

BAQIR, MUHAMMAD NAVEED, Ph.D., A Qualitative Inquiry of ICT based Socio-Economic Development in Developing Countries: The Case of Pakistan. (2009)
Directed by Dr. Prashant Palvia, Dr. Hamid Nemat. 305 pp.

The role of information communication technologies (ICT) growth in citizens' political participation, socio-economic development, and poverty alleviation is an active area of study within information systems (IS) research in developing countries. This dissertation contributes in (1) developing an historical perspective of ICT growth, (2) identifying antecedents of ICT growth, (3) proposing extensions in 'design-actuality gaps framework' (for ICT policy analysis), (4) extending dimensions of ICT based socio-economic development, and (5) in integrating relationship between ICT growth and socio-economic development. The data collection was done in three phases from December 2006 to January 2009 in Pakistan. A total of 54 officials who made or influenced government's ICT policies and 46 citizens participated. The qualitative analysis shows that government's policies play an important role in ICT growth. However, political instability and lack of citizens' involvement in policy design leads to inconsistent policies which can impede realization of the benefits of ICT growth. The findings have practical implications for government's ICT policy design and evaluation, understanding of the antecedents of ICT growth, and ICT based socio-economic development. The recommendations for ICT policy design in this research can potentially benefit governments in increasing citizens' quality of life, socio-economic development, and poverty alleviation.

**A QUALITATIVE INQUIRY OF ICT BASED SOCIO-ECONOMIC
DEVELOPMENT IN DEVELOPING COUNTRIES:
THE CASE OF PAKISTAN**

by

Muhammad Naveed Baqir

A Dissertation Submitted to
the Faculty of the Graduate School at
the University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2009

Approved by

Dr. Prashant Palvia
Committee Co-Chair

Dr. Hamid Nemati
Committee Co-Chair

© 2009 Muhammad Naveed Baqir

وَأَنْ لِّئَيْسَ لِلْإِنْسَانِ إِلَّا مَا سَعَىٰ

man has no share in what he does not earn through his hard work

To

Dr. Allama Iqbal (1877-1938)

Poet of the East

قوت عشق سے ہر پست کو بالا کر دے

The power of passion can transform the one below to the one above

APPROVAL PAGE

This dissertation has been approved by the following committee of the Faculty of the Graduate School at the University of North Carolina at Greensboro.

Committee Co-Chair _____
Dr. Prashant C. Palvia

Committee Co-Chair _____
Dr. Hamid Nemati

Committee Members _____
Dr. Kathleen Casey

Dr. Susan Walcott

Date of Acceptance by Committee

Date of Final Oral Examination

ACKNOWLEDGMENTS

I want to express special gratitude to my family. My wife, Amna, stood by my side through thick and thin. She comforted me when I was worried and didn't know what to do. Her support enabled me to spend months of sleepless nights on analyzing loads of qualitative data. She took care of both Maryam and Fatima so that I could focus on completing this dissertation. My parents assured that I understand the importance of education when I was a little child. They provided me unconditional financial and moral support to continue my studies without worrying about anything. I am also thankful to my younger brother, Ali, who has been a source of great comfort to me in times when I felt worried. My sister, Sahrish, and her husband, Kamran, have provided me a great support by taking care of my parents when they greatly needed me.

I would like to individually acknowledge the kind support of my dissertation committee members. They spent countless hours in ensuring that I grow both academically and professionally. It is because of their support and guidance that I excel in my personal and professional life. I feel fortunate to have dissertation committee members who I had the honor of working with. I will never forget Dr. Walcott's support in adding value to my dissertation by ensuring that I understand the importance of spatial representation of my research sites. She provided constant comparison of my research with her own expertise on the socio-economic impact of technology parks in developing countries. Since my meeting with Dr. Alan Lee in August 2005, I wanted to undertake a qualitative study for my dissertation. While I took several courses on qualitative research methods, it wasn't until I took a course from Dr. Casey that I developed the capability to design my research study which was based on sound methods. Dr. Nemati's encouragement, support and intellectual support has been the hallmark of our mutual relationship since August 2005. His kindness throughout my course work, research projects and dissertation has been incredible. He has the capability to intellectually excite his students by making significant contributions to their

research. I have certainly benefitted from his guidance considerably for which I am very thankful to him. I have always expressed my gratitude for Dr. Palvia's support since I took my first course with him during the Fall of 2005. I cried sometimes when I had to accomplish tasks that I thought I would never be able to undertake. Surprisingly, his strategy of setting higher standards and then expecting his students to do even better has worked wonders for me. I could not have completed this dissertation if he had not supported me at every step of the way.

I must also thank Dr. Lakshmi Iyer, Dr. Al Salam, Dr. Rahul Singh, Dr. Kwasi Amoako-Gyampah, and Dr. Rick Reitzug, who prepared me well to undertake challenges and avoid making mistakes. I am extremely thankful to Dr. Cathy Urquhart at the University of Auckland, and Dr. Richard Heeks at the University of Manchester, for providing valuable feedback and suggestions to improve the overall quality of the study. I must also mention Dr. Elizabeth Davidson at the University of Hawaii for encouraging reviews on initial dissertation proposal.

This dissertation was not possible without the kind support of many supporters in Pakistan. Dr. Mohammad Yaseen, Chairman Pakistan Telecommunication Authority, Dr. Nazir Sangi, Chair of the Computer Science Department at Allama Iqbal Open University (AIU), Dr. Rashid Kausar, Pro-Rector of the University of Management and Technology in Lahore, Dr. Arshad Ali, Director General at the School of Electrical Engineering and Computer Science (SEECs) – National University of Science and Technology (NUST), Pakistan, and Dr. Hafiz Farooq Ahmad, Professor at SEECs–NUST, Pakistan, provided crucial help throughout my pursuit of graduate level education in general and dissertation in particular. Last but not the least, Dr. Mahmood Butt, Vice Chancellor at Allama Iqbal Open University in Islamabad, provided me a very supportive environment in Islamabad. I cannot thank him enough to express my gratitude.

TABLE OF CONTENTS

	Page
LIST OF TABLES.....	ix
LIST OF FIGURES.....	xi
CHAPTER	
I. INTRODUCTION.....	1
1.1 ICT Growth And Socio-Economic Development	3
1.2 Research Gaps.....	4
1.3 Need For Developing A Theory Of ICT Based Socio-Economic Development.....	6
1.4 Research Framework	7
1.5 Research Objectives And Questions	10
II. LITERATURE REVIEW.....	13
2.1 Growth and Development	16
2.2 Theories of Development	17
2.3 Economic Development.....	23
2.4 Socio-Economic Development in Different Disciplines	24
2.5 Digital Divide (inequality).....	29
2.6 ICT based Socio-Economic Development in Developed World	33
2.7 ICT issues in Developing Countries	34
2.8 Why Pakistan?.....	38
2.9 Historical Perspective of ICT Growth in Pakistan.....	45
2.10 ICT Growth and Socio-Economic Development in Pakistan	46
2.11 Dark side of ICT	51
2.12 Conclusion.....	52
III. RESEARCH SCOPE/EXPLORATORY FRAMEWORK	53
Conclusion.....	57
IV. RESEARCH METHODS	58
4.1 Historical Research.....	61
4.2 Grounded Theory.....	68

4.3 Narrative Research.....	73
4.4 Researcher Subjectivity.....	78
4.5 Myself as a Researcher	81
4.6 Conclusions	83
V. PILOT STUDY.....	84
5.1 Lessons Learned from the Pilot	89
5.2 Pilot Analysis and Preliminary Findings	92
VI. RESEARCH DESIGN AND METHOD.....	99
6.1 Theoretical Sampling and Evolution of Research Design	99
6.2 Research Design.....	102
6.3 Data Collection and Organization	113
6.4 Timeline.....	115
VII. HISTORICAL REVIEW OF ICT GROWTH IN PAKISTAN	116
7.1 History of ICT Growth in Pakistan	117
7.2 Lessons Learned from Historical Review of ICT Growth.....	138
VIII. ANALYSIS AND EVALUATION OF THE NATIONAL ICT POLICY AND ACTION PLAN.....	140
8.1 Introduction to the ICT Policy and Action Plan of 2000.....	140
8.2 Design-Actuality Gaps Framework.....	144
8.3 Discussion and Analysis of Extended Design-Actuality Gaps.....	152
8.4 Discussion and Analysis of the Causes of Gaps.....	181
8.5 Summary and Lessons Learned.....	187
IX. ANTECEDENTS OF ICT GROWTH	190
9.1 Grounded Theory based Data Analysis.....	190
9.2 Globalization	196
9.3 Awareness of ICT Benefits	202
9.4 Regional Competition	210
9.5 Market Size	212
9.6 Law Enforcement Challenges.....	214
9.6 Summary	218

X. ICT GROWTH AND SOCIO-ECONOMIC DEVELOPMENT OF CITIZENS	221
10.1 Background of Research Participants (Citizens)	221
10.2 Dimensions of Socio-Economic Development	226
10.3 Axial Model	258
10.4 Theoretical Integration	259
10.5 Relationship between ICT Growth and Socio-Economic Development	264
10. 6 Summary	267
 XI. SUMMARY AND CONTRIBUTIONS.....	268
11.1 Overview of the Research	269
11.2 Contributions and Implications for Theory and Practice	272
11.3 Narratives of Children	278
11.4 Trustworthiness and Evaluation of the Study.....	281
11.5 Limitations.....	285
11.6 Future Research	286
11.7 Conclusion	288
 REFERENCES.....	290
 APPENDIX: INTERVIEW PROTOCOLS	304

LIST OF TABLES

	Page
Table 1: Top-Ten Emerging Markets (Willing, 2007)	37
Table 2: Teledensity Growth (PTA, 2008)	41
Table 3: Socio-Economic Data for Pakistan (PTA, 2008).....	41
Table 4: Foreign Direct Investment (FDI) in Pakistan (PTA, 2008).....	42
Table 5: Historical Research in IS Research	62
Table 6: Grounded Theory Research in IS.....	69
Table 7: Narrative Research in IS	73
Table 8: Research Design of Pilot Study	85
Table 9: Interview Protocol for Government Officials/Industry Representatives.....	87
Table 10: Data Collection Time Frame and Number of Participants	102
Table 11: Research Design	105
Table 12: Selection of Citizens	110
Table 13: Research Participants Selection	113
Table 14: Results from initial open coding of ICT policy, action plan and related government documents	144
Table 15: Dimensions of Design.....	151
Table 16: Dimensions of Actuality	152
Table 17: Extended Design-Actuality Gaps Across Identified Dimensions*	154
Table 18: Foreign Direct Investment (FDI) in Telecommunication Sector (US \$ Million – PTA, 2008)	168
Table 19: Open Codes, Key Terms and Phrases for Antecedents of ICT Growth	192
Table 20: Word Frequency in transcripts and codes list from 54 interviews.....	195

Table 21: Scaling up of Codes into Categories.....	196
Table 22: Background and Narratives of Select Participants.....	225
Table 23: Dimensions of Socio-Economic Development, Categories of Codes, Frequencies, Key terms and Phrases.....	230
Table 24: Gender distribution of participants in three competitions	279
Table 25: Assessment of the Trustworthiness of this Research	284

TABLE OF FIGURES

	Page
Figure 1: Research Framework and Questions	11
Figure 2: Global Digital Inequality; Source United Nations Global Development Goals Indicators	32
Figure 3: Teledensity Growth (PTA, 2008)	41
Figure 4: ICT Coverage Area in Pakistan (white space within the country boundaries represents coverage area)	44
Figure 5: Schematic Diagram of Data Collection and Analysis	60
Figure 6: NVIVO Software Screenshot	93
Figure 7: Open Coding from Data and Associated Attributes	94
Figure 8: Framework for the stages of Socio-Economic Development	96
Figure 9: Theoretical Model of Socio-Economic Development (Axial Coding).....	98
Figure 10: Selection of Ordinary Citizens for Narrative Interviews.....	109
Figure 11: Research Sites	115
Figure 12: Evolution of Information Communication Technologies in Pakistan	119
Figure 13: Extended Design-Actuality Framework	149
Figure 14: Axial Coding of ICT Growth Evaluation from ICT policy, action plan and other documented evidence	189
Figure 15: Axial Coding of the Antecedents of ICT Growth	220
Figure 16: A Newspaper Advertisement of a Cellular Service Provider Offering	235
Figure 17: Axial Model of the Dimensions of Socio-Economic Development	258
Figure 18: Internet and Socio-economic Development –.....	260
Figure 19: Theoretical Model of the Relationship between ICT Growth and Socio-Economic Development.....	265

Figure 20: Newspaper advertisement inviting children to participate in a narrative writing contest on “role of ICT on our lives	280
Figure 21: Winners of the narrative writing contest	280

CHAPTER I

INTRODUCTION

Information and Communication Technologies (ICT) are often represented as a factor in global socio-economic development. There is a widespread optimism that ICT can play a significant role in economic development and GDP (gross domestic product) growth, capacity development and employment, productivity and organizational restructuring, poverty alleviation and democratic participation of citizens (Kozma, 2005). ICT are also expected to have an important impact on improved transparency and responsiveness of governmental agencies, widely available education and healthcare opportunities, cultural creativity, and social integration of individuals with different abilities and groups with diverse cultural backgrounds. However, little academic research can demonstrate that these objectives can be met simply because of ICT growth.

ICT refers to technologies that help in the communication and transmission of information. This can be accomplished by using a number of computer based technologies, voice and data telephony, wireless local loops and cellular phones in addition to the rise in electronic media outlets such as new television and radio channels that enhance awareness of the socio-economic development. In this sense, ICT form an overarching discipline which encompasses Information Systems (IS) as part of it.

The potential of ICT in socio-economic development is being recognized around the world in recent years (Walsham & Sahey, 2006). The recent proliferation of ICT in many developing countries has led to exponential growth of the ICT sector and is considered vital for socio-economic development. However, the concept of socio-economic development and its relationship with ICT growth remain open questions. A great deal of current literature on the subject is based upon governmental plans and strategies or their analysis. The concept of socio-economic development has been used in a variety of ways in different academic disciplines such as sociology, psychology, economics, political science, geography, management and health sciences to describe enhancement of quality of life for ordinary citizens. Furthermore, the scale of analysis for socio-economic development could range from individual to societal and from organization to international depending upon the nature of the discipline (Jaffee, 1998).

In simplest terms, social development refers to the opportunities for education, social interactions and evolution of social customs, fashion and trends (Blakely, 2001). Economic development on the other hand means creation of (better paying) jobs, a widespread and sustained increase in the living standard and accelerated economic activities (Blakely, 2001). World Bank defines economic development in terms of “qualitative change and restructuring in a country's economy in connection with technological and social progress. The main indicator of economic development is increasing GNP per capita (or GDP per capita), reflecting an increase in the economic productivity and average material wellbeing of a country's population” (World Bank,

2008). Economic development is closely linked with economic growth. Madon's (2000) theoretical model attempts to define the concept of socio-economic development as well as its dimensions. In this model, dimensions of socio-economic development include (1) economic productivity, (2) health, (3) education, (4) poverty alleviation, (5) empowerment, (6) democracy and (7) sustainable development.

1.1 ICT Growth and Socio-Economic Development

The notion of ICT growth and its impact on socio-economic development is not new. Hardy (1980) argued that telephones have a direct impact on economic development because they increase managers' capability to communicate rapidly and therefore support coordination of economic activities. Wlatham (2001) calls for a "world of difference" while referring to ICT and socio-economic development. Eggleston et al. (2003) remark that even with the widely held optimism that ICT will promote socio-economic development and alleviate poverty, there is no theoretical or empirical evidence to support this claim. With the proliferation of ICT, the economic health of cities, regions and countries will depend on their ability to actively participate in technological advancements (Gibbs and Tanner, 1997). The investments in ICT by regional and local administrations are indicative of the perceived importance of ICT for economic and technological development. In many instances, local and regional administrations have taken special interest in the encouragement of small and medium size businesses to develop capacity for ICT to support their core business. The provision of training to the local population in order to prepare trained and skilled workers for

knowledge based economic development is another example of investments in ICT for economic development.

The majority of existing literature on socio-economic development is policy development and analysis oriented. A number of countries around the world, particularly developing countries, have adopted ICT policies recently or are in the process of adopting them. These policies usually start with the an understanding of ICT's role in shaping socio-economic landscape of these countries (Baqir & Pervez, 2000). Several research studies from various disciplines attempted to define socio-economic development. It has been defined in as simple terms as education and income (Hsieh, Rai & Keil, 2008) to encompass complex concepts such as quality of life, creation of a better world, social customs, fashion and trends, economic productivity, health, poverty alleviation, empowerment, democracy and sustainable development (Madon, 2000; Blakely, 2001; Walsham, 2001; Puri, 2007).

1.2 Research Gaps

Walsham (2001) and Puri (2007) emphasize the need to show the impact of ICT on socio-economic development, i.e., the creation of a better world. However, the question remains about what constitutes socio-economic development, how it is defined and how it should be measured. The literature also disputes the notion of income and education (Hsieh, Rai, & Keil, 2008) alone to define the socio-economic status of individuals, groups and nations. Existing literature and ICT growth data (ITU, 2008) from developing countries suggest tremendous growth of the ICT industries. The

relationship between ICT growth and socio-economic development also remains an open research question.

The *MIS Quarterly* June 2007 special issue on IS research in developing countries advocates further understanding of ICT based socio-economic development where 4/5th of the world's populations lives. While the mere promise of significant economic and social transformations/development due to ICT is easy to make, little academic research can demonstrate socio-economic development that was brought about due to ICT growth. The research framework of the virtuous cycles of productivity and gains (Mistry, 2005) discusses the role of public policies, enabling legislations, governmental initiatives in the growth of ICT and the digital divide in India. Yet, it doesn't explain the antecedents of ICT growth or what necessitates change in governmental policies.

Research on ICT growth in developing countries is specially limited. For example, most of whatever research exists on Pakistan consists of the description and analysis of ICT policy that the government adopted in 2000 (Mujahid, 2002; Baqir & Pervez, 2000). As such existing literature on the antecedents of ICT growth and their impact on socio-economic development is sparse.

There is no existing comprehensive and integrated theory of ICT based socio-economic development that empirically explains the concept of socio-economic development and its relationship to ICT growth. The lack of IS oriented research on developing countries and the need to better understand antecedents of ICT growth and ICT based socio-economic development call for in-depth research. Even though socio-

economic development is an interdisciplinary field, lack of a theoretical background for ICT based socio-economic development makes this research timely and worthwhile.

1.3 Need for Developing a Theory of ICT based Socio-Economic Development

Information and communications technologies (ICT) are often presented as enablers that can bridge physical distances in a number of ways, thus creating opportunities for accelerated social and economic activities. The quantitative data from International Telecommunication Union (ITU) and regulatory bodies for ICT sectors in developing nations clearly show an unprecedented growth in ICT infrastructure and market size. A comprehensive review of governmental ICT policies from developing nations and editorials in leading journals on this topic depicts that the citizens' point of view on ICT led socio-economic development has been specially ignored in literature.

There is a need to develop a unifying theme that integrates the concepts of ICT growth and socio-economic development. Since there is no existing theoretical foundation that explains socio-economic development and its relationship with ICT growth, this research aims at employing grounded theory and narrative research methods to develop an understanding of socio-economic development and its relationship with ICT growth. This research will develop an integrated model of ICT's role in socio-economic development in a developing country.

As an example of the case, Pakistan recently experienced a fast paced growth in the ICT sector (PTA, 2008). Interviews with ICT industry stakeholders such as

government officials, policy makers, representatives from ICT industry regulators, representatives from the ICT industry service providers, hardware providers, software development firms, and ordinary citizens will be conducted. The interviews will be transcribed and analyzed using grounded theory and the narrative research method. The findings will discuss how different stakeholders of ICT industry in Pakistan view socio-economic development and its association with ICT related growth. An attempt will be made to understand the meaning of socio-economic development from people's interpretation of these terms and impacts on their lives. This will lead to the development of a ICT based socio-economic development theory which will benefit policy makers, government officials, citizens as well as technology vendors and service providers in understanding ICT growth based socio-economic development needs.

1.4 Research Framework

The existing literature makes a number of suggestions as to what aspects of future research on IS/ICT in developing countries should be given particular attention. Walsham et.al (2007) point out the following dimensions of future research in this area: (1) geographical spread, i.e., conducting research in areas traditionally ignored in the existing literature, (2) types of organizations, i.e., traditional focus has been on public and private organizations: more research is needed on other types of organizations such as role of Non-Governmental Organizations (NGO), and (3) level of analysis, i.e., typical analysis level progress through individuals, groups, organizations, industry sectors, societies, and international organizations; progression of higher, aggregate levels of analysis tend to exclude community level research which represents an opportunity for future research.

Literature from other academic disciplines such as anthropology and development studies is especially important for future research in IS/ICT development in developing countries. Rich methodological and theoretical diversity from anthropology provide approaches to understanding cultures and societies. Developmental studies provide understanding of the debates around the basic tenets of “development” in various parts of the world. Additionally, academic disciplines such as political science, geography, economics, sociology, medical science, education and several others provide basic understanding and approaches towards developing a framework for research on ICT based socio-economic development in developing countries.

Walsham and Sahay (2006) suggest four basic questions for future research on IS/ICT in developing countries. These questions are listed below along with how they are addressed these in this research.

1. What is the “development” to which ICT aims to contribute?
 - For the purpose of the current study, the term development refers to social and economic development. While economic development may be translated into increased opportunities for economic development such as jobs creation, higher pay, infrastructure development, business development and enrichment due to the use of ICT and ability to reach a larger customer base, there is no unified definition of the term. Different academic disciplines such as economics, political science, sociology, anthropology and others define this term differently. Similarly the concept of social development is illusive because of the wide spectrum of changes that may be considered social development. The dimensions of socio-economic development are explained in later chapters and

will be understood from the perspective of ICT stakeholders as a result of grounded theory and narrative research analysis.

2. What are the key issues being studied related to ICT?

- The relationship between ICT growth and socio-economic development remains open in IS/ICT in developing countries research. The causes and the consequences of the relationship between ICT growth and socio-economic development have implications for developing countries. Similarly integration of antecedents of ICT growth and socio-economic development is another important goal of this research.

3. What is the theoretical and methodological stance?

- Since there is no integrated theory of ICT based socio-economic development, a qualitative approach will be used. Historical research method will be used to identify antecedents of ICT growth in developing countries. Grounded theory and narrative research methods will be used to analyze the qualitative data from interviews with government officials, industry representatives and ordinary citizens. Further discussion on this aspect of the current research is given in Chapter 4.

4. What level and focus of analysis is being adopted?

- The level and focus of analysis is society. Even though level and focus of analysis for socio-economic development can be individual, societal, organizational or international (Jeffee, 1996), societal impact of ICT growth on socio-economic development is the basic tenet of this research.

1.5 Research Objectives and Questions

The underlying exploratory framework for this research is shown in Figure 1: Research Framework and Questions. These research questions are consistent with the suggestion for a research framework by Walsham and Sahay (2006 & 2007).

1. What are the antecedents of ICT growth?

- What is the historical evolution of ICT based upon documented evidence?
- How do government officials interpret historical events in the past that lead to ICT growth?
- What external and internal antecedents played an important role in ICT growth in Pakistan?

2. What is ICT based socio-economic development and how is it related with the ICT growth in developing countries?

- What does socio-economic development mean to citizens (Dimensions of Socio-Economic Development)?
- How do policy makers and enforcers in government interpret this relationship?
- How do industry representatives such as service providers, software/hardware providers and technology developers perceive ICT based socio-economic development and ICT growth in developing countries?

- How ordinary citizens’ make sense of socio-economic development and ICT growth?

Based the set of research questions above, following five research objectives are undertaken in this research:

1. Develop a historical perspective of ICT growth (so that the next objective is informed by the historical context of ICT growth)
2. Identify antecedents of ICT growth
3. Identify dimensions of ICT growth (for ICT policy analysis)
4. Identify dimensions of socio-economic development
5. Integrate the relationships between ICT growth and socio-economic development

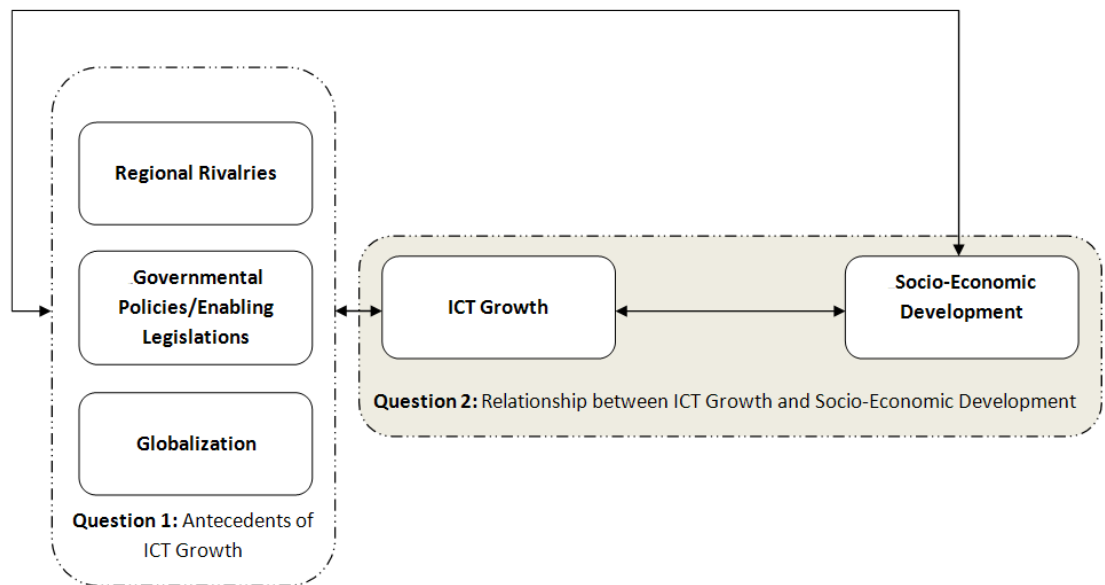


Figure 1: Research Framework and Questions

The relationship between ICT growth and socio-economic development has been shown as a two way arrow to highlight a possible two-way relationship. The existing literature presents this relationship as an open question and it forms the first research question for this research. This research framework lists a few antecedents of ICT growth based upon the literature. The historical research method will be used to discover antecedents and their mutual relationships. This constitutes the second research question.

Since this research is not a positivist study, identification of the relationships between various components of the framework are based upon exploratory methods. Efforts have been made to avoid any preconceived notions of these concepts and their relationships (grounded theory method). The framework above was developed based upon the suggestions for IS research in developing countries literature. This framework serves as a starting point for this research. The research does not attempt to validate this particular model. As explained in the chapter on research methods, grounded theory based research considers literature review and relevant existing theories as data sources for theory development of the issue being studied. A theory and a model of ICT based socio-economic development will be developed as a result of grounded theory and narrative research analysis. Further discussion of this framework and concepts is provided in Chapter 3.

CHAPTER II

LITERATURE REVIEW

Information communication technologies (ICT) have been defined by different researchers in a number of different ways. The combination of both terms i.e., “information and communication” took place in the 1980s to emphasize the merging of both technologies (Ong, 1998). Thus ICT refers to a range of technologies for gathering, storing, retrieving, processing, analyzing, and transmitting information. ICT includes but is not limited to technologies such as the Internet, mobile telephony, satellite communications and digital television over cable or aeriels. Additionally, use of the term “information communication technologies” (ICT) is preferred over the term “Information Technology” (IT) or “Information Systems” (IS) in the context of this research. How information is communicated is just as important as how information is collected, stored and shared (Yildiz, 2007). Therefore, for the purpose of this research, the term “ICT” is used as an umbrella term which includes any communication device or application encompassing: Internet, cellular phones, computers, radio, television, network hardware and software and satellite systems, in addition to the various services and applications associated with them, such as videoconferencing, e-learning, e-government and online databases.

The notion of ICT based socio-economic development is not new. Several researchers have reported social and economic benefits of these technologies. Hardy's (1980) analysis of data from 60 nations over a period of 13 years for the use of telephone showed ICT played an important role in economic development. He hypothesized that telephones play the role of a catalyst when economic development activities result in the improvement of housing, education, health etc. (i.e., social development). Even though, his data did not provide any conclusive results, he found that contribution of telephones as a vehicle for socio-economic development came from the information flow they created. It is not just the economic gains that are realized from the proliferation of ICT, social aspects of citizen's lives also change dramatically (Campbell, 1990). It is also important to mention the impact of digital divide which creates two parallel cultures, social systems and customs (Campbell, 1990). Qureshi (2003) suggested that the disparities between the "haves" and the "have-nots" can only be bridged by developing capacity for using ICT for economic development. The digital divide may exist not only between people and communities but also between nations and large geographic regions. The ICT based socio-economic development efforts can bridge the digital divide at local level as well as regional and global level.

IT is an infrastructural technology and a transport mechanism, similar to electric power and railroads respectively and has shown similar patterns of phenomenal growth as all other infrastructural technologies (Carr, 2003). Therefore, ICT have created a new platform which brings people and organizations together. These technologies allow for

unparalleled socio-economic development opportunities. Qureshi (2003) cites an example of Indian villagers and farmers who can access latest developments in land management and even order seeds using the Internet thus having a major impact on the socio-economic development of their region. From social development perspective, even with the widely held optimism that ICT will promote economic development and alleviate poverty, there is no theory of ICT based socio-economic development which can explain the relationship between ICT growth and socio-economic development. Eggleston et al. (2003) state that based upon the theories of information and markets, greater access to ICT can pay off significant yields from economic development efforts. They articulated the gist of their argument in the form of “digital provide” which signifies the point that ICT can become a vehicle for socio-economic growth. These reported socio-economic benefits and the controversies surrounding the notion are intriguing points for this research which fills the gap between anecdotal examples and theory development.

Walsham and Sahay (2006) point out that future research on IS in developing countries should also attempt to define “development” to which ICT contribute. In line with the suggestions from other researchers, it seems appropriate to review the literature around the concept of “development” and associated theories of development before an in-depth analysis of socio-economic development in various academic disciplines.

2.1 Growth and Development

Development is defined as a progressive process of growth (Oxford English Dictionary, 2008). It is important to understand the concept of horizontal expansion and vertical advancement in the context of growth and development (Jacobs, Macfarlane & Asokan, 1999). Growth is the case of horizontal expansion in which, for example, service area for ICT might be increased by putting more cellular towers or allowing people in far off places to connect to internet hubs without cost penalties (infrastructure development). Development represents vertical advancement where society moves from lesser to greater level of energy, efficiency, quality, complexity, comprehension, creativity, enjoyment and accomplishment (Jacobs et.al, 1999). Therefore development would result in increased pace of service use for social and economic well-being of society.

From economic development theory perspective, growth is the increase in specific measures such as national income, gross domestic product (GDP) or per capita income. Development refers to improvements in literacy, life expectancy, poverty rates, leisure time, environmental quality, freedom and social justice among other measures of social aspect of society (Abbot, 2003).

2.2 Theories of Development

This section covers some of the well known development theories. Description of each theory is followed by a brief analysis of why a specific theory is unable to explain ICT based socio-economic development in developing countries.

2.2.1 Modernization Theory (Development Theory)

Modernization theory suggests that development can be achieved by following the development path followed by developed nations (Rostow, 1990). According to this theory, development is a linear process and every nation and country must go through stages in this linear process. A key factor in this theory is that underdeveloped/developing nations must rely on developed world for their development. Therefore the relationship between developed and developing country would be similar to core and periphery. This theory however postulates that the imported technologies can stimulate growth at a much faster rate than they did in the developed countries. Therefore an equal level of development can be reached between developing and developed countries.

The basic tenet of this theory ignores the fact that different cultural norms, customs and traditions affect the development process differently. The linear process may not consist of the same sequence and stages of development in different nations. There are differences in the technology life cycles for various ICT even within a nation and these differences have the potential to magnify when

deployed in environments with considerable socio-economic and cultural differences. In addition, there are considerable differences in the legal environment and operating regimes in different countries and this theory cannot satisfactorily explain development in cross cultural situations.

2.2.2 Dependency Theory

Dependency theory represents Marxist concepts of development. This theory suggests that development and underdevelopment are result of each other (Amin, 1976). In other words, developed countries can only be considered developed as long as there are underdeveloped countries. Therefore according to this theory developing countries must break their ties with developed world and only focus on endogenous development.

This theory negates the leapfrog strategy often used when one or more stages of development are skipped to directly reach a higher level of technological advancement. This theory cannot explain development of second generation and third generation cellular and wireless technologies being deployed in several developing nations while a large portion of the developed world is still operating the first generation technologies (US still has predominantly first generation cellular networks while several developing countries have leapfrogged to second and third generation networks skipping several stages of development that most developed countries went through).

2.2.3 *World Systems Theory*

This theory explains the relationship between industrialization within developing countries. Wallerstein (2004) describes this theory as

a social system, one that has boundaries, structures, member groups, rules of legitimation, and coherence. Its life is made up of the conflicting forces which hold it together by tension and tear it apart as each group seeks eternally to remold it to its advantage. It has the characteristics of an organism, in that it has a life-span over which its characteristics change in some respects and remain stable in others. One can define its structures as being at different times strong or weak in terms of the internal logic of its functioning.

As opposed to modernization theory this theory introduces the concept of core, semi-periphery and periphery. In this theory, inequality is considered separate entity from growth and development and therefore leads to distrust on state for development.

Existing literature on ICT/IS development in developing countries overwhelmingly reports that the growth of the ICT sector is heavily dependent upon government policies. Since most ICT/IS projects utilize wired or wireless communication infrastructure for access and interconnection, government policies play an important role. Due to the lack of trust in government, world systems theory fails to explain how enabling legislations in several developing countries such as

Pakistan, Jordan, Egypt, India, United Arab Emirates and others have dramatically changed the ICT/IS sectors in a matter of few years.

2.2.4 State Theory

The distrust for state posed in the world systems theory led to the proposal of state theory. This theory suggests that development is intertwined with politics and each country might take different amount of time to overcome political forces that inhibit growth (Preston, 1996). According to this theory, development is dependent upon a state's stability and influence over internal and external affairs. Therefore this theory suggests an increased role of state in spurring growth and development of the country.

The literature on ICT/IS in developing countries suggests a strong commitment from the state's public policies, laws and regulations. However, in several developing countries including Pakistan where state's stability has been continuously threatened, growth of ICT sector and socio-economic development has been consistent (this case has been particularly described later in this chapter).

2.2.5 Economic Development Theory

Economic development refers to increase in economic wealth of regions or countries for the well-being of their inhabitants (Abbott, 2003). This theory explains that economic development goes far more than increase in economic measures such as national income, GDP or per capita income. Economic development should reflect

increase in social aspects of society such as literacy, life expectancy, poverty rates, leisure time, environmental quality, freedom and social justice.

This theory pays attention to the indirect effects of economic development in line with the literature on ICT/IS in developing countries. However it does not explain the relationship between ICT growth and socio-economic development.

2.2.6 Comprehensive Theory of Social Development

The comprehensive theory of social development was suggested by Jacobs et.al (1999). This theory states that all forms of development should make society move from lesser to greater levels of energy, efficiency, quality, productivity, complexity, comprehension, creativity, enjoyment and accomplishment. This theory suggests that political, social, economic and technological developments are various expressions of human collective and social existence. Accordingly, no development can be realized until it results in the development of human collective and existence. Development cannot be confined to increase in the economic measures alone. Therefore development would be incomplete unless political, social and technological progress results in enhanced quality of life experience for human beings.

While this theory emphasizes the role of indirect impacts of development, it fails to address the relationship between ICT growth and the process of socio-economic development.

2.2.7 Social Development

Social development is a process of transformation of social structures in a way that improves the capacity of people in a society to fulfill their aspirations (Szirmai, 2005). It is a concept that corresponds to a commitment for individual well-being and the opportunity for citizens to determine their own needs and to influence decisions which affect them. Opportunity for citizens to determine their own needs and to influence aspects of their life such as education, human capabilities, politics, culture, ecology, nutrition, health, life expectancy, personal dignity, freedom of association, personal safety and freedom from fear of physical harm, and the extent of participation in civil society . The term social development is normally associated with changes in society that are considered beneficial. However, social changes may also lead to undesired side-effects that are considered negative consequences (Houtman, 2004).

ICT in developing countries have been credited in the literature for its influence on social development. Kozma (2005) explains the role of ICT in bringing about social change in the following words:

[social development] is the set of broader social changes resulting from the convergence of computers and communication technologies, their assimilation throughout society and their use for communication, collaboration, and the sharing of knowledge. As ICTs—including laptops wirelessly connected to the Internet, personal digital assistants, low-cost video cameras, and cell phones—become more accessible and embedded in society they

offer the potential to restructure organizations, promote collaboration, increase democratic participation of citizens, improve the transparency and responsiveness of governmental agencies, make education and health care more widely available, foster cultural creativity, and enhance the social integration of individuals with different abilities and groups of different cultural backgrounds.

