

Full Length Research Paper

Understanding the gemstone path and value chain in Nigeria

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Gemstones are known as a mineral crystal of precious stones found underneath the earth. They are naturally formed as minerals or substance of beauty when cut and polished for jewelry and part of alternative and complementary medicine from pre-historic times. Gemstones all have something special and beautiful about them. This study was undertaken to explore the rationale of gemstones path, value chain and their contribution to the economy of a developing nation such as Nigeria. Nigeria is known to have over 44 deposits of different solid minerals including gemstones in large quantity, and the sector contributes less than 0.3% to the Gross Domestic Product (GDP) of the nation. The scope of the study is to analyze the path a gemstone takes from extraction to the end users. The objective of the study is to examine each stage of the gemstone value chain, issues and opportunities that abide in each stage, as well as the current and future status each stage has on the economy of the nation. Based on a model of personal experience and knowledge, qualitative research analysis using interview and focus meetings was used to obtain participants opinions about the various level of gemstone value chain. The findings of the study are meant to address the lack of coordination that exists in the gemstone sector and propose suggestions and recommendations on the organization of the sector.

Key words: Nigeria, mining, gemstone, path, value chain, value, miners, artisanal and small-scale, jewelry.

INTRODUCTION

Gemstones are natural organic matter, minerals or stones, which are available in igneous rocks and alluvial gravels. Gemstones in cut and polished forms are used to make jewelry or other adornments. Mining of gemstones in Nigeria is an old practice. Nigeria is known for the availability of different gemstones including Corundum, Beryl, Quartz and its varieties, Tourmaline, Garnet, Aquamarine, Topaz, and Spinel. Gemstones occur in most major geological environments, and each environment tends to have a unique suite of gem materials. Gemstones are characterized to be precious or semi-precious stones as a result of its characteristics of beauty, rarity, and durability. Gemstones that fall into the category of precious stones are diamond, corundum, beryl, topaz, and opal, while the likes of garnet, tourmaline, amethyst and all other stones are classified as semi-precious. Other key features of gemstones are

hardness and specific gravity. The hardness of stone is known as its resistance to scratching, while specific gravity shows the ratio of how large a gem of any volume is to an equal amount of water. The geological environment in which a gemstone is found or mined is known as the gemstone occurrences; most gemstones are available at the site where their formation took place. However, rain, wind or rivers transport some gemstones from their place of formation; these are known to be alluvial gem deposits.

According to Read (2016), the locality of a gem deposit is the country or area where the gem exists; some parts of the earth seem to have been more blessed than others by geological conditions favorable to the formation of gemstone deposits. Some countries and villages are fortunate in this regard as they are known for their abundance of gem deposits. Each type of gemstone

differs from one another, and the gems have different mineral and chemical composition. Gemstones are the formation of crystals, amorphous minerals, or organic rocks. Gemstones are used for jewelry, adornment, and healing. Gems are an oddity of nature; over the years, humans have ascribed importance to gemstones and the jewelry made from them. Charms made from gemstones were thought to prevent evil from entering the body.

Additionally, gemstones and crystals have pure energy. Some people believe that when the vibrations of gemstones and crystals come into contact with our vibration, they will have effects in much the same way as we experience sound waves. In distinguishing gems from diamonds, gemstones are sometimes called colored stones.

Purpose of the study

The purpose of this qualitative research study was to conduct a research study that analyses the gemstone path as it relates to Nigeria Artisanal and Small-Scale mining and the mining sector in general. The study was conducted by interviewing artisanal miners, gem dealers, and officials of regulatory bodies. The objective of the interview was to discover themes regarding each of their experiences in the activities involved in gemstone path.

Also, the objective is to further comprehend the activities in each stage of the gemstone path and how they can be more developed to ensure more significant opportunity for economic development. According to Demetrius and Bryan (2012), qualitative research tends to provide detailed information about user behaviors, needs, and other essential information, hence the reason why this research method was chosen for this study. The method enables the researcher to have a holistic overview of the subject under study and obtain underlying details.

Research question

Some of the open-ended interview questions are:

- (1) What efforts are being made by the government to integrate gemstones mining operations into a formal regulatory and operational framework?
- (2) How can the gemstone sector be further established and administrative processes improved to ensure maximum business opportunities in the sector?
- (3) How can the activities of the gemstone sector be improved to eliminate bureaucracy and administrative hurdles?
- (4) How can the government promote investment in the gemstones mining sector to increase its contribution to the country's GDP?
- (5) How can the private sector holders and private sector

organizations, such as associations, participate in the capacity development of the miners? Moreover, are there any such programs?

(6) How can the private sector facilitate the process of selling gems at a valued price for the artisanal miners?

