

EFFECTS OF TECHNOLOGICAL CAPABILITIES, INNOVATIONS AND CLUSTERING ON THE PERFORMANCE OF FIRMS IN THE NIGERIAN FURNITURE INDUSTRY

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ABSTRACT The paper evaluates the effects of Technological Capabilities, Innovations and clustering on the performance of firms in furniture making industry in Southwestern Nigeria. The aim is to recommend policy measures to enhance the innovative performance of the furniture makers. The research covered Lagos, Oyo, Ondo and Ekiti States because of the predominant of the industry in these selected locations. The sample population consisted of 319 furniture makers. The research instruments were questionnaire and personal observation approaches. The questionnaire was administered to furniture makers and elicited information on the effects of Technological Capabilities, Innovations and Clustering on the performance of firms in furniture industry in Southwestern Nigeria. Personal observation was used to obtain more information on the industry. Both descriptive and inferential statistical techniques were employed for data analysis. The result shows positive impact of technological capabilities, innovations, and clustering on the performance of the firms on new furniture products produced monthly through adaptation or modification on office furniture, cabinet, upholstery, beds, doors among others. Furniture makers benefit immensely from clustering notably in the area of sharing furniture experience from one another. The ideas of adaptation of furniture were obtained from brain storming of the master furniture makers with their colleagues and apprentices, while catalogue, photograph, magazine and their creativity were instrumental to minor modification of furniture products. Interaction between institutions and Furniture Makers needs to be strengthened to avail them of access to technical support services which institutions can render to the industry. So also financial institutions should finance the industry without interest rate.

KEYWORDS: Technological Capabilities, Innovations, Clustering, Furniture Industry

INTRODUCTION

Technological capabilities are the resources needed to general and manage technical change. They include such things as skills, knowledge, experience, institutional structure and linkages. It encompasses the variety of knowledge and skills, firms, big or small, required to acquire, assimilate, use, adapt, change and create technology (Akinbinu, 1998). Abdullahi and Ajoku (2001) explained that technological capabilities involve issues surrounding the acquisition of necessary skills for investment, production and learning. These authors refer to investment capability as the skills required identifying feasible projects, sourcing of suitable technologies, plant design and engineering, erection or installation, commissioning and start up.

Innovation is seen by Ilori, (2002), as a new thing applied in the business of producing, distributing and consuming. It can also be the first commercial transaction involving the new product, process, system or services. Adeoti (2002) also puts it as the commercial application of an invention which also includes the adaptation and improvement of existing innovations. Akinbinu (2001) lists five types of innovation. These are: adaptive innovation, incremental innovation, original innovation, revolutionary/radical innovation and imitative innovation. The adaptive innovation is an activity that is directed at modifying the technical basis of production process prior to full scale. Incremental innovations are also referred to as autonomous technical dynamism. Original innovations bring about new products entirely but their technical/scientific basis may not be new. Radical/revolutionary innovations are innovations that are new in the locality.

A cluster in its ordinary meaning refers to a group of people or things that are very close to each other. In its application to the business environment, a cluster retains its essential values, that is, the coming together for a common purpose. In technical form, a cluster is a geographical concentration of interconnected businesses, specialized suppliers, service providers and associated institutions. A cluster is defined as an industrial district and a set of companies located in a relatively small geographical area. The companies work, either directly for the same market. Their shared range of values and body of knowledge is so important that they define a cultural environment, and that they are linked to one another by very specific relations in a complex mix of competition and cooperation (Brusco 1992, and Oyelaran- Oyeyinka, 1997). The linkages among firms in a cluster mutually reinforce and enhance their competitive advantage. Members of the clusters could be competitors that produce similar products or customers that patronize similar producers, partners, suppliers among others (Rojas, 2007).