Social development may mean different things to different people in different contexts. It is important to find out what does it specifically mean in the context of a developing country.

2.3 Economic Development

As discussed earlier Abbott (2003) considers economic development an increase in economic wealth of regions or countries for the well-being of their inhabitants (Abbott, 2003). More specifically, it is generally tied to the activities that lead to creation of jobs and increased income of the members of a society or even rise in the GDP of a country. Increased opportunities for economic activities including higher job availability and higher pay are considered cornerstone of economic development efforts. The literature shows a number of different measures for economic development in different contexts. Some of these measures include quantitative numbers such as GDP growth, market size and capacity, employment, productivity, poverty. Some researchers believe that economic development should reflect increase in social aspects of society such as literacy, life expectancy,

poverty rates, leisure time, environmental quality, freedom and social justice. However it is not a consistent view shared by several other researchers on the topic.

The role of ICT and economic development has been emphasized in the literature. There are several case studies that report ICT based economic growth in India resulted in increasing value-added telecom links to capture more benefits domestically through offshore development for developed country firms. It also helped in greater spillovers to the local economy, broadening the ICT industry with production of telecom access devices, improving the functioning of the economy through a more extensive and denser communications network, and improving governance. Other studies that examined ICT based economic development in other developing nations suggest that ICT growth has a close relationship with economic development.

2.4 Socio-Economic Development in Different Disciplines

It seems appropriate to define socio-economic development as a combination of socio and economic development. This assertion is true to a certain level but the literature treats socio-economic development as a much more refined concept than a mere combination of social and economic development.

Socio-economic development is a multidisciplinary concept and is frequently referred to in sociology, economics, political science, psychology, geography, management, health sciences and information systems among others. While there are unifying threads, different academic disciplines focus on significantly different aspects of socio-economic development. The following sections present a review of how the concept of socio-economic development is used in different academic discipline.

2.4.1 Economics and Socio-Economic Development

Economics views socio-economic development as a “potpourri of economic, social, cultural and political forces” (Lewis, 1954). It is considered a process which enables human beings to realize their potential, build self-confidence and lead lives with dignity and fulfillment (Lewis, 1954). Various dimensions of socio-economic development that are considered vital include grassroots development such as entitlement, empowerment, entrepreneurship, well-being and sustainability. Poverty is viewed as vulnerability and lack of voice, power and representation (Choudhury, Zaman & Harahap, 2007).

2.4.2 Sociology and Socio-Economic Development

Socio-economic development or formerly known as sociology of economic change, is an important concept in sociology. Socio-economic development refers to individual income as well as contextual income such as GDP, education, information, freedom of choice, social stability, autonomy, and social values such as power,

security, achievement, hedonism (aspiration), stimulation, self-direction, conformism/tradition and benevolence/goodness (Ramos, 2006). Szirmai (2005) considers development in income, education, human capabilities, politics, culture, ecology, nutrition, health, life expectancy, personal dignity, freedom of association, personal safety and freedom from fear of physical harm, and the extent of participation in civil society part of socio-economic development.

2.4.3 Political Science and Socio-Economic Development

The concept of socio-economic development is at the heart of political science. This is mostly taken in broad and equitable improvements in material and social welfare of people (Goldsworthy, 1984). It considers economic power, wealth, income, direct and indirect economic benefits in the form of (better paying) jobs, better living standards and accelerated economic activities (Blakeley, 2000).

2.4.4 Geography and Socio-Economic Development

Geography deeply impacts socio-economic development. Socio-economic development becomes an important and interesting concept when the impact of altitude, urbanization, rainfall, distance to market, sea, rivers, population density, quality of public administration, general level of health and diseases are discussed in relation socio-economic development (Gallup, 2000). It is interesting and revealing to find out that natural resources, income, infrastructure, health, poverty, infant

mortality, child nutrition, inequality and social cohesion combined tell a story of the socio-economic development of a region, country and society.

Geography often addresses issues such as social capital, civil society and participatory development and economic development as it relates to geographies of development (Potter et.al., 2004).

2.4.5 Climatology and Socio-Economic Development

Climate (or weather) studies also look at the socio-economic development and its relationship to climate change. Socio-economic development is defined as complex social challenge including life-expectancy, educational achievement, quality of governance (political stability, level of corruption) and disparities in per capita income.

2.4.6 Medical Science and Socio-Economic Development

Socio-economic development is considered means of inequality in access to healthcare, service use and outcomes. Medical science's view of socio-economic development includes understanding of the poverty levels, social justice (and inequalities), education, health care access, service use and ability to pay (Ahmed, Adam, Chowdhury & Bhuiya, 2000).

2.4.7 Information Systems and Socio-Economic Development

The concept of socio-economic development is not new to information systems researchers. This concept was referred to as early as 1977 in an article on

“computers and the frustrated chief executive” by Danzger (1977). Hardy’s (1980) research on telephones as an economic development vehicle was another step towards realization of the importance of ICT in socio-economic development. Orlikowski and Iacono (2001) in their “Research commentary: desperately seeking the “IT” in IT research – a call to theorizing the IT artifact” referred to information technology on the centrality in everyday socio-economic life. Quoting Walsham’s (2001) book “making a world of difference”, Puri (2007) discussed the role of ICT in creating a better world and referred to socio-economic development as a means to advance the less developed countries. Hsieh, Rai and Keil (2008) analyzed behavior models of socio-economically advantage and disadvantage to understand digital divide (further discussed in the next section).

Interestingly enough, a concept as complex as socio-economic development is measured only in terms of income and education (Hsieh et.al., 2008). Even though Puri (2007) talks about socio-economic development as a possible way of creating a better world, it does not give any further detail of what does creating a better world entail. Madon’s (2000) work on dimensions of socio-economic development is probably as close as it can get to the definition of socio-economic development from other disciplines. Her dimensions of socio-economic development include economic productivity, health, education, poverty alleviation, empowerment, democracy and sustainable development.

This situation warrants an in-depth study of how socio-economic development is understood by stakeholders of ICT based socio-economic development including government officials, policy makers, citizens and others in the context of a developing country. The understanding of relationship between ICT growth and socio-economic development will help in better understanding the antecedents of ICT growth and the relationship between ICT growth and socio-economic development.

2.5 Digital Divide (inequality)

The concept of digital divide (or sometimes called digital inequality) is closely linked to socio-economic development in prior research. Digital inequality is considered a form of social inequality. There are considerable differences in the definition of the term by various researchers. For example, for some, the term refers to the gap between people who have access to the Internet and those who do not (Mehra, 2002). Digital divide may also refer to a more specialized type of inequality, i.e., broadband Internet. However, some researchers consider digital divide at a very basic level, e.g., access to ICT. It is unequal access to ICT and unequal acquisition of related skills by segments of society. Therefore the meaning of digital divide will depend upon the context. For the purpose of this research, digital inequality is the “uneven distribution of the benefits of information communication technologies” (Azari & Pick, 2005, Pick & Azari, 2007). It is

studied and considered at both specialized level (such as broadband Internet access) and basic ICT access level (availability of basic ICT devices such as phone, TV and radio).

For some researchers, digital divide can be bridged by increasing access to ICT. Governments around the world take special interest in bridging this gap by instituting enabling legislations to open up markets for competition (Baqir & Latif, 2007) or providing ICT services directly to the citizens (Hsieh et.al., 2008). However prior research shows that access to technology does not automatically translate into effective use (Davis, 1993). Hsieh et.al. (2008) write that government initiatives to increase ICT access “will not alter the state of digital inequality unless there is continued use”.

Prior research indicates that there are several groups of people who are more vulnerable to being ‘left out’ as a result of digital inequality. Some of the groups considered in previous research studies include women, minorities, people with little education and people living in rural areas.

Eggleston, Jensen, and Zeckhauser (2003) point out that even with the widely held optimism that ICTs will promote socio-economic development and alleviate poverty, there is no theoretical or empirical evidence to support this optimism. Based upon the theories of information and markets, greater access to ICTs can pay off significant yields from economic development efforts. They articulated the gist of their argument in the form of “digital provide” which signifies the point that ICTs can become a vehicle for economic growth. Digital provide presents the gap between ‘haves’ and ‘have nots’ as an opportunity in the sense that the ‘have nots’ can become more

productive members of 'knowledge economy' with increased opportunities for access to ICT.

2.5.1 Global Digital Divide

Digital inequality does not exist only within a society. It may also exist among nations and countries. There are major difference in the intensity of ICT utilization and their use in the social and economic aspects of different nations (Pick & Azari, 2008). This type of inequality is sometimes called global digital divide. Developing countries around the world face severe problems with respect of global digital divide. These problems are both in terms of access to international bandwidth and over all affordability. As discussed earlier, digital divide can be looked at from various perspectives and figure 2 shows global digital divide as far as penetration of computers is concerned.

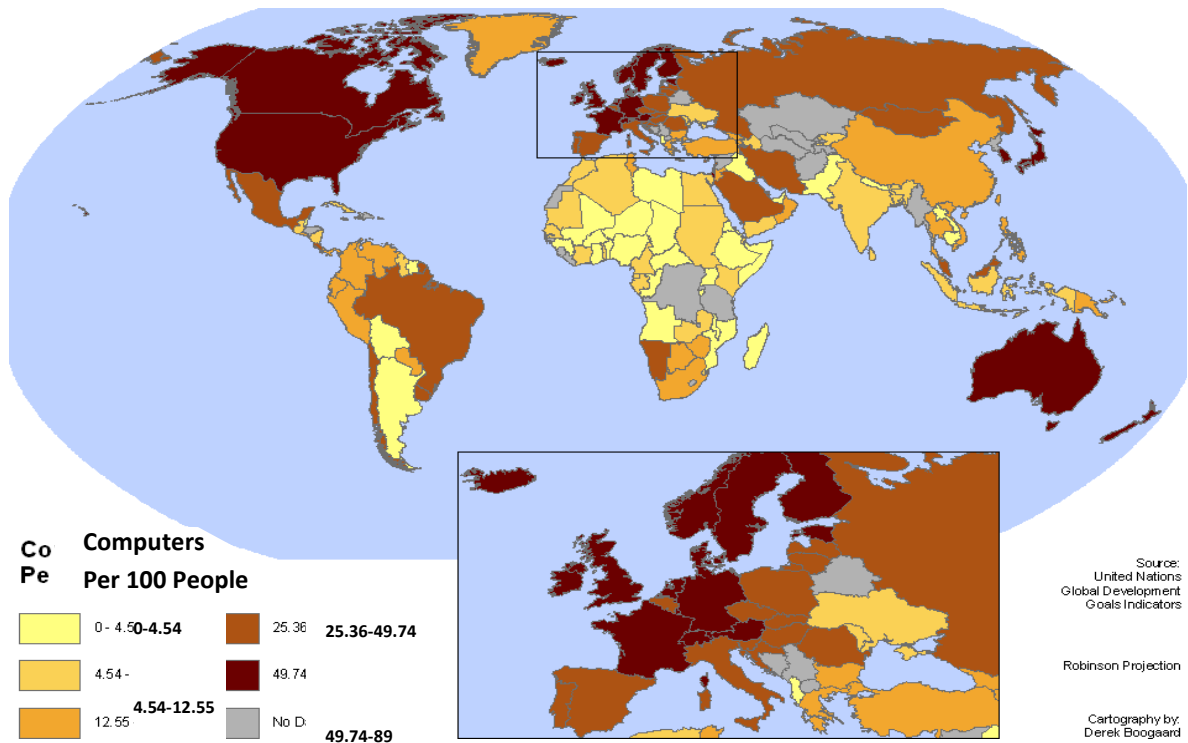


Figure 2: Global Digital Inequality; Source United Nations Global Development Goals Indicators

2.5.2 Digital Opportunity and Socio-Economic Development

Traditional measures of digital divide in terms of direct access to technologies makes sense in the developed world where the ownership of expensive traditional ICT devices such as computers might not be a major economic burden for businesses and individuals. However, in the case of developing countries, other factors such as indirect access and their impact on the socio-economic development might be appropriate measurement. In nations with low literacy rate and poor population, measurement of direct access to the Internet might not make sense.

On the other hand, these people may listen to a radio program or watch a television channel which has access to the Internet and enrich their broadcast with the latest news and entertainment from Internet. Therefore indirect access to the Internet may still help in the socio-economic development of the masses and thus bridging the digital divide.

2.6 ICT based Socio-Economic Development in Developed World

A number of policy level studies on the socio-economic impact of ICT exist. For example the information and communication technology comprehensive economic development strategy for Orange County in California is an elaborate report that documents socio-economic impact of ICT in one the most prosperous counties in the United States (Dominguez et.al, 2006). They reported alarming statistics with regards to the vast difference between availability of ICT in different parts of Orange County in California (Baqir, Babu & Palvia, 2007). The reports like these produce sensational findings because of the contrast they present (advanced ICT infrastructure for rich people, poor ICT infrastructure for poor people). Due to higher per capital income, direct access to ICT and ownership of traditional ICT devices such as computers is higher in developed countries. The use of ICT for businesses and individuals is higher but differences exist among various groups of people within the developed world. These differences are consistent with the digital divide literature. As indicated earlier, groups based upon gender, race, education, income and those living in rural areas or poor

neighborhoods are most vulnerable to be among the most disadvantaged as far as the ICT based socio-economic development is concerned.

2.7 ICT issues in Developing Countries

The developing countries offer a unique environment where the ICT infrastructure was laid down recently (or is still being laid down) and the jump (leapfrog) in information and communication technologies and its application has been sudden and vivid. In most cases this accelerated development of infrastructure and service provision is speculated to be due to regulatory evolution, liberalization and privatization in addition to market forces. In addition to these common characteristics, developing countries share a number of problems such as lack of appropriate products, cost of ICT devices, education, language, human resources and lack of robust regulatory framework for ICT (POST, 2006).

2.7.1 Lack of Appropriate Products

Most of the products are designed to cater for the needs of poor or those living in rural areas. Most of these products require electricity to operate which increasingly becoming a scare resource. Several developing countries are facing serious energy crises and issues with reliable electricity supply. Additionally, about 2 billion people in the world do not have access to any electricity. Some efforts have been underway to develop ICT devices that are independent of electricity or have a built-in electric supply. An example of this case is one-laptop-per-child (laptop.org)

initiative which aims at providing laptops to school children that are specially designed to cater for the needs of poor students living in the remote areas.

2.7.2 Cost of ICT devices

Most of the developing countries have low levels of per capita income which makes it cost prohibitive for poor people to afford ICT devices. It is therefore important to design appropriate products with affordable cost structure in order to increase ICT access.

2.7.3 Education

Education is another important issue that several developing countries face. In most of these countries, literacy levels are low. Even in situation where access to ICT is higher both in terms of availability and affordability, their use may still be limited. It is difficult to have any meaningful benefit from ICT if people cannot effectively use them.

2.7.4 Language

It is important to develop ICT services with local and meaningful content for people. Most of the content on today's Internet is in English language and even if availability and affordability are not a problem, it is difficult to see any meaningful benefit from ICT. This also highlights the point made in the discussion on digital divide that there might be need to account for the indirect access to ICT in cases like these. People with indirect access to ICT such as through TV or radio broadcast who

enrich their programming due to the access to Internet may still reap the benefits of ICT.

2.7.5 Human Resources

Developing nations are dogged by the lack of skilled human resources. Movement of highly skilled ICT professionals to developed countries creates a vacuum and therefore developing nations face severe problems in benefitting from the increased and affordable access to ICT.

2.7.6 Lack of Robust Regulatory Framework for ICT

Several developing nations are going through turbulent regulatory evolution as far as ICT framework is concerned. Even though many of the developing countries around the world are now moving from highly regulated ICT industries to more liberal and deregulated ones, the pace of such movements is unpredictable. In several of these countries governments have a number of fears related to uncertainty in the traditional control over information and ICT. These uncertainties lead to policies that prove to be growth impeding and therefore a constant effort is required to keep a balance between growth and control.

These are some of the unifying themes for research on ICT in developing countries. Most of the developing countries rely on increasing ICT access by expanding and developing telecommunication infrastructure. Wireless technologies present a cost effective way of expanding ICT base in developing countries by way of

avoiding expensive, complex and complicated cabling system. From ICT device affordability perspectives, mobile phones become the first barrier breaker to bridge the digital divide. The availability of reliable and cheap wireless devices make it easier for poor people and those living in the remote areas to get connected without huge upfront costs. Technologies such as WiMAX, 3G, CDMA 2000 and others are enabling people in rural areas to get affordable ICT access including broadband Internet. It is no surprise that nine of the top ten emerging wireless markets are in developing nations. Due to the sheer market size of India and China, they are among the top two emerging ICT markets. Table 1 lists these countries including the size and increase in the mobile market between 2005 and 2006.

Country	Subscriber additions in 2006 (in millions)	Total subscribers Dec 2006 (in millions)	% increase over Dec 2005
India	73.56	149.5	97
China	67.68	461.08	17.2
Pakistan	28.9	48.29	147
Russia	26.12	151.92	21
Indonesia	23	65	38.6
Ukraine	19.03	49.21	63.1
Brazil	13.7	99.92	15.9
Bangladesh	12	21.76	135
Nigeria	11.4	30	38
Vietnam	10	22.5	80

Table 1: Top-Ten Emerging Markets (Willing, 2007)

2.8 Why Pakistan?

There are several reasons for selecting Pakistan as a case for studying ICT growth and socio-economic development in developing countries. According to Table 1, Pakistan is ranked third among the world's largest ICT markets in 2006 and has the highest one year growth rate of ICT industry (147%) in the world followed by Bangladesh (135%) and India (97%). Table 1 shows top-ten emerging ICT markets. Since Pakistan is a developing country (IMF, 2008; World Bank 2008), lessons learned are valuable for other developing nations. As discussed earlier, developing countries around the world have peculiar issues with respect to the development and growth of ICT and its use for socio-economic development.

The characteristics of developing countries are relevant in the case of Pakistan are discussed:

1. A large portion of the population in Pakistan lacks access to basic needs such as reliable electric power. Electricity is not available in remote areas and in large cities a reliable electric supply has recently become a big problem. Due to the enormous economic activity in the recent years, Pakistan has suffered from severe shortage of electric power which impedes effective use of ICT.
2. Cost of traditional ICT infrastructure, devices and services (mostly wired) is significantly high and therefore the government has pushed the deregulation agenda with enabling legislations to facilitate wireless ICT

access (to avoid laying costly cables based infrastructure). This situation has allowed for cheap and reliable ICT devices such as 3G mobile phones, CDMA 2000 and WiMax devices that enable poor people and those in remote areas to get connected.

3. Pakistan suffers from a low literacy rate. Accordingly to government statistics, almost 45% of the population cannot even read and write. Even if ICT access were possible to these segments of the population, it would be difficult to achieve meaningful ICT based socio-economic development.
4. Even though 10% of all non-US/UK English speakers are from Pakistan, a large portion of the population in Pakistan has only a remote understanding of the English language.
5. It is common for highly skilled ICT professionals to leave Pakistan to pursue opportunities in the developed world. This situation leaves fewer ICT skilled people to support ICT.
6. Pakistan has been experiencing an evolving regulatory framework since the early 1990s. It continuously experiments, adopts, ousts and develops policies and regulations to increase ICT access and strives to create an enabling environment.

As evident from the above discussion, Pakistan makes a good case study for researching ICT based socio-economic development in developing countries. Pakistan

presents an interesting case which has evolved as an example of ICT growth for other developing countries.

2.8.1 Overview of ICT Industry in Pakistan

Since 2001, the provision of ICT services and reduction in price in Pakistan has increased availability as well as affordability in an extraordinary manner. Mujahid (2002) described the digital opportunity initiative (DOI) undertaken by the federal ministry of science and technology in Pakistan. In this program, the initiative launched during the year 2000 aimed at developing human resources, infrastructure, software and hardware industries, wider access and use of internet among others. The adoption of a national 'IT Policy' in 2000 triggered the imminent end of the government backed telecommunication company monopoly (Baqir & Pervez, 2000). The post-monopoly era with deregulation of the ICT sector started in January 2003. On the government level, a comprehensive liberalization policy for the telecom sector was offered. After the introduction of this policy, foreign investments rose from nothing to thousands of millions of dollars in a matter of months and weeks. The growth of teledensity from 2.8% to about 55.26% in just few years is just another reason that makes Pakistan a country of choice for this study. Figure 1 and 2 present a picture of the historical growth of teledensity in Pakistan during the last decade. Table 2 presents demographic data for Pakistan.

Years	Total Teledensity (%)
2000-01	2.80
2001-02	3.66
2002-03	4.31
2003-04	6.25
2004-05	11.89
2005-06	26.26
2006-07	44.06
July-07	45.91
Aug-07	46.91
Sep-07	47.84
Oct-07	48.75
Nov-07	50.88
Dec-07*	52.94
Jan-08	53.41
Feb-08	55.26

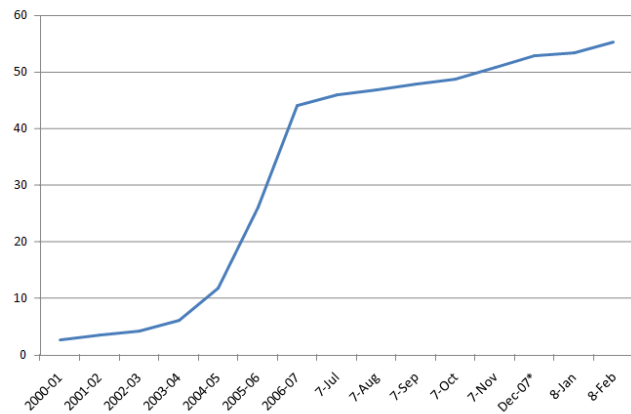


Table 2: Teledensity Growth (PTA, 2008)

Figure 3: Teledensity Growth (PTA, 2008)

Population	165 m (July 2007 est.)	Urban: 30%, Rural: 70%
GDP per capita (US)	\$2,600 (2007 est.)	Teledensity: 55.25%
Literacy	49.9%	
Inflation	6.9%	
Unemployment rate	7.5% (Substantial Underemployment)	

Table 3: Socio-Economic Data for Pakistan (PTA, 2008)

Internet users and cell phone users increased in numbers without any precedence in any other industry. Prices for the services and products went down dramatically and ICT technologies saw a real boom in a country where half the population cannot even read or write. The policy did not simply impact the telecommunication area; most other sectors of national economy including real estate, retailing, banking, financing and others gained a lot of momentum. This resultant economic growth has created thousands of high paying jobs across the

country. In addition, development of technology parks, high quality retail development, reduction/elimination of red-tape and other deregulations have helped boost the economy in other ways. Table 4 shows that foreign direct investment contribution to the total ICT sector investment rose from 1.5% in 2001 to about 54% by 2006. This amounts to well over 3.5 billion US dollars worth of foreign direct investment in a developing country where GDP per capita is not more than \$2200 with an average income of \$6 per day per person.

Years	Total FDI	FDI in Telecom Sector	Contribution in Total FDI (%)
2001-02	484.7	6.1	1.26
2002-03	798.0	13.5	1.69
2003-04	979.9	207.1	21.13
2004-05	1524.0	494.4	32.44
2005-06	3521.0	1905.1	54.11
2006-07	5124.9	1824.3	35.60
July-Dec 07	2014.6	654.3	32.47

Table 4: Foreign Direct Investment (FDI) in Pakistan (PTA, 2008)

Figure 3 depicts an interesting phenomenon of growth. During 2004-2005 and 2005-2006, teledensity growth was exponential. This was mainly because of two reasons, (1) coverage of urban population which is about 35% of the total population completed, (2) there are inconsistencies and problems within the reported data from PTA. PTA's teledensity data is obtained by dividing number of

active phone connections by country population. This method is misleading because a large number of ICT users have multiple phones.

Teledensity is basically a measure of how many people have access to basic telephony and data communication networks. While teledensity itself is not an indicative of ICT penetration, it is considered as a surrogate to ICT penetration. The assumption is that people cannot have access to sophisticated ICT such as the Internet if they do not have access to basic voice telephony and data communication systems. In the case of Pakistan, all wireless telephony service providers have either third generation Global System for Mobiles (GSM) or better infrastructure. Phone with limited mobility such as WCDMA based systems also allow broadband connection to data transmission. These infrastructure technologies can support sophisticated services as they become available. However, teledensity is only a part of the whole picture. As defined in Chapter 1 and under digital divide discussion in this chapter, ICT is a broader term which also includes access technologies such as to TV, radio, audio/video conferencing.

The current ICT services coverage area is about 60% of the geographical spread of the nation. Most of this coverage is through wireless networks such as cell phones and microwave relay antennas for TV and radio broadcasts. However, this spread is not uniform in several respects. First of all, even within the broadly defined “coverage areas” there are situations where access to only the most

basic forms of ICT are available if at all, i.e., wireless telephony and radio. Second, there are some isolated urban areas which might have basic services available. A coverage map of ICT services in Pakistan is shown in figure 4. This map has been drawn based upon list of cities available from major telecommunication companies in Pakistan. The shaded area included dots distributed on the basic map show services coverage area. This coverage map is a good indication of the population distribution across Pakistan. Most the population is traditionally spread close to water bodies such as rivers, lakes or sea coast in Pakistan. The Indus River flows from North to South in Pakistan and the following map clearly depicts the path of this river as well as coverage on the coastal sea line.

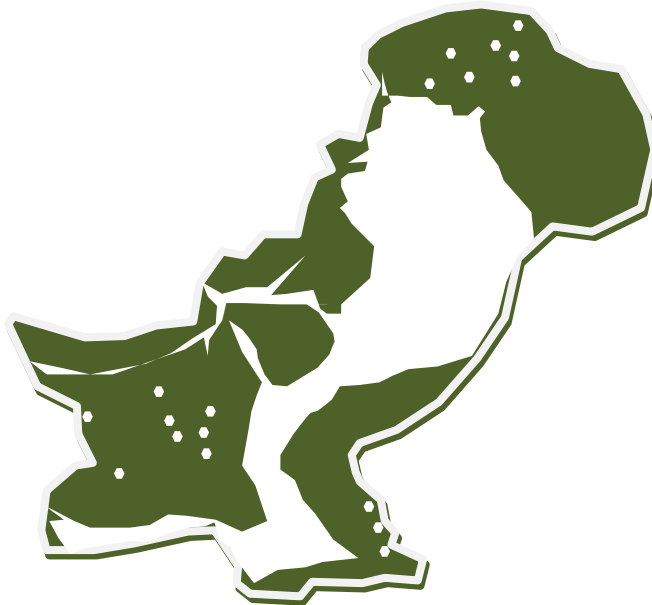


Figure 4: ICT Coverage Area in Pakistan (white space within the country boundaries represents coverage area)

2.9 Historical Perspective of ICT Growth in Pakistan

The history of ICT in Pakistan began with the establishment of the Posts & Telegraph Department in 1947 and establishment of the Pakistan Telephone & Telegraph Department in 1962. This organization evolved into Pakistan Telecommunication Corporation (PTC) in December 1990 under Pakistan Telecommunication Corporation Act 1991. Even though no written "ICT Policy" existed at that time, the Telecommunication Act of 1993 became the genesis for competitive ICT in the country. It encouraged private sector participation and resulted in the award of more licenses for cellular, card-operated payphones, paging and, lately, data communication services. The government of Pakistan also announced its plans to privatize PTC in 1991 which led to the formation of Pakistan Telecommunication Limited (PTCL). It was still a public limited company and enjoyed monopoly over the basic telephony infrastructure. Due to this monopoly, cost of various services for operators other than PTCL (2006) remained too high. Privatization did not happen until 2003.

The Pakistan Telecommunication Ordinance 1994 established the primary regulatory framework for the telecommunication industry including the establishment of an authority. Thereafter, Telecommunication (Re-Organization) Act number XVII was promulgated in 1996 that aimed to reorganize the telecom sector of Pakistan. Under Telecom Reorganization Act 1996, Pakistan Telecommunication Authority (PTA) was established in January 1997 to regulate the establishment, operation and maintenance

of telecommunication systems, and the provision of telecom services. However, even with these actions in place, the fact is that in 1998, there were less than 10,000 Internet users in only ten major cities across the nation and teledensity stood at about 2.3%.

The ICT policy (called IT policy) was adopted in 2000, opening up the path for privatization of the ICT sector. In 2003, licenses were given to private operators for ICT operations. PTCL still remained a major player due to its vast infrastructure throughout Pakistan but a number of private ventures were launched. Currently teledensity (including landlines and cellular phones) stands at 58.9%. However, internet penetration is still low. According to PTA's statistics, only 128,689 broadband connections exist with 3.5 million dial-up internet users. While the bandwidth for wired and wireless systems is reasonable, the Quality of Service (QoS) is very low. Internet service is not reliable for a number of reasons. International connectivity through submarine fiber optic cable disrupts frequently and dial-up connections are not too reliable because of aging copper-pairs that provide last-mile connectivity.

2.10 ICT Growth and Socio-Economic Development in Pakistan

The direct and indirect impact of ICT growth can be observed in the form of socio-economic developments across several dimensions, i.e., income, education, health, Politics, in Pakistan with the proliferation of ICT since 2000. Some of these socio-economic developments are discussed below.

2.10.1 Income

The increase in the size (growth) of ICT sector and billions of dollars worth of foreign direct investment has resulted in the creation of millions of white collar and blue collar high paying jobs (PTA, 2008). In order to increase access of ICT to far off and rural areas, projects such as “Rabta Ghar” (communication houses) are established to spread the benefits of ICT based socio-economic development throughout Pakistan (PTA, 2007). Rise in individual and contextual income (such as purchasing power parity) during the last few years also led to reduction in poverty level. However, a large portion of Pakistanis still lives under the poverty line and tens of millions of people do not pay taxes because their annual incomes are less than the taxable income range.

2.10.2 Education

Pakistan specially focused on investing in ICT that can disseminate educational content to masses. Pakistan educational research network allows access to international journals, books and other publications through locally stored content (HEC, 2008). Public and private universities are being connected to provide video conferencing facilities for researchers within Pakistan and abroad (HEC, 2008).

Allama Iqbal Open University (AIOU), established in 1976, has over 750,000 students all over the country and 1.8 million course registrations each semester (AIOU, 2008). Until recently, most of the educational content was

distributed in the form of books and printed material. Now, AIOU uses state of the art technologies for communication with its students and tutors. From online printing of examination ID cards and examination results to SMS (short message service on cell phones) notifications are aimed at enhancing educational experience for students. Things are not perfect yet and there is more that needs to be done. Internet servers go down frequently; emails to some departments go unanswered and only a small number of students, tutors and staff have access to Internet off campus (AIOU, 2008).

One of the major accomplishments in increasing access to education is the establishment of the Virtual University (VU) of Pakistan in 2002. VU has access to a communication satellite and disseminates its educational content for free. Its programs can be viewed from Nairobi in Africa to Bangladesh and Central Asia (VU, 2008). This university has an active enrollment of 50,000 students and offers undergraduate and graduate programs in computer science and management.

2.10.3 Health

The October 2005 earthquake which resulted in thousands of deaths in Northern Pakistan opened the door for ICT exploitation in telemedicine centers. A number of agencies have established telemedicine centers and call-centers

where people can dial in, and seek medical advice on various health related issues for free (TelMedPak, 2008; SafetyNetTele, 2008).

2.10.4 Politics

The genesis of ICT growth can be traced back to Pakistan Telecommunication Company Act of 1991 and Pakistan Telecommunication Ordinance of 1994. These two laws paved a way to a deregulated ICT industry and development of Pakistan Telecommunication Authority (PTA) in 1997. PTA's mandate flowed through the Ministry of Science and Technology until 2003 when Ministry of IT and Telecom took over the oversight of PTA. The deregulation since 2000, allowed for a number of ICT service providers to start or expand their business to the masses. Ordinary citizen no longer had to rely only on traditional newspapers, one state run television channel or a radio station. The concept of "breaking news" and "live coverage" in the communication of information emerged at an unprecedented pace.

Pakistani politics has been very volatile since General Musharaff's military coup in 1999. Military coups are not uncommon incidents in Pakistan's history. Like other military dictatorships, the Musharaff administration was able to control the people of Pakistan with an iron fist before privatization of the ICT sector. However, with ICT growth it increasingly became difficult for the Musharaff administration to cling on to power due to strict media scrutiny of his

actions. Naturally, the administration imposed bans on communication and media, blocked websites and outlawed open debate forums in an attempt to control the wishes of people. The use of ICT for governmental purposes proved to be a double edged sword in the case of Pakistan. While ICT provides a means of political development and a medium to speak freely, it also allows the establishment to have more control over people by posing a threat to individual privacy. Musharaff's dismissal of the chief justice of the Supreme Court, Bhutto's assassination and the ban on a number of electronic media outlets for extended periods could not control the outcomes of the February 2008 general elections. It is interesting to note that as the investigation of Bhutto's assassination progressed, most important clues came from a mobile phone video footage. All of these incidents can be considered social development where ICT played an important role in the communication of information. Members of civil society ran a successful campaign against the Musharaff administration using the Internet for blogs, mass emails of images of the police brutality, cellular phones and specially SMS (short messaging service on cellular phones) for immediate protests when needed. President Musharaff finally resigned in August 2008 owing to strong political pressure and media scrutiny. In order for a graceful exit, he demanded that the state run television (Pakistan TV -PTV) to provide a live broadcast of his last address to the nation. When PTV hesitated, he called in on

the same television channels for live coverage that he had shut down for months to punish them for raising a voice against him.

Mr. Asif Ali Zardari became president in September 2008. Due to his change in position on issues, electronic media representatives and reporters challenged him on several accounts (Mir, 2008). These events are indicative of the social developments as ICT become more pervasive and help in developing more transparency and accountability in Pakistani politics.

2.10.5 E-Government

ICT investments in developing e-government infrastructure seem impressive. The National database and registration authority (NADRA) was established in 2000 with the aim of developing national database of citizens. This has resulted in the creation of largest IT organization in the country which issues national identity cards, passports, driving licenses, birth and death records among many other services (NADRA, 2008). Other services such as computerized land record management, online tax filing, online utilities billing and payment, online government forms and services and crime control and prevention have been the hallmarks of socio-economic development.

2.10.6 Dark side of ICT

Impacts of ICT growth are not always positive (Saunders, 2007). The growth in ICT services, infrastructure and access has caused digital inequality in

several rural areas. It has resulted in the creation of marginalized groups of less educated and those who do not have access to ICT. In addition to social exclusion of marginalized groups, privacy concerns are some of the issues that ICT growth has yielded. Due to the lack of education and awareness of the useful uses of ICT, a vast majority of youth use these technologies for unhealthy activities such as wasting hours of time in useless surfing or chatting and visiting adult content.

2.11 Conclusion

ICT based socio-economic development can be vividly seen in the case of Pakistan. However, the relationship between ICT growth and socio-economic development cannot be readily explained. Research gaps necessitate a comprehensive study that examines this phenomenon from the government officials, the policy makers and the citizens' perspectives. Explanations of how ICT based socio-economic development can be achieved will not only help in developing the foundations of a theory but also allow for better planning of these activities.

CHAPTER III

RESEARCH SCOPE/EXPLORATORY FRAMEWORK

As discussed in Chapter 1, there are two major research objectives and questions, i.e., (1) the relationship between ICT growth and socio-economic development and (2) antecedents of ICT growth. Since there is no theory of ICT based socio-economic development, this research aims at developing a theory that not only describes antecedents of ICT growth and the relationship between ICT growth and socio-economic development but also explains how and why they are related to socio-economic development.

Since this is not a positivist research, the objective is not to develop or test an '*a-priori*' model. The research framework shown in Figure 1 is for developing understanding of the research scope. The relationships between different concepts presented in the framework have literature based justification. However, these relationships will be further evaluated in terms of ICT stakeholders' perspective as the research unfolds. This point is further explained in third chapter on research methods.

From Table 1, it is clear that among the top-ten emerging ICT markets, eight countries are proximate to each other. Except for Nigeria and Brazil, the remaining eight countries are neighbors to at least one other top ten emerging ICT market. In the case of India, it neighbors three other countries in this group. The growth of the same industry

among neighboring countries shows some sort of collaborative or rivalry based relationship to ICT growth. The literature also suggests that development in a region or a country may trigger growth in the neighboring regions and countries. It is therefore shown as one of the possible antecedent in the framework.

Prior literature and published reports from ITU, strongly suggest that enabling legislations for the deregulation of ICT sector is crucial for ICT growth in a country. A growing body of literature on ICT growth shows that deregulated ICT sector is vital for ICT growth. Deregulation and privatization require establishment of appropriate legal framework and practices that spur ICT growth.

Additionally, an increasingly knowledge based globalized economy necessitates ICT growth in developing countries. Countries and nations that lack access to appropriate access to the international ICT backbone infrastructure risk their international trade and representation. Therefore globalization is one of the important factors that stimulate ICT growth in developing countries.