(7) In what ways do artisanal miners need government intervention the most?

LITERATURE REVIEW

Historians regard mining as one of the oldest commercial operations where man exploits crudely, iron, clay, and other metals. Currently, the Nigerian government is making an effort to reinvigorate economic activities by focusing on the non-oil sector of the economy, particularly the mining industry. Akongwale et al. (2013) suggest that the Nigerian solid mineral sector can contribute immensely to the country's economy and development. According to Zaidi et al. (2012), mining forms the backbone of industrial development by providing the raw materials needed for building varied types of commodity. The mining sector is a crucial driver in National Economic Development as Nigeria has abundant deposits of iron, coal, and bitumen, adding that the under-utilization of the mining sector has led to the importation of minerals that could be domestically produced (Nafisat, 2018). Siswanto et al. (2012) also asserted that mining of minerals had been known to contribute immensely to the development of many countries; people also widely practice it in the developing nations of Africa. Development Economists regard mining as a critical driver of economic growth, and a lead sector that drives economic increment, which can lead to more substantial amounts of social and economic prosperity (Ahmed and Oruonye, 2016). Many experts consider mining as a critical business that produces minerals for the international market outside Africa. Mallo (2012) stated that the mineral industry in Africa if adequately harnessed can constitute a formidable source of socio-economic alternative for growth and development.

Nigeria loses income from the gemstone sector due to inadequate regulation of the industry, which is a result of which gems dealers and marketers smuggle the stones out of the country thereby evading taxation. Saidu and Dauda (2014) see the practice of maneuvering tax laws as illegal and indicate the need for checking and addressing such practices by the relevant authorities. Lack of government commitment and support to the sector also results in financial losses to artisanal miners, gemstone dealers, and the local government. Given the current average price of US\$1,200 per ounce of gold in the international market, Nigeria is losing an unaccounted sum of US\$4,232,40 per day to illegal mining (Nafisat, 2018). The former Nigerian Minister of Mines Dr. Kayode Fayemi stated that an "upgrade of the Mining Cadastre Office and the Mines Inspectorate Directorate, expert

review of overlapping and inactive titles and the establishment of the Mines Police" (Fayemi, 2015, p. 2) would be undertaken to ensure maximum generation of revenue.

The business sector of the gemstone industry in Nigeria does not contribute its quota of income generation to the nation. According to Fayemi (2015), Nigeria's solid minerals sector makes up about 0.34% of Gross Domestic Product (GDP), which is smaller than its real potential. The industry has been operating below capacity as artisanal and small-scale miners' man mining operations in the country and dominated the gemstone production. There are possibilities in the development of the local gemstone business in Nigeria as there is a high international demand for gems from Nigeria. According to Cartier (2010), there is an imperative need for the industry to examine the social and environmental responsibilities that come with the production, trade, and consumption of colored gemstones. There has been a lamentable lack of proactive progress concerning the mitigation of factors that degrade vulnerable regional environments. The gemstone industry in Nigeria is presently at an embryonic stage, with an enormous potential for growth, foreign exchange earnings, revenue generation, poverty eradication, and job creation.

The gemstone path starts with the discovery of the gemstone. According to Hausel (2006), gemstones represent some of the more valuable commodities on earth and knowing the geological conditions and environment where certain gemstones are found can lead to discoveries. The gemstone from the point of exploration to the final consumer goes through the 'gemstone pipeline' "through activities that are dispersed both geographically and organizationally" (Ostaeyen et al., 2013).

A gemstone moves from hand to hand among miners, gem dealers, stakeholders and covers a long distance through this process. For the gemstone to arrive at the final customer fit for jewelry, major steps which are included in the path are involved in the processing such as panning, cleaving, bruising, polishing, and final inspection as gemstones in its natural state has a highly irregular geometry and includes many contaminations (Gaywala and Surat, 2014).

Gemstones and the Nigeria situation

China, India, United States, Hong Kong and Switzerland are significant importers of gemstone with the gem and jewelry business worldwide amounting to over 143 billion Euros (2014 figures from McKinsey & Co) and growing between 5-6% annually; this amount is expected to reach 450 billion Euros by the year 2020. In Africa, we have South Africa, Zambia, and Mauritius as significant importers of gemstones. With this high demand in the gemstone sector, Nigeria has the potential to grow her

economy through the gemstone sector especially now that the country is returning to the path of sustainable development through the non-oil sector. According to Kayode (2018), due to the vast availability of gemstone deposit in Nigeria, the sector can be a vital source of income if available opportunities in the sector's value chain are leveraged. This article explores the gemstone path in Nigeria and how leveraging on the appropriate gemstone value-chain in Nigeria can ensure value-added businesses in the sector (Figure 1).

