

## Information and Communication Technology (ICT) in Egypt and its Impact on Economic Growth (comparative study)

تكنولوجيا المعلومات والاتصالات في مصر واثرها على النمو الاقتصادى (دراسة مقارنة)

Thesis

Submitted for partial fulfillment of the requirements for the Master Degree in Economics

 $\mathbf{B}\mathbf{v}$ 

#### **Rania Ibrahim Hamza**

Demonstrator in Economic Department Faculty of Commerce Ain Shams University

Under Supervision of

#### **Prof. Tamer Rady**

Associate Professor of Economics Faculty of Commerce - Ain Shams University

#### Dr. Amira Saleh

Lecturer of Economics
Faculty of Commerce - Ain Shams University
2015



كلية التجارة قسم الأقتصاد

# تكنولوجيا المعلومات والاتصالات في مصر واثرها على النمو الاقتصادى (دراسة مقارنة)

### Information and Communication Technology (ICT) in Egypt and its Impact on Economic Growth [Comparative study]

رسالة مقدمة للحصول على درجة الماجستير في الاقتصاد

مقدمة من الباحثة

#### رانيا إبراهيم حمزة إبراهيم

معيدة بقسم الاقتصاد كلية التجارة – جامعة عين شمس

#### إشراف

## الدكتور/ تامر راضى

استاذ مساعد الاقتصاد كلية التجارة – جامعة عين شمس

## الدكتورة/ أميرة صالح

مدرس الاقتصاد كلية التجارة – جامعة عين شمس



#### **Faculty of Commerce Economic Department**

#### **Approval Sheet**

Student Name: Rania Ibrahim Hamza

**Tittle of thesis:** Information and Communication Technology (ICT) in Egypt and its Impact on Economic Growth [comparative study].

Academic Degree: M.Sc. in Economics

This thesis submitted in partial fulfillment of the requirements for the master degree in Economics has been approved by:

#### **Dissertation Committee**

#### 1-Professor Tamer Rady

Associate Professor of Economics Faculty of Commerce- Ain Shams University

#### 2-professor Amr El-taki

Professor of Economics - Sadat academy Vice president of Sadat academy

#### 3-Professor Ihab Ezz Eldin Nadeem

Professor of Economics Faculty of Commerce- Ain Shams University

Date of Dissertation Defense / /2015 Approval Date

## Dedication

I would like to dedicate my thesis to my beloved husband, Mahmoud Yehia and my little baby Asser, who have always loved me and supported my dreams

Rania Hamza

## ACKNOWLEDGEMENT

The success of this work required a lot of support, guidance and assistance from many beloved people and I am extremely fortunate to have them along the way until the completion of my thesis.

First and foremost, I would like to thank God for giving me the willingness to develop my academic career.

I would like to thank and express my deepest appreciation to my supervisor Prof. Tamer Rady, for all what I learnt from him throughout my academic years and for his unconditional support throughout my entire master's studies and especially during the thesis process.

I would like to also thank my thesis committee: prof. Ihab Nadeem and Prof. Amr El-taki for their guidance and support to reach where I am today.

I would like to thank Prof. Amr El-taki, professor of Economics & vice president of Sadat academy, for his devotion of time and energy to read and discuss this thesis, which added a great value to the study.

My profound gratitude and sincere thanks is extended to Prof. Ihab Ezz Eldin Nadeem, professor of Economics -Ain Shams University, for all what I learnt from him throughout my academic years. Also I would like to thank him for agreeing to be a member of this committee and his valuable time.

I'm also grateful to Dr. Amira Saleh, my second supervisor, for her help and support and for her time.

I would like to also thank Prof. Dina Rady professor of Economics - Ain Shams University, for her help and support

I dedicate this research to my family, for giving me the opportunity to continue my academic career and for all their patience and continuous support over this long process.

I would like to thank all my dear friends & colleagues who have given me valuable insight, helpful analysis and precious thoughts.

Very special thanks to my beloved husband, Mahmoud Yehia and my little baby Asser, who have always loved me and supported my dreams.