ICT growth refers to the phenomenon of ICT infrastructure building, e.g., construction deployment of communication towers, base stations, and interconnection of telecommunication components to national and international data backbones. It also refers to actual service provision to customers and subscribers in addition to enhancing hardware and software support to end-users. As discussed in Chapter 1, the relationship between ICT growth and socio-economic development is interesting. The two way arrow depicts the possible circular nature of the relationship implying (1) ICT growth causes

socio-economic development, (2) as a result of socio-economic development, the economy and society demand ICT growth or (3) both ICT growth and socio-economic development are dependent upon each other.

The research will follow the Walsham and Sahey (2006) framework for ICT in developing countries. Walsham and Sahay's (2006) research framework consists of following four questions:

- What is the "development" to which ICT aim to contribute?
- What are the key issues being studied related to ICT?
- What is the theoretical and methodological stance?
- What level and focus of analysis is being adopted?

In the case of this research, socio-economic development is the "development" to which ICT aim to contribute. The key issues being studied include socio-economic dimensions that are related to ICT growth. The theoretical stance for this research comes from a vast body of resources on socio-economic development in other disciplines. From methodological perspective, because of the lack of existing theory of ICT based socio-economic development, qualitative methods, i.e., grounded theory and narrative research will be used. To identify antecedents of ICT growth, historical research method will be employed. The description of research methods will follow in Chapter 4. The level and focus of analysis is society. Even though level and focus of analysis for socio-economic development can be individual, societal, organizational or

international (Jeffee, 1996), societal impact of ICT growth on socio-economic development is the basic tenet of this research.

The research scope in relations to research objectives is described below:

- What is the relationship between ICT growth and socio-economic development?
 - In order to understand socio-economic development, it is important to first understand the meaning of ICT growth and socio-economic development. It is not an easy task to define socio-economic development. As discussed in Chapter 2, the literature on this subject from different disciplines defines this concept in a variety of ways. This research will focus on policy makers' interviews and ordinary citizen's narratives to evaluate how they define, describe and make sense of the socio-economic development in their lives due to ICT growth.
 - The concept of socio-economic development in terms of better social and economic opportunities, and its relationship with ICT growth has not been fully explored in IS literature. While one can argue ICT growth as an antecedent of socio-economic development, a reverse argument can also be made. Perhaps the relationship between ICT growth and socio-economic development is more of mutually symbiotic kind.
 - In addition to understanding citizen's perspective of socio-economic development, this research will attempt at gathering qualitative data directly from policy makers and government officials.

- What are the antecedents of ICT growth?
 - While there could be several factors that might play an important role in ICT growth, by utilizing Mistry (2005) research framework of virtuous cycles of productivity gains and expanding, the role of governmental policies (enabling legislations) will be explored in this research. This research questions also explores other antecedents of ICT growth that might directly impact governmental policies and ICT growth such as regional rivalries (national pride), globalization and others.

The exploratory model in figure 1 is formative and only provides initial guidelines for how the study will be organized. Since this is not a positivist research, testing of the model for validity is not an objective. This model will be redeveloped and refined rigorously as grounded theory and narrative research methods are used to analyze the qualitative data.

Conclusion

The basic objectives behind this research are: (1) finding the relationship between ICT growth and socio-economic development, i.e., how government officials, policy makers and other stake holders interpret this relationship? and how do ordinary citizens' make sense of socio-economic development and ICT growth? (2) Antecedents of ICT growth; historical review of ICT sector in Pakistan; what inspired and necessitated the changes in laws, and governmental regulations and policies in ICT Sector in Pakistan?

CHAPTER IV

RESEARCH METHODS

The relationship between ICT growth and socio-economic development of a country depends upon a number of factors. Since there is no existing integrated or comprehensive theory of ICT based socio-economic development, it is important to employ qualitative research methods to develop an in-depth understanding of the basic tenets of socio-economic development and its relationship with ICT growth.

Three different methods (multi-methods approach) are used to answer the two research questions. In order to investigate the answer to the first question, two major types of research participants are identified, i.e. (1) stake holders such as government officials, policy makers, industry representatives who work towards ensuring provision of ICT access and services to ordinary citizens, (2) ordinary citizens who experience the impact of ICT growth and associated socio-economic development. Interviews with first group of interviewees will be conducted and analyzed using guidelines of the grounded theory method (Cresswell, 1998). The interviews with ordinary citizens will be conducted and analyzed using the narrative research method (Casey, 1995; Riessman, 1993). In order to investigate the second research question, the historical research method will be used (Mason, McKenney & Copeland, 1997). Figure 5 shows a schematic diagram of each research question, the research methods used for data collection and

analysis in addition to brief research design. It also provides a brief justification for the use and appropriateness of a research method to investigate a research question. Further discussion is given in the research design sections in the next chapter.

Research Questions	Data Collection	Analysis	Justification
Q1: What are the antecedents of ICT Growth?	<p>Historical research based data collection</p> <p>Interviews with (40) stakeholders such as Govt. Officials, Policy Makers, Market Regulators, Software/Hardware providers.</p> <p>Documented evidence such as written policies, white papers, published interviews and news stories</p>	Historical Research	Historical research is considered best at understanding a phenomenon in past, e.g., ICT growth. "Seeing the past can help one envision future" and historical research allows for greater "richness in reality". Therefore this method is well suited to investigate historical perspective of the ICT growth.
Q2: What is the relationship between ICT growth and socio-economic development?	<p>Interviews with (40) stakeholders including Govt. Officials, Policy Makers, Market Regulators, Software/Hardware providers</p> <p>Narrative research based interviews (about 40) with ordinary citizens. Interviewees selected mainly on the basis on gender and domicile with appropriate proportion of people with different educational, age income background</p>	<p>Grounded Theory based coding and analysis</p> <p>Narrative Analysis</p>	<p>The purpose of grounded theory method is to generate or discover theory of a phenomenon, such as socio-economic development. It is an appropriate research method because of the lack of an integrated theory of ICT based socio-economic development.</p> <p>Narrative research method encourages research participants to relate the phenomenon under study to their personal life experiences. Therefore this method is not simply perception of the research participants about a phenomenon but also a close personal relationship in a particular context.</p>

Figure 5: Schematic Diagram of Data Collection and Analysis

The following sections describe these research methods in relationship to IS research and how they help in answering the two major research questions.

4.1 Historical Research

The historical research method has been used in IS research and is considered best in understanding a phenomenon of the past. Table 5 shows articles published in IS publications that employ the historical research method and are exemplar of the use of this method in IS context.

Often research methods attempt to find a cause and effect relation to make judgments for future. However, sometimes the best way of getting knowledge could be to look into the past rather than into the future. "Seeing the past can help one envision future" (Neustadt and May, 1986). Historical research attempts to do just that. "Historical research offers perspectives on phenomena that are unavailable by other methodological means" (Mason, McKenny & Copeland, 1997). Mason (1988) points out that any research must make a tradeoff between "tightness of control" and "richness in reality". Research methods that heavily depend on mathematical models and experiments achieve a high degree of "tightness of control" but lose "richness in reality". Marceil (1977) asks to focus on "idiographic" richness of reality because of the unique value of the particular within cultural and human settings. As opposed to control oriented approached that aim to produce context neutral research results, idiographic

historical research method focuses on the context by paying it complete and full attention. Due to the inherent differences in the epistemological stance of control-oriented research methods and idiographic research methods such as historical research, a scholarly field can produce knowledge that build upon the qualities of both (Mason et.al, 1997).

Porra, J., Hirschheim, R., Parks, M.S. (2005)	The History of Texaco's Corporate Information Technology Function: A General Systems Theoretical Interpretation	MIS Quarterly, (29:4), p721-746
Mason, R. O., McKenney, J. L., Copeland, D. G. (1997)	Developing an Historical Tradition in MIS Research	MIS Quarterly, (21:3), p257-278
Mason, R. O., McKenney, J. L., Copeland, D. G. (1997)	An Historical Method for MIS Research: Steps and Assumptions	MIS Quarterly, (21:3), p307-320
Mustonen-Ollila, E., Lyytinen, K. (2004)	How organizations adopt information system process innovations: a longitudinal analysis	European Journal of Information Systems, (13:1), p. 35
Subrmanian, R. (2005)	India and Information Technology: A Historical and Critical Perspective	Journal of Global Information Technology Management, (9:4)

Table 5: Historical Research in IS Research

Through a detailed analysis of historical data, we can determine, perhaps to a limited extent, cause and effect relationships. For example, the literature on the growth of “technology” (as in industrialization) and its socio-economic impact in various countries is abundantly available. This literature might help in contextual understanding of the antecedents of ICT growth. Additionally, it will also help in developing a historical background of socio-economic development in developing countries and its relationship with ICT growth.

In the case of this research, two major types of data sources will be used (1) interviews with key government officials and stakeholders. These interviews will include current and past key policy makers as well as regulators. (2) Review of official documents, policy papers, minutes and reports. Media coverage of past and analysis documents will be used to identify what inspired and necessitated the key decisions and policies in the past. Mason et.al., suggest the following seven steps to conducting historical research studies:

4.1.1 ***Begin with focusing questions:*** identifying appropriate questions is an important aspect of historical research. For example in the case of current research some of questions can be: What milestones led up to the current state of ICT industry? Who played the key roles in bringing about these changes? Why did indigenous and foreign investors decided to make huge investments in Pakistan despite the apparent instability of the region? What conditions were favorable to changes in the regulatory and legislative regime? How did the subsequent events unfold? What was the result? How did it bring about social and economic change in the country? How has the ICT industry evolved itself during the last few years? These questions will become part of interview protocol for government officials' interviews. The interviewees will be contacted via email, phone and fax. In-person interviews will be conducted and audio will be recorded on a computer.

4.1.2 ***Specify the Domain:*** Domain refers to the research scope and unit of analysis. In this case, unit of analysis is the entire society in a developing country to discover antecedents of ICT growth in the country. Since there is a possibility that socio-economic development was one of those antecedents, it is possible that during the exploration of the domain of study, interesting relationships between ICT growth and socio-economic development are discovered.

4.1.3 ***Gather Evidence:*** As a systematic research, the first step in historical research is to search for the public sources: policy documents, published historical records, articles, books, and progression of historical news records. These sources of data provide background and suggest broad outlines for scenario patterns. These sources are very helpful in establishing an authentic timeline of critical events. The timeline is a key methodological tool which will be developed as part of the analysis. Since interviewees might not remember exact dates and numbers, published reports and records become indispensable sources. However, the use of these sources serves as a secondary source and therefore the use of primary sources is important. Some of the primary sources include (1) written, official documents, policy documents, diaries, memoirs, letters and the like, (2) material, in the form of objects, artifacts, audio or video recordings, interview transcripts from key players in the past, (3) traditional, in the form of stories of the past repeated by secondary sources and (4) eye witness testimony. The last primary source becomes even more important if the

research participants are key players at the time major milestones were achieved. Visiting actual sites, comparing organizational charts, studying systems diagram, examining schematics, policies, laws and legislations and photographs provide contextual insights and are sources of additional clues.

4.1.4 ***Critique the Evidence:*** The next step is to critique the evidence. False, contradictory, irrelevant and incomplete evidence will require the use of analytical processes. These processes include applying basic logic, determining source credibility, counting the number of times the same observation is repeated and assessing the overall coherence of the entire collection of evidence. This is effort to ensure internal consistency of the evidence. An advantage in the case of dealing with living research participants is that they can be contacted subsequently to clarify items in questions.

4.1.5 ***Determine Patterns:*** The collection of ordered facts must be interpreted for patterns. “The historian.... continuously asks the question: why?; and so long as he hopes for an answer, he cannot rest” (Carr, 1961). This process consists of selecting and marshaling the facts and turning them into “historical facts”. The empirical mode of research changes into inductive and the discussion becomes more philosophical and theoretical. “The task is to explain what happened and how and why it happened” (Mason et.al, 1997). Following tools and methods in order to develop patterns will be used:

4.1.5.1 Conceptual Frameworks: Conceptual frameworks helps a researcher focus on the main concepts and key factors. It provides a language for description of the facts in precise and flexible manner to accommodate and understand any new data that may become available. As such a visual map of the concepts will be developed.

4.1.5.2 Causal Chain and Producer/Product Analysis: Causal chains are the sequence of events that produced the effects, results or consequences observed. Iterative “explanation building” is performed to identify and evaluate causal patterns (Yin, 1984). Cause-and-effect relationships are established and discovered. While different researchers have made arguments about the value and position of a “cause” in historical research, for literary purposes, it is considered an important aspect of historical research. Dosi et.al 1990 suggests analyzing “path dependencies” to point out that historical research should start far enough back in time to determine the role of distant causes that played a role in generating current situation. In the case of current research, such paths will be developed and analyzed based upon the primary and secondary data sources.

4.1.5.3 Establish Empathy: Developing a creditable account of historical research requires psychological understanding. The researcher should put him/her self in the shoes of the actors at any given point in time and

then attempt to see the events as they have appeared to those who actually experienced it. This step involves asking questions such as: “What was this person thinking at this time? What could he or she have known at that time? What pressures was he or she under? What were his or her motives and aspiration?”

4.1.6 ***Tell the story:*** The story will be written in an interesting and factual manner. In this artistic task we will maintain integrity and consistency of the evidence collected and analyzed through the course historical research.

4.1.7 ***Write the transcript:*** Writing the transcript in historical research is unique in the sense that it must fit within the network of other researchers. This places it in a context that helps future research in the area.

Even though the steps above are described in a sequential manner, they can rarely be performed in this order. Questions raised after a given level of data collection and analysis might necessitate the research to look back for more data to satisfy the newly raised questions. There might also be need for further checks of validity and reinterpretation of findings.

Mistry (2005) gave a research framework of the virtuous cycles of productivity and gains. He studied and explained the role of public policies, enabling legislations and governmental initiatives in the growth of ICT and digital divide in India. While we believe Mistry’s focus on public policies as an antecedent for ICT growth is good, there is a need to understand what necessitates the change in governmental policies. As suggested by

Mason et.al (1997) it is important to interview government officials, policy makers and other industry representatives who have experienced the changes in the regulatory and legislative evolution over the period of time. Structured interview protocol is developed to conduct preliminary interviewing high level officials in Pakistan who have been involved in the policy development and execution on ICT sector.

4.2 Grounded Theory

The basic purpose behind grounded theory research is to generate or discover theory of a phenomenon that related to a particular situation (Cresswell, 1998). Grounded theory refers to theory development process based upon inductive analysis of a corpus of data. The quality of a theory can be evaluated by the process by which a theory is constructed (Strauss & Corbin, 1990) which is in contrast to positivist approach where the goal of a theory is to explain new data. The grounded theory approach consists of a set of steps whose careful execution helps in the development of a theory as an outcome. A theory is a plausible relationship between concepts or set of concepts (Strauss & Corbin, 1994). The theory is articulated towards the end of the study and can be presented in the form of a narrative, a visual model, or a series of propositions. Table 6 shows articles IS publications that use grounded theory research.

Levina, N., Vaast, E. (2008)	Innovating Or Doing As Told? Status Differences And Overlapping Boundaries In Offshore Collaboration	MIS Quarterly, (32:2), p307-332
Orlikowski, W. J.(1993)	CASE Tools as Organizational Change: Investigating Incremental and Radical Changes in Systems Development	MIS Quarterly, (17:3), p309-340
Hunter, M. G., Beck, J. E. (2000)	Using Repertory Grids to Conduct Cross-Cultural Information Systems Research	Information Systems Research, (11:1), p93
Zahedi, F., Van Pelt, W.V., Srite, M. (2006)	Web Documents' Cultural Masculinity and Femininity	Journal of Management Information Systems, (23:1), p87-128
Pauleen, D. J. (2003)	An Inductively Derived Model of Leader-Initiated Relationship Building with Virtual Team Members	Journal of Management Information Systems, (20:3), p227-256
Scott, J.E. (2000)	Facilitating Interorganizational Learning with Information Technology	Journal of Management Information Systems, (17:2), p81-113
de Vreede, G., Jones, N., Mgaya, R. J. (1999)	Exploring the Application and Acceptance of Group Support Systems in Africa	Journal of Management Information Systems, (15:3), p197-234
Moody, J.W., Blanton, J. E., Cheney, P.H. (1998)	A Theoretically Grounded Approach to Assist Memory Recall During Information Requirements Determination	Journal of Management Information Systems, (15:1), p79-98
Zhang, J., Faerman, S.R., (2007)	Distributed leadership in the development of a knowledge sharing system	European Journal of Information Systems. (16:4), p. 479
Grimsley, M., Meehan, A. (2007)	e-Government information systems: Evaluation-led design for public value and client trust	European Journal of Information Systems. (16:2), p. 134

Table 6: Grounded Theory Research in IS

Based upon Cresswell's (1998) suggestions, the following grounded theory process will be pursued: (1) interviews will be conducted with about 20 to 25 government officials, policy makers and regulators in several trips to the field to saturate categories. The number of interviewees for this part of the research are consistent with the suggestions from Cresswell. Categories are concepts which are considered saturated when no further information can be found by conducting more

interviews. A category can be considered a unit of information which may be composed of events, happenings, and instances. Several different data collection approaches will be employed at this stage such as observations and documents analysis. Cresswell (1998) explains that the data collection process is a “zigzag” in the sense that the researcher might need to go back and forth between collecting and analyzing data. He also suggests a concept of theoretical sampling to help put theory to be developed in the best possible form. The number of iterations for data collection and analysis depend upon categories being saturated. The process of discovering more categories during the data collection and analysis is called constant comparative method of data analysis.

The fundamental process in grounded theory approach is to read a textual database and discover key themes (also called codes, concepts or properties) and their relationships. These themes are then categorized to develop constructs of a theory. There are three major coding techniques for qualitative data analysis that will be used during the analysis of data i.e. open coding, axial coding and selective coding.

4.3.1 ***Open Coding:*** The open coding method focuses on identifying, naming, categorizing and describing phenomena found in the transcripts. The purpose is to read each line, sentence and paragraph in order to find the reference and reasons behind what and why something is being said. An important step of this analysis process is to look for the use of language before interpreting (Strauss & Corbin, 1990). It is the initial form of categories about the phenomenon being studied by segmenting the information. Within each category a researcher finds

several properties or subcategories and look for data to dimensionalize or extreme possibilities on a continuum of the property.

4.3.2 ***Axial Coding:*** The axial coding involves finding relationships between related codes (or categories) by a combination of inductive and deductive thinking and analysis. The major elements of this stage will include element description, phenomenon, causal conditions, context, intervening conditions, action strategies and consequences.

4.3.3 ***Selective Coding:*** The selective coding requires choosing one category to be the core category, and relating all other categories to that category. In this manner, a single story line is developed and other things are placed around it (Cresswell, 1998).

In the case of this research, grounded theory approach provides a very relevant approach to develop a theory of ICT based socio-economic development. It will be used to develop better understanding of the government officials', policy makers', market regulators' and other ICT stakeholders' perspective of the ICT based socio-economic development. This technique allows for relatively more structure of the interview process and data collection. A questionnaire guide and interview protocol is developed and followed for the initial data collection and pilot study. Following six steps as suggested by Cresswell (1998) will be follows during the analysis of data:

- 4.3.4 ***Organizing and managing data:*** Interviews will be transcribed before analysis to increase familiarity with the data.
- 4.3.5 ***Reading and memoing the data:*** After transcribing, interviews and observations notes will be reread to identify key elements or codes in the data. Memos will be extensively used to annotate transcripts.
- 4.3.6 ***Describing the data:*** the case will be described to provide contextual view of various aspects of findings within the data.
- 4.3.7 ***Classifying, defining categories and patterns within the data:*** We will define categories based upon the codes and the description of the data. Patterns are developed that help explain the case.
- 4.3.8 ***Interpreting the data:*** We will attribute meaning to the identified patterns and relates them with the case studied. Thus we make naturalistic generalizations of the case where readers can learn from and apply to it to a similar setting or situation.
- 4.3.9 ***Representing or visualizing the data:*** The final step is to design a visual model that explains the case.

This method encourages consideration for any cases of negative analysis or outlier patterns that do not fit the categories in the study. This helps in establishing trustworthiness of the study.

4.3 Narrative Research

In order to find out ordinary citizen's perspective on what constitutes socio-economic development and how it is related to ICT growth in the country, it is important to pay particular attention to the way ordinary citizens make sense of access to ICT (Casey, 1996). Observation and description of their narratives about their use of these technologies (or abstinence thereof) in their daily lives will help in analyzing the extent to which ICT play a role in their socio-economic development. Narrative research has been employed in IS research studies (Alvarez & Urla, 2002; Davidson, 1997; Dube & Robey, 1999, Hirschheim & Newman, 1991). Table 7 lists some of these studies.

Joseph, D., Kok-Yee Ng; Koh, C., Soon Ang. (2007)	Information Technology Professionals: A Narrative Review, Meta-Analytic Structural Equation Modeling, and Model Development	MIS Quarterly, (31:3), p547-577
Kuechler, W. L., Vaishnavi, V. (2006)	So, Talk To Me: The Effect of Explicit Goals on The Comprehension of Business Process Narratives	MIS Quarterly, (30:4), p961-A16
Roy, M. C., Lerch, F. J. (1996)	Overcoming Ineffective Mental Representations in Base-rate Problems	Information Systems Research, (7:2), p233-247
Bartis, E., Mitev, N. (2008)	A multiple narrative approach to information systems failure: a successful system that failed	European Journal of Information Systems, (17:2), p. 112
Chae, B., Poole, M.S. (2005)	The surface of emergence in systems development: agency, institutions, and large-scale information systems	European Journal of Information Systems, (14:1), p. 19

Table 7: Narrative Research in IS

The basic idea behind narrative research is that all people can tell stories. In retrospect, when a researcher writes a paper or a report, it is in itself a story. Sometimes these stories make arguments that are quantitatively based and sometimes they are anecdotal in nature. However, when a lot of people have the same conclusions drawn from their personal stories, patterns start to emerge. It is interesting to note that an educational degree is not a prerequisite for storytelling and that oral histories are the oldest manner of conveying knowledge through generations (Casey, 1996). "Storytelling is the way to put shards of experience together, to (re)construct identity, community, and tradition" (Casey, 1996). Story telling is a "universal activity" that we learn as children as a form of discourse (Reissman, 1993). Narrative research deals with subjectivity rather than objectivity by representing the storyteller's experiences in their own words. Narrative research allows the storyteller flexibility and space to answer an open-ended question instead of answering a fixed interview guide. "Studying narratives is additionally useful for what they reveal about social life – culture 'speaks itself' through an individual's story" (Reissman, 1993).

This research method consists of collecting detailed accounts of research participants' life stories or narratives in a manner that seeks interpretation by the narrator in addition to description of their understanding of the environment. It allows for the in-depth analysis of the research participants' life stories and the way people socio-economic changes or development in their lives. It also allows for identifying and interpreting selectivity, silence, slippage and intertextuality of the research participants'

narratives which distinguish it from other qualitative research methods (Casey, 1995). The major idea behind narrative research is to understand the collective subjective or the cultural framework of meaning and people's social construction of reality (Casey, 1995). A basic assumption of narrative research is that people think and act in patterns, so it is important to identify different groups of people and analyze their narratives to find out how and why they differ or are similar. In this context, this research will involve people with different education levels (high educated vs. illiterate or less educated), age (youth vs. older generation), rural vs. urban and gender (men vs. women). Each of these population segments present interesting insights into various aspects of socio-economic development. A total of 35-40 interviews will be conducted involving about 5-6 members of each group.

There is no formal interview protocol developed. Interview will start by asking a “grand-tour” question, one that is open-ended and free-flowing allowing the storyteller to narrate his/her story in their own words and with freedom, with no or less interruptions by the researcher (Casey, 1996, Riessman, 1993, and Peshkin, 1988). A typical question will consist of a broad overview of the research followed by an open ended broad question, i.e., “I am studying the relationship between ICT growth and socio-economic development; please tell me the story of your life”.

The researcher will have the option of returning to the storyteller for clarifications in the story or to ask specific questions that pertain to the researcher’s

interests. Thus our first attempt would be to provide the storyteller with the flexibility and choice to narrate his/her story in a way that is most comfortable to him/her.

Following five levels of conducting and analyzing narrative research will be followed:

4.3.1 ***Attending:*** how a storyteller reflects, remembers, and recollects the “primary experience”. How he/she makes sense out of it, the context of the experience itself, and his/her selectivity of the experience itself.

4.3.2 ***Telling:*** The “performance of a personal narrative”. A storyteller sequences and orders the events of the experience in a particular way for the researcher/listener. Riessman (1993) argues that there is a gap between the lived experience and the way it is communicated through language and words because “language is uncommunicative of anything other than itself”. Thus meaning will be constructed about the storyteller and his/her experience at this level.

4.3.3 ***Transcribing:*** This step refers to choice of putting words into text/language, “a fixation of action” for interpretation. Thus it may be selective, incomplete, and partial in representing the storyteller and the experience.

4.3.4 ***Analyzing:*** We may choose to interpret and represent the experience as snippets or fragments without providing the experience in the storyteller’s own words.

- 4.3.5 **Reading:** “There is no master narrative”, thus readers bring another layer of meaning to the experience and the identity of a storyteller.
- 4.3.6 **Selectivity:** Story of one’s life is usually a brief version of major events in the life time of the narrator. Narrator usually chooses to describe personally significant events while leaving out the others. The selection of what the narrator chooses to tell is a clue for narrative researcher to discover what is really important in an individual’s life.
- 4.3.7 **Silence:** Narrator may choose to keep quiet on issues or may simply forget to tell that are known to the researcher about the narrator. These insights are clues to either less important things in a person’s life or the memory of a negative experience which people do not feel comfortable talking about.
- 4.3.8 **Slippage:** Contradictions in a narrative are called slippage which may occur due to the difference in beliefs and actions on a narrator’s part. Identification of slippage and explanation is crucial for the appropriate analysis of narratives.
- 4.3.9 **Intertextuality:** Narrative texts will be compared and contrasted with each other to identify selectivity, slippage, and silence as suggested by Case (1995). In order to identify patterns in the text, a we will focus on repetitions, hesitations, sequences, chronology, choice of vocabulary, expressions/emotions/values, and use of metaphors. Moreover, analysis of narratives may also include a comparison of the texts with historical and official versions.

To develop an in-depth understanding of the ICT based socio-economic development in ordinary citizen's lives, this research methods provides the right theoretical background, tools and approaches. This method will help in developing a better understanding of the relationship between ICT growth and socio-economic development. Narrative research "is the way in which it can display the assets of those ordinarily considered to have none". This aspect of narrative research is very useful for the current research because people from a variety of backgrounds including illiterate, highly literate, younger folks and older people in urban or rural area can become research participants. The research design describes the process of research participants' selection.

4.4 Researcher Subjectivity

Casey (1993) suggests: *"While we read or listen, we continually make judgments on what we see or hear; we make sense through a process of selection and rejection. And what we select and reject very much depends on who we are, who is speaking to us, what they say, how they say it, where and when we are listening"*. Subjectivity is an important notion in both qualitative and quantitative research, even though it is mainly associated with qualitative research. Peshkin (1988) writes that a researcher's own involvement and framework in the study is an undeniable truth and that it is inevitable in any type of research. There are several forms of this involvement including those that may exist in interpreting the meaning, perspectives, assumptions, gaze, experiences, the

way questions are designed, and the things we know about our research participants. This is what Casey (1995) calls existence of “multiple and competing versions” of any phenomenon. The recognition of a researcher’s subjectivity is an important task and leads to better understanding of multiple perspectives in the form of social language, values, words, expressions, and actions. Subjectivity as “an amalgam of the persuasions that stem from the circumstances of one’s class, statuses, and values interacting with the particulars of one’s object of investigation” (Peshkin, 1988).

The subjectivity can also be understood in terms of researcher’s own background, experiences and perspectives. For example, researcher’s gender, association with the research site, level of comfort for research participants in being able to speaking with the researcher, language and social language, understanding of literary meaning of metaphors and shared understanding of cultural norms are all important aspects of subjectivity. In an article “In Search of Subjectivity – One’s Own”, Peshkin (1998) makes a case for identifying and acknowledging personal subjectivity as a part of research process. The researcher’s subjectivity is an inevitable fact and even if a researcher claim to be impartial to the outcomes of the research, subjectivity plays an important role in the defining the research objectives, process and ultimately the outcomes. Therefore he suggests identifying and conveying these Subjectivity to the readers instead of claiming to be “objective” and “impartial”. The influence of subjectivity on the research process should not confused with any negative connotation because these subjectivity and influences can actually lead to more realistic research

findings which might not be possible otherwise. “The subjectivity is not a medal of honor that can be worn all the time for an exhibition but a garment which cannot be removed” (Peshkin, 1988). One way to describe subjectivity is to identify different “selves” within a researcher that can be explained in terms of “I” as in first person. Peshkin analyzed his own subjectivity during a research project and reported the following types of subjectivity:

1. the ethnic-maintenance I, (role of ethnic background on research process)
2. the community-maintenance, I (role of belonging to a community on research process)
3. the E-Pluribus-Unum I, (one perspective out of many – researcher’s perspective)
4. the justice-seeking I, (role of observing injustice in real life social settings)
5. the pedagogical-meliorist I, (that things can be done better from their present form)
6. the nonresearch human I, (that researcher has social life and is a living, breathing human being with feelings that have a role in the research process)

Peshkin asks researchers to identify their subjectivity before the start of a research project because this realization helps researchers manage their personal

influences/subjectivity on the research outcome. It also helps understand a researchers' lack of enthusiasm or over enthusiasm about a phenomenon and thus is helpful building what he calls a "tamed" or "virtuous" subjectivity.

4.5 Myself as a Researcher

I was born in a sub-urban area of the Eastern region in central Pakistan. I belong to a middle class family in neighborhood where most others were poor. My family was among the first few to have a TV and a phone. I was certainly among the first to have the opportunity to learn the use of computers and the Internet for economic activities within my neighborhood. Access to these technologies changed my life from both social and economic perspective. I experienced the benefits of these technologies on my personal socio-economic growth while serving as editor of two major IT publications from 1997 to 2000. During this experience, I not only analyzed ICT policy trends of Pakistani government but also observed and fed back on the progressive agenda that was expected to shape the role of ICT industry in the country. The shared understanding of the past, cultural norms, words, values, actions, language, social language, background, past observation, rapport, trust and involvement in the analysis of ICT policies and contacts with policy makers and enforcers are the qualities that increase the trustworthiness of the research process and potential findings. Pakistani's culture and economics situation are deeply rooted in what goes on in the neighboring countries such as India in the East and Iran on the West. In order for an appropriate analysis, my

dissertation co-chairs' help will be valuable. One of them is an expatriate Indian and can greatly improve the quality of literal analysis particularly in the use of language, form and content of interviews among overall support in the research process. The other co-chair is an expatriate Iranian and can help interpret deep cultural and religious influences that shape the lives of people their social construction of technology in this region.

Recognizing the self allows recognition of the personal perspectives and ensures that my personal views do not shadow the views of research participants. I have to develop capacity and exhibit efforts in attempting to understand the point of view from a people with varying levels of education, income, gender, age and domicile that might be different from those of mine. For example, it might require patience and understanding from a technology savvy researcher to understand the point of view of those who do not use ICT even though they have access to ICT and need to use it. I would have to develop an understanding that it is not just the access and use issue but a number of other differences that operate in a given context. I would be careful about my subjectivity when conducting interviews and collecting and analyzing qualitative data. My own background and my supervisors' backgrounds are important factors that increase the trustworthiness of the research process. Furthermore, a background in the analysis of regulatory policies of government of Pakistan will also enable me in gaining access and explore competing/alternate explanations/interpretations.

4.6 Conclusions

This chapter explains the research method that will be used for data collection and analysis of data as it relates to the two major research questions in the study. The historical research method will be used for developing a historical perspective and antecedents of ICT growth. Historical records, documents, published articles and policy documents in addition to interviews with key stakeholders involved in the policy development and decision making will be interviewed. Grounded theory and narrative research methods will be used to develop an understanding of the relationship between ICT growth and socio-economic development. Interviews with key stakeholders including government officials and industry representatives will be analyzed using the grounded theory method. Interviews with ordinary citizens will be conducted using the narrative research method. It also shed light on the potential subjectivity issues in this qualitative research.

CHAPTER V

PILOT STUDY

A pilot study was conducted to understand the relationship between ICT growth and socio-economic development during December 2006 and June 2007 (data collection during December 2006 to January 2007). Qualitative data were collected in Pakistan from different stakeholders in the ICT growth and socio-economic development process. Government officials who were involved in the policy making and implementation process, as well as some of the influential, aware and expert IT technocrats, educationists and ordinary citizens were interviewed. The selection of interviewee from government sector, technocrats and educationists was based on their ability to influence, formulate and execute ICT policies in the country. These interviews, in addition to the review of ICT related policy documents, published papers, reports and media stories, were considered for the historical review of ICT growth. The second phase of the pilot included ordinary citizens as research participants. These participants were selected on the basis of their education level (highly educated vs. less educated) and use of ICT. Table 8 describes the research design for the pilot. The interviews for the government officials and ICT industry representatives were conducted using semi-structured interviews. A semi-structured interview starts with a number of questions but allows for the introduction of more questions if and when needed. This is in contrast

to the structured interviews (also known as researcher administrated survey). A structured interview allows the interviewee to choose from a limited and predefined set of answers for each question. On the other hand, a semi-structured interview requires careful listening of the interviewees' answers and framing further questions in that context. Ordinary citizens were interviewed by administering unstructured interviews. In unstructured interviews, questions can be changed and adapted depending upon the respondent's intellect, understanding and beliefs.

<i>Research Method</i>	<i>Research Participants and Data Sources</i>	<i>Number of Interviews</i>	<i>Duration of Each Interview</i>	<i>How were the research participants selected</i>	<i>Interview Protocol</i>
<i>Historical Research and Grounded Theory</i>	Government Officials / ICT Industry Representatives, Educationists, Review of Policies and published papers	6	45 – 75 Minutes	Current or past position of authority in formulating government policy on ICT or the authority to influence the use of ICT on national level	Semi-Structured
<i>Narrative Research</i>	Ordinary Citizens	6	60 to 90 minutes	Level of Education (Highly Educated vs. Less Educated)	unstructured

Table 8: Research Design of Pilot Study

The research participants for the first phase of the study included representatives from the Ministry of IT and Telecommunication, heads of the two largest distance learning institutions in Pakistan that use ICT for the dissemination of

educational content to their students across the country, representatives from Pakistan Software Export Board and a past-consultant (special adviser) to the Ministry of Science and Technology who led the efforts on developing “IT Policy” for the government of Pakistan in 2000. The interviews lasted for about 45 to 75 minutes, during which the interviewees were encouraged to respond to questions at length using a semi-structured interview protocol. All interviews were digitally recorded. Each of these interviews was set up by requesting appointments in advance. In some cases where it was difficult to directly get in touch with the research participants; interviews were requested through personal contacts of other interviewees.

For data analysis, the qualitative interviews were organized, transcribed, described, classified, and categorized. The goal was to understand and discover problems in data collection and analysis including pattern finding, interpretation and representation. The interview protocol included questions shown in Table 9.

- What socio-economic benefits is the progress in ICT sector yielding in terms of economic development, education, community development, politics, etc.?
- What is the current state of affairs in use of ICT for public administration and education?
- What ICT applications and programs are being used for these purposes?
- What kinds of technologies are likely to play a role in weaving the social fabric in Pakistan with regard to public administration and dissemination of education?
- What is the expected level of growth in the use of ICTs for socio-economic development of Pakistan?
- What are some potential challenges likely to hamper this growth in future?
- What is the national climate prevalent for accepting and enhancing ICTs for socio-economic change?
- What role has the IT policy played in this progress?
- What lessons can other developing nations learn from the experience of Pakistan?

Table 9: Interview Protocol for Government Officials/Industry Representatives

In the second phase, six ordinary citizens were interviewed during February 2007 and April 2007. One interview was done on phone while the other five participants were interviewed using video conferencing facility at Allama Iqbal Open University (AIOU) in Islamabad (Pakistan) and the University of North Carolina at Greensboro. These research participants were selected on the basis of their education level, i.e., three of these six participants were highly educated and three were illiterate or educated only at the primary level (fifth grade and below). The basis for dividing people into groups based upon their education level was to obtain a wide spectrum of responses and

alternate explanations for the ICT based socio-economic development in their lives. All of these participants owned cell phones, had used computer in the past, were adults and had more than five years of work experience. Since these interviews were done using video conferencing facility in Islamabad, only the residents of Islamabad or the peripheral towns could be invited for the interview. Note that initially, fifteen potential research participants were approached via email and/or telephone to request participation. They were invited to the video conference facility at AIOU where the pilot interviews were conducted. Since these interviews were done in Islamabad, the selection was not completely random and therefore represented views from people in a large urban metropolitan area. A complete randomness in research participants' selection is not a goal in qualitative research anyway (Cresswell, 1999). The goal is to look at the particulars, differences and wide spectrum in stories and interviewees' responses rather than convergent results or consensus developing. A careful consideration was given for the selection in order to have a widest possible range of responses around the concept of ICT based socio-economic development in their own lives. Several of these participants were residing in large urban area due to their jobs and had families permanently living in rural areas. This purposeful selection allowed for the widest possible range of answers. Through video-conferencing, each participant was requested to narrate the story of his/her life and experiences with ICT. Each of these interviews lasted for about 1 to 2 hours.

