammed (2011, p. 88) on their review of the Nigerian metallic minerals found that "deposits of iron ore are abundant in Kwara, and Kogi States with about 3 billion metric tons in the country". They observed that occurrences of the mineral are found in other locations such as Nasarawa, Sokoto, Kaduna, Oyo, Osun, Bauchi, Borno and Benue respectively. The greatest revolution in Nigeria's solid minerals industry was meant to be the full take off of the iron and steel complexes in Kogi and Delta states which were established to tap into potentials of the nation's solid mineral sector. Efforts to diversify the Nigerian economy into viable sectors, namely, automobile, transport, agriculture, manufacturing, etc. rely heavily on the iron and steel industry. Iron and steel industry anywhere in the world is a major milestone for future industrialization.

Furthermore, other solid minerals available in Nigeria include lead and zinc, uranium, precious metals (e.g. gold), niobium ores, etc. (Olade, 2019). Lead and zinc are found in a commercial quantities at Ishiagu community of Ebonyi state and spread through Benue, Adamawa, Taraba, Nasarawa, Plateau and Bauchi states respectively. Other locations include Anambra, Abuja, Enugu, Imo, etc. Zinc is the 4th widely used metal in the world after iron, aluminum and copper (United States Geological Survey, USGS, 2020). Uranium deposits are found in locations at Adamawa, Bauchi, Cross Rivers, Kano, Plateau and Taraba states respectively. Gold deposits are located in Malele, Malendo in Zamfara and Sokoto States; Ife/Ijesha in Osun State; Minna and Suleja in Niger State, Okolom in Kogi State, Birnin-Gwari and KurminGemana in Kaduna State (Umar, Ali&Muhammed, 2011). Niobium ores are richly found in Jos, Plateau state and is widely used in making ferro-alloy (for maintaining quality, toughness and shock-resistance of metallic materials).These metallic minerals were adding a lot of values to the Nigerian economy before the discovery of crude oil and eventual degeneration of the nation into this lucrative commodity (oil and gas) for quick return on investment. For instance, Ifaturoti (1994) argued that between 1940 and 1956, Nigeria accounted for 95 percent of niobium production in the world. In spite of the availability of lead and zinc in commercial quantities (with estimate of 80, 000 tons of zinc and 10, 000, 000 tons of lead) as well as their industrial values, Nigeria is among the leading importers of lead and zinc in the world. Umar, Ali&Muhammed (2011) argued that Nigeria imports zinc and lead consumed in the country due to lack of smelter for zinc and lead.

Overview of Historical Efforts and Reforms to Revamp the Nigeria Mining Sector

The oil boom and dominance of petroleum sector especially in the 1970's saw the attention of the Nigerian government rapidly turned away from the more traditional sources of revenue (such as agriculture, manufacturing, mines, etc.), towards the extraction of crude oil as a more profitable commodity. During this period, combined with devastations caused by the Nigerian civil war, the 1972 and 1977 indigenization policies resulted in the evacuation of foreigners from ownership and management many enterprises in the country

(Edo&Ikelegbe, 2014). With this development, many foreign experts in the mining industry were forced to vacate. According to the FMMSD (2015) and Shitah (1984), the Indigenization Decrees of 1970s and 1980's in Nigeria were passed to eliminate foreigners from certain economic fields including mines, to be replaced by Nigerian citizens. This marked the beginning of demise of the sector which hitherto contributed significantly to the development and industrialization of Nigeria. Accordingly, the Nigeria NBS (2015) cited in FMMSD (2017, p. 6) observed:

> *"The low contribution of mining sector to the nation's GDP has not always been the case as Nigeria once had a booming mining industry. Like the agricultural sector, the discovery of oil resulted in the gradual neglect of the sector. Before the oil boom, Nigeria's economy was largely sustained by agriculture and exploration of solid minerals."*

However, the oil and gas windfall of 1970's was short-lived arising from the collapse of oil prices in the international market in the 1980's. Consequently, a decade fortunes from the sale of hydrocarbons suddenly evaporated leading to economic downturn. The need to revive the ailing Nigerian economy therefore necessitated the adoption of Structural Adjustment Programmes (SAP) in June 1986 as a means of diversifying economic activities in the country (Jonathan, Ezekiel & Yusuf, 2020; Obetta&Ike, 2019). Nwagbara (2011) averred that the economic deterioration of late 1970s and early 1980s compelled most developing economies to look towards the World Bank and International Monetary Fund (IMF) for one form of transformation or the other. African countries including Nigeria were confronted with massive economic decline and overbearing debt burden which were exacerbated by the global economic crises (Nwagbara, 2004 cited in Nwagbara, 2011).