The gemstones path

The gemstone path describes the process in which a gem passes through, from the mine to the customer. The process starts with the mining of the gems mostly done by ASM. The rough gems then pass through intermediaries, brokers, traders and dealers before they are cut and polished and sold to customers. Gemstones, such as diamonds, have a well-documented pipeline; the passage of the gem from mine to the client is relatively direct. The gemstone path is a process that can be adequately analyzed and possibly used to determine the value added at each stage of the process. The gemstone path is comparable to the supply chain management that consistently plays a significant role in all sectors. The supply chain for rare earth minerals includes extraction, separation, refining, alloying and manufacturing (Humphries, 2013). Integrating the supply chain activities into the ASM sector reduces the adverse impacts of the mining process, as well as minimizes energy and material usage (Mudili et al., 2013). The variability and routes that a stone may take are dependent on the locality in which it was mined, the quantity and quality extracted from the mines, the type of mining, and the identity of the material if it is typically treated.

The usual path a gem takes in getting to the client is from the mining pit to dealers, to jewelry manufacturers, to retailers, and finally, to the customers. Despite the opportunities embedded in the gemstone and jewelry business all over the world, Nigeria only operates in the first two stages of the process, which is artisanal mining and uncoordinated rough gemstones dealers. Graphical representation of the process is shown in Figure 2.

Mining

The first stage of the gemstone path is the mining of the stones. There are various mining locations all over the world, with regulations controlling the extraction process of each country. Most of the gemstones mining are on a comparatively small scale by artisanal miners who sometimes sell directly to cutters and treaters. In the case of Nigeria, cutters and treaters are not readily available, and gemstones are mined only by local miners. The local

