

CERAMICS AND ITS POTENTIALS TO COMPLIMENT NIGERIA'S OIL - BASED ECONOMY

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Abstract

Nigeria has been greatly endowed by nature with good and favourable climatic conditions, fertile soil, and abundant natural as well as human resources. Nigerians should normally be swimming in copious financial affluence, but regrettably, many of these God-given resources have remained untapped thereby leaving the Nation relying solely on oil for her economic growth. However, ceramics and ceramic products, the raw materials of which this Nation is plenteously blessed, remain grossly unexplored. This paper hereby makes a case for the recognition of ceramics as a potent and viable source of huge revenue generation for Nigeria as has been the case in many advanced countries like China and Spain, and thereafter calls for the vigorous exploration and exploitation of ceramics and its numerous end products to further augment and boost the hitherto oil-determined economy.

Introduction

Nigeria ranks amongst the most naturally endowed countries in the world. Hardly is there a single state out of the thirty-six that presently exist in the country that does not have one natural resource or the other. Even long before the discovery of crude oil, the South-South and South-East thrived in rubber production, timber, palm-oil and coal, the South-West was popular for its cocoa, coffee and timber production while the North was notable for groundnut, cotton and a variety of grains (Kashim, 2011). These products were the thrust of the national economy well before and after Independence. However, the discovery of oil led to the gradual deterioration in the exploration of these great gifts of nature thereby leaving the country relying solely on crude oil as the main source of national revenue generation.

Odularu (2008) captures the situation thus:

"The oil boom of the 1970s led Nigeria to neglect its strong agricultural and light manufacturing bases in favour of an unhealthy dependence on crude oil. In 2000 oil and gas exports accounted for more than 98% of export earnings and about 83% of federal government revenue. New oil

wealth, the concurrent decline of other economic sectors, and a lurch toward a statist economic model fueled massive migration to the cities and led to increasingly widespread poverty, especially in rural areas. A collapse of basic infrastructure and social services since the early 1980s accompanied this trend. By 2000 Nigeria's per capita income had plunged to about one-quarter of its mid-1970s high, below the level at independence."

Over the years, there have been concerns from different quarters on Nigeria's reliance on oil. The country relies on crude exports for about 95 percent of its foreign-exchange earnings and experts have asserted that this fact makes the national economy more vulnerable to oil-price swings. These concerns became more pronounced due to the fact that despite Nigeria's rich natural resources, poverty is widespread and Nigeria's basic social indicators place it among the 20 poorest countries in the world (Agbi, 2009).

Some pointed out that the wealth from oil has not fed through to the wider population, but instead, it has often been squandered on

projects not having direct bearing on the poor masses or lost through corruption. This is perhaps why whenever there is any rise in the local fuel prices, there is fierce outrage amongst Nigerians.

The situation above has resulted in the cry by many Nigerians for the government to diversify the national economy and develop a new revenue generation model, whereby the country should systemically and systematically reduce cost of governance, reinvigorate her agricultural sector, promote small scale industrialisation (Muhammad, 2012). Some have advocated for an alternative means of sustenance through exploration and exploitation of natural resources that are abundantly present in the country especially in form of ceramic raw materials (Kashim, 2011). It is based on the aforementioned that this paper seeks to lay bare the huge and abundant resources that are grossly untapped or underdeveloped in the ceramics industry and therefore makes a case for their exploration and exploitation in order to use the revenue generated therefrom to augment the national economy. This, it is believed, would gradually liberate the country from overdependence on oil as the only means of revenue generation.

Ceramics in History

Ceramics is unanimously agreed amongst historians to be as old as man himself. It is also ubiquitous and this is because it resulted from the struggle of man to conquer nature and coax it to satisfy his growing needs. This is perhaps why it has come to be referred to as a mark of civilization.

Ceramics has also survived in the archeological context and equally represents the most durable artifacts due to the fact that fired clay, unlike other art materials, cannot revert back to its former state. It has therefore been very easy to excavate the remnants of the pottery works of the long gone, ancient civilisations and traced down their ages.

