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ECONOMIC DIVERSIFICATION THROUGH SOLID MINERALS SECTOR IN NIGERIA: POTENTIALS, CHALLENGES AND PROSPECT

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ABSTRACT

This study examined the potentials, challenges and prospect of solid minerals sector of the Nigerian economy; with emphasis to factors responsible for the low performance of the sector in terms of contribution to GDP, export and employment generation. This sector has prospect to promote economic diversification drive of the Federal Government of Nigeria if well developed and managed. Despite government efforts over the years to reposition and revitalize it through legislation, regulation and investment; its optimum output in terms of wealth creation, government revenue, employment generation have been hampered by a number of factors that did not allow the sector to prosper as planned. The study employed Documentary Research Method (DRM) as a source of data; and document analysis in interpreting and presenting research findings. From 1981 – 2022, solid mineral had a positive but statistically insignificant impact on the Nigerian economic growth including export. Nigeria's Mining and Quarrying sector contributed 7.72% to the overall GDP in the third quarter of 2024, while it recorded 8.32% in the third quarter of 2023 according to the NBS report, 2024. Some of the challenges of the sector include access to high capital and technology; insecurity; poor private sector investment, energy intensive, local human capital, artisanal mining, illegal mining in many solid minerals' sites, value addition, developing and building investors' confidence as well as regulatory framework that can guarantee fair fiscal regime among others. In view of this, there is the need for the Federal Government of Nigeria through Nigerian Geological Survey Agency (NGSA) to provide data about locations of solid minerals in commercial quantities in the country for attracting local and foreign investment. Next is to ensure political stability and security in the country; promote forward and backward linkages in the solid minerals sector; provide basic infrastructure and address illegal mining activities across the mining sites in the country.

Keywords:
Solid minerals, economic diversification, economic growth, economic development.

1.0 Introduction

For economic growth and development in any country, optimum contribution of various sectors is vital. Nigeria's economic diversification drive require input from

many sectors in order to reduce overdependence from crude oil and natural gas. In view of this, this study examined the potential, challenges and prospect of solid mineral sector in Nigeria. The sector is capable and has the potential to transform the country's economy significantly and contribute greatly to Growth Domestic Product (GDP), revenue and employment generation if given the required attention by government through legislation, foreign and local investments and partnership with the relevant stakeholders and by extension operates in line with global best practices

In Nigeria, precisely there are forty-four (44) solid minerals that were discovered in commercial quantity and are spread across the 36 States and Federal Capital Territory, (FCT) Abuja. Out of these, seven (7) strategic solid minerals are being prioritized and promoted for private sector participation and investment by the Federal Government. The selected solid minerals are gold, coal, bitumen, limestone, iron ore, lead/zinc and barites (Afolabi, et al. 2020:1).

However, Nigeria's Mining & Quarrying sector contributed 7.72% to the overall GDP in the third quarter of 2024, while it recorded 8.32% in the third quarter of 2023 according to the NBS report, 2024. From 1981 – 2022, solid mineral had a positive but statistically insignificant impact on the Nigerian economic growth including export (Ajie, C., Okoh, & Ojiya, 2019; Mienebimo & Baghebo, 2024).

…Globally, the mining industry has been a close rival to the petroleum industry, while Nigeria earns a paltry $89 million per annum from it. The commercial value of Nigeria's solid minerals has been estimated to run into hundreds of trillions of dollars, with 70 per cent of these buried in the bowels of Northern Nigeria (Afolabi, et al. (2020:12).

For mining sector to contribute significantly in the Nigerian economic development, there is the need for policy reform and enforcement that can address its critical challenges through value creation in the immediate, short and long-term periods. Currently, the sector has laws and institutions empowered to regulate it - such as the Ministry of Solid Minerals Development (MSMD), Nigerian Minerals and Mining Act, 2007, Mining Cadastre Office (MCO), the Mines Inspectorate Department (MID), Nigerian Geological Survey Agency (NGSA) and Nigeria Extractive Industries Transparency Initiative (NEITI) Act 2007, among others (NEITI, 2011).

