# Networks and Linkages in African Manufacturing Cluster: A Nigerian Case Study

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# Networks and Linkages in African Manufacturing Cluster: A Nigerian Case Study[1]

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[1] This study draws from a much larger nationwide study undertaken with the Federal Ministry of Industry in Nigeria and coordinated by the author at the Nigerian Institute of Social and Economic Research (NISER), Ibadan, Nigeria. I thank Prof. Lynn Mytelka, Poul Ove Pedersen, Anthony Barzokas, and an anonymous reviewer for their comments on earlier drafts.

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## ABSTRACT

Employing survey data, this paper investigates the basis for long-term sustainable development of industrial clusters in Lagos, Nigeria. We compare these metropolitan clusters with the Nnewi cluster, located within a rural setting in a homogeneous ethnic community. The characteristics of clustering examined are: the forms and intensity of inter-firm linkages, including the formation of trade networks, and the role of business associations. We found a significant level of collaboration among firms in sharing utilities and modest forms of subcontracting non-core activities among Lagos firms, but this is less so at Nnewi. The Lagos clusters have relatively high proportions of educated manpower but this important asset is underemployed in a situation of low grow rate of demand for quality products. The firms at Nnewi on the other hand are owned by seem-illiterates who came from trading backgrounds into manufacturing. Networks such as Industry associations are playing vital roles as information providers and as links into the global market although the benefits are yet to fully manifest. Ethnic and kinship ties play a prominent role at Nnewi while social networks and non-family ties are more important in the Lagos clusters. This study suggests that non-economic factors exert profound influence on the evolving forms industrial organisations in late industrialisation.

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## 1. INTRODUCTION

The relevance of clustering to the industrialisation process of developing countries has been debated in the last decade, (Van Dijk, et al, 1997) and the role of clustering in attenuating some of the problems faced Small and Medium Enterprises (SMEs) is now widely documented, (Nadvi ,1996, 1997). The problems of SMEs are well known and relate to market failures in input and product markets. At the heart of the issue are information deficiencies as a result of weak institutions and poor finance, technical and marketing support in developing countries. The difficulties faced by SMEs are accentuated in poor countries with limited capacity for policy design and implementation. This situation has been made more difficult as a result of the rapid pace of liberalisation for which most African countries were ill-prepared. "The recent liberalisation and globalisation of financial markets has made it even more common for developing countries with inadequate banking structures, information imperfection and poor institutions and infrastructure, to suffer from vulnerability through external shocks", (Bhalla, 2001). (Lall, 2001) made the point that developing countries suffer more than financial market failures; they equally experience pervasive labour and technological market failures. However, as (Schmitz and Nadvi,1999) suggest, "clustering facilitates the mobilisation of financial and human resources", leading to the gains of collective efficiency. Nadvi and Schmitz (1994) recount five lessons learnt in the last decade on the importance of clustering for developing countries. First, it is a significant form of industrial organisation for small scale manufacturing. Secondly, clustering promotes different types of inter-firm linkages; third, clustering is identified with diverse forms of social networks, which are associated with personal ties, and the notions of trust and reciprocity in competitive behaviour. Fourth, a cluster is not a planned intervention yet the state has a role in promoting it and finally, cluster experiences are vastly diverse and internally uneven. While past efforts have concentrated on comparing emergent clusters with advanced clusters, particularly the Italian model, it has become more important to take a more "dynamic approach, which seeks to understand the processes that lead to success or failure" of cluster growth and development, (Schmitz and Nadvi, 1999). This paper pursues this line of inquiry in seeking to analyse the *processes and the dynamics* of cluster growth in Nigeria. Clustering, as Porter (1998) observes are not unique but typical and possess "the enduring competitive advantages in a global economy". He suggests that the strength of clusters can be found "increasingly in local things-knowledge, relationships, motivation-that distant rivals cannot match" I will argue in this paper that while poor infrastructure such as electricity and telecommunication lead to inefficiencies in industrial production, they only partly explain the problem of poor manufacturing performance. In addition to these problems, firms in Nigeria

have not exploited the enduring gains of clustering, and policy has not promoted development along the growth trajectory that advanced clusters have followed. Firstly, small manufacturers engage in little subcontracting, an activity which tends to promote product specialisation, leading to greater levels of collaboration among firms in information sharing and in gaining trust. Secondly, in the face of poor state performance in the provision of public goods and inadequate efforts in promoting inter-firm linkages, industry associations have emerged, but have done so slowly, to "substitute for the state", (Brautigam, 1997).

The broader question then is, what are the determinants of cluster formation, and how sustainable is the process in Africa? This paper is therefore structured as follows. In section two we review the nature of clustering and industrialisation in Africa and past efforts at promoting SMEs in Africa Nigeria followed by a discussion on the typology of clusters in developing countries while section 3 examines issues of inter-firm linkages and cluster dynamism. Sections 4 and 5 detail the methodology and analyse the survey result of two manufacturing SME clusters in Lagos which are compared with the Nnewi cluster in Eastern Nigeria. The comparison is useful given the contrasting characters of the Lagos and Nnewi clusters. The latter is located in South-eastern Nigeria, (Oyelaran-Oyeyinka 1997), where businesses bear strong family and ethnic accents. This unique ethnic character of Nnewi is due as much to geography as it is to historical and cultural forces. Nnewi is an industrial enclave located in a rural setting in the heartland of Igboland, populated by a homogeneous ethnic group, with a strong sense of kinship. On the other hand, Lagos is a highly cosmopolitan industrial centre, served by a large port, and a teeming unemployed educated manpower, a melting point of sorts for all Nigerians. Section 6 examines in details the nature and determinants of inter-firm linkages while section 7 concludes with a summary of the main findings.

## 2. CLUSTERING AND AFRICAN INDUSTRIALIZATION

Recent accounts of the limited studies of clustering in Africa are found in (McCormick, 1999), (Adeboye, 1996), (Oyelaran-Oyeyinka, 1997), (Van Dijk, 1997). The clusters vary widely in their levels of development and internal structure and characteristics. In a study of six clusters, (McCormick, 1999) identified three levels of cluster development: *groundwork enterprise clusters*, that is those at the incipient stages whose basic role is to improve producers access to markets and for joint action. The second category is *industrialising enterprise cluster* which "have much clearer signs of emerging collective efficiency". The third category, *complex industrial clusters* are diversified in size structure and in inter-firm linkages; they exhibit strong external economies, have reached into wider national and global markets and demonstrate joint action in institutionalised professional associations, subcontracting and collaborative arrangements. In terms of internal structural characteristics, majority of the enterprise clusters, which tend to fall in the first and second categories, operate with low-skilled manpower, they exhibit weak inter-firm interactions, and lack institutionalised systems of self-help. With the notable exception of the Nnewi cluster in Eastern Nigeria, The Western Cape clothing cluster in South Africa and the Lake Victoria fish cluster, empirical study of the relatively more advanced clusters in Africa are limited. Nevertheless, evidence from the literature suggest that clustering "can and do promote industrialisation" (McCormick, 1999), through improved market access, pooling of labour skills, opportunities for technological upgrading as proximity promotes exchange of technical information, promotion of joint action in dealing with external shocks. The next section examines official industrial policy of the Nigerian government over time within the context of clustering as a form of industrial organisation and the role and potential benefits of state cluster promotion or lack thereof.

### 2.1. Efforts at Promoting Small and Medium Enterprises in Nigeria

Concern over the persistent poor performance of Nigeria's manufacturing sector had been linked in the past exclusively to macroeconomic factors such as the exchange rate regime, and the hostile attitude of the finance sector to industrial financing. Lately analysts have pointed specifically to the lack of dynamism of the Small and Medium Enterprise (SMEs) sector. In a recent report[3], a new policy direction is being charted for the sector, however the observed

[3] The point was made by the Minister of Industry at a meeting jointly organized by the German NGO Friedrich Naumann Foundation, the Africa Leadership Forum and the Nigerian Association of Small Scale Industrialists (NASSI). The report titled "Decentralized Economic

weaknesses of the sector are still linked exclusively, in the view of policy makers, to poor access to finance, and to some extent, poor physical infrastructure. Support for SMEs in Nigeria has a fairly long history and various policy documents have highlighted the importance of the sector in employment generation, contribution to income growth, and sectoral flexibility in adapting to fluctuating demand patterns[4]. According to the new industrial policy, the government stated that the "Small and Medium Enterprises (SMEs) form the nucleus of industrialisation and …that given the structure of the industrial sector, SMEs hold the greatest prospect for growth. In addressing the constraints to the growth of SMEs, the following steps are being taken: (I) Merge all poverty alleviation agencies comprising the Nigerian Bank for Commerce and Industry (NBCI), the National Economic Reconstruction Fund (NERFUND), the Nigerian Industrial development Bank (NIDB) into one agency that will administer loan schemes to SMEs at "lower than commercial rates"; (ii) Set up a Small and Medium Industries Development Agency (SMIDA), an umbrella agency to co-ordinate the development of the sub-sector; (iii) Establish a National Credit Guarantee Scheme for SMEs to facilitate access to credit without stringent collateral requirements; (iv) Develop new industrial estates nation-wide; (v) revive the Entrepreneurship development Programme/Working-For-Yourself Programme. While the proposed establishment of SMIDA and the development of industrial estates (an old initiative with some measure of success in the western part of Nigeria) are non-finance support initiatives, the policy debate in Nigeria continues to centre around paucity of credit to micro and SMEs. A close examination of the policy statements and initiatives shows that while there is an acknowledgement of past policy failures and the role of the recession that slowed growth in the economy, it is doubtful that industrial policy is facing up to the specific challenges of the new competitive environment fostered among others, by liberalisation and the new market conditions arising from an innovation-driven and knowledge-based global economy[5]. Again while the Nigerian government carried out a nation-wide study of clusters in 2000, official

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Development: Citizen-Oriented Community Development Initiative" is summarized in the *Nigerian Guardian* newspaper of April 5, 2001.