In sub-saharan Africa, clustering is usually associated with informal and formal enterprises. This show cases characteristics that are hallmarks of SME, like clusters in other parts of the world (Akinbinu, 2001). The United Kingdom and some organisation for economic cooperation and development (OECD) countries believed that small and medium enterprises are major sources of technical change in the industrial sector (Freeman, 1987). Akinbinu (2003) states that industrial clusters in Nigeria are found around Oluyole industrial estate Ibadan, Otta, Ilupeju and Apapa wharf in Lagos state, all in Southwestern Nigeria. There are others located in Kano–Kaduna axis, in the Northern Nigeria, Onitsha, Ugheli and Nnewi axes, and the port Harcourt and Warri axes both in the Eastern part of Nigeria. Akinbinu

(2003) further suggested that the SME clusters in the Southwest are “constructed clusters” with essential infrastructures but devoid of the extensive collaborative arrangement of the European model. But these clusters have strong cooperation among themselves. Oyelaran-Oyeyinka, (1997) mentions that there are trading cooperation, intense competition, entrepreneurial dynamism and trust within the Nnewi industrial clusters. It was also observed (Olufemi, 2005) that in the plank markets in Ibadan and Akure, there exists some clustering of carpenters and furniture manufacturing workshops purposely to access purchase of cheap raw materials.

In Ibadan for instance, clustering of carpenters are found in Bodija, Sango, and Sawmill plank markets. Oyelaran-Oyeyinka (1997) observes that in Nnewi technological learning is a common characteristic of the industrial clusters. He observed that firms acquired product capacity by copying designs from products imported from other parts of the world, and also firms learnt process technology of quality control and industrial engineering. The automechanic clusters studied in Ibadan by Akinbinu (2001) also notes that mechanics advanced their skills through technological learning. Therefore, district clustering enhances technological learning and industrialization (Kim, 2007).

Contribution of the Study to Knowledge.

This research study provides information on the technological capabilities possessed by furniture makers. It also provides information on the extent and nature of innovations carried out in the industry and their effects on performance.

THEORETICAL FRAMEWORK

A firm’s technological capability is developed over time and accumulated through its past experience. It is a reflection of firm’s ability to employ various technical resources (Afua 2005). Firms with superior technological capability are likely to generate innovations and become highly competitive.

In this framework, there are two different environments which are endogenous and exogenous with a number of actors which are important for technological building. Within the endogenous environment of the model, stock of skilled labour plus infrastructures form the basis of technological capability building in a firm. These capabilities are marketing, production, major and minor and investment capabilities. The exogenous environment consists of many institutions such as government, tertiary institution, financial institution and customers/suppliers whose linkage with industry enhance technological capability building.

Interaction among the actors of both endogenous and exogenous environments will lead to strong dynamic capabilities (Teece et al, 1997). This is a capability within the industry which permits the firms to create new products and processes innovations which respond to changing market environment (Teece et al, 1997).

RESEARCH METHODOLOGY

The study was carried out in southwest Nigeria; comprising Lagos, Oyo, Ondo and Ekiti States. The whole area is located within the region known as lowland humid tropical rainforest. It is characterised by wet and dry season (Dada, Jibrin, and Ijeoma, 2006)

For the purpose of this study random sampling method was used from the furniture makers. Primary data was obtained using structured and unstructured questionnaires. Three hundred and sixty (360) questionnaires were administered to the furniture makers who had experience and technological capabilities, innovations and clustering of firms in the Nigerian furniture industry. The reliability and validity of the questionnaire was based on the use of rating scale to elicit information on the effect of technological capabilities, innovations and clustering on the performance of firms in the Nigerian furniture industry. A total of three hundred and nineteen (319) questionnaires were returned and found useful which amounts to a return rate of 88.61%. the questionnaire was subjected to content validity. The data collected were analysed with the use of both descriptive and inferential statistics. Patronage by customer as a result of innovative activities derived by furniture makers from clustering were measured on 5 point scale with 1-not at all, 2-Rarely, 3-Occasionally, 4-Usually and 5-Always.

