MODELING TECHNOLOGICAL CHANGE ON TELECENTER EFFECTIVENESS

ZAID M JAWAD (811718)

UNIVERSITI UTARA MALAYSIA

[2014]
PERMISSION TO USE

In presenting this thesis in partial fulfillment of the requirements for a Postgraduate degree from the Universiti Utara Malaysia, I agree that the University Library may make it freely available for inspection. I further agree that permission for copying of this thesis in any manner in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence by the Dean of Awang Had Salleh Graduate School. It is understood that any copying or publication or use of this thesis or parts thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to Universiti Utara Malaysia for any scholarly use which may be made of any material from my thesis.

Requests for permission to copy or to make other use of materials in this thesis, in whole or in part, should be addressed to

Dean of Awang Had Salleh Graduate School
UUM College of Arts and Sciences
Universiti Utara Malaysia
06010UUM Sintok
Kedah Darul Aman
Malaysia
Abstrak


Kata Kunci: perubahan teknologi, faktor, telecenter, model pengiraan, penggunaan yang berkesan
Technological change (TC) is the overall process of continuous invention, innovation and diffusion of technology that aims at improving the quality of technical performance. Without TC, there would be no business growth and development particularly in a telecenter. A telecenter is public environments that people develop essential digital skills to access information and communications technologies to create, learn and achieve their specific needs. The major goal of a telecenter is to bridge the digital gap between the urban and the rural areas, and provide digital support services to the neighbouring community. Telecenter effective usage is a major issue of telecenter sustainability because it has been found that there a lack of usage. Hence, this study focused on identifying TC factors that contribute significantly to telecenter effectiveness. The first objective of the study was to identify the contributing factors of TC. The second objective was to construct a computational model based on selected factors obtained from objective 1. The third objective was to evaluate the effectiveness of the model. The research was conducted using the computational model approach through three phases: abstraction, formalization, and evaluation. The results showed that the computational model was able to show the effect of the selected TC on telecenter effectiveness in different types of scenarios. The usage of telecenter can be more effective by considering the TC factors that are appropriate.

Keyword: technological change, factors, telecenter, computational model, effective usage
Acknowledgement

First and foremost, Alhamdulillah, All praise is to my Lord, the Compassionate, and the most Merciful Subhanahhu wata 'alah; for giving me the will and strength in completing this study.

I would like to express my greatest appreciation to Ass.Prof. Faudziah Bt Ahmad and Dr. Azizi Ab Aziz my respective supervisors for their efforts in their guidance, passionate, encouragement and valuable critique that assisted in the completion of this research. My special appreciation is to Dr. Norliza Binti Katuk, for her advice and assistance in the progress of my research. I wish to acknowledge my respective lecturers Dr.Farzana Kabir Ahmad and Mr. Suwannit Charleen, for their valuable comment. My sincere appreciation goes to all UUM lecturers and staff for their precious assistance during my entire study.

I remain entirely grateful to my family that never stopped praying for me, thanks for the wisdoms, passionate, love, and all kinds of support I got from them, and most especially my dear father and mother the light of hope in my life. Great thanks to my lovely sisters for their unlimited support. I am also grateful to my brothers in law Rami and Bassam, and all my uncles, aunts, and cousins for the assistance and efforts they afforded me during the study.

Finally, I would like to express my gratitude and feeling to all colleagues and lifetime friends and those I met during my study. They gave me great lessons touched my life and they had the much share of support in facing my obstacles during this journey. I would like to mention all names of friends and acquaintance but due to constraints of space I can only mention few but keep all next to my heart; Rami sweaty, Auday Yasir, Salam, Wadah, Hayder, Ali, Mohammed, Maytham, Wael, Faisal, and Ahmed.
Table of Contents

PERMISSION TO USE .................................................................................................................... i

Abstrak ........................................................................................................................................... ii

Abstract ........................................................................................................................................ iii

Acknowledgement ........................................................................................................................ iv

Table of Contents ........................................................................................................................ v

List of Figures ................................................................................................................................. viii

List of Tables .................................................................................................................................. ix

CHAPTER ONE INTRODUCTION ......................................................................................... 1

1.1 Background .......................................................................................................................... 1

1.1 Problem Statement .............................................................................................................. 4

1.2 Research Questions ............................................................................................................. 6

1.3 Research Objectives ............................................................................................................ 6

1.4 Significance of the Study ..................................................................................................... 7

1.5 Scope of the Study ................................................................................................................ 7