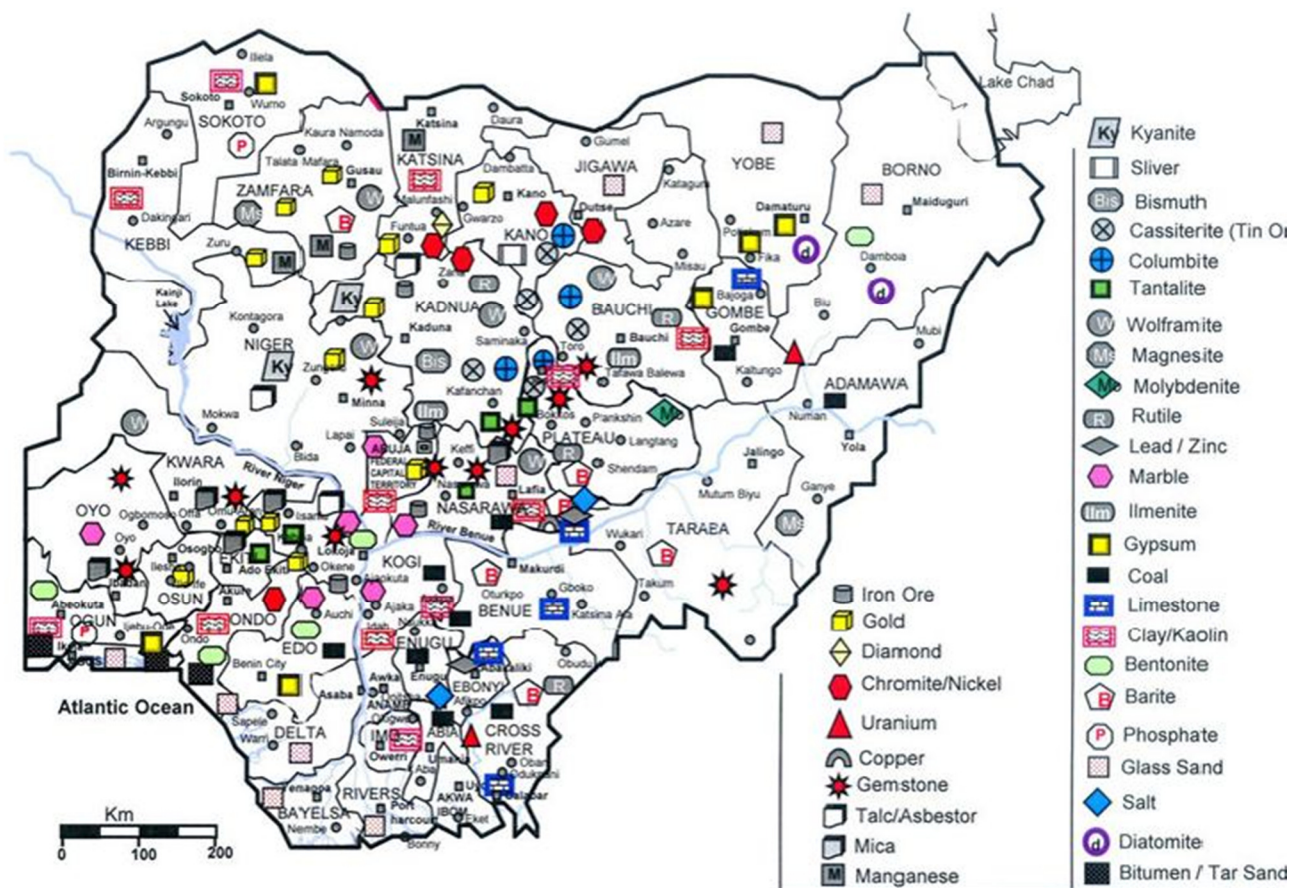


Figure 1. Map of Nigeria showing availability of gemstones and precious minerals in the country (Delta Analyst Online, 2018).

miners have no access to cutters or treaters. Thus, they sell directly to marketers or rough dealers who then transport it to cutters in cutting centers in Thailand, Srilanka, and India. Artisanal and Small-Scale Miners and rough dealers dominate the excavation and trade in the Nigerian gem industry. Dealers usually smuggle Nigerian gems out of the country as raw materials. According to Anyona and Rop (2015a), "since artisanal and small-scale miners have been informal, they often form partnerships with brokers who act as 'supporters and sponsors' but most times are exploitive as they get a large portion of the sales from the gemstones, leaving only small percentage to the actual miners." The informal nature of the sector is as a result of the sector being underdeveloped and neglected due to over-dependence on oil. There is a need for a review of the Nigerian Mining laws so that ASM activities could be regulated, while miners should have titles and licenses and operations are carried out under due diligence. The present operating context of the sector in Nigeria lacks sufficient geological data, cooperative federalism, limited infrastructure and weak institutional capacity that are achievable through the introduction of a management system. Onuiri et al. (2015) stated that, "a management system is an outline

of procedures utilized to ensure that an organization can accomplish all tasks mandatory to achieve its objectives and goals through process optimization" (p.14).

Jewelry manufacturers and cut dealers

Gem cutters sell their products directly to cut dealers or jewelry manufacturers. Jewelry manufacturers use the stone to make various adornments based on design and customers request. In Asian countries, such as Thailand, India, Sri Lanka, and Hong Kong, a large quantity of jewelry is manufactured by small and medium scale enterprises commercially. Although Entrepreneurs have not yet fully developed the jewelry business in the Nigerian gemstone industry, there have in the recent past been upsurges in the number of visible young entrepreneurs in the jewelry business. A new association of jewelers called Gemologists and Jewelers Association of Nigeria, boasts of about sixty members, while the Gemstones Miners and Marketers Association of Nigeria (GMMAN) with over 150 members was established to organize the artisanal miners and gemstones dealers in order to improve the sector.

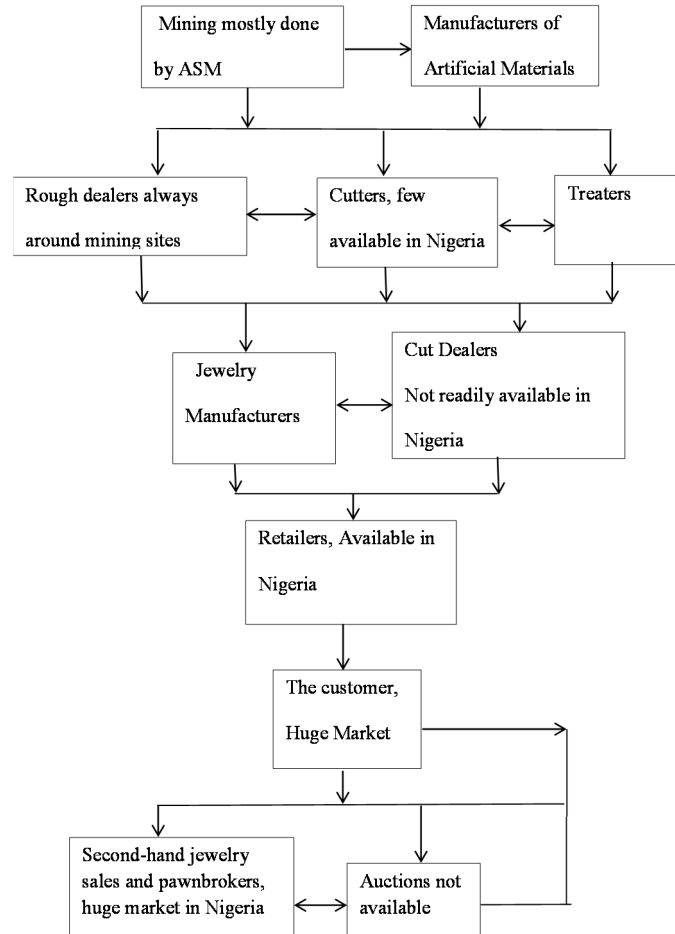


Figure 2. The Gemstone path: Routes a gemstone may take from the mine to the customer in Nigeria.