[4] See Oyelaran-Oyeyinka (2000),

[5] Nigeria embarked on a Structural Adjustment Programme (SAP) in 1986 that emphasized liberalization of the exchange rate market, privatization of public enterprises, downsizing of the public sector, financial sector reforms and trade liberalization. Since then the national currency has gone from one Naira to a dollar to 130 Naira to a dollar (April 2001), the manufacturing sector, largely unprepared for the new regimes, suffered massive close downs of factories and exits of firms from manufacturing to trading. Manufacturing decline coincided with the onset of SAP for several reasons. Import-dependent firms, unable to export to earn foreign currency were forced to cut spending on technical assistance, overseas training and import of spare parts. Capacity utilization dropped from a pre-SAP average of about 38 percent to 30 percent **less than** through the early 1990s. Abolition of preferential interest rate lending to SMEs and the agricultural sectors profoundly affected the capacity of firms to grow, and led in most cases layoffs and to abandonment of expansion plans, see Oyelaran-Oyeyinka et al (1996), Central Bank of Nigeria Annual Reports (various years).

industrial policy has made no explicit statement on how they are to feature in the renewed programmes for SMEs. It is unclear if the private sector itself has articulated its problems well enough beyond complains about poor infrastructure and tariff-related concerns[6]. While the state of urban infrastructure in which lives 40 percent of Nigerians is very poor, the needs of SMEs evidently include better infrastructure but much more is required to set the sector on the path of dynamic growth. Given the long neglect of private SMEs and the past exclusive concentration of state resources on failed public enterprises ( Nigeria invested close to $10 billion on steel projects that presently in operation; paper and pulp and fertiliser plants are among other projects that remain inoperable (EIU, 1999)), supply response to financial support may remain poor in the absence of a more robust non-financial policy intervention[7].

[6] Recently the Lagos Chamber of Commerce Director-General issued a report citing the major constraint as poor infrastructure, "namely, poor electricity supply situation, irregular supply of petroleum products, particularly diesel, and poor telecommunications". According to the Chamber, manufacturers commit some 25 to 30 percent of their production cost "to fill the gap created by infrastructural deficiencies in the country", *see Nigerian Guardian*, April 5, 2001.

[7] Real average annual growth rate of manufacturing MVA declined from 5.2 percent in 1970/80 to 1.9 percent in 1990/98, while per capita MVA dropped from 2.4 percent in 1970/1980 to –1.0 percent in 1990/98. This is consistent with overall decline of manufacture in SSA in the period of SAP from an already unimpressive figure of 0.4% to 0.3 % in 1995, Lall (1999) and UNIDO (1996).

## 3. INTER-FIRM LINKAGES, CLUSTER DYNAMISM AND MARKET DEMAND

In broad terms, there are several forms of inter-firm linkages in both developed and developing countries among which are: subcontracting, market linkages with customers and suppliers, informal and formal collaborations (joint ventures, franchise), membership of professional and trade associations and movement of skilled staff from one firm to another. According to (Mytelka and Tesfachew,2000), firm interactions with external agents "were “important sources of technological know-how and technological learning in East and South East Asian economies”. These diverse forms of interaction constitute important channels of flows in advanced and developing economies, (Pavitt,(1984), (Von Hippel,1988), (OECD,1999). In the study by (Mytelka and Tesfachew, 2001), subcontracting, which has yet to be fully institutionalised in African industry was singled out as having been an important source of technology transfer in garment manufacturing and textiles.

Subcontracting thrives where there is vertical disintegration and horizontal specialisation. In the current literature, production activities in firms in Africa are less specialised and more vertically integrated than their developed country counterparts but this should not be taken as parametric since production systems are dynamic. In separate visits to Taiwan, (Amsden,1974, 1985), reported dramatic changes in the Taiwanese machine tools industry. Earlier studies revealed high vertical integration and little horizontal specialisation, but this gave way to greater specialisation and significant vertical disintegration within eight years. The restructuring of the Taiwanese machine sector was made possible due to a combination of factors. Small producers, producing low quality products for the low income domestic market had operated side by side with large firms. Then came the opportunity and the incentives for expanding into the export market as a result of the boom in the machine tools market in the 1970s. The small producers had neither the technology nor the financial capability to re-equip in order to compete and as such had two options. They could participate as subcontractors to larger firms or participate in the export market by buying in a substantial proportion of their inputs; evidently subcontracting was an attractive alternative, (Amsden,1974, 1982), (Predergast,1990).

According to (Pack,1981), high levels of vertical integration is a result of low capability of subcontractors in supplying high quality inputs. He suggests that firms systematically underestimate the cost of internal co-ordination which includes the cost of learning and as a result do not seriously consider the subcontracting option. Secondly, larger firms in Africa lack the experience to organise subcontracting networks. This might well be a consequence rather

than a cause, and it is doubtful if it explains the whole story. (Predergast,1990), while agreeing in part with Pack, advanced another explanation which has both engineering and market dimensions. According to him firms have the tendency to capitalise on under-utilised capacity by expanding their product range, and in so doing, take advantage of economies of scope. Under-capacity results from insufficient demand for any single product to allow full capacity utilisation of facilities. Therefore low market demand induces an engineering response but in the process of product diversification, firms spread learning efforts in order to master a diverse market and in so doing, become less specialised.

In the Taiwanese experience, export market opportunities expectedly created greater output demand, and subsequently product specialisation and lower levels of vertical integration. The state in Taiwan as with other East Asian countries such as Korea was quick in providing technical, financial and marketing support that aided the exploitation of export markets, (Levy et al 1999). According to (Stigler,1951), firms in early stages of industrialisation internalise every possible phase of production because there is a lack of reliable raw materials, machinery and component sources. This is not so for mature industries, and by extension advanced economies, where large markets make possible the externalisation of upstream production. For this reason, specialised suppliers enjoy scale economies induced by market size for final products.

The explanation for the vicious circle, whereby firms are unable to specialise in the absence of subcontracting, and subcontracting is not developed due to lack of specialisation has been further elaborated by (Rosenberg,1976) in his classic study of American machine tools industry. Beyond market size as an explanatory variable, he introduces the element of *technological convergence* to explain why and how specialisation and vertical disintegration evolve. Technological convergence connotes the convergence of skills common in the main, to the mechanical engineering sector, by which machine processes such as milling, drilling, boring, planing, and polishing are common to a wide range of industries. The machines performing these tasks are subject to a common set of problems. Technological convergence then becomes a common denominator of industries that "…were apparently unrelated from the point of view of the nature and uses of the final product". Product specialisation then results from a combination of technological convergence and vertical disintegration :

> "Young industries are often strangers to the established economic system. They require new kinds of qualities of materials and hence make their own; they must overcome technical problems in the use of their products and cannot wait for potential users to overcome them;…These young industries must design their specialised equipment and often manufacture it, and they must undertake to recruit skilled labour. When the industry has attained a certain size and prospects, many of

these tasks are sufficiently important to be turned over to the specialists."[8] Stigler (1951)

Rosenberg 's conclusion, which advanced Stigler's proposition, is that there could not have been the extraordinary range of specialisation that characterised the American machine tools industry without technological convergence combining with vertical disintegration. Herein lies the role of technological capability and knowledge acquisition of specific kinds, and learning in the process of industrialisation. In sum, three elements interact in shaping the extent of vertical disintegration and product specialisation: technological diseconomies, transactional economies, and the extent of market demand, (Perry,1989), and (Stigler,1951).

An important horizontal form of networking that has become increasingly important in facilitating *joint action* is industry or business association, (Schmitz ,1998), (Perry, 1999). An industry association is a network of firms co-ordinated by a third party association or federation. They are established independently of any one of the firms and have vested in them, powers to guide, cajole, aid and abet participating business firms, (Perry,1999). This kind of network is influential and active in a variety of ways in developed and developing countries. (Romijn,2001) cites the role of associations in mediating in contractual problems between firms and clients, and their role in acting as intermediaries between large clients and small manufacturers. Manufacturers associations also act as contractual guarantors by enforcing group, rather than individual responsibility in contract performance. In general two preconditions are required for forming such associations: the recognition of collective interest and relatively large number of participant organisations. Expectedly, national experiences vary and the range and effectiveness of activities will be expected to depend on a host of factors such as history, learning path, the level of industrial development and so on. For instance, while (McCormick,1997) observed that "sectoral associations do not exist.." in the garment sector in Kenya, the Manufacturers Association of Nigeria (MAN) has not only state-level affiliates, some sectoral associations within MAN are very influential and highly organised. In New Zealand, industry associations perform functions such as: improving human resources, improving industry knowledge base, and setting and enforcing industry standards, (Perry, 1999). By far Germany and Japan are recognised as countries with particularly strong industry associations, (Sabel,1994). In these countries associations tend to have greater powers of enforcement and have influenced for instance, the pattern of business specialisation in these countries. For example, the Japanese Spinners Association (1950-1990), helped organise a fragmented cotton-spinning industry comprising over 110 firms into a more cohesive business, an important case of successful horizontal joint action.

[8] Quoted from Rosenberg (1976).

### 3.1. Typology of Enterprise Clusters in Developing Countries

An industrial cluster is a dense sectoral and geographical concentration of enterprises comprising manufacturers, suppliers, users, and traders. A cluster is not simply a geographic phenomenon, inter-firm interaction and sectoral specialisation are the defining features of a sustainable cluster, (Nadvi and Schmitz,1994). Recently there have been attempts to provide a taxonomy of clusters given the diversity of experiences particularly in developing countries. (Pedersen, 1997) identified two types which are *diversified industrial clusters* characterised by "vertical specialisation of individual enterprises and vertical diversity of the cluster as a whole". In this cluster, there is a broad sectoral specialisation but within the sector, individual enterprises and the cluster as a whole, are not narrowly, horizontally specialised. Efficiency gains depend on collaboration within and outside the cluster. The second type is the subcontractor cluster, characterised by a narrow vertical and horizontal specialisation by both individual enterprises and the cluster as a whole. Its collective efficiency derives from reduced transaction costs due to reliance on larger firms as subcontractor. (Amin,1994) identifies three generic kinds which are craft-based, artisinal or traditional sector industrial clusters (e.g. footwear, garment-making, metalworking etc..); high-tech clusters(e.g. Silicon valley); and clusters based on interaction of large and small firms. This is similar to Pedersen's subcontractor cluster. (Mytelka and Farinelli,2000) provide a functional categorisation of clusters that are either "public-induced" or "constructed clusters" such as industrial estates and EPZs or spontaneous clusters that could be *Informal, Organised, or Innovative*[9], table 1. Low levels of inter-firm linkages characterise informal clusters but organised clusters have advanced somewhat in this respect. There is relatively greater networking within and outside their national borders as exemplified by the firms in Nnewi, and the surgical instruments cluster in Sialkot, Pakistan.

