Enhancing Productivity of Forest Industry through Industrial Clusters Concept

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Abstract

The forest products industry in Nigeria was one of the most developed in the country in the 1960's to early 1970's. During this period, forest resources served as the engine of growth and propelled economic activities in the construction, furniture and packaging industries. It also made Nigeria an exporter of wood products such as plywood, furniture and particleboard. However by mid 1970's, the toll of intensive forest exploitation has started showing and volume of wood export which peaked at 700,000m3 in 1964, decreased to 290,000m3 in 1970. Since the 80's, installed capacity in most of the wood enterprises has dipped considerably. The capacity utilization in the sawmill industry rose from 8,831,750m3 in 1988 to 15,793,188m3 in 1992 and decreased to 10,900,000m3 in 1996. It subsequently increased to 14, 684,000m3 in 2002 and 11,734,000m3 in 2010. This pattern of decrease in capacity utilization was also experienced in the furniture, plywood, particle board and matches producing companies. A major characteristic of the forest industry in the country is that most of the companies operate at cottage and small scale level with 3-5 men workforce. They rely mostly on crude and old implements. The efficiency in most of the enterprises is low, leading to wastages, low quality products and marginal profitability. As industrial clusters have the capacity to rejuvenate local economies, provide competitiveness and create wealth, the formation of the enterprises into industrial clusters will significantly improve efficiency, innovation and quality of products in the forest industry. Clusters also have the advantages of promoting access to loan able funds, support by government and funding agencies in addition to promoting joint actions. Thus, clustering has the advantage of enhancing productivity in the forest sector and promoting access of the wood enterprises to global markets.

Key words: clusters, sawmill, quality control, forest industry, wood processing.

1. Introduction

The forest products industry in Nigeria was one of the most developed within the Nigerian economy in the 1960's to early 1970's. During this period, export of wood products and agricultural commodities provided more than 70% of the country's Gross Domestic Product (GDP).   As far back as 1899, the perspective planning for economic development was to exploit forest resources (Adeyoju, 1975). The export revenue from forestry grows at 4.1%, 8.0% and 28.8% between 1950-60, 1960-70 and 1970-80 respectively (Aribisala, 1993).   The resources served as engine of growth and propelled economic activities in Nigeria as far back as 1792 when pit sawing operation commenced followed by the establishment of a power sawmill in Delta area of the country in 1902 (Aribisala, 1993). These developments led to substantial increase in wood exploitation for utilization in domestic industries and for export. Wood export peaked in 1950's with log and sawn wood and subsequently, veneer and plywood. This trend was maintained and sustained in the 1960's and 1970's. Between 1960-early 1970's, Nigeria witnessed establishment of large scale wood processing companies such as African Timber and Plywood, Sapele ; Epe Plywood, Epe; Nigeria Romania Wood Industry Ondo, and a host of others. Most of the companies were established on bilateral and multilateral basis and were equipped with state of art facilities (Ogunwusi, 2011). This promoted the growth of the economy through the supply of raw materials for the construction, furniture and packaging industries.   It also made Nigeria an exporter of wood products such as plywood, particle boards, furniture, etc (Ogunsanwo, 2010).

However, by mid 1970's, the toll of intensive forest exploitation has started showing and volume of wood export which peaked at 700,000m3 , in 1964, decreased steadily to 290,000m3, in 1970 (Aribisala, 1993).   Among the factors that led to reduction in wood availability is the intensive exploitation of the resources without adequate replacement.   The forest resource survey, 1996-1998, revealed that the forest cover has decreased by 20% over the preceding 18 years.   According to Adeyoju (2001), the total forest estate which stood at 10% of the country's land area in 1996, is now less that 6%. Also, studies by RMRDC (2009) indicated that the total volume of usable wood down to 30cm cutting diameter in the forest reserves is 239,775,500cm3. This is not significantly different from

437,507,205.9m3 reported by Akindele et al (2001).

As a result of the significant reduction in the volume of availability of prime wood species, most of the large industries have collapsed (RMRDC 1991, 2003, 2009; Ogunwusi, 2012). The forest industry is now populated by small scale two to five men operated wood processing companies that are substantially inefficient, wasteful with marginal profitability (GWV, 1993; Larinde, 2010; Ogunsanwo, 2010). The small scale companies operate in isolation and have limited access to finance, technology and skills upgrading (GWV Consultants, 1994). This development has resulted in significant decline in the contribution of the sector to national industrial development. Most of the small scale enterprises operating within the forest industry have low level of productivity, poor quality products and are mostly serving localized markets. Thus, the forest industry has moved from one contributing to export volume to one with high dependence on imported inputs (Ogunwusi, 2011). To remove some of the disadvantages associated with small scale wood processing in Nigeria, it has become imperative that adequate efforts be put in place to ensure their access to optimal production facilities.