Furthermore, the past century has recorded a number of historic and landmark events in the Nigerian solid mineral industry through government's policy efforts aimed at exploiting the opportunities in the industry. In 1905, mining of tin ore by the Royal Niger Company began in Nigeria and was followed by coal mining in Enugu and gold mining in Kogi and Niger states respectively in 1914 while the Geological Survey of Nigeria was established in 1919. In 1946, the colonial government of Nigeria adopted the Minerals Act which provided the approval of mineral regulations. This was followed by the establishment of Nigerian Coal Corporation in 1950. All these culminated in the creation of Minerals Act of 1959 to regulate the exploitation and exploration of minerals as well as the establishment of Makeri Smelter in Jos, Plateau state in 1961.Then, the Quarries Act was established in 1969, followed by the adoption of a policy in 1971 enabling direct participation of the Nigerian government in mining industry and establishment of the Nigerian Steel Development Authority (NDSA) to drive the development of iron and steel in Nigeria (FMMSD, 2017).

Furthermore, since the inception of Second Republic till date, a lot of steps have been taken by the various government administrations to transform the Nigerian mines alongside other critical sectors of the economy. According to Badejo (2019, p. 17):

> *"The mineral ordinance of 1946, the coal ordinance of 1950, the Explosives Act of 1964, and the Explosives Regulations of 1967 provided the foundation for the legal framework for the development of the solid minerals sector in Nigeria".*

In 1979, the Nigerian government efforts towards industrialization using the solid mineral sector as a buffer, led to the establishment Ajaokuta and Delta Steel companies as well as the Inland Rolling Mills. In 1994, the military government headed by Late Gen. Sani Abacha launched "a private sector-led economic revival programme" in solid minerals, agriculture and manufacturing which necessitated the establishment of Federal Ministry of Solid Minerals Development in 1995.

Following a transition into the Fourth Republic, the new government's strategic efforts to revamp the solid minerals industry led to the institutionalization of the 1999 Mining Act (which eventually became upgraded to Minerals and Mining Act, NMMA, 2007) whereas in 2003, the federal government set up the modalities for the privatization of steel companies in Nigeria. In 2005, the Nigerian Mining Corporation established the Nigerian Coal Corporation and Bitaman Project. In 2012, Nigerian government established the novel strategic roadmap outlining the long-term goals for the solid mineral sector following the creation of the Nigerian Minerals and Mining Regulations (NMMR) in 2011 to guide the implementation of NMMA. Moreover, due to the 2016 economic recession in Nigeria as a result of crisis in the oil market, the Economic Recovery and Growth Plan (ERGP) were rolled out in 2017 by the Federal Government of Nigeria. The policy was aimed at unbundling the nation's economy and identified agriculture, manufacturing, solid minerals, services, construction and real estate as key areas of attention (FMBNP, 2017). However, the policy objectives of this growth plan for the solid minerals sector include the following:

a. Growth of solid minerals GDP from N103 billion in 2015 to N141 billion in 2020 at an average annual growth rate of 8.54 percent from 2017to 2020.
b. Integration of artisanal miners into the formal sector.
c. Encouragement and promotion of mineral processing and value addition industries that strengthen backward and forward linkages.

3. METHODOLOGY

This section explored the theoretical underpinnings of the study as well as methods adopted for data collection and analysis.

Theoretical framework

Theoretically, the study adopted the theory of "Resource-Curse" for explanation of the abysmal state of solid minerals industry in the current structure of the Nigerian economy. This theory was developed during the decade-long prosperous years, out of the experience of countries that discovered large quantities of fossil fuels or other minerals and have either generated billions of United States dollars from the booming commodities or attracted large-scale investments into the lucrative sector. These lucrative resources were expected to serve

as catalysts for economic growth but instead fed corruption and fuelled conflicts especially in the less developed countries. The theory therefore focuses on the assumption that plenitude of mineral resources does not guarantee economic prosperity especially in the less developed societies.