The question is where do these clusters go from here? As (Mytelka and Farinelli,2000) noted: "vulnerabilities in the production strategy of the cluster have emerged, especially because firms were not well organised within the cluster to support a continuous process of improvement". According to (Nadvi and Schmitz,1994), successful clusters are those that "have an indigenous growth potential, to be resilient in the face of economic crisis and to be conducive to a process of sustained innovation". This kind of cluster achieves sustained dynamism and competes in the export market not only on price basis but by becoming an innovative cluster. It almost certainly

[9] Most clusters in developing countries fall into the informal and organized type categories. Informal clusters generally contain micro and small firms whose technologies are far from the frontier, and have relatively low technological capabilities. Organized clusters have considerable technological competence, engage in training and invest in apprenticeship system. Firms undertake technical upgrading, undertake design adaptations in response to market and can be highly organized and cooperate among themselves.

is likely to be characterised by substantial inter-firm linkages and networking. Networks, according to (Perry, 1999) are built on the basis of four broad types of relationships: family and ethnic cohesion, buyer-supplier relations, geographical proximity and finally, ownership, investment, or organisational membership. A network structure may be created through trading ties, personal connections, links with collective institutions or a combination of these sources.

Networks also have roots in business opportunities and external pressures and function "through time-space economies, not sustained solely by historical forces alone", (Perry,1999). In developed export clusters, local networks are increasingly being integrated into global systems, creating new forms of industrial governance, (Schmitz,1998), (Vargas,2001). Ethnic and family ties are prominent in African clusters, (Forrest,1997), (Brautigam,1998), (Dijkam and Van Dijk 1997), Pedersen (1997). According to (McCormick,1997), Asian business success in Kenya owe much to the extensive family networks formally and informally utilised, and exploited to resolve a diverse range of problems from managerial, technical to marketing and financial. Perpetuation of kinship and ethnic dominance in business is sometimes overt. For instance, through "limiting training to co-ethnics, by passing information about business opportunities along ethnic networks".

Subcontracting in overseas Chinese business is highly conditioned by kinship and personal contact networks. These habits, norms and attitudes shape the trajectory of overseas Chinese businesses world-wide even though ethnic Chinese originate from a relatively confined part of China, they are dispersed widely but retain their kinship ties[10], (Perry, 1999). While contexts and history differ, these factors are no less important in shaping the growth patterns of clusters in Africa

From the above typologies, the Isolo and Ikeja clusters could be described as organised clusters , and in the Pendersen classification, diversified industrial clusters. In the range of product mix and sophistication of production processes, they are classified with the Nnewi cluster, but the Lagos clusters have longer production history and have had greater earlier exposure to international production systems, yet they differ in several respects.

[10] This is the pattern of the business behaviour among Igbo traders in Nigeria who due to limited land in Southeastern Nigeria, as well as the propensity to travel widely in search of business opportunities are found all over Nigeria and West Africa. The Igbo spare parts and auto components dealer is a well known entity who recruits an apprentice not from the locality of his current business location but from "the village", meaning that he goes back to his kith and kin to bring "my brother".

**Table 1. Types of clusters and their performance**

| **Types** | **Spontaneous clusters** | | |
|---|---|---|---|
| | **Informal clusters** | **Organised clusters** | **Innovative clusters** |
| **Examples** | Suame Magazine (Kumasi, Ghana) | Nnewi (Nigeria)<br>Sialkot (Punjab, Pakistan) | Jutland (Denmark)<br>Belluno (Italy) |
| **Presence of critical actors** | Low | Low to Medium | High |
| **Size of Firms** | Micro & Small | SMEs | SMEs & Large |
| **Skills** | Low | Medium | High |
| **Technology** | Low | Medium | Medium |
| **Innovation** | Little | Some | Continuous |
| **Linkages** | Some | Some | Extensive |
| **Co-operation** | Little | Some, not sustained | High |
| **Competition** | High | High | Medium to High |
| **Trust** | Little | High | High |
| **Product change** | Little or None | Some | Continuous |
| **Exports** | Little or None | Medium- High | High |

Source: Mytelka and Farinelli (2000)

## 4. METHODOLOGY

The study was carried out in late 1999 and early 2000 using a combination of structured questionnaires and face-to-face interviews of selected firms. The unit of study was the firm within the cluster, and two clusters, Ikeja and Isolo, located in Lagos State in South-western Nigeria were studied. Ikeja was chosen because it is by far the older cluster promoted in the 1950s by the government of Western region while Isolo has a relatively recent industrial history. Lagos, the home to predominantly Yoruba people contains more than 60 percent of all industrial firms in Nigeria. It is well served by a large port and an extensive but badly neglected infrastructure. It is a vibrant city of about 12 million people, and has a significant market of sophisticated customers. Other clusters in Lagos include Matori (predominantly auto components trade and manufacturing), Otta and Ilupeju industrial areas. Seventy five questionnaires were administered in the two clusters, fifty four were retrieved and four were unusable due to incomplete information. In the end, 50 were analysed representing a retrieval rate of about 66 percent. The product groups selected were food products( ISIC 311-314), Industrial chemicals (ISIC 351-356), and Metal products (381-384), in the latter, we focus on light engineering. The sectors were selected based on their significant contribution to manufacturing value added (MVA), propensity to foster inter-firm linkages(this is historically so for engineering and chemicals in particular) , (Rosenberg ,1976) and the dominance of these sub-sectors in the clusters under study.

### 4.1. Study Design

The first two stages of information gathering involved collection of secondary information using official statistics as well as other local sources. Due to resource constraints, it was not possible to conduct a survey of the entire cluster population. We therefore relied on the Census of SMEs in Nigeria conducted by the Manufacturers Association of Nigeria (MAN) in 1998 and available information on the firms by the Nigerian Association of Small Scale Industrialists (NASSI) and the National Association of Small and Medium Enterprises (NASME) in obtaining relevant background information on firms in the clusters.

In the second stage, we carried out a survey of a stratified sample of enterprises within the clusters. In order to ensure that the different segments of the population are represented in the sample, the estimated 150 SMEs identified in the two industrial clusters were divided into the ten sectoral groups. These are the groups recognised by the Manufacturers Association of

Nigeria out of which 75 were randomly selected using appropriate sampling interval from each of the sectoral groupings.

The survey, using structured questionnaires sought to obtain data on both the enterprises and their horizontal and vertical relationships with other economic agents. Information on the background of the entrepreneurs, their workforce and the process by which they receive support from external sources are here documented. The questionnaire also sought to find out how much of firm activities are carried out in-house and how much is sub-contracted with a view to determining how far and wide are enterprise activities externalised. We conducted selected interviews and obtained perspectives otherwise impossible to glean from a structured questionnaire.

## 5. MAJOR PRODUCTS

The dominant product groups in the two Lagos clusters are chemicals/ pharmaceuticals, domestic and industrial plastics, and rubber and rubber products (ISIC 351-356), and fabricated metals (light engineering, ISIC 381), see table 2. Other product groups in the clusters are paper and paper products (not significant), and food, beverages and tobacco. In strict terms, there is a sense in which except for beverages & tobacco, all these other sub-sectors belong to the chemicals sector and light engineering. Historically, significant inter-firm interactions exist between chemicals and engineering; for instance, among industrial plastics and rubber products manufacturers and machinery makers.

**Table 2: Major Products of the SMEs within the Clusters**

| Clusters | Product Group | Major Products |
|---|---|---|
| Ikeja | Chemicals & Pharmaceuticals | Antibiotics, analgesics, anti-malarial, vitamins and blood tonic (of various brand names), paints |
| | Fabricated Metals | Aluminium profiles, agricultural machinery (for food processing and oil milling), Drainage and pressure fittings, Louver frames, galvanised iron sheets, aluminium doors and windows. |
| Isolo | Chemicals & Pharmaceuticals | Hair treatment chemicals - shampoos, setting lotion, styling gel and instant conditioner hair relaxers, hair curl. Textile auxiliaries, analgesics, anti-materials, skin care products |
| | Domestic & Industrial plastic & rubber | Household plastics, general plastics and plastic water tasks. |
| | Fabricated metals | Food processing machinery – grinders, pounded yam machinery grain mills, cassava graters and presses; tricycles, foundry products (castings), straight and barbed wires and bearings. |

Source: Survey (2000)

A total of 50 firms were analysed comprising 21 small and 29 medium enterprises. 64.0 per cent are in the Ikeja industrial cluster, and 36.0 percent from Isolo cluster. Overall, 32.0 per cent are in the chemicals and pharmaceuticals sector, 12.0 per cent in domestic

and industrial plastics and rubber, 34.0 per cent in fabricated metals and 12.0 per cent in food, beverages and tobacco sectors (see table 3). Small firms are those with employee size of 1-49 and medium firms employ 50-99 persons. The firms are established, registered business entities with affiliations to local and foreign Chambers of Commerce. In this study, 42 percent are small while 58 percent are medium firms.

### 5.1. The Nnewi Cluster

One of the aims of this study is to provide a comparative perspective of the rural cluster, Nnewi and the two clusters (Ikeja and Isolo) based in the Lagos metropolis. Our study of Nnewi is based on Oyelaran-Oyeyinka (1997).

The study focused on firms in automotive spare parts manufacturing. This is an area in which Nnewi companies have developed considerable skills and given the market both in Nigeria and in the subregion - represents a possible direction for full-fledged development. Other products manufactured include motorcycle parts and components, cables and hoses, motorcycle engines and roller chains, automotive filters, exhaust system and others. Table 3 shows the size and product mix of the companies. Some 80 per cent of them are SMEs and all are fully Nigerian-owned.