One of the ways this can be achieved is by pooling the operatives into associations or clusters in order to promote synergy in operations, marketing and to improve productivity within the sector (Larinde, 2010). This will enhance the performance of the operatives and promote sectoral development (Ledholm and Mead, 1995; UNIDO,1998). For growth and transition to take place, small enterprises must be self sustaining through technological innovation and building of competitive advantages (Musa, 2010). Since most of the small enterprises are unable to build competitive advantage on their own, collective efficiency could contribute to their survival and growth (Schmitz, 1995). This paper examines the role of cluster formation in the sustainable development of the forest industries in Nigeria. It highlights the processes for formation of profitable pro-poor industrial clusters locally.

2. Characteristics of Forest Industry in Nigeria

The forest industry in Nigeria is principally made up of sawmills, furniture, wood based panels and safety match subsectors. The performance of each sector within the industry differs as subsequently discussed.

2.1 Sawmill industry

The installed capacity of the sawmill industry in Nigeria rose from 8,831,750m3 in 1988 to 15,793,188m3 in 1992. It then decreased to 10,900,000m3 in 1996 and subsequently increased to 14, 684,000m3 in 2002 and 11,734,000 m3 in 2010 (Ogunwusi, 2012). The saw mill industry is characterized by small scale operatives who constitute more than 90% of the entrepreneurs in the sector (Ogunwusi 2012, RMRDC 2009, Ogunsanwo, 2010, GWV Consultants, 1993). A major characteristic of the subsector is increasing number of operatives and decreasing performance (Ogunwusi, 2011). The capacity utilization in the industry is averaged 37% and the lumber recovery rate 40-60% respectively as a result of old equipment (RMRDC 2009; GWV Consultants, 1994). According to Olorunnisola (2000), the annual rate of return is between 15.2% and 44.3% while more than 70% of the workforces are manual laborers. The saw mills used outdated technologies while only less than 10% used advance technologies. Although, the sawmill industry has grown from the pit sawing to circular saw head rigs and French manufactured CD4, CD5, CD6 horizontal band saws, mighty mite, brenta vertical, kernali brand, antiglo machine, jevo machine, primultini vertical and forestor (Omoluabi, 1994), there are only few established saw mills that use the Numeric Controlled (NC) devices. Technological improvement in this industry will impact significantly on log to plank conversion efficiency (Ogunwusi, 2011).

Changes in the raw material characteristics such as decrease in log diameter in Nigerian forests also have a strong influence on conversion efficiency (Larinde, 2010). Another major factor limiting growth in the industry is scarcity of economic timber resources. The short fall in installed capacity and actual capacity utilization occurred as the saw mills are structured to utilized large diameter logs which are now limited in the natural forest as small size timber dominate the present composition of Nigeria's forest resources (Larinde, 2010; RMRDC 2003). In Nigeria, round wood processing has reach the limits of available forest resources such that the future increase in wood production and revenue could be derived from further processing of sawn wood rather than expansion in sawmill and exploitation of wood resources (Larinde, 2010). Consequently, Omoluabi (1985), Oyegade (1997) and Larinde (2008) recommended that efforts should be geared towards having most of the wood industries in Nigeria integrated to enable the wood waste or wood materials which are not suitable for one mill to be channeled to other mills that can process them. This is one of the major reasons for encouraging industrial cluster formation for collective

efficiency and growth of the industry.

2.2 Furniture

Capacity utilization in this industry in 1988 was 217,700m3 . This increased to 250,714m3 in 1992 and 326,172m3 in 2010. More than 400 companies exists in this sector while over 10,000 outlets operates at cottage and small scale levels in the informal sector (Ogunwusi, 2012). The furniture industries in Nigeria date back to 1872 when commercial logging commenced in the country. The evolution of the sector is reflective of the diverse influences that have enriched the countries heritage. While the domestic market for furniture is growing rapidly, the sector has not contributed significantly to foreign exchange earnings as it is dominated by small scale operators of about 3-5 workmen (RMRDC 2009; GWV. Consultants, 1994).