Operationally, resource-curse theory, also known as "paradox of plenty" assumes "that countries with abundance of natural resources (such as fossil fuel or premium minerals) tend to have less economic growth, less democracy and development outcomes than countries with fewer natural resources" (Di-John, 2010). Di-John further narrowed down his submission and stated that mineral and fuel abundance does not determine either political or economic trajectory of less developed countries. Similarly, Stevens, Lahns&Kooroshy (2015, p. 8) stated that "the windfall nature of revenues and the idea that a new 'booming' sector renders other sectors uncompetitive in the world market are central to the majority of resource-curse theories". On a more empirical basis, Sachs&Warner (1997) sampled 95 developing countries with "resource abundance" and found a negative relationship between natural resource-based exports (such as hydrocarbons) and economic growth during the period 1970 to 1990 (the period of boom in the global oil market). Corroborating the above assertion, Auty (2001) cited in Stevens, Lahns&Kooroshy (2015, P. 8) observed that in a period between 1960 and 1990, the per capita incomes of resource-poor countries (i.e. countries with limited natural-resource) outweighed those of countries with abundance of natural resources. Meanwhile, Jean Bodin, a 16th century philosopher and political theorist made a popular quote in justification of resource-curse theory, as cited in Sachs&Warner (1997, p. 14) as follows:

> *"Men of a fat and fertile soil are most commonly effeminate and cowards whereas a barren country makes men careful, vigilant and industrious".*

Resource-curse is also linked to the resource-abundant countries with poor records of human rights and indices for poverty alleviation. In this prism, Beblawi&Luciani (1987) called those countries "rentier-states". They argued further that elites in these rent-seeking economies have vested interests in maintaining the existing status quo and act in a manner as to suppress criticisms and opposition. Validating the above claims, Mkandawire (2001) pointed out that an abundance of resources in the developing societies significantly weakens emerging democratic institutions and withers opposition political parties to the extent that impunity is formalized while public finances are subjected to the discretion of the elites and bureaucrats.

However, like other theories or models in arts, humanities and social sciences, the resource-curse theory has been a subject of criticisms. Some scholars such as Stevens, Lahns&Kooroshy (2015), Di-John (2010), Wright&Czelusta (2007), Findlay&Lundhal (1999), and Ostrom (1990), among others have questioned the universal applicability of the theory following different experiences and effects natural resource-abundance has on economic growth or development in countries that possess them. For instance, in historical terms, Di-John (2010) argued that almost all societies (including the advanced economies of

the United States, United Kingdom, Canada, United Arab Emirate, Malaysia, etc.) began as mineral-dependent states before they metamorphosed into diversified economies. Similarly, Findlay&Lundhal (1999) stressed that in the period 1870 to 1914, natural resources were generally growth catalysts, stimulating capital accumulation and growth in the now developed economies of the world. Also, Wright&Czelusta (2007) averred that knowledge industry and technological advancement in the United States of America were aided by exploration, transformation and utilization of natural resources.

Accordingly, Stevens, Lahns&Kooroshy (2015, p. 2) provided very succinct views of the critics as follows:

> *"However, since the turn of the century, the nature of the alleged curse and its causality has come under question. Critics of the resource-curse theory point to countries that have avoided the curse (such as Botswana, Chile and Malaysia) and challenge the methodology, particularly the use of a small sample of countries or short timeframe. The shortcomings of the resource-curse theory arise mainly from the reductionist quest for 'one big explanation' of the role of resources in development. The generalization that resource production harms the economy overlooks the complexity of economic development in different countries under different circumstances. Inevitably, the experience of extractives-led growth varies from country to country".*

However, though some experts believe that the theory of resource-curse is bereft of universal application, its fundamental thrust appears to be suitable for explaining the problematic in the Nigerian solid minerals sector. Shocking dependence on petroleum products for the past four decades has reduced Nigeria to a rent-seeking state, whereas the rent generated has continued to feed corruption while poverty, hunger and inequality have become the country's "national symbol". This ugly trend has growth-restricting effects on other sectors of the economy (particularly the solid minerals industry) and has generally stifled socio-economic performance across the country. The Nigerian economy has remained import-based, consumption-driven and less diversified due to increasing reliance on the currently lucrative oil and gas industry while other sectors are left in a state of comatose. The abundance of hydrocarbons has rather become "a curse instead of blessing" to Nigeria and has over the years created a class of political elites better described in the words of Jean Bodin "as effeminate, cowards and indolent" with gruesome consequence on socio-economic growth and development of Nigeria.