The performance of firms within the Nnewi cluster is measured using the rate of capacity utilisation. From our study, average rate is about 20 per cent above the 1996 national average of 32 per cent. Local resource-based manufacturers such as rubber products firms averaged in some instances over 70 per cent in the 1990-1995 period.

Some 52.6 per cent imported between 81-100 per cent of machinery while 26.3 per cent sourced 61-80 per cent of all equipment abroad. Only 19.1 per cent fell into the 1-60 per cent range. In other words, majority of firms, close to 80 per cent of firms imported between 61-100 per cent of machinery

**Table 3 :*Profile of Nnewi Firms in Sample***

| Firm | Firm Size<br>S = Small<br>M= Medium;<br>L = Large | Main Products | Ownership |
|---|---|---|---|
| 1 | M | Palm kernel mill, oil mill, bakery equipment | Nigerian |
| 2. | M | Motorcycle parts and components | Nigerian |
| 3 | M | Cables and hoses | Nigerian |
| 4 | M | Motorcycle & motor engines roller chains | Nigerian |
| 5 | S | Gears, motor bushings, sprocket for machines mould fabrication | Nigerian |
| 6 | L | Motor & motorcycle batteries, motor spare parts | Nigerian |
| 7 | L | Generator engines, motor & motorcycles parts, film processing machines | Nigerian |
| 8 | S | Motorcycle seats | Nigerian |
| 9 | M | Motor & motorcycle spare parts | Nigerian |
| 10 | L | Automotive filters | Nigerian |
| 11 | M | Motor & motorcycle spare parts | Nigerian |
| 12 | S | Machine spare parts | Nigerian |
| 13 | M | Power rope, fan belt, industrial v-belt | Nigerian |
| 14 | S | Feeder pillars, electrical equipment | Nigerian |
| 15 | S | Exhaust system | Nigerian |
| 16 | S | Oil plant equipment, moulds, hammer mills | Nigerian |
| 17 | M | Motor spare parts | Nigerian |

*Source:* Author's survey

### *5.1.1 Origin and Investment Strategy of Nnewi Cluster Firms*

Table 4 details the age of firm, source of technology and technical services and the principal products. The firms studied fall within the small and medium enterprise category but employ relatively sophisticated technology and they produce products that require some measure of technical skills. While the size of investment is equally small relative to developed countries' standard, in Africa they could qualify as capital-intensive at the SME level. In short the level of investment require mastery of significant elements of investment capability. The firms in our sample are all in the basic metals and automotive components segments. Investment in these segments of industry requires knowledge of machine tools, product design at the early stages and process and complex products design at later stages.

In all the cases but one, the road to manufacturing was through trading apprenticeship to importer and finally to manufacturer. All the entrepreneurs, once enough capital is raised from trading, strike a manufacturing partnership with suppliers. None of the founders had previous production experience except one who had worked with a multinational company (MNC) and then gone on to establish business along the same line. The entrepreneurs in the process of trading accumulated considerable experience in the line of business; some in fact sponsored themselves to study the factory operations for a while in Taiwan before making a commitment.

Once persuaded, most went ahead to import machinery and equipment. In addition the services of pertinent engineering personnel are contracted for setting up the plant. While a few did feasibility studies, others simply assumed the existence of a market. Procurement of machinery is sometimes done piecemeal as capital becomes available until a whole plant assembly is ready. The pattern of investment is unbelievably uniform for all the firms.

### *5.1.2 Technological Learning Mechanism and Development of Capabilities at Nnewi*

The most important mechanism for technological learning is in the beginning, external training of start-up/pioneering staff undertaken either in Taiwan or on-the-job. In each instance, instructions are given by the foreign technical partner. Majority of start-up staff are semi-literates coming from trading background and without formal engineering schooling. This training mode is as such very basic and central to firms technological capabilities acquisition strategy.

None of the firms received state support in terms of training. On-the-job training during production takes the form of "close marking" of the foreign technical partners. Overall, firms in our sample succeeded in acquiring investment, production and minor innovation capabilities to a great measure. Major innovation involving advanced design skills and process capabilities are yet to manifest since firms are still basically copying and modifying foreign designs.

**Table 4:** ***Summary Profile of Nnewi Firms in Detailed Case Studies***

| No | Location | Size Employ-ment | Principal Products | Age in Production (Years) | Country Source of Technology |
|---|---|---|---|---|---|
| 1 | Nnewi | 250 (1990) | auto parts, gaskets for motorcycles | 7 | Taiwan |
| 2 | Nnewi | 40 | switch gear | 12 | UK |
| 3 | Nnewi | - | roller chains for all auto engines | 2 | Taiwan |
| 4 | Nnewi | 160 (1995) | auto tubes, damper | 8 | Taiwan |
| 5 | Nnewi | | crumb rubber | 4 | Taiwan |
| 6 | Nnewi | 70 (1995) | automotive parts | 8 | Taiwan |
| 7 | Nnewi | 120 | auto filters | 8 | Taiwan |
| 8 | Nnewi | - | auto parts; pistons for automobiles and motorcycles | 10 | Taiwan |
| 9 | Nnewi | | auto parts: power ropes | 9 | Taiwan |

*Source:* Survey data.

### *5.1.3 Nnewi Firms and Cluster Characteristics*

The following firms' and cluster characteristics which will be compared with that of the metropolitan clusters are examined : networking, geographical proximity, co-operation and competition, trust and cultural affinity.

a) *Networking:* At Nnewi, there is evidence of shared facilities, informal provision of capital through family ties but subcontracting of the European kind is yet to emerge. This is not surprising for two reasons. First, the technical conditions such as the presence of a wide array of technological infrastructure (foundry, forge shops and so on) that promote subcontracting, have not fully been developed. Second, most of the factories were established to be self-sufficient in terms of core production, the provision of ancillary facilities, and even physical infrastructure. This is because investment assumed "greenfield" conditions. It may be that subcontracting may evolve overtime when production processes begin to demand greater specialisation and as the market demands higher quality products.

b) *Geographical Proximity:* Firms are concentrated within the locale of Nnewi although there is considerable trading and other supply relationships with companies outside Nnewi. The most remarkable aspects of the linkage relationship is that firms' source of technology which is largely Taiwan. To this extent, Nnewi cluster differs significantly from the European and Japanese clusters that have their origin in traditional crafts and a longer history of technical apprenticeship.

c) *Co-operation and Competition:* There is an intensive desire by the entrepreneurs for social relevance and high visibility. The subtle competition which started with trading seems to manifest in a "manufacturing contest". There was co-operation in trading where a group of traders will entrust huge sums of money to make purchases on behalf of the group. This practice which reduces transactional costs (air fare for instance) is common among family members. This element of co-operation still exists where for instance wealthier kinsmen advance credit to new entrants to start a business; there is shared facilities equipment and in rare cases, assistance with manpower. Competition and rivalry however remain intense and firms protect production "secrets" constantly.

d) *Entrepreneurial Dynamism:* A most important source of the relative success of Nnewi is the perceived dynamism of its entrepreneurs. The typical small hi-tech firms in Europe and Japan are run by skilled labour and highly educated manpower. The Japanese entrepreneur is likely to be a product of an apprenticeship system (*deshi*) with its strong emphasis on technical skills while the Nnewi businessman comes from a trading and apprenticeship background. Brautingham (1994) compares Nigeria's literacy level in 1989 with that of Taiwan in the 1950s which was 45%. In the 1920s adult literacy in Japan was 100 per cent, in the 1970s, majority of Nnewi manufacturers are semi-literates. On the one hand clusters in these industrialised societies have acquired and operate with advanced skills, while on the other, Nnewi manufacturers equally operate relatively modern systems but with low level educational background but evidently good technical factory level skills.

e) *Trust and Cultural Affinity:* Nnewi is a culturally homogenous society and manufacturing, like trading which gave impetus to it, tend to be organised along a strong ethnic accent. Family ties is critical while kinship network formed the basis for informal finance and the apprenticeship system that provided foundation for Nnewi's success. The way in which the system works need to be properly understood through systematic research.

**Table 5: Sectoral and Size distribution of Surveyed firms in the Lagos Clusters**

| Sub Sector | Ikeja Freq. | % | Isolo Freq | % | Total Freq. | % |
|---|---|---|---|---|---|---|
| Food, Beverages & Tobacco | 3 | 9.4 | 3 | 16.7 | 6 | 12.0 |
| Chemicals & Pharmaceuticals | 11 | 34.4 | 5 | 27.8 | 16 | 32.0 |
| Domestic and Industrial Plastics & Rubber | 3 | 9.4 | 3 | 16.7 | 6 | 12.0 |
| Fabricated Metals | 12 | 37.6 | 5 | 27.8 | 17 | 34.0 |
| Small Enterprises | 13 | 40.6 | 8 | 44.4 | 21 | 42.0 |
| Medium Enterprises | 19 | 59.4 | 10 | 55.6 | 29 | 58.0 |
| Total | 32 | 100 | 18 | 100 | 50 | 100 |

Source: Survey (2000)

## 5.2. Age and Ownership Structure of Lagos Clusters

The age structure of the surveyed enterprises is shown in table 6. 32.0 per cent were established over the past ten years, 44.0 per cent were established between 1980-89, 20.0 per cent were established between 1970-79 and only 4.0 per cent were established before 1970. In effect, about 70 percent of firms were established in the last twenty years, the period of economic structural adjustment. There is a higher concentration of firms established in the 1990s in Ikeja and there are a number of possible explanations for this. Ikeja is an older more "desirable" location due to superior infrastructure (although all urban areas suffer from epileptic power and water supplies). It is a "denser" cluster and therefore better able to offer *collective efficiency* advantage conferred by geographic proximity to other firms small and large.

