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THE IRON AND STEEL INDUSTRY IN NIGERIA: AN ASSESSMENT OF PERFORMANCE

By

S. N. ESSIEN*

ABSTRACT:

The iron and steel industry is considered to play an important role in the process of rapid development and attainment of self-sufficiency in the industrial sector. This paper assesses the performance of the steel industry in Nigeria against the effective utilization of available man-power, raw material and energy resources in the country as well as the domestic technological capabilities. Unfortunately, these endowments have not been optimally utilized in the planning and implementation of the steel projects with the result that the import components of production remain very high. Based on the declining trend in operations of the existing plants, the paper concludes that the iron and steel industry in Nigeria is still extensively under-developed and has failed to make appreciable impact on the economy despite huge investment by the Government. The paper, therefore, suggests the adoption of mini-steel production concept and the improvement of domestic production technology.

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1. INTRODUCTION:

The socio-economic situation in Nigeria in the 1960s characterized by insufficient infrastructural facilities and undeveloped industrial activity underscored the need to evolve an industrial strategy that would adequately utilize the abundant natural and human resource endowments of the country. Such need and desire could partly be met by developing the iron and steel sector. This reality became more evident in the 1970s when the illusion created by the oil boom caused many industries to become heavily dependent on foreign inputs. The country failed to effectively exploit the potentials of the import-substitution strategy to strengthen the inter-sectorial linkages for the purpose of promoting economic growth and employment generation.

To stimulate development and provide necessary raw material inputs for the operation of downstream industries, the Federal Government established some basic capital-intensive industries in the early 1980s, tagged "Industrial Core Projects". One category of such industries was the iron and steel plants which was intended to provide a solid base for sound industrial take-off in the country. Following the adoption of the Structural Adjustment Programme (SAP) in 1986, the government embarked on major policy reforms which placed emphasis on the reduction of import contents of industrial production. This involved domestic sourcing and use of local raw materials for manufactured goods.

The development of the steel industry was then seen to be an essential pre-requisite for a balanced industrial growth with its potential for raising the capacity to produce engineering goods. Such capability was also known to be essential for the development of technological skills

which would facilitate the need of meeting the growing demands for machinery and equipment. This reputation derives from the important role played by the iron and steel industry in the foundation of modern industrial economy by creating satellite upstream and downstream industries through the supply of raw material inputs and intermediate products (e.g. machinery, equipment, spare parts, etc.). It also facilitated the development of high-level manpower for the sector itself and other related industries. Therefore, the level of achievement in this sector provides a useful index for measuring the pace of a nation's industrial development.

The purpose of this paper is to assess the performance of the iron and steel industry in Nigeria in the light of its contribution to the realization of the country's industrial objectives. The performance of the individual plants are assessed in terms of annual output and capacity utilization rates, effective use or otherwise of local raw materials, appropriateness of technologies employed and the general economic impact created. It also identifies the peculiar problems constraining the operations of these plants and proffers solutions for improvement. The assessment is done at two levels. First, the paper is critical about the unsatisfactory achievement recorded so far by the steel industry as a whole inspite of huge financial commitments by the government. Second, by taking into consideration the technological difficulties involved in the development of modern steel projects, the paper goes on to provide an outline of a strategy for future development of the Nigerian steel sector.

The rest of the paper is organized as follows: Part II reviews the literature; Part III examines the role of steel in economic and industrial

development; while Part IV reviews the experience of other countries in steel development and draws some useful lessons. Part V appraises the performance of the individual steel plants from the inception to 1995; Part VI considers the lingering problems of the Nigerian steel industry; Part VII recommends measures for improved performance; while Part VIII summarizes and concludes the paper.

II. REVIEW OF LITERATURE:

Studies conducted on the Nigerian steel industry so far seem to concentrate on identifying the problems relating to the development of the industry. Notably, the technological handicap of the country appears to have been overlooked in the planning process whereas any adventure into steel development should have critically addressed this issue. Igwe (1989) was concerned about the potential of steel in the rapid industrial development of Nigeria and thereby identified the iron and steel industry as an engine of growth. With this perceived role, he credited the steel industry as the centre-piece of Nigeria's future technological and industrial advancement. Such expectations are not misplaced as they are predicated on the firm conviction that enhanced levels of domestic production and consumption of steel products are absolute pre-condition for Nigeria's transformation from developing to a developed economy. The same conception led to the argument that steel serves as a reliable index of a country's development and has been amply illustrated by the four leading producers of steel in the world (namely, the former Soviet Union, The United States, Japan and West Germany) who are also acknowledged as the most "developed" countries. In contrast, all those countries that are classified as "least developed" are also non-producers and very low consumers of steel.

Jerome (1993) carried out an analytical study to evaluate the several policy issues currently confronting the Nigerian iron and steel industry. His analysis indicated that the existing steel plants are inefficient. By using a Mathematical programming technique, he found out that the estimated marginal cost of production of steel during the first planning phase (1993-1995) was greater than the world price of steel by as much as 19.3 per cent for Delta Steel Company, 41.3 per cent for the Inland rolling mills and 47.3 per cent for the already commissioned mills at Ajaokuta Steel Company. The study recommended that it would be sub-optimal to construct any new plant during the stipulated planning period (1993-2000). Rather, emphasis should be placed on maximizing the utilization of the existing plants, while all the requirements for flat steel products should be imported. The latter part of the recommendation appears not to be in the best interest for a country that principally requires flat steel products for its engineering fabrications.

Other studies on the Nigerian steel sector were conducted by the following researchers: Diejomaoh (1983); Ogegbo and Igwe (1984); Oyeyinka and Adeloye (1988). These studies also examined the main issues and problems of steel development in Nigeria. They seem to agree on the need to improve the technological capability of the country in order to achieve sustained development in the steel sector.