These interviews were conducted and analyzed using narrative research guidelines by Reissman (1993) and Casey (1996). The interview protocol was kept unstructured and the interview started with a following 'grand tour' question:

- We are investigating the impact of ICT on people's life. Please tell us the story of your life.

In addition to the grand tour question, two backup questions were designed to be used in situations where research participant faces difficulty in telling their stories and need specific questions to be asked. Following are the two questions:

- How is ICT changing your life socially and economically?
- What are the innovative ways in which you use technology to perform your day-to-day business?

5.1 Lessons Learned from the Pilot

The pilot study was very helpful in improving the final research design. A number of lessons were learned.

Interview Questions: A set of questions was developed for the pilot study to collect qualitative data about the antecedents of ICT growth and their impact on the socio-economic development. After these interviews, the questions were modified to increase clarity. Based upon the suggestions from Mason et.al. (1997), questions that aim at exploring the history and antecedents of ICT growth were further revised and new questions were introduced. The narrative research question, i.e., "tell me the story of your life", needed improvements to

narrow the scope of the answer to ICT related histories. It was important to modify the question that it does not violate the “grand tour” question suggestion and yet allows the participants to formulate their stories/narratives within the scope of the study. The purpose is not only to persuade research participants to narrate their stories only around the concept of ICT but also to give them an idea of what was being researched. The revised question starts with providing the research participant with the background of research.

Logistics and interview scheduling: Some of the interviews were done online using a video conference facility at Allam Iqbal Open University in Islamabad - Pakistan. While it was an excellent arrangement in that it allowed the researchers and the research participant to see each other and have a discussion in an informal and relatively normal manner, the connectivity issues plagued the setup. There were frequent breakdowns in the connection which interrupted the flow of the narrative. Additionally, several prospective research participants could not participate simply because they could not manage to travel to the video conference facility. In order to fix this problem, it was decided that the researcher will travel to Pakistan, meet with people and record interviews in person. Interviewing government officials proved to be a challenging task at the start of the pilot. However with the help of a few influential officials, it became increasingly easy to schedule interviews with government officials. This process also included frequent traveling between different cities (sometimes as far away

as a 12 hour drive). For the final study, appropriate scheduling arrangements will be made prior to travelling to Pakistan to ensure efficient scheduling.

Identification of more Stakeholders: The pilot began with interviewing government officials and industry representatives who were involved in ICT policy development process. As the study unfolded, it became increasingly clear there are a number of other stakeholders such as electronic and print media, law enforcement, healthcare and activities who play an important role in harnessing the socio-economic potential of ICT. Some of these stakeholders were later included for interviewing and several more groups are to be included in the final research design.

Categories of Citizens : Pakistan has about 50% literacy rate and selection of ordinary citizens on the basis of their level of education was revealing. However, it was discovered that there are other important categories of citizens who should be involved. For example, gender is an important aspect that defines how people think, behave and act. This has an ultimate effect on how people use and employ ICT in their daily life for their socio-economic development. Similarly, a large percentage of Pakistani population (70%) lives in rural areas with far less sophisticated access to ICT compared to a smaller population (30%) living in urban areas with access to highly sophisticated ICT. Income and age are also very important factors. In order to enhance the final research design, research participants are selected mainly based upon gender. Other factors such as

domicile, education, age and income are kept proportional to national population. Further discussion is provided in the research design.

5.2 Pilot Analysis and Preliminary Findings

The data from interviews of government officials and industry representatives was analyzed using the grounded theory approach. The video recording of the six interviews was about seven hours in length which was transcribed into about 96 pages of double spaced word processing document. Additionally, policy documents from the Government of Pakistan were considered during analysis. The interviews were reviewed for content and context to identify codes. This step ensured that the identified codes are grounded in data. The transcripts were entered into the qualitative software package, QSR NVIVO 7.0 to make the management of the data and analysis and coding more effective. The software package NVIVO includes the ability to code across documents to investigate the data for open codes. Even though NVIVO was used to hold the interview transcripts and codes, the content analysis was mainly manual. NVIVO does not automatically code the transcript even though it has the ability to count occurrences of different words that might be repeated in a transcript. See Figure 6 for a screen shot of NVIVO's document view. From this analysis, an initial set of five concepts was developed. Based upon the context of the policy documents and interviews, an open coding map was generated.

The interviews transcripts from ordinary citizens consisted of about 9.5 hours of video and 2 hours of audio recording. The transcription of these interviews led to 160 word processed pages.

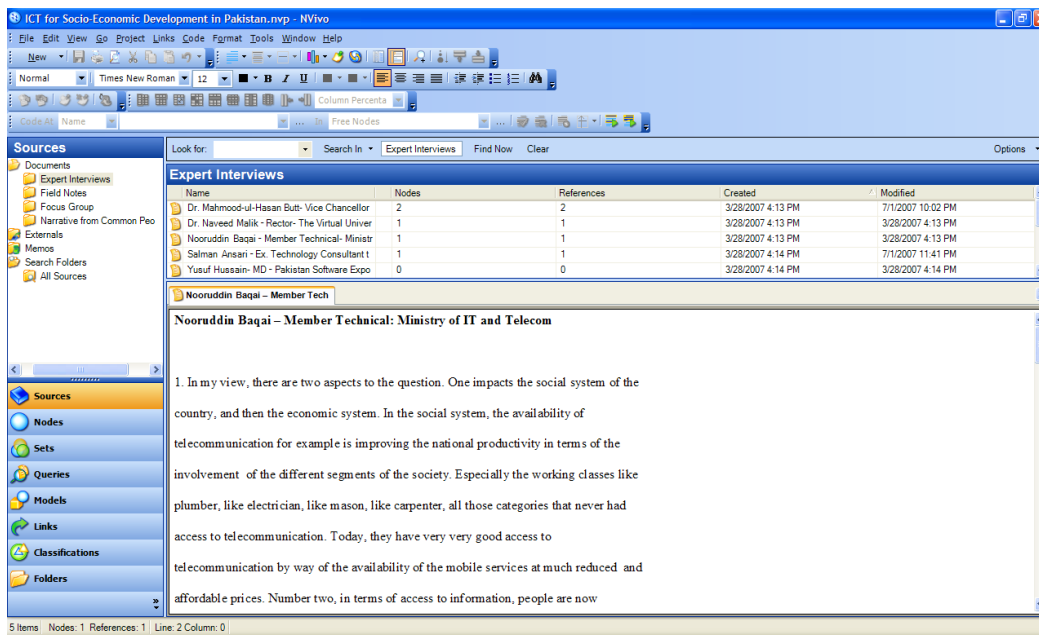


Figure 6: NVIVO Software Screenshot

5.2.1 Initial Research Findings

During the course of initial interviews for the pilot study, it became clear that socio-economic development is a multidimensional and complex concept. The study of the relationship between ICT and socio-economic development is no less complicated either. The codes and concepts from within the interview transcript were identified. This

resulted in the identification of five major concepts that explained the nature of relationship between ICT growth and socio-economic development. The open coding of these concepts is shown in figure 7.

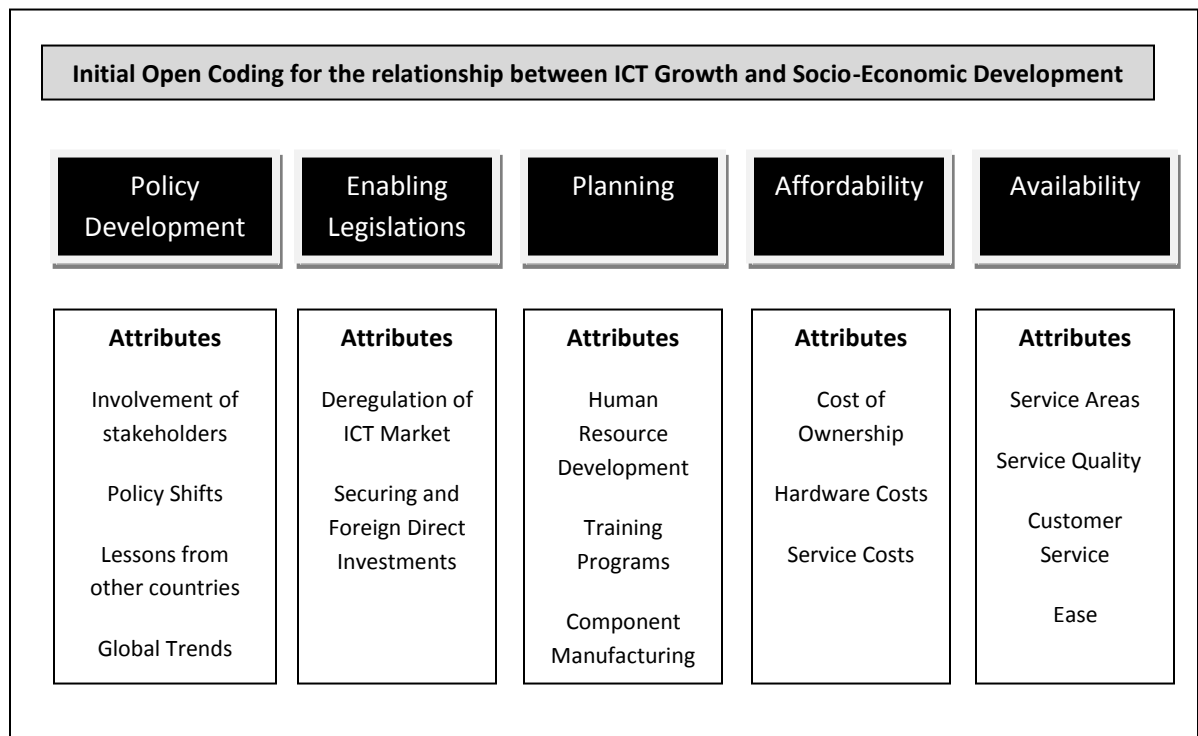


Figure 7: Open Coding from Data and Associated Attributes

These concepts reveal the dependence of the ICT growth and socio-economic development relationship on policy development, enabling legislations, planning, affordability and availability. Since this analysis was done using the grounded theory method, these concepts must be supported with rich descriptive quotes from the data.

A framework of the stages of socio-economic development was also developed and shown in figure 8. It was found from the analysis of interviews that globalization (developments around the world), regional competition (developments in neighboring countries) and success stories (local, regional or international) play a significant role in developing and increasing awareness of the ICT based socio-economic development among stakeholders. The awareness stage leads to shaping of the environment which is suitable for the next stage, growth. In the shaping stage, policy development takes place with the involvement of several stakeholders. Based upon these general policy development efforts, enabling legislations are set forth and plans are drawn that spur ICT growth. Planning may include several things, e.g., in the case of Pakistan, planning focused mainly on deregulation plans, human resource development and hardware and software industry support. These efforts create an environment for the market growth in terms of quality of services, types of services, coverage area and customer base. The next stage is the actualization of socio-economic development and success stories.

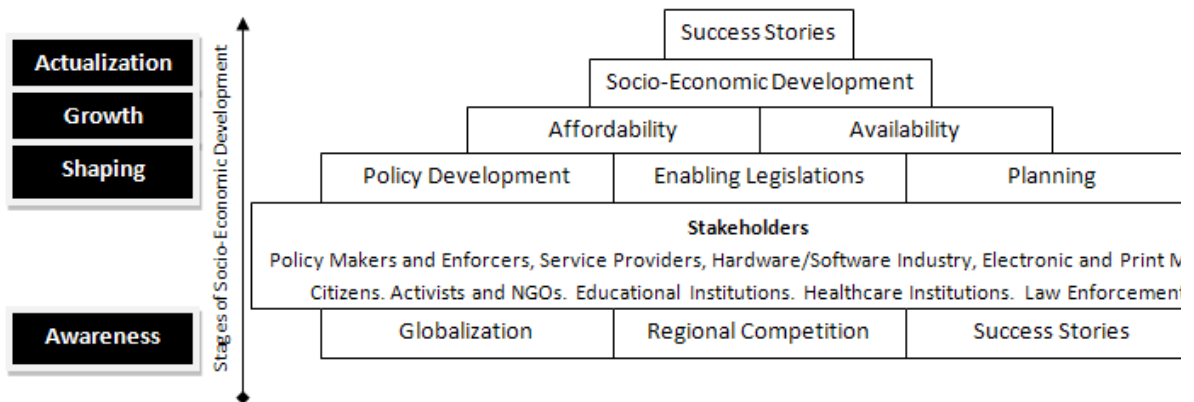


Figure 8: Framework for the stages of Socio-Economic Development

The success stories in the actualization stage together with global development in ICT sector and regional competition create an environment for the next iteration of these stages. The iterative process explains well the situation that preceded the success of the first ICT policy developed by the Ministry of Science and Technology in the year 2000. In the year 2003 a de-regulation policy for the telecommunication sector was made public which created an environment of market competition. Following the successful implementation of this policy, a ‘Mobile Cellular Policy’ was announced in January of 2004. The next policy to appear on the horizon was ‘Broadband Policy’ in December 2004.

Based on the initial analysis of coding and relationships an initial theoretical model of ICT growth and socio-economic development is developed. This model will become the foundation of an integrated theory of ICT based socio-economic

development and will be further developed, refined and evaluated in next phase of data collection, analysis and discussion.

The success stories also give confidence to the stakeholders in their ability to develop and follow through different policies, enabling legislations and planning. Several participants also pointed out failures of some aspects of policies and plans. However, these failures become lessons learned as part of the success stories. For example, the failure of broadband policy and hardware industry development was particularly cited in the interview transcripts. However, these failures fed into future policy and plan development stages.

In analyzing the policy documents, published reports, transcripts of interviews, narratives of ordinary citizens and discussions with government officials, a theoretical model of the ICT based socio-economic development was created by using radial coding as suggested by Creswell (1999). This model (figure 9) further explains the relationship between ICT growth, socio-economic development and concepts identified in figure 8. Several new stakeholders are also identified and refined in this model.

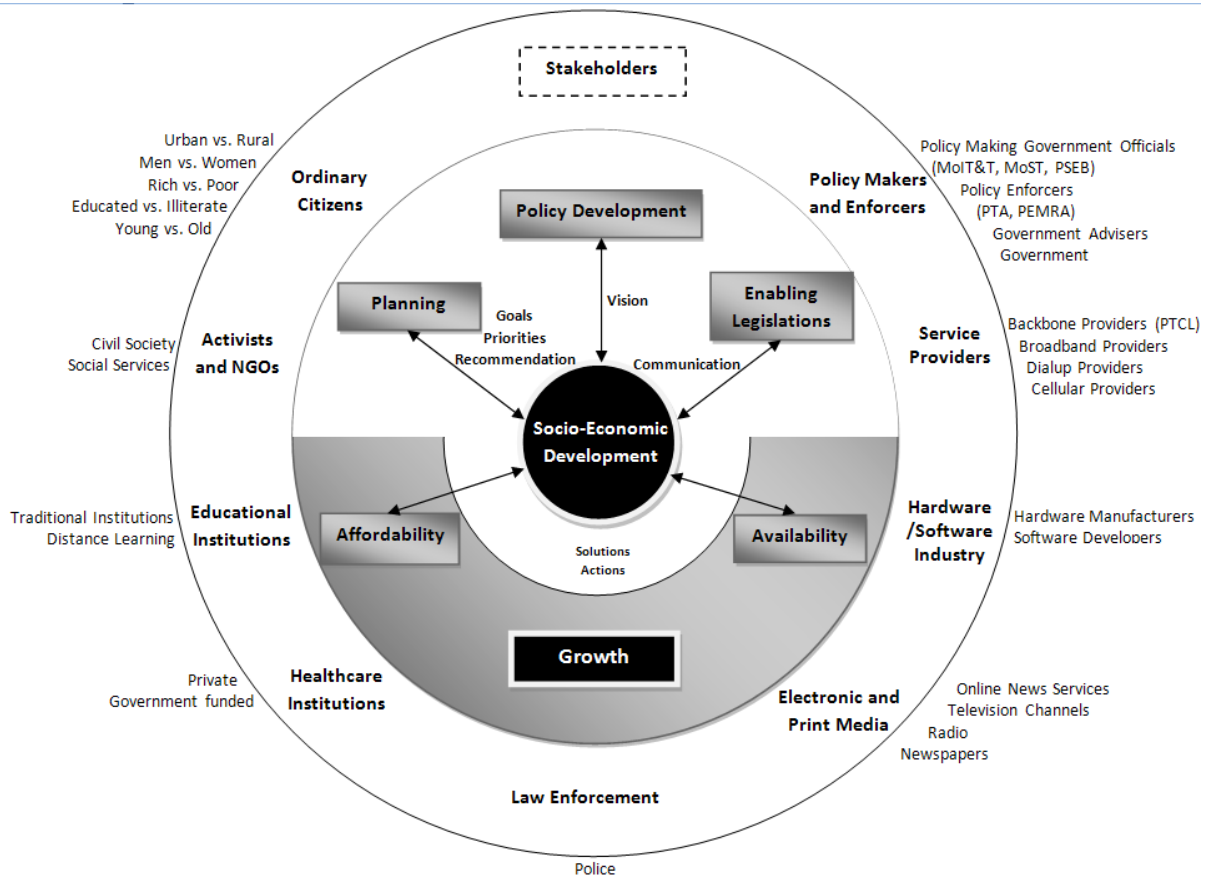


Figure 9: Theoretical Model of Socio-Economic Development (Axial Coding)

CHAPTER VI

RESEARCH DESIGN AND METHOD

A research design is a plan that outlines how data will be gathered (identification of the data collection method), what interview protocols will be used, and how the data will be organized and analyzed. This chapter presents the evolution of research design, and method used to collect, organize, and analyze qualitative data. It also provides details of the data collection methods, data collection time frame and research participants in addition to justifications for the theoretical sampling of the participants.

6.1 Theoretical Sampling and Evolution of Research Design

Theoretical sampling is defined as a purposeful selection (on analytic grounds) of where to sample from next in study (Urquhart, Lehmann and Myers, 2009). It ensures comprehensive nature of theory and truly grounding it in data. It may not only determine who should participate in the study but also how they will be involved in the research. For example, initial design for this research required only interviewing citizens. However, during one of the interviews, an illiterate research participant pointed out that she might be more participative if she is interviewed during a lunch break in a wheat harvesting field when a lot of other women are there to “*gossip*”; basically she made a suggestion to do a focus group. The suggestion of a “focus group” in addition to

interviews with research participants was important because the research design had to be improved by including focus groups as well.

The notion of pilot study (previously described in chapter 5) in interpretive research differs from that in positivist research. In positivist research, the research design is developed 'a-priori' and a pilot study is conducted to fine tune the final design. However, in interpretive research where design may evolve as research progresses, the context of pilot itself determines initial design which is further improved and enhanced in the final design. In other words, an 'a-priori' design for the overall research study may not exist. After the pilot, the final design is outlined which may also evolve as the research progresses through the process of theoretical sampling.

In this sense, data collected during pilot study became a starting point in the theoretical sampling and determined where the future pieces of data should come from and how the data should be collected. It is therefore appropriate and logical to use data collected during pilot along with the full study in the development of a comprehensive theory which is grounded in data. As the research progressed, theoretical sampling was not only done for interviews and selection of research participants but also for other published policies that affect ICT policies and actions plans. For example, initially the IT Policy and the Action Plan of 2000 was included in the study. However, during the review of these documents, it was determined that other policies such as Broadband Policy, Mobile Cellular Policy, Deregulation Policy for the Telecommunications Sector, Cyber Laws Ordinance of 2007, Import Duty Policy and Tariff Policy should also be

included. The process of theoretical sampling was useful in assuring appropriate selection of citizens along a set of criteria i.e., gender, domicile, income and education. Similarly, the process of theoretical sampling was used for the selection of officials and stakeholders making/influencing government's ICT policies.

Some other refinements after the pilot study included revision of the interview protocol for different stakeholders, inclusion of more diverse groups of citizens and allowing for more interviewing time. The data collection effort started in December 2006 and lasted until January 2009 in three phases. Table 10 lists these phases, data collection methods, types of participants, criteria for their inclusion in this study and data collection timeframe for each of the phases.

Data Collection Method	Type of Research Participant	How were they selected	Data Collection Timeframe			Total Research Participants
			December 2006 – January 2007	April 2008 – May 2008	December 2008 – January 2009	
Interview	Stakeholders Making or Influencing Government's ICT Policy	Current or past position of authority in making of influencing ICT policy decisions	6 interviews	15 interviews	33 Interviews	54
Interview	Citizens	Gender, Domicile, Education, income	6 interviews	9 Interviews	20 interviews	35
Focus Group	Citizens	Domicile, Education	-	-	2 focus groups (5 and 6 participants respectively)	11
Total			12	24	64	100

Table 10: Data Collection Time Frame and Number of Participants

6.2 Research Design

A total of 100 research participants were interviewed in this study in addition to an exhaustive review of the government's published policies and action plans that affect ICT growth. The research participants included 54 officials, who made or influenced government's ICT policies, and a total of 46 citizens.

Historical research and grounded theory analysis method was used to analyse government's ICT policies and action plans (specifically broadband policy, mobile cellular policy, deregulation policy for the telecommunications sector, cyber laws ordinance of 2007, import duty policy and tariff policy). These documents were obtained from

different government agencies through personal contacts. Some of these policies were available online on the websites of some agencies. This analysis was useful in developing an understanding of a static or a frozen view of policies and actions plans. Other data collection methods such as interviews cannot provide this static or frozen view of something that happened in the past because perceptions and views of people who make these policies change over time. It is therefore appropriate to use these documents to understand the goals and objectives of past policies and evaluate their effectiveness.

The interviews with 54 officials who were involved in making or influencing government ICT policies were useful in understanding the motivations behind policy decisions that might not be available in a documented format. These interviews also provided insights into these officials' qualitative self-evaluation of the success or failure of these policies which are valuable for future policy making recommendations in this research. These interviews lasted for about 45 minutes to two hours. A grounded theory method was used to analyze the contents of these interviews.

The interviews with 46 citizens involved listening to the narrative and life stories of 35 participants. These interviews sometimes lasted as long as 8 hours. The selection criteria for these participants consisted of four considerations: gender (male, female), domicile (urban, rural), education (high, medium, low), and income (high, medium, low). Theoretical sampling was used to ensure a representative involvement of participants from different socio-economic and cultural backgrounds. A narrative and grounded

theory based analysis method was used to analyze the contents of these interviews. Two focus groups were arranged to understand the collective sense making of the role of ICT in citizens' lives. One of these focus groups was conducted in Islamabad and involved participation from highly educated research participants. The other focus group was conducted in a rural area and involved illiterate citizens. Table 11 provides further details of the research design.

<i>Research Participants</i>	<i>Data Collection Method</i>	<i>Time/Space per participant</i>	<i>Data Analysis Method</i>	<i>Objective</i>	<i>How were research artifacts/participants selected</i>	<i>Data Collection Protocol</i>
Exhaustive review of documented evidence such as government policies, action plans, published reports from government agencies, industry reports, news reports and blogs			Historical and Grounded Theory	<ul style="list-style-type: none"> • Historical Perspective of ICT Growth • Antecedents of ICT Growth • Dimensions of ICT Growth 	Published documents from government agencies, industry and newspaper stories and blogs dealing that highlight role of ICT in social or economic context	Semi-Structured
Stakeholders Making/Influencing Government ICT Policy	54 Interviews	45 minutes to 2 hours per interview	Grounded Theory	<ul style="list-style-type: none"> • Antecedents of ICT Growth • Dimensions of ICT Growth • Policy Evaluation 	Current or past position of authority in formulating government policy on ICT or the ability to influence the use of ICT on national or societal level	Semi-Structured
Citizens	35 Interviews	1 to 8 hours per interview	Narrative	<ul style="list-style-type: none"> • Dimensions of ICT Growth • Policy Evaluation • Dimensions of Socio-Economic Development 	<ul style="list-style-type: none"> • Gender (Men, Women) • <i>Domicile (Urban, Rural)</i> • <i>Education (High, Medium, Low)</i> • <i>Income (High, Medium, Low)</i> 	Unstructured
Citizens	Two focus groups of 5 highly educated and 6 illiterate citizens from urban and rural area respectively	90 Minutes per focus group	Narrative Analysis and Grounded Theory	<ul style="list-style-type: none"> • Dimensions of ICT Growth • Policy Evaluation • Dimensions of Socio-Economic Development 	<ul style="list-style-type: none"> • Focus groups based on Education and Domicile • Representatives from urban area were highly educated. • Representatives from rural area were illiterate. 	Unstructured

Table 11: Research Design

6.2.1 Selection of Citizens

The selection of citizens was an important step in the research design. Cresswell (1999, 2006), Casey (1995) and Reissman (1993) emphasize a purposeful selection of individuals as research participants. This 'purposeful' selection of research participants is sometimes charged with the term "bias", however, qualitative researchers recognize that the researcher and the researched are both part of the research process and will have their own perspectives on the phenomenon being studied. In order to address the "bias" issue, researchers are suggested to explain their perspective and position clearly from the perspective of research participants. Mehra (2002) suggests that the role of researcher's subjectivity plays an important role in designing and conducting qualitative studies. Additionally, in order to address the issue of "bias in the selection of research participants", researchers are advised to provide a rationale of the selection instead of attempting to "target a random sample". This process builds trustworthiness in qualitative research. A section on researcher's subjectivity addressed this issue in Chapter 4. Lately, the concept of theoretical sampling has been popularized in IS literature on qualitative research methods which requires qualitative researchers to carefully choose where to sample next in a given situation (Urquhart, Lehmann and Myers, 2009).

Casey (1995) points out that people think and act in patterned ways and therefore selection of various groups of participants is crucial in getting the widest

possible range of responses. Therefore a set of four criteria including gender, domicile, income and education was used to identify the impact of ICT on citizens' lives.

Gender plays an important role within the cultural and social environment in Pakistan. It usually defines how people think, act and interact with others. In order to better understand overall socio-economic development in a developing country such as Pakistan, it is important to include both genders proportionally. However, a total of 26 men and 9 women agreed to participate in the study. The low participation from women is indicative of the socio-cultural norms which inhibit women from voicing their opinions and standing out within the socio-cultural boundaries that women are expected to follow. Even though the number of women included in the study is not proportional to that of men, the depth of the thought process and richness of their narratives were noteworthy. Casey (1995) suggests including approximately 6 participants from each category and therefore for the purposes of this research, this number is still considered good.

The government of Pakistan designates and defines rural and urban areas throughout Pakistan and this list of rural and urban areas were considered to categorize participants' domicile as rural or urban.

A proportional selection of research participants was made on the basis of their income (high, medium, low). Individuals having an annual income within the non-taxable range set by the Government of Pakistan were considered low income.

Non-taxable range of annual income usually includes people who are below the national poverty line. In 2008, individuals with an annual income less than Pak Rupees 100,000 (about \$1300: poverty line in Pakistan) do not pay income taxes (Central Board of Revenue, 2008). Research participants with annual earnings of Pak Rupees 500,000 (about \$10,000) are considered among group of people with high income. Citizens with an annual income of Pak Rupees 500,000 are among the top 5% of Pakistani population. Citizens with income in between these limits are categorized as participants with medium income.

The level of education also defined level of comfort in using technologies that rely on reading and writing (particularly in English language). People with at least a BA are considered highly educated, and with no formal schooling are considered illiterate. People with several years of formal education (who have not earned a BA) are considered participants with medium level of education.

The selection guideline given in Figure 10 was helpful in providing a framework for theoretical sampling. It is important to remember that every participant belonged to multiple categories (i.e., contexts) e.g., a man living in a rural area may be illiterate and has low income. For some combinations multiple participants were available. However, for some other combinations (such as women, rural, high income, and high education), it was difficult to find a participant who satisfied this set of criteria.

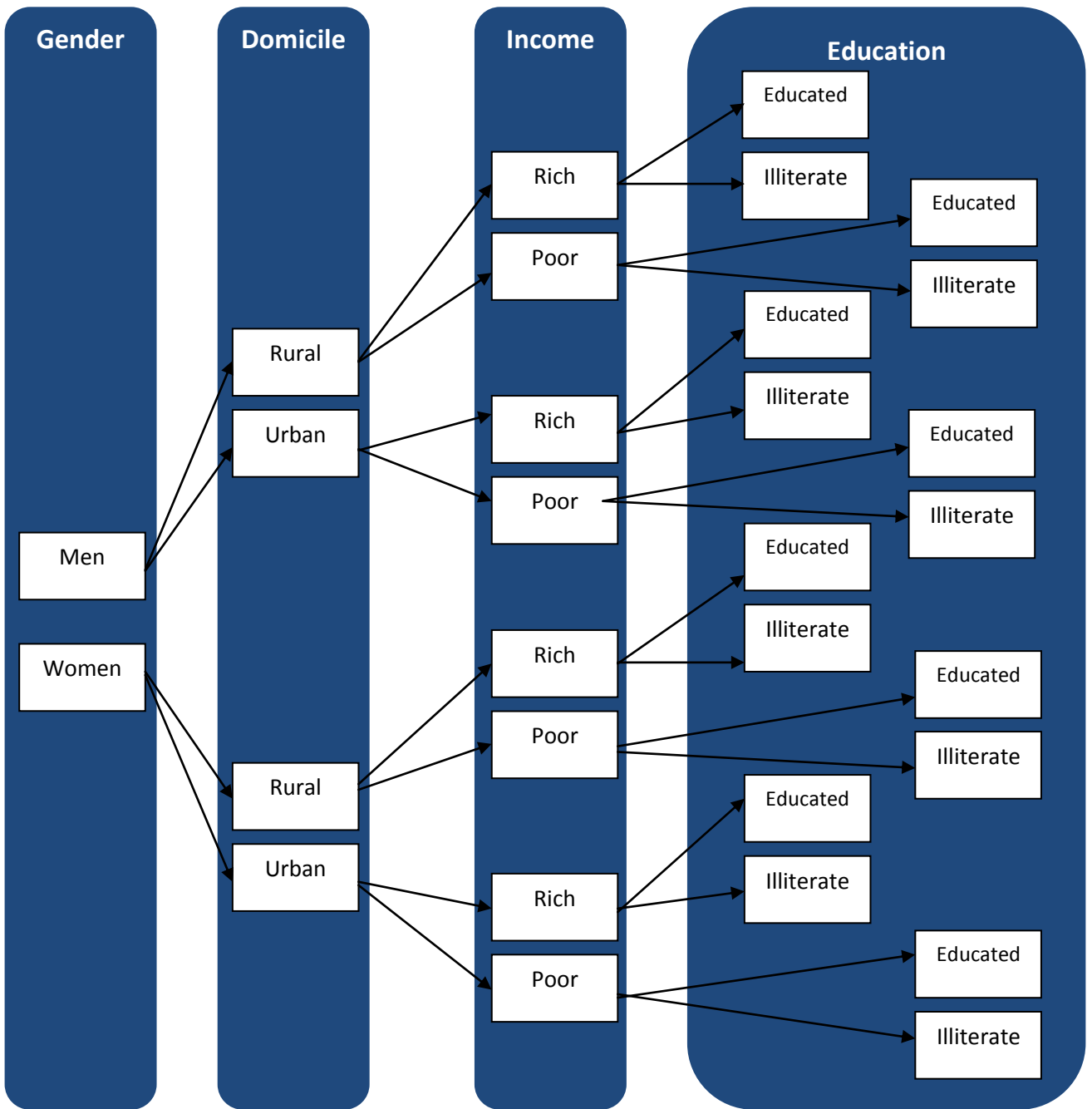


Figure 10: Selection of Ordinary Citizens for Narrative Interviews. A total of 35 interviews were conducted

As mentioned earlier, the focus of this effort was a purposeful selection of research participants in order to gain an in-depth understanding of the collective subjective of people who belonged to various groups such as how men view the role of technology in their lives, or the views of all women on this subject. Table 12 showed how a total of 35 research participants had different contextual background, i.e., 26 men and 9 women, 19 rural and 16 urban, 17 rich and 18 poor, 19 illiterate and 16 highly educated participants.

Citizens	Contextual Background of Citizens					# of Participants
Total of 35 citizens selected. The context of participants' interviews was particularly considered. The selection criteria included consideration for gender, domicile, income and education.	<i>Gender</i>		<i>Income</i>			35
	Men	Women	High	Medium	Low	
	26	9	4	13	18	
	<i>Domicile</i>		<i>Education</i>			
	Rural	Urban	High	Medium	Low	
	19	16	7	12	16	

Table 12: Selection of Citizens

6.2.2 Selection of Officials Making/Influencing Government's ICT Policies

Different stakeholders from several stakeholder bodies participated in this study. These stakeholder bodies included government agencies, private sector businesses, non-governmental organization, non-profit institutions and civil society organizations. The national economy revolves around the business activity in three

major business hubs in the country, i.e., Karachi, Lahore and Islamabad. Most ICT companies such as telecommunication service providers, electronic news media outlets, and software development houses are clustered in these cities. Since these cities are also political centers in Pakistan (Islamabad is the federal capital, Lahore is the provincial capital of Punjab province and Karachi is the provincial capital of Sindh province), most government agencies are also setup in these cities. It is therefore possible to have access to stakeholders of the ICT sector in these cities.

Additionally, Information communication technologies infrastructure and the regulation of ICT industry is under the jurisdiction of the federal government. Therefore most ICT related policies and decisions are made in the federal capital, i.e., Islamabad. The government officials with the authority to formulate national ICT policies are primarily located in the federal capital. Therefore, research participants from the following stakeholder groups were selected from Islamabad and Lahore: policy makers and enforcers, service providers, hardware/software industry, electronic and print media, law enforcement and educational institutions.

Provincial (state) governments play a limited role in ICT growth. The ICT departments in provinces have the responsibility of providing computer use training to government employees and developing ICT systems that help in government processes. In order to understand the point of view from grass roots level, a district ICT director was interviewed. Additionally officers from local law enforcement agency, Punjab Police, were interviewed within the context of a particular robbery

case where ICT were used to apprehend and prosecute criminals. A relevant case study is given in chapter 9.

A total of 54 interviews were done with different stakeholders that lasted for 45 minutes to two hours. These interviews were conducted in three phases between December 2006 and January 2009. Table 11 provided the details of these phases and number of interviews in each phase. Table 13 provides further details of different stakeholder bodies and number of interviews from each type of stakeholder.

Stakeholder Type	Stakeholder Bodies	Interviews
Policy Makers and Enforcers		14
	Ministry of IT and Telecom	1
	Ministry of Science and Technology	1
	Pakistan Telecommunication Authority	2
	Government Adviser and Consultant	1
	Pakistan Software Export Board	1
	Pakistan Electronic Media Regulatory Authority	1
	Pakistan Frequency Allocation Board	1
	Election Commission of Pakistan	3
	National Database and Registration Authority	3
	District ICT Director – District Vehari (Punjab)	1
Law Enforcement		12
	Federal Investigation Authority	1
	Federal Investigation Authority (Cyber Crimes Unit)	1
	Punjab Police	1
	Islamabad Police	2
	Islamabad Traffic Police	3
	Islamabad Rescue 15 Police	2
	Islamabad Police ICT Services Development Unit	2
Service Providers		8
	Backbone connectivity provider (PTCL)	1
	Broadband Service Provider	1
	Narrowband Service Provider	1
	Cable Provider (for triple play services i.e. TV, voice, data)	1
	Cell Phone Service Provider	3

Hardware/Software Industry		10
	Hardware Provider	1
	Software Developers	6
	Infrastructure Developer	3
Electronic and Print Media		3
	Online News Services	1
	TV	1
	Radio	1
Educational Institutions		4
	Distance Learning Institutions	2
	Traditional Institutions	2
Activists and NGOs		3
	Activists from Civil Society	1
	National Level Politician	1
	Non Governmental Organizations	1
Total		54

Table 13: Research Participants Selection

6.3 Data Collection and Organization

The interviews were done in four languages: English, Urdu, Punjabi and Siraiki. In most cases the interviews were videotaped on a DV (digital video) tape using a Sony PD-170 camera mounted on a tripod. Two research participants allowed the use of audio recorder only and one did not allow any recording. These interviews were transferred (digitized) from DV tapes to computer hard drive using a video capturing and editing software i.e., Adobe Premiere 7.0. This transfer was generally done within 24 hours of the interviews. During digitization of the interview files, detailed notes and reflections were written down. The audio recorder recorded interviews in .wav format which were easy to transfer to a computer. These videos and audios were imported in NVivo 8.0 software package. NVivo 8.0 has the ability to embed identified codes and categories

directly on the video file using a process called time-stamping. This eliminated the need to transcribe interviews. Additionally, it preserved contextual richness of the original interview language, interviewing environment and participants' body language, which are not assured in an interview transcript. Selective translations (where the interview was not in English) were made for use of direct quotes in this paper. In a few cases, where participants did not want video and/or audio recording, detailed notes were taken during the interview and extensive reflections and observations were recorded immediately after the interviews.

