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IRON AND STEEL INDUSTRIES; A STRATEGIC SECTOR FOR TECHNO-ECONOMIC DEVELOPMENT AND NERVE CENTER FOR INDUSTRIALIZATION IN NIGERIA

PRZEMYSŁ ŻELAZA I STALI; SEKTOR STRATEGICZNY DLA ROZWOJU TECHNO-GOSPODARCZEGO I INDUSTRIALIZACJI W NIGERII

Abstract

The Nigerian iron and steel industry established as a basis for industrialization has remained unproductive even as the year 2020 targeted for the country to become one of the world's top 20 economies is barely a few months away. Despite, the boom in the oil sector, the value-added sector is low while the inter-sectoral linkages are weak.

This implies a boom in one activity rarely affects another in the sector, but will rather impact on the foreign economy from where imports were sourced. Nigeria relies mainly on crude oil to the neglect of the iron and steel sector which is a major determinant for the industrialization of any nation. Lack of industrialization and unemployment in Nigeria today which engenders insecurity could be linked to the comatose state of the Nigerian iron and steel industry. Thus, this paper discussed the iron and steel sector as a strategic sector for rapid development and nerve center for industrialization in Nigeria.

Keywords: *Economy, sustainable, technology, industrialization, development*

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Streszczenie

Nigeryjski przemysł żelaza i stali ustanowiony jako podstawa uprzemysłowienia pozostał bezproduktywny, mimo iż od roku 2020, w którym kraj ma stać się jedną z 20 największych gospodarek świata, dzieli nas zaledwie kilka miesięcy. Pomimo boomu w sektorze naftowym sektor wartości dodanej jest niski, a powiązania międzysektorowe są słabe.

Oznacza to, że boom jednej działalności rzadko wpływa na inną w tym sektorze, natomiast wpływa na gospodarkę zagraniczną, z której pozyskiwano import. Gospodarka Nigerii polega głównie na ropie naftowej, zaniedbując sektor żelaza i stali, który jest głównym wyznacznikiem uprzemysłowienia każdego narodu. Brak uprzemysłowienia i bezrobocie w Nigerii, które powoduje poczucie niepewności, mogą być powiązane ze stanem śpiączki w nigeryjskim przemyśle hutniczym i stalowym. W niniejszym artykule omówiono sektor żelaza i stali jako sektor strategiczny dla szybkiego rozwoju i dla uprzemysłowienia w Nigerii.

Słowa kluczowe: ekonomia, zrównoważony rozwój, technologia, uprzemysłowienie, rozwój

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Statement of the problem in general outlook and its connection with important scientific and practical tasks.

The world is on our hands. By 2030, 9.3 billion people will walk this earth. Meeting their growing demands, as well as ensure that tomorrow's environment is kept intact, has been a critical issue for a decade. The true wealth of a nation is measured by her overall ability to provide for the citizenry a sustainable and comfortable standard of living which can be gauged by reference to the level of production and/or consumption of minerals, metals and their products. Industrial raw materials are either mining or agricultural products. The former is depletable while the latter is replenishable. It behooves any nation, therefore, to judiciously explore, exploit, process, extract and utilize her solid mineral resources. The economic development and technological advancement of any nation are two sides of the same coin. We cannot have one without the other. So, the developed economy and advanced technology can be used interchangeably. No country in the world will be able to

show off in the comity of developing nations (not to talk of the developed nations) without the two (technological advancement and economic growth) (Adetula et al, 2013). It has been discovered most developed economies are the top world crude steel producers, without any doubt, steel is the most commonly used metal in the world and the key to sustainable technology advancement and economic growth for the world today and a key driver of tomorrow's world economy (Bamidele et al, 2014).