The establishment of a local iron and steel industry requires a careful survey of the market and general evaluation of the economic situation by well-established experts. Even after a decision has been taken to produce steel locally, a minimum of five to seven years will generally be required

to construct a completely new plant. This assessment by UNIDO (1969) was further amplified by Walstedt (1974) while reviewing the steel indust , in Turkey. He warned that the production of steel is highly c:.pital intensive and advised that high investment will hurt badly if the steel mills are not designed to an economic size with the market correctly guaged, and construction implemented in phases with great care. The effect of any miscalculation would be intensified in the typical developing country in which capital is scarce and expensive. This must have been the dilemma the Nigerian government faced in its hurry to develop the steel sector.

A developing country's demand for steel products are numerous and multi-dimensional. For this reason, while planning the establishment of a steel industry, it is important to take into consideration the variety of steel products that cannot be manufactured economically by a single plant. It may be advantageous to construct various plants, each specializing in a limited product-mix within a country or regional group of countries. Even then, it may still be necessary to plan that 20 per cent or more of consumption should continue to be imported (UNIDO, 1969).

III. ROLE OF STEEL IN ECONOMIC AND INDUSTRIAL DEVELOPMENT

The iron and steel industry is considered to be indispensable in the industrialisation of developing countries. It has been accepted as an empirical fact that a nation's industrial and technological development can hardly commence unless annual per capita steel consumption exceeds 50 kilograms (UNIDO, 1969). Steel is also regarded as an engine of economic growth. This credit derives from the multifarious linkages it

enjoys both internally and externally with other economic sectors, such as industry and agriculture. The steel industry directly or indirectly represents a potential source of several thousand jobs in a country (such as Nigeria) which has employment creation as one of the principal objectives of its industrialization programme. Again, the significance of steel as a material essential to economic development is attested to by the desire of so many emerging nations to join the ranks of steel producers.

The establishment of a steel industry in a developing country carries with it the following advantages:

(i) effective utilization of indigenous natural resources by the extraction and conversion of metallic ores, fuels, reductant and additives.

(ii) creation of satellite upstream and downstream industries for the production of raw material inputs and intermediate products, machinery, equipment and spare parts as well as engineering and technical support services.

(iii) promotion of development of industries generally through effective supply of steel products to priority sectors such as mining, engineering, energy, chemical, construction, transport and communication, agriculture and agrobased industries.

(iv) generation of high level employment and creation of facilities for high-level manpower development for the sector itself, as well as for other related metal working engineering industries. People will be trained to work as skilled operatives in a highly technical industry.

(v) diversification of the source of income as well as increasing the foreign exchange earnings of a country.

However, the governments of developing countries should evaluate the relative advantages and disadvantages of establishing a local steel industry as part of a comprehensive industrial programme to decide the order of priorities in the light of its resources.

IV. EXPERIENCE OF OTHER COUNTRIES: SOME LESSONS

The experience of a few countries in the development of the steel industry will provide some useful lessons for Nigeria.

(i) The Italian Steel Industry:

The steel industry has been a leading sector and the driving force of Italy's industrialization. Marked by high growth rate, the expansion of the industry has been accompanied by wide-ranging process of technological innovations. This explains how the country reached and maintained competitive position in a market that is open and very dynamic. To attain this level, the Italian steel industry slowly organised itself along two main types of manufacturing processes, namely, integrated steel production and scrap-fed electric furnaces. With a valid and balanced structure, the steel industry played and still plays a major role in the country's economy.

(ii) The Steel Industry in India:

For the most part of India's overall development plans since independence, investment in steel has been accorded priority over

most other industries. India has the comparative advantage of possessing all principal raw materials necessary for the manufacture of iron and steel. Her ores are widespread, easily mined and are of sufficiently good quality to allow production of iron in conventional blast furnaces. However, the country's potential in improving the quality of these raw materials through research has not been fully exploited.

India's employment of unskilled labour in the steel industry is substantially higher than elsewhere. This abundant labour force are employed in the mining of ore, handing of raw material and finished steel, construction and other subsidiary activities where speed is unnecessary, dangers to physical well-being small, and the demands upon the energies of workers at a minimum. The government plays a prominent role in the development of the Indian steel industry as it recognises that the private sector would be unable to raise sufficient capital to erect new steel mills.

(iii) The Brazilian Steel Industry:

The growth of a heavy industry such as steel in a developing economy like Brazil represents a remarkable effort. This success story could be traced back to the early co-operation between the public and private sectors of the economy in making optimum use of natural resources (large iron-ore deposits) and application of innovative technology and factor substitutability in steel-making. By late 1960s, Brazil had become the largest producer in South America and a net exporter of certain types of steel products. This achievement is against the general skeptical view that steel mills and other heavy industries are beyond the range of development activities of poor

countries, as they are too complex for the existing labour and managerial talents coupled with heavy capital and large market requirements. The lesson here is that different developing countries have different types of factor endowments, leading to different spheres of economic activity of these countries.

(iv) The Japanese Steel Industry:

The Japanese steel industry has recorded the world's fastest growth in production, and made the sharpest penetration into the U.S. market. The industry which was virtually nonexistent at the end of World war II assumed the position as one of the world leaders by the end of 1960. Its rapid expansion is made possible by the existence of a strong demand for its products at home and abroad. The development of the sector was spearheaded by government's actions that promoted the modernization of the industry. Important privileges were granted to the industry in raising capital funds and direct government subsidies on raw-materials and prices. These outright subsidies and various other protective measurers made the survival of the Japanese steel industry possible.

The modernization programme was aimed at reducing the cost and increasing the capacity of production mainly through renovation and expansion of existing facilities, thereby enabling the industry to establish itself as a strong international competitor. Today, the industry is quite advanced in technological sophistication and modern equipment as the Japanese steelmakers are exporting many items that reflect their ingenious technical know-how. What distinguishes the Japanese steel industry from others is the dual structure of co-existence of a few large and modern integrated firms with numerous

outdated small firms.