Though, some of the critical needs (and challenges) of the sector include access to high capital and technology; political stability and security; private sector investment, energy intensive, local human capital, artisanal mining, value addition, developing and building investors' confidence as well as regulatory framework that can guarantee fair fiscal regime among others. Currently, illegal mining is taking place in many solid minerals' sites in Nigeria. Numerous security challenges across geo-political zones in Nigeria affect development of this sector.

It is in order to state that the solid mineral and agricultural sectors did not get the absolute attention of government after the discovery of crude oil and natural gas in the country; particularly with the sale of the commodity in commercial quantity in the sixties through the 1970s. The era of Covid-19 pandemic that resulted reduction of revenue from the oil sector had clearly signalled the implication of lack economic diversification. During that period Federal Government revised its budget in line with crashed oil benchmark in the international market. It is not late for the government to look into solid mineral and other sectors that are yet to be harness fully for way out to crises such as this (Abbas, Ali & Wakili, 2022).

This study investigated the potential, challenges and prospect of solid minerals sector of the Nigerian economy. This

investigation was necessitated by the need to discover why in spite of availability of different solid minerals across the 36 states in the country; the sectors' contribution to the Gross domestic Product, export to foreign markets, employment and revenue generation is very low considering its potentials. The sector contributes less than 10% to the country's Gross Domestic Product (GDP) in recent times. In addition, there is the need for economic diversification in order to reduce over-dependence oil sector over the years in Nigeria.

1.1 Problem Statement

Nigeria is one of the countries in the globe whose domestic natural resources are in excess of its domestic requirements. The state is endowed with abundant natural resources of different category. Specifically, the country is with proven deposits of vast solid minerals that remained largely under-exploited and untapped (Amoo, et al. 2020). After oil, the sector is next with potentials to contribute to Nigeria's economic growth and development. The sector requires high technology, human capacity, partnership and capital formation for government to realize its optimum benefit in terms of revenue generation, foreign exchange earnings, economic growth and development. The sector has potential to transform and diversify Nigeria's economy. Currently, contribution of the sector to revenue generation, foreign exchange earnings and employment is very low compared to proven reserve of deposit in the country. Nigeria's solid minerals sector contributed ₦173.48 billion in revenue to government treasury in 2021, showing significant increased from ₦128.17 billion in 2020 (NEITI, 2023, Daniel, Shinge, and Yakubu, 2017; Abayomi and Olufemi, 2022; Abbas, Ali and Wakili, 2022 & Korgbeelo and Ezekwu, 2024).

Indeed, The Geology of Nigeria is comparable to those of other countries where world class deposits have been found (Kareem and Kadiri, 2017:171). The Ministry of Solid Minerals Development has identified and prioritized the development of Seven Strategic Minerals (7SM), Coal, Bitumen, Limestone, Iron Ore, Barytes, Gold and Lead, Zinc. These seven minerals are world class and geologically available in commercial quantities that can sustain mining operation for years in the polity. Why the low performance of the sector in terms of revenue generation, foreign exchange earnings, economic growth and development despite proven huge solid minerals deposits in Nigeria?

1.2 Objectives of the Study

This study examined the potential, challenges and prospects of solid minerals sector of the Nigerian economy; with emphasis to factors responsible for the poor performance of the sector in terms of contribution to GDP, export and employment generation.

The specific objectives were to:

i. examine the contemporary state of the solid minerals sector in Nigeria
ii. find out the contribution of the sector to Growth Domestic Product and revenue generation
iii. investigate the challenges responsible for low performance of the sector to foreign exchange
iv. analyse the prospect of solid minerals sector to attainment of economic diversification drive of the Federal republic of Nigeria.

2.0 Background on Exploration and Exploitation of Solid Minerals in Nigeria

Solid Minerals refer to mineral deposits found in the different states of the federation, including FCT, Abuja. They include tin, columbite, limestone, kaolin, tantalite, coal, lead/zinc, iron ore, gypsum, bitumen, gold, kaolin and related solid materials. Ali, Abdullahi, and Zangina (2018:531) state that mining is the extraction of minerals and other geological materials of economic value from deposits of the earth.