The ceramic industry is one of the most ancient industries in the world. As early as it was discovered that clay could be dug up and formed into objects after mixing with water and then firing, ceramics as an art was born. Animal and human figurines were made from clay and other materials as far back as 24,000 BC. These works were then fired in kilns

partially dug into the ground. As settled communities were established, production of tiles began in Mesopotamia and India. The first use of functional pottery vessels for storing water and food is thought to be around 9000 or 10,000 BC. Clay bricks were also made around the same time (American Ceramic Society, 2012).

Glass was noted to have been discovered in Egypt around 8000 BC, when overheating of kilns produced a coloured glaze on pottery (Graham, 2013). Experts estimate that it was not until 1500 BC that glass was produced independently of ceramics and fashioned into separate items. Furnaces for melting the metal at that time were constructed of natural materials. When synthetic materials with better resistance to high temperatures (called refractories) were developed in the 16th century, the industrial revolution was born. These refractories created the necessary conditions for melting metals and glass on an industrial scale, as well as for the manufacture of coke, cement, chemicals, and ceramics.

Another major development occurred in the second half of the 19th century, when ceramic materials for electrical insulation were developed. As other inventions came to the fore – including automobiles, radios, televisions, computers – ceramic and glass materials were needed to assist in making these a reality. Researchers have also claimed that sophisticated ceramic wares were produced in the Middle East as far back as 4,000 years ago while archaeologists have excavated porcelain articles made in China more than 5,000 years ago (Chigbo, 2011).

According to Chigbo, (2011), Nigerian pottery has been dated 2,400 years or more. He cited the publications of the Geological Survey of Nigeria (GSN) and those of the Raw Materials Research and Development Council (RMRDC) showing that Nigeria is host to an extreme excess of raw materials suitable for the production of a very large number of ceramic products for which Nigeria has a great need.

Ceramic Raw Materials

Taking a cue from the history of ceramics above, it would be noticed that ceramics had come a long way and had developed into a full blown technology today. It has come to play an

important role in the lives of mankind; a role far more complex than the domestic one from which it evolved. The Nigerian government, apart from investing in the production of ceramics wares – a venture so many advanced countries are generating huge revenue from today, could explore and exploit the myriad of ceramic raw materials that a dotted all over the country for both local use and export. These materials include ball clay, kaolin, feldspar, quartz or silica sand, calcium carbonate, bentonite and talc. The country is equally blessed with some other ceramic materials like limestone, marble and gypsum which are quite important in the production of cement and plaster of Paris (P.O.P).

Clay, which is the most important and basic of all the raw materials for ceramics, is equally the most abundantly available in Nigeria. The use to which ball clay could be put is almost limitless. Clay is used for household utensils and interior decorations as well as for structural purposes in the building industry, just to mention a few. According to Kashim (2011), ball clays deposits spread all over Nigeria. However, they are found in very large quantities in about sixteen states namely, Akwa Ibom, Cross-River, Rivers, Benue, Ebonyi, Ekiti, Ondo, Ogun, Enugu, Abia, Plateau, Niger, Kaduna, Kano and Delta.

Feldspar is used locally in the ceramic and glass industries and it occurs abundantly in the Basement Complex. Economic deposits are found in the granitic intrusives in the basement and especially in pegmatites where potash feldspar is the commercial type. Important sources of feldspar are Kwara, Kogi, Osun, Ekiti, Borno, Adamawa, Taraba and Benue states (OnlineNigeria.com, 2012).

Kaolin which is used in the ceramics industries as a major material, as fillers in the building industries, and as extenders in paper, paint, cosmetics rubber and pharmaceutical industries is available in Cross River, Akwa-Ibom, Abia, Enugu, Imo, Benue, Anambra, Ondo, Ekiti, Nasarawa, Ogun, Kogi, Niger, Kaduna, Plateau, Bauchi, Yobe, Borno, Edo, Delta, Osun, Katsina, Kano, Kebbi and Oyo states. The estimated reserves of kaolin in Benue, Anambra, Ondo, Ekiti, Nasarawa, and Katsina are in hundreds of million tonnes (OnlineNigeria.com, 2012).

