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TECHNICAL EFFICIENCY OF SMALL AND MEDIUM SCALE INDUSTRIES (SMI) IN NIGERIA: EVIDENCE FROM NATION-WIDE SAMPLE SURVEY

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ABSTRACT. Development economists over the years have solicited the use of small and medium industries (SMI) to accelerate the pace of industrialization and economic growth, particularly in developing economies. In recognition of this, entrepreneurship education and the promotion of entrepreneur spirit have received significant attention in Nigeria. This is evident through the deep involvement of government and Non-Governmental Organizations in recent times in the promotion and financing of SMI. In spite of all these efforts, the contribution of the SMI sector to economic growth has been miniscule, while the productivity of the sector has also not been commensurate with the incentives packages. This is essentially because the sector lacks knowledge of modern management techniques and technological capabilities. As postulated in the endogenous growth theory, factor accumulation is not enough to engender growth. Efficiency is a key driver of growth as it enables entrepreneurs to derive more output from a given input. This study lays emphasizes on the role of technological capabilities as an important catalyst for the development of SMI and technical efficiency as a major driver of capabilities. An assessment of technical efficiency in this way is necessary because, how technical efficiency contributes to enterprise productivity is a prerequisite to assessing the need for any kind of support for its development. The study utilizes quantitative information gathered from field survey to compute productivity and efficiency indicators. The study also identifies lingering constraints to SMI development. Overall, the findings from this research draw attention to the need for the development of local technology to support and stimulate indigenous entrepreneurship of SMI.

Key Words: Agrarian Economy, Factor Productivity, Technological Capabilities, Technical Efficiency, Endogenous Growth, Learning Mechanism

I. Introduction

Industrial development has been at the heart of Nigeria's economic programme since independence. Shortly after independence, the economic agenda of government was rapid structural transformation of the agrarian economy into a modern industrial one. Indeed, the import substitution strategy of the early 1970s, which was an extension of this agenda, was expected to inter alia drive industrialization.

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This was however not sustained and the aim of rapid industrialization was not realized. With the adoption of the Structural Adjustment Programme (SAP) in 1986, there was a renewed drive to promote industrial development through various incentives and policy pronouncements that would facilitate rapid industrialization and enhance export growth. Consequently, the Small and Medium Industries (SMI) were recognized as having the potential to play a dynamic role in industrial growth, particularly through its multiplier effects on macroeconomic objectives of economic growth, full employment, and income distribution as well as the development of local technology and the stimulation of indigenous entrepreneurship.

In implementing this strategy, the thinking was three fold. Firstly, SMI are more labour intensive than are large enterprises hence labour market distortions, particularly those accentuated by government policy tend to affect SMI less. If such distortion results in higher wages, through institutional factors or trade union activities, larger firms are likely to be more adversely affected. Secondly, larger firms tend to concentrate more in urban areas than SMI. With time, this concentration drives up costs and threatens to stifle the growth potentials of larger firms. By contrasts, widespread SMI growth could create many growth poles, which could serve as a basis for renewed sources of growth (Mazumdar, 2001). Finally, price incentives and the elimination of price and distribution distortions would elicit a speedy and sizeable response in private sector investment, particularly in the SMI.

Lesson of experience has however shown that the expected output growth of the sector has not been realized. The diffusion of managerial skills has not been observed, while the expected increase in productivity has not been commensurate with the level of incentives and other financial support given to them. It is clear that even though price incentives matter, other factors are also important in conditioning the speed and magnitude of output response. Consequently, in 2003, when government drew up a home grown economic programme, christened the National Economic Empowerment and Development Strategy (NEEDS), with private sector led growth as the main strategy, SMI again took centre stage. It is interesting to note that the NEEDS document further identified *"ineffective linkages between industry (SMI' and the larger enterprises) and the research institutes/universities" and "lack of engineering capacity to translate research results into finished goods and maintain existing machinery as well as low level of entrepreneurial capacity,…technological support,… and paucity of trained artisan skills"*, as major constraints to the development of SMI. The NEEDS document was invariably referring to the absence of technological capabilities, that is needed to leverage firm-level efficiency.

Technological capability comprises the skills and information to establish and operate modern machinery and the learning ability to upgrade the skills over time. These capabilities, which can be grouped into investment, production capabilities, and learning mechanism, is a veritable tool for determining firm productivity. Firm productivity, which is broadly measured using the concept of technical efficiency,

is known to shift firms output supply curves outwards and thus require both inter-sectoral allocation of resources towards lower domestic resource cost activities as well as movement within firm best practice production technologies. Both of these responses require managerial and workers technical effort and skills.

There are important policy issues, which have been documented in the lioterature, that arise in the context of analyzing efficiency of the SMI. First, raising efficiency is an essential condition for further industrial development. Second, relative efficiency between sub-sectors can help policy makers identify enterprises/sectors with the highest potential for meeting planned economic targets as well as provide inputs into government policies aimed at maximizing gains from targeted credit programmes or from technical assistance. Thirdly, it allows for linkages between small firms and large ones on one hand and between small firms and research institutions on the other hand. Fourthly, it has been observed that a large number of SMI stagnate in the smallest size classes and do not make the necessary transition into a medium or large size and the need to know why is compelling. Fifthly, for trade policy, the level of relative efficiency of SMI could indicate the ability of SMI to survive extensive trade liberalization. It also has implications for unfair competition from dumped, second-hand, fake, counterfeit, smuggled, and sub-standard goods from abroad. Lastly, an analysis of inter-firm variation in total productivity becomes easier.

In order to formulate a coherent strategy for the SMI sector, it is necessary to: understand the level of efficiency in the SMI; examine the constraints to efficiency; and articulate how the different constraints affect SMI performance. To do this, we designed a flexible survey instrument and administered it to selected owners and managers of SMI. This allows us to derive measures to aid in the assessment of the outcome of technical efficiency and also deploy the analysis in a comparative setting across different sectors. These objectives will help in designing effective incentive and assistance programmes that would foster long-term industrial and economic growth. Furthermore, since most SMI are entrepreneur-owned, focusing on them allows an evaluation of the extent to which personal attributes of owners significantly influence productivity.

Following this introduction, the paper is organized into six sections. Section II, explores contemporary conceptual and theoretical literature on the efficiency nexus of the relationship between SMI and economic growth. In section III, an overview of SMI in Nigeria is presented. Section IV, presents a discussion of the survey methodology, including instruments used, selection procedure and coverage. It also covers the analytical framework, while section V contains the analysis and major findings. Section VI concludes the paper with policy recommendations.

II. SMI, Technical Efficiency and Economic Growth

There is no universally acceptable definition for SMI. Every country sees SMI from perspectives that are peculiar to her. In particular, from the point of view of the role SMI play in economic development and from differences in the state of

industrial organization. According to the National Council on Industries (NCI), a small scale industry is a manufacturing enterprise with total cost (including working capital but excluding land cost) of above N1 million but not exceeding N50 million, with a labour size of between 11 and 100 workers. A medium scale industry, on the other hand, is one with total cost (including working capital but excluding land cost) above N50 million but not exceeding N200 million, with labour size of between 101-300 workers (Anyanwu, 2001).

Typically, SMI have unique characteristics. For instance, they are small in size, in terms of the labour employed and the financial resources required for their take-off and working capital. The capital is mainly generated from own or family sources and from the informal credit market. They are also largely entrepreneur owned and utilize low technological modes of production and management and often do not refer to any legal status. Furthermore, SMI are widely dispersed and make intensive use of mostly locally sourced raw materials.