The world has been divided by technology into developed and developing/underdeveloped nations. The developed nations being exemplified by the G8 nations which include Canada, France, Germany, Great Britain, Italy, Japan, the United States, and Russia. These developed nations are industrialized nations (Anon, 2014). Sustainable iron and steel production in these nations is pivotal to their industrialization as they all

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produce large tonnes of crude steel on a sustainable basis. Even the developing economies such as India, Brazil, Mexico, South Africa, China, South-Korea and Taiwan have since appreciated the fact that the steel industry is the core industry and embraced the steel sector as a strategic sector of their economies. This implies that the iron and steel sub-sector of the economy can only be

ignored at a terrible prices to sustainable national growth. In this paper, we shall consider the role of crude steel in technology advancement and economic growth of nations, the comatose state of Nigeria Iron and Steel Industry, and the effect of this comatose state on the other sectors of the economy.

Analysis of latest research where the solution of the problem was initiated.

The adoption of Vision 20:2020 in Nigeria, had two different administrations since inception each having its own economic growth plan. Under President Jonathan, it was Transformation Agenda and President Buhari's focus was Economic Recovery and

Growth Plan (ERGP). It is noteworthy that the plans have been predominantly based on the bedrock of driving economic expansion and an inclusive growth i.e. growth that advances equitable opportunities for every section of the society (Abah, 2019).

Aims of paper. Methods

Iron and steel sector as a strategic sector for rapid development and nerve center for

industrialization in Nigeria. (Adetula et al, 2013)

Exposition of main material of research with complete substantiation of obtained scientific results. Discussion.

Overview of the Nigerian Economy


Nigeria is a mixed economy and the economic activities are undertaken in a partnership between the public and private sectors. Characteristically, there are businesses that are owned and operated by the public sector (corporations and public utilities) as well as private limited liability companies, etc. However, it must be noted that in Nigeria the government or public sector is very dominant. Since the 1980s the government had started a process of privatizing its corporation in a bold attempt to divest and downsize the public sector. The country's economy depends heavily on the oil sector,

which generates up to 95 % of Nigeria's export revenues, accounts for 85% of foreign exchange earnings and about a third of gross domestic product (GDP).

Both the World Bank and the MMSD consider that, with its large reserves of human and natural resources, Nigeria is seen as one of the most promising markets for international companies. It has the potential to build a prosperous economy, significantly reduce poverty, and provide the health, education, and infrastructure services its population needs. As an agrarian country, a large percentage of the population finds

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employment which is still crude and dependent on simple traditional farming implements.

Although modern farm implements and equipment have been introduced, their usage is still not widespread. Similarly, the economy is mono-cultural, as it depends up to 70% on crude oil as a source of foreign exchange earnings and government revenue, dependence has varied from about 90% in the 1980s to the current figure. This no doubt makes the country very vulnerable to the vagaries of an ever-volatile oil market. It so unfortunate, despite the abundant resource the industrial base is fragile, backward, underdeveloped and extremely foreign-oriented both in terms of capital goods, spares and raw materials. Furthermore, the value-added sector is low while the inter-sectoral linkages are weak. This implies that a boom in one activity rarely affects another in the sector, but will rather impact on the foreign economy from where imports were sourced.

The Nigerian Metals Industry

In its drive towards becoming one of the most industrialized economies in the world by harnessing the human and natural resources that abound in its geographical space, the Nigerian government at various times over the years, initiated several economic reform policies and targets, none of which can be said to have been successful as their objectives were largely unmet. However, at the onset of independence, industries were streaming into Nigeria. Academia was consulted for industrial research and policy formulation. Then came the incursion of the military in government and the discovery of oil. The untold consequences of these led to non-participation of the citizenry in industrialization, mining and agricultural activities.

While China has since woken up from its technological slumber, Nigeria has been regrettably labeled the sleeping giant of Africa. As the most populous black nation on earth is a sleeping giant, so is her metallurgical industry which is the basis of national industrialization. It is usually convenient to group engineering materials into four: metals, ceramics, polymers and composites. Thus at a glance, we can see that metals are a subset of engineering materials. However, special attention is paid to metals by nations that desire to develop because they are indispensable in all areas of technological advancement and industrial development. In the developed nations and even some developing ones, growth and development indices seem to be tied to the per capita consumption of iron and steel products, hence their continued dominance of the production of machinery and equipment to run the major industries of the world.