**Table 6: Age Structure of Enterprises**

| Date Established | Ikeja Freq. | % | Isolo Freq. | % | Total Freq. | % |
|---|---|---|---|---|---|---|
| 1990 – 1999 | 13 | 43.3 | 3 | 15.0 | 16 | 32 |
| 1980 – 1989 | 10 | 33.3 | 12 | 60.0 | 22 | 44 |
| 1970 – 1979 | 5 | 16.7 | 5 | 25.0 | 10 | 20 |
| < 1970 | 2 | 6.7 | – | – | 2 | 4 |
| Total | 30 | 100 | 20 | 100 | 50 | 100 |

Source: Survey (2000)

The structure of ownership reveals that all the firms are private Nigerian owned. 61 per cent of the firms have sole proprietorship while 38 per cent are jointly owned by private investors. All the small enterprises have sole proprietorship. This ownership structure of SMEs is in contrast to what obtains in East Africa where substantial ownership are in the hands of Asians and Europeans, (World Bank,1995).

Similarly, close to 80 per cent of firms at Nnewi are between 10 - 20 years old meaning that in spite of Nigeria's economic difficulties, a reasonable level of investment was made by Nnewi businessmen even during the Structural Adjustment Programme (SAP) years. Due to lack of public utilities, a strong feature of the cluster is the widespread provision of private facilities such as water boreholes, electricity generating plants and communication.

Some 97.8 per cent claim to maintain standby generating sets while only 2.2 per cent do not have. 79.5 per cent of firms spend between 1 - 20 per cent of total investment on power generating sets while 12.8 per cent spend between 21 - 40 per cent of investment on private power generation. Small firms tend to spend disproportionately large amounts on utilities

### *5.2.1 Educational Levels of the Entrepreneurs and Workers*

All the Lagos firm owners have formal education, the majority have gone beyond high school to have advanced degrees. About 4.0 per cent have high school Certificate while 12.6 per cent have Trade Technical Certificates and/or school certificate (equivalent of high school but with emphasis on technical courses), while 63.2 per cent have bachelors degrees, and 20 per cent obtained Higher National Diploma (a degree course taken in Polytechnics with emphasis on skills rather than theory). The other 8 per cent have postgraduate degrees.

In the skilled workers category, only 1.3 per cent do not have formal education. 15 per cent passed high school while some 32 per cent have Trade Technical Certificate, and 28 per cent obtained Higher National diploma while about 23.7 per cent have bachelors degrees and higher. In the unskilled workers category, 19 per cent have no formal education while 56 per cent passed high school. About 25 per cent have Trade Technical Certificate and/or secondary schools certificate, see table 7.

**Table 7: Educational Levels of workers and entrepreneurs**

| Educational Level | Company Owners % | Skilled Workers % | Unskilled Workers % |
|---|---|---|---|
| No formal Education | - | 1.3 | 19.1 |
| High School Leaving Certificate | 4.2 | 14.7 | 55.7 |
| Trade Technical Certificate* | 12.6 | 32.1 | 25.2 |
| Higher National Diploma | 20.0 | 28.2 | - |
| Bachelor's Degree or higher | 63.2 | 23.7 | - |
| Total | 100.0 | 100.0 | 100.0 |

Source: Survey(2000); * equivalent of High School with bias for technical subjects.

At Nnewi, the path and sequence of transformation from trading to manufacturing is, with few exceptions, extremely very similar. Most of the entrepreneurs have only elementary education before starting an apprenticeship period - usually funded by a relation. There is a strong accent on kinship that defines the structure of trading and subsequently, that of manufacturing. This practice is not uncommon with small and medium entrepreneurs. The strategy is to keep the skills and experiences gained within the family while reducing the risk of losing a valuable worker. Again, consistent with the literature findings on SME clusters, trust between employers and employees is critical for success. Employing relatives into the trading and manufacturing network reduces the risk of sabotage and ensures some measure of loyalty. These distinguishing characteristics of this emergent cluster have dramatically shaped the process of industrialisation in this semi-urban town.

### *5.2.2. Ethnic and Social Identity*

74 per cent of owners are from states within the South Western part of the country while other Nigerians from other parts of the country own 26 per cent of the enterprises. In contrast, all owners of businesses in the Nnewi cluster are natives, not just of South-eastern Nigeria but specifically from Nnewi town. In a detailed case study of seventeen manufacturing firms, (Oyelaran-Oyeyinka,1997), we found that all owners of businesses are from Nnewi town, and

nearly all workers in firms are equally from the town and most are related to each other and to owners of firms. The liberal land policy and the relatively more accommodating attitude of Lagosians, contrasts sharply with what obtains in South-eastern Nigeria where a non-native person is most unlikely to have access to land for business. The contrasting pattern of ownership of businesses in the clusters reflects the cosmopolitan nature of Lagos and the different values of the cultures. It is part of what is commonly known as "the son of the soil syndrome" in Nigeria and an important determinant of the nature of ownership and direction of development.

Less than 10 percent of workers in the Lagos clusters are family members of the owners of the SMEs, tables 6. Four kinds of informal ties seem to be important, and family ties, while important, is less of an influential factor compared to the Nnewi cluster. Professional ties, social interactions and proximity tend to be more important in the Lagos clusters, even though individuals own 75 percent of businesses from the area, table 9 and 10.

**Table 8: Relationship of workers to Owners (%)**

| Relationship | 1995 | 1996 | 1997 | 1998 |
|---|---|---|---|---|
| Non-family | 91.6 | 91.7 | 92.1 | 91.6 |
| Family | 8.4 | 8.3 | 7.9 | 8.4 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Survey(2000)

**Table 9:Ethnic Origin of Owners**

| Regional Concentration | % |
|---|---|
| South West Nigeria | 73.7 |
| Others | 26.3 |

**Table 10: Factors fostering business relationships between SMEs**

| Factors fostering informal relationships | % |
|---|---|
| a) Family Ties | 20.2 |
| b) Spatial proximity | 19.4 |
| c) Friends or formal colleagues from courses or work | 32.2 |
| d) Social Networks | 28.2 |

**Source: survey (2000)**

## 6. INTER-FIRM LINKAGES

We found the following forms of interactions among the firms: linkage with input suppliers (raw materials), linkage with machinery and equipment makers, linkage with spares and component suppliers, linkage with maintenance firms, table 11. Firms also engage in subcontracting and maintain membership of professional associations.

**Table 11: Sources of Inputs (%)**

| Inputs | Sources | |
|---|---|---|
| | Domestic | Foreign |
| Raw Materials | 62.9 | 37.1 |
| Machines | | |
| New | 42.5 | 57.5 |
| Second Hand | 33.3 | 66.7 |

Source: Survey (2000).

### 6.1. Linkage with Input suppliers

This is a critical network for most SMEs since much of firm efforts are directed at exploiting comparative advantage of local raw materials, a strategy long encouraged by various Nigerian governments. Firms were given incentives to substitute local materials for imports by the establishment of, among others, the National Economic Reconstruction Fund (NERFUND) in the mid-1980s. The eligibility criteria for access to the Fund was to set up process plants that fully utilise domestic inputs. This policy brought into existence a number of firms that are in operation in the clusters and for this reason most have nurtured sustained input user-supplier networks, reflected in table 9. 62.9 percent of respondents source raw materials locally. While small firms tend to rely on raw materials suppliers for "doorstep" delivery, some medium-sized firms make their own transport arrangements. Both small and medium firms receive most inputs in processed forms. 37.1 percent of the imports are components made from special metals ,electric motors, other electrical and electronic components that are not easily manufactured in Nigeria due to a combination of scale economy disincentive and engineering complexity. These imported parts are then coupled with locally fabricated parts. Over 90 per cent of the firms claim that they are satisfied with the quantity and quality of local inputs, a measure of the capability of suppliers to meet user standards. Most firms realise that the basis for competition has changed, and a new market orientation is needed. Evidently, inherited practices, and

attitudes are hard to change but changes to the process and technical characteristics, originally tailored to domestic production and consumption patterns will have to be made. This study did not systematically pursue the response of firms to competitive pressures, but the often changing policy of government, and the promotion of economic nationalism (through substitution of local raw materials) on the one hand, while embracing wide scale liberalisation and on the other, were cited repeated by firms as contradictory.

## 6.2. Linkage with Machinery and Equipment Suppliers

About 43 per cent of firms obtained new machines needed in the domestic market and 58 per cent imported machines from external sources. 33.3 per cent that depend on second hand machines source them locally while 66.7 per cent import from foreign sources, Table 12. Much of the transactions take place within the clusters but it is difficult to put a precise figure on the volume of such transactions. While countries discriminate against used machines through trade restrictions, there are strong arguments in its favour particularly in low-income countries where low wages and technological learning imperatives make them attractive. The optimal scale of older machines make them more appropriate to the small markets of developing countries, greater flexibility in use and the likelihood of familiarity of workers, make vintage technology suitable for SMEs in Africa. New machines are however superior to used ones in three important ways, (Navaretti et al 2001) which are: old machines are likely to suffer more frequent breakdowns and therefore increase idle times, they are less productive and finally labour-intensive machines require greater craft (hand skills) than more automated machines. However, due to high interest rates and the high cost of sourcing foreign exchange, firms are likely to prefer used machines wherever they can find them, in spite of the risk of greater downtime and idle capacity. As Navaretti observed, firms are reluctant to move into high tech technologies because of the cost of investment in training to acquire the requisite skills to operate new and presumably, more complex vintage plant. Firms tend to slide down the productivity path when appropriate skills are not available to use new and modern machines.

As shown in Table 12, the key information sources for firm production and innovation are machinery suppliers, exhibition and trade fairs, client firms, publications, repair workshops (foundries, heat treatment shops and others), staff of other firms, and social and professional associations, and consultancy firms within and outside the clusters. Firms confirm that some of the contacts have been long-lasting while some are one-off interactions. The proximity factor which co-location in the clusters engender, tends to promote faster response to service demands The most enduring are with machinery makers to which they return in times of trouble while machine makers also tend to cherish the user-producer relation with clients. The dominant

forms of inter-firm linkages tend to be market with suppliers and manufacturers that are located within clusters.