There are three important arguments for the existence of SMI. The first is rooted in the labour absorptive capacity argument that SMI exist simply because the growth rate of the formal economy is inadequate to absorb the national labour force. The second is the labour creation argument, which explains how SMI can be used to create jobs. The third argument, is the poverty reduction argument. In this context, SMI is seen as a vehicle that facilitates pro poor growth and offer opportunity for better utilisation of indigenous resources. Indeed, the considerable low capital outlay requirement enables them to convert minimal resources into productive ventures and also offer veritable outlets for technological advancement especially in businesses with rudimentary technology requirements.

Since the 1970s and 1980s, when small scale industries came into prominence, their potential for growth has become more apparent. The age long view that lack of entrepreneurship was responsible for the low supply response of SMI has been discredited by the proliferation of informal sector industries comprising petty manufacturers with technical skills and attributes often associated with entrepreneurship: dedication, initiative, hard work, and readiness to jump at opportunities and to take risk (Schmitz, 1995). In developing countries with large informal sector, the importance of SMI and the upgrading of the informal sector are being advocated as a strategy for enhancing development and growth. The case for nurturing the SMI for growth becomes more apparent when one considers their labour intensive nature, income generating possibilities, capital-saving capacity, use of local resources and reliance on few imports, flexibility, innovativeness and strong linkages with other sectors of the economy (Inang and Ukpong, 1992; Pissarides et al, 2000; Anyanwu, 2001).

Beck and Levine (2003) studied the relationship between the relative size of SMI, economic growth, and poverty. Using a sample of 76 countries, they found a strong correlation between the importance of SMI and GDP per capita growth. Even though the relationship was not robust, the study concluded that the overall business environment as characterized by perfectly competitive market attributes,

sound property rights, contract enforcement influenced economic growth. Globalisation has also provided another avenue for the utilization of SMI as an instrument of growth. This is because with the apparent flexibility and adaptability of SMI, globalization creates opportunities for them to be beneficially involved in the global market for goods and services, including technology (Biggs et al, 1996).

In spite of these empirical evidences of their importance as instruments of development, many SMI in developing countries lack effective organization and knowledge of modern management techniques and low technological capabilities. Technological capabilities refer to the information and skills—technical, managerial and institutional—that allow productive enterprises to utilize equipment and technology efficiently (World Bank 1995). Technological capabilities are in a nutshell, the range of efforts that an enterprise must itself undertake in order to absorb and build upon the knowledge that has to be utilized in the production process. It also includes on the job training undergone by employees and the motivation mix employed by the enterprise to its workers in order to function as an organization.

There are basically three functional classifications of technological capabilities: namely; investment capabilities—the skills and information needed to identify feasible investment projects, locate and purchase suitable technologies, design and manage the plant; production capabilities which is the skills and knowledge needed for the operation and improvement of the plant; and learning mechanism, the dynamic element of technological capabilities enabling firms to change over time the level of investment and production capabilities.

Recent economic growth theories focus on technological capabilities as a major driver for economic growth. Subsequent development in the literature suggest that long run economic growth reflects sustained increases in firm productivity stemming from continuous accumulation of technological capabilities as witnessed in East Asia (Romer, 1986; Stokey, 1988). Theoretical models, in particular those of evolutionary economics, have also demonstrated that incremental technological accumulation can have a positive impact on firm- level efficiency and productivity (Hanusch and Hierl, 1992; and Caves and Barton, 1992).

Technological capabilities have significant positive effect on firm-level technical efficiency. (Krugman, 1979) in his model of technology gap brought in the possibility of technology diffusion to explain North–South trade. He argued that new technology is created in the North but get diffused to the South, the gap between the creation and diffusion creates the possibility of trade. He therefore assumed the existence of a certain imitative, adaptive or absorptive capability in the South to allow for diffusion of technological innovations. Other studies have also emphasized the centrality of technology in explaining firm competitiveness in the United States (Sveikauskus, 1983; Verspagen and Wakelin, 1993).

Studies on technological capability in developing countries are scanty. For instance, Kumar (1990) affirmed that technology variable such as intensity of R&D and technology imports were significant in explaining export performance. Nagesh

and Siddharthan (1994) studied inter-firm variation in export behaviour of some Indian enterprises, using a Tobit model. The study estimated with a three year panel data, confirmed that a firm's technological activity favourably influences its export behaviour only in medium and low technology industries. Studies on some African countries (Zimbabwe, Ghana and Kenya) show that investments in technology and worker training are both examples of a broad set of learning activities that firms undertake to increase their overall technological capabilities (Tyler 1995). Overall, technological capabilities actually enhance efficiency. In a related study, Adei (1987) examined joint venture with TNCs in the timber industry, in Ghana. The study found that the government took technology transfer and the building of national capacity for granted, very little indigenous technological capacity was developed within the firms and upon nationalization, output deteriorated. Building technological capacity requires not only training, but also preparing employees to perform strategic managerial, production, engineering, financial and marketing functions.

Boris et al (1997) studied the possibilities of production gains by improving the efficiency of small scale agriculture. Using an estimated stochastic production frontier to estimate a Cobb-Douglas production frontier, the empirical result showed that the level of technical efficiency stood at 70 per cent indicating a substantial output production and cost minimization at the existing level of technology. In a similar study Deraniyagala (2001) examined the effects of technology accumulation on firm-level technical efficiency in the Sri Lankan clothing and agricultural machinery industries, using cross-section survey data. Results showed that adaptive technical change had a significant and positive effect on efficiency in both industries. In addition, variables relating to technological skills and training also emerge as significant determinants of firm-level efficiency. Also, in Bagachwa (1992), the choice of technology was x-rayed for Tanzania, by evaluating the relative performance of small and large grain milling techniques. The paper discussed technology choice within the context of employment creation, output expansion, surplus generation, skill formation and resource use. The study found out that there exist economic viability of the small–scale milling sub-sector in terms of employment generation, effective utilization of capital and surplus generation, while flexibility of the sub-sector provided the impetus for the development of entrepreneurial capacity.

III. Overview of Initiatives and Support for SMI

Admittedly, the dynamics and behaviour of SMIs in Nigeria is not well understood. What is known, however, is that their contribution to GDP is about 30 per cent relative to the large population engaged in SMI activities and the 58 per cent employment generating capacity (Ukeje, 2003). Limited evidence suggests that they often face challenges, such as, economic, institutional and legal obstacles. These include; restricted access to working capital, long term credit, inadequate

physical infrastructure, low demand for goods, as well as limited managerial and technical expertise. In recognition of these challenges, government had over the years introduced various institutional arrangements and schemes, intended to enable firms' overcome them. The organized private sector has also made significant contributions to the development of the sector. These schemes together with the institutional arrangements are discussed below.

III.1 Government

Small-Scale Industries Credit Scheme (SSICS)

This programme was introduced in 1971 to serve as a revolving grant, which SMI could draw from on concessionary terms, compared to the prevailing conditions in commercial banks. However, the scheme was aborted as a result of mismanagement and abuses by the beneficiaries.

Nigerian Bank for Commerce and Industry (NBCI)

The NBCI was established in 1973, jointly, by the Federal Government and Central Bank of Nigeria as an apex institution for SMI financing. This was in recognition of the fact that the commercial banks' were not able to meet the financing requirements that would sustain the development of SMI. The NBCI also managed the special fund for SMI on behalf of the Ministry of Industry. Available data showed that out of the total loans of ₦710.5 million approved for SMI between 1980 and 1990, only ₦281.6 million was utilized. Factors adduced for this development were poor loan repayment and management abuse.