Nigeria possesses a geologically diverse and potentially wealth-creating endowment of solid minerals that spans metallic and non-metallic commodities. The country's geology comprises three principal provinces, the Precambrian Basement Complex, the Younger Granites and extensive sedimentary basins (Omotehinse & Ako, 2019). In addition, Omotehinse and Ako (2019) emphasized that each of these geologic settings is hosting a range of metallic (e.g. gold, iron ore, lead-zinc, tin-columbite) and non-metallic (e.g., limestone, bitumen, barite, gemstones) resources. This geological framework underpins Nigeria's long-term mineral potential and justifies renewed exploration efforts to support economic diversification beyond oil. Historically, prior to the oil era, mining activities (notably tin and columbite in the Jos Plateau and coal in Enugu) contributed meaningfully to domestic industry and export receipts (NEITI, 2023). These estimates indicate the sector accounted for several percent of GDP during the 1960s–1970s before petroleum became dominant. The subsequent oil boom redirected public investment, institutional attention and human capital away from mining, producing a legacy of under-investment in geological data, exploration capacity and value-chain development.

Policy reforms in recent times has attempted to address the challenges of solid minerals sector, one of which was the Nigerian Minerals and Mining Act (2007). This provides the legal framework to attract private investment, introduced transparent licensing procedures, established the Mining Cadastre Office and created mechanisms such as the Solid Minerals Development Fund to finance sector development. The Act marked a shift toward private-sector-led mining and set out obligations for environmental protection and community engagement (NEITI, 2023). Nevertheless, effective implementation and regulatory certainty remain work in progress. Empirical audits and diagnostics reveal a persistent performance gap between geological potential and economic outcomes. NEITI (2023)'s solid-minerals audit and dashboard show that, despite incremental revenue gains in some years, the sector's direct contribution to national GDP remains marginal. This is because it is well below 1% in recent years, illustrating both under-exploitation and missed opportunities for growth and fiscal diversification. NEITI (2023) further highlighted issues of data inconsistency, revenue leakages and the dominance of informal/illegal extraction in several mineral provinces.

NGSA (2023) revealed a wide range of structural constraints explains the sector's weak performance. Firstly, exploration financing is limited. Due to the fact that it is capital-intensive geophysical surveys, feasibility studies and mine development projects attract fewer domestic and foreign investors. This is in comparison with countries that have clearer regulatory predictability and better infrastructure (e.g., electricity, roads, and ports). Secondly, data poverty, such as incomplete national geological maps and limited up-to-date mineral inventories. These raise exploration risk and increase costs for prospective developers. Thirdly, governance and security issues in some mineral belts (including artisanal and illegal mining hotspots) undermine formal investment and raise social and environmental risks. These constraints have been flagged in national diagnostics and international sector reviews (World Bank, 2023).

Policy-wise, recent momentum and operational changes indicate growing political will to unlock the sector. Government roadmaps and public statements underscore commitments to revoke dormant licences, strengthen cadastral systems, improve transparency and partner with international technical agencies to boost capacity. In parallel, security improvements in formerly unstable states (e.g. the lifting of exploration suspensions in Zamfara State) have reopened access to major gold and critical-

mineral deposits. These are changes that could materially alter domestic production prospects if accompanied by robust regulations and community safeguards. (Reuters, 2024, April 24). Opportunities for value addition and job creation are considerable if policy and financing gaps are addressed (Reuters, 2024, December 23). Because downstream processing, formalisation of artisanal miners, investment in geo-scientific data generation and targeted incentives for exploration could increase formal sector output, widen export diversification and deliver socioeconomic benefits in mining regions. International diagnostic tools (e.g. Mining Sector Diagnostic) and multilateral technical partnerships provide frameworks to prioritize reforms, linking legal clarity, fiscal regimes, infrastructure investment and community development to improved sector outcomes. (Eniowo, Kilambo & Meyer, 2022)

In essence, Nigeria's solid minerals endowment constitutes a credible opportunity for economic diversification and regional development. Yet realising this potential will require simultaneous progress on three fronts: (1) financing and technical investments in exploration and geological data; (2) stronger governance, cadastral transparency and environmental/social safeguards; and (3) integrated local development strategies that channel mining benefits into jobs, infrastructure and resilience in mining communities. Current reforms and emerging investor interest are promising, but sustained, evidence-based implementation remains essential to convert geological promise into measurable socio-economic returns. (NGSA, 2023).