Quartz: With the major deposit in Ekiti State put at 23.817 million metric tonnes, quartz exists in six other states of Nigeria in large quantity. The states are Ebonyi, Plateau, Kogi, Niger, Katsina and Kebbi. Quartz is used for Gel-Silica as catalyst/desiccants, precipitated silica.

Silica sand is used in the production of glass, fused silica, and as fillers in automobile tires, rubbers, and in footwear soles. Apart from the large deposits found in Benue and Ondo states which are estimated at over 250 million tonnes and 200 million tonnes respectively, it is located in fifteen other states.

Bentonite is used as ceramic additive for plasticity, drilling mud in petroleum industries and gas exploration, iron- ore, palletizing, foundry and sand bonding or molding. Deposits are found in Cross-River, Akwa-Ibom, Ebonyi, Abia, Anambra, Gombe, Adamawa, Yobe, Borno and Edo states.

Talc is used for ceramics, as cosmetics, and for tire manufacturing. It is found in Cross-River, Osun, Ekiti, Niger, Kaduna, Kogi and Oyo states.

Limestone is also a raw material for flux in ceramic, glass, iron, and steel industries. It is equally used in Cement Industries and as lime fertilizer. It is located in Cross River, Akwa Ibom, Imo, Abia, Anambra, Ebonyi, Enugu, Benue, Ogun, Kogi, Nassarawa, Gombe, Yobe, Adamawa, Borno, Edo and Kebbi states.

Gypsum is used for the production of Plaster of Paris (P.O.P), cement and classroom chalk. It is said to be spread over many sites in Nigeria with the estimate running to about one billion tonnes (Farriconsultingng.blogspot.com, 2011).

Ceramic Industries, their Products and Potentials

It is indeed expected that with the numerous ceramic materials available in Nigeria as mentioned above, one expects that ceramic industries should abound in this country turning out as many ceramic products as possible and yielding high revenue to boost the national economy. This has however not been the case. Many of the ceramic products like

tiles and sanitary wares in use locally are still being imported from abroad.

In modern times, the ceramic industry has come to assume quite a prominent position encompassing a wide range of products. It is also key to the successful operations of many other industries and important to a lot of their products. The architectural and building industries would find their operations difficult without the use of clay, feldspar, glass and cement; glass products are equally important to the automobile, architectural and electrical industries; refractories are essential to the metallurgical and glass industry; aerospace engineers use ceramic materials for space shuttle tiles, thermal barriers, high temperature glass windows; while medical and dental specialists use ceramic products to make hip joints, bone implants, dental caps, and dental bridges.

According to Chigbo (2009), ceramic products are divided into eight groups namely glass, lime/gypsum/cement, porcelain enamels, structural clay products, refractories, abrasives and mineral preparation with glass being the largest of all. In spite of the fact that about 85% of the raw materials for the manufacture of ceramic wares are obtained locally, it has not been easy for the industry to grow to the required standard in Nigeria.

It is highly disheartening that the oil sector of the national economy alone is responsible for 95% of Nigeria's foreign exchange earnings while ceramic industries and others share the remaining 5%. Meanwhile, if necessary machineries are put in place, a lot more can be generated from ceramics only.

For instance, the production of domestic earthen dinner wares such as dishes of different shapes and sizes; serving plates, teacups and saucers, mugs, casseroles and so on is a labour intensive operation capable of employing thousands of workers. Nigeria is currently able to produce 5% of her domestic need in this area (Ossai2006). But with the raw materials largely available locally, it is possible for Nigeria to be able to satisfy her domestic needs and even export.

Current researches in structural ceramics have shown that building with bricks allows for stronger and more durable structures than with

ordinary sandcrete blocks. Apart from the fact that this is cheaper in cost, it is highly ideal and environmental friendly especially in tropical countries like Nigeria because houses built with bricks are cooler in hot weathers and warmer in cold weathers. They are also naturally beautiful. Clay roofing, clay painting floor tiles, clay sewer and drainage pipes fall in this category. With massive building projects going on in all of the country and with 40-60% of the Nigeria's requirements in bricks locally produced, a lot of industries would be generated thereby providing jobs for indigenes and also improving the internally generated revenues (Odewale, Idu & Amaakaven, 2013).