The furniture industry uses simple technologies; they have low technical knowhow and low capital input. They are mostly made up of outfits with crude hand tools and equipment (RMRDC, 1991; 2003 and 2009), resulting in poor quality products (GWV Consultants, 1994). The small scale furniture producers are technically inefficient as they fall below efficiency level of 60% (Ako and Kuye, 2010). The implication is that the average furniture producer need 48% cost saving devices to attain the status of efficiency, while least furniture producer need about 88% cost saving devices to become an efficient producer. Most of the small scale operators in this subsector are more interested in quick profit rather than quality control and expansion (NACETEM, 2010). Other problems militating against adequate performance of operatives in this subsector are low level of demand (Arowosoge et al. 2010), poor workmanship (GWV Consultants, 1994), and high level of poverty and long lifespan of furniture products.

2.3 Plywood and Particleboards

Plywood production in Nigeria has reduced drastically in the country as a result of high reduction in the volume of economic wood species (RMRDC, 1991; Arowosoge, 2010). In 1988, the total capacity was 126,000m3. This decreased to 106,000m3 in 2010 (Ogunwusi, 2012).   Face veneer is in short supply as one of the major producers; the government owned African Timber and Plywood has closed operations. It is expected that the privatization of this company will lead to the achievement of goals of the privatization exercise among which are technological innovation and improved productivity.   Currently a considerable volume of face veneer is being imported from Ghana and various parts of Europe (GWV Consultants, 1994). Other problems of face veneer producers are old equipment and lack of spare parts.   Plywood production is capital intensive and consequently beyond the scope of small scale producers locally. Thus the formation of associations and clusters avail significantly promote adequate production of plywood locally. Capacity utilization in the particleboard industry was 12,900m3 and 11,496m3 respectively in 2002 and 2010 respectively. Current production is hampered by high cost of production resulting primarily from high cost of imported resins.

2.4 Matches

Seven safety matches operated in Nigeria in the 1980's. These reduced to 3 in 2010 (Ogunwusi, 2012).   The low cost of imported matches in juxtaposition with the high cost of those produced in Nigeria make local production an unprofitable enterprise.

2.5 Wood treatment plants

Capacity utilization has been decreasing constantly in this subsector. Capacity utilization decreased from 55,100m3 in 1988 to 12,370m3 in 2010 (Ogunwusi, 2012). While the need for preservative treatment of wood is becoming germane as a result of decrease in ages and diameter of remaining wood species in the forests, the treatment plants in the country are closing down by the day as a result of old age of equipment.

3.0   Problems Militating Against Optimal Performance of Wood Industry in Nigeria.

Some of the problems militating against optimal performance of the wood industry are highlighted below.

3.1 Domination of the Subsector by Small Scale Operators

The industry is dominated by cottage and small scale processeors(Ogunwusi, 2011, Olorunisola, 2000). Small scale enterprises play an important role in the processing and marketing of wood and non-wood   products (Kozak, 2007).   According to FAO (2005), small scale enterprises are usually characterized by small size, simple technological operations, low technical knowhow and low capital input. Arnold (1994) classified   small   scale enterprises as organization that employs a minimum of five workers with 50 workers as ceiling. Traditionally, small

scale enterprises are designed to meet the demand from local market and beyond local market, requires scale up in the value and volume of production (Panshin, 1980). According to Daravan et al (2006), many small scale enterprises lack the necessary skills and resources to operate efficiently and are ill prepared to deal with the problems of production and management. In the small scale furniture businesses in Nigeria there is general lack of incentives for quality work (GWV Consultants, 1994). Most of the companies are in serious need of good basic hand tools such as chisels, hammer, saws, screw drivers, etc (GWV Consultants, 1994). They also need access to power tools and parts, new equipment and replacement parts (GWV Consultants 1994). Most of the small scale operators are more interested in quick profit rather than quality control and expansion (NACETEM, 2010).

3.2 Energy Generation

A major problem limiting adequate performance of the wood industry in Nigeria is infrastructure. The most important of this is energy. The processes involved in the processing of wood items are strictly tied to the use of equipment and machineries which are powered by electricity. Most manufacturers in Nigeria depend on alternative energy supply for full operation (Aku, 2009). According to Aku (2009), the cost of diesel is over N2.0 million on monthly basis, leading to high cost of production. As most trucks uses diesel, the prohibitive cost of movement of both raw materials to the firm and movement of finished products becomes very difficult, expensive and dangerous. According to the Manufacturers Association of Nigeria, about a hundred factories had their plants shut down annually between years 2000 to 2008 due to high cost of generating power (Yusuf, 2009). If the problem of energy is removed, Nigeria will gain 30% competitiveness in production (Bamikole, 2007).