Citizens were selected from Islamabad and Multan regions. Both cities have large urban population and are surrounded by several rural and underdeveloped towns and villages. Most of the larger towns around these cities have basic ICT infrastructure laid down but several rural areas still lack access to basic ICT. The ICT infrastructure disparities within close proximities made these sites ideal for this research. These disparities ensured widest possible responses in how citizens use ICT for their socio-economic development.

Officials making/influencing government's ICT policies were selected from Islamabad and Lahore. Figure 11 shows the research sites in Pakistan.

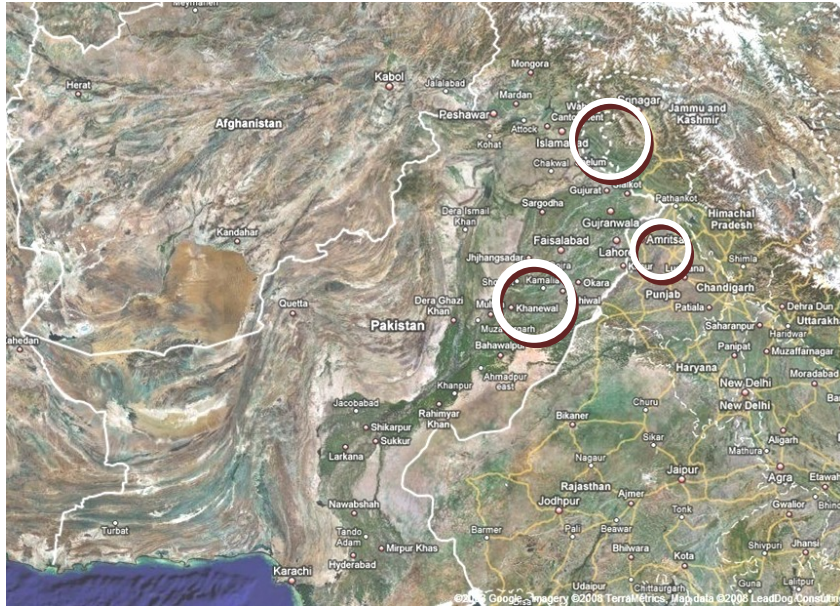


Figure 11: Research Sites

6.4 Timeline

The following time provides sequence of major events in this study:

Idea development and lit review	Fall 2006
Pilot Study	December 2006 – June 2007
Further idea refinement	Spring-Fall 2007, Spring 2008
Second phase of Data Collection	April 2008 – May 2008
Dissertation Proposal Defense	October 2008
Final Data Collection	December 2008 to January 2009
Data Analysis	January 2009 to May 2009
Dissertation Defense	June 19, 2009

CHAPTER VII

HISTORICAL REVIEW OF ICT GROWTH IN PAKISTAN

This chapter presents a historic review of ICT growth in Pakistan. The historical evolution of ICT growth started in areas that are now part of Pakistan when the first telegraph and voice infrastructures were installed in 1850s. The historical developments that have played an important role in ICT growth are divided into five distinct eras along with corresponding justifications for doing so.

It is important to evaluate documented evidence of the historical evolution of ICT in Pakistan in order to develop a holistic picture of what transpired to cause ICT growth. The historical overview of ICT growth is also helpful in understanding and developing the relationship between ICT growth and socio-economic development (which is addressed in Chapter 9). Even though National ICT policy and action plan adopted in 2000 by the Government of Pakistan set the scene for the extraordinary growth in the ICT sector, a number of factors such as national telecommunication reorganization act of 1993 defined the future ICT industry. A great body of government documents, action plans, evaluations and public comments have refined the evolution of ICT in the country. In order to develop an in-depth understanding of this evolution, these documents, policies, and plans were examined carefully to develop a grounded theory based model. This model is presented at the end of this chapter. Even though the

analysis in this chapter emerges from the review of ICT policies and action plans, appropriate quotes from interviews with research participants are used. The use of interviews in order to understand historical development of ICT in the country enriches the contextual discussion and historical background that are not already documented elsewhere.

7.1 History of ICT Growth in Pakistan

Since the experimental telegraph lines in 1850 in British India, ICT growth has gone through periods of development. The historical evidence for ICT growth in parts of British India that are now part of Pakistan is somewhat documented as part of pre-independence of ICT in India. Historical records of ICT growth since the 1990s are also available in fragments from different stakeholders of the ICT industry such as the computer society of Pakistan, internet service providers association (www.ispak.org.pk) and government bodies (including Ministry of Science and Technology and Ministry of IT and Telecom). There is a growing body of documented history of ICT growth since the late 1990s. However, records of ICT growth right after the independence in 1947 until 1989 are mostly available in the form of history of technology in general. Based upon the careful examination of historic records, the evolution of ICT in Pakistan is categorized into five distinct eras, i.e., 1850-1946 pre-independence era, 1947-1987 early era, 1988-1999 transition era, 2000-2003 policy development era and post 2003 post-monopoly era. The justification for identifying each era is given along with salient

features in the following sections. Figure 12 provides an overview of these eras and corresponding important milestones.

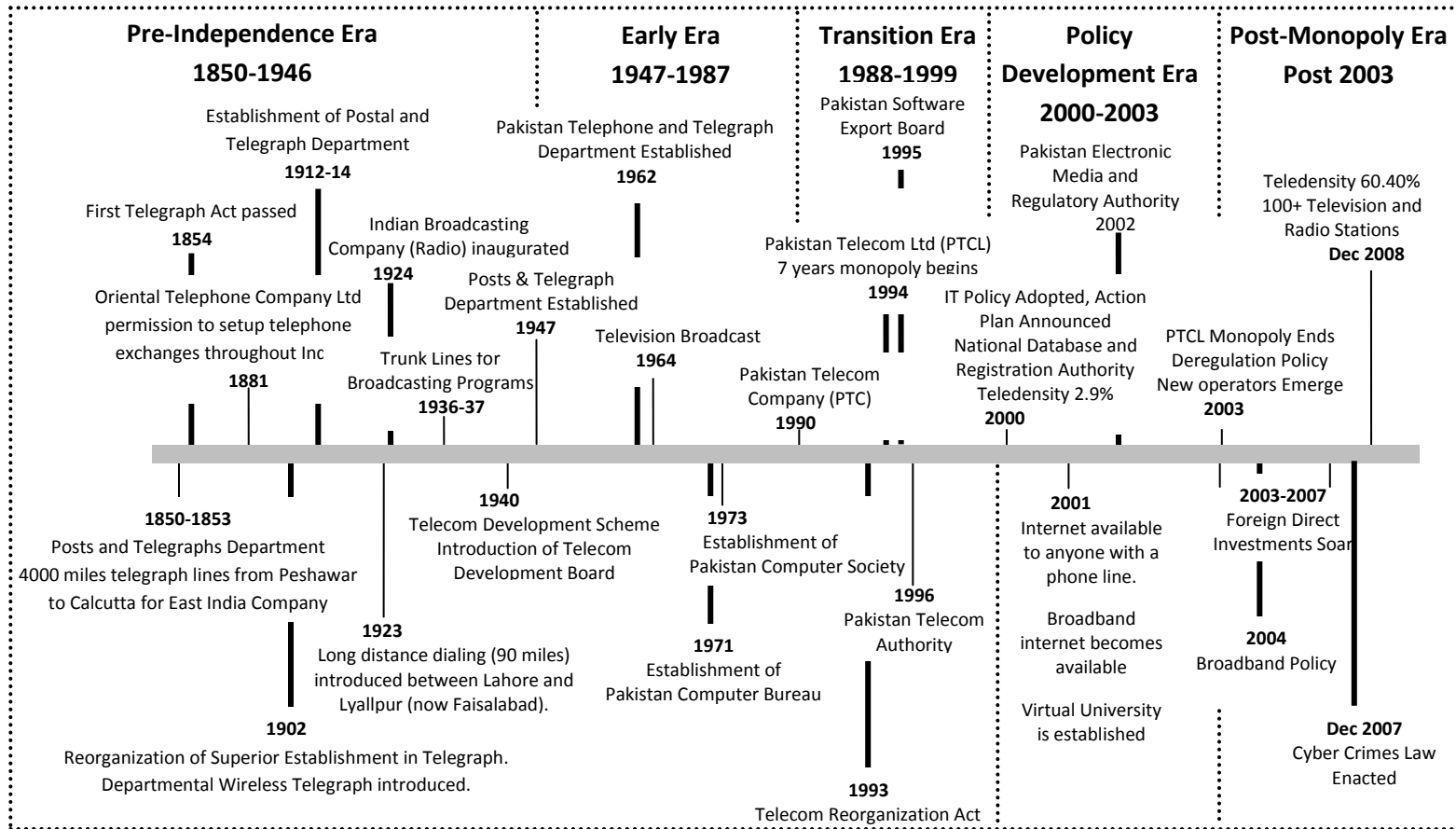


Figure 12: Evolution of Information Communication Technologies in Pakistan

7.1.1 Pre-Independence Era (1850-1946)

The Political Environment

The *East India Company* gained control of most of the areas that are now part of India and Pakistan by 1757. The colonial powers maintained some of the local rulers such as Bahadur Shah Zafar who served as a ceremonial head of the Mughal Empire until 1857. However, the control of the government for trade and tax collection remained in the hands of British agents. The development of a faster communication means was important for the British to keep the entire nation in check. The importance of a telecommunication system became apparent in the first independence war of 1857. As soon as the British intelligence got the news of the “mutiny”, it managed to gather its forces from the neighboring areas and curb the independence war with an iron fist. It was when a British official claimed “the telegraph saved India [for the British]”. India became part of British Empire according to the British parliament’s *Government of India Act 1858*. The distrust of British rulers gave birth to the concept of self-reliance which prevailed in the areas of social, cultural and technological development until after independence from the British in 1947.

Analysis of ICT Growth

The history of ICT in Pakistan starts with the introduction of Telegraph in British India in 1850 (BSNL, 2008). The experimental telegraph line between Calcutta and Diamond Harbor completed for East India Company's use. This experimental line soon linked Agra, Bombay, Varansai (in India) and Lahore (in Pakistan). The success of this experimental line immediately prompted the construction of about 4000 miles of telegraph lines that connected Peshawar (now capital of the North-Western region of Pakistan) to Calcutta via Agra, Bombay, Madras and Bangalore (now parts of India) in 1853. British Parliament's Act XXXIV of 1854 (also known as Telegraph Act of 1954) allowed public telegram service (Markovits, 2005). Even though it was a very expensive service (1 rupee to transmit sixteen words over 400 miles), political value of this communication technology became apparent during the freedom war of 1857-58 when agents of East India Company throughout India were immediately notified of the possible "disturbances" (Metcalf, 1991). By 1861, Telegraph lines were stretched for more than 11,000 miles across India including major cities across what is now Pakistan. Oriental Telephone Company was licensed in 1881 for establishing telephone infrastructure in India. In 1923, a direct dialing system was introduced between Lahore and Lyallpur (now called Faisalabad) that are about 90 miles apart. Radio was first introduced by a private British company called Indian Broadcasting Company. Soon after, Government of India took over the

Radio Broadcasting and by 1936-37, telephone trunk lines were used for broadcast transmission. India was connected to international telephone lines between Britain and India around 1933. In 1940, a telecommunication development board was established and a telecommunication development scheme was introduced which aimed at increasing telephone ownership for public.

Salient Features of this Era

The ICT growth in this era was dominated by the British aspiration to hold political and administrative control of India and protect its interests in the Indian sub-continent and the Far East. The growth in the information communication technologies allowed colonial powers to establish monopolies of telegraph, telephone and radio as a source of economic power as well as curb political opposition from the local politicians. Since the advanced electronic ICT at the time were controlled by the British rulers, local politicians and political activities relied mainly on printed information in the form of newspaper. Limited educational opportunities for Indians in British Universities such as Oxford and Cambridge helped produce politicians and scientists who were able to challenge the British supremacy in 1930s and 1940s until India and Pakistan emerged two independent countries in 1947.

7.1.2 The Early Era (1947-1987)

The Political Environment

The political environment was uncertain soon after independence from the British. The death of the first Governor General of Pakistan, Muhammad Ali Jinnah, and assassination of the first Prime Minister, Liaqat Ali Khan, created an environment where political uncertainty loomed. The *Government of India Act 1935* of the British Parliament served as constitution of the state until 1956 when first constitution was passed. The laws governing the ICT sector in pre-independence remained in effect with minimal changes. The constitution was abrogated in 1958 when General Ayub Khan took over the government and role of Military in Pakistani politics started. The passage of the 1962 constitution, 1965 war with India, imposition of second martial law in 1969, aftermath of 1970's general elections, war with India and 1971 and separation of East Pakistan, passage of 1973 constitution, third martial law in 1977 are some of the historic events that added to the political instability. The political instability curbed ICT growth and aimed government's ICT policies and resources at using them as propaganda tools of the rulers. The wars and tensions with India also added to putting checks and control over the use and import of ICT devices for their possible use in espionage efforts.

Analysis of ICT Growth

Pakistan gained independence from British rule in 1947. At the time of independence, there were two ICT related applicable laws i.e., the telegraph act of 1885 and the wireless telegraphy act of 1933. These laws were extended and adopted by the Government of Pakistan and “Posts and Telegraph Department” was established in 1947. The 1885 act gave primary governing powers for telegraph and telecommunication services to the government. The government of Pakistan therefore maintained and ran ICT infrastructure in Pakistan. As a result of 1962 amendment of Posts and Telegraph Act, Pakistan Telephone & Telegraph Department was established in 1962 (Sheikh, 2006).

Radio communication and broadcast was also controlled by the Government of Pakistan just as it was done in the British era. Pakistan Television started broadcasting in 1964 as a result of an agreement between Government of Pakistan and Nippon Electric Company of Japan. Initially a private organization, Television Promoters Company, owned the infrastructure but was taken over by the Government of Pakistan in 1967 as a public limited company (PTV, 2008). It is important to mention the use of radio for the “green revolution” in the 1960s. The import of the new variety of wheat, Maxi-Pak 65, and the use of radio to run informational programs on how to harvest the new breeds resulted in 40% increase in wheat yield. Historians have attributed the successful adoption of the new varieties of crops by Pakistani farmers to the radio and TV programs.

The financial institutions and large businesses in the country realized the need for using computers. The banking industry was the first one to import IBM computers followed by Military and other large government organizations. Pakistan Computer Bureau was established in 1971 by the government to facilitate introduction of computers in the country. Even though like telecommunication and broadcasting departments, the bureau has survived political unrests of the 1970s through 2000s, its role is now limited to computer related training services.

Pakistan telephone and telegraph department evolved into Pakistan Telecommunication Corporation (PTC) in 1990 under because of the adaptations of telecommunication laws during mid 1980s. While the ICT sector observed some development during this era, an important feature of this era was government control of the telecommunication and broadcasting infrastructure. During the military regime of the 1980s, ICT were scrutinized to the extent that it was illegal to have a fax machine or import “*unapproved*” telephone sets. In the private sector, a notable effort was the formation of Pakistan Computer Society in 1973 with the aim to provide a platform to computer professionals and assist government in policy formulation efforts. The role of this society was not very visible until late 1990s, just before the policy development era started.

From an objective and critical point of view, ICT services were limited both in terms of citizens’ access as well as utility. It was not uncommon to wait

for at least 10 years for telephone connection to become available. During interviews with a citizen who witnessed the situation narrated the following story:

I was a young boy in 1985 when a phone was installed in our home. My family was the first to have a telephone in our locality. We filed an application for this phone about 10 years ago. Our family became the sweetheart of the whole neighborhood. Family members of our neighbors would call their relatives from other cities and countries on our phone. Now everyone has a phone and everyone loves it that they are in touch with the family members in other cities and countries all the time.

Salient Features of this Era

The 1960s saw a positive use of ICT for development as is evident by the use of radio and television for the “green revolution”. However, political instability and wars with India had distasteful implications for ICT growth in the country. Some area of science and technology saw limited development such as nuclear technology development but overall ICT growth remained limited. The introduction of computers in military and financial institutions grew. The continuous military involvement in Pakistani politics and fear of ICT use for espionage resulted in limited and controlled growth of ICT for defense and propaganda purposes.

7.1.3 The Transition Era (1988-1999)

The Political Environment

The political environment of 1990s was eventful with frequent changes in civilian governments. The office of Prime Minister was held by six politicians in the following order:

- 1- Benazir Bhutto (December 1988 - August 1990)
- 2- Ghulam Mustafa Jatoi (August 1990 - November 1990)
- 3- Nawaz Sharif (November 1990 - April 1993)
- 4- Balakh Sher Mazari (April 1993 - May 1993)
- 5- Nawaz Sharif (May 1993 - July 1993)
- 6- Moeenuddin Ahmad Qureshi (July 1993 - October 1993)
- 7- Benazir Bhutto (October 1993 - November 1996)
- 8- Malik Meraj Khalid (November 1996 - February 1997)
- 9- Nawaz Sharif (February 1997 - October 1999)

Even though this era of civilian political instability ended with a military coup in 1999, several developments were made on the legislative front. Constitutional amendments and new bills were presented, debated and passed in the parliament. Discussion of the need for changes in government's ICT policy led to the passage of telecommunication reorganization acts and laws.

Analysis of ICT Growth

The era of ICT sector growth and liberalization started in the late 1980s after civilian government was restored in 1988. While there was no written “ICT Policy”, the Telecommunication Act 1991 became the genesis for competitive ICT in the country. It encouraged private sector participation and resulted in award of more licenses for cellular telephony, card-operated payphones, paging, and data communication services. In 1991, the government announced that it plans to privatize PTC. Even though the 1991 telecommunication act did not create a regulator, PTC became a de-facto regulator with responsibilities for ICT development, research, quality improvement, advising government, tariff determination and maintaining liaison with foreign governments (Sheikh, 2006). The 1994 Pakistan Telecommunication (Reorganization) Ordinance formed the basis for PTC monopoly over basic telephony for seven years. In 1996, Pakistan Telecommunication Company Limited (PTCL) was formed and listed on all stock exchanges. While there were many telecommunication services providers in the market; due to PTCL monopoly, cost of services for operators other than PTCL remained high. The 1994 ordinance established the primary regulatory framework including the establishment of a regulatory authority. Thereafter, Telecommunication (Re-Organization) Act number XVII was promulgated in 1996 aimed to reorganize the telecom sector. Under Telecom Reorganization Act of 1996, Pakistan Telecommunication Authority (PTA) was established in 1997 to

regulate the establishment, operation and maintenance of telecommunication systems, and the provision of telecom services.

At the same time, other sectors of ICT were going through drastic changes. Private radio channels started broadcasting and a TV operator, Sadar International, was allowed to broadcast TV signals in Pakistan. E-mail service became available in 1993 as part of United Nations Development Program (UNDP) for Sustainable Development Networking Program (SDNPK) in Islamabad. Later on, the service was expanded to include users from Karachi, Lahore Peshawar. By 1995, dial-up internet was available in large cities and PC market started to flourish. "Computer Science" and software development became well known concepts. In 1995, Government of Pakistan established Pakistan Software Export Board to facilitate the growth of emerging software industry in the country. High demand of IT professionals and programmers in the US during late 1990s fueled the need to produce more IT and computer science graduates. Software development houses and other private organizations of ICT professionals started emerging in the private sector.

However, even with these actions, in 1998 there were less than 10,000 internet users and teledensity stood at 2.3% (PTA, 2008). The growing awareness, geo-political situation, social development and fall in the prices of ICT devices and services such as cellular phones, computers, internet tariff, calling rates created an environment for organized planning for the ICT sector.

Salient Features of this Era

Despite political instability, the constitutional and legal support paved the way for the future ICT growth. The telecommunication reorganization act, promise to end monopoly in the ICT infrastructure and encouragement of the private sector to invest in ICT are some of the major steps taken in this era. The economic potential of ICT sector growth in the area of software export was an important realization. This era of ICT growth was dominated by the Indian experience of software development and provider of programmers to United States and the Europe to combat Y2K problem. The economic development policies in Pakistan during Nawaz Sharif's 1991 and 1997 and Benazir Bhutto's 1993 terms as Prime Ministers were pivotal in bringing about much needed change in the ICT sector. This situation provided the much needed critical mass for the ICT growth to not only continue but also thrive in the years to come. The establishment of Pakistan Telecommunication Authority, Pakistan Software Export Board, National Data Organization (NDO) and other institutions provided a basis for the process of ICT growth to continue.

7.1.4 The Policy Development Era (2000-2003)

The Political Environment

After the military coup in October 1999 which ended civilian governments, this era can be regarded an era of relative stability with a military

dictator, Pervez Musharraf, running the country as the *chief executive officer* of Pakistan. He appointed himself as the President of Pakistan after a controversial referendum in June 2001 and remained in the office until August 2008. Several steps were taken during this era that led to increase in foreign direct investment and opening of the ICT market for new businesses and entrepreneurs. The conversion of National Data Organization (NDO) into National Database and Registration Authority and takeover of ICT policy development task by the Ministry of Science and Technology were important decisions that set the scene for specific ICT policies for information technology, software exports, telecommunications, broadband access, mobile cellular phones and cyber laws. In the post-911 (September 9, 2001 attacks on the World Trade Center) situation, mounting pressure on Pakistani government to support the United States' war in Afghanistan and increase in international funding for use of technology in governance further helped ICT growth in the country.

Analysis of ICT Growth

By the end of the millennium, politicians, bureaucrats, technocrats and ICT professionals realized that Pakistan had already lost opportunities to become part of the thriving ICT world. Pakistan did not make any effort to acquire a link to the international submarine fiber optic cable and did not acquire any communication satellite. Pakistan had to act fast; if it did not, the last space for a satellite in the geostationary orbit will be lost forever and the cost to lay a fiber

optic link to international backbone was growing astronomically. These setbacks haunt Pakistan's ICT industry even today and it still lacks access to vast international bandwidth that other countries in the region such as India and China enjoy. These factors contributed to the mounting need for a national "ICT Policy".

The National Data Organization (NDO) was created with the aim of developing a national database of citizens (later on the name of this organization was changed to National Database and Registration Authority - NADRA). NDO's year long work on ICT policy formulation was taken over by the Ministry of Science and Technology in early 2000. The policy formulation process involved interaction with 300 IT professionals within Pakistan and abroad including members of Pakistan Computer Society, IT Commission, representatives from software development companies and academicians. A strategic advisory board was established in US headed by two Pakistanis (one was President at Sun Microsystems – a Pakistani by descent). A special advisor from the minister of science and technology was appointed to the board. This group came up with two main documents: IT Policy, and the Action Plan. The policy was made available to public for comments and finally approved by the federal cabinet. The policy touched upon all major areas that impacted the development and deployment of ICT infrastructure: from the development of ICT human resource to deregulation and liberalization of ICT infrastructure. The roles of Ministry of

Science and Technology and Pakistan Telecommunication Authority were important catalysts for ICT revolution in a matter of few years. Additionally, the access to the undersea fiber optic cable, policy change in cellular billing regime, establishment of the Virtual University of Pakistan (now with about 50,000 students all over Pakistan; has four satellite TV channels and uses internet for communication between teachers and students), use of more ICT resources at Allama Iqbal Open University (with about 800,000 students) and the launch of a communication satellite 'PakSat I' were important steps forward. A research participant explained:

Two or three major decisions taken by the government have impacted the ICT growth. The first one was the calling party pays (CPP) regime in cellular communication. That substantially lowered the cost of a telephone call, and suddenly people became empowered. More cellular companies came to Pakistan, and the biggest benefit was to the consumer because of the competition.... second, the government put in place PakSat I, which is Pakistan's first telecommunications satellite.... With that satellite in place, it became possible to start using ICTs for education, and for the dissemination of information.

Salient Features of this Era

This short era of policy development went through a number of advancements. These policies were essential in attracting direct foreign investment, ICT service providers, and telecommunication operators to setup

businesses in Pakistan. The upcoming end of PTCL's monopoly of the basic ICT infrastructure and access to a market with 160 million possible ICT customers meant an era of notable ICT growth was in the making. The success of the IT Policy of 2000 provided the government officials with a great deal of experience in ensuring continuity of policies to attract investment.

7.1.5 The Post-Monopoly Era (Post 2003)

The Political Environment

The political environment stabilized after the 2002 general elections. The appointment of retired military officers (or people with close ties to Pervez Musharraf) in several government agencies such as Pakistan Telecommunication Authority, National Database and Registration Authority, provided political support for the ICT growth. The stability in the political situation started to deteriorate in March 2007 as Pervez Musharraf attempted to remove Chief Justice Iftikhar Muhammad Chaudhry and restrict electronic media's coverage of rallies against Musharraf. The results of February 2008 general elections, the lawyers' movement, rising political backlash against Musharraf's dictatorship and the electronic media's opposition finally succeeded in August 2008 when he resigned. The stability since the 2002 general election wore out and the government was handed over to a weak civilian leadership. The rise in

insurgencies as a result of militants from Afghanistan has resulted in the Pakistan military engaged in fighting militancy in the tribal and northern areas of Pakistan.

Analysis of ICT Growth

After the national ICT policy was adopted in 2000, telecommunication monopolies headed towards an imminent end. Services and infrastructure providers faced bigger challenges and greater competition. A post-monopoly era with deregulation of ICT started in January 2003 when the constitutionally protected monopoly of PTCL ended. The government offered a comprehensive liberalization policy for the telecom sector. Foreign investments rose from nothing to thousands of millions of dollars in a matter of months. Teledensity grew from 2.8% to 60% by the end of 2008. Internet and cell phone users increased in numbers without precedence in any other industry. Prices for services and products went down dramatically and ICT saw a real boom where half the population cannot read or write. One research participant said:

Everybody has a cell phone in their pocket, from the street vendor, to the pushcart vendor.

Another research participant said:

Readily available mobile phone in schools, headmasters, headmistress, teachers and students are making it possible for the young learners to interact with teachers.

The use of ICTs in areas such as the legal system, land record management, remote health services, farmers' support, law and order, and national identity management are now a reality. Many systems are already fully functional and many are underway. One participant commented:

Pakistan is going through, what I call, a silent revolution, both in terms of quantitative expansion and qualitative improvements of education and our social infrastructure.

There is a huge population that is still not connected and does not have access to ICTs due to lack of financial resources, education and foremost telecommunication infrastructure. Two interviewees emphasized the need for infrastructure development and bringing ICTs costs down further:

We need to bring the cost of bandwidth down... We need to expand our fiber networks still further because there are large areas of the country that do not have access to this kind of technology...

The 2005 earthquake in Pakistan which severely jolted the northern areas and the capital showcased the importance of ICT. Cellular phones were the only viable way to get in touch with family members during and after this disaster. Apart from the role of electronic media for fund raising and helping those impacted by this tragedy, volunteers (IT and computer science students) from various universities helped put together online registries to report and find lost relatives. The use of ICT such as internet became even more important and visible when volunteer doctors in Europe and US provided treatments to affected people with the help of on-ground volunteer staff for x-rays and administration of medical help. Some of these telemedicine centers are still in operation and a large number of people in the rural areas benefit from the available services.

While instability has taken over the political landscape in Pakistan once again since March 2007, the investments in the ICT sector continue. The ICT service providers are continuously expanding their network coverage and new services are being rolled out.

Salient Features of this Era

This era started with an environment of relative political stability in 2004. The deregulation and liberalization of the telecommunication and ICT sector has resulted in opening up of the market which attracted several major international ICT service providers to invest and benefit from the large consumer base of 160

million people in Pakistan. Even though political instability has taken over, the experiences gained during the several years are valuable for government officials in insulating the ICT industry from the harm that instability might bring in for ICT growth. The growth rate as reported by the industry representatives and Pakistan Telecommunication Authority show positive progress in the ICT sector.

7.2 Lessons Learned from Historical Review of ICT Growth

This part of the chapter looked at the historical review of ICT growth in Pakistan. This review covers a span of about 160 years of ICT growth since the British rule. It identifies that even after the successful use of ICT in bringing about “green revolution” in the agriculture sector of Pakistan, the lack of focus on ICT policies created a restrictive environment for ICT growth. The political instability allowed for the creation of an environment where ICT were mainly used for propaganda and hide embarrassing news for politicians and government officials. The restrictive situation for ICT growth was worsened by the suspicion after two wars with India in 1965 and 1971 that ICT will be used as tools for creating chaos and wage espionage operations. The military dictators controlled ICT to monitor and curb opposition activities.

However, the realization of change in the ICT sector paved the way for ICT growth after 1988. The telecommunication reorganization act, end of monopoly in the basic ICT infrastructure and realization of government’s role as a regulator created political support for a business friendly environment. Even though political instability remained a big challenge, focus in policies created a critical mass so that momentum of

ICT growth continued (in the form of IT policy of 2000 and subsequent government policies that encouraged investments in the ICT sector).

The government officials learned from the success of IT policy in attracting foreign direct investment. The role of formal policies in ensuring continued political support was realized which has proved successful even during the political turmoil and deteriorating law and order situation since March 2007. Since policies are a way of planned development, questions arise about their importance. The following chapters further examine these policies and their role in ICT growth and bringing about ICT socio-economic in the lives of citizens through planned development.

CHAPTER VIII

ANALYSIS AND EVALUATION OF THE NATIONAL ICT POLICY AND ACTION PLAN

This chapter takes a closer look at the recent ICT growth in the light of national IT policy and ICT action plan. The depth of this review is useful in evaluating the success and failure of ICT policies. The analysis of ICT policy and action plans is done in conjunction with related policies that affect ICT growth (for example, Import Policy and Tariff Policy). The evaluation of the policy development is done by proposing extensions to the theoretical framework of “design-actuality gaps¹” and evaluating the extensions against data collected citizens’ interviews. The analysis benefits from interviews with officials making and influencing ICT policies. The understanding of their point of view helped in evaluating the success and failure of these policies. The chapter also presents a discussion of the causes of gaps between policy design and its impact on citizens’ actuality.

8.1 Introduction to the ICT Policy and Action Plan of 2000

¹ Heeks (2002) developed design-actuality gaps framework based upon contingency theory. The framework suggests that there are gaps among dimensions of system design and user actuality. The framework has been used to identify gaps in different research settings. We use this framework to identify gaps between government policy design and citizens’ actuality.

The ICT policy and action plan was adopted by the government of Pakistan in late 2000. The national ICT policy provided a framework for ICT growth in the country. The evolution of the policy is full of triumphs and failures. However before the critical review of the evolution it is appropriate to understand both the policy and the action plan. The vision of the policy is stated in the document as follows:

The vision of the policy is to harness the potential of Information Technology as a key contributor to development of Pakistan and the broad-based involvement of the key stakeholders is a must for its sustainable development.

The document consistently refers to the use of ICT for the social and economic development of various segments of society, particularly the poor and rural residents. The following quote from the policy document indicates the importance of this document and the vision of government as it regards to exploiting information technology for socio-economic development:

The wealth of a nation is not judged by its physical assets. It is determined by the technological gaps between the 'haves' and 'have-nots'. No leap frogging of the type witnessed in Southeast Asia is possible without increasing technological sophistication being built into the production structure. Information Technology today drives the technological and economic advancement of the developed as well as emerging economies. The Government is fully aware of IT being the driving force in the new millennium. A number of initiatives have accordingly been taken in the recent past to provide a sharper

and clearer focus to the IT sector. The present initiative of launching IT Policy and Action Plan by the Ministry of Science and Technology (MoST) has revived serious interest in developing the IT industry in Pakistan. Impressed by the commitment, sincerity and responsiveness of present Government towards the sector, stakeholders in Pakistan and abroad have responded enthusiastically to helping Government implement a proper and adequate package of reforms and incentives geared toward achieving accelerated growth in the IT industry.

The ICT policy and action plan set the following policy goals for the government of Pakistan:

- Government as a facilitator and enabler in providing maximum opportunities to private sector
- Developing extensive pool of trained IT human resources to meet local and export needs
- Incentives for local and foreign investors
- Developing enabling legislation and regulatory framework
- Revitalizing and supporting dormant manufacturing sector and research and development potential
- Providing efficient and cost effective infrastructure for access to national and international networks and markets
- Setting up reliable, secure, up-to-date and easily accessible national databases
- Increasing use of IT applications in government

- Increasing use of IT applications and internet in trade, industry, home, agriculture, education and health.
- Encouraging quality software development for export
- Developing e-commerce infrastructure for national and international transactions
- Encouraging expatriate Pakistanis to return or help IT industry from abroad

The IT policy and action plans 2000 alone consisted of 227 pages. The following analysis and evaluation is based upon an exhaustive review of the IT policy of 2000, the associated action plans, telecom deregulation policy, mobile cellular policy, broadband policy, tariff policy, import duty policy, electronic transactions ordinance, and cyber laws ordinance (we refer to the set of these policies as ICT Policies). A semi-structured protocol was used to review these policies and documents. The grounded theory method was used to identify codes and categories from these documents and develop a theoretical foundation for this discussion. Qualitative data from interviews with citizens and officials making and influencing government's ICT policies is also used to further enhance and enrich the analysis.

The ICT policy documents were read and coded manually with notes and reflections written down on the margins of the pages. The codes were later entered in NVivo 8.0 for organization. The results of the initial open coding are given in Table 14.

E-Government	Legal Framework
IT in Government	Telecom convergence/deregulation
Government Databases	Recognition of electronic records
Standards Development	Digital signatures
Data Sharing among agencies	Cyber laws
Fiscal Incentives	Intellectual property rights
Fiscal issues	Industry Development
Incentivizing IT investments	IT market development
Venture capital	Software industry development
Microcredit	Hardware industry development
HR Development	Software Exports
Training Programs	IT Use
Foreign Faculty Hiring	Internet use growth
Scholarships and non-binding loans	E-Commerce
National accreditation and testing services	
Online libraries	

Table 14: Results from initial open coding of ICT policy, action plan and related government documents

8.2 Design-Actuality Gaps Framework

The design-actuality framework has traditionally been used in understanding success, failure and local improvisations of information systems in developing countries (Pozzebon and Heck, 2006; Gerhan and Mutula, 2007, Best and Kumar, 2008). This framework has also been used to explain success and failure of specific government projects (Gichoya, Hepworth, and Dawson, 2006). This chapter proposes extensions to the *design-actuality gaps* (Heeks, 2002) framework and evaluates/analyzes gaps between government policy design and actual outcomes of the implementation of these policies within the context of this research.

The role of government policies for ICT growth is well recognized. According to the United Nations:

Government policies that encourage competition and innovation can play a major part in helping developing and transition economies establish and expand information and communication technology networks. (UNCTAD, 2009)

About 44% of developing countries have already adopted national plans for the growth of ICT sector and another 20% are in the process of developing such plans (Information Economy Report, 2007). However, developing plans alone is not enough; the evaluation of the success and failure of these policies is vital for a meaningful impact on ICT growth in a country. The literature on national ICT policies in developing countries addresses successes and failures of national ICT policies in several countries (Olsson, 2006; Samarajiva and Zainuddin, 2008; Gao & Rafiq, 2009). However, categorization of ICT policies into successes and failures without critical theoretical grounding runs into problems of evaluation subjectivity: a failure for one person could be success for another, and evaluation timing: today's success might be tomorrow's failure (Heeks, 2002).

The contingency theory holds that there is no single best method of organizing or leading change (Fiedler, 1964). It assumes that there are internal and external factors that determine the best course of action in a given situation – contingencies. The idea of

contingency is closely related to the idea of fit, congruence or match/mismatch between these factors (Lorsch & Morse, 1974; Sillince, 2005). Heeks (2002) notion of design-actuality gaps refers to “*an assessment of the match or mismatch between local actuality (‘where we are now’) and system design (‘where the design wants to get us’)*”. He developed this idea to include temporal and systemic contingencies i.e., the internal and external factors that may make actual output of a change process to be different from the planned output. In other words, the notion of *gaps* can be understood as deviation of final results from the planned results due to temporal or systemic contingencies.

In other words, a comparison of the design objectives (where policy wanted us to go) and actual achievements (where we actually got) will lead to the discovery of *design-actuality gaps*. The policies will be considered successful if these gaps are not significant and policies will be considered a failure if these gaps are significant. Heeks (2002) recognizes the existence of partial successes, where some of the policy objectives were met, but not all. He identified a set of seven dimensions to evaluate *design-actuality gaps* within the context of evaluating gaps for information systems projects in developing countries. This framework has been used in several research publications (e.g. Gichoya, Hepworth, and Dawson, 2006). Heeks suggests that the dimensions for evaluating *design-actuality gaps* can be built in a number of ways, e.g., “*theoretically on the basis of information systems literature; descriptively on the basis of a straightforward delineation of components of an information system; and analytically on*

the basis of case studies". The flexibility in terms of identification of dimensions makes this framework useful in explaining *gaps* in a variety of situations. A dimension may be decomposed into more measurable *elements*. Since, the idea of *gaps* represents deviation of actual results from planned results for each element along an identified dimension, we refer to these *gaps* as "*performance gaps*". These *gaps* are derived by integrating Heeks (2002) notion of *country context gaps* and *hard-soft gaps* that attempt to address *gaps* between information systems (IS) *design* and local user *actuality*.