#### **Abstract**

This study examines the Information and Communication Technology (ICT) sector in Egypt and its impact on economic growth. Taking a comparative study approach, the study particularly focuses on the development of Information and Communication Technology and the possibility of how Egypt can benefit from the Malaysian experience in developing this sector. The findings of this study show that Malaysia has some big achievements to its credit in the field of Information and Communication Technology that makes it a role model for the developing countries. As for Egypt although it has made an important steps in the Information and Communication Technology field, but it still faces a lot of challenges and problems. The study reached a conclusion that Egypt can benefit from the Malaysian experience in Information and Communication Technology to overcome some of its challenges.

Keywords: Economic Growth, Information and Communication Technology.

## بِنِيْمُ النَّالَاجِيْنَ الجَّهِ الْجَهِيْنَ الْمُعَالَّا الْجَهِيْنَ الْمُعَالَّا الْجَهْزَالِ جَهْدَيْنَ الْمُعَالَّا الْمُعَالَّالِ الْمُعَالَّا الْمُعَالَّا الْمُعَالَّا الْمُعَالَّا الْمُعَالَّا الْمُعَالَّا الْمُعَالَّا الْمُعَالِّينَ الْمُعَالَّالِي الْمُعَالِقِينَ الْمُعَالَّالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعِلَّالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ الْمُعَالِقِينَ اللَّهُ عَلَيْنِيلُولِ الْمُعَالِقِينَ الْمُعِلَّالِقِينَ الْمُعَالِقِينَ الْمُعِلِقِينَ الْمُعِلَّقِينَ الْمُعِلَّالِقِينَ الْمُعِلِقِينَ الْمُعِلَّقِينِ الْمُعِلِقِينَ الْمُعِلَّقِينِ الْمُعِلِقِينَ الْمُعِلِقِينَ الْمُعِلِقِينَ الْمُعِلَّقِينِ الْمُعِلِقِينَ الْمُعِلَّالِقِينَا الْمُعِلَّقِينِ الْمُعِلِقِينَ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلَّقِينِي الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلَّقِينِ الْمُعِلَّقِينِ الْمُعِلِقِينِ الْمُعِلَّقِينِ الْمُعِلِقِينِ الْمُعِلَّقِينِ الْمُعِلِقِينَ الْمُعِلَّقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلَّقِينِ الْمُعِلِقِينِ الْمُعِلَّقِينِ الْمُعِلِقِينِ الْمُعِلِقِينِ الْمُعِلِي الْمُعِلِي الْمُعِلِقِينِ الْمُعِلِي الْمُعِلِقِينِ الْمُعِلِقِ

"وَهُلِ اعْمَلُوا هَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ وَسَتُرَدُّونَ إِلَى عَالِمِ الْغَيْدِجِ وَالشَّمَادَةِ فَيُنَبِّنُكُمْ بِمَا كُنْتُمْ تَعْمَلُونَ"

(التوبة:105)

#### LISTOF CONTENTS

Title	Page
Listof Contents Listof Tables	I XI
Listof Figures	XIIX
Listof AcronymsandAbbreviations	VI
Part One: Literature Review	
Introduction	1
Chapter one: Information and Communication	2
TechnologyDefinitions and Measurements.	
Introduction	2
Empirical studies	2
Section one: The Importance and Definitions of Information and Communication Technology	6
First: Information and Communication Technology(ICT) definition.	6
Second: components of ICT.	7
1. Hardware	7
2. Software	7
3. Networks & Internet	7
A. Local-Area Networks (LAN)	7
B. Wide Area Networks (WAN)	7
C. Wireless Networking D. Internet	7
D. Internet	,
Third: The Importance of ICT.	8
1. The Importance of ICT to the Business Cycle	8
2. The Importance of ICT to the Educational Process.	9
Fourth: The challenges of ICT.	9