3.3 *Finance*

Despite the various monetary, fiscal and industrial policy measures which the government has embarked on to promote the development of Small Medium Enterprises (SMEs), it is still difficult for industries in Nigeria to access funds. Although, the Bankers Committee in collaboration with Federal Government arrived at a conclusion whereby 10% of the bank's pre-tax profits would be set aside for equity investment in small businesses inform of Small and Medium Industries Equity Investment Scheme (SMIEIS), it has been difficult for investors to access the fund. The major problem is the sole ownership nature of SME's in Nigeria. This become more difficult as the SMEs does not have adequate accounting system that shows growth in profit and loss accounts. The consequence is the extreme difficulties SMEs face in accessing the N200 billion SME bailout fund (Bamikole, 2007). The recent proclamation by the Central Bank of Nigeria (CBN) that the pre-tax 10% profit contribution to the fund is optional has placed serious limitation on the growth of the fund.

3.4Difficulty in Clearing Imported Machines, Equipment and Spare Part

The difficulty in clearing imported facilities at the sea port as a result of ports congestion is a major impediment to manufacturing in Nigeria (Aku, 2009). This usually results in payment of demurrage and terminal charges. It takes a minimum of three months to obtain container deposits. The consequences of these are missed deadlines, cancellation of orders, inability to meet speedy and punctual delivery of finished goods (Arowosoge, 2010).

3.5 Marketing of Finished Products

The local demand for finished products of Small Scale Furniture Operators (SSFO) in Nigeria is low (Arowosoge et al, 2010). This is due to poor workmanship (GWV Consultants, 1994), high level of poverty and the long lifespan of household furniture items. Consequently, Arowosoge et al (2010) advocated the need for the furniture industry to operate at the global market. However, for small scale furniture businesses to access the export market, government must provide the necessary policy and regulatory environment to make local goods compete favourably with goods from other countries.

3.6 Ineffectiveness of the Ban on Furniture Importation

While the ban on furniture importation facilitated the establishment of medium and small scale furniture making enterprises, the high incidence of smuggling is making the ban ineffective (Aku, 2009). Nowadays, most offices and houses built by government patronize smuggled furniture to the detriment of locally made ones (Aku, 2009). The ban on furniture items also led to the ban on synthetic leather and upholstery fabrics that are required in the furniture production process (Dada, 2011). The rising cost of local production, juxtaposed with low prices of imported furniture items served as a major dis-incentive to small scale producers (Ahuma-Young, 2011).

3.7 Inadequate availability of Skilled Manpower

Unavailability of skilled manpower is a very serious challenge to production of quality wood products locally. The paucity of skilled manpower is prevalent in the industry as technical schools are very few and not many people are willing to make a career of sawmilling and furniture making (Dada, 2011). Although, manpower training in the private sector of the wood based industry is carried out to a certain level, it has little or no link with formal education (RMRDC, 2004).

3.8 Poor Quality Control Standard

In adherence to well defined standard procedure and processes is a bane of the furniture business in Nigeria (GWV Consultants; 1993, Ogunwusi, 2011). For instance the standard practice is to use kiln seasoned wood for furniture items. In most cases, as a result of lack of facilities, most small scale furniture manufacturers use air dried or green wood. This increases products susceptibility to attack by wood destroying agents (RMRDC, 2009).