Performance Gaps are fundamental congruence or match/mismatch between what was planned and what was accomplished. While the notion of *performance gaps* is consistent with Heeks, it runs into an interesting situation. What happens when the dimension and elements of *design* and *actuality* do not match (especially when dimensions and corresponding elements are identified from two different perspectives)? This type of mismatch is not identified as *gaps* in the *design-actuality gaps* framework. In order to overcome this issue, we propose an extension of the framework which has two additional types of *gaps*: dimensional *gaps* and elemental *gaps*.

There are three major extensions made in this chapter in the use of *design-actuality gaps* framework:

- (1) **Dimensional Gaps:** We approach the identification of dimensions from two perspectives in this research. (a) The dimensions of *design* derived from

grounded theory analysis of government policy and action plan documents, (b) The dimensions of *actuality* derived from interviews and focus groups with citizens. These dimensions are further informed by the insights from interviews with officials who made or influenced government policies.

Since the dimensions of *design* and *actuality* are derived from two different perspectives, any differences in the *design* and *actuality* dimensions depict dimensional gaps (i.e., a dimension of *design* might not be a dimension of *actuality* and vice versa).

(2) **Elemental Gaps:** For each dimension of *design* and *actuality*, elements of the dimension are identified. The concept of *elements of dimension* is important in the sense that it breaks down each dimension into measurable pieces. Any differences in the elements of *design* and *actuality* allow for further depth in understanding the gaps.

Since the elements of each dimension of *design* and *actuality* are derived from two different perspectives, any differences in the elements of *design* and *actuality* dimension depict elemental gaps (i.e., *elements of design dimension might not be identical to the elements of actuality dimension*).

(3) Instead of focusing on a case study of individual information systems development projects (e.g., Gichoya, Hepworth, and Dawson, 2006), this chapter extends the framework to understand government's ICT policy design and

citizens' actuality. This extension helps in the estimation of overall success or failure of ICT growth policies design in a developing country. According to Heeks, *"taken alone, these [case studies] provide no basis for estimation of overall failure/success"* of IS development [or ICT growth] in a developing country. Therefore this is a useful extension of the framework.

These extensions are shown in Figure 13, which depicts that not only are there gaps between the dimensions of design and actuality, but also between the elements of design and actuality for each dimension.

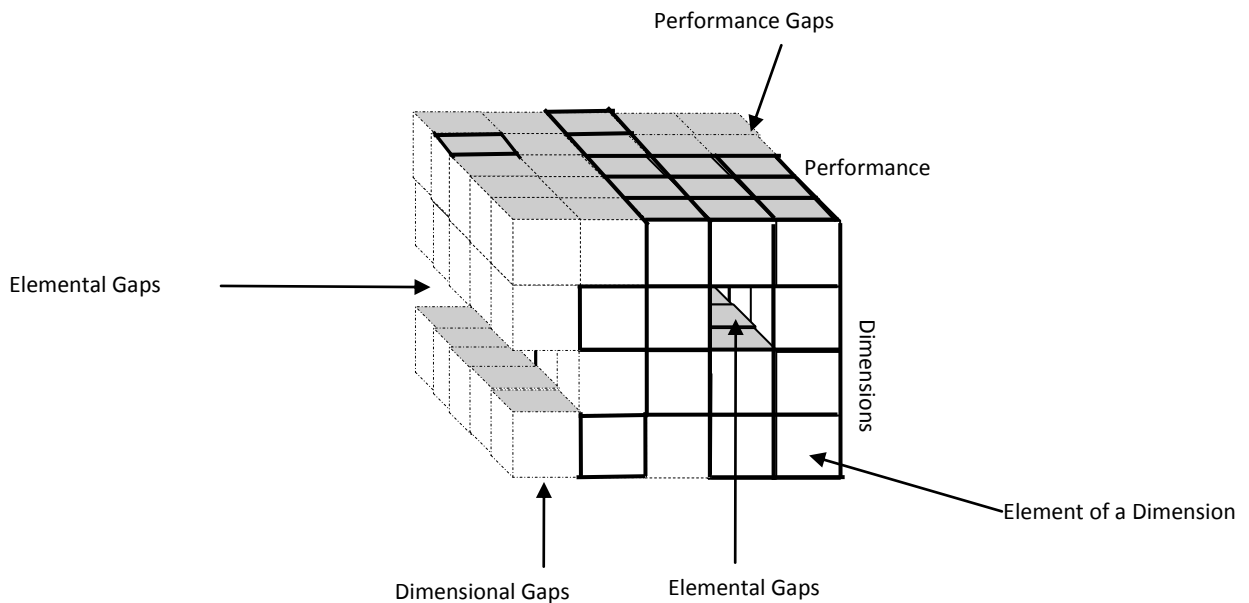


Figure 13: Extended Design-Actuality Framework

8.2.1 Dimensions of Design

The ICT policies and action plans were used to identify dimensions of ICT policy *design* and elements of these dimensions. The elements in each of the dimension were identified as codes during the grounded theory analysis of government's ICT policies. The dimensions are derived by scaling up similar or related codes into categories. Since *design* is an evolving process, the use of policy documents helps in the identification of a *static* or *frozen* view of design dimensions and corresponding elements. It is therefore appropriate to use government's ICT policy documents and action plans to identify elements and dimensions of design. From open codes, several categories of codes were identified. The scaling up of related categories resulted in six major themes. These themes represent dimensions of *design*. The categories of codes within a dimension are referred to as elements of a dimension and are given in Table 15.

<i>Dimensions</i>	HR Development	E-Government	Incentives	Legal Framework	Industry Development	ICT Use
Elements of Design Dimensions	National accreditation and testing services	IT in Government	Incentivizing IT investments	Telecom convergence/deregulation	IT market development	Broadband internet growth
	Training Programs	Government Databases		Recognition of e-records	Software industry development	
	Scholarships and non-binding loans	Standards Development	Venture capital	Digital signatures	Software Exports	E-Commerce
	Foreign Faculty Hiring	Data Sharing among agencies	Microcredit	Intellectual property rights	Hardware industry development	
	Online libraries			Cyber laws		

Table 15: Dimensions of Design

Identification of categories of codes and themes from ICT policies, action plans and related government documents

8.2.2 Dimensions of Actuality

In order to identify and discover dimensions of *actuality*, qualitative data from citizens' interviews was used. In order to relate qualitative data with the dimensions of design in policy analysis document, interviews with officials making and influencing ICT policies were also used. Interviews with citizens were carefully examined for not only the content and context of what they said, but also for their own background and personal experiences with ICT. The codes were grouped into categories that constituted elements of the dimensions of *actuality*. The dimensions of *actuality* were developed by scaling up similar categories of codes (elements) into themes. Table 16 shows dimensions of *actuality* and corresponding elements. While most dimensions of *actuality* match with their corresponding dimensions of *design*, elements of each

dimension represent differences in the understanding of a given dimension. These differences are indications of the gaps that exist in the dimensions of *design* and *actuality*. Additionally, one of the dimensions i.e., impediments, is different from a possible corresponding *design* dimension, i.e., incentives.

Dimensions	HR Development	E-Government	Impediments	Legal Framework	Industry Development	ICT Use
Elements of actuality dimensions	National accreditation and testing services	IT in Government	Corruption	Telecom convergence/deregulation	Ignored Hardware Industry	Broadband Internet growth
	Training Programs	Government Databases	Taxes	Cyber laws		
	Scholarships and non-binding loans	Standards Development	Government Business Processes	Intellectual property rights	Software Exports	Cell phone use growth
	Foreign Faculty Hiring	Data Sharing among agencies				
	Online libraries					

Table 16: Dimensions of Actuality

Identification of categories of codes and themes from interviews/focus groups with citizens, interviews with policy making/influencing officials

8.3 Discussion and Analysis of Extended Design-Actuality Gaps

The analysis shows significant design actuality gaps where design objectives were not met at all or were partially met. Table 17 shows extended design-actuality gaps for government policies and actual ICT growth within the context of this research. In some cases, the elements of different dimensions did not match up between design and actuality. For example, recognition of e-records and digital signatures that were

identified as elements of legal framework in design dimensions did not appear as elements of legal framework actuality dimension.

Several dimensions of *design* did not appear in *actuality* and some could have been executed in a better manner. The following analysis of the *design-actuality gap* has lessons for developing countries that need special attention in the development and execution of ICT policies, plans and strategies. The purpose of this analysis is not to paint a rosy or a gloomy picture, but to identify missed opportunities, so that future plans can cater to these shortcomings, and policymakers in other countries can learn from them.

Elements of Design (from public policies)	Elements of Actuality (from Interview data)	Gaps
HR Development		
National accreditation and testing services	National accreditation and testing services	Limited scope; testing services to find scholarship recipients remained active for four years but scholarship funds no longer available
Training Programs	Training Programs	Limited success; Plans to establish seven IT universities shutdown in 2008
Scholarships and non-binding loans	Scholarships and non-binding loans	Funding is no longer available; no implementation of non-binding loans
Foreign Faculty Hiring	Foreign Faculty Hiring	Funding became scarce; no longer active
Online libraries	Online libraries	Implemented but use is limited
E-Government		
IT in Government	IT in Government	Isolated success stories; overall use of IT in Government is limited
Government Databases	Government Databases	Isolated success stories; overall use of Government databases limited
Standards Development	Standards Development	No notable implementation
Data Sharing among agencies	Data Sharing among agencies	No notable implementation
Incentive		
Incentivizing IT investments		Limited and vanishing incentives
Venture capital		No Implementation
Microcredit		No Implementation
	Corruption	Bribes in setting up and execution of private sector business
	High Taxes	High sales, activation and corporate taxes levied on ICT industry.
	Government Business Processes	Complicated government businesses processes; inter-agency coordination
Telecom convergence/ deregulation	Telecom convergence/ deregulation	Deregulation successfully completed; lack of focus in evolving regulations
Recognition of e-records		Limited discussion; No Implementation
Digital signatures		Limited discussion; No Implementation
Intellectual property rights	Intellectual property rights	Limited discussion; No notable implementation
Cyber laws	Cyber laws	Cyber law passed in December 2007; limited awareness/implementation
IT market development		Little to No Implementation
Software industry development		Little to No Implementation
Hardware industry development	Ignored Hardware Industry	Completely ignored this area of ICT sector
Software Exports	Software Exports	No substantial gains in exports
Broadband Internet growth	Limited broadband internet growth	Limited growth – 130,281 broadband subscribers
E-Commerce		No Implementation
	Cell phone use growth	91.5 million subscribers in April 2009 up from 306,493 in June 2000

Table 17: Extended Design-Actuality Gaps Across Identified Dimensions*

*Dimensions and elements of “*design*” are identified from government ICT policy documents and action plans. Dimensions and elements of “*actuality*” are derived from interviews with citizens. Further insights are gained from interviewing officials making or influencing government policies for ICT growth.

8.3.1 Human Resource Development

Design

The policy puts a great deal of emphasis for human resource development. The policy recognized the evolving nature of ICT tools, services and knowhow. It was therefore considered the top ICT policy strategy. The development of trained human resources as well as nurturing and retention of skilled human resources were given high importance. It was viewed as a means for providing strong roots to ICT sector to set hold in Pakistan that had the potential to meet local and software export related ICT needs. Emphasis on IT education led to the establishment of the Virtual University of Pakistan and provision of ICT services and tools at existing public sector universities. The development of “world-class” BS, MS and PhD programs was one of major undertakings of this policy. At the same time, it was emphasized to provide compulsory computer literacy to students in high schools. A national educational intranet project was also proposed to enable knowledge sharing among universities and linking them to digital libraries for teaching and research. A national accreditation council was setup to ensure quality IT education. A human resource development fund was proposed which would require ICT companies to contribute 1% of their profits that can be spent on scholarships and non-binding loans.

The concept of non-binding loans was a revival of religious provisions for supporting education with loan that the borrower is required to pay only if he or she can

afford it. Additionally, no finance charges are collected on the loaned money. Financial autonomy was proposed for ICT departments in public universities so that they can “attract and retain” qualified faculty members to respond to changing IT industry requirements. The strategy included a provision for providing foreign universities with incentives for setting up distance learning and resident degree programs in Pakistan. A mega plan to establish seven IT universities in collaboration with foreign universities was set out and funding was allocated to it. The policy also emphasized provision of compulsory computer literacy to students in high schools. Another important aspect of this strategy was to increase opportunities for women in the ICT and telecommunication sector.

Actuality

As ambitious as the policy, plan and strategy may sound, it was interesting to observe that some of these plans were realized while others met with utter failure. Obviously some of the strategies never worked and most others could have been executed in a better manner. There are several lessons for developing countries that need to give special attention to the development and execution of ICT policies, plans and strategies.

This dimension of *design* witnessed partial success in certain aspects of *actuality*. For example, the establishment of the Virtual University of Pakistan was a major milestone. The large sums of investments yielded a high-tech university that was built

around developing quality ICT human resource by utilizing ICT for the dissemination of educational content to students. The state-of-the-art lecture recording and broadcasting facilities were developed. The university model required hiring of “*top-class*” faculty from Pakistan and abroad. These faculty members would develop quality educational that would meet and exceed international standards in ICT and computer science education. The lectures were broadcast using PakSat I (which was an aging Malaysian satellite bought by the Government of Pakistan for the purpose of reserving space for sophisticated satellites in future). PakSat I was capable of broadcasting up to four TV channel streams. The Virtual University was given full control of the satellite. The university employed a learning management system (similar to BlackBoard and WebCT) for assignments submission from students and documents distribution from the university. The university currently caters for the needs of about 50,000 students across Pakistan and offers undergraduate and graduate programs in computer science and business administration. There is no doubt that it is one of the magnificent projects that demonstrates Government of Pakistan’s commitment towards promoting ICT in education sector. Additionally, the project also showcased a “*different*” model of education dissemination by developing “*interesting*” and “*involving*” educational content. However, several Pakistanis and educationists found problems with this model. On the issue of developing human resources in far off places, one of the research participants argued the following:

In terms of education, the major impact has been the delivery of very high quality, affordable education to every nook and cranny of the country. What happens to kids who study in their own home town? In other words, education at their door tips. It means, they do not have to migrate to the big cities for education. Migration had a down side, which meant that if a student came to a big city, 90% would stay on. Or they would move on to even a larger town or even country in search of better job opportunity etc. But the hinterland, from which these students originated would never benefit from this education. By using distance education, and using ICTs to deliver it, what we are doing is, we have got world class education being delivered to every corner of the country. And then, after graduation, if a student wants to set up a shop, I hope, and we assume that this happens, many of them will do so in their own home towns. Which means, there will be an economic benefit that will accrue from this education right where the student is located. This is only possible through ICT and not possible through the conventional mechanism or traditional education unless we are able economically and financially to establish universities in every little town and district of the country.

It was this emphasis on creating human resources that are proficient in ICT that one can find very well trained ICT professionals in all parts of the country. However, this does not mean that everyone graduating from universities in Pakistan today is proficient user of ICT. In an interview with the CEO of a large telecommunication company, he said:

We have job applicants for various ICT jobs who have earned undergraduate degrees. When we ask them to demonstrate their 'computer abilities', they can barely find alphabets on the keyboard.

Another research participant said:

We can talk as much as we want about the good progress of ICT in the country; the fact is that if you go out today and visit a high school, you will know how difficult it is to even find teachers who can use a computer.

Other elements of this dimension saw utter failure. For example, the plan to establish seven IT universities was shutdown in late 2008 due to the unavailability of already allocated funds and other “undisclosed” [political] reasons. Scholarship recipients who went abroad for higher education (PhD in most cases) under this scheme are facing problems because of the reduction or discontinuation of committed financial aid. Non-binding educational loans were not even given out. Foreign faculty hiring program which worked actively for a few years was finally shutdown. Plans to introduce computers and ICT education in high schools were not realized. Therefore, online libraries and access to journals and books is only recognized among researchers and some graduate students, but the overall impact of the availability of these resources cannot be felt.

Several research participants had reservation about the only program which did seem to work i.e., The Virtual University project. The policy of provision and allocation of funds for creating yet another distance learning university did not make sense to several participants. Some pointed out that the establishment of Allama Iqbal Open University (AIOU) in 1970s revolved around similar objectives. This university caters to 800,000 students in Pakistan and abroad and uses ICT for the dissemination of

educational content. Recently, due to the cutbacks in funding, AIOU is unable to develop modern ICT systems to support the delivery of their educational content. Apart from the question of need for establishing yet another “distance learning” institution, devoting 100% of the newly acquired recourses such as PakSat I to a single university were questioned by several participants. The Virtual University has only been able to use two of the four TV beams that the satellite supports. The remaining two beams are still not utilized and could have been allocated to other institutions to create a sense of competition among universities for coming up with innovative course content development and programming. It is apparent from the comments of these research participants that several strategies in the policy document did not work. Some of policies were later on abolished such as in the case of setting up seven new universities. Some of the policies were scaled down such as in the case of scholarships for PhD from other countries. The lack of funding is blamed for the failure of policies that did not work. However, there is a need to design these policies appropriately from the beginning and anticipate problems of funding as well as lack of political support in future.

8.3.2 E-Government

Design

The ICT policy and action plan recognized that the use of ICT for socio-economic development cannot be recognized unless ICT becomes part and parcel of government

services. To achieve this goal, the policy set out goals to increase role of ICT in government and creation of government databases. Policies and plans were introduced to development standards for the sharing of government data between different agencies. A focus on developing ICT capabilities to support government processes was emphasized and required government to provide funding for such initiatives such as providing computers to government officials and staff, development of software for government needs and websites for various government bodies. Additionally, government bodies such as National Database and Registration Authority were setup to provide database capabilities for government's future planning purposes. In order to facilitate data sharing and exchange between government bodies, standards were to be planned. Autonomous government bodies such as Federal Board of Revenue and Election Commission of Pakistan were encouraged to roll out their plans for computerization and increased role of ICT in their interaction with citizens and other government bodies.

The establishment of e-government directorate was planned with the aim to provide a central source of funding and training human resources to mobilize e-government projects. One of the major goals behind promoting e-government was to increase transparency in the conduct of government agencies and officials. IT literacy was planned to be mandatory for government employment. The policy called for internet and intranet email use to support all government communications with necessary security, digital authentication and level cover for the validity of such

communications. The policy also called for computerization of government processes and software development to support e-government plans.

Actuality and Gaps

In order to achieve the objectives set out in government policy documents, several steps were taken. The creation of the National Database Organization (later named National Database and Registration Authority – NADRA) demonstrated that the use of ICT for developing national databases was a doable task. It is the largest IT organization in the country and undertook the development of a national identification system as one of its first projects. This project increased international confidence in Pakistani identification documents by reducing the possibility of counterfeit ID cards, passports, birth certificates and such. The national database was also instrumental in collecting basic census data which is constantly updated as requests for identification documents and passports are received and served. Officials at NADRA proudly claim the development of a “one of a kind” national database for the citizens’ data, which is a remarkable achievement. The chairman of NADRA said the following:

I am happy to tell you that we have developed a very large database of citizens’ that even the most advanced countries do not have a comparable database. We are using state-of-the-art biometric recognition software to discover if someone trying to fool the system. We have the largest database of fingerprints in the world... A few years ago we did not have any ability to discover basic facts about the nation. For example, if the prime minster wanted to establish a fund to provide relief to poor and needy families, there was no objective way of finding that out. Now I can design a search

query by defining certain parameters and evaluate the results of the search with a quick survey.

He shared the query design, its parameters and evaluation (with 99% reliability) of the results after a survey of 500 people who were considered eligible to receive financial relief from the prime minister. While it raises questions of privacy and security, the use of ICT for managing citizens' data has increased international confidence in Pakistani identification documents. It has reduced the possibility of counterfeit ID cards, passports, birth certificates and other identifying documents. The national database is also instrumental in collecting basic census data which is constantly updated as requests for identification documents and passports are received and served.

The e-government directorate established as ICT policy implementation point, has taken a number of initiatives including computerization of national election rolls and business processes for land records and law enforcement. Most of the government bodies have online presence in the form of websites and downloadable forms.

Even with these services in place, over all use of ICT in government bodies is still limited. When one visits a government office, computers are clearly visible. However, it soon becomes apparent that those computers are used mainly for word processing if at all. The ICT training programs for government officials are limited to teaching them the use of Microsoft Office at the most. There are rarely any computer applications to support government business processes and most of the records are still paper based. It

is difficult to see implementation and follow up of the electronic transactions ordinance that became law in 2002. A number of research participants showed frustration with the lack of data sharing among government agencies and lack of standards to support such sharing.

Data sharing among different agencies was a contentious issue during the interviews. Law enforcement agencies, particularly the officers from the Islamabad Police and Punjab police, pointed out the lack of support for data sharing from NADRA and Pakistan Telecommunication Authority (PTA). An officer of the Islamabad police complained with frustration:

We have serious criminal cases where we need urgent access to the profile of a particular criminal but NADRA makes it impossible for a police officer on the ground to access even the most basic data. They ask us to send them a request in writing routed through proper channel involving intelligence agencies. The criminals are long before anything can be done. I do not understand what will NADRA do with the data? Will they use it against India in a war?

Consequently, the chairman of NADRA, as was the case with several other government agencies until 2008, was a retired military officer. He said the following:

We have established rules and regulations for access to 'our' data. We have provided them basic access to verify that an identity card is real or fake. For advanced search option, I fear for the abuse of the system and that's why the request is required through proper channel to avoid

misuse of the national database... we are planning to request a constitutional protection for our database.

The lack of trust between a civilian officer and a retired military officer is not a surprise in a country where military has ruled the country for more than half of the time since independence. Similar sentiments were felt against PTA which was chaired by a retired general for nine years with two extensions to his tenure. Law enforcement agencies are not the only government bodies that felt the need to have access to the national database. Equally, convincing arguments were made from the representatives of Pakistan Election Commission. He said:

We collect essentially the same data about a voter that NADRA does. I can understand that two databases are better than one but why can't we share our data to prevent voter fraud. We have sent several requests to NADRA but they are not willing to share anything even with the constitutional government body such as ourselves.

It is apparent from the analysis and discussion above that only a small number of e-government projects were implemented in isolation. Even though the ICT policy required coordination of e-government projects and services through IT Commission and e-government directorate, much of the plans were not realized. Military interference in politics and appointment of retired military personnel also plays a role in breaking down the communication channels between government agencies.

8.3.3 Incentives

These two dimensions, although interrelated, did not match in *design* and *actuality*. Citizens and officials who made or influenced policies were of the view that the incentives in the government policy became impediments for investors and businesses. The incentives for ICT such as tax holidays and lowering of taxes for the ICT sector were not only rolled back, but also became a thriving source of revenue for the government through heavy taxes. The ICT service providers are absorbing taxes such as activation taxes to increase sales for their products and services. The culture of corruption that hinders infrastructure development across country is an additional source of unanticipated financial burden on service providers.

Design

The ICT policy set up a plan for providing fiscal and non-fiscal incentives for local and foreign investments for ICT growth. These incentives included extended tax holidays, lowering of taxes, and easing up the business setup process throughout the country. To encourage entrepreneurship, the policy sets out plans for establishing venture capital and fund innovative business plans and projects. In addition to providing support to conduct business in Pakistan, the policy required the government to provide support and funding to citizens in the form of microcredit for ICT devices such as computers, and accessories. One of the major tasks undertaken in the policy involved creating a communication system to coordinate different government agencies in the development of a package of incentives. These bodies included State Bank of Pakistan,

Central Board of Revenue, Banks, National Investment Trust, Securities and Exchange Commission of Pakistan, Export Promotion Bureau, Ministry of Finance, and Customs Department. It also aimed at simplifying the taxation system for ICT products and services and reduce or eliminate tax on most ICT services and products.

Actuality and Gaps

The ICT policy and action plan called for fiscal incentives for local and foreign investors. Several major international telecommunication players from Europe and the Middle East invested in Pakistani ICT sector which not only brought in financial investments but also human resource capabilities to the country. This opened up a huge market for Western equipment manufacturer for their products and services. Foreign direct investment rose from \$6.1 million in 2001-2002 to \$1.9 billion in 2005-2006 and \$1.8 billion in 2006-2007 (PTA, 2009). These achievements were made mainly by offering extended tax holidays on corporate income, lowering of taxes and easing up the process of establishing a new business in Pakistan. Table 16 demonstrates the impact of ICT policy adoption in 2000 on foreign direct investment (FDI).

Years	Total FDI	FDI in Telecom Sector	Contribution in Total FDI (%)
2001-02	484.7	6.1	1.26
2002-03	798	13.5	1.69
2003-04	979.9	207.1	21.13
2004-05	1524	494.4	32.44
2005-06	3521.0	1905.1	54.11
2006-07	5124.9	1824.3	35.60
2007-08	5152.80	1438.60	27.92

Table 18: Foreign Direct Investment (FDI) in Telecommunication Sector (US \$ Million – PTA, 2008)

However, several of the plans were not realized. For example proposal to setup venture capital was a complete failure and was abandoned soon after. While these incentives helped attract capital flow in the country, most of the capital flowed back out of the country to suppliers from other countries. For example, cellular industry now requires about 50 million cell phones each year putting the import bill at several hundred million dollars. Lack of priorities and action plan emphasis on how to spend FDI, Pakistan did not realize full socio-economic development potential of these investments.

The venture capital fund to establish and support entrepreneurial businesses was never realized and the microcredit scheme to support citizens in the purchase of ICT equipment could not be offered. In fact the lack of communication among different government bodies created an environment of impediments instead of incentives for businesses. A participant said:

The promised incentives in IT policy attracted significant amount of investment and ICT infrastructure grew rapidly. The Federal Board of

Revenue realized that ICT growth could increase government revenues. They started taxing everything... 21% in sales tax on ICT services and equipment, high service activation tax and several other taxes. 'One-window operation' to facilitate business setup process only remained a promise. Now, ICT Service providers are facing tough time in justifying their investment decision due to fierce competition and disregard from Government officials for ICT service providers concerns.

Research participants regarded this situation as impediments. Additionally, the promise to smooth out business set up process (which involved coordination among several government agencies) not only lacked implementation but also allowed for corruption to creep in the business setup process. The notion of impediments is strengthened with references to corruption as well. A research participant said:

It is almost like an industry standard that you will pay 50,000 rupees to a lineman in bribes when you need a connection for electricity. I do not even want to go into further details of how many ways the corruption has plagued us. Government promised one-window operation for setting up ICT businesses but nothing was done and investors are disappointed but learning how to survive in a culture of corruption. These things breed more corruption and do not really help the country in any positive way.

It can be observed from situations like these that this dimension of *design* did not live up to its promises and rather gave birth to a new dimension of reality which made the situation even dismal.

8.3.4 Legal Framework

Design

The policy included provisions for developing a robust legal framework to protect the interests of businesses and citizens. It aimed at providing legal protection for the telecommunication liberalization and deregulation. It also proposed protection of telecommunications convergence in future. In addition the policy proposed legal support recognition of electronic transactions and digital signatures to not only facilitate e-government procedure but also to provide a basis for their acceptance in the legal proceedings in the court of law. A section of the policy was devoted to establishing legal framework to protect intellectual property rights and curb software piracy. The ICT policy recognized the need for a supporting legal framework and regulatory environment that protects the interests of investors while providing socio-economic development opportunities for the citizens. A number of steps were proposed such as telecom convergence and deregulation policies, cyber laws and intellectual property rights.

Actuality and Gaps

Among the steps taken for legal framework development, one of the major accomplishments was the successful formulation and execution of telecommunication convergence and deregulation policy. The end of monopoly in ICT sector allowed new businesses to emerge and invest in Pakistan. Progress was also made towards

recognizing the legal value of digital records and digital signatures in the form of the electronic transaction ordinance. Legal framework and protocols were established to recognize electronic records for prosecution and defense in the legal proceedings. Constitutional support for creation of regulatory bodies such as Pakistan Telecommunication Authority (PTA) and Pakistan Electronic Media Regulatory Authority (PEMRA), National Database and Registration Authority (NADRA), Pakistan Software Export Board at (PSEB), e-government directorate and Provincial IT Boards have proved to be effective vehicles of advancing government's ICT policies. Cyber laws ordinance became law in December 2007 and software anti-piracy plans were introduced and advertised.

However, several gaps can be observed in the execution of this dimension of design. Lack of priorities and frequent changes in the operating regime for ICT industry has created problems of compliance for ICT service providers. The lack of legal framework and protocols for data sharing within government bodies that allow the use of digital records for prosecution and defense were pointed out by the research participants.

The use of regulatory bodies to restrict ICT from their coverage of government's inefficiencies and misuse created a feeling of resentment among several stakeholders citizens. For example, PEMRA was instrumental in imposing bans on several electronic media outlets and TV channels. Often, PEMRA was used to force TV cable operators to discontinue carrying TV channels and programs that were critical of the actions and

misuse of power by some government officials. The passage of pieces of legislation such as cyber crimes ordinance 2007 became tainted as the government's way of restricting electronic media's reporting and opposition. Cyber crimes ordinance confined electronic media's ability to report on government misuse by barring photography on public property without consent. A member of the electronic media said:

When police used to kidnap journalists, photographers, and cameramen, they didn't have any legal cover to keep us locked up for more than 24 hours. Now, they can put us in jail, prosecute us and do whatever they want, all under the legal cover by claiming that we did not acquire consent for a person who walked down the street while the camera was rolling.

Software piracy has been a well recognized issue since the 1990s. Software anti-piracy rhetoric has been visible in slogans alone and little efforts have been made toward prosecuting commercial interests that pirate, market and benefit from software piracy. This situation has not only curbed revenues for international software providers such as Microsoft and Oracle but also hampered local software industry's ability to produce software for local needs. This is one of the reasons that the software industry in Pakistan has only focused on developing business outside of Pakistan. Representatives of software development companies acknowledged that much of the ICT awareness was possible because citizens had access to cheap pirated software. However, they expressed frustration with the situation and that they have to rely on international markets for their business. One participant said:

God forbid, if something were to happen to the relationship between Pakistan and other countries that affects our business, we have no alternate way to generate revenues and pay our software engineers. We would have to shut down the entire operation. Our software manages data of several major international companies but the government buys software for its use from foreign companies. Even if we develop software for the local market, there is no way to prevent piracy.

It is therefore important to provide legal protection that facilitates ICT growth.

The lack of focus in developing and enforcing appropriate legal protection curbs ICT growth in the country. On the other hand, inappropriate development and enforcement of laws to prevent reporting of news in electronic media also hurts ICT growth.

8.3.5 Industry Development

Design

The policy recognized the importance of ICT industry development. It promised appropriate government support for ICT growth by supporting hardware, software and telecommunications industries. To promote ICT growth, it is necessary to encourage local language content, increase software exports, and augment manufacturing of ICT products. To simplify software exports, the policy promised to involve other government agencies such as State Bank of Pakistan and Central Board of Revenue to remove hurdles in increasing software exports and facilitate the software exports companies. The policy also promised to stimulate government resources such as Pakistani embassies and foreign missions by appointing personnel with software export

marketing experience. The policy recommended pursuing manufacturing facilities that do not put Pakistani hard manufacturing industry in competition with other developed nations. For example, instead of personal computer manufacturing, focus was put on value added hardware which enhances the abilities of a piece of hardware with embedded software.

Actuality and Gaps

While telecommunication industry received a lot of government support, other sectors of ICT industry such as software development and hardware manufacturing were ignored. Particularly the hardware industry suffered significantly from this neglect. Before the adoption of ICT policy, Pakistan had a number of telecommunication products manufacturing facilities in the country. In the past, to strengthen and support telecommunication monopolies, government of Pakistan had an extended ban on the import of telecommunication hardware. However, to encourage healthy competition, the policy required the government to abolish import bans and allow for competition to exist. It was expected that the healthy competition will allow for growth of ICT industry.

With the import ban and telecommunication monopolies lifted, Pakistani manufacturing facilities are non-operational. Pakistan is in need of about 50 million mobile phone sets each year and 100% of these phones are imported which puts the import bill very high. An inappropriate import duty policy which requires payment of 5% import tax on parts for use in telecommunication manufacturing, another 16% general

sales tax with 5% advance tax created financial impediments for anyone interested in manufacturing in Pakistan. This comparison becomes even bleaker when the review of import policy suggests that importing finished ICT products requires 5% import duty. Several research participants showed deep concern over the plight of hardware industry in particular.

The government ICT policies realized that ICT growth is only possible by identifying and developing new IT markets both inside and outside the country. To support software industry's search for international markets development, Pakistan Software Export Board (PSEB) was established in 1995. A number of steps were taken to support software industry. For example, IT parks were established in three major cities and IT companies were given subsidies to establish their offices in IT parks. These parks were equipped with high speed internet connection necessary for doing business in international environment. It also helped companies in obtaining quality certifications such as ISO 9000 and capability maturity model (CMM) for the software companies. However, most research participants pointed out that the software industry did not receive much needed attention from the government and that the current state of software industry is the result of private businesses developing software export industry on their own.

The research participants pointed out there an urgent need to develop local IT market. For a software industry to thrive, it must explore local opportunities for business instead of solely relying on foreign business. Hardware industry has probably

been the most neglected aspect of ICT growth in the country. Several research participants showed deep concerns over the plight of hardware industry in particular. The hardware manufacturing facilities that used to run at capacity are shutdown after the ban on importing ICT products was lifted. A participant who was aware of the situation of hardware industry said:

Just look at the state of hardware industry. The manufacturing facilities are in ruins. We import 50 million phones each year. Don't you think a hardware provider would be interested in erecting a manufacturing plant right here in Pakistan instead of importing it? All we need to do is give them financial reasons to do that. This will bring jobs, technology and experience in manufacturing in the country.

The gaps in *design* and *actuality* are apparent in this case. This situation demonstrates the need for aligning policy objectives, plans and actual outcomes. There is a need for developing local ICT industry with ICT friendly policies and support from the government. The policies such as encouraging the development of local language content will be helpful in increasing ICT penetration and furthering the business potential for ICT industry. However, lack of focus and coordination among government agencies creates impediments for the ICT industry and discourages investors.

8.3.6 ICT Use

Design

The ICT policy of 2000 recognized the need for increasing ICT use and proposed action plans to increase ICT penetration and use in government and businesses. The increasing role of ICT in government was also discussed under e-government. However, the policy specifically emphasizes the need for general ICT use among government employees and agencies. An important aspect of this policy was to increase role of ICT in business to develop and support a culture of e-economy. In order to support this policy objective, promises were made to provide all necessary resources to support the creation of environment that is conducive to e-commerce. For example, the creation of Electronic Commerce Council of Pakistan was proposed that would govern all e-commerce affairs such as deployment of e-commerce infrastructure, electronic data interchange (EDI), internet and emerging technologies to provide connectivity, and restructuring and development of laws and regulations. To further enhance the ICT use in businesses, the policy offered incentives for the computerization of business process and use of technologies such as bar codes to oversee production and sales of products and services. The policy called for increased use of credit cards, national clearing house for credit card transactions and infrastructure for online credit card processing. A specific portion of the policy was dedicated to exhibit government's dedication towards increasing broadband internet penetration as a vehicle for increasing ICT use.

Actuality and Gaps

This policy had interesting implications for Pakistan. This policy didn't address citizens' use of ICT as part of 'ICT use'. The inconsistent use of different ICT products and services in the country is apparent. For example, use of cellular phones is on the rise significantly with 90 million cell phone users (PTA, 2009) but the internet growth and e-commerce growth remained promises. The use of mobile phones to support existing businesses activities to finding unexplored markets has been innovative as well as interesting.

Even though the government put forward a separate "Broadband Policy" in 2004, it has yet to produce any comparable results to cellular telecommunication industry. Broadband internet user count was at 130,281 by March 2008 (PTA, 2009). There is a great opportunity and need for broadening the internet user base and allowing people to use internet for financial transactions. The challenge is even more complicated by the cash nature of Pakistani economy. Several government officials (to protect corrupt practices) and businesses (to avoid taxes) do not use electronic commerce facilities to by-pass accountability that ICT brings to accounting. A research participant pointed out the following: "I am happy to see businesses using electronic registers but this type of use is limited. When I go to government offices, I see computer on the desks but all the processes are still done on paper. They think they have computerized the system if they can type an application and then forward it to other departments for manual processing. ICT brings transparency to systems and processes and this is what I think government officials and businesses do not want.

The use of ICT to facilitate social contact is one of the most acknowledged elements of ICT use. The participants shared a number of emotional stories of the impact of ICT use in their personal lives such as

I don't cry anymore; I can speak with my children as much as I want

and

when I am on a business trip abroad, I can still see my 5 and 2 years old girls on a webcam and they can see me too; ICT keep us united even when we are physically apart.