In 2017 out of 93.3% of steel raw material, 66.3% were converted to steel products, 32.7 into co-product and only 3.7 is waste (worldsteel, 2019). Steel is fundamental to achieving a circular economy because the well-being and standard of living of any nation can be accurately gauged with respect to its level of production and/or consumption of metals especially iron and steel. Thus, various stages of human civilization: Stone Age, Bronze Age, Iron Age, Nuclear Age are characteristically named after minerals/metals and metal products. Even the ICT Age we are in now is made possible by metal and metal products.

The Comatose Nigerian Metallurgical Industry

The Nigerian metal subsector of the economy is in comatose status and this has contributed to the distressed national economy and in spite of the abundance of mineral resources within her boarder, the nation has been unable to produce liquid steel. Nigeria

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is blessed with all the necessary raw materials needed for steel development including iron ore, coal, natural gas and limestone. The National development plan between 1976 and 1978, Nigeria commenced the construction of two integrated iron and steel plants located at Ajaokuta (Ajaokuta steel company-ASC) and Aladja (Delta steel company-DSC) and three rolling mills at Oshogbo, Jos and Katsina. The 1.3 mtpa ASC is based on blast furnace/basic oxygen furnace (BF/BOF) technology with a rolling product capacity of 5.2 mtpa. DSC has a 1.0 mtpa steel melting plant for the production of 0.96 mtpa of billets and 0.32 mtpa of rolled products while supplying 210,000 tones of billets each to Oshogbo, Jos and Kastina rolling mills.

A vibrant iron and steel sector projects were expected to kick start. In order words, due to several factors including logistical and managerial, technical challenges and political, all iron and steel publicly-owned companies folded up in Nigeria. While the privately-owned iron and steel companies, which are mostly rolling mills that were dependent on the integrated mills for billets are now threatened due to lack of raw materials.

The publicly-owned iron and steel companies (ASC, DSC, and the three inland rolling mills) were privatized in 2000- 2005, yet most of them are still moribund. According to a recent study, Nigeria is endowed with all the major raw materials needed for the production of iron and steel including 3 billion tons of iron ore, 3 billion tons of coal, and limestone in excess of 700 million tones and 187 billion SCF of natural gas. After 58 years of independence, the country was yet to establish a stable iron and steel sector despite huge investments of over \$ 9 billion in which the planning for the Nigerian steel sector started in 1958.

The gigantic Ajaokuta Steel Company (ASC) failed to take off, Delta Steel Company (DSC) and the three government-owned inland/satellite rolling mills in Oshogbo, Jos and Kastina are moribund, working under low capacity utilization despite the huge investment. The privatization carried out between 2004 and 2005 have a negative impact on the sector. Rather than reviving and transforming the sector, the companies were enriching their pockets via private monopolies and the two integrated iron and steel companies in Nigeria (ASC and DSC) are unable to produce billets for all the vibrant steel rolling mills in the country.

This affected the sector to depend on imported billets and due to the high cost of billet importation, many steel companies are unable to function. The few steel companies that are operational though at low capacities have had to depend on recycling of scrap iron and steel obtained mostly from municipal solid wastes.

The reasons for the poor performance of the Nigerian steel sector are but not limited to inadequate funding, poor planning, and implementation and political influences. Until recently, the nation's steel requirement was substantially met since independence by imports from western nations particularly the US, Great Britain, Germany, Japan and recently, by relatively cheap and sub-standard steel from some Asian nations and the collapse of the building became rampant across the country. Nigeria is now spending a large portion of her foreign exchange for the importation of steel products while investing heavily in the domestic production of steel becomes a nightmare.