4.0 Role of Forest Industry Cluster in Sustainable Industrial Development

The business environment in Nigeria poses lots of challenges to investors. With problems of policy somersault, poor infrastructure and high lending rates; there is need for adequate innovation and careful planning to keep businesses running. Innovative clusters have the capacity to transform and revitalize local economies, provide economic competitiveness, wealth creation and jobs (OECD, 1992; UNCTAD 2007). The industrial cluster concept dates from the last century and has captured the imagination of policy makers, scholars and governments in the last decade. Porter (1990) observed that a localized concentration of horizontally and vertically linked firms can create and sustain competitive advantage. Clusters can be defined as a group of business enterprises and non business organisations for whom membership within the group is an important element of each of the member firms individual competitiveness (Bergman and Feser, 2011). Binding the cluster together are buyer – supply relationships or common technologies, common buyers or distribution channels or common labour pools (Enright, 2000). In most cases, non-business associations such as industry associations, technical and community colleges with specialized industry programmes, universities, government industrial extension programmes, commonly referred to as critical related supporting institutions are often part of the cluster. In many countries, the formation of industrial clusters has led to the success of several industries in the global market. According to Porter (1990), the success of any firm can be attributed to the nature of strategy, structure and rivalry in the country including attitudes towards competition, (ii) the basic endowments such as natural resources or the cost of unskilled labour versus knowledge and technology related factors, (iii.) nature of local demand for foreign or domestic goods as well as the existence of local industrial demand for related intermediate goods, and (iv.) the presence of related and supporting industries including suppliers and successful competitors to stimulate competition and rivalry.

All these operate to promote constant upgrading of processes and techniques and to seek new opportunities. Competitions also provide opportunities for cooperation in solving joint problems or addressing industry wide issues. For example, the Brazilian shoe cluster of Snior Valley is one of the world's leading producers of export oriented leather shoes (Neto, 2008). Among the factors that led to the success of the cluster are backward linkages that shoe producers have with local suppliers of inputs, such as machinery and services, forward linkages between producers and buyers, and the strategic intervention of local support institutions in facilitating the clusters ability to move into higher value added product markets (Neto, 2008; Nadvi, 1995). Likewise the major factors that promoted the success of East Asian clusters is the successful imitation and assimilation of technologies, the formation of geographically dense industrial clusters consisting of large members of small enterprises producing similar and related products and the advent of multifaceted innovations. Locally, the Aba industrial cluster proved the possibility of achieving industrial development through the cluster initiative. In the late 80's, the cluster has over 11,000 enterprises located in 6 main sub-clusters and provides employment for almost 20,000 labour force with a turnover of more than US$100 million (Amobi, 2006). On the average, the association have between 16 – 28 lines with 5 of the sub-clusters producing footwear, 85% of which are ladies footwear while the 6th sub-cluster mainly produce travelling bags, school bags, ladies bags, wallets, belts and other related products (Amobi, 2006). The industry has

developed a niche in the domestic market in labour intensive inexpensive imitations that are able to compete with larger, capital intensive-producers in Lagos due to relative low labour and overhead costs (Amobi, 2006). Thus, when small manufacturing enterprises cluster together, they have the potential to gain from local external economies and collective efforts (Schmitz, 1995; Nadvi 1995; McCormick,1988). Thus, enterprises have the capacity to engage in flexible specialization where they perform certain operations or produce certain types for other enterprises (McCormick, 1988). These joint actions enable small enterprises to derive competitive advantage from external economies. Collective efficiency is facilitated by clustering on a number of factors including product specialization, rapid production of specialized products, emergence of suppliers, emergence of service producers, marketing agents, pooling of skilled labour and formation of consortia or association for specific services and lobbying (Schmitz,1995).

5.0   Importance of Cluster Formation in the Forest Industry.

The increasing global attention being diverted to issue of poverty in developing countries has made it necessary that efforts be made to promote programmes and actions that will lead to poverty reduction on global basis (UNIDO, 2004). Poverty reduction is at present of global concern (UNIDO, 2004). The leading industrial and developing countries are proposing to reduce to half, the portion of household with income per person or less than US$1 per day by 2015 (UNIDO, 2003). Poverty is also increasingly being acknowledged as a multidimensional problem that involve more than depravation of income but also lack of freedom, increase vulnerability to risk and powerlessness (UNIDO, 2003). According to World Bank (2001), meager assets, capabilities and accessibility to market as obtained in clusters are the key to poverty reduction. In Nigeria, rural poverty is high and upward surging since 1980 (Akpomuvie, 2009). Data from the federal office of statistics on the poverty profile in nigeria showed that the incidence of poverty rose from 28.1% in 1990 to 46.3% in 1985, but dropped slightly to 42.7% in 1992 before rising to 65.6% in 1996 (FOS; 1999). The specific causes of the poverty phenomenon have been identified as inadequate access to physical assets such as land and capital, inadequate social infrastructural facilities, lack of equipment, amongst others. Although successive governments have designed various rural development programmes to eliminate or reduce poverty, they have not worked as expected due to income inequality and a weak private sector to augment policy and programmes (Stephen and Lenihen, 2007).