The participants with entrepreneurial backgrounds explained financial benefits of access to ICT in supporting their businesses e.g.,

my costs of doing a business have gone down because I don't need to rent a shop anymore. I do more business and my customers never have to leave their place to come see me. They just call me and I am there for a service in a few minutes.

My business has expanded several folds since I started using a phone and email to keep in touch with my suppliers.

Another woman who was studying at one of the prestigious universities in

Pakistan explained:

I probably would not be pursuing higher education if I didn't have a cell phone. My parents didn't feel that they can keep in touch with me anytime they wanted and they were worried about my safety in a large city 700 kilometers away from my home.

The participants also pointed out negative impacts of ICT use within the socio-cultural context of Pakistan e.g.,

I have seen a lot of girls and boys making out on phone and even deciding on marrying without their parents' approval; this is very bad,

I know it is wrong to steal money to pay for my cell phone bill but I cannot help it.

I cannot concentrate on anything because of I am always getting emails and SMS – even in the middle of the night.

This policy did not address all areas of ICT growth and use equally. For example, the use of cellular phones was significantly, but, the Internet use remained limited. The promise to set up Electronic Commerce Council of Pakistan, deployment of electronic commerce infrastructure and electronic data interchange remained promises.

There is a great opportunity and need for broadening the internet user base and allowing people to use internet for financial transactions. The challenge is even more complicated by the cash nature of Pakistani economy. Several government officials (to protect corruption related practices) and businesses (to avoid taxes) do not use of electronic commerce facilities to by-pass accountability that ICT bring to accounting.

8.4 Discussion and Analysis of the Causes of Gaps

The gaps identified in the previous section are opportunities that developing countries can capitalize on for an increased role of ICT in reducing ambiguities in government and business transactions with citizens and customers. This section provides a discussion of the causes of gaps identified in this chapter. These causes are identified from the qualitative analysis of the interviews with citizens and government officials.

There are several reasons for the existence of gaps between policy design and actuality. Most of these gaps are identified due to the differences in evaluation perspective, e.g., consumer rights, business interests and government interests. Depending upon the point of view, significance of the gaps might change. It is therefore

important to identify these gaps from multiple perspectives that might help in reducing these gaps. The synergetic effect of focus on the interests of different perspectives helps ICT growth in developing countries. This discussion and analysis has implications for policymakers and encourages them to design policies that assure consideration for different types of interests.

8.4.1 Lack of Citizens' Involvement in Policy Design

The importance of experienced officials and visionary technocrats cannot be denied in policy design but the lack of citizens' involvement in this process only widens the design-actuality gaps. In the case of ICT policy design process in Pakistan, the proposed policy document was placed on Ministry of Science and Technology's website for public comments and review during 2000. This was an unusual step in government policy making and did attract some feedback from citizens. However, there were several problems with the level of citizens' participation. First, the proposed policy document was written in English which is not the national language of Pakistan and only a small number of educated people can understand it. Second, internet access was limited and expensive in 2000 (only 10 major cities had dial-up internet service). As a result the public comments were not only limited in number but also ignored a large segment of society. A participant said:

We have bureaucrats and technocrats who think they know everything that's good for citizens. It is easy for special interest groups to influence their opinion in a culture of corruption. Maybe their policies will be well received and win citizens' support if they had actually made an effort to find out citizens' needs and then formulated public policies.

It is therefore imperative to increase citizens' participation in policy design in order to bridge *design-actuality gaps*. The public comments can be solicited through communication avenues that are already available to citizens such as newspaper, radio and TV announcements. The citizens' involvement could also mean protection of consumer interests that affect ICT growth positively.

8.4..2 Inter-Agency Coordination and Inconsistent Policies

Policy evolution is a natural phenomenon which can be expected in an environment where policy designers do not have a great deal of experience with formulating successful policies. The inconsistencies in policies which lead to coordination gaps between government agencies make it difficult to fulfill the promises made to businesses. A participant reflected on this situation:

The promised incentives in IT policy attracted significant amount of investment and ICT infrastructure grew rapidly. The Federal Board of Revenue realized that ICT growth could increase government revenues. They started taxing everything... 21% in sales tax on ICT services and equipment, high service activation tax and several other taxes. 'One-window operation' to facilitate business setup process only remained a

promise. Now, ICT Service providers are facing tough time in justifying their investment decision due to fierce competition and disregard from Government officials for ICT service providers concerns.

The import duty on ICT products is another example of inconsistent government policy which hampers local ICT products manufacturing. The policy requires manufacturers to pay 5% import duty on parts and collect 15% general sales tax with 6% advance tax on their finished products. However, the importers have to pay only 5% import duty if they import finished products. This creates discouraging tax implications for local manufactures. Similarly, dispute resolution mechanism that involves local, provincial or federal judicial system is not only costly but also requires following several years of court proceedings for minor disputes.

It is therefore important to ensure consistency in policies and coordination among government bodies to fulfill promises made with investors. It is essential for government agencies and regulatory bodies to balance consumer interests and business interests that can help bridge design-actuality gaps and help ICT growth.

8.4..3 Political Instability – Changes in Government Interests

Political instability and frequent changes in governments hamper the continuity of policies and negatively impact local and foreign investments. Between 2002 and 2008, five prime ministers took control of the government in Pakistan i.e., Zafarullah Khan Jamali (Nov 2002- Jun 2004), Chaudhry Shujaat Hussain (Jun 2004-Aug 2004),

Shaukat Aziz (Aug 2004-Nov 2007), Muhammad Mian Soomro (Nov 2007-Feb 2008), Yousaf Raza Gillani (Feb 2008-Present). The frequent changes in governments, political confrontations and assassinations have been detrimental to ICT growth in the country. A participant said:

You cannot expect an investor to keep investing when you don't know what mayhem might await your business... a riot, a mob or may be a political showdown.

Political instability has another downside in the form of change in priorities and unavailability of committed funds to ICT development projects. The controversial role of Pakistan Electronic Media and Regulatory Authority (PEMRA) in controlling ICT services such as television and broadcast services was mentioned in the interviews frequently. Citizens expressed displeasure with government's policy of shutting down news channels during political crises such as civil society movement against Musharraf regime in 2007-2008 and "long march" against Zardari regime in 2009 to restore Chief Justice of the Supreme Court of Pakistan.

Political stability plays a role in ensuring protection of ICT service providers' business interests and consumers' rights. The growth is difficult when ICT service providers and investors are not assured of their interests and consumers feel alienated from the policy design process. Political instability also hampers government's ability to

keep promises and enable supportive environment of ICT growth. The perspectives and interests of politicians and policy makers change with time. Therefore, political instability translates into lack of political support for ICT growth.

8.4..4 Lack of Protection for Private Sector Business Interests

While increasing competition among private sector ICT products and services providers is fierce, there is a need to ensure protection of their business interests in order for ICT growth to continue. For example, ICT tariff policy allows *Pakistan Telecommunications Authority* (PTA) to control tariff by ICT service providers and interconnect fees for completing service requests among ICT service providers. This policy has benefitted citizens by lowering services rates but little control to set ICT services tariff threatens private sector's business interests. This leads to a situation where services providers focus on the development of ICT services and markets that are more profitable. The neglect is apparent in the broadband internet services, software development for local markets, and hardware manufacturing industry, which ultimately impedes ICT growth.

PTA interacts with representatives of select private sector businesses in developing and implementing ICT policies (such as involvement of mobile service providers). However, this involvement is not at a level that satisfies private sector

business interests. There is a need to broaden the involvement of private sector businesses.

8.5 Summary and Lessons Learned

There are several lessons that can be learned from historic review of ICT growth in general and role of government policies since 2000 in particular. As is evident from the vision and mission statements in the ICT policy and action plan, socio-economic development has been the major goal of these policies. However, the implementation of these policies to achieve socio-economic development has neither been uniform nor consistent. Some of the policies such as cellular mobile policies have been successful at mobilizing government resources and attracting foreign direct investment. This success has been crucial and their impact is visible in the form of citizens' IT use (which is discussed in more detail in Chapter 10).

However, the lack of uniformity in policy implementation raises questions about the effectiveness of the policy formulation process. It also points out the ineffectiveness and lack of coordination among government's inter-agency communication in ensuring uniform and consistent ICT friendly policies. It can be observed that the lack of support for different policies comes from an inadequate involvement of the stakeholders in the policy development process. It is also possible to have unintended consequences (both positive and negative) of the policies that were not particularly addressed and formally

planned. This chapter has not only extended an existing theoretical framework and also provided implications for future policy development to support ICT growth.

The axial coding yields a model of ICT growth which is provided in Figure 14. This model shows that the purpose of policy objectives was socio-economic development which has been put in the center. The figure also shows important codes within each category of government's ICT policy that were aimed at ICT growth. It also provides a brief evaluation of the categories. It can be observed from the diagram that there were significant differences between the policy objectives and actual outcomes. While the policy cannot be called a complete failure, it is far from being considered successful either.

Figure 14 summarizes findings given in this chapter. It does not attempt to show any relationships and cause/effects in any way. It is simply a graphical representation of the dimensions of ICT growth as they were identified from the qualitative analysis of the government policy documents and citizens' interview data.

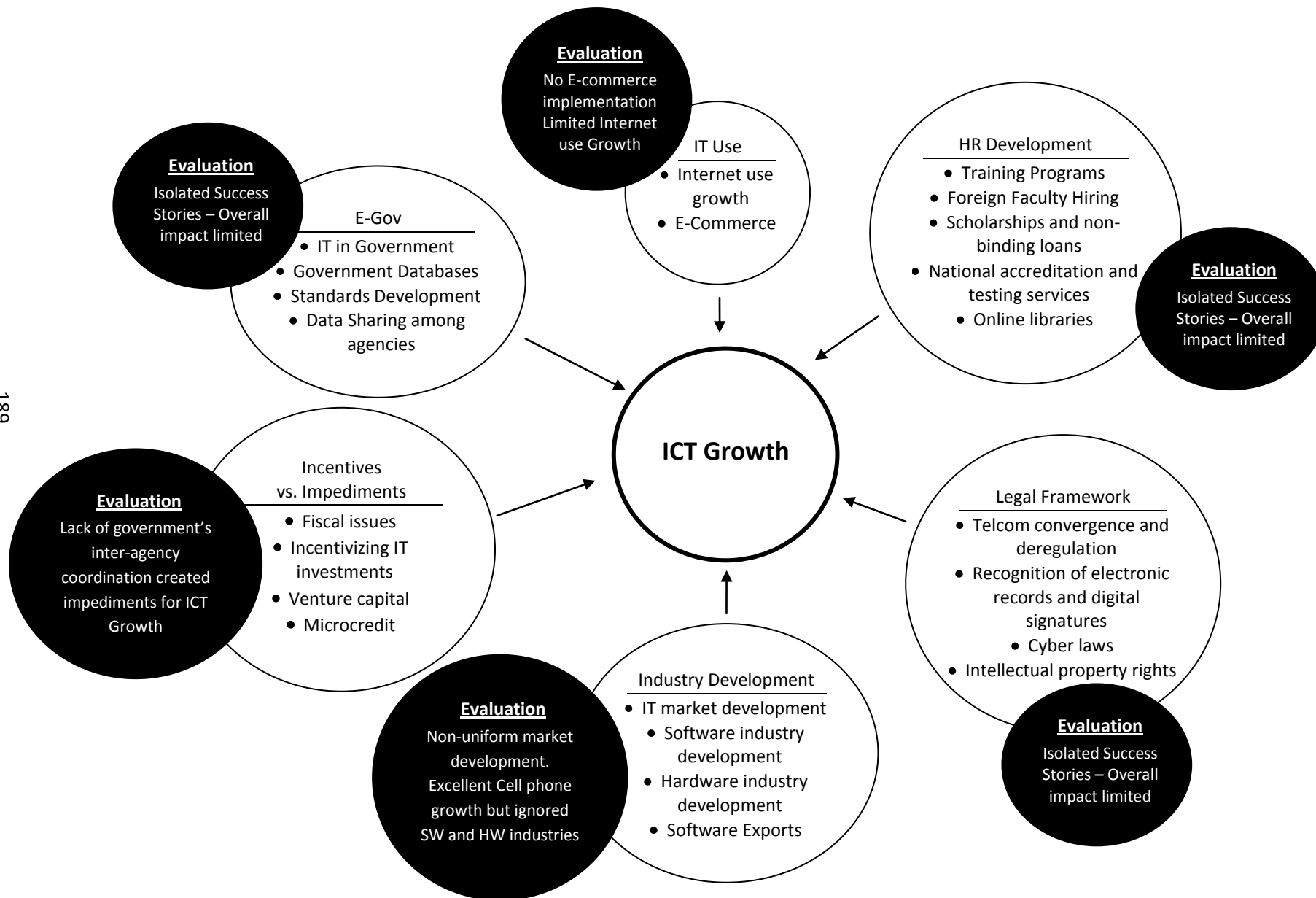


Figure 14: Axial Coding of ICT Growth Evaluation from ICT policy, action plan and other documented evidence

CHAPTER XI

ANTECEDENTS OF ICT GROWTH

Antecedents of ICT growth are important indicators that can provide insight into the status of ICT penetration in a country. As pointed out in chapter 1, current research on antecedents of ICT growth is sparse and therefore an in-depth analysis of the case of ICT growth in Pakistan was undertaken. This chapter identifies and presents antecedents of ICT growth in Pakistan. A list of antecedents that exhibit the conditions leading to the development of ICT policy decisions by the government is developed from grounded theory analysis of 54 interviews with government officials, law enforcement agencies, industry representatives, electronic and print media, educational institutions, activities and non-governmental organizations. These interviews lasted from 45 minutes to 2 hours and were recorded on audio and video. Further details were provided in Chapter 6 on research design

9.1 Grounded Theory based Data Analysis

Ten unique codes that are identified from the text include (1) globalization, (2) enabling legislation, (3) awareness of ICT benefits, (4) self-realization, self-confidence/pride, (5) market size, (6) regional competition, (7) law enforcement challenges, (8) international pressure, and (10) saturation of Western markets. Table 19 lists the identified open codes from different categories of research participants along

with key terms and phrases used by them. The repetition of the same codes during open coding shows that codes were saturated and that further interviewing and data collection might not yield more insights.

Research Participants	Identified Open Codes	Key Terms and Phrases
Govt. Officials (Policy Makers and Enforcers)	Globalization, Enabling Legislation, Market Size, Awareness, Self-Confidence/Pride, Regional Competition	"Everyone is doing it", "ICT policy changed ICT industry forever", "population size makes Pakistan an attractive investment opportunity for international investors", "We were left behind", "We have to do something", "India has already done it", "even India has not done it", "no other country has our kind of systems and databases", "Citizens and businesses demand better ICT connectivity", "use of ICT in businesses brings transparency in economy"
Law Enforcement and Police	Globalization, International Pressure, Law Enforcement Challenges	"Citizens appreciate when we use ICT", "Post-911 international aid", "trauma of terrorist attacks in Pakistan", "involvement of overseas Pakistanis returning home"
Industry Representatives (Hardware, Software and Service Providers)	Globalization, Enabling Legislation, Saturation of the Western markets, Regional Competition, Market Size	"Vendors need to sell their technologies", "ICT policy was a major step forward", "we have to compete with India", "We have a great market potential because of the size of our population", "Our customers are becoming quality-conscious"
Electronic and Print Media	Globalization, Regional Competition	"This is part of a global scenario", "Global Village", "Indian Information Industry", "People want to know the reality of things from independent sources", "Citizens expect accountability"
Educational Institutions	Enabling Legislation, Awareness, Self-Confidence/Pride	"ICT policy development provided major funding for educational institutions across Pakistan", "We have to educate masses; traditional education alone is not enough", "Only one other country has the kind of ICT based educational delivery system that we have developed"
Activists and NGOs	Awareness	"We have suffered enough from corruption", "We can spread the word around, gather people and stage demonstrations by sending a few short messages on cell phones and posting on online blogs"

Table 19: Open Codes, Key Terms and Phrases for Antecedents of ICT Growth

Table 20 shows the frequency of codes identified from the interviews. The frequency of a code is an indicator of the importance of a shared concept among research participants.

Table 20 also identifies two related concepts about the nature of each antecedent, i.e., internality or externality of an antecedent, and level of control. The idea of internality or externality of a factor is not new. Contingency theory and situational theory are built upon the concept of contingent factor such as internal antecedents that can be manipulated to control a system or process, e.g., a change process. The level of control points to the ability of policy makers in adjusting an antecedent to obtained desired results. For example, antecedents with high control are those that policy makers can fully control with tools such as legislation, e.g., allowing service providers to operate in certain geographic markets with limited or unlimited types of services. Antecedents with medium control imply that policy makers can put incentives or deterrents in place to achieve desired goals. For example, fiscal incentives can be offered to investors to bring in foreign direct investments. The antecedents with low control are the ones that are beyond the control of policy makers and individual governments.

Since the growth of ICT challenges older forms of information communication, the concept of internal and external antecedents becomes important. External antecedent of ICT growth imply that officials making/influencing government's ICT

policies had little or no control over a situation that presented itself as a threat or opportunity, e.g., globalization, international pressure. On the other hand, the concept of internal antecedents imply that officials making/influencing government ICT policies could control the situation and use it for ICT growth in the country, e.g. enabling legislation, awareness of ICT benefits. In other words, internal factors are indigenous that government can control. Some antecedents are classified as internal and external both to show situations where policy makers/influencers have limited control in its use for ICT growth. Justification for identification of an antecedent as external or internal is given in the following sections along with analysis and discussion of the antecedent.

Open Codes	Code Frequency	Antecedent Type	Level of Control
Globalization	128	Internal/External	Medium
Enabling Legislation	125	Internal	High
Awareness of ICT Benefits	114	Internal	Medium
Self-Realization, Self-Confidence/Pride	82	Internal	Medium
Market Size	77	Internal	High
Regional Competition	67	External	Medium
Law Enforcement Challenges	43	Internal/External	High
International Pressure	12	External	Low
Saturation of the Western Markets	11	External	Low

Table 20: Word Frequency in transcripts and codes list from 54 interviews

The next step in the analysis process was to scale up these open codes into themes and categories. Table 21 shows this categorization which resulted in the formulation of five major categories. The open codes that were closely related were grouped into the same category. Regional competition and Market size, in the absence of closely related codes were placed in categories of their own. Where appropriate, insights from existing literature are used in the analysis.

Themes/Categories	Closely Related Codes
Globalization	Saturation of Western Markets
Awareness of ICT Benefits	Self-Realization, Enabling Legislation, Self-Confidence/Pride
Regional Competition	
Market Size	
Law Enforcement Challenges	International Pressure

Table 21: Scaling up of Codes into Categories

9.2 Globalization

The increasingly interdependent nature of international markets and businesses plays an important role in the growth of ICT in developing countries. Several tasks in the service industry can be carried out in any part of the globe and delivered to customers on time by exploiting the time zone difference and "cheap" labor from developing countries (WTO, 2009). Establishment of international bodies such as the World Bank, International Monetary Fund (IMF) and World Trade Organization (WTO) make international trade and movement of goods across borders easy. However, the system for international trades involving services wasn't signed into an international agreement until 1995 when General Agreement on Trade in Services (GATS) came into force. This agreement establishes rules of international trade and has made economies of different countries inter-dependent.

The focus on free trade and easing restrictions on international trade has impacted the ICT growth in Pakistan significantly. For Pakistan, globalization has meant no or low tariffs on the import of ICT growth and free flow of capital to and from the country. Even though globalization has impacted ICT growth in the country significantly, its impact in other sectors of the economy can also be felt. It has brought a number of amenities that represent luxurious life styles in Pakistan and other developing nations (such as organized urban development, rise in the use of ICT and modern transportation). Several provisions of the national ICT policy and enabling legislation in Pakistan echo the goals of globalization.

The impact of globalization was heard loud and clear during the data collection process for this research. A large number of research participants attributed the fast paced growth of ICT industry in Pakistan to this antecedent. While globalization might mean different things to different people, it was clear from the analysis of interviews that to most shareholders, it meant an abundant supply of foreign direct investment and increasing share of ICT based offshore software development projects from Western Countries and the Middle East. In addition to the increase in foreign direct investment and ease of international monetary flow, the research participants identified promises of stability from the political regime as part of their understanding of globalization. During the analysis process, phrases and terms such as *“everyone is doing it”* (in an international sense), *“global village”* and being *“part of global scenario”* were

coded as globalization. These terms and phrases appeared repeatedly during these interviews. In fact, the word “*globalization*” appeared 128 times in the transcripts and list of codes from the 48 interviews which is an indicator of the strength of the belief that globalization has played an important role in (CT growth in Pakistan. The phrases such as “*everyone is doing it*” also provide a clue that it is a reactive or external type of antecedent.

Several government officials pointed to globalization as a major antecedent for ICT growth in Pakistan. A high ranking government official put things in perspective as follows:

Pakistan is part of international community and cannot remain isolated from the growth and development in other parts of the world. We want to be a productive member of the international trade and that's why we have taken measures to increase our software development related exports and to invite foreign investors to invest in ICT industry. We understand that we cannot bring about ICT revolution in the country from indigenous resources alone. Globalization of services and trade has certainly helped us attract foreign direct investment that revolutionized the whole country in just a few years. Now people from even the low socio-economic backgrounds, such as day laborers, gardeners, small shopkeepers and farmers have access to ICT.

The availability of foreign direct investment (which is considered a result of globalization), has significantly helped Pakistan in the growth of ICT industry. Economic indicators tracked and reported by Pakistan Telecommunication Authority (Table 4 in

Chapter 2) suggested a 54% rise in Foreign Direct Investment (FDI) during 2002-2007 which corresponds to 55% in teledensity (Figure 3 in Chapter 2) during the same timeframe. The rise in FDI was possible due to globalization of ICT services and movement of service providers from Europe and the Middle East in their bid to increase coverage areas and maximize profits.

The impact of globalization on various sectors of ICT industry (such as software development, telecommunication, hardware manufacturing, e-government, computerization of business transactions) is not the same. For example, ICT related service industry (such as software development and telecommunication) has benefitted more from globalization than sectors such as hardware manufacturing. Globalization of services such as offshore software development has also created an economy where it is hard for the government to keep track of revenues through traditional means of import/export control on the borders. A high ranking government official gave an example of this situation as follows:

We have over 800 active IT companies developing software for foreign clients in Pakistan. We believe that the total industry size is about 2 billion dollars. However, only half of that, 1 billion dollars, of software is exported using the WTO framework for services trade recognition. When we talk about trade of physical goods, it is easy to track them because they are imported or exported through sea ports or dry ports with a bill of landing. Services are harder to monitor. A person could be developing software or doing medical transcription, and the money could be coming into some personal bank account in London or New York with no recognition as IT

revenue. This is a worldwide problem and we are trying to make it easy for people to declare IT revenue without the fear of high taxes and such.

In the light of above analysis, it is clear that globalization has played an important role as an antecedent of the ICT growth in the Pakistan. The nature of this antecedent demonstrates that developing countries need to recognize the importance of international trade in attracting foreign direct investment that is vital for the ICT growth in developing countries. Since globalization is a being experienced all over the world, it is categorized as an external antecedent. Additionally, governments in developing countries can sometime use tools such as fiscal incentives to attract foreign direct investments. Therefore, the level of control for this antecedent is identified as medium.

9.2.1 Saturation of Western Markets

One of the major reasons for the flow of foreign direct investment into developing countries such as Pakistan was identified as the saturation of ICT markets in the Western (developed) world. Interestingly, this realization did not come from policy making government officials. It came from industry representatives from telecommunications companies and hardware providers. A research participant said the following:

After all, they [hardware vendors] have to sell their products. There is hardly any room for further growth in developed countries such as those in Europe and North America. In this situation where can they sell their ICT products and equipment? Of course developing nations such as Pakistan and India are the ideal places them. They will even sell those products which did not sell well in the West. They will tell our government officials that it will be an awesome thing for our people... they [hardware vendors] will do everything and anything to sell their equipments. In a sense, our country becomes a dumping ground for either those technologies that are outdated or were not recognized as good technologies in the developed world.

This research participant gave an example of a wireless broadband internet vendor. When its representatives made presentations to government officials and policy makers, they portrayed as if mass deployment and millions of customers would be just as easy as was in the case of the cell phone industry. The industry representatives were convinced that government officials' were shortsighted when policy decision revolved around particular tools and technologies. Another participant pointed out another type of shortsightedness in government officials:

What happens to the billions of dollars coming in the country? Most of that basically goes back from wherever it came. It goes back sometimes in the form of equipment purchases or consulting fees. Even if we consider for a moment that the foreign capital did stay in Pakistan for a while, it will eventually go out with huge profits.

While the saturation of the Western markets makes good sense, the conflicting accounts and negative image of developing nations as “dumping grounds” for the technologies from the West were troubling. It was even more troubling to hear these statements came from those who were potentially benefitting from selling these technologies.

It is clear that the saturation of ICT related hardware and services in the West can be regarded as an important antecedent for ICT growth in developing countries. Since saturation of Western markets is beyond the control of governments in developing countries, it is classified as an external antecedent. The governments in developing nations do not have any meaningful control in ensuring when Western markets become saturated for certain products and services and when it is profitable for multinational corporations to explore new markets.

9.3 Awareness of ICT Benefits

The officials’ point of view indicated that their awareness of the benefits of ICT growth played an important role. The realization of awareness comes from several sources such as experience with past initiatives and citizens’ opinion. This category is composed of three other open codes i.e., self- realization, enabling legislation and self-confidence/pride.

9.3.1 Self-Realization

Self-realization is one of the repeatedly mentioned codes by government officials and representatives of educational institutions. The code was identified as a result of recurring statements such as *“we are left behind”, “we have to do something”, “We have to educate the masses”, “traditional education alone is not enough”, and “we have suffered a lot”*. In fact, there were 114 such statements that showed a conviction to do something for the growth of ICT. The tone of these statements showed a sense of understanding that creating a fostering environment for ICT growth was the only logical choice for Pakistan. The government officials and educators realized the importance of ICT growth and its role in the socio-economic development. Several research participants shared stories of their philanthropic activities that aimed at introducing ICT in villages and underdeveloped areas where they originally belonged and grew up. As more interviews were done, it became clear that the development of a national agenda for ICT growth in some cases was the result of personal philanthropic experiences of these officials. Some of the government officials had strong opinions about the image building of Pakistan in the international community. A high level government official explained how self-realization and awareness have played a role in ICT growth:

We are part of the problem if we are not part of the solution. A number of social and economic problems that we face today are

result of the lack of dialog among our people. We need a platform where we can share these concerns and come up with solutions. ICT provide a perfect opportunity for creating such a platform... I have seriously started thinking that I am also in one way or the other part of the problem. If I do not contribute something positive for removing or at least reducing the problems that we as a nation face, I think I am contributing to the expansion of these problems... The steps that were taken to increase ICT availability to Pakistanis in all parts of the country mainly originated from the sense that we have to do it. We didn't have any choice to delay it any further. We had to let our people enjoy the benefits of ICT and develop a better Pakistan.

Today, there are a number of online blogs, TV shows, seminars and conferences that use the power of ICT in creating an environment of a dialog to discuss and raise awareness about various socio-economic issues and challenges that Pakistan faces. For these reasons, self-realization and awareness of the benefits of ICT growth are important antecedent in this research.

9.3.2 Enabling Legislation

The government of Pakistan inherited protective legal framework for telecommunications at the time of independence from British rule in 1947. The tightly monitored telecommunication industry gave birth to a monopoly based ICT industry in the 1970s and 1980s. However, during the 1990s, two major pieces of legislation were passed by the parliament (the telecommunication act of 1991 and telecommunication reorganization ordinance of 1994) that promised ending monopoly of the basic ICT infrastructure and easing the entry

of new players in Pakistani ICT industry by 2003. Several legal entities such as Pakistan Software Export Board and Pakistan Telecommunication Authority were established in 1995 and 1996 respectively to enable ICT growth in the country. The passage of ICT policy and action plan by the federal cabinet in 2000 also provided much needed specific direction and implementation ground work for opening up the ICT market, attracting foreign direct investment and ending monopoly of ICT sector. Tax and import/export duties were waived on ICT based revenues in software development and hardware import.

This situation fostered an environment where ICT growth could take place. Several research participants pointed out the importance of the legislation of the 1991 and 1994 as an important step towards unleashing the ICT industry. However, most agreed that the ICT policy of 2000 provided the tipping point for international investors and service providers to give investing in Pakistan a serious thought. Highlighting this situation, a high level government official said: *"ICT policy changed ICT industry forever"*. The CEO of a major telecommunication service provider appreciated the role of ICT policy as an important antecedent of ICT growth in the country as follows: *"ICT policy was a major step forward"*.

The ICT policy also provided much needed funding to meet the high speed connectivity requirements for software development industry in three major cities i.e., Islamabad, Lahore, and Karachi, by designating several buildings

that housed software development companies as Software Technology Parks. The designation of software technology parks was more than just naming a building. The designation meant provision of high speed internet connectivity to these buildings for enabling software companies to perform their international business activities efficiently (PSEB, 2009). During the last several years, high speed connectivity has been extended to various parts of the country. During November 2008 terrorist attacks on the Islamabad Marriott Hotel, the blast severely damaged the software technology park in the nearby block. The software development companies housed in the building could move to temporary buildings across Islamabad and were online without much interruption for their customers in other countries (Ghraib, 2008). A participant said:

The involvement of different stakeholders in formulating legislation to support ICT growth is a new kind of phenomenon in Pakistan. Supportive legislation are crucial in socio-economic development of any nation. Pakistan, like other developing countries, suffers from colonial bureaucracy where government officials think they know everything there is to benefit citizens. Maybe it is the nature of information communication technologies that old bureaucrats feel handicapped and need other stakeholders to join in formulating legislation to support ICT growth. Whatever it is, I am convinced that the awareness of the importance of ICT growth in socio-economic development of the country as well as importance of stakeholders' involvement in formulating legislation is growing in Pakistan. And I think this good for the government and this is good for our businesses and citizens.

Legislation to develop ICT industry have a spillover effect. For example, the results of providing high speed internet connectivity to software development companies were perceived as successful. Therefore, enabling legislation made funding for the development of high speed internet connectivity for universities across Pakistan easy. This has brought Pakistani universities closer and online. Facilities such as video conferencing, online libraries and research collaboration between Pakistani and foreign researchers are now available. The use of ICT for research collaboration and dissemination of educational content at the Virtual University of Pakistan, Allama Iqbal Open University, National University of Science and Technology and other universities across Pakistan are some examples of the success of enabling legislation in ICT growth in the country.

From the telecommunication aspect of ICT, enabling legislation provided fertile ground for local and foreign investors and legal protection of their interests. It also created an excellent competitive environment among service providers to deliver quality telecommunication services at bottom-line prices. The adoption of Calling Party Pays regime (CPP – in which the cell phone owner does not pay anything for receiving a call) had an important role in the mass adoption of cellular phone in Pakistan.

There are several challenges that remain. Further improvements in enabling legislation are also warranted. For example, enabling legislation for ICT industry development did not help the hardware manufacturing industry. While these legislation were successful in creating competitive environment for the cellular phone industry; broadband internet penetration, e-commerce, e-government and online facilities for citizens are still very limited.

Since government officials in developing countries have control over supporting ICT growth with enabling legislation, it is classified as an internal antecedent with high level of control.

9.3.3 Self-Confidence/Pride

Individuals involved in the transformation of ICT sector in Pakistan faced several daunting challenges. However, as they overcame these problems, the confidence and *"can do it"* spirit reinforced their passion for developing an environment for more sophisticated uses of ICT in the country. The sense of self-confidence or pride was coded from phrases such as *"we are the only country with such systems"*, *"no other country has our kind of systems and databases"* and *"only one other country has the kind of ICT based educational delivery system that we have developed"*.

The belief that self-confidence or pride can be an antecedent for the ICT growth in a developing country started emerging during an interview with a high

level government official in National Database and Registration Authority (NADRA). NADRA has developed one of the largest IT organizations in the country with about 12,000 employees. Any Pakistani, who has a national identity card or a passport, has a personal profile in this database loaded with biometric data such as finger prints and facial recognition. A national identity card is the major identity document in Pakistan and most business transactions, personal financial transactions (at banks), property transfers etc., require recording of the national identity card number. The government official seemed very content with the development of a national database for citizens' records and said:

We are the only country in the world with such a large database. Developed countries don't even have anything similar to what we have created. Even Americans do not have anything of this magnitude.

Another episode of self-confidence/pride was apparent during interviews with government officials who are computerizing electoral rolls and election results at the election commission of Pakistan. One of the young government officials said:

We gave a presentation of our electoral rolls system and the ease of viewing personal records for accuracy to Mr. Boucher [Richard Boucher: U.S. Assistant Secretary of State for South and Central

Asian Affairs] in a ceremony at the US embassy in Islamabad. After the presentation, Mr. Boucher patted me on the shoulder and said, 'young man, even we don't have such a system for our electoral rolls'. I was very happy and surprised to find out that we have actually developed something that Americans have not yet developed.

From the evidence presented above, it is understandable that positive experiences (actual or assumed) and success stories with implementing ICT systems are important in increasing self-confidence and pride. These successes have not only helped government officials adopt aggressive ICT growth policies but also export such experiences to other developing nations. For example, NADRA (National Database and Registration Authority) has recently implemented a driving license issuance system for the Government of Bangladesh and a passport printing and issuance system for the Government of Sudan. Therefore, the role of self-realization, enabling legislation and self-confidence and pride is important in raising awareness of the benefits of ICT growth among ICT policy makers.

9.4 Regional Competition

Regional rivalries and competition were clearly important antecedents for ICT growth in the country. The research participants consistently compared the state of ICT in Pakistan with that in India. The intensity of emotions during such comparisons made it one of the important antecedents of ICT growth. Willing (2007) pointed out that eight

of the ten fastest emerging ICT markets (Pakistan, India, Bangladesh, China, Russia, Ukraine, Vietnam and Indonesia) are geographically contiguous. Several of these countries have long standing disputes. These disputes are a major cause of competition among the neighbors.

Historical and regional facts about the estranged relationship between Pakistan and India make it no surprise that government officials and policy makers compare the conditions in the two countries to fine tune their policies. They seem to not only recognize the importance of the Indian experience but also learn from it. One of the government officials listed the following advantages that Indian software development industry had over Pakistan during the 1990s:

India has had a bit of headstart on us in some areas of ICT industry. For example, graduates with technical degrees from the IITs [Indian Institute of Technology] and many state administered educational facilities have been in a larger volume; much larger volume than ours. They have had a protected industry historically, so the domestic projects created the management expertise to tie up different things together. Financing has been available to them, both private equity from the large business groups, as well as from the stock market and other sources. Finally, marketing-wise, due to the large numbers of Indian expatriates, they were able to source some of the earlier projects... In Pakistan, we were slightly late in all of these areas – financing, marketing, HR, and management. But now we have, as I mentioned earlier, some world class companies in Pakistan... and by the same token, on the growth side potential, the opportunities for us are tremendous. In several of ICT industry areas we have done much better than India. Historically, we have a better telecommunication system in place and growth rate of ICT industry has been phenomenal.

Another government official pointed to the need for the same level of focus in ICT growth as for developing a nuclear capability in response to India's 1974 atomic bomb explosion:

We need the same kind of seriousness and focus we had in developing the nuclear bomb. I don't like nuclear bombs, but there was a focus. If we can bring the same focus, to the growth of ICT industry in Pakistan, I think it will revolutionize Pakistan forever.

The evidence from the existing literature as well as strong and sometimes passionate opinions of government officials makes regional competition an important antecedent of ICT growth. The role of success stories (successful implementation of ICT systems, use of ICT for alleviating poverty and enhancing people's life) have played an important role in raising awareness of the benefits of ICT growth in the country.

9.5 Market Size

Market size is an important factor that investors (local or foreign) look at while making a decision. Government officials were fully aware of the potential of Pakistani market. The enabling legislation and investment friendly policies for ICT growth made market size an important selling point. Pakistan is the sixth largest country in terms of size of its population [about 160 millions population]. This makes Pakistan an attractive

market for investors. The telecommunication market alone has expanded from 300,000 customers in 2000 to over 95 million telecommunication customers in April 2009. One of the government officials said:

Pakistan is an ideal place for ICT investors. Most of the urban population is concentrated in just a handful of cities where economies of scale make it easy to roll out ICT services quickly. When the cash flow starts for these companies from urban centers, they can slowly start rolling their services to smaller towns and villages.

Other officials as well as industry representatives pointed to the market size as an important antecedent for ICT growth in the country.

This antecedent is classified as internal because government policies can limit market size by denying to setup and offer service to certain areas for different reasons effectively reducing the market size (e.g., for the sake of security). For example, in the mid 1990s, cellular phone service in parts of Karachi was shut down for two years due to law and order situation and use of cell phone for coordinated criminal activities. Karachi is the largest city in Pakistan with over 20 million people. More recently, due to the military operations against militants in Swat valley and northern areas of Pakistan, cellular phone service is frequently shut down to disrupt cell phone use by the fighter groups.

