OBAFEMI AWOLOWO UNIVERSITY

A STUDY OF PRODUCTION AND INNOVATION CAPABILITIES IN SELECTED INFORMATION AND COMMUNICATIONS TECHNOLOGY CLUSTERS IN NIGERIA

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DEDICATION

This work is dedicated to the Almighty God who is the Father of the fatherless; He has been all-in-all to me and my family. To Him be all the glory.

And to the memory of my beloved biological father and mother, Late Mr James Adeoye AWOLEYE who was a Principal Nurse at the Health Centre(HC), Obafemi Awolowo University until his death in 1983 and Late Mrs Comfort A. Awoleye, who was also aWard Maid until her retirement in 2001 at the same hospital (HC).

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Michael Awoleye

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ABSTRACT

The study examined the production capabilities existing in selected ICT clustered firms in Nigeria and determined the nature and extent of innovations possessed by the firms. It also investigated factors influencing the building of production and innovation capabilities of the ICT firms in the clusters and established the impact of clustering on business performance of the firms. This is with a view to designing policy framework for facilitating innovativeness in the Nigerian ICT clusters.

The study employed survey design and was carried out using both primary and secondary data sources. A multistage sampling technique was used to select a total of 400 firms from ICT clusters from Abuja, Lagos and Port-Harcourt. Primary data were collected through structured questionnaire administered on founders of the selected firms. The questionnaire elicited information on issues such as firm's production and innovation capabilities; types of innovations; sources of information for innovation activities; internal and external factors affecting production and innovation activities and impact of clustering on business performance of the firms. Personal observations and interviews were also used to obtain more information on the activities in the clusters. Secondary data were sourced from official documents such as reports, journals and textbooks. The data were analysed using descriptive and inferential statistics.

The study revealed that about 15% of the ICT firms in the clusters had been involved in product manufacturing such as computer cloning, power packs modification, computer casing design and fabrication among others. About 57% and 22% had monthly production up to 20 and 40 computers on the average, respectively. These firms had adopted traditional quality control (94%) and total quality management (23%). About 65% and 63% of the firms were involved in marketing and organisational

innovations, respectively. These firms had generated 148, 382, 498 and 396 product, process, organisation and marketing innovations, respectiiv,vely between 2011 and 2013. Most of the innovations were either new or significantly improved products or services. The study further showed factors that significantly influenced the building of production and innovation capabilities. This include qualification of marketing manager (β=30.66, ρ<0.01), suppliers of materials (β=22.16, ρ <0.01), qualification of owner (β=16.17, ρ <0.01), competition (β=13.76, ρ <0.01), innovation expenditure (β=16.17, ρ <0.01), age of business (β=6.97, ρ <0.01) and percentage of engineers (β=1.11, ρ<0.05). The following factors significantly contributed to business performance: resource spillover (R^2= 14.4%), cooperation and linkages (R^2=11.5%), availability of financial resources (R^2=11.4%), inter-firm resource sharing(R^2=10.6%), increased performance (R^2= 8.36%) collaborations (R^2= 8.3%)and information sharing (R^2= 7.7%). The study also designed policy framework for facilitating innovativeness around effective linkage and collaborations between the clusters and knowledge institutions, standardisation and promotion of quality assurance as well as provision of cluster knowledge management system.

The study concluded that production and innovation capabilities in ICT clusters in Nigeria could be improved through provision of adequate human resource development, financial and technology support services and improved working environments among others.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Around the globe, the concern of improving national economic performanceis paramount to every government. They attempt to achieve this by intensifying effort on academic research and its transfer to industry;they also facilitate the application of this research by domestic firms (Kodama and Suzuki, 2007). The dynamics of competitiveness and globalisation as propelled by technological change has also repositioned the way people think and live today. The amount of knowledge that a country has acquired and put to use has been adduced to the basis of her productivity and economic growth (Kim, 1998; Spielkamp and Vopel, 1999). The transfer and use of information now play an important role in the effectiveness of innovative systems and their potential to advance economic performance.

The concept of innovation capability (IC) is the ability to create new and useful knowledge (Kim, 1997; Ilori, 2006).It is further defined as the ability to continuously transform knowledge and ideas into newproducts, processes and systems for the benefit of firms and their stakeholders (Lawson and Samson, 2001).Innovation capability thus represents a tool that induces the process of bringing firms together to tap new sources of knowledge and technology (Guinet, 2002). It also involves translating the acquired knowledge and technology into entirely new (Mytelka, 2000) or an improved (OECD, 2005) products and processes. Further concepts of Innovation Capability reveals that if a firm is to 'stand tall' in global competitiveness, external knowledge is essential (Cohen and Levinthal, 1990). The mobilisation of external sources for technological learning is christened 'learning by interacting' (Abereijo *et al.,* 2007). This suggests that companies cannot 'go it alone'and