Central Bank of Nigeria (CBN) Special Credit Programme

In line with its developmental role, the CBN established this scheme in order to assist SMI access credit from the commercial banks. In the programme, the CBN instructed banks to allocate certain percentage of their total credit to SMI. This directive was consistent with the direct monetary policy framework adopted by the CBN at that time. The CBN also established other Development Finance Institution (DFIs) and schemes, with specific objectives of providing financial assistance to priority sectors of the economy which included the SMI. For instance, the CBN in 1997 assisted in establishing the Agricultural Credit Guarantee Scheme (ACGS). Under this scheme, the CBN guaranteed a maximum of 75 per cent of commercial banks loan disbursement to agriculture in any event of default by the beneficiaries. This was aimed at facilitating credit availability to the agricultural sector.

The Rural Banking Programme

The rural banking programme was introduced in 1977 with a clear mandate of lending, at the rural level, through the establishment, by commercial banks, of specified number of rural branches to be opened within a given period, given the fact that most of the SMI are located in rural areas. The aim was to mobilize deposits from these areas and channel them into productive activities and improve

rural access to the sources of formal finance. A total of 200 rural branches were allowed under the first phase of the programme, which ended on June 30, 1980, while 266 branches were allocated in the second phase, which ended on December 31, 1983. The third phase that began in August 1, 1985 increased the number to 300 branches and this phase was expected to end by July 31, 1989. However, the fourth phase of the programme was suspended following the deregulation of banking services that favoured voluntary establishment of rural branches.

Available data show that the rural banking programme did not mobilize substantial deposits. This was due to factors, such as, cumbersome procedure for loan application, the requirement that loan beneficiaries should have a bank account, the need for collateral, certificate of registration of company, tax clearance, and the filling of numerous application forms. These led to inconveniences as repeated calls had to be made to the banks, which in turn increased the transaction cost for borrowers. Thus, the banks were ineffective either in mobilising rural savings or in loan recovery and portfolio management and, thus, rural credit became grossly inadequate for financing SMI.

National Economic Reconstruction Fund (NERFUND)

The Structural Adjustment Programme (SAP) established in 1986, brought in its wake the liberalization of the financial sector and the adoption of indirect monetary control. Consequently, in order to ameliorate the difficulty in accessing loans by SMI, government established the NERFUND. The main objective was to provide soft loans of medium to long term nature to SMI at concessionary rates as well as provide assistance in terms of equipment acquisition from abroad with respect to the foreign exchange needs. The areas covered by the scheme were enterprises that are wholly owned by Nigerians in Agro –allied Industries, Mining and Quarrying, Equipment Leasing, etc. However, NERFUND was faced with some constraints, which hindered its proper execution of the scheme. This included the systemic distress experienced by the financing banks and the volatility of the exchange rate of the domestic currency.

Peoples' Bank of Nigeria

Established in October 1989, the Peoples' Bank of Nigeria was designed to extend credit to informal small scale enterprises at the grass root level. Available statistics indicate that as at end June 1992, a total of 169 branches were opened with loans, amounting to ₦102.6 million, granted to 181,061 beneficiaries. The programme was relatively successful because of the strategy of using "peer group" as a basis for granting loans. The advantage of this arrangement was that it served as a viable option to conventional collateral security demanded by the conventional banks. Despite this remarkable advantage, Peoples Bank experienced some problems, principal among which was inadequate financial resources to meet the enormous number of rural dwellers requesting.

Small and Medium Enterprises Equity Investment Scheme (SMEEIS)

The SMEEIS was set up by the Central Bank of Nigeria, as Small and Medium Industries Equity Investment Scheme (SMIEIS) in December, 1999 to provide long term finance to SME. It however became operational in June 2001.The objectives of the scheme were mainly to provide and facilitate flow of funds for the take up of new SME projects as well as expansion and restructuring of on going projects and to stimulate economic growth, develop local technology and generate employment. Banks under the scheme were expected to provide a portion of their previous year's profit annually for funding to SME in the form of equity investment or direct loan. Participating banks enjoyed benefits such as: dividend from the investment; capital gains at time of investment; tax exemption; and 100 per cent Investment tax credit in the year an investment is made under the scheme. A total of 83 banks under a syndication arrangement had set aside the sum of ₦20.7 billion, between June 2001 and September 2003, for funding the scheme. However, only 23.7 per cent of the total amount was invested and substantial amount was in the real sector activities. Though the scheme is at an infant stage, the pace of utilization of funds has been very slow.

Small and Medium Scale Enterprise Development Agency of Nigeria (SMEDAN)

The Small and Medium Scale Enterprises Development Agency (SMEDAN) was established in 2003 and charged with the responsibility of promoting and facilitating the development of programmes in the Small and Medium Scale Industries sub-sectors. In particular: initiating and articulating ideas for small and medium scale industries policy thrusts; promoting and facilitating development programmes, instrument and support services to accelerate development, modernisation, networking and linkage of small and medium scale industries; mobilizing internal and external resources, including technical assistance for small and medium scale industries, their support institutions; trade associations, and non-governmental organization; facilitating, promoting and developing of standard designs and quality assurance for machinery and equipment, and commercializing them to end-users; among others. It is however too early to give a thorough assessment of this scheme.

III.2 Private Sector

Deposit Money Banks (DMBs) Credit to SMI

Credit to the SMI by the Deposits Money Banks was on the increase under the direct monetary policy control regime, due mainly to the mandatory credit allocation to the sector. However, mandatory credit ceiling was abolished in 1996, while the level of credit disbursed to SMI remained stable up to 1999 with an upsurge in 2000. Conversely, in terms of proportion to the total credit of the banking system, the credit to SMI was on the decline. This showed that banks no

longer considered the SMI as viable. The core competence of commercial banks is not in long-term lending as SMI repayment gestation period is long term in nature. This factor together with risk aversion prevented many DMBs from greater participation in SMI financing.

World Bank Facility for Small and Medium Scale Enterprises

In order to further promote the growth of the SMI, the Federal Government in 1987 negotiated a World Bank facility. This facility, approved in 1989, was operated in the Central Bank of Nigeria, under the CBN SMI Apex Unit and was worth US$270 million. However, disbursement was very slow. The slow pace of the disbursement was as a result of lack of awareness due to inadequate publicity; People's Bank unwillingness to assume all the risk; unstable macroeconomic environment, among others. This affected the viability of the scheme, such that out of the 242 projects approved for financing only a little above 50 per cent of the value of the loan was executed.

Non-Governmental Organizations (NGOs)

Complimenting government's effort toward building a viable and productive small scale industrial climate, several NGOs have been set up. Prominent among them is the National Association of Small Scale Industrialist (NASSI). NASSI was founded in 1978 and aimed at; fostering the exchange of ideas and techniques on issues relevant to the development of Small Scale Industries (SSI); facilitating credit delivery to SSI; developing computer based information centers for assessing reliable economic data for the industry, among others. With over 20,000 members nation-wide, the activities of the association cover two broad industrial groups, namely, manufacturing, mining and processing and service groups. NGOs involved in the promotion of SMI also organize workshops aimed at providing information and education on how to manage small businesses. Other areas of intervention include training and retraining of prospective small scale business owners and post training support services.

IV. Survey Methodology

The design for eliciting responses from the owners or managers of SMI, using flexible questionnaires is presented below.