Retailers

Retailers are people who interface with the gem trade and the customer. Having good product knowledge at this stage is vital as this will improve the selling capacity of the retailer and create consumer confidence. The oil boom that occurred in the 1970s and 80s heightened high importation of imitation jewelry from Asia, especially China by Nigerian importers who distributed to retailers in Lagos and Eastern markets. Retailers dealing in real jewelry were few and hardly had outlets, but deal with their customers on a face-to-face basis. Currently, most of the retailers in the field are people from other countries such as Guinea, Gambia, China, Sri Lanka, and India. Most of the retailers can be found in cities such as Jos, Ibadan, Abuja, Kaduna, and Kano. Most of the retailers buy and smuggle the gemstones to foreign countries.

Customers

These are the users of the gemstones; some clients

purchase gems for adornment while others for their belief in its healing power. Customers are not the final stage of the gemstone pipeline as some pieces of stones are re-sold through antique dealers and auction houses. Traditionally, Nigerian women are known to adorn jewelry as part of their dressing. According to Falola (1992), gold was a status symbol, and to appear in public well dressed and ornamented, was to announce success, impress the poor and competitors, and set a standard in taste. Before 1970 in Nigeria, most women and jewelry users would traditionally use local goldsmiths to design and produce their jewelry. However, due to the oil boom of the 1970s and 80s, there was an influx of imported imitation jewelry. The use of imitation jewelry led to the lack of patronage of local goldsmiths. Jewelry set with real gemstones is a favorite amongst the elite who usually buy their jewelry from cities such as Dubai, London, Paris, and New York. Recently, and since 2017, the Gemstones Miners and Marketers Association of Nigeria (GMMAN) has made attempts to sensitize Nigerian jewelry users on the need to patronize local jewelry makers who have improved in

their designs and cuts of the gemstones they use

Gemstone value chain

According to Macfarlane (2013), value chain activities are a process that involves an integrated structure, which captures and assesses information on a concurrent base. The gemstone value chain describes the range of activities that people perform to bring a gemstone from its origin to final use and beyond. This value chain includes excavation, design, marketing, distribution, and support to the consumer. The gemstone sector has much potential that could contribute to the human and economic development of a country. Nigeria as a country has not been able to maximally tap the potentials and impact positively on the lives of those who operate around its value chain (Kayode, 2018). Gemstone processing stage is lacking in Nigeria, and it has contributed immensely to shortchanging the country. The gemstone value chain tends to provide an indication that enables economic growth, reduce poverty and vulnerabilities, and promote human development.

METHODOLOGY

The research study was conducted to understand the gemstone pipeline and value chain in Nigeria. The purpose of the study was to explore all the levels of the gemstone path in Nigeria to integrate a competitive value chain successfully. The qualitative research analysis method was used to generate leads and opinions of individuals about the activities of the gemstone sector in Nigeria. Artisanal miners, gem dealers, private stakeholders and regulatory body officials as each participant is involved with activities relating to the gemstone value chain. The study materials were gathered in the period of October-November 2017 in offices and mining sites across Nigeria. The empirical materials consist of in-depth interviews, field observations and literature review of existing information. The interview questions were designed in such a way as to minimize the alleged biases of the researcher. Questions are also designed to be readily understood by the target audience and open-ended with the purpose of establishing a conversation between this researcher and participants.

Data gathered from the study was analyzed using NVivo analysis software to generate themes as it frequently occurred in participants responses to research questions. In addition to information gathered from the interviews, the researcher was involved in several formal and informal meetings, and discussions relating to the gemstone sector, reports and paper presentation of respectable actors in the sector were incorporated. The research approach used was based on a paradigm of personal knowledge and subjectivity, which was drawn from the participant's perspective, assumptions and usual

ways of perceiving. A sample of twelve participants was selected. The participants had over ten years of experience in their various capacities as regards gemstone activities.

Research design

This qualitative study used open-ended interview questions to obtain adequate information from each participant and also to increase the researcher's understanding. The interviews were conducted with standardized questions to achieve sufficient knowledge saturation as respondents could elaborate on pertinent details. The findings of the study rely on the qualitative framework to understand the pipeline and value-chain of gemstone in Nigeria.

Target population

Ten participants selected for this research study comprises of artisanal miners, gem dealers, policy makers, regulators, and private stakeholders with years of knowledgeable experience in the gemstone sector.