RESULTS

Table 1: Majority (83.1%) of the respondents produced between 1 – 10 new cabinets every month. 12.2% of the furniture makers produced between 11 and 20 pieces of new cabinet monthly. Furthermore, 3.2% of the respondents also produced between 21 – 30 cabinets per month while 0.9% and 0.6% of the respondents claimed to have produced between 30-40 and above 41 cabinets monthly respectively. Torum and Cicekci (2007) reported that innovation is today the crucial source of effective competition, profitability, economic development, and transformation of the society.

Majority (77.7%) of the furniture makers produced between 1 – 10 sets of upholstery per month. Similarly, about 13.2% of the respondents produce between 11-20 sets of upholstery monthly. Furthermore, about 6.3% of the respondents produced between 21 – 30 upholstery monthly while 2.5% and 0.3% of the respondents reported that they produced 31 – 40 and above 41 sets of upholstery every month respectively. According to the furniture makers, the cost of raw materials for production of upholstery was very high. This high cost dictates the price of upholstery. In turn it has negatively affected the rate of customer's patronage.

Table 1: Majority (81.5%) of the furniture makers produced between 1 – 10 beds per month. Similarly, 12.2% of the respondents also claimed that they produced between 11 – 20 beds every month. Furthermore, about 4.1% of the furniture makers reported that they produced between 21 – 30 beds every month while 0.9% and 1.3% of the respondents produced between 31 – 40 and above 41 beds per month respectively. Majority (67%) of the respondents produced between 1 – 10 doors per month (Table 1). Similarly, 14.4% of the respondents produce between 11-20 doors monthly. Furthermore, 6.6% of the furniture makers produce between 21 – 30 doors every month, while 5.3% and 4.7% of the respondents produced between 31 – 40 and above 41 doors every month. The furniture makers claimed

that different door styles were produced according to the request of buyers. The production of doors was higher than other furniture items.

Generally, Table 1 indicated high performance by furniture makers as a result of their technological capabilities and innovations. The effect of technological capability and innovations were more felt on door, bed and upholstery making where different styles of the products were produced. The study revealed that the number of office furniture produced by majority of furniture makers was very low. This may be due to economic melt-down which affects establishment of more business outfits in Nigeria.

Table 1: Result of the number of furniture products produced monthly through innovations and modification/adaptation

Types of furniture and quantity	States				Total	Percentage
	Lagos	Oyo	Ondo	Ekiti		
Office furniture						
1 – 10	64	120	48	42	274	(85.9%)
11 – 20	6	3	12	12	33	(10.3%)
21 – 30	4	0	1	3	8	(2.5%)
31 – 40	1	0	0	2	3	(0.9%)
Above 41	0	1	0	0	1	(0.4%)
Total	75	124	61	59	319	(100%)
Cabinet						
(i) 1 – 10	57	116	48	44	265	(83.1%)
11 – 20	10	5	11	13	39	(12.2%)
21 – 30	5	2	2	1	10	(3.2%)
31 – 40	2	0	0	1	3	(0.9%)
Above 41	1	1	0	0	2	(0.6%)
Total	75	124	61	59	319	(100%)
Upholstery						
1 – 10	48	114	49	37	248	(77.7%)
11 – 20	8	7	10	17	42	(13.2%)
21 – 30	14	1	2	3	20	(6.3%)
31 – 40	5	1	0	2	8	(2.5%)
Above 41	0	1	0	0	1	(0.3%)
Total	75	124	61	59	319	(100%)
Beds						
1 – 10	65	111	47	37	260	(81.5%)
11 – 20	5	8	10	16	39	(12.2%)
21 – 30	3	2	3	5	13	(4.1%)
31 – 40	1	0	1	1	3	(0.9%)
Above 41	1	3	0	0	4	(1.3%)
Total	75	124	61	59	319	(100%)
Doors						
1 – 10	55	96	42	27	220	(67%)
11 – 20	12	13	11	10	46	(14.4%)
21 – 30	4	3	7	7	21	(6.6%)
31 – 40	3	4	1	9	17	(5.3%)
Above 41	1	8	0	6	15	(4.7%)
Total	75	124	61	59	319	(100%)

Table 2 shows patronage by costumers as a result of innovative activities of the furniture makers. The mean rating of the patronage was 3.8 which indicated that costumer's usually

patronize them because of their innovative activities. Similarly, Table 4.31 also presents the results of how productively are furniture makers which made them to be highly patronized. The mean weighted average of 3.7 also indicates that the furniture makers were usually engaged. The above revelations implied that many customers patronize the furniture makers.