Methods of data collection and analysis

We adopted an Ex-post facto design which enabled us to observe historical trends of growth in the Nigerian economy with particular attention to the solid minerals industry. The study also used Time Series design which was useful in tracking recurring trends in the mining sector in terms of government policies and growth statistics. The study relied on the qualitative data collected from secondary sources such as scholarly works, official documents (from the FMMSD, FMBNP, NBS, and the World Bank reports, among others),

and media reports to carry out literature review and discussion of results and findings. Finally, the data were analyzed descriptively which enabled us to provide detailed presentation and explanation of results and findings of the study.

4. DISCUSSION OF FINDINGS AND RESULTS

Every state in Nigerian is reposed with solid minerals which are either underutilized or yet to be exploited. The 2017 reform in the solid minerals sector under the Nigeria Economic Recovery and Growth Plan (ERGP), 2017 to 2020 was designed to leverage the potential of the mining industry to help diversify the nation's economy. Under this frame, the discussion of results and findings of the study considered some key issues which enabled us to examine the policy objectives of ERGP in relation to solid mineral industry.

Abysmal Contribution of Solid Minerals to the Nigerian GDP

Solid minerals no doubt are potential source of wealth and have the prospects to improve growth and development of the Nigerian economy. Nigeria is at vantage position to increase its foreign earnings and tax revenues by achieving efficiency in the exploitation its solid minerals. One of the cardinal objectives of 2017 solid minerals development roadmap in Nigeria under the auspices of Economic Recovery and Growth Plan (ERGP) was the growth of the sector's contribution to GDP from N103 billion in 2015 to N141 billion in 2020 at an average annual growth rate of 8.54 percent (FMBNP, 2017).

However, the findings of our study showed that the 2017 reform in the mining sector under ERGP is merely but a paperwork as the Nigerian government has not been able to grow the industry to surpass its GDP record of N103 billion in 2015. Mustapha (2019) observed that the mining sector which ranked second to agriculture, contributed about 10 percent of GDP and provided quantum of job opportunities to many Nigerians as of 1970, has downgraded and accounts for an annual average of 0.15 percent of national GDP in the last four (4) decades. Available statistics from the Nigeria Extractive Industries and Transparency Initiative (NEITI) showed that while the Nigerian GDP in 2016 was N67.98trillion, the solid minerals sector contributed N87.61billion which represented 0.13 percent of total GDP (Badejo, 2018). Meanwhile, NEITI (2020) reported that over 90 percent of revenue accrued to the government from the mining sector in 2016 came from quarrying. This implies that the real business of solid minerals extraction accounted for an insignificant 10 percent in the same year. In 2017, the total volume of solid minerals used or sold decreased from 41.87 tons in 2016 to 35.33 tons in 2017, which represented 15.64 percent decrease (NEITI, 2017). In terms of contribution to export, NEITI reported that solid minerals sector contributed $40.93 million and $29.90 million in 2016 and 2017 respectively, representing 29.95 percent decrease. The report further revealed government's disclosure of N52.76 billion of total revenue accrued from the solid minerals, representing 0.05 percent of the total revenue accrued to federation account in 2017.

In 2018, the Nigerian government reported total sum of N69.47 billion accrued to the federation account from the mining sector (Nigerian Investment Promotion Commission, 2020; Badejo, 2019). This represented a marginal increase of N16.71 billion from the receipts of immediate past fiscal year, 2017. However, the mining sector accounted for 0.18 percent of the national GDP in 2018 (NBS, 2018 as cited in Ango, Blessing, Choquette, Erdenebat, et al 2019). Accordingly, the NBS GDP report for quarter four of 2019 cited in Adeniyi&Afuye (2020), stated that the mining industry accounted for 0.75 percent of Nigeria's GDP in 2019. In 2020, there was a record decline in the sector's growth at about -6.05 percent largely due to the outbreak of Covid-19 (NBS, 2020). In contrast, solid minerals industry contributes much more to the national economy in countries such as Botswana, the Ghana and South Africa. For instance, the sector accounted for 16.0, 12.6 and 8 percents of national GDP in Botswana, Ghana and South Africa respectively compared to 0.18 percent in Nigeria (World Bank, 2019; Ango, Blessing, Choquette, Erdenebat, et al 2019), as well as 25 and 12 percents in DR Congo and Guinea respectively (Olade, 2019). Corroborating the importance of solid minerals as socio-economic stimulus, the World Bank (2019) stated that solid minerals have helped build the economies of the Southern Africa, being a key provider of investment, employment, government revenue and infrastructure. This is averse to the current situation of the sector in Nigeria. In Zimbabwe, Foreign Direct Investment (FDI) is mainly in the mining sector and represented about 20.8 percent of GDP in 2018 with over 10 percent accruing from the solid minerals industry alone (Gochero&Boopen, 2020).