Fayemi (2016), former Minister of Solid Minerals Development of the Federal Republic of Nigeria; highlighted strategies and key factors for rebuilding Nigeria's mining sector in a paper titled: Nigeria's Solid Minerals Sector: Alternative Investment Opportunities. The key areas of reform and action are institutions and governance, stakeholder engagement, industry participants, geosciences data and information, access to finance (including Nigerian Solid Minerals Investment Fund) as well as enabling environment. The target is to create a globally competitive sector capable of contributing to wealth creation, employment and the advancement of social and human security.

3.0 Methodology

This study employed Documentary Research methodology (DRM). A document is any written, printed, photographed, painted or recorded material that can be used to provide information or evidence. (Dolowitz, Buckler and Sweeney 2008:39; as cited in Tight, 2019). It is one of the qualitative research methods for conducting social research. The DSM tools are frequently used in business, anthropology, communications, economics, education, medicine, political science, social work, and sociology. Beyond that, it is a valuable research method that has been used in various fields where documents are available. This method involves analyzing various types of documents and publications (through secondary analysis) such as books, newspaper articles, academic journal articles, government publications and institutional reports. It is possible to investigate in a very large scope. Secondary analysis involves analysis of documents about a particular phenomenon and present it thematically. It is a valuable research method that has been used in various fields where documents are available for many years. The major concern for researchers to note and observe while using this method include authenticity, credibility, representativeness and meaning. This is to ensure the material is genuine, validity of the content, credibility of the source, not distorted, reliable as well as it is clearly presented. A key characteristic of documentary methods is: researchers rely greatly on the analyses of data collected for purposes other than those of particular studies in social relations; (Judd, Smith and Kidder, as cited in Ahmed, 2010:5). For this

study, involves collection and analysis of data on contribution of solid minerals to Gross Domestic Product, its export, strategies for economic diversification in Nigeria from Nigerian Geological Survey Agency (NGSA), Nigeria Extractive Industries Transparency Initiative (NEITI), Central Bank of Nigeria, National Bureau of Statistics, scholarly works among others.

4.0 Contribution of Solid Minerals Sector to Nigeria's Economic Growth and Development

The solid minerals sector represents one of Nigeria's most underutilized yet economically strategic endowments for achieving post-oil diversification and sustainable development. With over forty-four (44) identified mineral types spread across more than 500 locations, Nigeria's geological profile encompasses diverse resources. These includes metallic ores (such as gold, lead-zinc, tin, iron ore, and niobium), industrial minerals (e.g., limestone, barite, gypsum, kaolin, and feldspar), and energy minerals including coal, bitumen, and uranium (NGSA, 2023; Omotehinse & Ako, 2019). These mineral assets, if properly harnessed, can support industrialization, create employment and improve foreign exchange earnings. The sector's developmental potential lies not only in extraction but also in downstream value addition, processing and mineral-based manufacturing that can foster regional economic transformation (World Bank, 2023). Empirical evidence underscores the sector's macroeconomic significance. Reports have it that Nigeria's solid minerals contributed ₦173.48 billion in revenue to government coffers in 2021, showing significant increased from ₦128.17 billion in 2020 (NEITI, 2023). However, this contribution translates to only about 0.63% of the national GDP, illustrating a wide gap between potential and actual performance (NEITI, 2023). Comparatively, the mining sector contributes more than 7% to South Africa's GDP and approximately 5% in Ghana (World Bank, 2023). The disparity highlights Nigeria's structural and institutional constraints, including limited exploration financing, inadequate infrastructure, weak data systems and policy inconsistency (Eregha & Mesagan, 2016).

The economic potential of the solid minerals sector is multi-dimensional. According to Adetoye and Adewuyi (2020), large-scale mineral development can catalyze employment creation across the value chain, from exploration and processing to logistics and marketing, while stimulating demand for local goods and services. The artisanal and small-scale mining (ASM) subsector alone is estimated to provide direct and indirect livelihoods for over 500,000 Nigerians, especially in rural and semi-arid zones (Delve, 2023). This underscores the sector's role in promoting inclusive economic growth and rural development. Furthermore, with rising global demand for critical minerals used in renewable energy technologies, such as lithium, cobalt and nickel, Nigeria's strategic mineral reserves could position it as a key player in the global green economy (OECD, 2023). Value addition and industrial linkages are crucial levers for realizing this potential. For instance, limestone, gypsum and kaolin provide raw materials for cement, ceramics and pharmaceutical industries. Expanding beneficiation and refining capacity would reduce raw material exports and boost domestic manufacturing competitiveness (Omotehinse & Ako, 2019). Similarly, gold value chains can promote artisanal upgrading and enhance export earnings through formalized trading frameworks (Eniowo et al., 2022). NEITI's (2023) audit emphasized that strengthening mineral processing infrastructure and encouraging private investment in mineral industrialization zones would substantially improve fiscal revenues and employment generation.