Table 2: Rating of patronage by customer as a result of innovative activities of the furniture makers

Customers visits	States				South-western
	Lagos	Oyo	Ondo	Ekiti	
How customers visit furniture makers due to capability and innovation activities.	3.6	4.1	3.7	3.8	3.8
How busy are the furniture makers due to capability and innovative activities.	3.7	3.4	3.9	3.9	3.7

Key:

Always (AL)	=	5,
Usually (US)	=	4,
Occasionally (OC)	=	3,
Rarely (RA)	=	2,
None (NO)	=	1.

Figure 1 presents the result of monthly profits made by furniture makers due to their innovative activities. From the figure, 24.1% of the furniture makers earned between ₦21,000 – ₦30,000 each month. Similarly, 20.4% made an average monthly profit between ₦11,000 and ₦20,000. Furthermore, 16.3% of the respondents made between ₦40,000 – ₦50,000 profits every month. So also, 15.4% of the furniture makers made profits between ₦1000 – ₦10,000 every month while few 11.6% and 10.3% earned above ₦51,000 and between ₦31,000 and ₦40,000 profits per month respectively. Oyelaran-Oyeyinka (2006) reports that innovation often generate benefits, however majority (59.9%) of furniture makers in this study earned too little profits monthly. This income is inadequate to sustain furniture makers' family especially in Nigeria where inflation rate is high. The respondents that earned substantial profits ₦(31000-50000) per month was 38.1% of the master furniture makers.

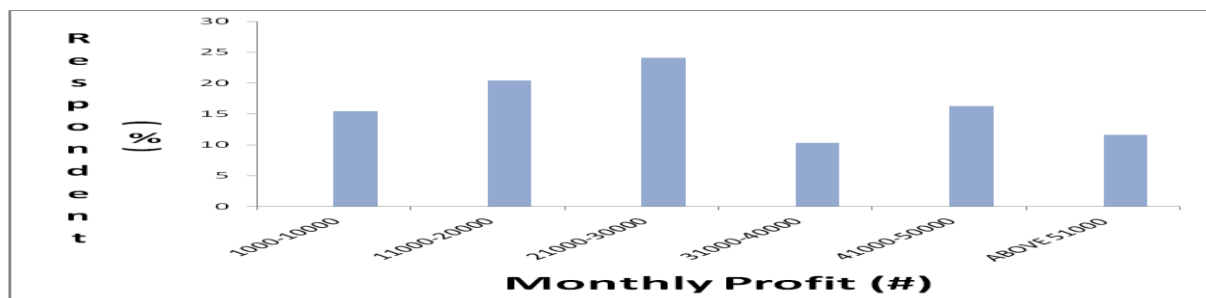


Figure 1: Monthly Profits made by Furniture Makers due to their Innovation Jobs

Table 3 presents result of cooperation among furniture clusters in the study areas. The result reveals cooperation that existed in a few areas. These forms of cooperation are: joint purchase of generator (22.55), *Esusu* contribution (18.2%), cooperative thrift and credit societies (15.0%). No cooperation existed in provision of well water, provision of toilet, provision of roads among others.