However, from the paltry performance of the mining sector as stated above, it is clear that a number of factors have continued to plague the contribution of solid minerals to socio-economic growth and development of Nigeria. Several floodgates for losses have always decimated revenues accruing from the solid minerals sector. According to NEITI's report:

> *"The cadastral office and its appointed officials have no proper way to assess the amount of solid minerals produced, sold, or consumed by companies. Royalty payments made by the companies are therefore based only on what the operators disclose to the regulators. With no framework for transparency or real consequences for defaulters, the companies can withhold or share information to their benefit. This is similar to what obtains in the oil industry where the federal government continues to find it difficult to determine how much crude is really produced daily but relies on figures submitted by the oil procuring companies" (Commodity-Port, 2020).*

Furthermore, growth in the mining industry is whittled by lack of transparency amongst the key players of the sector. For instance, income declaration from the operating firms and remittances to the government has been shrouded in opacity. According to the Commodity-Port (2020), many mining firms have defrauded the Nigerian government through non-remittance of revenues, unlicensed mining and evasion of taxes as well as illegal practices and incessant smuggling of solid minerals out of the country. These shady practices by the registered mining companies or otherwise form the loopholes for revenue leakages in the solid minerals industry.

Meanwhile, in the absence of any effective fiscal policy, Amosu&Adeosun (2021) argued that sharp practices occasioned by organized syndicates (comprising both Nigerian citizens and foreigners) have continued to drain government's revenues and royalties from the solid minerals industry unabated. According to them, the time has come for government of Nigeria to pay more attention to the mining sector, block revenue leakages as the sector contributes currently less than 1 percent of the nation's GDP. In spite of the developmental prospects of solid minerals mining in Nigeria, the process is undermined by criminal consortia profiteering from it to the detriment of vulnerable Nigerians (Ogbonnaya, 2020). However, Ninyio (2019) assessed the obstacles and challenges in collecting taxes and duties in Nigeria and concluded that the most damaging to tax collection and revenues generation from the mining industry is illegal mining which is usually described as artisanal or informal mining. Similarly, the Nigerian Senate alleged an annual loss of $9 billion from the mining industry through clandestine activities and smuggling of solid minerals (Okocha, 2020). Interestingly, Zabyelina&van Uhm (2020) identified a nexus between organized crimes and mining industry, and stressed that crimes such as illegal mining have become channels of illicit revenues for organized crime groups.

Regrettably, in an industry bedeviled by mammoth corruption and shady activities, it is seemly impossible to achieve sustainable economic growth or build an economy of scale. This is a vicious trend going on in the Nigerian solid minerals industry; a cycle characterized by loss of funds through unauthorized and unregulated extraction as well as sale of the nation's treasured commodities.

Challenging Tasks of Formalizing Artisanal and Small-Scale Mining in Nigeria

Mineral mining has a long standing history in Nigeria. The Nigerian government military decree which domesticated foreign investments in the nation's solid minerals industry laid the foundation for the present dominance of artisanal and small-scale mining in the sector. According to Ango, Blessing, Choquette, Erdenebat, et al (2019, p.7), "artisanal mining is typically performed on small, shallow mineral resources and miners use rudimentary techniques, generally manual, to access the ore while the small-scale mining is typically performed on mineral resources that require some degree of mechanization to make it cost-efficient to access them". Formalization of artisanal mining therefore is a process that seeks to integrate artisanal mining into the formal sector of the economy (United Nations Environment Programme, UNEP, 2012). More succinctly, informal artisanal and small scale mining (ASM) refers to operations that are not supported by the requisite licenses and permits required by law, but do have a social license to operate; and formalizing the sector would bring ASM's informal income-earning activities and economies into the formal sector through legal, regulatory and policy frameworks (International Institute for Sustainable Development, IISD, 2018).The essence of formalization is to organize all actors along the value chains of operation into legally recognized entities that represent their needs to enable enforcement of compliance with regulations, policies, and