The same as above can be said about refractories which are very strategic to any nation's industrial development. Industries such as the Iron and Steel, Steel Rolling Mills, Aluminum Smelting Plants, Glass and a lot more cannot operate without refractories. And according to Oyewole (2011), almost 100% of Nigeria's requirements in refractories are imported at exorbitant costs in hard currency. Porcelain insulators used for electrical installations possess the same potentials as above. And quite unfortunately, to date, there is no porcelain insulator or refractory industry in Nigeria (Ajayi, 2002). There is no doubt that the establishment of these industries would accelerate Nigeria's industrial development and save her huge sums of foreign exchange. It would also engender wealth creation, drastically reduce unemployment rate and finally absolve Nigeria from the sole reliance on oil as the only such of foreign exchange.

The Problems

One of the major problems is the difficulty associated with processing of the raw materials into finished products. In developed countries like China, Spain and Italy from where the technology was imported, about three or more industries are engaged in the overall process. The mining industry takes care of the mining of the raw materials for the production of ceramic wares; the material-processing industry is responsible for the processing of the necessary raw materials to produce the required standard of slip/ceramic body; while the ceramics manufacturing industry processes the raw materials into finished products (Na'Allah, 2001).

Funding is however the biggest problem of the ceramic industries in Nigeria. The importance of finance in industrial development is predicated on the need to acquire real capital, that is, machinery, equipment and the building facilities, and the raw materials with which productive industrial activities are undertaken. In fact, the volume of the industrial finance available determines, to a very large extent, the supply of real capital and the means of fast industrial development (Ganiyu, 2011).

Some of the other problems identified include quality control which also involves the ability of the government to enforce and regulate the quality of products as well as the pricing through a deliberate formulation of policies.

Unavailability of skilled manpower is another problem especially as it relates to ceramics products in the building and construction industries. Artisans that are properly and appropriately trained in the art of laying bricks are few in the country. This limit the use of bricks to those who can afford to transport and lay bricklayers from wherever they are found to their building sites at any cost (Na'Allah, 2001). The technology involved in the processing and refining of locally sourced materials equally poses a big problem as this involves the technical know-how and large amount of fund to make them suitable for a variety of industrial uses.

Conclusion

The paper identifies ceramics and its numerous products as a potential economic booster for Nigeria as a developing nation. It also seeks to draw the attention of the government to the development of the tremendous potential in the ceramic industry as a sub-sector of the national economy. This becomes very important especially at this time when concerned stake-holders in the ceramic industry and planners are calling on government to institute plans for economic restructuring and diversification.

It is believed that if government can do this, it would go a long way in assisting in

repositioning the Nigerian economy and liberate it from the sole dependence on oil as the main source of revenue generation. It would also create more employment opportunities for the teeming unemployed youths and keep them fruitfully engaged while also reducing youth restiveness and crime.

Recommendations

The government should, as a matter of urgency, put in place an enabling environment in terms of effective monetary and fiscal policies to give a good signal to industrialist to invest in the ceramic industry.

This should immediately be followed by drawing appropriate fiscal and monetary policies that would effectively aid the growth and development of the industry by facilitating local acquisition of technology, inter-sectorial and multi-sectorial linkages to create a pool of value added practices that will stabilize and reposition the industry as a key player in the economy.

Government must also aim at reducing the prices of its products, increase its scale of production and hence recapture the confidence of consumers and the market lost to imports.

Attempts should be made by the government at state levels, where ceramic industries have gone moribund, to resuscitate such industries and give them the required impetus for effective operations. The present Ekiti State government is commended in that vein by reviving and reinvigorating the dead Ire Red Bricks Factory at Ire-Ekiti in Ekiti State.

Finally, the government should encourage ceramic education in the various higher institutions where it is being studied by providing access to important equipment and facilities that would enable students and teachers carry out constant researches that would assist them keep up in pace with their counterpart all over the world.

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