IV. 1 Survey Design

Scope, Frame, and Design

Using the international standard industrial (ISI) classification of manufacturing enterprises, eight sectors comprising food, beverages and tobacco (31); textile, wearing apparel and leather industries (32); manufacture of wood and wood products, including furniture (33); manufacture of paper and paper products, printing and publishing (34); manufacture of chemicals and chemical, petroleum, coal, rubber and plastic products (35); manufacture of non-metallic mineral products, except

products of petroleum and coal (36); basic metal industries (37); manufacture of fabricated metal products, machinery and equipment (38); were covered. A frame listing SMI was obtained from a combination of sources, including; the National Association of Small Scale Industries (NASSI) and the National Bureau of Statistics (NBS). This was complemented by the "baseline study" on small and medium enterprises of the CBN and from information obtained from the zonal offices of the CBN.

A two-stage random sampling design was adopted for this study. The first stage selects the states in the six geographical zones, while the second stage is the selection of the SMI from the eight ISI subdivisions. A total of twelve states, two from each of the six geopolitical zones in the country were selected out of the 36 states. In each of the states, two SMI from each of the eight sub-divisions were chosen. By this arrangement, a total of sixteen (16) SMI were covered per state, except for Lagos (24), because of the large number of SMI in that state. Thus, a total of 200 SMI were studied nation wide (see table 4.1).

Table 4.1

Survey Plan and Industry Classification*

State	31	32	33	34	35	36	37	38
Cross River	xx	Xx	Xx	xx	xx	xx	xx	xx
Rivers	xx	xx	xx	xx	xx	xx	xx	xx
Abia	xx	xx	xx	xx	xx	xx	xx	xx
Anambra	xx	xx	xx	xx	xx	xx	xx	xx
Lagos	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Oyo	xx	xx	xx	xx	xx	xx	xx	xx
Gombe	xx	xx	xx	xx	xx	xx	xx	xx
Bauchi	xx	xx	xx	xx	xx	xx	xx	xx
Kano	xx	xx	xx	xx	xx	xx	xx	xx
Kaduna	xx	xx	xx	xx	xx	xx	xx	xx
Plateau	xx	xx	xx	xx	xx	xx	xx	xx
Niger	xx	xx	Xx	xx	xx	xx	xx	xx

31. Manufacturing of Food , Beverages and Tobacco sector, 32. Textile, Wearing Apparel and leather industries,

33. Manufacturing of wood and wood products including furniture, 34. Manufacturing of paper products and printing and publishing, 35. Manufacturing of chemical and chemical products, petroleum, coal rubber and plastic products. 36. Manufacturing of non-metallic mineral products, except products ofpetroleum and coal, 37. Basic metal industries

1. Manufacturing of fabricated metal and products, machinery and equipment

Structured questionnaires were then administered to the sampling units (entrepreneurs or the heads of the firms) across the country. The questionnaire

focused on: name and location; age of SMI; employment, categorized into skilled and unskilled; training, to mirror research and development; educational status of entrepreneur; capacity utilization; use of capital, characteristics of entrepreneur; and external factors, such as effects of government policies.

IV.2 Survey Response

Four call backs were allowed for each SMI, after which such industry was declared as non-respondent. Consequently, a total of 174 questionnaires were successfully retrieved. The actual number of questionnaires retrieved by state and sector is given in table 4.2, below.

Table 4.2

Questionnaire Retrieval by State and Sub-sector

States	Number of Small and Medium Industries								
	Food	Textile	Wood	Paper	Chemicals	Non-Metals	Basic Metals	Fabricated Metals	Total
Abia	0	3	2	3	3	1	0	4	16
Anambra	1	1	2	2	0	0	1	1	8
Bauchi	2	1	4	2	0	1	4	0	14
Cross River	3	2	3	3	2	1	1	1	16
Gombe	3	2	3	2	2	0	2	2	16
Kaduna	2	1	2	4	1	0	1	4	15
Kano	3	1	2	1	0	0	3	0	10
Lagos	3	5	3	2	1	1	0	1	16
Niger	2	2	3	4	1	2	1	1	16
Oyo	5	1	2	2	2	1	1	2	16
Plateau	3	3	4	2	1	0	1	1	15
Rivers	4	5	2	1	0	0	3	1	16
Total	31	27	32	28	13	7	18	18	174

Table 4.3

Response Rate from the Survey of SMIs

States	No. of Questionnaires Administered	Response	Non-Response	Response Rate (%)
Abia	16	16	0	100.00
Anambra	16	8	8	50.00
Bauchi	16	14	2	87.50
Cross River	16	16	0	100.00
Gombe	16	16	0	100.00
Kaduna	16	15	1	93.75
Kano	16	10	6	62.50
Lagos	24	16	8	66.67
Niger	16	16	0	100.00
Oyo	16	16	0	100.00
Plateau	16	15	1	93.75
Rivers	16	16	0	100.00
Total	200	174	26	87.00

IV.3 Analytical Framework

A descriptive analysis is carried out across sectors, using standard ratios as well as percentages. The aim of the analyses is to examine the determinants of technical efficiency in the SMI along major industry attributes and inputs and thereafter quantify the outcome. This is because systematic technical efficiency differences can be highlighted along major firm dimensions.

Industry Attributes include: size, age of firm and entrepreneur, capacity utilization, training, sources of input use in production, ownership, and ethnic background. Examining firm attributes in these areas are important for several reasons. For instance, larger firms have better penetration in the market and can exploit economies of scale. Studies have shown that technical efficiency increases with firm size (Gumbau-Albert and Maudos, 2002). However, larger firm may also have the problem of keeping the units, hence undermining efficiency. The effects of age on efficiency have been documented even though ambiguous. A positive relationship can be due to learning by doing, which occur with cumulative production experience. The negative impact can be due to old capital equipments (Deraniyalaga, 1999). A sector-wide analysis of firms is considered because there could be positive effects predicted on the grounds of scale economy and the availability of financial resources to invest in skills and technologies. Assessing capacity utilization rate, while examining firm-level technical efficiency, has been very useful in adjusting for the quality of capital and labour (World Bank, 1995).

Efficiency levels are also determined by knowledge and skills and enhanced by a process of learning over time. It may originate from the ownership structure of the firm—foreign linkages can facilitate flow of knowledge and technical progress. Thus, the amount firms invest in new technology is closely related to how much they invest in training. There are sectoral differences in the training of workers such that some industry sectors, because of the peculiarities of their production process require more skilled labour and spend more on research and development. On the other hand firms may be reluctant to invest in training if turnover is high as training itself may contribute to employee turnover (poaching). Also, employers train workers who are trainable. For instance skilled workers have more training than unskilled workers (Lynch 1994). Lastly, training depends on the amount and quality of education workers received before entering the work force.

When markets are characterized by high transaction costs, as is the case in developing countries, a firm's reputation and legitimacy, i.e the degree to which the firm is socially recognized and accepted in the business environment, facilitates a firm's access to scarce resources e.g. credit, foreign exchange, imported spare parts, licenses, skilled labour, etc. (Sleuwaegen, Goedhuys, 2002). Issues such as ownership or formal status of the firm, therefore becomes important.

Technical efficient production is defined as the maximum quantity of output attainable from given inputs. We quantify the inputs and output into the production and development process in terms of labour, capital, and use of technology.