management practices, including revenue collection. It also helps in creating healthy investment climate that attracts private investors (both local and foreign).
However, part of the strategic components of the 2016/2017 roadmap for revamping the Nigerian solid minerals industry was the integration of artisanal and small-scale mining into a formal sector through the automation of mining cadastral office operations. The Nigerian cadastral system is designed to provide mining registry and regulate issuance of mining licenses. According to Girones&Pugachevsky (2009), an effective cadastre is central to good mineral resource management in any country. The goal of the licensing system (cadastre) is to guarantee good use of national resources and receipts of taxes and royalties by the government. This would help to boost productivity by enhancing the efficiency of mining and block loopholes that breed corruption and thievery in the industry. Also, it is aimed at intensifying mine file inspection and policing operations to improve reporting of mine quantities, and target tax evaders to curtail smuggling (Badejo, 2018; FMBNP, 2017). Notably, any individuals or cooperatives that intend to mine commercially in Nigeria must therefore obtain the mining title called "Small Scale Mining Lease (SSML) from the Nigeria's cadastral office located in Abuja.

However, the study found that several factors have undermined the formalization of ASM in Nigeria. Some of these include the following:

I. Availability of geological information. Geological data keeps miners informed about mineral reserves and their locations within a geographical terrain. Lack of it usually results in environmental degradation, loss of time and manpower as miners are left to grapple with guesswork, trial and error. The Nigerian mining space and formalization process is hampered by dearth of geological data (Oxford Business Group, OBG, 2021). This is a concern to firms already in the sector as well as prospective investors. According to Donne Darku (the Technical Director of Multiverse Mining and Exploration, a local Nigerian firm, quoted in OBG, 2021), "most miners will not come without data on the geological landscape of Nigeria". This has created opaqueness of the Nigerian solid minerals industry. This finding is corroborated by Okechukwu & Arowosaiye (2020) who argued that one of the major problems militating against the private sector investment in the Nigerian mining sector is inadequate geosciences and data. According to them, the sector is poorly understood and characterized by limited enforcement of regulations, inadequate engagement and leverage of the industry's stakeholders. Besides, Solomonds (2020) maintained that the Nigerian domestic mining industry is highly underdeveloped. According to her, most of the available geological/geosciences data in Nigeria are outdated and this affects the credibility of the resource information, and has impacted the bankability of mining projects.

II. Another factor is access to finance. Access to credit represents a major challenge to many Nigerian miners (OBG, 2021). According to IISD (2018), debt and poverty are major concerns in ASM, as informal work means miners cannot access finance given their non-legal status. Also, due to the long period of inactivity and the slow implementation of the Federal Government's reform agenda in the mining sector, multinational corporations

have been reluctant to fund major mining projects in Nigeria (Solomonds, 2020). Similarly, despite the reconstitution of the Nigerian Solid Minerals Development Fund (SMDF):

> *"The impact is yet to be felt at the industry. On the other hand, commercial banks remain skeptical and continue to assess the industry as high risk" (Okechukwu&Arowosaiye, 2020).*

This situation is worsened by the "tall order" requirement of bank guarantees from the ASM as pre-condition to formalize their operations when it is obvious they cannot access bank facilities. Many of them are not only poor but do not have operating bank details. Global Findex Database (2017) indexed Nigeria as a country in which only 40 percent of lower-middle income adults operate bank accounts. The reason for this is that most of the artisanal miners dwell in remote locations where banking operation is completely absent, and may not have the required national biometric identification (ID). Additionally, most Nigerian deposit money banks (DMB) are reluctant to provide credit facilities to small scale business operators (including artisanal and small scale miners) (Obianagwa & Eze, 2020), thereby making it difficult for them to provide these bank guarantees as required for miners' documentation. The existing fiscal framework in the Nigerian mining sector is not friendly to investors and has failed to consider long gestation period of investment in the sector. Again, multiple regulations, costs and means involved in securing mining licenses from the national cadastre deter miners from formalizing their operations. According to Okechukwu & Arowosaiye (2020), multiple regulations are reducing investors' confidence in the mining sector as the requirement to adhere to these regulations have contributed to a seemingly lack of interest in the industry.

