IMPACT OF COMPETITION ON TECHNOLOGY ACQUISITION AMONG QUOTED FIRMS IN NIGERIA (2001-2013)

BY

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B.Sc. (Economics), O.A.U. IFE

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CERTIFICATION

This study by Oluwadare, Adekemi Jessica has been read and approved in fulfillment of the requirement for the award of M.Sc. degree in Economics in the department of Economics, Obafemi Awolowo University, Ile-Ife.

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DEDICATION

This research work is dedicated to the Almighty God, who is the guide of my youth, my help in ages past and my hope for years to come.

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TABLE OF CONTENT

Title Page i

Certification ii

Authorization iii

Dedication iv

Acknowledgement v

Table of Content vii

List of Tables x

List of Figures xi

Abstract xii

Chapter One: Introduction

1.1 Background to the Study 1

1.2 Statement of Research Problem 4

1.3 Research Questions 6

1.4 Objectives of the Study 6

1.5 Justification for the Study 7

1.6 Scope of the Study 8

1.7 Organisation of the Study 8

Chapter Two: Review of Literature

2.1 Theoretical Literature 9

2.1.1 Monopoly and innovation 11

2.1.2 Perfect competition and innovation 12

2.2 The Importance of Knowledge and Technology 13

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2.3 Empirical Evidence 15

2.3.1 Studies from developed and emerging economies 15

2.3.2 Studies from developing economies 21

2.3.2 Studies in Nigeria 22

Chapter Three: Methodology

3.1 Theoretical Framework 25

3.2 Model Specifications 28

3.2.1 Competition and technology acquisition 28

3.2.2 Technology and productivity growth 29

3.3 Description of Key Variables 31

3.3.1 Competition 31

3.3.2 Technology acquisition 32

3.3.3 Productivity 32

3.4 Method of Estimation 33

3.5 Source of Data 34

Chapter Four: Data Analysis and Discussion of Results

4.1 Description of Data 35

4.2 Descriptive Statistics 38

4.3 Inferential Statistics 46

4.4 Discussion of Findings 54

Chapter Five: Summary, Conclusion and Recommendations

5.1 Summary of the Study 56

OBAFEMI AWOLOWO UNIVERSITY

5.2 Conclusion 57

5.3 Recommendations 57

5.4 Limitations to the Study 58

5.5 Contribution to Knowledge 58

5.6 Suggestions for Further Research 59

References

OBAFEMI AWOLOWO UNIVERSITY

LIST OF TABLES

Tables		Pages
Table 4.1:	Sectorial Distribution of Firms	36
Table 4.2:	Technology Acquisition by Firms	39
Table 4.3:	Descriptive Statistics of Variables	45
Table 4.4:	Correlation Matrix	47
Table 4.5:	The Relationship between Competition and Technology Acquisition	49
Table 4.6:	The Impact of Technology Acquisition on Productivity Growth	52

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LIST OF FIGURES

Figures		Pages
Figure 3.1:	SCP Paradigm	26
Figure 4.1:	Distribution of firms according to sector of activity	37
Figure 4.2:	Nature of Technology Acquisition by Quoted Firms	40
Figure 4.3:	Growth trend in technology Acquisition	42
Figure 4.4:	Classification based on Technology Intensity	44

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ABSTRACT

This study examined the impact of competition on acquisition of technology by firms in Nigeria. The study also examined the extent to which firms acquire technology in their production processes; it examined the impact of technology on productivity growth of the firms and the influence of market structure on the acquisition of technology by firms in Nigeria. This was done with a view to providing insights into policy directions that shape competitive practices.

Secondary data was used for the study. Panel data which covered forty-two (42) randomly selected non-financial firms quoted on the Nigerian Stock Exchange between 2001 and 2013 were used. Competition was measured by the price-cost margin and technology acquisition was measured as the total expenditure on research and development (R&D), technical fees/licenses and royalties. Data used were sourced from the annual reports and accounts of the firms and were analysed using tables, charts and the Arellano-Bover/Blundell-Bond Generalised Method of Moments (GMM) estimator.

The results showed that about 48% of the firms invest less than 1% of their turnover in the acquisition of technology and only 9% of the firms invest more than 4% of turnover in the acquisition of technology. The results also showed that competition has a significant ($p<0.05$) and positive (0.142) impact on technology acquisition by firms. However, technology acquisition has a negative (-0.051) and insignificant ($p>0.05$) impact on productivity.