Thus, employment, investment, working capital, cost of production, value of production, value added, etc. are examined. The outcome of an efficient production process is then evident in the productivity of the industry. Thus, ratios mimicking the characteristics of factors of production, namely, factor productivity, factor intensity, and incremental factor ratios, are calculated. Sector specific disparities in these measures, are of interest to planners.

There are policy constraints facing most SMI. These policies hinder their ability to assess financial resources and thus their ability to expand production. The effect these policies have on the performance and efficiency of SMI are also examined in this analysis. In the next section, a detailed discussion on the results of the analyses from the responses obtained from SMI is presented along the major characteristics discussed above.

V.Results and Major Findings

Firm Attribute

Age of Firm

Firm or industry age is a very important determinant of technical efficiency. Respondents were asked to indicate how long their SMI have been in operation. The different ages were grouped into classes of five-year intervals and the proportion of industries as a total of all industries in each of the sectors belonging to the different age categories were calculated. The results presented in table 5.1. The oldest firms are mostly manufacturers of non-metallic mineral products. This comprises manufacturing of non-metallic mineral products, 57.1 per cent of this type of industry has been in existence for more than 20 years. Following closely, with age of above 20 years are the paper and chemical industry. The youngest SMI is textile. Whether this is capable of inducing efficiency due to learning-by-doing would be gleamed from the output and productivity of the industry.

Ownership and Ethnic Background of Entrepreneurs

On the ownership structure of SMI (Table 5.2), a larger proportion of SMI are individually owned, accounting for almost 65 percent of respondents assessed. About 21 percent are family owned industries, while 13 percent pool resources together to start the business. The table also shows that 47 percent of the entrepreneurs are operating in their places of origin, while 53 percent operate as non-indigenes. These results have implications for technical efficiency. This is because operating in the area of origin is believed to enhance reputation and legitimacy and therefore the degree to which the firm is socially recognized and accepted in the business environment. This may make it easier for the firms to access credit necessary for investment.

Table 5.1

Proportion of SMIs in Different Age Category by Sector

Sector	Age (Years)				
	< 5	5-10	10-15	15-20	> 20
Food	23.3	20.0	16.7	13.3	26.7
Textile	22.2	33.3	25.9	7.4	11.1
Wood	9.7	16.1	29.0	22.6	22.6
Paper	7.1	25.0	14.3	14.3	39.3
Chemicals	15.4	23.1	23.1	7.7	30.8
Non-Metal	28.6	0.0	0.0	14.3	57.1
Basic Metal	23.5	17.6	17.6	11.8	29.4
Fabricated Metal	11.1	16.7	16.7	33.3	22.2

Table 5.2

Ownership of SMI and Ethnic Background of Entrepreneurs

Type of Ownership	Number	% of Total
Family	35.00	20.47
Group	22.00	12.87
Individual	110.00	64.33
Others	4.00	2.34
Total	**171**	**100**
Ethnic Background	**Number**	**% of Total**
Indigene	81.00	47.37
Non- indigene	90.00	52.63
Total	**171**	

Training and Educational Level of Entrepreneurs

As indicated in table 5.3 below, of all the various types of training indicated, most SMI entrepreneurs place a greater emphasis on "learning by doing" otherwise called, "on the job" training, which accounts for 73 percent of responses. Only about 12 percent of employees in SMI benefit from in-house training. Most SMI workers do not benefit from external training (8 per cent). Research and development, which exposes workers to current developments in the industry and a critical factor

in enhancing technological capabilities, paving the way for further improvement of existing production methods, was the least utilized source of training. The need for training, particularly formal training is more compelling if SMI in Nigeria are to reach internationally competitive skill proficiency. The lack of adequate training may result in lower technical efficiency. Overall, the survey revealed that the proportion of workers trained to the total number employed in the SMI was a miniscule 1.3 per cent.

The amount firms invest in new technologies is also influenced by the level of education of entrepreneurs. This suggests that there are likely to be variations in the implementation of technical change and is also an important factor capable of enhancing technical efficiency. The responses, which are also summarized in table 5.3, showed that most SMI were run by entrepreneurs who possess secondary (43.8 percent) and tertiary education (36.84 percent). With this prevailing level of education, SMI entrepreneurs are not positioned to at least improve and update production techniques and to adopt more efficient production methods.

Table 5.3

Training and Level of Education of Entrepreneurs in SMI

Type of Training	Number Trained	% of Total	Number of Entrepreneurs	% of Total
On the Job	2,549	73.26	63.00	36.84
In-house	447	12.85	75.00	43.86
Outside	279	8.01	28.00	16.37
Research & Dev.	205	5.88	5.00	2.92
Total Trained	3,480		171	
Total Employed	261,201	1.33		

Investment Capabilities

Investment capabilities determine the acquisition and installation of new technology and raw materials. It is also related to the sources from where such equipments and materials are purchased. This is because identifying the source of equipment requires some knowledge about its use, while installation would require some knowledge about the suppliers. Table 5.4 distinguishes between foreign and local technology sources. Analysis shows that for most industries, apart from those in the fabricated metal, non-metal, and chemicals sectors, local sources dominate. The dominance of foreign sources for fabricated metals, non-metal and chemicals is quite understandable given the type of equipments required for production. For most sectors, the use of local source of equipments increased between 2004 and 2005.

Table 5.4

Sources of Equipments/Raw Materials for SMI by Sector (%)

Sector	Foreign		Local	
	2004	2005	2004	2005
Food	32.42	43.75	67.58	56.25
Textile	32.81	28.75	67.19	71.25
Wood	27.65	27.88	72.35	72.13
Paper	32.58	36.79	67.42	63.21
Chemicals	55.13	54.60	44.87	45.40
Non-Metal	60.20	55.60	39.80	44.40
Basic Metal	41.67	37.98	58.33	62.02
Fabricated Metal	60.28	51.56	39.72	48.44

Effect of Government Policy

Government generally acknowledges the conventional wisdom that the promotion of growth is inched on a conducive macroeconomic environment within, which the private sector can flourish. Such a friendly environment is engendered by consistent policies that can have profound effects on the development of SMI. Respondents were asked to rank government macroeconomic policies as it affects their operations. Three major policy areas were considered. They include; monetary policy, fiscal policy and external sector policy. Table 5.5 summarizes the findings.

Interest rate, price stability, and exchange rate were ranked highest in terms of their effect on the way SMI do business. This is not surprising as these are key determinants of real interest rates, which could provide the incentive or des-inventive to invest. CBN development policies, particularly those of SMEEIS, have also been very beneficial to SMI as confirmed by 52 per cent of respondents, while 47 per cent of respondents ranked this policy low. This reflects narrow coverage the policy has enjoyed since its inception. With respect to fiscal policy, lower tax rates, particularly on profits, allows firms to retain some earnings, help them in increasing investment, more so since most of the capital for investment as seen earlier are from own funds. Respondents considered the effect of taxes highest on their ranking of fiscal policy. Infrastructural policy, which facilitates business transaction and minimizes the costs of business also ranked high as indicated by 64.6 per cent of respondents. Respondents did not consider subsidies as important to their operations. Only 35.3 per cent of them considered subsidies as capable of increasing their capacity to produce.

External sector policies dealing with trade (imports and exports) are important as SMI require foreign inputs of raw materials and component parts for their operation. However, respondents ranked import incentives higher than export incentives. This is a reflection of the dominance of production for domestic consumption in the Industry.