(v) The American Steel Industry:

The steel industry in the United States has been one of the foundation stones of the economy. Its importance cannot be over-stated, for virtually everything manufactured either contains steel or is made with the aid of steel tools. In contrast to other countries' experiences, the American steel industry evolved through a painful transition which dates back to colonial times. The raw materials were found in relative abundance in many of the colonies and the steel industry was centred at its fundamental producing unit, the blast furnace. Again, contrary to the situation in other countries, the American steel industry has grown witn a minimum of direct gov ernment intervention. Perhaps, this and the steady influx of imports could explain the slow pace of development in the sector. The threat of penetration of foreign steel into the domestic market generated a series of vigorous campaigns by the U. S. steel industry to obtain some formal protection.

From these experiences, it is important to note that financial constraints have particularly affected investment in integrated iron and steel projects. There is need to create capacities in some develop-ing countries, either by establishing new plants or by rehabilitating, modernising or expanding existing units. Modernising of existing production processes and equipment in the iron and steel industry offers considerable economic, financial and social advantages.

The common experience of developing countries (such as India

and Brazil) shows that large-scale iron and steel industries are practically all initiated and implemented by the state. The massive financial support and other incentives provided by the government were intended to assuage for the huge capital needed in the development process of the steel industry.

The success of Japan and Korea in capturing a significant part of the world's steel market had been attributed to their careful scrutiny of the many production variables influencing efficiency, and their determined application of standardized operating procedures based on evaluation of accumulated data. This is a useful lesson for Nigeria on the need to establish a commission of steel technocrats to assume a planning role in the iron and steel industry to ensure efficient and effective utilization of resources.

V. APPRAISAL OF THE PERFORMANCE OF STEEL PLANTS IN NIGERIA

Attempts to develop the iron and steel industry in Nigeria date back to the early 1960s, starting with the enunciation of a deliberate industrialization policy which centred at intensive steel development. Initial efforts were geared towards the establishment of rolling mills to meet the limited requirements of imported steel at the time.

Between 1960 and 1967, the government initiated various market studies on the feasibility of establishing steel plants in Nigeria. Those studies, conducted by foreign firms, almost unanimously expressed pessimism about the economic viability of an integrated iron and steel plant in Nigeria for reasons ranging from the small size of the domestic

market to inadequacy of infrastructural support facilities and the deficient manpower base for operating and maintaining such a technically sophisticated industry.

However, the UNIDO and Teknoexport studies of 1967 established a convincing demand pattern for steel in Nigeria in addition to revealing the abundant availability of iron ore at Itakpe Hills, coking coal at Lafia, limestone at Mfamosong, marble at Jakara and Ubo, dolomite at Burumu and Osara, and refractory clay at Oshiele and Onibode. The basis for setting up steel plants was thus established with these discoveries.

The period 1968-1985 could be considered as the steel development era in Nigeria. During this period, significant activities were undertaken which culminated in the signing of a contract with the Tiajpromexport (TPE) of USSR for the construction of the Ajaokuta Steel Complex in July 1979; the commissioning of the Delta State Company in 1982; and the commissioning of three steel rolling mills at Katsina, Oshogbo and Jos between 1983-1985. This development was followed by the establishment of the National Iron Ore Mining Project at Itakpe in 1987, which was to serve as a major feed-source for the steel plants. At present there are five (5) steel plants established by the Federal Government and sixteen (16) privately owned mini-mills in the country (Table 1), whose production profiles and characteristics are as shown in Tables 2 and 3. The performance of the individual plants is summarized hereunder.

(i) The National Iron Ore Mining Project (NIOMP):

The National Iron Ore Mining Project at Itakpe, Kogi State was

established in 1987 and charged with the responsibilities of exploring, exploiting and processing iron ore, the raw material for the iron and steel industry. The company has an installed capacity to mine and process 2.15 million tonnes of 64.0 per cent concentrate for Ajaokuta Steel Company and 0.55 million tonnes of 68.0 per cent super-concentrate for Delta Steel Company annually. To this end, the NIOMP which has a run-off-mine of relatively low iron content of 36.0 per cent has been able to stockpile 3.1 million tonnes of iron ore since its inception, awaiting beneficiation (upgrading) to meet the requirements of the Ajaokuta and Aladja steel companies.

The Company, whose staff strength stood at 1,120 in 1990, has witnessed a declining trend in production over the years. Total output of raw iron fell steadily from 359,328 tonnes in 1990 to 239,275 tonnes in 1994 and further to 168,261 tonnes in 1995, while the average capacity utilization rate decreased from 3.9 per cent in 1993 to 2.7 per cent in 1994 and 2.0 per cent in 1995. The decline in production was attributable largely to inadequate and irregular funding, obsolete mining equipment and scarcity of spare parts to rehabilitate the malfunctioning plants. Other problems included low demand for iron ore, managerial inadequacies and absence of a committed and technically qualified foreign operating partners.

(ii) The Ajaokuta Steel Company (ASC)

The Ajaokuta Steel Company, Kogi State whose design was based on the conventional blast furnace production technology, was to be completed in three phases. The first phase would have a crude steel production capacity of 1.3 million tonnes annually, while the

second and third phases were expected to increase the capacity to 2.6 and 5.2 million tonnes respectively, and would incorporate a flat products mill. But as at end 1995, construction work and equipment installation on the first phase which had reached 98 per cent completion since 1994 remained stalled at this level due to the company's inability to settle outstanding foreign and local debts as a result of inadequate working capital. The plant is yet to commence full operations, even though it was officially commissioned in 1992.

However, the Ajaokuta Steel Company has been able to generate skilled employment to Nigerians. A high proportion of the company's technical staff have been trained overseas under the terms of agreement with the multinationals. The training was mainly in operation and maintenance of equipment and machinery leading to the so-called "passive technology transfer". As at 1992, the company employed a total of 5,131 workers in various categories but consequent upon the lull in operations of the completed units within the complex, the level of employment progressively dropped to 4,446 as at 1995.

It is pertinent to note that the Ajaokuta steel project has slipped behind schedule due to financial constraints and has inadvertently been caught up with unprecedented cost escalation due to the delay in completion. Completion of the construction work is becoming extremely difficult because of government's reluctance to provide more funds and inflationary trend has thereby caught up with the project.