Data collection and analysis

As suggested by Moustakas (1994), the approach used in this study gave room for a deeper understanding of each situation through interaction. Each interview was semi-structured with open-ended primary questions and follow-up questions as to when necessary. Participant observation tool was used by the researcher to gain more insight into each question. At the mining sites, focus group meetings were carried out with the artisanal miners to gather unbiased information.

The study conducted the interviews and recordings in quiet locations, and the recorder was strategically placed to ensure better audio quality. Transcription was done manually to get a clear picture of the interview word-for-word.

According to Joel (2013), the responses to open-ended items (qualitative data) were in the form of phrases and words arrangements; creation of categories with themes and patterns related to research questions. Identification of themes and sub-themes with a word-based technique, such as repeated words used by participants, unique words, and frequently occurring words; this interviewer achieved this by using computer software called NVivo to generate a word-frequency list from the interviews.

Delimitation

The study of the gemstone path and value chain in

Table 1. Level of education among miners.

Response	Count	Percentage (%)
Primary	0	0
Secondary	3	75
Post-secondary	1	25

Nigeria inquired about the path a gemstone take and the possibilities in each stage that can help improve business in the gemstone industry. Delimitations in this study were to ensure that the goal of the study is not rendered impossible or too large to complete. Also, the views of the participants were subjective, and it generates data sufficient to draw valid conclusions. Specific percentages of respondent opinions on each section were not identified as the qualitative study do not use the analytical methods in quantitative research, as well as the integration of private stakeholders in the study.

Ethical consideration

Ethical issues are the point of consideration through the study process. According to Easterby-Smith et al. (2012), it is vital to understand ethical issues in dealing with qualitative methods. These issues include confidentiality of information, handling difficult issues that crop up in the process of the research in a discreet fashion, validity, and reliability through consistency of data even under different circumstances.

The researcher assured participants of the confidentiality of the data collection and analysis process. The researcher also complied with all privacy requirements and did not reveal data connected to the participants' identity. To ensure validity and reliability of the study, the basis of the participant's selection criteria was on their gender, age, and years of experience relating to the gemstone sector. Proper assessment of the research instrument enables the researcher to identify factors that can negatively influence the validity of the study.

RESULTS AND DISCUSSION

The qualitative research study investigated challenges associated with gemstone path and gemstone value chain in Nigeria. Also, it defines how operations in the sector can be significantly improved and better organized to encourage the development of value-added businesses in the Industry. This research study focused on the positive change that was required in the gemstones Artisanal and Small-Scale Mining in Nigeria, hence the use of qualitative research which is known to be all inclusive and subjective as it often provides

increased potential for interpretation.

The operators at the first level of the gemstone path are the artisanal miners and on asking the question about their level of education.

Level of education attained

Seventy-five percent of participants have a secondary school level of education and twenty-five percent have post-secondary school level (Table 1)

To whom do you sell your gemstones?

All participants responded that they all sell their products to gem dealers/brokers whom most times come to the mining sites before the close of the day to buy their proceeds.

Do you get value for gemstones?

All participants believe they get value for their gemstones.

When asked if mining contributes to participants household income

Seventy-five percent of artisanal miners interviewed stated that mining contributes significantly to their household income.

The following themes are further discussed based on the gemstone value chain analysis.

Operating context

The Nigeria gem industry is operating in an embedded way of doing business. The sector is dominated by Artisanal and Small-Scale Miners that excavate the gems and rough dealers; Nigeria gems are literarily smuggled out of the country as raw materials. The opportunities in this sector such as employment generation, increase in internally generated revenue, reduced poverty and the enhancement of foreign exchange earnings are not harnessed. This is as a result of the sector being undeveloped and neglected due to over-dependence on oil. It is essential to review the Nigerian Mining laws so that ASM activities could be guided; miners should have regulated titles, and licenses and operations should be carried out under due diligence. The present operating context of the sector in Nigeria lacks sufficient geological data, cooperative federalism, limited infrastructure and weak institutional capacity. There is the need for research

and development, and the use /application of science, technology, as well as innovation within the sector (Devex, n.d).

Business analysis

Gemstone industry is estimated to be worth excess of \$10 billion annually with an increase in market demand (James et al., 2015). The Business sector of the gemstone industry in Nigeria does not contribute its quota of income generation to the nation. According to Fayemi (2015), Nigeria's solid minerals sector makes up about 0.34% of gross domestic product (GDP), which is smaller than its true potential; the sector has been operating below capacity as small-scale artisanal miners' man many mining operations. Artisanal and small-scale mining dominates colored gemstone production, which can pose obstacles to transparency, traceability and risk management (James et al., 2015).