expect success. Competitiveness now depends on complementary knowledge including technologies acquired from other firms and institutions (Ilori and Irefin, 1997; Cassiman and Veugelers, 2002). The ability to in-source externally developed technology or ideas underpinfirm's absorptive capacity which cannot be underplayed in this context (Cohen and Levinthal, 1990; Cassiman and Veugelers, 2002; Liao*et al.*, 2009). Innovation Capability is further described as an embodiment of 7 key elements which are: (i) Learning capability which is the capacity to identify, assimilate and exploit existing, internal knowledge and competence essential for a firm's competitive success, (ii) R&Dcapability refers to a firm's ability to integrate R&D strategy, project implementation, product portfolio management andR&D expenditure, (iii) resource allocation capability is the firm's ability to mobilise and expand its technological, human and financial resources in the innovation process, (iv) manufacturing capability refers to the ability to transform R&D results into products, which meet market needs, (v) marketing capability indicates the capacity to publicise and sell products on the basis of understanding consumer's current and future needs, customer's access approaches and competitors' knowledge, (vi) organising capability is the capacity to constitute a well-established organisational structure;and (vii) strategic planning capability is the capacity to identify internal strengths and weaknesses and external opportunities and threats (SWOT) (Oyebisi, 2001; Yam *et al.,* 2004).

Knowledge flow andheterogeneity of firms and organisations tend to receive more prominence in innovation system literature which emphasises network of actors jointly creating, adapting and diffusing knowledge (Freeman, 1987; Lundvall, 1992; Ilori, 2006). Innovation has played a vital role in country's development, much more, where it is harnessed with adequate knowledge and skills.

1.2 Statement of the Research Problem

Economic viability of small-scale production has the ability to contribute to employment, income creation, innovation; productivity and competitiveness (Romijn and

Albaladejo, 2002; Porter, 1990; Becattini, 1989.) Activities in ICT clusters are expected to hold promising potentials as agents of industrial regeneration. This is a major element in the quest of building a knowledge-driven economy (Bamiro, 2006). Innovativeness influences business performance and this may vary across firms based on organisation's place in the value chain. Firm's strength and disposition to opportunities and threats around them could also impact productivity. Oyebisi (2001) notes that enterprises need to be aware of their business environment/settings and hence recommended that firmsshould scan their environment to take business opportunities and to identify possible threats that may emanate from competitors.

A number of studies have provided empirical evidence in the USA and Europe that clustering is an important driver of economic growth (Blien *et al.,* 2006; De Lucio *et al.,* 2002; Combes, 2000; Glaeser *et al.,* 1992; Hendersonet *et al.,* 1995; Henderson, 1997). In low income economies, especially in Africa, studies on the effects of clusters on firm's performance and industrial development are particularly scarce. Where available, it primarily comes in form of case studies with small coverage of study. For example, Zeng (2008) conducted a desk research on comparative analysis of clusters in Africa and identified some capabilities in the clusters. He reported the capability of natural endowments to producing cut flowers in Kenya, fishing in Uganda and wine in South Africa. Also the Kamukunji metal works in Kenya, Nnewi auto parts and Ikeja Computer Villages in Nigeria. The Suame manufacturing and vehicle repair clusters in Kumasi, Ghana have also been noted toleverage on tacit knowledge of the indigenous entrepreneurs among otherstrengths (Zeng, 2008).

For more information, please contac Oyelaran-Oyeyinka (2006) reported that most of the entrepreneurs in the ICT cluster in Ikeja came purposely to take advantage of the unprecedented growth of ICT businesses in the cluster. He also noted that the entrepreneurs started their businesses with funds from their own savings, friends and relatives. The study also showscomputer assembly process is the main technological processtaking place in the cluster. The components and parts merchandise take place also in the cluster provides the required input for the computer assembly (cloning) process. It was further reported that 70% of the operators sourced their components from the leading countries in micro-electronics around the globe. The total sum of these sources was put at about 800 suppliers scattered abroad (Bamiro, 2006; Oyelaran-Oyeyinka, 2006).This company had operational assembly capacity of 200-350 computers per day. However, some of the components were fabricated abroad to the company's design, which enabled them to make the Zinox brand. There is no recent information about what has happened to this collaboration, the data collected earlier may have been outdated. Whereas, innovation survey is expected to be repeated every three years (OECD, 2005), this is one of the reasons for this study.

In the computer village study, the cluster impact was reported to have created both direct and indirect employment. The total direct employment was estimated at 5,000 to 6,000 with an average of 10 staff per firm. The cluster also provides a platform for knowledge acquisition and diffusion for apprentices, street operators as well as opportunities for industrial work experience students(Oyelaran-Oyeyinka, 2006). The previous studies of ICT clusters in Nigeria (Bamiro, 2006; Oyelaran-Oyeyinka, 2006)have only used the conventional indicators to measure innovation output of firms and have failed to leverage on the new indicators as posited by OECD (2005).

Considering the dynamic nature of technological activities in the ICT clusters, there is a need for regular periodical assessments. The information obtained at the Ikeja Computer