OBAFEMI AWOLOWO UNIVERSITY

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

OLUSESAN MICHAEL AWOLEYE

2015

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE
DOCTOR OF PHILOSOPHY IN TECHNOLOGY MANAGEMENT

OF THE

AFRICAN INSTITUTE FOR SCIENCE POLICY AND INNOVATION,
FACULTY OF TECHNOLOGY,
OBAFEMI AWOLOWO UNIVERSITY,
ILE-IFE, NIGERIA

September, 2015

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DEGREE: Ph.D. (Technology Management)

YEAR: 2015

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CERTIFICATION

This is to certify that this research work was conducted by **Olusesan Michael Awoleye** in the African Institute for Science Policy and Innovation (AISPI), Faculty of Technology, Obafemi Awolowo University, Ile-Ife, Nigeria; and was supervised by Professor M. O. Ilori and co-supervised by Professor T.O. Oyebisi both of AISPI.

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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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ACKNOWLEDGMENTS

To God be the glory great things he has done, I appreciate Baba for His favour, grace, love and mercy He has been extending to me, I cannot thank Him enough. His praise will continue to be on my lips. Space will not permit me to mention all that have contributed to the success of this Ph.D thesis. First and foremost, I will like to state that my able supervisors, Profs: Mathew Olugbemiga Ilori and Timothy O. Oyebisi have done a very good job in mentoring me and for the training I have received from them. I wish to register my deepest appreciation to Prof. M.O. Ilori who despite his commitments to other works, tight schedule, took his time to take me through the successful completion of this thesis, may God reward you sir. I cannot forget your impact in my life sir, I appreciate you.

I cannot forget Professor Sikiru Adebayo Sanni, who was my first employer at the National Centre for Technology Management (NACETEM), who believed in me and gave me all the support I needed for a successful beginning in a policy oriented research Institute. Prof. Willie O. Siyanbola, an erudite scholar who introduced me to the world of academics; he is an encourager, may God grant you the desire of your heart.

Other people who have contributed their time, energy, ideas, advice and suggestions towards making this work worthwhile and successful. The first person in this category is my able Director of the Institute (AISPI) Prof. O.O. Jegede, since I was employed he has been leading with good examples. Despite his busy academic schedules coupled with the administrative work, he does not allow files to stay on his desk, he clears them immediately. On a number of occasions when you meet him in the corridor on his way out, he does not hesitate to attend to you on matters you come to discuss with him. God bless you richly sir and lift you up the more in life.

I will also like to appreciate my teachers and lecturers both within and outside (AISIPI) some of which have stood in the position of fathers and mothers for me. These are Prof. J.B. Akarakiri, Prof.F.A. Ogbimi and Prof (Mrs) K.A. Taiwo. Prof (Mrs) K.A. Taiwo has been an encourager since I started this programme till now, she is always asking for the progress of my work. I appreciate you ma, may the good Lord lift you higher in this community and beyond. Others are Dr. I.A. Irefin, Late

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(Dr) A.A. Adeniyi, Dr B. Oluwale and Dr (Mrs) T. O.Olaposi. I will also like to thank Dr (Mrs) M.O. Jegede, Dr (Mrs) M.O. Onwudiegwu,Dr (Mrs) G. Binuyo, Mr P. O. Ayoola, Mr I.A. Oyebola, Mrs Ayanlade for their support. Also the administrativestaff of the department have also contributed their quota in their capacity to the success of this work:Mrs Adesola, Mr Oladapo, Mrs Popoola, I appreciate you all.

I cannot but appreciate other people who have also impacted my life spiritually and have prayed for my success in this programme. I appreciate Pastor E.A. Adeboye, the General Overseer of the Redeemed Christian Church of God and Dr. E.O. Abina, the General Overseer of the Gospel Faith Mission International, where I started from. In addition, I appreciate Pastor Pius Erhume, Pastor Ikuomeniosan, Pastor Julius Arogunyo, Prof Greg Erhabor, Prof. O. Oladeji, Prof. Omoigui and Dr Adetan.

My special thanks to my siblings Hon. Olufemi Awoleye, late (Deaconess) Titilayo Okunola, Mr and Mrs Akintola, Mrs Abosede Akinade, Deaconess and Pastor Eluyemi, Mr and Mrs Olabimtan, Dr and Mrs'Seun Ajileye, Mr and Mrs Bisi Awoleye and Mr and Mrs Kola Awoleye and others.

My profound gratitude to the OAU management for providing staff development opportunity to train while on the job and for supporting me with Postgraduate Research Grant. Many thanks to Council for the Development of Social Science Research in Africa (CODESRIA) Dakar, Senegal for the 'Ph.D Small Grants for Thesis Writing' awarded me (grant number: SGRT.46/T13), the grant substantially supported this work. I cannot but appreciate the opportunity I received on two occasions through the GLOBELICS PhD. academy, Finland in 2013 and AfricaLics academy, Kenya 2015. The two-week intensive training on each occasion has actually given me a good exposure and has created network of friends in the world of innovation.

My life has been influenced by other people's thoughts and ideas these are: Prof. E.R. Adagunodo, Prof G.A. Aderounmu, Dr I. Abereijo, Dr Wale Adejuwon, Dr Kunle Ogundari, Dr D.A. Dada, Mr Sola Asa. Others from NACETEM are: Prof Okechukwu Ukwuoma (DG/CEO), Mr Ini Ekanem, Dr (Mrs) Boladale Abiola-Adebowale, Mr Sola Okogun, Mr Blessing Ojuloge, Dr Wale Olaopa, and a host of others. I also will like to appreciate the commitment of all my field workers for this study

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who assisted during the data collection and the interview process in the three clusters studied (Abuja, Port-Harcourt and Lagos). My special appreciation goes to three research officers of the National Centre for Technology Management, Abuja- Messrs Rufai Abubakir, Kazeem Abubakir and Emmanuel Iroh.

I cannot close this acknowledgement if I fail to specially appreciate my wife who has been given me the support even when challenges seem to overshadow me, may God bless you and take you to higher heights in life. And to my children: Tomisin Awoleye, David Awoleye and Chris Awoleye, you have been part of my fulfillment in life, may God take you to your destiny more quickly than I did.

Michael Awoleye

September, 2015

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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, respectively between 2011 and 2013. Most of the innovations

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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.

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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

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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

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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).

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