III. Another major challenge undermining transition of artisanal and small scale mining into the formal sector of the Nigerian economy is inadequacy of capacity building, relevant equipment and resources to adapt to sustainable mining techniques. Formalization of artisanal mining is not just about paper documentation but involves capacity building and funding, aimed at enhancing efficiency as well as best practices in mining operations. Hence, it has been established that most of the Nigerian miners cannot operate at large scale or adapt into a formal legal framework as they are either confronted with dearth of modern equipment or short of funds (World Bank MinDiver, interviewed by Columbia Capstone team in Abuja Nigeria, March 19, 2019).

On capital outlay in Nigeria, Mike & Taiwo (2020) argued as follows:

> *"The capital needed for mining of solid minerals is high and may not be affordable to many local investors. Besides, specialized financial institutions for the development of solid mineral are not available. Therefore, local entrepreneurs find it difficult to raise funds for financing such type of industry. There is also inadequate human capital needed for exploitation of mineral resources".*

IV. There is a communication gap between the miners and respective government agencies in terms of the benefits associated with formalizing their operations. Lack of effective

communication has created room for skepticism among miners over government reforms in the solid minerals sector. Most miners are unaware of the existing government policies and are concerned that the costs of securing Small Scale Mining Lease (operating licenses) may outweigh their potential benefits (Ango, Blessing, Choquette, Erdenebat, et al, 2019). Meanwhile, understanding of terms and conditions involved in the formalization process requires sufficient corporate and legal knowledge, yet most of the artisanal miners belong to the core illiterate clay of the Nigerian socio-economic formation. As confirmed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) report, Nigeria has only 51 percents of literacy rate with 50 percent of the population (majority of whom illiterates) living in the remote areas (UNESCO, 2017).

Regrettably, four (4) years after launching the roadmap for the mining sector, economic growth in the industry is still marginal and dominated by the army of informal artisanal operations. Worrisomely, Ogbonnaya (2020) stated that an estimated 80 percent of mining in the North West region of Nigeria is carried out illegally and on an artisanal basis by local populations. Currently, only a few of the Nigerian solid minerals have been tapped and production is dominated by low capacious small scale miners while its contribution to national economy has declined due to overdependence on crude oil (Mike &Taiwo, 2020). Similarly, Olade (2019) observed that mining of metallic minerals is scattered over large areas of Nigeria spearheaded by artisanal operators. Moreover, Brady (2020) insisted that Nigeria's solid minerals industry is still dominated by artisanal and small-scale miners whose activities are largely characterized by mining of precious minerals which are being smuggled out of Nigeria. From the existing statistics, it appears Nigeria is not yet ready to explore the enormity of value chain in the mining industry. Contrast to Nigeria, in Botswana for instance:

> *"Efforts have been intensified to digitize and make geoscience information readily available to local and international potential investors in an effort to encourage prospecting for non-diamond minerals with focus on copper, nickel, soda ash, gold endowments, etc. The development of the minerals industry in Botswana is in full steam, as evidenced by several ongoing exploration projects and the issuance of mining licenses to private companies" (Lexology, 2021).*

As above, Ango, Blessing, Choquette, Erdenebat et al (2019) observed that the nation's solid minerals industry has potential for rapid growth due to large number of informal artisanal miners whose output is not currently accounted in the statistics. On paper:

> *"The current institutional framework guiding the mining sector provides incentives (such as geological information, mineral reserve evaluations, skills training, access to mining equipment, environmental impact assessment reports, and workshops on legal, marketing and business skills) for artisanal mining operators to formalize but in practice, very few of the outlined services are provided as incentives for miners to formalize" (Ango, Blessing, Choquette, Erdenebat et al, 2019, p.34).*

The ambition to create a globally competitive mining sector by the Nigerian government has not translated into reality as the sector still remains overwhelmingly informal. The impact of underdevelopment of the Nigerian mining sector can be seen in terms of loss of revenues (taxes), loss of foreign exchange earnings and poor forward and backward integrations.