The question also arises as to the suitability of the outdated blast furnace production technique to Nigeria's circumstances and

endowments, specifically in relation to the quality of local-availability of metallurgical coal needed for its operation. It must be conceded that since the technologies and equipment involved in the Ajaokuta plant were all imported, it cannot be expected that they would be particularly appropriate or tailor-made for the Nigerian environment.

According to World Bank report in "Nigeria: Federal Government Expenditure Review 1995", the Ajaokuta steel complex had gulped N99 billion of public funds between 1979 and 1993. The Bank considered the project to be economically unviable and recommended the scaling down of further investment in view of Nigeria's low absorptive capacity for steel and the economic realities in the country. Perhaps, if the government had considered this advice the Ajaokuta project would not have suffered so much as to turn into a conduit pipe whose track record is littered with procrastinations, political indecisions, incessant infightings, poor planning and escalating costs.

(iii) The Delta Steel Company (DSC)

The Delta Steel Company (DSC), Aladja-Warri, which is currently the largest operating steel plant in Nigeria, was established through a contract signed between the Federal Government and a German-Austrian Consortium on a turnkey basis, which implies that the control, direction and application of technology would largely remain with the source of supply. The Company commenced operation in 1982 and has an installed annual crude steel production capacity of one million tonnes. The establishment of the company

evolved with an initial intention of obtaining part of its inputs from Mifergui-Nimba iron ore deposits in Guinea and the balance from Ajaokuta Steel Company. But this dream was never realized, thereby creating a raw materials constraint which caused the company to operate at below one-quarter of its capacity since commissioning.

It is noteworthy that a greater sensitivity to technological appropriateness seemed to have been displayed in the choice of the gas-based Midex Direct Reduction process employed in the Delta Steel Company. This was in recognition of the abundance of associated gas in the locality where the plant is sited, thereby facilitating cheap generation of electricity to operate the electricity-intensive arc furnace process.

The company's production profile, comprising mainly of billets and rolled products, maintained a steady decline from 189,371 tonnes in 1990 to 49,356 tonnes in 1993 with corresponding capacity utilization rates falling from 18.9 per cent in 1990 to 6.2 per cent in 1993. The outputs of billets and rolled products further decreased in 1995 to 31,895 and 6,627 tonnes respectively, accompanied with a fall in capacity utilization to 3.6 per cent. The employment figure rose from 5,592 in 1990 to 5,666 in 1991 but subsequently fell by 4.9 per cent in 1992 as a result of resignations. The poor performance of the DSC was attributable mainly to shortage of raw materials, high cost of inputs and spare parts, and inadequate funding resulting from the company's inability to source for its financial requirements.

*(vi) **The Rolling Mills:***

Three steel rolling mills were established by the Federal government at Oshogbo, Jos and Katsina, having installed capacities of 105,000; 160,000 and 210,000 tonnes per annum, respectively These mills produce bars for the construction industry and wire rods for downstream manufacturers of mesh and nails. It was expected that DSC would provide the billets used by these mills but currently they are being imported from Europe and America. Increased and continued import dependence has significantly constrained the capacity utilization of these mills, as reflected in the steady decline in their production levels over the years (Tables 9 and 10). For instance, the Oshogbo mill produced 20,182 tonnes of rolled steel in 1989; 18,467 tonnes in 1990; 19,982 tonnes in 1991; 23,280 tonnes in 1992; and as low as 10,081 tonnes in 1993. Aggregate output of round and bar products increased by 15.9 per cent from 9,419.5 tonnes in 1994 to 10,921.1 tonnes in 1995. Inadequate funding constrained the supply of raw materials and spare parts, thus accounting for the low level of capacity utilization. The company's work force increased by 2.0 per cent to 701 in 1990 and further by 3.5 per cent to 708 in 1992.

Similarly, the Jos Steel Rolling Mill recorded a declining trend in production from 19,220 tonnes in 1989 to 1,440 tonnes in 1993, with a corresponding decline in capacity utilization rate from 12.0 to 0.6 per cent. Inspite of the dearth of working capital, high cost and inadequate supply of billets, the Jos Steel Rolling Mill was able to raise the aggregate quantity of steel produced to 12,062 tonnes in 1995. The situation has not been different for the Katsina Steel Rolling Mill which experienced a steady decline in production from 24,800

tonnes in 1989 to 5,454 tonnes in 1993. Correspondingly, the rate of capacity utilization declined from 11.8 per cent to 2.6 per cent while the employment level rose by 2.3 per cent to 573 in 1992. Total quantity of steel products sold by KSRM fell by 51.6 per cent from 36,354 tonnes in 1994 to 17,586 tonnes in 1995.

The poor performance of the rolling mills was attributable largely to inadequate supply of billets from DSC, high tariffs on energy, erratic power supply and lack of funds to import billets, spare parts and other consumables. The high production cost had reduced the competitive advantage of local steel products over the imported variety. Despite the initial huge investment in establishing these mills, they have continually operated at less than 10.0 per cent of installed capacity and incurred heavy losses. The low production levels of the mill made it extremely difficult to meet the national demand.

(v) The Private Steel Plants:

The appraisal of the performance of steel plants in Nigeria would not be complete without mentioning the significant role of the mini-mills and other steel fabrication outfits spread all over the country. Substantial credit must be given to these privately-owned projects for spear-heading the genesis of steel industry and complementing the activities of the public steel works.

There are about sixteen (16) of such mills currently in operation, whose range of products include rounds, channels and shapes obtained from melted scraps and imported billets. At full capacity these mills are capable of producing a total of 236,000 tonnes of crude steel

and 1,201,000 tonnes of rolled products annually. At present the operation of these mills suffer from heavy under-utilization, with a combined annual production capacity between 9,000 and 72,000 tonnes. Among the operational constraints are inadequate funding, shortage of raw materials and inefficiencies of production associated with lack of technical skills.