There is a scope for development of the local gemstone business, including small and medium-sized enterprises as gemstones from Nigeria are being sought by buyers internationally, and the value of exports should not be less than \$2 million. According to Olaniyi (2011), "there was no standard business in gemstones, it remains traditional. The business was not regulated, and there was no controlled price. Mining business, therefore, required perseverance." The gemstone business in Nigeria is at an embryonic stage with high potential for growth, foreign exchange earnings, revenue generation, poverty eradication and employment generation.

Revenue generation and collection (Taxation)

Nigeria loses so much income from the gemstone sector because the industry is not regulated, as gemstones dealers and marketers practically smuggles the stones out of the country thereby invading tax, fees, and levy. The practice of maneuvering tax laws is considered illegal, which needs to be checked and addressed by the relevant authorities (Saidu and Dauda, 2014). The lack of government commitment and support to the sector results in huge financial losses to artisanal miners, gemstone dealers and the government of Nigeria. Olaniyi (2011) stated that in 2010, "government planned the establishment of Gemstone Centre in Ibadan and Jos as part of the Gemstone Development Programme. It was meant to provide opportunities for government to collect royalty at the point of export, create a buying and export center and a one-stop shop to fast-track government export control."

To ensure maximum generation of revenue, Fayemi stated in his speech the importance of upgrading the Mining Cadastre Office and the Mines Inspectorate Directorate, efficient review of overlapping and inactive

titles and the establishment of Mines Police.

Income and employment generation

Artisanal and Small-Scale Mining of gemstones are known to be as high as 80% in the mining sector (Fayemi, 2015). Recent research by ILO estimates the number of people involved in ASM worldwide ranging from 13 to 50 million (Collins and Lawson, 2014). News of a major strike in high unit value stones causes the influx of people to an area with expectations of high income. One of the characteristics of ASM is that it is poverty driven, as miners involve in the activities notwithstanding the dangers involved due to the fact of earning sustainability income.

ASM can be a critical source of income and employment that will stimulate the economic development, which is essential for human development. ASM has generated direct livelihood opportunities to mine owners, miners, dealers, processors, transporters and equipment providers.

According to Hentschel et al. (2003), mining frequently constitutes the principal means for development by creating opportunities for micro-, small- and medium-scale enterprises, as well as providing infrastructure for the miners and their families.

Investment opportunities

Every country strives to provide enabling environment for investment as this contributes to the development of industries, increase in Foreign Direct Investment, and stimulate the expansion of domestic production capacity. To ensure an effective gemstone value chain, the sector must be enabled for foreign investors by developing incentives that will revive the economy and accelerate growth and development. Foreign investors can help develop the Nigeria gemstone path to reach the stages of jewelry production and sales to consumers. The gemstone sector is full of opportunities, and the involvement of the private sector will lead to evolution. The sector can be promoted through activities and initiatives, including trade fairs, technology exhibitions, business incubators, and networking events. According to Fayemi (2015), the priority of the Ministry of Mines is to accelerate investor confidence in the mining markets and get the sector growing within the context of the overall emerging strategy.

For effective gemstone value chain, miners are provided with support services such as reforms of the organization sector, capacity building, advocacy of workers right, and availability and accessibility to finance. According to the research participants, there exist some key challenges across the gemstone value chain, they are:

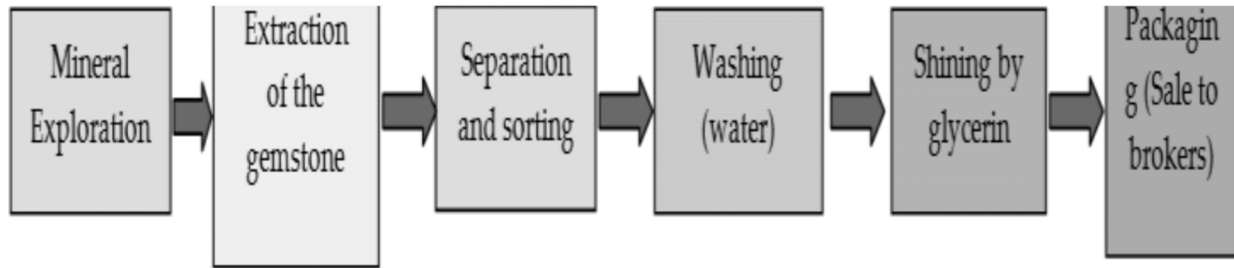


Figure 3. The first stage of gemstone value chain culled from Anyona and Rop (2015b).