Industrial clusters lead themselves to poverty concerns both directly and indirectly through employment, income and well being generated for the working poor and indirectly through their wider impact on local economy (UNIDO, 2004). Conceptually, clusters and poverty are related in three distinct ways: through cluster features, cluster processes and cluster dynamics. Certain types of clusters such as those established in rural areas and urban informal areas, those with predominant SMEs, microenterprises and home workers and those that employ women, migrants and unskilled labour have a more direct impact on poverty (UNIDO, 2005). Agglomeration economics reduce costs and raise the capabilities of workers and producers. While few studies have explicitly address cluster and poverty, a review of existing evidence underlines the relationship between cluster and poverty. There is substantial evidence that cluster generate employment and income for the poor in developing countries and on their growth dynamics (UNIDO, 2005). In incipient cluster, small producers advance by taking small risk able steps in coordination with others in the cluster. This allows small producers and workers to grow, thus raising their income and well being. Local agglomeration economics are central to growth and income generation and well being in those engaged in incipient as well as matured clusters from rural Indonesia, to the urban informal sector in Lima to the export clusters of Mexico, Brazil and India. Joint action also assists producers and workers to confront external shocks and give way to external linkages (UNIDO, 2005). Clustering not only raises employment opportunities and incomes for the poor, it can also have wider implications of notions of poverty – addressing the issues of risk, vulnerability, empowerment and participation for poor and marginalized groups.

A poverty-focused strategy requires stronger attention to people within clusters, namely entrepreneurs and workers, their households and the wider community. Thus a pro poor cluster development strategy may require the tweaking of existing cluster initiatives (UNIDO, 2004). It would also need to consider new areas of intervention and forms of policy networks that brings together various civil society and public actors which can effectively promote poverty and social development within the cluster (UNIDO, 2004). For instance, UNIDO's intervention in the support of the Jai-pur block printing cluster in India has helped to develop a community of largely informal, often home-based, urban artisanal producers of block-printed fabrics, many of which lack formal education qualifications, into producers for more demanding national and export markets (UNIDO, 2002). Through intervention that sought to

promote the development of inter-firm collaboration and provision of business development services, a number of poor communities, especially women, acquired tools, improved skills and thereby raise their capabilities (UNIDO, 2002).

6.0 Strategies for Establishment of Wood Processing Clusters in Nigeria

Although, there is limited understanding of how innovative clusters emerge (Freeman and Soete, 1997), the need to access basic requirements leads to clustering. Entrepreneurs are a critical element in the formation and vibrancy of firms. Schumpeter (1942) described entrepreneurs as active agents that organize resources and the environment to be conducive to their pursuits. Through the creation of new companies, entrepreneurs spark regional industrial transformations and with time, a cluster become entrenched as the success of early entrepreneurs attract venture capital and specialized labour to the region as institutions and government enact policies to promote the cluster. According to Yamawaki (2001), the evolution of industrial clusters is brought about by a variety of circumstances ranging from existence of industries to technology transfer from other clusters, availability of a pool of workers, foreign technology input, import substitution and creation of new infrastructure. The furniture cluster in Morodomi in Saga prefecture in Japan was formed as a result of a toll bridge built over Chikugo river connecting Ohakwa and Morodomi at the point where furniture producers at Ohakwa were searching for new locations to expand its manufacturing base (Yamawaki, 2001).

Forest industry clusters in Nigeria could be established by investors or associations within the industry. The initiative could be supported and promoted by government through its agencies as the Raw Materials Research and Development Council. Figure 1 presents a schematic relationship and interdependencies between government policy, entrepreneurs and environmental factors that influences formation of industrial clusters. In the diagram, the local environment which includes research and business institutions, physical and human resources coupled with government policies influence entrepreneurship decision. In a well functioning entrepreneurship system, each component reinforces the other, promoting industry development and evolution of a cluster. Once the incentives and the environment are aligned, the result is a fully functioning industrial cluster that is able to sustain economic growth as well as withstand adverse shocks. For instance the Nnewi Automotive Parts Industrial cluster is a huge success story that depicts how an informal cluster can survive and succeed. According to Okoye (2006), the key critical success factors of the manufacturing cluster are active participation by industrial associations, high entrepreneurial spirit as well as investment in training and capacity to imitate and assimilate foreign technology.