Table 3: Areas of cooperation of furniture making industry in the cluster villages

Agency	States				Southwestern/ percentage
	Lagos	Oyo	Ondo	Ekiti	
Provision of tap water.	-	-	-	-	0 (%)
Provision of well water.	1	-	-	-	1 (0.6%)
Provision of toilet.	-	-	-	-	0 (0%)
Provision of roads.	-	-	-	-	0 (0%)
Provision of government electricity.	-	-	-	-	0 (0%)
Joint purchase of generator.	20	30	10	12	72 (22.5%)
Co-operative thrift/credit society.	20	15	5	8	48 (15.0%)
	28	30	-	-	58 (18.2%)
<i>Esusu</i> contribution.	-	-	-	-	0 (0%)
Building of workshops.	69	75	15	20	179 (56.1%)

Table 4 presents the benefits derived by furniture makers from clustering. These benefits were rated on a 5-point likert scale. There were significant differences in the rating of the benefits derived by the furniture makers in the clusters. The exchange of information was rated highest in Ekiti State with mean weighted average of 3.7. This was followed by Oyo State with mean weighted average of 3.6. The exchange of information was rated low in Lagos (2.7) and Ondo (3.0). Above statements implied that information exchange within cluster villages in Ekiti and Oyo States flow better than that of Lagos and Ondo States.

Their responses were that the benefits were numerous. These include skill and knowledge flow in a user-producer type relationship through movement of skilled staff from one firm to another, sharing of work experience among members, sharing of tools, cooperative activities in the area of purchasing of raw materials and product specialization, existence of financial cooperative society (*Esusu* contribution), joint ownership of expensive equipment like generating plant among others.

The above findings corroborated the studies carried out on benefits of clustering by Oyeyinka-Oyelaran (2006). Enterprises acquire technological learning when they hire workers from more effective rival firms or receive training from large firm, the exchange of skills information and technical knowledge which can serve as vehicle for enhancing technological capabilities in the cluster villages. There could be financial assistance (*Esusu* and microcredits) and equipment assistance among firms.

Cooperative activities among firms in the cluster areas involve purchasing of raw materials and product specialization. For instance, in the upholstery sector, two firms may be collaborating to develop a new design of settees. According to McCormick (1999), clustering 'can and do promote industrialization' 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.

Table 4: Rating of the benefits derived by furniture makers from clustering

Attributes	States				South-western
	Lagos	Oyo	Ondo	Ekiti	
Exchanging information with other furniture makers.	2.7	3.6	3.0	3.7	3.3
Sharing experience with other furniture makers.	3.6	4.5	3.2	3.6	3.7
Sharing tools with other furniture makers.	2.8	3.4	3.5	3.6	3.3
Sharing equipment with other furniture makers.	2.8	3.3	3.0	2.6	2.9
Engaging furniture makers from others workshops.	3.3	3.2	2.7	3.1	3.1
Buying of expensive furniture equipment together (jointly)	3.4	2.5	2.9	3.2	3.0

Key:

Always (AL) = 5,
 Usually (US) = 4,
 Occasionally (OCC) = 3,
 Rarely (RA) = 2, and
 None at all (NO) = 1.

Summary, Conclusion and Policy Recommendations

The paper evaluated the effects of technological capabilities, innovation and clustering impacted on the performance of furniture firms in furniture industry in southwestern Nigeria. The research covered Lagos, Oyo, Ondo and Ekiti States due to the fact that furniture makers are many in the states.

The respondents were 319 furniture makers. The research instruments used were questionnaire, personal observation and focus group discussion approaches. The questionnaire was administered to master furniture makers and elicited information on the effects of technological capabilities, innovations and clustering on the performance of firms

in furniture industry. Interview was conducted to ascertain and supplement the information obtained from the questionnaire administered. Both descriptive and inferential statistical techniques were employed for data analysis.

The paper showed clustering advantages such as frequency of sharing tools, equipment, information, experience and collaboration of furniture makers from other workshops. The effects of technological capabilities, innovations and clustering impacted positively on the performance of firms in the furniture industry. This positive impact reflected on new furniture products produced monthly through adaptation on office furniture, cabinet, upholstery, beds and doors.