Section Two: The Indexes and Reports of Information and Communication Technology.	11
Introduction	11
First: Networked Readiness Index (NRI)	11
1. Environment.	10
2. Readiness.	12 12
<ul><li>3. Usage.</li><li>4. Impact.</li></ul>	12
4. Impact.	13
Second: Knowledge Economy Index (KEI).	13
Third: IT Industry Competitiveness Index.	14
Category 1: Overall business Environment	14
Category 2: IT infrastructure	15
Category 3: Human Capital Category 4: R&D environment	15
Category 4: R&D environment  Category 5: Legal environment	15
Category 6: Support for IT industry Development	15
Forth: ICT Price Basket (IPB).	16
Chapter Two: Economic Growth Theories and ICT Worldwide	18
Introduction	18
Section One: Economic Growth Theories.	19
First: Neoclassical Growth Theory (The Solow-Swan Model)	20
1-The basic Solow Model	20
2-Technology and the Solow Model	22
Second: Endogenous Growth Model (Romer (1990))	23
Section Two: The Status of Information and Communication	
TechnologyWorldwide.	26
Introduction	26
First: The Liberalization of Information and Communication	26
Technology	
Second: The Status of Information and Communication Technology Worldwide.	28
Summary of Part One	35

Part Two: The Malaysian Experience in Information and Communication Technology (ICT) sector.	
Introduction	37
Chapter Three: The Historical Development of ICT in Malaysia	38
Introduction	38
Section One: ICT Sector Development in Malaysia.	39
First: Malaysia Country Overview.	39
1. Malaysia Country Profile.	39
2. Economic Overview	39
A. The New Economic Policy (NEP: 1971-1990)	40
B. The National Development Policy (NDP: 1991-	41
2000)	71
C. National Vision Policy (NVP: 2001-2010)	42
3. Economic Reform by Dr.Mahathir Mohamad (1981-2003)	44
Second: ICT Sector Development.	45
1. Vision 2020	50
2. Multimedia Super Corridor (MSC).	51
A. The Development of MSC Malaysia	31
B. MSC Malaysia Achievements and Milestones(Target	52
and Actual)	53
C. MSC Malaysia advantages	53
C.1 Cyber-cities and Cyber-centers	
C.2 Qualifying Criteria	53
C.3 E-Xpats Center& e-Dfi System	54
C.4 Intellectual Property C.5 R&D Initiatives	55 55
C.5 K&D initiatives C.6 MSC Flagship Applications	55
C.7 Smart cities (Cyberjaya)	56
C.8 Bill of Guarantees (BoGs)	57
Cio Bin or Guarantees (Booss)	57
D. MSC Malaysia Status	<b>-</b> -
D.1 Malaysia MSC Companies' Growth	58
D.2 Malaysia MSC Companies' Investment, 2012.	59
D.3 Malaysia MSC Companies' Revenues	60
D.4 Malaysia MSC Companies' Exports	61
D.5 Malaysia MSC Employment	62
D.6 MSC Malaysia Contribution to GDP	62

Section Two: Market Structure of ICT Sector in Malaysia.	64
First: Information Technology Sector	64
1. Hardware Industry	64
A. Revenues and Expenditure of Computer Services	65
B. Employment of Computer Services	65
C. Imports and Exports of Electrical and	66
ElectronicGoods Related to ICT.	
D. The Distribution of PC Market	66
E. SWOT Analysis of the Hardware Industry in	
Malaysia	67
2. Software Industry	
A. Revenues and Expenditure of Programing and	67
Broadcasting	68
B. Distribution of Market Share for Packaged Software	69
C. Employment in Programing and Broadcasting	09
Second: Information Technology Services Sector	
Revenues and Expenditure of IT Services.	69
2. Employment in IT Services	70
3. Shared Services & Outsourcing (SSO).	70
A. The Advantages of Choosing Malaysia for SSO	70 71
B. Shared Services &Outsourcing Landscape	71
	71 72
Third: Communications Sector	12
The Liberalization of ICT Sector In Malaysia	72
A. The Privatization of Communication Sector.	72
B. The Communications and Multimedia Act 1998	73
2. Telecommunication Sector Indicators	73
A. Share of Telecommunication Services of ICT	73
Components.	
B. Revenues and Expenditures of Telecommunication Sector	74
C. The Employment of Communication Sector	75