Table 5.5

Effect of Government Policies

Monetary Policy	High	% of Total	Low	% of Total	Stable	% of Total	Total
Interest Rate	154	91.12	9	5.33	6	3.55	169
Exchange Rate	149	92.55	5	3.11	7	4.35	161
Price Stability	97	75.19	21	16.28	11	8.53	129
Dev. Policy	73	52.52	47	33.81	19	13.67	139
Fiscal Policy	**High**	**% of Total**	**Low**	**% of Total**	**Stable**	**% of Total**	**Total**
Taxes	145	86.83	3	1.80	19	11.38	167
Subsidies	53	35.33	88	58.67	9	6.00	150
Infrastructure	106	64.63	43	26.22	15	9.15	164
External Sector	**High**	**% of Total**	**Low**	**% of Total**	**Stable**	**% of Total**	**Total**
Imports incentive	102	79.07	22	17.05	5	3.88	129
Exports incentive	38	33.93	67	59.82	7	6.25	112

Industry Input

Employment

Using the sampling frame of SMI classified according to the eight industrial sectors, we estimated the total number of workers employed in the SMI to be 261,201. Sectoral analysis of total employment in the SMI (Table 5.6) shows that majority of workers, 19 per cent, are found in the paper, wood and food sectors. This is expected as these industries are mostly labour intensive. Fabricated and non-metal sectors have the lowest employment share at 5.29 and 8.06 per cent, respectively. With a complete frame of SMI, it would be interesting to see what this means in terms of nation-wide employment. However, employment statistics is a rarity in Nigeria.

Table 5.6

Estimate of Employment in the SMIs in Nigeria (2005)

Sectors	Number	% of Total
Food	42,966	16.45
Textile	28,388	10.87
Wood	49,871	19.09
Paper	50,638	19.39
Chemicals	27,621	10.57
Non-Metal	21,054	8.06
Basic Metal	26,853	10.28
Fabricated Metal	13,810	5.29
Average per Sector	**32,650**	
Total	**261,201**	

Investment

Investment in physical capital means the purchase (and thus the production) of capital goods - goods which are not consumed but instead used in future production. This also represent the efforts firms put in place to enhance their technical efficiency. Table 5.7 shows that investment in physical capital, irrespective of its source, declined for the paper, non-metal, and basic metal sectors and was high for food, fabricated metal, and textile sectors, between 2004 and 2005. As a proportion of total investment, the food sector dominated with more than half of total investment being concentrated in that sector. In terms of growth, considerable decline was witnessed in the paper, non-metal, and basic metal sectors.

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Table 5.7

Small and Medium Industries Investment by Sector

Sector	Amount (N'000)	Amount (N'000)	Growth in Investment (%)
	2004	2005	
Food	402,559.73	521,900.05	29.65
Textile	142,079.91	202,585.70	42.59
Wood	110,506.59	121,632.45	10.07
Paper	-7,893.33	-13,070.32	65.59
Chemicals	71,039.95	111,628.42	57.13
Non-Metal	-86,826.61	-131,431.00	51.37
Basic Metal	-88,386.97	-102,354.00	15.80
Fabricated Metal	165,759.89	203,173.00	22.57
Total	708,839.17	914,064.30	

Working Capital

Access to finance has long been recognized as a major constraint to SMI, particularly in purchasing new equipments or adopting new technology. Entrepreneurs sometimes rely on their own savings or finance from family members. Because of their weak financial base and high transactional costs, attracting loans as working capital is difficult. The study examined the size of working capital for each sector. Working capital here refers to that part of capital financed from long-term funds. The result is shown in tables 5.8. High content of foreign equipment inevitably require a lot of money. This probably explains the observed similarity in the responses for sourcing of equipments and working capital. Indeed, sectors with high foreign equipment source tend to have a much higher working capital. Thus, working capital as a proportion of total working capital, seem to be higher for food and chemicals industries.

Table 5.8

Average Working Capital of Small and Medium Industries by Sector

Sector	2004		2005	
	Amount (N'000)	% of Total	Amount (N'000)	% of Total
Food	222,698.30	38.07	250,513.30	48.93
Textile	8,737.59	1.49	8,055.93	1.57
Wood	13,621.19	2.33	12,746.90	2.49
Paper	13,553.89	2.32	15,835.11	3.09
Chemicals	256,119.85	43.78	156,147.00	30.50
Non-Metal	15,250.00	2.61	14,885.71	2.91
Basic Metal	38,107.41	6.51	36,773.00	7.18
Fabricated Metal	16,911.36	2.89	17,068.45	3.33
Total	584,999.60	100.00	512,025.40	100.00

Operation

The cost of operation represent the total amount of money (or the monetary value of goods) spent in the cause of running the industry. Admittedly, the cost of operation differs from industry to industry, depending on managerial, cost and technical efficiency and also on the location of the industry. A high cost of operation may also be due to exogenous factors like infrastructure deficiency, government policy. Tables 5.9 shows the average cost of operation by sector. The cost of operation was higher for the food sector at 54.35 and 54.31 per cent for 2004 and 2005, respectively. The lowest cost of operation was in the wood sector, at 1.65 per cent. This result is not entirely surprising since production in this sector requires that physical infrastructure be adequate.

Table 5.9

Average Cost of Operation of Small and Medium Industries by Sector

Sector	2004		2005	
	Amount (N'000)	% of Total	Amount (N'000)	% of Total
Food	154,840.80	54.35	175,870.23	54.31
Textile	5,799.04	2.04	6,684.26	2.06
Wood	4,638.00	1.63	5,332.77	1.65
Paper	6,982.11	2.45	8,239.71	2.54
Chemicals	35,344.77	12.41	41,548.43	12.83
Non-Metal	15,374.29	5.40	16,580.00	5.12
Basic Metal	33,807.06	11.87	37,106.59	11.46
Fabricated Metal	28,099.22	9.86	32,435.97	10.02
Total	284,885.28	100.00	323,797.97	100.00

Inventories represent capital tied up in unsold goods. If large stock of raw materials, work in progress, and finished goods are not required, industries do not necessarily have to hold large inventories. The surveyed SMI were asked to provide information on the value of inventories held by them. Table 5.10 summarizes this result. Inventories held in paper, textile, and Non-metal industries were less than 10 per cent, each, of total inventory. These industries manufacture products that, in most cases, require little inventory. For these products, it is either customers are willing to wait for production to be completed before taking delivery, since there are no half products or raw materials do not necessarily arrive in batches to warrant a break in production.

Table 5.10

Average Inventory of Small and Medium Industries by Sector

Sector	2004		2005	
	Amount (N'000)	% of Total	Amount (N'000)	% of Total
Food	42,615.68	14.95	61,004.67	18.76
Textile	10,435.96	3.66	18,247.33	5.61
Wood	32,353.81	11.35	36,449.29	11.21
Paper	11,725.14	4.11	15,736.64	4.84
Chemicals	63,809.53	22.38	74,809.32	23.01
Non-Metal	45,112.43	15.83	24,869.29	7.65
Basic Metal	49,409.94	17.33	51,146.59	15.73
Fabricated Metal	29,593.89	10.38	42,918.83	13.20
Total	285,056.39		325,181.96	

Industry Output

Value of Production

The value of production in the different activity sectors of the SMI is an important factor to consider, not just from an academic view point, but also for policy related issues. This is because for efficient industries, maximum output is expected from a given input. Tables 5.11 present the value of production of SMI by sector. As a proportion of total production, the food sector outperformed the other sectors in terms of output. This value increased from 29.45 per cent in 2004 to 30.49 per cent in 2005. Declining output was witnessed in the other sectors except for wood and chemical sectors, which recorded marginal increases.