**Table 12: Sources of Information for Production and Innovations**

| Sources | Responses (%) | | | |
|---|---|---|---|---|
| | Often | Occasionally | Never | Total |
| a. Social /professional Associations | 11.0 | 56.0 | 33.0 | 100 |
| b. Export agents | 2.2 | 60.8 | 37.0 | 100 |
| c. Machinery suppliers | 27.6 | 62.1 | 10.3 | 100 |
| d. Exhibitions/fairs | 27.7 | 63.1 | 9.2 | 100 |
| e. Repair workshops | 14.0 | 60.5 | 25.5 | 100 |
| f. Client firms | 23.1 | 34.6 | 42.3` | 100 |
| g. Specialised publications | 31.0 | 53.4 | 15.6 | 100 |
| h. Visits to other enterprises in the local area | 10.9 | 41.8 | 47.3 | 100 |
| i. Visits to other enterprises in other regions | 7.7 | 51.9 | 40.4 | 100 |
| j. Workers previously employed in other firms | 14.8 | 65.6 | 19.6 | 100 |
| k. Consultants from the local area | 8.9 | 48.9 | 42.2 | 100 |
| l. Consultants from outside the local area | 6.4 | 63.8 | 29.8 | 100 |
| m. Libraries or information services. | 17.0 | 53.2 | 29.8 | 100 |

Sources: Survey (2000)

### 6.3. Linkage with Repairs and maintenance Organisations

Firms depend largely on in-house engineers and technicians for minor repairs of machinery and equipment but major breakdowns are contracted to independent machine shops with machine facilities such as founding, heat treatment and so on. There is a growing relationship with public institutions and universities especially for design of difficult parts, and for testing of material[11]. This is due to the increasing commercialisation of university services as a result of which a number of "university consultancies" have become more aggressive in marketing their capabilities. Another phenomenon is the substantial numbers of university "outreaches", by which universities in all parts of the country now have "study centres"[12] in Lagos, Nigeria's commercial hub.

[11] One of the most diversified firms in Isolo had entered into a partnership with the Ladoke Akintola University of Technology to establish a technical training center called, "Techno Polytechnic Center". The precise functions of the center was not investigated as they are still at an incipient stage.

[12] Study Centres undertake both bachelors and masters degrees particularly business administration which is quite popular among busy executives, who cannot afford to take leave of their job. Most of the lectures take place on weekends and in the evenings to allow working candidates attend classes. An important fallout may well be the access provided by the Centre

This may well have promoted greater contact due to proximity of knowledge sources to firms since one of the major complaints of entrepreneurs had been lack of "access" to both the personnel and their expertise. Maintenance and repairs are often co-joined with parts replacement. Although some medium-sized firms have *captive foundries (for in-house use),* many do not have and firms with this facility tend to use it as a profit centre, for undertaking repairs and maintenance jobs for those that do not have such facilities. Independent or "jobbing" foundries in particular have become more sophisticated. The Foundry association of Nigeria(FAN) has become an influential organisation that bids for big government contracts on behalf of its members.[13] FAN has members among the machinery makers of Ikeja and Isolo and as such networking is leveraged at several levels.

### 6.4. Sub-Contracting Relationships

Subcontracting refers to user-producer relation, usually a form of non-equity arrangement between firms, in which goods and services are provided according to the specification of the user. This mode of inter-firm linkage often demand communication and consultation, and in most cases lead to obligational relationship, (Perry,1999). How much firms externalise their activities is subject to a number of factors from the level of production know-how outside the firm, to the need for specialised intermediate inputs, to cost-reduction. The need for supply security, in timeliness and quality, and the decision on the choice of local as opposed to distant suppliers, particularly for low-volume supplies play a part in firms' decisions in underdeveloped economies. A good number of the SMEs in these two clusters subcontract some aspects of their productions, table 13 and these involve non-core operations such as packaging, labelling, printing, and production of bulk materials, animal feed production, among others. About 68 per of those who subcontract do so because of the greater efficiency of the subcontractors, a recognition of the role of specialists, while 10 per cent do so because of irregular demand. Cost savings by reducing inventory costs and machinery or resulting from the lower wages paid subcontractors (16%), are additional reasons for subcontracting, table14. Far more than before, there seem to be a growing user-producer interaction developing among firms in these clusters. 39 percent of subcontractors approach SMEs on process-related problems while over 80 percent do so in respect of product improvements. This might point to a new and important phenomenon of firms collaboration and learning from one another, far more than we found in

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offices to firms. This of course is speculative and no study has been undertaken to test this conjecture.

(Oyelaran-Oyeyinka et al,1996). In order to explore further the links between subcontracting and specialisation, we conducted a number of case studies among the firms, the subject of the next section.

**Table 13: Subcontracting Among the SMEs**

| Do you subcontract? | % |
|---|---|
| Yes | 32.6 |
| No | 67.4 |
| Total | 100.0 |

Source: survey

**Table 14 Reasons for Subcontracting**

| Reasons for subcontracting | Total % |
|---|---|
| Irregular or low Demand | 9.7 |
| Savings on inventory | 6.5 |
| Greater efficiency of subcontractor | 67.9 |
| Lower costs of subcontractors | 16.1 |
| Total | 100 |

## 6.5. Case studies

### *6.5.1 Product Specialisation and the Nature of Market*

Further insights emerged from in-depth interviews with five firms selected on the basis of their reputations as leaders in the sector. Three of the firms started out as agro-processing machinery makers while the other two had planned to specialise in structural engineering products. As in the broader survey, all five of these firms have adequate complements of graduate engineers and technicians. We sought to know from the firms why they diversified into products that were not in their original corporate plans. In what follows, we discuss the responses of firms under five headings:

[13] FAN undertakes engineering contracts for big national agencies like the National Electric Power Authority (NEPA)

**Table 15: Selected Firms and Product Range**

| Firm (size, year established) | Product Mix (Selected) | Reasons, Market orientation |
|---|---|---|
| F1 (1990) Medium Sized | Briquetting Machine,<br>Ice-block making machine<br>Domestic cold room for fish<br>Toilet roll making machine | Exports to Ghana, Benin and Republic of Cameroon. "Don't put your eggs in one basket". Low market demand for single product |
| F2 (1991) Medium Sized | Palm nut cracker<br>Auto candle-making machine.<br>Hammer Mills<br>Cosmetic product plant<br>Cold Stores<br>Bakery oven | Diversification because of idle capacity, low demand for the Product.<br>Established a training centre in collaboration with a Nigerian University<br>Exports to West African Country |
| F3 (1995) Medium Sized | Cassava & instant yam tablet plant<br>Palm kernel oil extraction plant<br>Automatic water processing plant<br>Soap making plant | Specialises in agro-industrial equipment fabrication.<br>Has networks all over Nigeria<br>Exports to the sub region |
| F4 (1992) Medium Sized | Underground Fuel and water tanks<br>Automatic Sachet water and filling machines | Diverse products<br>Firm specialises in civil and structural products and has a team of skilled engineers.<br>We have "the ability to follow the dynamics of the trade which gives us advantage over our competitors" |
| F5 (1973) Medium Sized | Steel structures<br>Underground fuel tanks, motor body building, electric poles | Firm has 2 facilities connected with oil marketers, state governments and hotels |

Source: Survey(2000)

### *6.5.2. Market Size*

According to the firms, demand for specific products have slowed and due to the non-perishable nature of engineering materials; it is unrealistic to expect sales of the same products on a continual basis in a regime of low economic growth rate. This kind of answer reflects the domestic market orientation of these firms, most of whom have earned decent profit in the past

by exploring the large but rather limited, low-quality segments of the Nigerian market. Low growth rate in demand forced them into production of other products easily handled by their extant facilities to reduce idle time and to engage otherwise idle engineers and generate revenue. Most firms attribute slow growth to reduced consumer incomes as a result of devaluation, and in some cases firms in fact claim to have reduced material quality to save costs, in order to meet the kind of price levels affordable by customers. Market size is also limited by poor marketing strategy (most firms rely on pamphlets and trade fairs to advertise their products), as well as poor or non-existent distribution channels. Table 13 shows firm responses.

### *6.5.3. Nature of Production and Product Type*

Engineering production process could be as vertically integrated as process industries (such as refining ), but is much more amenable to discreet operations or done in batches. This is the origin of small jobbing shops such as forges, foundry, and heat treatment and it is largely for this reason that engineering industries are populated by large numbers of small firms. The propensity for multi-products production is high because of the complementarity of skills, a manifestation of technological convergence. Firms therefore capitalise on available facilities to produce different kinds of products because "the facility is available". Machine makers in our sample will fabricate bakery ovens, as readily as they will palm kernel nut crackers since they are all agro-processing products. This so-called concurrent scale economies benefit firms in keeping plants running but slows enterprise movement towards product specialisation. It also leads to the issue of underemployment of skills, which we examine next.

### *6.5.4* Skills Implication of High Vertical Integration

Machinery and component manufacturers in our sample exhibit behaviour consistent with the pattern in developing countries. The tendency to widen product mix implies that the proportions of parts for machining, and fabrication is multiplied. Since firms are unable to keep and in fact unwilling to employ, and train technicians for every separate process, individuals are made to master several unit operations. On the contrary, in a regime of high rates of outputs for single products, there is division of labour which in turn facilitates technical learning, and makes full use of the knowledge, skills, and experience of engineers and technician. (Amsden,1985) suggests that faster growth rates lead to productivity gains for three reasons. First, greater economies of scale and specialisation, second, more investment embodying new technologies, and thirdly, technological learning about production processes. The overall effect is the accumulation of tacit technological capability and ".technological advances when the growth rate of demand accelerates". Importantly, as firms grow in sophistication, better use is made of engineers' theoretical knowledge and the two components of machinery manufacture, machining and assembling begin to receive greater but differentiated attention. Firms then

produce higher quality products as product specialisation grows, capacity utilisation also grows and unit cost drops. The particular phenomenon we find in these firms and our discussions with engineers show that their skills are under-utilised.