The primary objective of establishing forest industry clusters is to remove isolation and barriers that have eliminated profitability of the small scale forest industries in Nigeria. In line with UNIDO (2006), the purpose will be to encourage small scale enterprises which are located in close proximity to come together as a group to promote their rapid economic growth, efficiency, production of high quality products for export, employment generation and creation and preservation of high value added jobs. For optimal achievement of the objective of the formation of pro poor clusters, there is need for the planners either in government, development institutions or associations to strategize as follows:

6.1 Utilization of Standard Process Equipment

There is need for provision of standard process equipment for production of components to international standard (GWV 1994). The hand and un-powered tools currently employed by small scale entrepreneurs are out place in modern wood processing industries. In the furniture companies for instance, the basic equipment required are seasoning kilns, wood treatment plants, cross cutting machines, saw doctoring facilities, etc. These could be centrally located or duplicated within the clusters to enable members have access to them. The type of equipment to be located within the cluster will be dictated by the final product. There is need to develop strategic supply alliances to allow each entity to focus on areas of core competencies (Porter, 1998). Special intervention funds for the procurement of equipment and machinery could be obtained from funding institutions, cooperatives, government agencies such as the Raw Materials Research and Development Council or raised by the associations involved (Ogunwusi, 2011). Each business outfit within the cluster will use the facilities at standard costs.

6.2 Training and Innovation

The primary objective of training small scale wood processors in the cluster will be to ensure a paradigm shift in the business of designing and manufacturing of quality wood products. According to Oyelara-Oyeyinka and Lal (2006)

on increase of 1% in the number of trained workers potentially increase value added of firms by as much as 60%. The initial training should be based on export market specifications. There is also need for contacts with research institutes such as Forestry Research Institute of Nigeria or it's out stations on design and products improvement. This is necessary as the supply base of prime wood base is depleting and the need for complementary use of alternative raw materials is becoming important. Research on appropriate treatment methods, innovations on optimal utilization of solid wood and wood wastes are also imperative. Tertiary institutions such as Departments of Forestry and Wood Products Engineering in relevant universities should also provide training on innovation for operatives. In most cases, innovations should be directed towards cost reduction and competition (NACETEM, 2010). Also research and training institutions should help sustain perpetual research and innovation necessary to continuously generate new products and open new markets (Freeman and Soete, 1997). Already in Nigeria, Oyebisi et al (1996) reported that industry-university interaction do exist, but at low levels. This type of interaction is important to enable clusters internalize knowledge developed elsewhere (Rosa and Mohnen 2008).

6.3 Marketing of Products

There is need for development of marketing outlets for the products of the industrial clusters. High quality hardwood furniture produced to international specification and standards will find market in most developed countries (Aku, 2009). There is also need for development of a comprehensive marketing consultancy for all the products within the cluster so as to ensure that the products are marketed professionally (Schmitz, 1995).

6.4 Raw Materials

This is one of the important issues in clusters development (Yamawaki, 2001). The primary raw material, wood is available locally. Although some secondary raw materials such as resin binders are produced locally, the qualities are poor and cannot meet standard specifications required by the export market. Consequently, there is need for alliance on import of secondary raw materials such as adhesives. Research Institutions and Universities within and around the clusters should innovate on development of high quality substitute raw materials for use in the clusters. To promote afforestation and smooth operation within the clusters, government may give concessions to the clusters authorities with the proviso that they are replanted.

6.5Provision of Infrastructure

Cluster authorities should provide relevant infrastructure such as energy, road and water within the cluster. This is imperative as energy generation by government agencies has proved unreliable over the years (Aku, 2009). The procurement, installation, servicing and fuelling of generators for day to day running of operatives should be handled centrally to optimize efficiency. Successful operation of regional clusters may attract funding agencies and banks, etc., as impediments associated with individual ownership have been removed (Ogunwusi, 2011).

7.0 Conclusion

The forest industry in Nigeria as it is presently constituted is highly inefficient, wasteful and highly disorganized. Several factors make the establishment of clusters for wood processing imperative in the country. These are decreasing availability of industrial wood, low access to investible funds, leading to utilization of obsolete and highly inefficient equipment and inability to produce to the standard required in the international market. These three factors have conspired against optimal productivity in the sector. The need to remove the constraints has become obvious. One of the ways of achieving increased productivity is to promote formation of clusters, thereby, promoting industrial ecology and joint action in the industry.

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Figure 1:   Factors in the Formation of Clusters