CHAPTER TWO LITERATURE REVIEW ............................................................................. 8

2.1 Telecenter Concepts .............................................................................................................. 8

2.2 Telecenter Effectiveness ....................................................................................................... 11

2.2.1 Technological Infrastructure Sustainability ..................................................................... 13

2.2.2 Collaboration ................................................................................................................... 14

2.2.3 Technology Adoption (Knowledge) ................................................................................ 15

2.2.4 Technological Costs (Pricing Challenges) ....................................................................... 16

2.3 Issues Related to User Satisfaction of Using Telecenter Services ..................................... 17

2.3.1 Quality of Services (QoS) .............................................................................................. 17

2.3.2 Information Technology Services .................................................................................... 18

2.3.3 Information Accessibility ................................................................................................. 19

2.3.4 Individual Commitment ................................................................................................. 20

2.4 Models of Adopting and Measuring Telecenter Effectiveness ........................................... 21

2.5 ICT Approach of Telecenter ............................................................................................... 24

2.6 Concept of Technological Change (TC) ............................................................................. 25
List of Figures

Figure 2.1. The Three Phases Linear Model of TC..............................................................27
Figure 2.2. Influences Diagram of TC Factors to produce new products......................50
Figure 3.1. Methodology for the Study .............................................................................56
Figure 3.2. Relationship between TC Factors and Telecenter Effectiveness..................62
Figure 3.3. Relationship of Invention ...............................................................................63
Figure 3.4. Relationship of Innovation ...........................................................................64
Figure 3.5. Relationship of Diffusion .............................................................................65
Figure 3.6. Quality of Service .......................................................................................67
Figure 3.7. Short term Satisfaction .................................................................................68
Figure 3.8. Long term Satisfaction ................................................................................69
Figure 3.9. Relationship of Utilization utilization .........................................................70
Figure 3.10. Relationship of Utilization .........................................................................71
Figure 3.11. Relationship of Effectiveness ......................................................................72
Figure 3.12. Long term Effectiveness ............................................................................73
Figure 3.13. The Script Code Using Matlab .................................................................79
Figure 3.14. Simulation Outlines ..................................................................................80
Figure 4.1. Results of Case 1 .........................................................................................83
Figure 4.2. Result for Case 2 .........................................................................................85
Figure 4.3. Result for Case 3 .........................................................................................87
List of Tables

Table 2.1 Examples of Computational Modeling Approach ........................................53
Table 3.1 The Abstracted Factors for the Model .........................................................57
Table 3.2 Factors Formalization of Conceptual Model ...............................................60
Table 3.3 The scale level of assigned values .............................................................75
Table 4.1 Entry values for Case 1 .............................................................................83
Table 4.2 Entry values for Case 2 .............................................................................84
Table 4.3 Entry values for Case 3 .............................................................................86
CHAPTER ONE
INTRODUCTION

1.1 Background

Telecenter is commonly associated with Information and Communication Technology (ICT) (Di Stefano, Gambardella, & Verona) for development projects (Mishra, 2013). Telecenters are considered as one of the most successful projects of ICT diffusion in developing countries, particularly the poor and people living in remote rural areas (Rajalekshmi, 2007). It branded by many names likes community technology centers, multimedia community centers or cyber centers. According to Gomez, Pather, and Dosono (2012) and Razak, Hassan, and Din (2010), a telecenter is a place where ICT facilities such as computers, and Internet services, training, and Internet access are provided to the rural community. Previous findings have shown that communities have opportunity to improve their access to information, job creation, skill development, study opportunities, and increased income, due to effective utilization of telecenter (Bailey & Ngwenyama, 2013; Buhigiro, 2013; Zamani-Miandashti, Pezeshki-Rad, & Pariab, 2013).

In addition, a study carried out by Ibrahim, Yasin, and Dahalin (2010) to ascertain financial sustainability among 132 Malaysian telecenters, has discovered that telecenters were a resourceful point with the provision of Internet service for economics, academic and social development, and others utilities of the community. It also enhances
The contents of the thesis is for internal user only
REFERENCES


Garrido, M., Sey, A., Hart, T., & Santana, L. (2012). Literature review of how telecentres operate and have an impact on e-inclusion: *This publication is a Technical Report by the Joint Research Centre of the European Commission: European Union.*


Hlungulu, B. (2010). *Building a semantic web based e health component for a multipurpose communication centre.* (Doctoral dissertation), University of Fort Hare.