A recent survey of firms in food processing, (Adeoti,2001) confirms the relatively high local "skills intensity"[14] of the sector relative to textiles for instance. While the figure for food processing owned largely by Nigerians, is 0.714, that for textiles, dominated by Asians is 0.135. Taken against the absolute percentages, workers with "higher education" in foods and food machinery, and textiles respectively are 29 percent and 23 percent respectively. This may mean that in addition, the textile top management has more non-technical staff, in contrast to what we find in the Lagos clusters where a high proportion of owners have university education. It is likely that given the skills intensity of these firms, engineers and technicians will have been able to meet the competitive pressures arising from demand for high quality products. In other words, specialisation has not been promoted because "the division of labour is not only limited by size and growth rates of the market but also by *type*", (Amsden,1977). The path to higher quality competitive products demanded in export markets is not helped by the pattern of demand and production found in low-income economies. In effect, poor subcontracting of core activities and the resulting lack of specialisation due to the size, growth rates and type of markets, may result in underemployment of skilled labour or a stifling of progress towards local creation of higher engineering skills.

The types of assistance given by SMEs to subcontractors include advance payment, organisations of production and transportation of parts or products, table16. When subcontractors breach agreement (for example delivery of poor quality goods), the contracting firm often requests that the job be re-done and at times offer supervisory assistance to avoid further problems.

[14] Skill Intensity is the ratio of the number of engineering and scientific personnel to the total number of persons employed by the firm. These figures of local skills intensity, relate to the Nigerian engineers and technicians.

**Table 16: Assistance given to subcontractors by contracting firms**

| Types of Assistance | Frequently % | Occasionally % | Never% |
|---|---|---|---|
| a) Advance payment or preferred credit | 71.0 | 22.6 | 6.5 |
| b) Organisation of production | 74.2 | 16.12 | 9.7 |
| c) Lending of machines or equipment | - | 9.7 | 90.3 |
| d) Repair/maintenance of machines | 38.7 | 6.5 | 54.8 |
| e) Training of workers | 9.7 | 25.8 | 64.5 |
| f) Transportation of parts of products | 67.7 | 12.9 | 19.4 |
| g) Data bases providing information services | 16.1 | 54.8 | 29.0 |
| h) Credit guarantee Scheme | 25.8 | 16.1 | 58.1 |
| i) Other technical assistance, e.g. quality assistance, etc. | 38.7 | 29.0 | 32.3 |

Source: survey(2000)

**Table 17: Actions taken when subcontractors break agreements**

| Types of Assistance | Frequently % | Occasionally % | Never % |
|---|---|---|---|
| a) Request that job be re-done | 45.2 | 29.0 | 25.8 |
| b) Deduct same of their payment | - | 48.42 | 51.6 |
| c) Change subcontractor | 19.4 | 35.5 | 45.2 |
| d) Offer supervision to avoid further problems | 41.9 | 25.8 | 32.3 |

Source: survey (2000)

**Table 18: Suppliers approaching SMEs for assistance on process - related problems**

| Do subcontractors ask for production Assistance? | Frequency % |
|---|---|
| Yes | 38.7 |
| No | 61.3 |
| Total | 100 |

Source: survey (2000)

**Table 19: Suppliers Approaching SMEs for suggestions on product improvement**

| Suggestions on product improvement? | Total % |
|---|---|
| Yes | 80.6 |
| No | 19.4 |
| Total | 100 |

Source: survey (2000)

## 6.6. Links with Consulting Organisations

In addition to in-house technical training, accounting, and some other routine functions are contracted to consultancy firms within and outside the clusters. These include legal, management and technical consulting services such as specialised quality assurance services that are provided in the main by private companies within and outside the local area.

In addition to the above linkages, we sought to establish the overall pattern of co-operation among firms. 24 percent confirm formal collaboration with other firms, a significant figure given the tendency of firms in Africa for secrecy. Nigerian entrepreneurs are notoriously individualistic, always seeking to protect trade secrets. In specific terms, 25, 26, and 37 percent collaborate with others in product development, marketing and in purchasing inputs, tables 19 and 20. The core engineering activities predictably are carried out in-house, although this is a pattern not peculiar to Africa. We sought firm perception on the levels of collaboration and this tended to be high in sharing the burden of utilities which 34 percent rate as "high", and 17 percent rate as "average". There is also joint action in security and environmental enforcement, the former an important issue necessary for the protection of factory facilities and warehouses. Some of the factories are located far from residential areas and security can be very expensive in the absence of, or inadequate state protection of properties. Table 22 shows the types of interaction among enterprises. Exchange of ideas on common problems, visits to factories sites of collaborators and rivals alike is a growing form of firm collaboration  Proximity tends to engender inter-firm linkages. For instance, in the repair function which firms consider absolutely key to production, this is carried out by 34 percent of firms within the clusters while only 10.5 are outside agents. Product  development, legal services, and management and technical consultancy are handled by 24, 63, and 59 percent of firms within the cluster.  This is consistent with theory and as (Stiglitz,1987),  observed,."being in the right place with the right idea gives firms the advantage over followers. Being in a position to take advantage of any spillovers gives neighbouring firms an advantage over more distant firms".

**Table 20: Formal Collaboration with other firms**

| Formal working arrangements with other firms? | % |
|---|---|
| Yes | 24.2 |
| No | 75.8 |
| Total | 100 |

**Table 21: Co-operation with other local producers**

| Type of Co-operation | Ikeja | Isolo | Total | |
|---|---|---|---|---|
| | | | Freq. | % |
| Lending machinery | 3 | - | 3 | 5.9 |
| Product Development | 6 | 6 | 12 | 24.6 |
| Marketing | 8 | 5 | 13 | 26.3 |
| Training of workers | 2 | 1 | 3 | 5.9 |
| Purchase of inputs | 14 | 5 | 19 | 37.3 |
| Total | 33 | 17 | 50 | 100 |

Source: Survey(2000)

**Table 22: Ratings by SMEs of Co-operation among Enterprises**

| Level of Co-operation | Frequency (%) | | |
|---|---|---|---|
| | High | Average | Low |
| Sharing of Utilities (electricity) | 33.9 | 16.9 | 49.2 |
| Sharing of tools machines | 7.7 | 19.2 | 73.1 |
| Security and environmental Enforcement | 39.3 | 41.4 | 19.3 |
| Joint savings and credit schemes | 4.0 | 6.0 | 90.0 |
| Training/Apprenticeship | 4.6 | 25.6 | 69.8 |
| Joint Sourcing of materials | 4.0 | 78.4 | 17.6 |
| Joint marketing | 2.3 | 75.0 | 22.7 |
| Joint purchases of expensive equipment | - | 20.4 | 79.6 |

Source: Survey(2000)

**Table 23: Types of Interactions among the enterprises**

| Type of interactions | Frequency (%) | | |
|---|---|---|---|
| | High | Average | Low |
| Exchange ideas or discuss problems or strategies with other local producers | 30.8 | 64.1 | 5.1 |
| Visit production sites of other local firms | 32.1 | 64.1 | 3.8 |
| Visit of other entrepreneurs to the factory | 26.0 | 68.8 | 5.2 |

Source: Survey(2000)

**Table 24: Spatial Determinants of Inter-Firm Co-operation**

| Type of Services | In-plant | | Firms within clusters | | Firms outside clusters | |
|---|---|---|---|---|---|---|
| | Freq | % | Freq | % | Freq | % |
| Repair of Machinery | 30 | 55.8 | 17 | 33.7 | 5 | 10.5 |
| Recruitment of Personnel | 39 | 78.9 | 2 | 4.2 | 8 | 16.8 |
| Product Development | 37 | 73.7 | 12 | 24.2 | - | - |
| Accounting Function | 37 | 73.7 | 8 | 9.5 | 8 | 16.8 |
| Legal Services | 4 | 8.4 | 32 | 63.2 | 19 | 38.4 |
| Staff Training | 29 | 58.9 | 6 | 12.6 | 14 | 28.4 |
| Management/Technical Consultancy Services | 9 | 18.9 | 29 | 58.9 | 11 | 22.1 |

Source: Survey(2000)

## 6.7. Membership of Professional Associations

Almost all the firms in our sample belong to a business association. One of these is the Manufacturers Association of Nigeria (MAN), an influential association of manufacturing enterprises. MAN has state level affiliates and predictably, the Lagos MAN with other subsidiaries at sectoral levels is the most active. MAN activities include circulating to its members information on changing government quarterly and yearly reviews of the state of manufacturing and providing liaison services between members and foreign technical partners. One body that played a crucial role in the survival of SMEs and demonstrated the value of *joint action*, The National association for Small and Medium Enterprises (NASME) was born in the crisis of adjustment but has persisted as an organisation giving voice to SMEs concerns[15].policies,

[15] NASME was formed by desperate industrialists who faced a certain danger of collapse as a result of currency devaluation. Most of the firms had benefited from NERFUND (to which we earlier referred) and had obtained loans at the rate of 22 Naira to a dollar. At the time of repayment, Naira had been devalued to 1 dollar to 86 Naira, the rate at which the terms of loan expected firms to repay. Since most firms sell at the national and sub-regional markets they argued, their repayment could not be denominated to the dollar. Left as individual enterprises, they had no chance, but joint action, and consistent propaganda forced the government to relent and allowed the firms to repay at the original rate of exchange.