Table 5.11

Value of Production of Small and Medium Industries by Sector

Sector	Output (N'000)		Average Per Sector (N'000)		Percentage of Total	
	2004	2005	2004	2005	2004	2005
Food	3,431,073.63	4,120,497.30	127,076.80	152,611.01	29.45	30.49
Textile	319,030.00	371,722.00	13,292.92	15,488.42	3.08	3.09
Wood	666,400.00	792,347.70	21,496.77	25,559.60	4.98	5.11
Paper	792,713.00	907,600.00	27,334.93	31,296.55	6.34	6.25
Chemicals	1,380,113.00	1,842,380.00	92,007.53	122,825.33	21.32	24.54
Non-Metal	261,900.00	177,380.00	37,414.29	25,340.00	8.67	5.06
Basic Metal	1,363,924.00	1,543,181.00	80,230.82	90,775.35	18.60	18.13
Fabricated Metal	684,669.00	770,265.00	32,603.29	36,679.29	7.56	7.33
Total	**8,899,822.63**	**10,525,373.00**	**431,457.35**	**500,575.55**		

Value Added

Value added measures the contribution of an industry to gross output. The result presented in table 5.12 shows, as expected, that value added or net output was higher for food and chemical sectors than most of the sectors. As a proportion of total value added, food recorded 29.7 per cent, closely followed by chemicals and paper sectors at 28.8 and 12.0 per cent, respectively. This pattern was the same in the previous year. However, while slight decreases or increases were witnessed in most sectors between 2004 and 2005, there was a sharp decline in value added for non-metal, basic metal, and fabricated metal sectors, while there was a sharp increase for the chemical sector.

Table 5.12

Value Added In Small and Medium Industries by Sector

Sector	2004		2005	
	Value Added (N' 000)	Percentage of Total	Value Added (N' 000)	Percentage of Total
Food	688,591.00	26.71	920,264.61	29.71
Textile	238,288.00	9.24	262,735.00	8.48
Wood	169,496.32	6.57	215,357.20	6.95
Paper	366,666.00	14.22	372,698.00	12.03
Chemicals	461,131.60	17.89	894,541.37	28.88
Non-Metal	186,850.00	7.25	89,130.00	2.88
Basic Metal	181,885.00	7.05	133,491.00	4.31
Fabricated Metal	285,357.00	11.07	209,729.00	6.77
Total	**2,578,264.92**	**100.00**	**3,097,946.18**	

Average capacity utilization rate, overall, was above 50 per cent for the SMI. However, capacity utilization was higher for the basic metal sector than every other sector in 2004 and 2005. The food sector was next at 61 and 60 per cent. This result, shown in table 5.13, is not very encouraging as a huge capacity is still left unutilized. The result apart from having implications for the output of the industry also is indicative of the level of efficiency of technology. **Error! Not a valid link.**

Table 5.13

Capacity Utilization (%)

Sector	2004	2005	Average
Food	61.07	60.36	60.72
Textile	59.95	60.15	60.05
Wood	53.03	54.14	53.59
Paper	60.22	57.38	58.80
Chemicals	52.98	55.83	54.41
Non-Metal	50.42	49.17	49.79
Basic Metal	69.75	64.38	67.06
Fabricated Metal	55.19	59.01	57.10
Average	**57.83**	**57.55**	**57.69**

Industry Outcome

Factor Intensity and Productivity[3]

Capital intensity is the term used to describe the amount of fixed or real capital present in relation to other factors of production, especially labor. Since the use of tools and machinery makes labor more effective, rising capital intensity (or "capital deepening") pushes up the productivity of labor. Therefore it is assumed that an industry that is more capital intensive tends to be more efficient over the long run than one with low capital intensity. The degree of capital intensity is measured simply as the ratio of the total money value of capital equipment to the total amount of labor hired. Productivity on the other hand is the amount of output created (in terms of goods produced or services rendered) per unit input used. Capital productivity is the output per unit of capital goods employed, the inverse of the capital/output ratio. Labour productivity is typically measured as output per worker or output per labour-hour. Since productivity is related to the concept of efficiency, which is the amount of output produced relative to the amount of resources (time and money) that go into the production, all things being equal, it

[3] Comparable estimates for Zimbabwe (2042, 3734, 1.92); Kenya (2612, 2200, 1.41) and Ghana (430, 507, 1.28). See The World Bank, 1995.

benefits a business to improve productivity, which over time lowers cost and (hopefully) improves ability to compete and make profit. Table 5.14 below shows factor intensity and productivity across sectors in 2004 and 2005.

Table 5.14

Selected Indicators of Efficiency in the SMI by Sector

Sector	Capital Intensity K/L (N'000)		Labour Productivity Y/L (N'000)		Capital Productivity Y/K	
	2004	2005	2004	2005	2004	2005
Food	2648.21	3580.17	6126.92	7358.03	2.31	2.06
Textile	4313.34	4860.87	862.24	1004.65	0.20	0.21
Wood	1781.02	1968.15	1025.23	1219.00	0.58	0.62
Paper	2446.59	2426.79	1201.08	1375.15	0.49	0.57
Chemicals	2655.94	2966.02	3833.65	5117.72	1.44	1.73
Non-Metal	1280.70	905.19	748.29	506.80	0.58	0.56
Basic Metal	3185.74	2893.30	3896.93	4409.09	1.22	1.52
Fabricated Metal	3771.87	4900.61	3803.72	4279.25	1.01	0.87
Average	**2760.43**	**3062.64**	**2687.26**	**3158.71**	**0.98**	**1.02**

Capital intensity was highest for the textile, fabricated metal, and food sectors. Non-metal and wood sectors recorded the least capital intensity. However, non-metal, basic metal and fabricated metal sectors witnessed decline in capital intensity. With respect to factor productivity, labour was more productive in the food, chemicals, fabricated metal, and basic metals sectors. Capital, on the other hand, was more productive in the food, chemicals, and basic metal sectors. Overall, the result confirms the fact that higher capital intensity tended to be associated with high labour productivity. Thus, in the long run, capital intensive industries may be more efficient than those with low capital intensity.

Incremental Capital-Output Ratios

Efficiency of production could be determined by the incremental capital-output ratio (ICOR). The ICOR can be thought of as a measure of the inefficiency with which capital is used. The value of this ratio could be equal to, less than or greater than one, representing constant, increasing or decreasing marginal return to scale, respectively. Consequently, the higher the value of the ICOR, the lower would be the productivity of capital. In table 5.15 below, these ratios, are presented. Textile sector recorded the highest ICOR, at 3.8, followed by fabricated metal and non-metal sectors. These results, are consistent with those of table 5.14, and are indicative of low productivity/decreasing marginal return to scale in these sectors. The food, wood, and chemical sectors recorded low ICOR, while the rest of the sectors recorded negative ICOR. The average ICOR for all the sectors was 1.13. This is very close to one, implying constant return to scale. This result highlights the potential high gains from economy of scale in the SMI if technically efficient.

V.2. Summary of Major Findings

The result of the analysis from the survey of SMI provides a number of interesting findings. The relationship between firm age and technical efficiency remains inconclusive. As earlier postulated, a positive relationship is said to be due to learning by doing, which occur with cumulative experience, while the negative impact may be due to old capital equipments. Overall, the study revealed that all the SMI apart from textiles industries have been in existence for more than 20 years, albeit with inter-sector variations. The result suggests that non-metal, paper, and chemical sectors which have over 30 per cent of industries in this age bracket may be more efficient when cumulative learning experience is considered. They may however be less efficient when viewed from the negative impact of old capital equipments. Intra-sector age variability was consistent with this result as it indicated a large concentration of old industries in the above-mentioned sectors.