VI. LINGERING PROBLEMS OF THE NIGERIAN STEEL INDUSTRY

A rapid and consistent development of steel industry in Nigeria is impeded by several constraints including low steel consumption and production, lack of financial resources, inefficient infrastructural facilities, lack of skilled manpower and low domestic technological capabilities. These are further explained below.

(i) Production-Demand Imbalance:

The projected demand for steel has been increasing steadily over the years while the per capita consumption and intensity has been on the decrease and relatively very low (Tables 5 - 7). The consumption of steel between 1978 and 1991 (Table 5 and Chart) showed that the local production (27.8% of total consumption) was grossly inadequate and had to be heavily supplemented by imports (72.2%). Also, the product-mix distribution pattern of the Nigerian steel plants showed a complete absence of flat products (Table 8). This does not augur well for the high demand for such products by the capital goods industries in the country.

(ii) Over-dependence on Imported Inputs:-

The steel industry currently depends heavily on imported inputs for its operation despite the abundant availability of iron-ore at the Itakpe mine, even though the mine has a relatively low iron content. The plants do not only depend on imports for its raw material sourcing but also for their equipment and machinery requirements. However, most of the crude raw material requirements for steel production are available in Nigeria (Table 4).

(iii) Lack of Domestic Technical Skills and Technology:

Steel production requires sophisticated technology and technical expertise which is seriously lacking in Nigeria. Special effort is required to improve the local technology through development of engineering industry, otherwise the high dependence on foreign expertise will continue indefinitely.

(iv) Huge Financial Requirement:

It is well-known that the development of an integrated steel plant is capital-intensive. The huge fund sunk into the Ajaokuta Steel Company is a clear testimony to this fact, which the Federal Government should recognise and start planning its investment in the steel sector in phases.

VII. RECOMMENDATIONS

The real challenge for the Nigerian Steel industry is to break into the international markets for standardized products. It is only at this stage that one can talk of successful industrialization. Given the huge financial resources for investment in large steel projects, the relatively small size of

the Nigerian market, and the availability of cheap electricity supply, it is suggested that the mini-mill concept of steel production should be encouraged. An improvement in the technology employed in the private sector mills is therefore an essential prerequisite for widening the range of products manufactured by them.

The technologies employed in the Nigerian Steel industry should appropriately reflect the local technical capabilities, raw material and other resource endowments. Improvement of the domestic technologies should not only be targeted at increasing the quantity of production but also at diversifying the product-mix to include the flat products which are currently in high demand.

The adoption of the outdated blast furnace technique of steel production is not attractive to the Nigerian condition because of its intricate nature of operation and the heavy capital requirements. The direct reduction technique (which converts ore into iron .without melting) is more suitable for an energy-rich country like Nigeria. Therefore, steel production by direct reduction (DR) and electric arc furnace (EAF) routes offer a more profitable option for accelerating the development of the iron and steel industry in Nigeria.

The decision to tie the steel rolling mills to the Delta Steel Company as a major source of feed-stock has turned out to be counter-productive. The low capacity utilization witnessed in these mills was partly caused by the inadequate and irregular supply of raw materials by the DSC. This created a situation whereby the companies resorted to imports at high uncompetitive prices to supplement their requirements. Therefore, in order to significantly reduce the import-contents and improve efficiency

of local production, urgent steps have to be taken to initiate research programmes on local raw materials as well as improving infrastructural support services such as energy, water, transport and communications.

It is desirable to create new domestic and subregional markets to provide outlets for the country's steel products. At present Nigeria is the only country in the West African subregion which has established iron and steel industry. At the same time other countries in the subregion are well endowed with ample resources needed in the industry. For example, there is high-grade iron ore deposits in Guinea, manganese and ferro-alloys deposits in Ghana. These potentials could be harnessed through economic co-operation among the ECOWAS member States to feed the Nigerian steel industry and assist it to meet the steel demands of the subregion at comparatively competitive prices. This would help in reducing the dependence on outside suppliers and thereby promote the much desired subregional integration. Nigeria also requires to pursue an aggressive export-oriented strategy for her steel products, particularly the long products which is a good source of foreign exchange earnings.

Finally, to achieve enhanced efficiency and productivity in the steel sector it is necessary to evolve an institutional framework that would enable the government play a creative, leading and directive role in accelerating development in the industry. This would require setting up a committee of steel technocrats whose responsibility would be to plan investment in the sector in phases.

VIII. SUMMARY AND CONCLUSION

The paper appraises the performance of the iron and steel industry in

Nigeria from inception (effectively 1982) to 1995. It notes that the initial efforts at developing the industry were geared towards meeting the limited requirements of imported steel at the time. However, substantial stride was made in the process of steel development during the period 1968 - 1985 when two integrated plants and three rolling mills were established by the Federal Government. This was followed in 1987 by the siting of an iron ore industry at Itakpe to supply raw material inputs to these mills.

The performance of the individual plants in terms of annual output, capacity utilization rates and effective use of local raw materials is adjudged to be poor. The paper identifies the following factors as major constraints of the steel sector: limited financial resources, inadequate energy supply, lack of skilled manpower and domestic technological handicap. Others include high production cost, poor planning, over-dependence on foreign inputs and expertise. Based on the relatively better performance of the private mini-plants, the paper suggests the adoption of mini-steel production technique and recommends improvement of technology employed as a pre-requisite for widening the range of products manufactured by then. However, the technologies to be employed in the Nigerian Steel industry should reflect the nation's technical capabilities, local raw material and other resource endowments. The need for setting up a committee of steel experts to plan future investment in the steel sector in phases is emphasized. This will enhance efficiency and productivity.

The paper reveals that the iron and steel industry in Nigeria is extensively under-developed because of its capital intensive nature. Not only is domestic production limited, but also a good proportion (72.2%)

of steel consumption is sustained through imports. It is also obvious from the paper that the steel industry has failed to create an appreciable impact on the economy despite huge financial investment by the government. The poor performance should not, however, obscure the successes achieved in the sector through the learning process of industrial transformation and acquisition of transferred technology.