From a policy perspective, Nigeria has made progress through the Minerals and Mining Act of 2007 and the Roadmap for the Growth and Development of the Nigerian Mining

Industry (2016), both of which aim to formalize artisanal mining, attract investment and diversify the economy. Yet, implementation has lagged due to regulatory fragmentation and insufficient financing. The World Bank–assisted Mineral Sector Support for Economic Diversification (MinDiver) project seeks to bridge these gaps by enhancing data availability, institutional efficiency and sustainable mining governance (World Bank, 2023). The sector's contribution to sustainable development extends beyond revenue. Properly regulated mining can promote environmental rehabilitation, rural infrastructure and local empowerment programs (Omotehinse & Ako, 2019). Conversely, unregulated extraction has been associated with deforestation, soil erosion and pollution, particularly in gold- and lead-mining communities (Adetoye & Adewuyi, 2020). Therefore, a balanced approach integrating environmental management, social inclusion and economic diversification is imperative for the sector's long-term viability.

In essence, while the solid minerals sector currently plays a modest role in Nigeria's GDP, its latent potential remains immense. Strategic investment in exploration, beneficiation and value-chain integration, coupled with transparent governance and community participation, can reposition the sector as a cornerstone of Nigeria's post-oil economy. As global energy transitions accelerate, the demand for critical minerals offers a window of opportunity for Nigeria to become a competitive mineral economy in sub-Saharan Africa. Realizing this vision will require coherent policies, fiscal incentives, sustainable mining practices and the alignment of extractive governance with the Sustainable Development Goals (SDGs), particularly Goals 8 (decent work and economic growth), 9 (industry, innovation, and infrastructure) and 12 (responsible consumption and production).

Nigeria's Mining & Quarrying sector contributed 7.72% to the overall GDP in the third quarter of 2024, while it recorded 8.32% in the third quarter of 2023 according to the NBS report, 2024. From 1981 – 2022, solid mineral had a positive but statistically insignificant impact on the Nigerian economic growth including export (Ajie, C., Okoh, & Ojiya, 2019; Mienebimo & Baghebo, 2024).

Under the 2023 EITI Standard, countries are expected to disclose their revenue forecasts or scenarios, considering different market conditions. This includes revenues from oil, gas, and solid minerals. As the world transitions to renewable energy technologies, demand for certain minerals (like cobalt, lithium, and rare earth elements) will increase. These minerals are essential for batteries, solar panels, and wind turbines. By shedding light on relevant policies and revenue expectations, the EITI Standard ensures transparency and informed public debate about the energy transition's impact on revenue streams (Extractive Industry Transparency Initiative, 2023).

Abayomi and Olufemi (2022) investigated the influence of solid mineral development on economic growth in Nigeria using annual time series data from 1981 to 2019. The result of the study showed that the impact of solid minerals on economic growth is weak. Based on this, its effect on economic growth in the country is not significant. The study recommended the need for reform through implementation of development plan and strengthening regulatory framework in the sector among others with a view to boosting economic growth in the country.

In the past, solid minerals contributed greatly to the development of Nigeria through mining of iron ore, coal and gold (Shasore, 2016; as cited in Korgbeelo and Ezekwu, 2024). Exploitation of solid minerals started in 1902. Unfortunately, the sector experienced poor policy implementation and lack of proper attention, which resulted to decline in the contribution of the sector to the country's Gross Domestic Product (GDP). Contribution of the sector to

employment generation is also very low (Korgbeelo and Ezekwu (2024).