5. CONCLUSION AND RECOMMENDATIONS

The journey of Nigeria towards creating a viable and globally competitive solid minerals sector capable of generating wealth, employment opportunities and other multiplier's effects has not recorded the much desired strides. The prospects of the mining sector are largely undermined by the mindsets of the Nigerian policy makers that investments in the industry will have a long gestation period as opposed to petroleum industry with quicker returns on investment. Currently, Nigeria is facing a humongous challenge of reviving the mining sector in order to diversify its revenue sources following imminent crises in the global crude oil market. Several efforts have been made in the past decades by the government to leverage the potentials of the solid minerals, yet the industry has remained largely underdeveloped. However, following the initiatives of the government under President Muhammadu Buhari to declare mining as one of the key growth sectors of the economy, the Economic Recovery and Growth Plan (ERGP) was established spanning from 2017 to 2020.The study found that in spite of pockets of achievements recorded by government, the sector is still bedeviled by myriads of challenges such as loss of tax revenues, loss of foreign exchange earnings, inadequate geological data, and sustained dominance of informal and illegal mining, among others. Based on our findings, we made the following recommendations:

a. Transparency of income declaration and revenue remittances. Transparency and anti-corruption measures should be adopted for effective public finance management in order to curtail revenue losses in the mining industry. There is need for adequate policing of the mining fields as well as oversight of trade and export of these gemstones in order to restrain illegalities and leakages in the sector. This can be achieved by building synergy through intelligence sharing among security agencies, the cadastral officers and host communities, among other stakeholders.
b. Also, the FMMSD should be tasked to provide details of geological map of every mine in Nigeria and make them available to the relevant stakeholders. Without access to geological data, mining activities would be prone to guesswork. Therefore, availability of geological information will lead to increase in productivity and investment, and minimize environmental degradation. Mapping Nigeria's potential reserves and land use, and making geological information available to miners will be fundamental in determining appropriate locations of solid minerals for miners in an organized mining sector. It will also help in addressing the problem of poor governance system in the mining sector as well as the weakness and failure of regulatory oversight, being the result of gross inadequacies in the enforcement of compliance by the respective authorities.
c. Decentralization of the Nigerian Cadastral Office. Centralization of the Nigerian cadastral system is one of the factors truncating the transition of artisanal and small scale miners into a formal sector. Formal artisanal mining is fundamental for

increasing socio-economic growth and building economies of scale in the solid mineral industry. Since formal mining will serve as a catalyst for increasing investments and productivity in the mining sector, efforts should be made by the respective authorities to provide business friendly environment to facilitate this process. Part of this measure should be aimed at decentralizing the Nigerian Cadastral Office which is currently domiciled in the Abuja, Nigeria. This will enhance service delivery and create more channels for miners in accessing government services. In order to achieve this, the FMMSD should establish regional cadastral centers and offices in every geopolitical zone or state to make access to services easy and fast to the miners and other stakeholders.

d. Simplification of registration process. Formalization of miners requires a certain level of capital base in order to register and gain a concession as well as procure the necessary equipment to mine and process minerals. Since this process is capital intensive, there is need for government to open up channels that will increase access to credit and finance especially through microfinance credit and savings, the Nigerian Bank of Industry (BoI), grants and government loan facilities with minimum interest rates. This has become very exigent as over 80 percent of artisanal miners are not bank creditworthy due to lack of collateral. Furthermore, the current registration charges are high and therefore truncate the formalization exercise. Considering the existing socio-economic hardship worsened by Covid-19 pandemic, there is need for the relevant authorities to moderate registration fees as a means of encouraging future applicants to register with the Nigerian Cadastral Office.
e. Provision of capacity building can scale up successful formalization in the Nigerian mining sector. There is need for relevant authorities to organize training programmes for miners especially the artisans and small scale holdings, aimed at promoting best practices and practical knowledge of mining that will facilitate their integration into the formal mining sector. There is the need to acquaint them with the socio-economic peculiarities of the host mining communities and other relevant stakeholders which will enhance their awareness of modus operandi and foster partnerships with mining community organizations as well as the private sector.
f. Access to equipment is vital for a formalized mining economy. In order to build an economy of scale in the Nigerian solid minerals industry, miners' access to equipment should be increased. However, equipment should be portable and affordable to miners; and more importantly, they should be locally made to ensure easy repair and servicing. Meanwhile, for individual miners with weak capital base, "hire purchase schemes" and decentralized processing centers should be made available which can create alternative and more access to machineries.
g. Effective feedback mechanism between the miners and government will facilitate formalization process. To create sustainable formalization plans, there is need for the relevant authorities to create platforms that will provide conduits for feedbacks between the miners and government. This will ensure effective and regular

discussion between the artisanal and small scale miners and government on current trends and complexities thereby providing channels for feedbacks and interventions.

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