It is widely acknowledged that the development of the iron and steel industry creates a multiplier effect on other steel-consuming sectors of the economy. It also provides wider opportunities for employment generation because of its forward and backward linkages to other downstream industries. Therefore, maximum effects on the economy could be attained if development in the steel sector is based on indigenous resources. The government must be prepared to marshal out plans and programmes to tackle the operational constraints of the existing plants in order to improve their performance towards meeting domestic demands and minimizing dependency on imports. Efforts should be geered at improving the country's resource endowments as well as the necessary infrastructural services. By and large, the iron and steel industry has provided a solid base for a sound industrial take-off in Nigeria and there are good prospects for integral growth in the sector.

TABLE 1: STEEL MILLS IN NIGERIA

COMPANY/ LOCATION	CRUDE STEEL CAPACITY (T)	ROLLING CAPACITY (T)	PROCESSES	OWNERSHIP
1. ASC, Ajaokuta	–	1,090,000	BF	Fed. govt.
2. DSC, Aladja	1,000,000	320,000	DR	Fed. govt.
3. KSRM, Katsina	–	210,000	R	Fed. govt.
4. JSRM, Jos	–	210,000	R	Fed. govt.
5. OSRM, Oshogbo	–	210,000	R	Fed. govt.
6. ALLIED, Onitsha	–	20,000	R	Private
7. A. MANDARIN, Ikeja	–	60,000	R	Private
8. BROLLO, Onitsha	–	65,000	R	Private
9. CISCO, Ikeja	60,000	150,000	R	Private
10. CONTINENTAL, Ikeja	–	90,000	EAF/R	Private
11. FEDERATED, Otta	40,000	140,000	EAF/R	Private
12. GMS, Asaba	14,000	50,000	EAF/R	Private
13. KEW METALS, Ikorodu	–	20,000	EAF/R	Private
14. KWARA COMM; Ilorin	–	40,000	R	Private
15. MAYOR, Ikorodu	–	228,000	R	Private
16. NIG. SPANNISH, Kano	72,000	188,000	EAF/R	Private
17. NIGERSTEEL, Emene	–	50,000	EAF/R	State govt. /Private
18. QUA STEEL, Eket	–	100,000	R	State govt. /Private
19. SELLMETALS, Ikeja	–	60,000	R	Private
20. UNION STEEL, Oro	–	–	R	Private
21. UNIVERSAL, Ikeja	50,000	80,000	R	Private
TOTAL —	**1,236,000**	**3,241,000**		

Notes: BF = Blast Furnace, DR = Direct Reduction
EAF = Electric Arc Furnace, R = Rolling

SOURCES: 1. Atlas of African Industry, UNIDO, 1989
2. Igwe, 1986, p.80

TABLE 2: PROFILE OF STEEL WORKS IN NIGERIA, 1990
(Tonnes)

COMPANY	MAX. OUTPUT	TYPE	ACTUAL OUTPUT
INTEGRATED PLANTS:			
1. Ajaokuta Steel Company	1,300,00	Integrated	
	790,000	Rollng	
2. Delta Steel Company	630,000	Integrated	
	330,000	Rolling	130,000
INLAND ROLLING MILLS			
1. Jos Steel Rolling Co.			52,500
2. Oshogbo Steel Rolling Co.			52,500
3. Katsina Steel Rolling Co.			52,500
PRIVATE MINI-MILLS			
(16 Firms in No.)	1,230,000	Rolling	
	250,000	Crude Steel Making	

SOURCE: Federal Ministry of Mines, Power and Steel, 1991.

TABLE 3: SUMMARY OF CHARACTERISTICS OF NIGERIAN STEEL PLANTS

ITEM	ASC	DSC	SRM
1. Installed Capacity	Phase I: .1.3m MTA Phase II: 2.6m MTA Phase III: 5.2m MTA	1.0m MTA 2.5m MTA	210,000 MTA each 420,000 MTA each 720,000 MTA each
2. Production Process	BF/BOF Continuous Casting & Rolling Mill	DR/EAF Continuous Casting & Rolling Mill	Rolling Mills
3. Product	a) 320mm Light Section Mill: Angles, Bars, Hexogens, Squares, Rounds, etc. b) 150mm Wire Rod Mill Rods and Reinforcement Bars c) 700mm Medium Section Mill: Beams, Anglets, Channels, Bars, etc.	a) Concast Billets (120 x 120mm) b) Light Section Mill: Bars, Sized Rounds, Shapes, etc.	Wire Rods and Bars
4. Production Programmes	a) 320mm Light Section Mill: 400,000 MTA b) 150mm Wire Rod Mill: 130,000 MTA c) 700mm Medium Section Mill: 560,000 MTA	a) Concast Billets - Wire Rods - 660,000 MTA b) Light Section Mill: 300,000 MTA	a) Wire Rods: 420,000 MTA each b) Bars: 168,000 MTA each
5. Manpower Requirement	9,114	6,400	3,000
6. Commissioning Date	1983	1982	1982/83

Notes: BF = Blast Furnace; BOF = Basic Oxygen Furnace; MTA = Metric Tonnes per Annum; EAF = Electric Arc Furnace; DR = Direct Reduction

SOURCE: Industrialization in Nigeria, Handbook, 1992

TABLE 4: RAW MATERIAL REQUIREMENTS FOR STEEL PRODUCTION IN NIGERIA

(Metric Tonnes per Annum)

RAW MATERIAL	ASC	DSC	SRM	SOURCES
1. Iron Ore	2,135	1,500,000	–	Local/Foreign
2. Limestone	635,000	50,000	–	Local
3. Dolomite	265,000	65,000	–	Local
4. Coal	1,400	–	–	Local/Foreign
5. Refractory-clays	63,000	1,500	–	Local
6. Natural Gas	–	2,000,000m3	–	Local
7. Ferro-alloys				
a) Ferro-silicon	13,200	–	–	Foreign
b) Ferro-manganese	9,200	–	–	Foreign
8. Manganese	85,000	–	–	Foreign
9. Bauxite	13,000	–	–	Foreign
10. Alumina	650,000	250,000	–	Local/Foreign
11. Scrap	260,000	250,000	–	Local/Foreign
12. Billets	–	–	66,000	Local