Chapter Four: ICT Sector Indicators in Malaysia	76
Introduction	76
Section one: ICT as A catalyst for Economic Growth in Malaysia	77
First: General Economic Environment	77
Second: ICT Contribution to the Economy	77
<ol> <li>ICT Contribution to GDP</li> <li>ICT Revenues</li> <li>ICT Expenditure</li> <li>Employment in ICT</li> <li>Investment in ICT</li> <li>Trade in ICT</li> </ol>	77 78 79 79 80 81
Third: The Assessment of ICT Sector in Malaysia  1. ICT Access and Usage by Individuals	82 82
o High ICT Evenon ditues	83 83 84 84 84 85 85 85

Chapter Five: The Opportunities and Challenges of ICT Sectorin Malaysia	or 86
Introduction	06
	86
Section One: The Opportunities of ICT in Malaysia.	87
A dynamic Business Environment	87
2. Multilingual Workforce	87
3. Well-developed Infrastructure	88
4. Government Facilities for ICT	89
5. Government Initiatives for Cyber Crime	89
6. ICT Sector Liberalization & Increase Competition	90
7. Developing the Malaysian Human Resources.	90 90
8. Develop the Capacity of Knowledge Workers	
9. Increasing Pool of Malaysian Professionals	90
7. Increasing 1 oor or waitay stair 1 foressionars	91
Section Two: The Challenges of ICT Sector in Malaysia Ho	w
Malaysia Overcame it.	93
First: The Challenges of ICT in Malaysia	93
	93
1. Decline in the Number of ICT Graduates.	
2. ICT Incentives and Salaries Still Low	94
3. ICT Awareness, Computer Literacy Still Limited.	94
4. Talent Migration (brain drain).	94
5. Lack of Research & Development (R&D) and Science&	94
Technology (S&T).	
6. The Malaysian EducationNeeds More Improvement	95
Second: How Malaysia overcame ICT Challenges.	95
Summary of Part Two	97

Part Three: HowEgypt Can Benefit FromThe	
Malaysian Experience ICT sector.	
Introduction	100
Chapter Six: ICT Sector Development in Egypt	101
Introduction	101
Section one: ICT sector development in Egypt.  First: Historical Development of ICT Sector in Egypt.  1. National Information and Communication Technology Master Plan (2000)	102 102 102
<ul> <li>A. Developing the National Demand for the ICT in all Economic Sectors.</li> </ul>	103
B. The Orientation from Domestic Market to Global Market.	103
c.Human Resource Development.	103
D. Cooperation with the Global Industries.	104

_		Т
	E-Improving the telecommunications infrastructure.	104
	F- Set a regulatory environment.	104
	•	
2.	Egypt Information Society Initiative (EISI)	104
	A.E-readiness –Equal Access for All	105
	A.1 PC for Every Home	
		105
	A.2 IT Clubs	105
	B.E-learning	105
	C.E-Government	106
	D.E-Business	
	E.E-Health	106
	F.E-Culture	106
G Indu		107
G.maus	stryDevelopment	10,
3.	National ICT Strategy in Egypt	107
] 3.		107
	Phase I: National ICT Strategy Building Blocks (2000-2004)	107
	Phase II: National ICT Strategy Building Blocks (2004-2006)	108
	Phase III: National ICT Strategy Building Blocks (2007-	109
	2010)	10)
G 4	TO DATE OF A SECOND COMMENT OF THE PARTY OF	111
Section	Two: Market Structure of ICT Sector in Egypt.	111
Dinet. L	of a marting Tarky along Canton	111
First: I	nformation Technology Sector	111
1	Hardman Industry	
	Hardware Industry	111
2.	Software Industry	112
Second	: Information Technology Services Sector	113
TP1. 1 1 4	3	
I nira: (	Communications Sector	114
1.	Internet Services	114
2.	Mobile and Fixed Lines Services	114
3.	Postal Services	114
-		
Chanta	or Covers ICT Coston Indicators in Forms	
Спарсе	er Seven: ICT Sector Indicators in Egypt.	115
		115
Introdu	ction	
G		116
Section	one: ICT as A catalyst for Economic Growth in Egypt	110
L.		116
First: G	eneralEconomicEnvironment	116
Second	: ICT Contribution to the Economy	
	ICTGDP at Constant Prices	117
2.		117
۷.	ICT Contribution to GDP	117
<u> </u>		