Korgbeelo and Ezekwu (2024) examined the contribution of solid mineral export to the development of the Nigerian economy through Augmented Dickey-Fuller (ADF) unit root test, Johansen co integration test, error correction mechanism (ECM) and Granger causality test. The study used annual time series data for the period 1986 to 2022. The result of the investigation revealed that solid mineral export has insignificant negative impact on the Nigeria's economy. The research suggested the need for providing basic infrastructural facilities for the solid minerals sector.

Table 1: Annual Report of Contribution of Solid Minerals Sector in Nigeria (2007 - 2021)

S/N	Reporting year	Number of Reporting Companies	Government Receipts	CBN Exchange Rate as @ 31st	Government Receipts	Publication Dates
			N Billion	N	US$' Million	
1	2007	78	7.59	116.3	65.26	12-Dec.
2	2008	78	10.57	130.75	80.82	12-Dec.
3	2009	78	19.15	147.6	129.73	12-Dec.
4	2010	78	17.1	148,67	115	12-Dec.
5	2011	67	27.01	156.2	172.91	13-Jan.
6	2012	65	25.57	155.27	164.67	15-Dec.
7	2013	65	30.25	155.2	194.93	16-Mar.
8	2014	39	49.17	167.5	293.57	16-Dec.
9	2015	42	64.46	196.5	328.06	17-Jul.
10	2016	56	43.22	304.5	141.94	18-Nov.
11	2017	59	52.76	305.5	172.69	19-Oct.
12	2018	69	69.47	306.5	226.66	20-Mar.
13	2019	74	79.96	306.5	260.88	20-Dec
14	2020	102	128.17	379.5	337.73	22-Mar.
15	2021	121	173.48	413.3	419.74	22-Mar.
16	2022	85	341.27	448.55	756.79	
	TOTAL		**1,139.21**		**3,861.38**	

Source: NEITI Solid Minerals Audit (SMA) Reports - 2023:39

Table 1 presents a sixteen-Year Reporting Trend of Sector Contribution of solid minerals in Nigeria from 2007 to 2022.

4.1 Challenges That Hindered Solid Minerals Sector to Contribute Optimally to Nigeria's Economic Growth and Development

Despite Nigeria's vast geological endowment, the country's solid minerals sector continues to experience structural, institutional and operational weaknesses that have hindered its contribution to national development. Several interrelated challenges have combined to stifle progress and discourage investment. A key impediment to the growth of Nigeria's mining industry is the paucity of reliable geoscience data and the low level of exploration investment. According to the NGSA (2023), many potential mineral deposits remain underexplored due to limited geological mapping and lack of up-to-date mineral inventories. This gap significantly raises investment risks and undermined investor confidence. Similarly, the World Bank's MinDiver Project (2023) highlighted that only about 0.5% of Nigeria's landmass has been subjected to detailed geological exploration compared to over 50% in other mineral-rich African countries. The absence of credible data on mineral reserves has thus restricted the ability of policymakers and private investors to make informed decisions on commercial mining operations. In contrast, countries such as South Africa and Ghana have well-

established geological survey institutions and publicly accessible exploration databases that guide mineral investors (OECD, 2023). Nigeria's lack of comparable data infrastructure leads to duplication of efforts, discourages foreign direct investment (FDI) and results in informal and inefficient exploitation of mineral resources.

Infrastructure remains another major constraint. As Adetoye and Adewuyi (2020) observed, inadequate transport networks, erratic electricity supply and poor access to water in mining areas significantly increase the cost of exploration, processing and exportation. Many mineral-rich states, particularly in northern Nigeria, lack paved roads and reliable energy grids needed for industrial-scale mining. The World Bank (2023) emphasized that the absence of processing infrastructure and smelting facilities forces Nigeria to export raw minerals, thereby losing substantial value addition. Similarly, Eregha and Mesagan (2016) argued that resource-based sectors in Nigeria are often constrained by infrastructural bottlenecks that limit their forward and backward linkages with the manufacturing sector. Without deliberate investment in transport corridors, power supply and industrial parks, the mining value chain will continue to be weak and disjointed.