SOURCE: Industrialization in Nigeria, Handbook, 1992

TABLE 5: STEEL CONSUMPTION IN NIGERIA (1978 - 1991)

(Metric Tonnes per Annum)

YEAR	TOTAL PRODUCTION	IMPORTS	STEEL CONSUMPTION
1978	186.0	1,282.0	1,468.0
1979	152.6	876.9	1,029.5
1980	141.0	1,798.6	1,939.6
1981	221.8	1,650.3	1,872.1
1982	443.9	1,185.3	1,629.2
1983	308.2	585.1	893.3
1984	357.0	409.9	766.9
1985	488.5	415.9	902.4
1986	377.5	264.1	641.3
1987	305.6	466.7	772.3
1988	367.2	518.8	886.0
1989	383.0	617.0	1,000.0
1990	409.0	891.0	1,300.0
1991	456.0	986.0	1,442.0

SOURCES: 1. Steel Sub-sector Study in Nigeria, Hatch Report, 1989

2. Field Survey (Jerome, 1993)

TABLE 6: PROJECTED STEEL DEMAND BY PHOENIX SERVICES

(Tonnes per Year)

YEAR	PROJECTED DEMAND
1990	1,300,000
1991	1,442,000
1992	1,732,800
1993	1,787,930
1994	2,033,100
1995	2,143,930
1996	2,294,005
1999	2,810,254
2005	4,217,435

SOURCE: Federal Ministry of Power and Steel, Lagos, 1991.

TABLE 7: PER CAPITA CONSUMPTION AND INTENSITY OF STEEL IN NIGERIA

YEAR	STEEL CONSUMPT. ('000 Tons)	GDP (=N= Mill.)	% CHANGE in STEEL CONSUMPT.	% CHANGE in GDP	POPN. (Mill)	PER CAPITA STEEL CONSUMPTION	STEEL INTENSITY
1981	1872.1	70.396	–	–	89.4	20.9	0.0266
1982	1629.2	70.157	-13.0	-0.3	92.4	17.6	0.0232
1983	893.3	66.390	-45.2	-5.4	95.4	9.4	0.0135
1984	766.9	63.006	-14.1	-5.1	98.6	7.8	0.0122
1985	902.4	68.916	+17.9	+9.4	101.8	8.9	0.0131
1986	641.3	71.076	-29.1	+3.1	105.2	6.1	0.0090
1987	772.3	70.741	+20.4	-0.5	108.6	7.1	0.0109
1988	886.0	77.752	+14.7	+9.9	112.3	7.9	0.0114
1989	1000.1	81.030	+12.9	+14.2	116.0	8.6	0.0123
1990	1300.0	90.800	+30.0	+12.1	119.9	10.8	0.0143
1991	1442.0	94.280	+10.9	+3.8	88.5	12.9	0.0153

SOURCES: 1. Steel Consumption from Hatch Report (1988) and Phoenix Nigeria Limited (1990)

2. GDP at 1984 Factor Cost from CBN Statistical Bulletin (1991)
3. Population figures from Nigeria's Principal Economic and Financial Indicators, Federal Office of Statistics and provisional result of 1991 population census.

TABLE 8: PRODUCT MIX DISTRIBUTION PATTERN OF NIGERIA'S STEEL PLANTS

STEEL PLANT	WIRE RODS AND COILS	OTHER BAR PRODUCTS	STRUCTURAL PRODUCTS	FLAT PRODUCTS	CAST PRODUCTS	TOTAL
1. ASC, Ajaokuta	130,000	150,000	250,000	–	–	530,000
2. DSC, Aladja	–	180,000	140,000	–	–	320,000
3. JSRM, Jos	124,100	85,900	–	–	–	210,000
4. KSRM, Katsina	124,100	85,900	–	–	–	210,000
5. OSRM, Oshogbo	124,100	85,900	–	–	–	210,000
6. MINI-MILLS	–	1,201,000	–	–	–	1,201,000
TOTAL	**502,300**	**1,788,700**	**390,000**	–	–	**2,681,000**

SOURCE: Jerome (1993) p.38.

TABLE 9: ROLLED STEEL PRODUCTION (1985 - 1988)

(Tonnes)

	COMPANY	ROLLING CAPACITY	1985	1986	1987	1988
1.	ASC, Ajaokuta	540,000	43,843	50,000	42,013	–
2.	DSC, Aladja	320,000	77,948	66,943	53,762	58,260
3.	JSRM, Jos	210,000	65,000	26,000	20,410	17,700
4.	KSRM, Katsina	210,000	70,000	70,000	42,050	35,000
5.	OSRM, Oshogbo	210,000	50,000	30,000	33,937	16,500
6.	ALLIED, Onitsha	20,000	8,000	3,500	2,000	2,140
7.	A. MANDARIN, Ikeja	60,000	2,000	3,000	6,000	5,000
8.	BROLLO, Onitsha	65,000	–	–	4,000	6,000
9.	CISCO, Ikeja	150,000	25,000	16,000	20,000	26,000
10.	CONTINENTAL, Ikeja	90,000	–	–	–	–
11.	FEDERATED, Otta	140,000	20,000	25,000	12,000	15,000
12.	GMS, Asaba	50,000	15,000	1,500	–	3,000
13.	KEWMETALS, Ikorodu	20,000	8,000	1,500	2,500	4,130
14.	KWARA COMM; Ilorin	40,000	–	–	2,440	3,000
15.	MAYOR, Ikorodu	228,0000	20,000	20,000	14,000	10,000
16.	NIG. SPANNISH, Kano	188,000	36,000	24,000	24,000	–
17.	NIGER STEEL, Emene	50,000	–	–	–	–
18.	QUA STEEL, Eket	100,000	18,000	9,000	5,777	920
19.	SELMETALS, Ikeja	100,000	–	–	5,000	18,000
20.	UNION STEEL, Oro	–	–	–	2,500	2,500
21.	UNIVERSAL, Ikeja	80,000	30,000	30,000	36,000	60,000
	TOTAL	**2,871,000**	**488,791**	**376,443**	**328,389**	**283,150**