The study concluded that competition strengthens technology acquisition in firms. There is, however, a negative relationship between technology acquisition and Nigerian firms' productivity growth.

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CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Technology plays a fundamental role in wealth creation, improvement of the quality of life, real economic growth, and transformation in the society. Technology is knowledge and it constitutes the totality of the use and application of knowledge, skills, tools, and materials for the well-being of man. The Scientific and Industrial Revolutions in the 17th and 18th century, respectively, were largely driven by technical efficiency and productivity which resulted from the systematic applications of scientific and technical knowledge to the manufacturing process. Technology has since been at the core of industrial activities and technological innovation is right at the centre of economic growth. Much of modern growth theory was developed at a time when economists began to stress savings, investment, and capital accumulation as key drivers of gross national product levels and growth (Sachs and McArthur, 2002).

Early economic contributions such as Solow (1956), illustrate how long-run economic growth depends on technical change. Contributions of the endogenous growth literature by Romer (1990), Grossman and Helpman (1991) and Aghion and Howitt (1992) illustrate that a continued increase in the level of resources spent on the creation of new technologies leads to a continued increase in economic growth. There is evidence that growth in traditional factors of production such as capital and labour explain less than half of productivity growth in countries (Hall, 2011); the 'residual' is ascribed to technical change. According to Wolf (2007), the ability to adopt new technologies and

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adapt them to local conditions will be a crucial first step to increase productivity in developing countries.

Technical change has the benefit of increasing firm efficiency, improving the quality of goods and services, increasing consumer demand as well as reducing costs of production (Hall, 2011). Companies hence seek to introduce technology into their production process, and this can be done by either developing the technology internally or by buying new technologies from external sources. Firm-level theories of technical change suggest that a firm's innovativeness is an outcome of increases in its knowledge base, and a firm's knowledge base can grow through a series of knowledge-enhancing investments by the company over time, and through acquiring or 'grafting' of external knowledge bases (Ahuja and Katila, 2001).

Technology acquisition, broadly described as a process in which firms buy technology from external sources, provides a host of benefits to companies, ranging from the development of new products, to gaining entrance into new markets. Acquiring knowledge and technology involves tapping and adapting knowledge available elsewhere in the world—for example, through an open trading regime, foreign investment, and licensing agreements—as well as creating knowledge locally through research and development, and building on indigenous knowledge (World Bank, 1998). According to Adenikinju (2005), technology can be acquired or developed using at least three channels: research and development (R&D), technology transfer and adoption of new technology.

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For an effective technology transfer process, many pre-conditions such as trade policies, legal and regulatory policies, linkages between foreign and local firms, and sufficient absorptive capacity are required (Fu *et al.*, 2010). The success of the process of technology acquisition and development is also guaranteed under an effective system of Intellectual Property (IP) protection. IP is basically any creative work that has economic value and is protected by law, and the principal forms of IP include patents, copyrights and trademarks. The global trade for IP licenses signifies an increase in innovation and technological development which, in 2012, accounted for 5% of world trade (Mortara and Ford, 2012). Also, patent filings grew by 9.2% in 2012 (WIPO, 2013). The increased level of IP protection in the international community places huge demands on developing countries to strengthen their national IP regime and harmonise it with those of developed countries in order to encourage international technology transfer through licensing (Hassan *et al.*, 2010).

An important pre-condition to technology acquisition also explored in literature is the competitive nature of the market in which firms operate. Competition can be simply referred to as the number and distribution of firms in a market. Black (2002) simply illustrates competition as the situation when anybody who wants to buy or sell has a choice of possible suppliers or customers. Competition can be intensified in a market when more firms enter the market due to a fall in entry barriers or when there is more aggressive conduct by incumbent firms (Boone *et al.*, 2007). Competitive forces tend to encourage rapid rates of adopting new technologies as more vigorous competition exerts discipline on firms and strengthens incentives for development (Aghion *et al.* 2001, 2005; Hou and Mohnen, 2013). An increase in competition is usually expected to reallocate resources from lower to higher productivity firms (Ospina and

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Schiffbauer, 2006). The Schumpeterian (1942) view to this economic issue is that large firms in concentrated markets in which firms possess market power, are the most conducive conditions for technical and economic progress. By implication, society must be willing to put up with imperfectly competitive markets in order to achieve rapid technical progress. Innovation is said to be higher in concentrated industries because firms with greater market power are better able to finance R&D from own profits, and they also have better incentives to innovate because they can more easily appropriate the returns from innovation (Symeonidis, 1996). Based on the

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