Regulatory inconsistency and institutional overlap remains persistent challenges. The NEITI (2023) reported that the sector is burdened by overlapping responsibilities between federal, state and local authorities, resulting in double taxation, ambiguous licensing regimes and corruption risks. Such inefficiencies discourage formalization and create uncertainty for both local and foreign investors. In addition, Adetoye and Adewuyi (2020) stressed that weak policy coherence and bureaucratic delays in obtaining mining leases have led to project stagnation. Although the Minerals and Mining Act (2007) aimed to improve governance, enforcement remains inadequate and coordination among regulatory agencies such as the Ministry of Mines and Steel Development and the Mining Cadastre Office (MCO) is weak. The OECD (2023) also linked these governance challenges to Nigeria's limited integration into global value chains for critical minerals, arguing that institutional inefficiencies constrain the country's ability to benefit from the emerging green energy transition, which demands minerals such as lithium, cobalt, and nickel.

The dominance of artisanal and small-scale mining (ASM) further complicated the landscape. According to Delve (2023), over 80% of miners in Nigeria operate informally, often using rudimentary tools without environmental safeguards or occupational safety measures. This has resulted in unregulated exploitation, unsafe working conditions and significant revenue leakage. Eniowo et al. (2022) found that the informal nature of ASM operations limits miners' access to formal credit and financing, reinforcing a poverty trap among small-scale operators. Moreover, ASM activities contribute heavily to environmental degradation. Omotehinse and Ako (2019) reported that artisanal mining leads to deforestation, loss of biodiversity and contamination of soil and water bodies through the use of mercury and other harmful chemicals. These practices threaten local ecosystems and public health, especially in northern states such as Zamfara, where lead poisoning incidents have been recorded.

Environmental and social risks presented further complications for mining operations. Insecurity across several mineral-producing regions, particularly in the North-West and North-East, has led to disruptions in exploration and production (NEITI, 2023). Frequent attacks by insurgents, bandits and illegal mining cartels make it difficult for legitimate operators to function effectively. At the same time, environmental degradation from both legal and illegal mining activities has intensified community resistance. Omotehinse and Ako (2019)

highlighted that mining-induced pollution and land degradation have triggered conflicts between communities and companies. Without strong environmental governance, Nigeria risks replicating the "resource curse" dynamic identified by Eregha and Mesagan (2016), where natural wealth fosters conflict and governance decay rather than economic progress.

Furthermore, the weak industrial linkages and limited value addition in Nigeria's mining sector remain major missed opportunities. Adetoye and Adewuyi (2020) argued that exporting raw minerals without domestic processing forfeits substantial economic value and employment potential. The country's industrial minerals such as limestone, baryte and kaolin could serve as raw materials for domestic industries (e.g cement, paint and ceramics), yet most are exported unprocessed. The OECD (2023) underscored that enhancing beneficiation and value addition could aligned Nigeria's mineral sector with the global energy transition, positioning it as a supplier of critical minerals to green industries. However, this requires investment in processing technology, logistics and market linkages.

Some studies indicated that the solid mineral sector is very strategic to industrialization and development of the Nigerian economy (Kashim, 2011; Filani, 2014; Kaita, Kankara, and Mubarak, 2017). Daniel, Shinge, and Yakubu (2017) conducted a study titled: Challenges of Harnessing and Development of Solid Mineral Resources in Taraba State, the study revealed that terrorism, ethno-religious conflicts and illegal mining has significantly reduced the potential of the solid mineral sector to contribute to the economic development in the country.

Aniobi, Adedokun, Akinsunmi and Nweze (2021) investigated the state of Nigeria's solid minerals sector in view of its potentials and contemporary challenges in a study titled: Economy Beyond Oil: Harnessing Nigerian Solid-Mineral Deposits for Sustainable Development. The study observed that lack of proper attention to the solid minerals sector in the country by the government is responsible for its under-performance; for this reason, the country loses huge amounts in foreign exchange (over US$200m) for importation of solid minerals from abroad.