SOURCES: Compiled from:

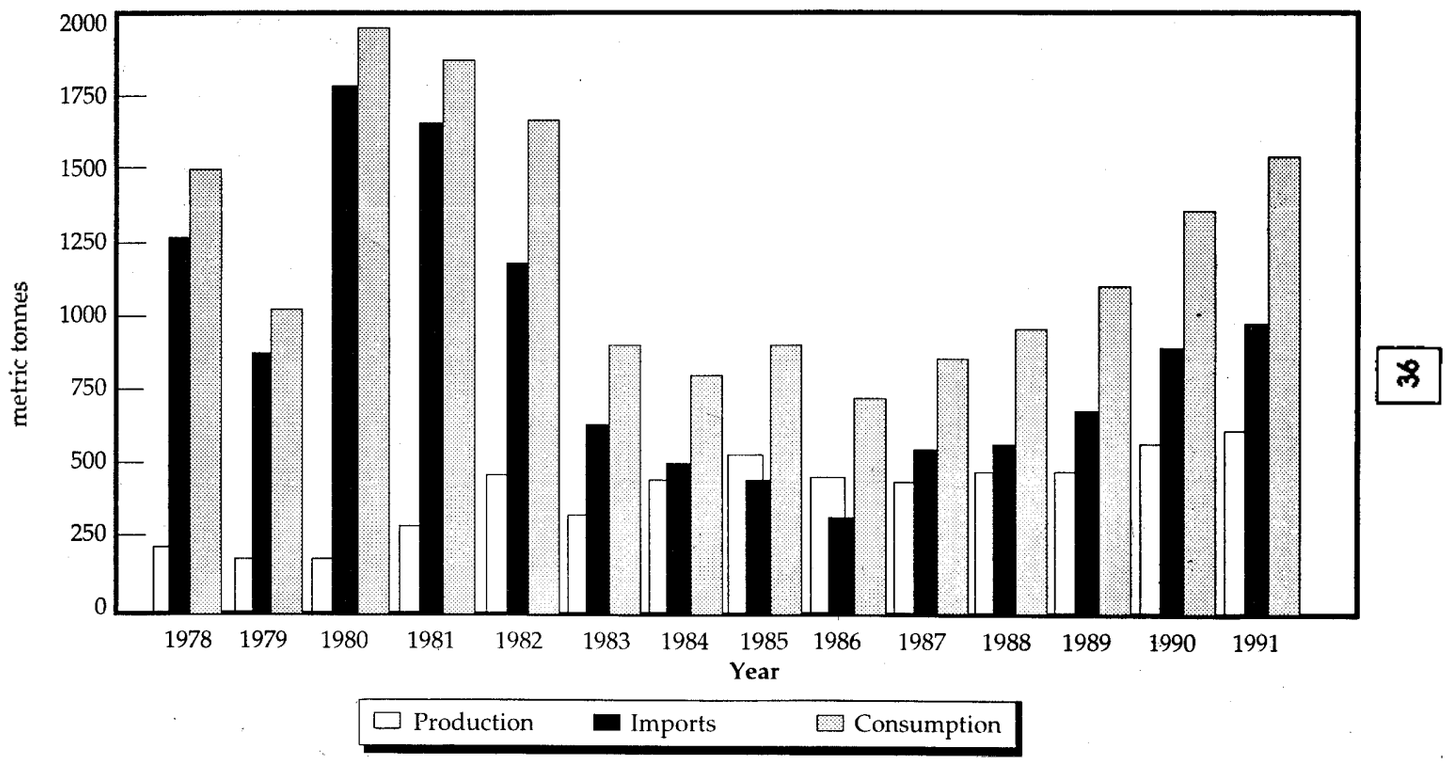
1. Atlas of African Industry, Iron and Steel, UNIDO, 1989.
2. Steel Sub-sector Study in Nigeria, Final Report, 1989, Federal Ministry of Mines, Power and Steel, Lagos.
3. Ajaokuta Steel Company, 1990 Calender.

TABLE 10: OUTPUT/CAPACITY UTILIZATION OF FEDERAL STEEL PLANTS (1989 - 1995)

	1989	1990	1991	1992	1993	1994	1995
1. Delta Steel Company							
a) Prod. (Tonnes)	–	189,371	136,867	87,334	49,356	52,351	38,522
b) Cap. Util. (%)	–	18.9	11.3	8.1	6.2	5.0	3.6
2. Jos Steel Rolling Mill							
a) Prod. (Tonnes)	19,220	20,385	11,746	8,203	1,440	10,578	12,062
b) Cap. Util. (%)	12.0	12.7	7.3	4.0	0.6	5.0	5.7
3. Katsina Steel R. Mill							
a) Prod. (Tonnes)	24,800	19,117	16,404	14,911	5,454	40,150	17,586
b) Cap. Util. (%)	11.8	9.1	7.8	7.1	2.6	19.1	8.4
4. Oshogbo Steel R. Mill							
a) Prod. (Tonnes)	20,182	18,467	19,982	23,280	10,081	9,420	10,921
b) Cap. Util. (%)	9.6	8.7	9.5	11.1	4.8	4.5	5.2
5. Nat. Iron Ore Mining Co.							
a) Prod. (Tonnes)	–	359,328	213,850	341,500	82,696	239,275	168,261
b) Av. Cap. Util. (%)	–	n.a.	n.a.	n.a.	3.9	2.7	2.0

SOURCE: Compiled from CBN Annual Reports (Various issues)

Steel consumption in Nigeria (1978 - 1991)



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