**Table 25: Membership of Business Associations**

| Firms belong to any associations | Frequency | | Total No | % |
|---|---|---|---|---|
| | Ikeja | Isolo | | |
| Yes | 24 | 14 | 38 | 76.8 |
| No | 4 | 8 | 12 | 23.2 |
| Total | 28 | 22 | 50 | 100 |

Source: survey (2000)

**Table 26: Types of Associations**

| Major Associations | Percentage |
|---|---|
| Manufacturers Association of Nigeria (MAN) | 33.3 |
| National Association of Small-Scale Industrialists (NASSI) | 16.7 |
| National Association of Small and Medium Enterprises (NASME) | 6.0 |
| Lagos Chamber of commerce | 30.3 |
| Others: National employers Consultative Assembly (NECA), Nigeria-British Chamber of Commerce, Nigeria-America Chamber of Commerce, etc. | 13.7 |
| Total | 100 |

***N/B:*** Multiple membership

About 77 per cent of the respondents belong to an association and the major associations in the clusters are the Manufacturers Association of Nigeria (MAN), National Association of Small-Scale Industrialists (NASSI), National Association of Small and Medium Enterprises (NASME), and the Lagos Chamber of commerce, tables 21 and 22. NASSI is responsible exclusively for small manufacturers while NASME combines small and medium enterprises. There are over 20 such Associations in the country and the working relationships among the various Associations are adjudged by firms to be good, table 25. These leading associations provide members the following services: capacity building, dissemination of relevant information on government policies/incentives, tariffs as well as other information on the activities of other enterprises, international and national Non-Governmental Organisations (NGOs), organising trade fairs and protecting their interests before government. The Associations also provide members the fora for exchanging business ideas, finding solutions to difficult industrial problems such as environmental, infrastructural and legislative matters, table26. Other functions of the associations include joint procurement of inputs, marketing and product development.

Some 78 per cent of the surveyed firms rate the associations as being abreast of information on market development and able to assist their members. 70 per cent of the SMEs credit the

Associations with the capacity for technical guidance to members while about 89 percent of the SMEs see the Associations as effective leaders representing the collective interest of members, table 27.

Some of the Associations are affiliated to foreign Chambers and Federations such as the Franco-Nigerian Chamber of Commerce and Industry (FNCCI), The Nigerian-American Chamber of Commerce and Industry (NACCI), are among the most prominent. These associations are concerned largely with SMEs because the big companies "can look after their own interests". For instance, through the FNCCI, Nigerian firms are connected to the 183 chambers around the world. The Chambers provide information, organise trade fairs for members, lobby for projects, and assist foreign investors in identifying partners.

**Table 27: Working Relationships among the Association**

| Working Relationships | Percentage |
|---|---|
| Very good/Cordial | 65.8 |
| Good | 24.7 |
| Fair | 9.5 |
| Total | 100 |

Source: survey(2000)

**Table 28: Provision of Services by Association**

| Uses | Often % | Occasionally % | Never % |
|---|---|---|---|
| 1. Advice on legal matters | 8.2 | 39.7 | 52.1 |
| 2. To obtain information on other enterprises | 23.3 | 16.4 | 60.3 |
| 3. Capacity building through courses and seminars | 9.6 | 60.3 | 30.1 |
| 4.Dissemination of useful information through bulletins | 21.9 | 50.7 | 27.4 |
| 5. Trade Fair Organisation | 19.2 | 67.1 | 13.7 |
| 6. Obtaining concessions from government and getting government assistance | 65.8 | 20.5 | 13.7 |
| 7. Product Development | 30.1 | 54.8 | 15.1 |
| 8. Joint Procurement of inputs | 34.2 | 47.9 | 17.9 |
| 9. Joint Marketing | 27.4 | 47.9 | 24.7 |

Source: Survey(2000)

**Table 29: Effectiveness of the Associations**

| Effectiveness | Yes % | No % |
|---|---|---|
| Association is abreast of information on market development and is able to assist members | 78.1 | 21.9 |
| Association is able to provide technical guidance to its members | 69.9 | 30.1 |
| Association is an effective leader or voice of the collective interest of members | 89.0 | 11.0 |

Source: survey (2000)

## 6.6. Determinants of Urban and Metropolitan Cluster Formation and Evolution

We summarise in table 30, the main characteristics of the clusters in the urban and metropolitan locations. We have discussed how different attributes have shaped the evolution and performance of the clusters. However, the most striking attribute of the two locations is the influence of socio-cultural factors on the evolution of Nnewi. As McCormick (1997) points out, economic relation among a group of firms has elements of social embeddedness and can be viewed in three different ways. The first is the notion that specific and interrelated social, and cultural factors give rise to different processes of development. Secondly, the notion that those socio-cultural identities provide a foundation for trust and reciprocity in firms dealing with one another; and third, that the social milieu exert strong influence on, and is influenced by, the processes of innovation and technical change. There is evidence from our study that investment decision by firms and the subsequent cluster formation in our rural cluster was strongly predicated on ethnic, family and geographic factors. In the metropolitan clusters, family and kinship factors were less influential but social and professional networks were very important.

The role of education of entrepreneurs seems to be neutral in the choice of location for the rural cluster as other factors tend to be more powerful. The compelling need for investment security, and the unavailability of land in Eastern Nigeria meant that entrepreneurs locate factories within their own “fathers compound” even in the face of high transaction costs (poor road networks and poor power supply). However in the metropolitan clusters, social and professional networks are based on educational attainment of owners and for that reason tend to be a strong determinant of business formation and growth.

Spatial proximity plays different roles. Nnewi firms are part of business associations as are the Lagos firms but the two clusters tend to leverage professional networks in different ways and to different degrees of intensity. The linkage with foreign firms is more crucial to the Nnewi entrepreneur while firms in Lagos have developed greater inter-firm links among themselves.

While in the former cluster collaboration has grown with input suppliers and traders within and outside the country, the latter engage local firms in maintenance, purchase of spares and in sharing of information on technical and market matters. Almost all Nnewi firms have market outlets in Lagos and tend to do much of their transaction there.

**Table 30: Lagos and Nnewi: Comparison of Firm and Cluster Characteristics**

| Characteristics | Lagos (metropolitan) | Nnewi (rural cluster) |
|---|---|---|
| Educational level | Most owners are first degree holders and workers are largely educated | Most owners of businesses are semi-illiterates |
| Age in production | 80% of businesses were established in the last 15-25 years | Similar age structure with Nnewi firms |
| Ownership | Nigerians own all firms; 61% sole ownership while balance has joint private ownership. | Mostly sole proprietorship *by natives of Nnewi*. |
| Relation with support institutions | Average | Very weak |
| Export orientation | West African markets | Exports to West African countries |
| Manufacturing origin of entrepreneur | Diverse backgrounds including previous experiences with MNCs | Most come from trading with close ties with Taiwan and from there moved into manufacturing of same products |
| Geography, spatial proximity | Metropolitans cluster with far greater availability of utilities but poorly maintained. Liberal land policies enable a diverse set of business ownership. Factories are located in industrial areas and spatial proximity a greater determinant of inter-firm co-operation. | A rural enclave with poor roads, and poor power supply. Factories are built on family land. Spatial proximity does not seem to engender horizontal inter-firm co-operation. |
| Ethnicity, family and kinship ties | Accent on ethnicity is not pronounced, social and professional ties tend to be more a determinant than kinship and family. | This is a strong basis for employment and trust is equally based on filial and family ties. Nnewi cluster originates from “this is our land”. |
| Relation with foreign suppliers of machinery | Diffused and non-uniform. Not as strong and enduring. | Very strong ties with Taiwanese partners. |
| Relation with local inputs suppliers and subcontractors | Stronger than what obtains at Nnewi. Sources of supply are wider and there is greater scope for co-operation within the metropolis. | Local resource-based activities have strong trading ties with domestic input suppliers. Core activities are not subcontracted |

# 7. CONCLUSIONS

## 7.1. General and specific findings

a) The study examined the nature and intensity of networks and firm linkages such as subcontracting and membership of trade and industry associations as bases for long-term sustainable development of clusters in Nigeria. Greater sub-contracting tends to deepen local inter-firm linkages, where we assume sub-contracting to be an important type of contractual linkage. We also found greater propensity for collaboration among firms in the metropolitan clusters induced in part by the need to lower transaction costs although these are limited to non-core firm activities. Most firms still undertake most of their production activities in-house. There are a number of specific and important findings from the study with implications for industrial policy. First, the Lagos clusters have relatively high levels of educated entrepreneurs and skilled workers while the Nnewi cluster does not. Due to the type of market that allows firms to produce and sell relatively unsophisticated products it will seem that higher skills levels may not be exploited in the short term. Firms rarely engage in R&D and product and process improvements are of minor kinds undertaken by factory staff relying on experience rather than new forms of knowledge. However, what this would mean for the long term development and competitiveness of clusters remain unclear.

**b)** We found that ethnic and family ties are less important in the two Lagos clusters compared with Nnewi. Thirdly, professional associations are becoming increasingly important as providers of information, as vehicles for fostering collaboration between firms, and between local and foreign associations. Lastly, the role of subcontracting core activities that foster specialisation is still constrained by lack of demand. The size of market, the growth rates and type of market, that is between low-income domestic and high quality competitive export market call forth greater levels of technological skills and in the process lead to greater learning and technological capability acquisition. Technical, market and financial support to clusters remain weak or unavailable.

## 7.2. Policies for Cluster Promotion

There are both general and specific policy implications from this study but the suggestions here are made in very general terms and are by no means uniformly applicable to all clusters in Africa. First the clusters are largely medium sized, with potential for considerable capabilities acquisition; they carry out manufacturing with relatively sophisticated technologies. They are as

such not the stereotypical micro enterprises for which Africa is known. Secondly, some of the firms sell into the export market albeit in the region and are have the potential to expand production but are severely limited by poor public goods delivery-water, power supply, and telephone- facilities that are parametric for goods made by foreign firms with which they compete in the domestic market . Thirdly, the urban cluster firms are owned by individuals, who are resourceful but with limited education, while the metropolitan clusters have a full compliment of skilled owners and workers but equally limited by market type and size. The role of policy therefore appears evident but in reality complicated. First, the provision of basic infrastructure should be made a priority in all industrial clusters. In addition *real services provision* such as training, quality assurance and control, should receive state assistance in collaboration with trade and professional associations. Secondly, a full range of technical, financial, and marketing support services should be studied and adapted for clusters with the objective of making them competitive both locally and globally. The role of education, not limited to formal training should be examined for both the urban and metropolitan clusters. The role played by professional associations was acknowledged by overwhelming proportion of the firm owners; greater collaboration between these associations and the state need to be encouraged. Finally, firms grow when markets expand, and more importantly, when income levels are able to sustain high quality consumer goods. Policies to promote greater purchasing power of consumers should be seen in the light of enterprise promotion, leading to the evolution of higher levels of sub-contracting and specialisation.

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