4.2 Potentials and Prospect of Solid Minerals Sector to Economic Diversification In Nigeria

According to Ali, Abdullahi, and Zangina (2018) the prospect for mining is not new for Nigeria. This is because the solid mineral sector had played vital roles for over four decades ago in generating revenue to government and financing programmes in the form of infrastructural design, education, and health care among others. Despite its present position and neglect since the discovery of crude and natural gas in commercial quantity in the country; its potentials can be harness fully for optimum benefit to the Nigeria's economy. David, Noah, and Agbalajobi; as cited in Aniobi, Adedokun, Akinsunmi and Nweze (2021) maintained that Nigeria has great potentials in solid minerals to develop the economy, its contribution to the GDP is insignificant, and not favourable compare to other African countries like Botswana, Namibia, DR Congo and South Africa in respect of GDP and earning from foreign exchange of solid minerals.Aniobi, Adedokun, Akinsunmi and Nweze (2021) stated that solid minerals have the potential to contribute greatly to the economic development of any country like Nigeria where there is availability of it in the environment. The sector can create significant economic benefits which include the direct benefits that come in the form of income and employment generation. In view of this, there is prospect that solid mineral will have great contribution to economic development of Nigeria.

Kaita et al. (2017) observed that despite huge potentials of solid mineral sector in Nigeria, but the sector has been undermined by many

challenges. The sector is also a source of alternative energy for industrialization in the country. Backward and forward linkages between solid mineral sector and industries can greatly help in promoting economic diversification.

Nigeria's economy requires input from all sectors for it to address micro and macro-economic challenges. For any nation-state in the international system to attain balanced economic growth and development; needs to exploit its resources optimally, invest and regulate their activities through relevant government agencies.

This sector has prospect to promote economic diversification drive of the Federal Government of Nigeria if well developed and managed. Despite government efforts over the years to reposition and revitalize it through legislation, regulation and investment; its optimum output in terms of wealth creation, government revenue, employment generation have been hampered by a number of factors that did not allow the sector to prosper as planned. Across the length and breadth of Nigerian territory, abundant solid minerals underground that remain under-exploit or untapped. The solid minerals in Nigeria have the potential to transform Nigeria's economy through local and foreign investment and partnership (Akande, 2022; Edeme, (2019; Fayemi, 2016 and Filani, 2014).

Based on the mineral endowment spread across the 36 states and Federal Capital Territory (Abuja), the solid minerals sector has the potential to contribute greatly to Nigeria's economic diversification drive, enhance GDP, generate employment and revenue as well as poverty reduction if enabling environment is provided.

5.0 Conclusion and Policy Implication

In conclusion, Nigeria is one of the countries endowed with huge mineral resources which can transform its economy to one of the best in the world. However, very little attention is directed to this sector as the sector contributes less than 10% to the country's Gross Domestic Product (GDP) in recent times. The study investigated the factors responsible for the poor performance of the sector in terms of contribution to GDP, export and employment generation.

This sector is capable and has the potential to transform the country's economy significantly and contribute greatly to Growth Domestic Product (GDP), revenue and employment generation if given the required attention by government through legislation, foreign and local investments and partnership with the relevant stakeholders and by extension operates in line with global best practices. Precisely there are over forty (40) solid minerals that were discovered in commercial quantity and are spread across the 36 States and Federal Capital Territory, (FCT) Abuja; with seven (7) strategic solid minerals - gold, coal, bitumen, limestone, iron ore, lead/zinc and barites are being prioritized and promoted for private sector participation and investment.

5.1 Recommendations

i. Federal Government of Nigeria through Nigerian Geological Survey Agency (NGSA) should provide data about locations of solid minerals in commercial quantities in the country for attracting foreign investment. This is because mining companies are attracted to countries with proven geological endowment.
ii. Political stability and security of the country are very vital for promoting any economic activities.
iii. Promote forward and backward linkages in the solid minerals sector in Nigeria's economy.
iv. Provide basic infrastructure that can support the development of that sector. It is energy consuming investment. Construction of good road network: Construction of road network to make sure that the sites where these solid

minerals are located are accessible. Provision of Healthcare facilities, educational institutions, water supply.

v. Provide modalities for private sector participation: Public Private partnership is also an option.
vi. Partnership with established institutes, centres, multi-national companies and private is required for driving the economic diversification of this sector for optimum output.
vii. Through Ministry of Solid Minerals Development (MSMD), its agencies and Extractive Industries Transparency Initiative (NEITI); promotes transparent, less risk and guarantee participation (license) of local and foreign firms in line with global best practices.
viii. Illegal miners: The informal mining needs to be regulated and enforce regulations that can address illegal mining in the country.

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