- (a) Inadequate Geodata on mine deposits and insufficient capacity
- (b) Conflicts with the local community and lack of infrastructure
- (c) Lack of access to funds
- (d) Insufficient skills by miners and gem dealers, and absence of functional gems exchange
- (e) Low tech, old machinery, and outdated designs

Obtaining value for gemstones

To further harness the opportunities in the gemstone sector, adding value to the gemstone is essential. Artisanal mining employs the use of simple tools by creating adequate space around the gemstone to allow for digging and movement of the stones. During the extraction process of these stones, they come along with some rocks, sand or pebbles. To add value to the gemstones, artisanal miners are expected to separate all sediments from the stone, wash and shine using glycerin (Figure 3).

Creation of assessment/buying centre

Seventy-five percent of interview participants discussed the importance of having buying and assessment centers in the gemstone path in Nigeria. Participants also indicated that the centers should be sited close to the miners, where their products can be tested and given adequate value. Fifty percent enumerate the importance of miners adding value to the stones before selling; this will make the more valuable. According to participant five, artisanal miners need to have a means of pulling their collection where it can be certified so that registered buyers may purchase at a reasonable price. Participant seven believes that government should create partnerships with private institutions to establish buying centers.

According to Anyona and Rop (2015b), the gemstone center will provide a wide range of services including gemstone banking, state of the art gemstone laboratories, gemstone buying center, gemstone cutting

and polishing laboratory, among others. The buying center will enable the Artisanal and Small-Scale Miners access international markets within their locality. Creating assessment and buying centers close to the artisanal miners will enable the miners to identify their products, know the international standard rate, and obtain a value for the gemstones. These centers should be equipped with equipment's to analyze gemstones and ready cash to pay artisans once the stone is valued, this will encourage the miners more, liberate them from the oppression of local brokers and give room for the government to regulate the sector.

Capacity development

Capacity development of miners, brokers, gem dealers and customers are essential to ensure maximization of the gemstone value-chain. All research participants are of the opinion that there is a need to develop the capacity of all players in the gemstone sector. According to participant five, the government should as a matter of policy designate, encourage, and support the private sector to provide the required needs. The government cannot provide enough training platform for skills and capacity development in the sector, hence the need to collaborate with the organized private sector. Participant four stated that it is essential for the gemstone sector to be sustained through the involvement of the private sector. Players in the gemstone value chain can be organized through the creation of associations and involvement of the Nigeria Chamber of Mines in overseeing the gemstone value-chain. The Gemological Institute in Nigeria (GIN) was established by private stakeholders to enable capacity development of interested Nigerians.

Conclusion

The gemstone industry in Nigeria is full of opportunities; availability of adequate information concerning the path and value chain of the gemstone can lead to the positive evolution of the industry. The stages of the gemstone

path in Nigeria abruptly stopped with the rough dealers and few gem cutters, going forward, the other stages of the path are essential for economic development of the nation if promoted. There is the need for government to realize that the sector is capable of contributing immensely to the National economy, as presently the full contribution of the sector is not captured in the GDP of the country. The market for finished gemstones is not fully developed in Nigeria, as a result of which most of the rough gems are smuggled out of the country. If the Nigerian market is developed to purchase the homemade processed gems, there will be a multiplier effect that will have great economic benefits that is capable of inducing development in the mining sector. Also, there is the need to improve on policies as it affects the gemstones sector and redefine the concept of illegal artisanal mining in order to bring a significant number of the miners into the formal sector. The sector has the capacity of contributing up to 10% to the GDP of the country by the year 2030 if each aspect of the value chain is fully developed, and thus making Nigeria one of the top international gemstones markets. Government and policymakers should promote formalization of the gemstone sector in which specific provisions are made to increase trading levels and enhance transparency in the gemstone value chain.

Recommendations

To ensure that activities of the gemstone path in Nigeria are adequately utilized in all the stages of the path, the study recommends the establishment of implementable policies that will improve activities carried out in the sector. The policies should give room for the smooth establishment of more training institutes, centers and gem identification laboratories to ensure skills and capacity development.

Also, the notion of legal artisanal mining should be redefined to include the present state of miners after a simple means of registration. This will enable the Ministry to be able to have a fair record of those who are mining gemstones in the country. It will also encourage the miners to be open, and there will be increased revenues as royalties meant for government coffers will be paid.

This study also recommends the creation of buying centers in states endowed with gemstones to enable miners to get value for their stones and enable value-added business and economic growth in the gemstone sector. There is need to massively explore and operate the value chain by involving a huge investment in expertise and finance. To avoid bureaucracy and pitfalls associated with government institutions, it is recommended that the gemstone sector be run in a public-private partnership format to avoid inefficiencies and related mismanagement.

One of the basic problems identified in the whole chain is the capacity of the players in the sector. Therefore, it is

recommended that Government should support the existing gemological institutions in the training of artisanal and small-scale miners, cutters and jewelers in order to improve the quality of the products and encourage the participation of the local market in the gem business.

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