Role of Steel Industry in Technology Advancement of a Nation

It is imperative to know that a vibrant iron and steel sector is necessary for the infra-structural and technological development

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of any nation. Technology remains the most important part of any meaningful development be it economical, socio-cultural, infrastructural among others; the backbone of technology remains the industry while the nerve center of the industry is indisputably the iron and steel industry. This depicts that the sustainable production of iron and steel is the fundamental requirement for the techno-economic development of any nation. Steel is everywhere, without any doubt if a product is not made of steel, the chances are that it will be made from a machine made of steel. As nations around the world seek to build resilient infrastructure, improve their standards of living and lift populations out of poverty, it is inevitable that the demand for steel will increase. Even as it addresses the needs and challenges of today's economic environment, the steel industry is looking ahead at the challenges that are just over the horizon. Materials that are stronger and meet higher environmental standards will be needed. New generations of steel continue to be developed that make it possible for manufacturers and builders to implement durable, lightweight designs. Current forecasts suggest that in 2050 the steel production will be 1.7 times today's levels (Allwood & Cullen 2012). Over time, the iron and steel sector has made remarkable improvements in energy efficiency. The energy use per one ton of steel between 1900 and 2010 dropped by 80% (Smil, 2016) These impressive advancements in energy efficiency were brought forward mainly as a result of the quest for lower cost and higher productivity (Smil 2014), a trend achieved not only as a result of technological advancement but also due to increasing sizes and capacities of steel furnaces. Steel plays a critical role in virtually every phase of our lives. The rails, roads and vehicles that make up our

transport systems use steel. A strong framework and connections in buildings where we work, learn and live are created as a result of steel production and its application. It protects and delivers our water and food supply which also serves as a basic component that generates and transmits energy via technology.

Role of the Steel Industry in Economic Growth of a Nation


In the 21st century, it is difficult to imagine a world without iron and steel. This Industry is the engine of growth, thereby recognizing the steel industry as what brings about development in any nation of the world cannot be overemphasized. Most countries developed their industrial base by establishing a viable steel industry. No wonder India transfer the headquarter of poverty to Nigeria. The rapid rise in production of steel has resulted in India becoming the 2nd largest producer of crude steel in the world in the year 2018, from its 3rd largest status in 2017.

The country is also the largest producer of sponge iron or DRI in the world and the 3rd largest finished steel consumer in the world after China and the USA. The global steel industry developed from the heavily industrialized Europe and the USA. These regions have an industry in place prior to the Second World War between 1939 and 1945.

It was not until after the war that the production capacity increased rapidly. Steel is a material that is difficult to do without and less developed countries demands more as they embark on development programmed as occurred in the last quarter of the 20th century when Asian Countries increased their appetite for steel. So as when western countries downgraded supply-side economics, Asian economies (first Japan, then Korea and China) with their lower input factor

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costs, moved in and captured steel production market share. This was done during the period of significant economic development for these countries that in effect used the steel industry as a model to utilize resources, reduce reliance on imports and at the same time increase their industrial base capacity.

Correspondingly, this growth has been positively reflected in GDP statistics. Taking China (the highest crude steel producer) for instance, between 1978 and 2005, China's per capita GDP had grown from \$153 to \$1284, while its current account surplus had increased tremendously between 1982 and 2004, from \$5.7 billion to \$71 billion. As a result of this China had become an industrial powerhouse, moving beyond initial successes in low-wage sectors like clothing and footwear to the increasingly sophisticated production of computers, pharmaceuticals, automobiles.

The iron and steel industry is very resource hungry and factors of production incorporate a large proportion of a country's energy, minerals, and labors. Steel has not only become an indispensable material in the construction of railways, machinery and reinforced building structure, it has also created new markets and demands e.g. in the electrical industry and the oil and gas industry. Even nowadays, in the twenty-first century, steel remains the most widely used material in construction (Smil, 2016).

Way Forward to Nigeria Technology and Economic Growth

The adoption of Vision 20:2020 in Nigeria, had two different administrations since inception each having its own economic growth plan. Under President Jonathan, it was Transformation Agenda and President Buhari's focus was Economic Recovery and Growth Plan (ERGP). It is noteworthy that the plans have been predominantly based

on the bedrock of driving economic expansion and an inclusive growth i.e. growth that advances equitable opportunities for every section of the society.