Investment in skills and technology are important in enhancing efficiency. Training is important if firms are to attain optimal output. However, efforts inside the firm to promote learning seemed to be geared more towards on the job training for most of the industries. Research and development was very minimal. High level of education, in relevant fields, is crucial for assessing information on products, markets, technology, and improving efficient use of equipments. However, majority of the entrepreneurs in the SMI possess basic secondary school certificate as their highest level of education. The impact of skills in promoting efficiency via learning by doing may seem not to favour industries that invest minimally in training and research and development.

Generally low investment in physical capital was observed, even though there was considerable growth in some sectors when compared to previous years. Investment was high in the food, fabricated metals and textiles sectors, while investment capabilities were high in the fabricated metal, non-metal, and chemicals sectors, particularly with the high foreign content of production in these sectors. The use of foreign sources of equipments and materials enhances the possibility for technological transfer, which in turn enhances technological capabilities for the industries in those sectors. There was an association between input source and working capital. Thus, working capital was observed to be highest for the SMI with high foreign inputs. This reflects the huge resources required for the maintenance of equipments and the purchase of spare parts. With respect to cost of operation, the food sector was also dominant when compared to all other sectors. Sectors with huge cost of operation were also observed to keep large inventories of goods. This allows them to keep up production, minimize cost and reduce the risk of price volatility.

The above deductions are consistent with the output and factor outcome of the industries within the sectors. For instance, in terms of value of production and value added, sectoral analysis indicated that the food, textile, and chemicals sectors recorded high value added to production. Conversely, the survey showed sharp decline in value added for non-metal, basic metal and fabricated metal sectors.

There is also a consistency in the relationship between capital intensity and labour productivity. For instance, capital intensity, which was highest in food, textile, and fabricated metal sectors, was associated with high labour productivity in these sectors. Capital was also more productive in the food sector. An industry that is more capital intensive and productive tends to be more efficient over the long run than one with low capital intensity, which over time lowers cost and (hopefully) translates to improvement in the ability to compete and make profit.

Overall, the analyses suggest that the food sector is the most productive sector. It is therefore not surprising that all the parameters for gauging efficiency as well as output were positive in this sector. For policy, the high level of factor productivity in this sector implies that there are no limitations to the scope in exploiting economies of scale.

VI. Recommendation and Major Conclusions

VI.1. Recommendations

Role of Government

A government that is desirous of an orderly development of SMI would need to make policies and design strategies that would support access to resources, creation of market opportunities, the development of entrepreneurial and managerial skills, and competition. These issues are discussed hereunder.

Macroeconomic Environment

Complementing the workings of the markets and removal of structural rigidities through appropriate macroeconomic policies, such as monetary, exchange rate, fiscal, and structural policies are essential for the development of SMI. Consequently, government should ensure that the policy of maintaining a low interest rate regime should continue in order to encourage investment in the SMI. Availability of foreign exchange is also important to enhance the ability of SMI to source for raw materials, spare parts, and finance new technology. Furthermore, reducing the complexities of the tax system and streamlining the different categories of taxes would exert fewer burdens on entrepreneurs in terms of cost and time.

Trade Liberalization

Government long term trade policies should address issues like SMI infant industry protection from dumping of competing imported goods. Lower tariffs for imported raw materials and import quotas or outright ban would boost the development of SMI.

Financial Deepening

The strengthening of the financial system has already begun with the re-capitalization of banks. This would provide incentives to save and catalyze the channeling of savings into investment. The small and medium enterprises equity

investment scheme (SMEEIS) set up by the CBN and the promotion of micro-finance institutions are also steps in the right direction.

Development of Local Technology

This encompasses incentives to develop alternative local technologies. Consideration should be given to the adaptation and assimilation of technology capabilities. The strategy should focus on sectors with comparative advantage such as food processing and basic metals. Thus, there is need to strengthen the existing technological incubation centers and provide them with the necessary incentives that would enable them perform the task for which they were set up.

Technical Education

The education planners in Nigeria have long neglected the importance of technical education as the bedrock for industrial development in any country. Our universities of technology are ill-equipped to facilitate technological development. Emphasis on technological and technical education would provide a more industry-oriented work force and further enhance the efficiency of the SMI.

Regulatory and Legal Environment

There is need to strengthen the existing legislations that would minimize the cost and bottlenecks associated with the registration and licensing of new SMI. This would go along way to facilitate the development of SMI. Special attention should be paid to reducing cumbersome documentation and the cost of registration.

Infrastructure

The provision of physical infrastructure like good roads, communication, and energy that would facilitate business transaction would inevitably enhance the efficiency of the SMI.

Role of Private Sector

With the emphasis on a private sector-led growth, in which case government would only be an enabler, while the private sector would be the initiator of industrial development, some of the critical issues the private sector needs to address in order to promote the orderly development of SMI are discussed.

Training

Development of entrepreneurs' human capital should be given top priority. This would help firms leverage on existing technological capabilities and thereby attain a high level of technical efficiency.

Adaptation of Foreign Technology

There is need to promote skill transfer and access to technology. This can be achieved through training, research and development, and increasing the foreign content of machineries and equipment, particularly at the initial stage. Industries can then adapt such technology to their own needs.

Global Partnership

Global partnership is necessary to facilitate access to new technology and sourcing of raw materials and equipments, thereby enhancing technological capabilities.

VI.2. Concluding Remarks

In this study we surveyed 174 SMI in eight major industrial sectors, soliciting response that would enable us assess their efficiency.

Overall, the study examines efforts inside the firm to promote technical efficiency and their effects on productivity. The study showed that firms are populated with mostly unskilled workers with little incentive for firm-based training and lack of an effective training mechanism. Furthermore, there is a vibrant entrepreneurship with mostly individual-owned firms but with limited managerial and technical expertise. Low capital intensity and factor productivity has also led to significant decline in output and investment levels. While the marginal productivity of capital is high and significant, marginal productivity of labour is low and insignificant. Consequently, return to scale is constant and firms do not enjoy economy of scale. The cost of operation is high thus compelling firms to hold huge stock of inventory against price volatility. Technical efficiency was gleamed from the characteristics of the ownership structure of the firm—foreign linkages can facilitate flow of knowledge and technical progress and the degree to which the firm is socially recognized and accepted in the business environment is important for accessing credit.

An assessment of the technical efficiency of small and medium industries in Nigeria in this way is necessary because, how technical efficiency contributes to industry productivity is a prerequisite to assessing the need for any kind of support. In order to attain higher levels of productivity and efficiency and thus achieve meaningful growth and development, there is need for public policy, such that would engender the development of local technology and the stimulation of indigenous entrepreneurship. The private sector itself has some role to play.

There are some lingering constraints to SMI development. Financial service is still concentrated in urban centers, while lack of information on the different sources of finance still poses a daunting challenge. Thus, a large number of them stagnate in the small size classes and do not make the necessary transition into a medium or large size. There are also major constraints in the competition for inputs necessary for production owing to shortage of credit, business infrastructure and other resources.

Raising the productivity of Small and Medium Industries (SMI) is an effective vehicle for stimulating private-sector led growth. If ways are not found to raise their technical capabilities, international competition may seek to de-industrialize Nigeria rather than provide the driving force for economic development.

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