CONCLUSION

The paper concluded that the effects of technological capabilities, innovations and clustering impacted considerably on the performance of furniture firms in the industry. Especially in the making of office furniture, cabinet, upholstery, beds and doors. It also occurs in the patronage of furniture makers by customers where rating shows usually in Oyo State, Occasionally in Ekiti, Ondo and Lagos States. However the effects of technological capabilities, innovations and clustering negative performance in the areas of cooperation in provision of pipe born water, electricity, road among others.

RECOMMENDATION

The following recommendations are made in order to enhance technological and innovative capabilities of the furniture makers.

- (i) Interactions between institutions and furniture industry should be strengthened to avail them of access to technical support services which these institutions can render to the industry.
- (ii) Financial institutions should be encouraged to give financial support to furniture industry and other industries at one digit interest or at no interest to the entrepreneurs as it happened in some developing countries in the world, for instance, China.
- (iii) State and local government should encourage furniture makers in their domains to establish cluster villages where member firms could derive maximum benefits from clustering. This idea will no doubt enhance knowledge diffusion, technological capability development and innovation among the entrepreneurs.

REFERENCES

- Abdullahi, A. and Ajoku, K. B. (2001). Capacity Building for Sustainable Industrial Development: A Nigerian Perspective, Publisher: Raw Materials Research and Development Council, Abuja, Nigeria.
- Afua, A (2005). Firms Ability to Employ Various Technical Resources: Strategic Management Journal, 31: 547-561. www.fbe.hku.hk/
- Akinbinu, B. (1998). Liberalization Policies and Technological Capability in the Informal Sector: A Case Study of the Auto-Repair Industry in Oyo State. NISSER Monograph Series, No. 5, pp. 12-44, Ibadan, Nigeria.

- Akinbinu, B. (2001). Informal Small Enterprises Clusters: A Case Study of Auto-Mechanic Villages in Ibadan; NISER Monograph Series, No. 5, pp. 8-24, Ibadan, Nigeria.
- Akinbinu. A.F. (2003). Industrial Reorganization for Innovations: Current Knowledge on small and Medium Enterprises Clusters in Western Nigeria: NISER Monograph Series, No 87, pp. 30-35, Ibadan, Nigeria.
- Brusco, S. (1992). "Small firms and the Provision of Real Services" In Pyje, F. and Sensenberger W. Industrial Districts and Local Economic Regeneration: International Institute of Labour Studies. Geneva.
- Dada O. A, Jibrin G.M, and Ijeoma, A. (2006): Macmillan Nigeria Secondary Atlas, Macmillan Nigeria Limited, Ibadan, 136pp
- Freeman, C. (1987). Technology Policy and Economic Performance – Lessons from Japan, London.
- Ilori, T.A. (2002). Promoting Technological Innovation for the Industrial Development of Africa, NISER Monograph Series, no. 6, Ibadan, Nigeria.
- Kim, J.H. (2007). The Korean Experience and African Economic Development. Journal Compilation African Development Bank, Oxford, Blackwell, U.K.
- McCormick D. (1999). World Development, 27, PP. 1531-1551.
- Olufemi, B. (2005). Forest Industries in Nigeria: An Overview, Akure, Nigeria.
- Oyelaran – Oyeyinka, B. (2006). Learning to compete in African Industry: Institution and Technology in Development, Hampshire, Ashgate.
- Oyelaran-Oyeyinka, B. (1997). Technology and Comparative Advantage in the Context of Vision 2010. A Paper Presented at the Workshop of Vision 2010 on Science, Engineering and Geochronology, Abuja, Nigeria.
- Rojas, D. T. (2007). "National Forest Economic Clusters: A New Model for Assessing National Forest-Based Natural Resources Products and Services" Pacific Northwest Research Station. United States' Department of Agriculture Forest Service. <http://www.F.S.Fed.U./Pnw.Ile-Ife>, Nigeria.
- Teece, D. J, Pisano, G and Shuen, A (1997), Dynamic Capabilities and Strategic Management; Strategic Management Journal. 18 (7), 509-533. Cambridge, U. K.
- Torun H. and Cicekci (2007). Innovation: Is the Engine for the Economic Growth?