It appears Nigeria is not prepared to take a place among the top 20 economies in 2020, which is six months away, as envisaged by Vision 2020 going by all economic indicators, especially as the iron and steel sector which ought to be the chief driver of the revolution is still in limbo even as billions of naira have been sunk into developing it. Technology has makes the delivery of builds and infrastructure as a result of steel. Over 50% of the steel produced globally goes into steel buildings and infrastructure. The population will increase by another 2.7 billion people by 2050 and this will be accompanied by rapid urbanization. It is important to know that the timely completion of the Ajaokuta steel company is imperative (Adetula et al, 2013). Industrialization, which can be defined as a progressive ability of a people to harness human and material resources for the production of goods and services; remains a key component of economic development, and it has been arrived at by a period of massive technological progress.

A perusal at the Periodic Table shows that about 2/3 of the 110 elements in the Table are metals- ferrous and non-ferrous and knowing that the ferrous and non-ferrous metals are the basic materials used in producing the products in the industry, hence, the synergic revitalization of both sectors (ferrous and non-ferrous) in Nigeria remains the major pre-requisite for rapid industrialization and play a crucial role in reducing the rate of unemployment in the country. According to the Labor Force Statistics, the total number of people classified as unemployed rose from 17.6 million in Q4 2017 to 20.9 million in Q3 2018 and while over 1.8 million graduates enter the

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labor market annually. With the utilization of steel in building various infrastructure, there is every opportunity for the growth of Nigeria's economy and the drastic reduction in the rate of unemployment because the steel industry is one the highest employer of labor.

The World Steel Association (2019) reported that the industries have the capacity with direct employment of more than two million people worldwide, plus two million contractors and four million people in supporting industries. Other relevant industries include transport, energy and construction and the steel industry is a source of employ-

ment for more than 50 million people. Similarly, as the Cuomo Commission on Trade and Competitiveness stated in its 1998 report, "industries are interdependent and a broad base of industrial activity is necessary for a healthy economy." The iron and steel industry is an important source that can generate employment and tax revenues for local and regional economies, for every one job in the steel industry, at least a quite a number of job opportunity are created in other economic sectors, such as raw materials, transportation, computers and related technical services. These interrelationships demonstrate that the steel industry maintains a key role in economic development.

Conclusion

In all of these, where is the hope of making Nigeria count among the 20 industrialized economies in the world as expected? Where is the hope of accomplishing the Vision 2020:20 objectives in the coming year 2020? Did Nigeria not start this journey to industrialization with its contemporary Third World countries then like China, India and others who are now heavyweights among the industrialized nations? What actually has been going wrong?

These are some of the questions that readily come to mind in view of the quagmire that has engulfed the Nigerian metallurgical industry over the years. Today steel products will become tomorrow cans, trains, bridges, or buildings. All steel is originally made from iron and iron is 4th most common element in the earth's crust after oxygen.

Nigeria is abundantly endowed with iron ore and other basic minerals needed for the production of iron and steel, but the country has abandoned this key sector whose timely completion is the major key to rapid indus-

trialization. This paper shows industrialization as the backbone of any meaningful development and pinpoints the iron and steel industry as the nerve center of the industry. Steel remains an integral part of a solid manufacturing sector and it is noteworthy, the strong domestic steel industry is vital to ensuring a sound manufacturing base.

The completion of Ajaokuta Steel Complex Limited of Nigeria which has been in the moribund state can revive the economy from being the headquarter of poverty to headquarter of rich nations.

Recommendation

The developed nations and even some developing ones, growth and development indices seem to be tied to the per capita consumption of iron and steel products, hence their continued dominance of the production of machinery and equipment to run the major industries of the world.

In order to bring about rapid industrialization in Nigeria, first, there is a need for the political will in which our leaders will have the mindset of it is possible. Second, the

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Ministry of Mines and Steel Development should give more attention to the Iron and Steel Industry.

Third, the Professional Societies, the Student societies, and the labor congress should not relent in drawing the attention of the government to the iron and steel sub-sector of the economy.

Conclusively, if Nigeria truly anticipates rapid industrialization which precedes any meaningful development, she needs to pay serious attention to her Iron and Steel Industry as it remains a strategic sector for techno-economic development which can only be ignored at the expense of insecurity, large unemployment rate and poor GDP as experience currently.

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