9.6 Law Enforcement Challenges

Post September 11, 2001 situations put Pakistan in the limelight in a number of ways. Its strategic geographic location and proximity to Afghanistan made Pakistan prone to infiltration from violent groups with conflicting agendas. As a result, law enforcement situation has become worrisome. However, efforts to develop databases and use modern ICT as well as forensic techniques to support law enforcement agencies started around 2000. Pakistani police departments are administered at the provincial (state) level. Building upon the colonial legacy, traditionally the role and image of police has been negative in society. A police officer's pay is usually less than \$100 a month which is not enough for even the modest life style for a small family (Khan, 2009). In most cases, there is no specific requirement on education for being hired as a police officer [hiring in police departments is usually politically motivated or is the result of bribes]. Therefore, police departments basically become tools to support corruption of influential politicians and government officials. People who have a legitimate reason to go to police would normally avoid implicating themselves with the matters of police (Khan, 2009).

The inauguration of Motorway (interstate highway system) in 1997 brought about a revolution in perceptions about police. The motorway and highway police department was instituted as an independent entity. The officers were educated (a minimum of undergraduate degree was a hiring requirement), were paid well and

equipped with state of the art ICT equipment for motorway and highway laws enforcement. The fair application of the law by this police department soon caught the attention of other police departments and a movement to revolutionize police departments in the four provinces and the federal capital started. Islamabad Traffic Police and Islamabad Police Departments were soon turned into models. Online systems were developed during 2005-2007 to file and track investigation progress after the First Investigation Report (FIR) is filed at any of the police stations in Islamabad. A visit to the IT support department for Islamabad Police and interview with their IT director was part of this research. He explained:

We are bringing transparency to the matters of police in Islamabad. Traditionally, police departments, like other bureaucratic agencies in Pakistan, are considered corrupt where a file would not move until someone pays bribes. We are trying to change that culture and bring transparency to the dealings of police. When you file a report [FIR], progress of the case can be tracked online. We have to overcome a lot of challenges from within the police department as far as training and consistent use of online reporting system is concerned but we are making progress. We have involved several citizens who have live in foreign countries in giving us ideas about image building of Islamabad police.

Additionally, the establishment of Rescue 15 (equivalent of 911 emergency services in the US) was another effort to use ICT in establishing a bridge between the citizens and the police departments. These developments and restructurings within law

enforcement agencies are not isolated events and are helping in the growth of ICT significantly. Therefore it is identified as an important antecedent of ICT growth in the country.

9.6.1 International Pressure

After September 11, 2001, the situation of law enforcement agencies changed dramatically. Mounting international pressure and the movement of terrorist suspects from Afghanistan to parts of Pakistan meant foreign aid to deploy and use ICT based intelligence infrastructure. It also provided funding for the development of databases for crime control and prevention.

The use of ICT during the beheading of Daniel Pearl (CNN, 2002) in Karachi sparked an outcry for developing tech savvy Pakistani intelligence agencies. Emails were sent to lure Daniel Pearl in a trap and video of his beheading were posted online. Law enforcement agencies were able to track down the suspected master mind but it was too late for Mr. Pearl. Cyber crimes ordinance was finally signed into law in 2007. Even though this piece of legislation is contested vigorously by civil liberties activists, it sets penalties for crimes and fraud using ICT.

For the effective enforcement of cyber crimes utilizing ICT devices and infrastructure, a National Response Center for Cyber Crimes (NR3C) was established at the Federal Investigation Authority (FIA). FIA was also chartered to

develop border control system with diametric recognition software, i.e., Personal Identification Secure Comparison and Evaluation System (PISCES), as well as Automated Fingerprint Identification System (AFIS) and special investigation group (SIG). A high ranking government official in FIA explained:

Since September 11, 2001, we have seen a substantial increase in funding for sophisticated ICT tools. We have developed and deployed several applications specially to do with forensics analysis of crime scenes, border control system, finger and facial recognition system. We have also developed capacity for criminal investigation involving computers and ICT.

Other law enforcement agencies such as Islamabad Police have seen substantial increase in their funding of ICT services and applications. For example, Geographic Information System (GIS) based software for emergency response unit in addition to ICT tools for communication were deployed during 2002-2007. It is therefore important to consider law enforcement challenges and international pressure for the use of ICT in police and intelligence agencies as antecedents of ICT growth in the country.

9.6 Summary

The literature on the antecedents of the ICT growth in developing countries is sparse and therefore an investigation of these antecedents was included in this research. A total of nine antecedents were identified in this chapter. These antecedents were further scaled up in five themes. The chapter also discusses rationale for classifying antecedents as internal or external. This classification is helpful in indicating the level of control that governments in developing countries have over getting desired level of ICT growth by developing appropriate ICT policies. This classification has implication for government's ICT policy designers. The future ICT policy designs can recognize emerging external antecedents and use them to align internal antecedents for ICT growth.

The chapter provided an in-depth analysis of these antecedents within the context of ICT growth in Pakistan. Based upon the analysis of the identified codes, interview recordings and transcripts, an axial model of the antecedents of ICT growth was developed (Figure 15). The model is organized in five different types of antecedents as they were given in Table 21. According to the guidelines for developing axial coding (Creswell, 1999; Creswell, 2006), ICT growth was put in the center and the five categories of antecedents were laid out around it. The model demonstrates that internal and external antecedents both play an important in the ICT growth. It is clear from the evidence demonstrated in this chapter that these antecedents do not lead to

ICT growth in developing countries in isolation. For example, globalization or regional competition alone cannot bring about change in the ICT sector. These external antecedents must be coupled with internal antecedents such as awareness and passage of the enabling legislation so that foreign direct investments are assured of financial as well as business environment security. Some antecedents have larger role in creating enabling environment conducive to bring about the needed change. However, the impact of other antecedents-such as self-confidence/pride, market size, saturation of Western markets cannot be ignored. Therefore it is important for developing countries to understand and capitalize on these antecedents for creating a positive environment that leads to ICT growth.

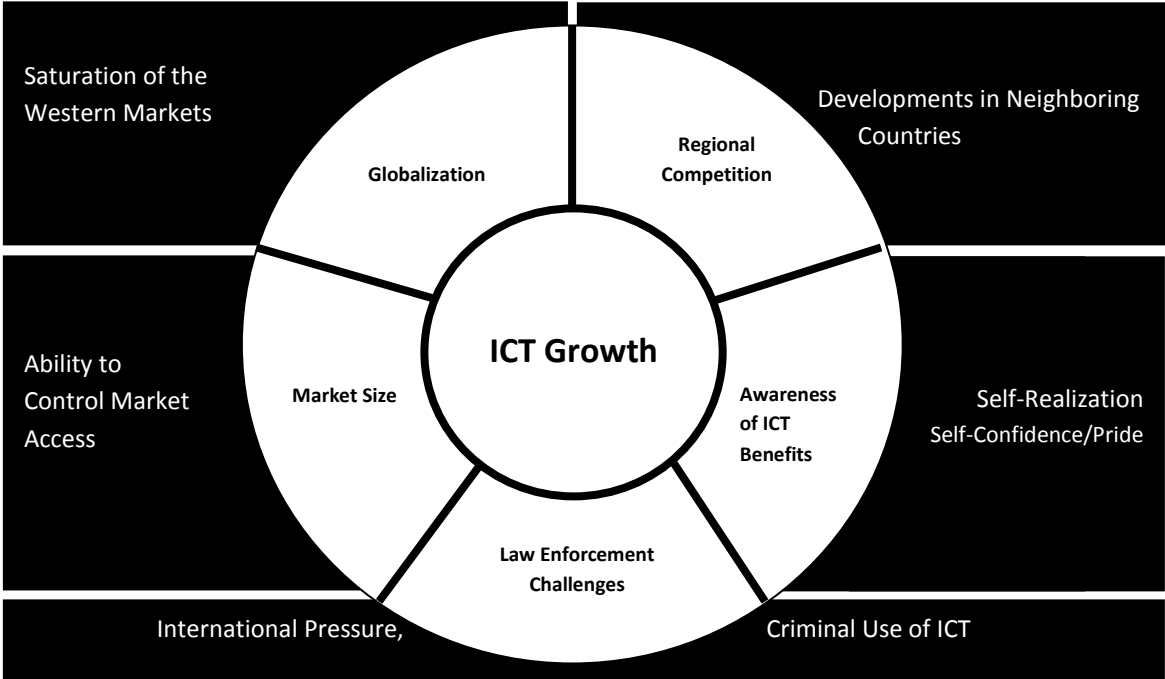


Figure 15: Axial Coding of the Antecedents of ICT Growth

CHAPTER X

ICT GROWTH AND SOCIO-ECONOMIC DEVELOPMENT OF CITIZENS

This chapter presents analysis and findings of citizens' narratives. A set of dimensions for socio-economic development from citizens' perspective is developed. This analysis is helpful in understanding the impact of ICT growth on the socio-economic development. These dimensions extend understanding of Madon's (2000) dimensions of internet based socio-economic development. A theoretical model of ICT growth and socio-economic development is developed which relates antecedents of ICT growth (Chapter 8) with dimensions of ICT growth (Chapter 9) and dimensions of socio-economic development (Chapter 10). The participants for this part of the research were mainly selected from Islamabad/Rawalpindi (in the North) and Multan region (in the central part of Pakistan). They were selected according to criteria that included gender, education, income and domicile. Grounded theory analysis was used to analyze citizens' narratives while ensuring sensitivity to participants' background, presentation and integration of ideas.

10.1 Background of Research Participants (Citizens)

An understanding of the personal backgrounds of research participants provides insights into participants' beliefs and social-construction of their life experiences. The

use of personal narratives of citizens in conjunction with grounded theory analysis increases trustworthiness and validity of research. Chapter 6 provided details of theoretical sampling of citizens and their contextual backgrounds (Table 12). Table 22 provides a brief summary of the narratives of some participants.

Participant #	Selection Criteria	Narrative Summary and Background
1	Gender: Woman Domicile: Rural Education: Illiterate Income: Medium ~50 years old entrepreneur	This participant has a small cloth sale business in several nearby towns. She travels as far away as 300 miles to buy cloth at whole sale prices and sells at profit to villagers who cannot travel. Her business has grown significantly since she got a cell phone because her customers call her and tell what they want. Her personalized service for customers has increased her revenues. She said: "I continuously travel from one village to another and for buying wholesale cloth. My customers love the fact that they can place 'special orders'."
2	Gender: Man Domicile: Urban Education: High School Income: High 35 years old entrepreneur	This participant owns a small mechanical parts manufacturing facility in a small urban area. The demand for his quality parts has grown steadily between 2003 and 2007. In late 2007, he imported a used machine to automate the manufacturing process. However, the machine had missing parts and was not in operational condition. He used internet to find a manual for this machine, made and fixed some parts and brought the machine in operational condition. The variation in production process has gone down (0.0001% quality rejection rate) and demand has increased exponentially (800% in one year). He uses internet, email and cell phone to stay in touch with his clients in different countries. He said: "I have no idea what I will do without internet." He said: "my business has expanded several folds since I started using a phone and email to keep in touch with my suppliers"
3	Gender: Woman Domicile: Urban Education: Graduate Income: High ~50 years old school teacher	Her children permanently live in United States. She said: "I don't cry anymore; I can speak with my children as much as I want without worrying about the bill." Calls to United States and most other countries do not cost more than local call toll. She said she had to wait every weekend for her children to call her. Now she says she can call whenever she wants. "I sometimes see my children on a webcam as well" she said. This is one of the most important changes that ICT have brought in her life.
4	Gender: Man Domicile: Rural Education: Illiterate Income: Low ~40 years old honey farmer	He travels to find places with flowers for his bees. In addition to keeping in touch with his family, he relies on his cell phone to find markets where he will find the best rates for his honey. He said: "I do not have to run around anymore to find good rate for my honey." Sometimes bees develop a deadly fungus. He can immediately call someone to bring treatment for his bees from city. He said: "It is very expensive and difficult to raise bees

		once again if they die due to fungus. I don't suffer those losses anymore because I can get medication right away."
5	Gender: Man Domicile: Urban Education: Illiterate Income: High ~38 years old entrepreneur	This "illiterate mechanical engineer" was making a pulley system for a machine that could be used in construction or agriculture businesses to fetch loads or water. He said: "I got the idea from a TV program. I already have a customer who will be using it in his construction business." Additionally, he runs public transport system with 5 passenger vans. "I can keep in touch with my employees and know exactly where they are when the van breaks down. I can go and fix it." he said.
6	Gender: Woman Domicile: Urban Education: Graduate Income: Low ~22 years university student	"Initially, My parents did not allow me to go to Islamabad to study at one of the premier universities in Pakistan" this participant said. Her parents were concerned of her safety in a city as far away as 500 miles. However, things changed when they got her a cell phone and found out that they could always stay in touch with her. She said: "I probably would not be pursuing higher education if I didn't have a cell phone and my parents didn't feel that they can keep in touch with me anytime they wanted." She has access to a large online library which helps her in research and access to latest publication on her areas of interest. She explained: "I use online library to find research papers to support my literature review."
7	Gender: Man Domicile: Rural Education: Illiterate Income: Medium ~23 years old barber	This participant works in his father's barber shop. He spends hours on phone with prostitutes. His daily pocket money is Rs 20 but his daily cell phone expense is Rs. 500. To satisfy his addiction, he steals money from the barber shop cash drawer. "I know it is wrong to steal money to pay for my cell phone bill but I cannot help it" he said. "My father wants me to get married but I have a lot of aspirations. I want to be famous and rich and have a good life" he added. He explained: "The cell phone makes me live a life of fantasy and I feel that I am important because some women need me. I know it is not good but I cannot help it and don't know how to stop it."
8	Gender: Woman Domicile: Rural Education: Illiterate Income: Medium ~50 years old housewife	"I have seen a lot of girls and boys making out on phone and even deciding on marrying without their parents' approval; this is very bad" this participant said. This conservative woman in a village admits that cell phones are very helpful in several aspects but doesn't want young girls and boys to be carrying phones around just to waste time on "useless" talk. She sees a major transformation in the social structure in rural areas where parents are losing control over their children in young age due to cell phones.
9	Gender: Woman	This participant accidentally got involved in IT administration because of good credentials in

	<p>Domicile: Urban Education: Graduate Income: High ~45 years old IT administrator</p>	<p>project management. “My boss did not give me a choice and wanted me to head the IT department. I told him that I didn’t know a thing about computers and he said, you can learn these things. I got a big raise too.” She explained: “I enjoy this job because I have learned a lot here but it has turned my family life upside-down.” She carries her phone with her when she is cooking food for her children just in case her services are needed during network and IT services disruptions.</p>
10	<p>Gender: Man Domicile: Urban Education: Illiterate Income: Medium ~34 years old donkey cart owner</p>	<p>This participant hauls loads from warehouses to furniture showrooms when someone makes a purchase in a showroom. “The owner of the showroom would go peak out of his place to see if a donkey cart person was there” he said. Then he got a cell phone. He cannot read... not even numbers (he visually matches patterns for a phone number on a piece of paper and dial pad of his phone when he needs to dial a number). He explained: “Someone helped me with setting up the phone for distinctive ring tones. Showroom owners give me a missed call, and I can recognize who needs my help by a specific ring tone setup for a particular showroom owner. Now, I can work as much as I want.”</p>
11	<p>Gender: Man Domicile: Urban Education: High School Income: High ~27 years old plumber</p>	<p>“I started my plumbing business a few years ago. I rented a place to setup my shop. I did a mediocre business” he said. He bought a cell phone in 2007. Now, he only puts his cell number on the business card. He explained: “I do more business and my customers never have to leave their place to come see me. They just call me and I am there for service and repair in a few minutes.” His business has expanded significantly and costs have gone down. He explained: “my costs of doing a business have gone down because I don’t need to rent a shop anymore.”</p>
12	<p>Gender: Man Domicile: Urban Education: Graduate Income: High ~39 years old vice-president of a software development house</p>	<p>This participant travels frequently to see his clients overseas in Europe and United States. “ICT have changed my life; my life revolves around these technologies” he said. He uses online meetings with his clients but for major decisions such as signing off a large project or deliver final product in a ceremonial manner, he travels for weeks away from his little children, wife and old parents. “When I am on a business trip abroad, I can still see my 5 and 2 years old girls on webcam and they can see me too; my mother does not feel that I am away because she can still see me and speak with me every night before she goes to bed. ICT keep us united even when we are physically apart” he added.</p>
<p>Table 22: Background and Narratives of Select Participants</p>		

10.2 Dimensions of Socio-Economic Development

The analysis of citizens' narratives was done using grounded theory method which involved identification of codes and categories through the process of theoretical coding. By using the method of iterative conceptualization on these categories of codes, higher level categories were developed which represented an increasing level of abstraction. These abstract categories were scaled up to develop broader level themes that are referred to as dimensions of socio-economic development in this research. Table 20 provides dimensions, categories of codes, and their frequencies, along with key terms and phrases that support the identification of these dimensions.

A total of five dimensions were identified. These dimensions are grounded in qualitative data and provide an understanding of what socio-economic development means to citizens. The literature review on socio-economic development (Chapter 2) found that different academic fields (such as economics, sociology, political science, geography, climatology, medical science, and information systems) define this term differently and that there is no consensus on the definition. It was one of the objectives of this research to comprehend socio-economic development in terms of citizens' understanding. The identification of the five dimensions in Table 23 fulfills this objective. These dimensions include:

- Social contact – ability to stay in touch with family and friends

- Economic transformation – effective management of existing business, new business development, and demise of old businesses
- Quality of Life – opportunities for education and learning, opportunities for healthcare, participation in the political process, self-fulfillment, self-efficacy, self-empowerment
- Cultural Evolution – changes in social behavior, westernization of culture, family life, respect for others, addiction of ICT use, pornography, nuisance, waste of time, unnecessary expense, lack of attention
- Personal security and Criminal Use – sense of security, peace of mind, harassment, sexual misconduct, fear of being robbed, stealing, online fraud, illegal use of ICT

The identification of these dimensions is a significant contribution to the literature on socio-economic development because it enhances understanding of the concept from citizens' perspective.

10.2.1 Social Contact – (“I don’t cry anymore”)

Social contact is referred to as the ability of a person to stay in touch with family and friends. While social contact may be defined in a number of ways, for the purpose of this research, it is defined in terms that the research participants used, e.g., staying in touch with family and friends, developing new friendships, and replacement of pen-pals with SMS buddies. The emphasis on social contact (frequency of related codes was 367)

shows that it was very important for research participants to be able to stay in touch with family and friends and develop new friendships. Another evidence of the importance of this dimension comes from a quick review of ICT service providers' advertisements that show the ease ICT brings in keeping in touch with family and friends.

Dimensions of Socio-Economic Development	Categories of Codes	Frequency	Key terms and phrases
Social Contact	Staying in touch with family and friends, Develop new friendships, replacement of pen-pals to SMS buddies	367	“Now I can keep in touch with my family whenever and wherever I go”, “I don’t cry anymore; I can speak with my children as much as I want without worrying about the bill”, “I sometimes see my children [living abroad] on a webcam as well”, “the ability to stay in touch with family alone is the most important blessing that comes with owning a cell phone”, “when I am on a business trip abroad, I can still see my 5 and 2 years old girls on webcam and they can see me too; ICT keep us united even when we are physically apart”, “I probably would not be pursuing higher education if I didn’t have a cell phone and my parents didn’t feel that they can keep in touch with me anytime they wanted.”
Economic Transformation	Effective management of current business, Increased business opportunities, New business opportunities, Status of old business	289	“my costs of doing a business have gone down because I don’t need to rent a shop anymore”, “My business has expanded several folds since I started using a phone and email to keep in touch with my suppliers”, “I do more business and my customers never have to leave their place to come see me. They just call me and I am there for a service in a few minutes”, “I have just hired three employees to look after my current business and I am now starting a new business”, “I had a public call office (PCO) in a village and made tons of money but for the last three years, I have shut it down and started a new business; no one uses PCO anymore; everyone has a cell phone.”
Quality of Life	opportunities for education and learning, opportunities for healthcare, participation in the political process, self-fulfillment, self-efficacy, self-empowerment, news and media, entertainment	254	“I probably would not be pursuing higher education if I didn’t have a cell phone and my parents didn’t feel that they can keep in touch with me anytime they wanted”, “I use online library to find research papers to support my literature review”, “I frequently send SMS [short messaging service] to TV channels that display my message on current affairs at the bottom of the screen; I feel my SMS gives me voice and I can say things I believe in”, “I have not bought a news paper in years; I get my news on internet and TV”, “I love live coverage of political issues; it gives me a sense of involvement and I feel I am learning and participating.”

Cultural Evolution	Changes in social behavior, Westernization/globalization of culture, Family life, Respect for others, Addiction of ICT use, Nuisance, Pornography, Waste of time, Unnecessary expense, Lack of attention, Lack of Privacy	126	“I have seen a lot of girls and boys making out on phone and even deciding on marrying without their parents’ approval; this is very bad”, “People see icons of Western culture, try to adopt their style and act like them too... this is a big threat to indigenous culture and values”, I cannot concentrate on anything because of I am always getting emails and SMS – even in the middle of the night”, I cannot go to a park or anywhere else and have a quiet time; phones keep ringing everywhere”, “only time I get relaxed is when I shutdown my computer and cell phone.”
Personal Security and Criminal Use	Sense of security, peace of mind, harassment, Sexual misconduct, fear of being robbed, Stealing, Online Fraud, ICT use for Criminal Activities	193	“Even if I don’t have to call anyone, my cell phone gives me a sense of security that I am not alone”, “cell phones give peace of mind that you can call anyone if you are in trouble”, “I was once robbed; all this other dude wanted was my cell phone”, “I know it is wrong to steal money to pay for my cell phone bill but I cannot help it”, “a lot of online ‘scamsters’ would try to rip you off if they found out that you were an easy victim”
Table 23: Dimensions of Socio-Economic Development, Categories of Codes, Frequencies, Key terms and Phrases			

An educated urban woman narrated an emotional personal story whose children live abroad. She had not seen one of her sons in several years. She used to wait for the weekends so that her children can call her. The international call was expensive and she could only speak for a few minutes. She used to cry during the week and anxiously counted days until the weekend.

She said:

I used to cry too much and my husband always told me that our children abroad are studying and doing very well. They take care of us; they call us and visit us frequently. The youngest one has not visited me in years. He loves me very much but his work visa application is in progress and he cannot come to see me until it is complete. I miss him too much and when I think about him, my eyes start shedding tears. I cannot stop missing him.

She did not believe when she heard of special international calling packages that allowed her to make international calls at local toll rates. She explained:

I don't cry anymore; I can speak with my children as much as I want without worrying about the bill. I call them almost every morning. I can actually call them anytime I want but I understand that they might be busy. So, I only call them in the morning which is evening for them.

She also explained how internet service has improved and that she has learned how to use a computer to go online and see her children on a webcam. Her excitement,

emotions, and sentiments about the role of ICT in her life demonstrated the importance of social contact in the social development of citizens.

An executive of a software development house who frequently travels internationally narrated an emotional and powerful personal story. He travels for weeks leaving his two little girls, wife, and old parents back home. His ability to stay connected with his family is an important aspect of his ICT use. He explained:

When I am on a business trip abroad, I can still see my 5 and 2 years old girls on webcam and they can see me too; my mother does not feel that I am away because she can still see me and speak with me every night before she goes to her bed. ICT keep us united even when we are physically apart.

His use of ICT is not limited to staying in touch with family alone. His job and his responsibilities as an executive in a multinational organization requires him to always stay connected.

It was clear that for educated participants, the scope of ICT services and devices was not limited to voice communication alone. The use of computer and internet also compliment their usual ICT usage.

The use of ICT for staying in touch with family is not limited to educated participants in urban areas alone. From illiterate farmers in rural areas to blue-collar workers on the busy streets in Multan and Islamabad, the ability to stay in touch with family is the most important aspect of their everyday ICT use. However, for illiterate

people, the scope of devices that they can use usually remains limited to cell phones. Cell phones are readily available, easy to carry and cheap (cell phone is available for under \$20 – 1500 rupees – and the cost of ownership might be as low as a couple of dollars each month depending upon the amount of use). It makes these devices ideal for use by people with little to no education. While the lack of formal education prevents them from using computers, internet and other advanced ICT devices and services, it does not always mean that use of cell phone would be limited to voice communication alone. The use of Short Messaging Service (SMS – that allows short messages to be sent on cell phones) and Multimedia Messaging Service (MMS – that allows files, photos and videos to be sent on cell phones) was quite common among illiterate research participants.

An illiterate research participant, who is a honey farmer by profession, travels great distances to find flowers. His job requires him to stay away from his family for months. His cell phone allows him to keep in touch with his wife and parents. He said:

I speak with my wife for hours in the night when the service is free. If my mother needs to speak with me, she can always find me. I cannot read but a friend of mine has shown me how to take a photo on my cell phone and send it to someone else. I do send photos of new places to my family that I discover in search of flowers for bees.

The concept of friendship was very important to several participants. The stories of meeting someone at a bus stop or elsewhere and then staying in touch with them were credited to ICT. A young participant said:

I love making friendships. I used to have 20 pen-pals when I was in school. I have not written a single letter in three years now and I have more friends now. When I SMS a joke, or forward an email, sometimes there could be as many as 300 receipts. I have a facebook [facebook.com] page and my family and friends in other cities and abroad know whatever goes on in my life at work and home. I just love it all and I cannot imagine how anyone else can live without these things.

The support presented above to demonstrate the importance of “social contact” as a dimension of socio-economic development is grounded in the qualitative data collected from interviews with citizens. A quick review of ICT service providers’ advertisements in national newspapers seems to support this notion strongly. These advertisements usually offer special calling rates or ease of use in staying in touch with friends and family. Figure 16 shows one such advertisement.

telenor PERSONA

آپ کے فرینڈز اینڈ فیملی، سب سے خاص
جب ہی توہیں زیادہ پاس

SPECIAL 5 IVE

اب کریں صرف 25 پیسے میں کال
اپنے پانچ Telenor فرینڈز اینڈ فیملی نمبرز پر
صرف 150 روپے ماہانہ میں

Special 5ive
SIMPLE, EASY اور FREE پیکجز کے لیے ہے

سیسکریپشن کے لیے
111 345 100 | 345
یا قریبی Telenor سٹورز سے رابطہ کریں

www.telenor.com.pk

Figure 16: A Newspaper Advertisement of a Cellular Service Provider Offering

It is therefore appropriate to regard “Social Contact” as one of dimensions of socio-economic development.

10.2.2 Economic Transformation – (“I can earn as much as I want”)

Economic transformation is a broad term which not only refers to economic productivity due to support in effective management of business but also increase in the market size of existing business, new business opportunities and demise of some old business. This concept emerged as an important theme across research participants from different backgrounds and therefore has been identified as a dimension of socio-economic development.

The use of ICT (such as cellular phones, internet, television) to support economic transformation in some cases was unique as well as interesting. A research participant, who hauls loads on his donkey driven cart from warehouses to furniture showrooms when someone makes a purchase, narrated the following:

The owner of the showroom would go and peek out of his place to see if someone with a donkey cart was there. There are a lot of people searching for work around the furniture market. I get paid only when a customer makes a purchase at a showroom, and I am available to bring furniture from the warehouse. I am not too lucky and most of the time others [other workers] who are standing nearby will grab the job before I even know about it.

Then he got a cell phone. He cannot read... not even numbers (when he needs to dial a number, he visually matches patterns for a number on a piece of paper and dial

pad of his phone). However, he got some help which changed the dynamics of how he gets a job at the furniture market. He explained:

Someone helped me with setting up the phone for distinctive ring tones. Showroom owners give me a missed call, and I can recognize who needs my help by a specific ring tone setup for a particular showroom owner. Now, I can work as much as I want.

This innovative way of using cell phones to effectively manage small businesses is not too uncommon. There were several stories and positive experiences for people with different backgrounds. Another illiterate participant who runs 5 passenger vans for public transport said the following:

I have been in public transport business for about ten years. There are several other people who are in the same business. I cannot afford to buy new vans and the older vans sometimes breakdown in middle of transporting customer. The fierce competition and low profit margins affect customer service. When a van breaks down, there is not much that the driver [his employee] can do except to help passengers get a seat on one of my competitors' vans. That makes me lose all the fare money my driver had collected. I am mechanic myself but since I do not even know what happened to the van, the driver would have to get it fixed from someone else. That was a big expense. On the top of everything else, my van is not making me money until it is fixed and who knew how much time it might take before it gets back to business.

Since he got a cell phone for himself and his employees, his business runs relatively smooth and he has raised the level of customer service to some extent. He said:

I can keep in touch with my employees and know exactly where they are when a van breaks down. I can go and fix it myself. My employees do not have to run here and there to find another mechanic. To better serve my customers, I can dispatch a replacement van right away. It is a win-win situation for me, my employees, and my customers.

The support of ICT for the effective management of business does not end here. In several other cases, ICT proved helpful in developing new business ideas as well. One research participant was making a pulley system for a machine that could be used in construction or agriculture business to fetch loads or water. He explained how a program on TV about making mechanical systems inspired him to make the pulley system. He was content to share the news that he has already found a customer who wants him to deliver this machine as soon as possible.

ICT growth has played an important role in changing the nature of competition. Those with knowledge to use computers and internet have discovered new products and markets to sustain and their transform business. An educated research participant who owns a small mechanical parts manufacturing facility in a small urban area shared his success stories of using ICT in his business. His father opened up a mechanical

workshop to fix and retool mechanical parts of tractors several years ago. The agriculture based economy of the region meant a thriving mechanical repairs business in the 1980s and 1990s. However, the competition has increased and it is difficult for them to make a reasonable living within the existing business. He said:

My father was the first person who opened up a mechanical workshop in this town. We did a lot of good business. We had to hire a lot of employees to keep up with the amount of work. These 'boys' would learn how to use machines here and a few weeks later, they would open up their own shop next door. Let me give you an example. We were the first ones to bring a diesel testing laboratory in the town. Now there are many other diesel testing labs that you can get a job done for 300 rupees today [in 2009] for which we used to charge 600 rupees in 1995.

Therefore, they decided to start mechanical parts manufacturing business in 2002. They did not want to hire employees for the fear that they [employees] will open up same or similar business independently. They kept the manufacturing knowledge to their own family members. The demand for their quality parts grew steadily between 2003 and 2007. In order to keep up with the increase in demand, he and his family decided to explore options to automate their manufacturing business. In late 2007, he imported a used machine which could be used to automate the manufacturing process. However, the machine had missing parts and was not in operational condition.

We spent a substantial amount of money to buy this old machine... about 300,000 rupees. That's a lot of money for one piece of equipment considering you can open up two manual mechanical workshops for that much money.

He used the internet to find a manual for this machine, made and fixed some parts and brought the machine to operational condition. The variation in production process has gone down (0.0001% quality rejection rate according to his own measurements) and demand has increased significantly (800% in one year). Now, he continuously uses internet, email and cell phone to stay in touch with his clients in different countries.

An illiterate entrepreneur woman shared her stories of success with a cell phone in increasing her business. She has a small cloth sale business in several nearby towns. She travels as far away as 300 miles to buy cloth at wholesale prices and sells at profit to villagers who cannot travel. Her business has grown significantly since she got a cell phone because her customers call her and tell what they want. Her personalized service for customers has increased her revenues. She can now accept special orders and her customers are very happy with her. She has expanded her business to farther villages because of her ability to stay in touch with her customers, understand her market needs and serve accordingly.

There are several other narratives that exhibit effective management of business, expansion of business markets, and creation of new businesses. However, in

some situations, ICT have been instrumental in the demise of some types of businesses. As these businesses shut down, some have moved to explore other economic opportunities. For example, a research participant who owned and operated a Public Call Office (PCO) experienced a thriving business in 1990s and early 2000s. He narrated his story as follows:

I opened up a PCO in this town in 1992. My PCO's phone was the only phone in town and nearby villages where you could go and call someone in another city or country emergencies. The calls were expensive but profit margin was great. I did very well for several years. Then, around 2003 and 2004, my business started to decline because cheap and easily available cell phones became affordable for my customers. I struggled for a couple of years but in 2007 I gave up. For one week, I did not get a single customer in my PCO to make a call. I knew that was it for me in this business.

Now, he operates a motorbike rental business. This story resonates with demise of several other service sector jobs and businesses. ICT growth is transforming the nature of business. Several business owners are discovering that they can run their business more effectively and cut down on expenses by using ICT to stay in touch with their customers. For example, a plumber explained that previously he had to rent a shop just to make sure his customers can find him. With his cell phone, his business card bears his business name and cell phone number alone. He said he has more satisfied customers because they do not have to come to his place to find him.

My customers just call me on the phone and I can be at their place in no time. It saves me and my customers a great deal of time. I am more accessible and I make more money than I used to when I used to rent a shop. I don't have to pay rent anymore and I can save on my business expenses.

It is clear from the narratives and qualitative evidence above that ICT growth is changing old business models and regimes. Therefore, economic transformation is considered an important dimension of socio-economic development for citizens.

10.2.3 Quality of Life – (“My life is more comfortable”)

Quality of life is identified as one of the most important and comprehensive dimensions of socio-economic development in this research. This dimension is derived from the categories of code that represent the use of ICT for the following four major categories: (1) education and learning, (2) healthcare, (3) political process and role of media, and (4) entertainment. The use of ICT for educational and learning opportunities has been wide spread. From access to free educational content from the Virtual University of Pakistan and Allama Iqbal Open University to ICT use in traditional education, this trend can be clearly observed. The use of ICT is significant in rural healthcare facilities where patients can call doctors and get advice for minor ailments. Awareness and understanding of the social and political issues have been brought about from the use of ICT such as special interest televisions on current affairs and social issue,

internet blogs, online message boards, short messaging service (SMS) and cell phones. Citizens acknowledged the role of ICT such as TV and internet in increased opportunities for entertainment.

The role of ICT has been substantial in the availability of free educational content from the Virtual University of Pakistan and Allama Iqbal Open University. These two universities have student base throughout Pakistan and employ ICT such as TV, Internet, radio, and SMS messages to impart educational content. Lectures and most other educational material are freely available to anyone. Students have to register, pay nominal fees, and take exams only if they want to earn a degree. The use of ICT for educational opportunities is limited in traditional education institutions where research and teaching material are rarely available on university websites.

However, ICT have created an interesting situation where some students are able to pursue their education because their parents can now keep in touch with them. One of the young participants who was pursuing graduate level education in Islamabad shared interesting insights into how ICT is opening up educational opportunities for young girls. Many students, especially girls, are not allowed to go to universities far off from their home towns. This participant is a good student who excelled in her B.Sc. in 2005 and wanted to pursue a M.Sc. in Microbiology. She said:

You know, not many universities in Pakistan have a good Microbiology program. I wanted to do my M.Sc. at Quaid-e-Azam

University in Islamabad. That is one of the best programs around. But my parents would not allow me to go a university which is like 800 kilometers from my home... I wasted a year and could not start my graduate studies right after my B.Sc.

Her parents were concerned of her safety in a city as far away as 500 miles. Cellular phones were becoming popular and things changed for her when they got her a cell phone and found out that they could always stay in touch with her. She said:

Even though I started my M.Sc. one year later, I am glad I got this opportunity. My parents are very open-minded but they still feared for my safety... I probably would not be pursuing higher education if I didn't have a cell phone and my parents didn't feel that they can keep in touch with me anytime they wanted.

She used access to a large online library which helps her in research and access to latest publication on her areas of interest. She is not the only one who got permission to continue her studies because of ICT. She was aware of several others who experienced the same struggle for their education in their families.

The role of ICT in healthcare is important in developing countries. Pakistan like other developing countries suffers from the shortage of qualified health professional. This shortage is even severe in rural areas where natural hazards such as snake bites and other hygiene related ailments are common. A medical doctor shared a number of

stories where villagers were able to get his advice for minor ailments on a quick phone call.

The importance of ICT became apparent in the October 2005 earthquake in Pakistan. Thousands of people died in that earthquake and wired telephony systems were severely affected. Mobile cellular units were established in the affected areas and medical camps were setup. However, there were not enough doctors. A participant who volunteered for the relief team said:

I was among the first responders. The biggest problem was to give medical care of injured. There was only one doctor and thousands of injured people. An internet service provider setup satellite links to doctors in Europe and America who volunteered to assist with the diagnosis and prescriptions for the injured people. Two X-ray specialists ran x-rays for this camp where I was volunteering. I scanned X-rays and emailed those to volunteer doctors abroad. They diagnosed what needed to be done with detailed instructions so people with minimal medical training can run those procedures. We saved hundreds of lives in those few days.

Several of those relief camps were turned into small medical facilities that still exist and provide basic healthcare to people in nearby villages and towns.

ICT have played a role in creating political awareness and opportunities for political participation. The special interest TV channels such as those for news and current affairs encourage viewers to send their opinions in an SMS. Those SMS messages scroll at the bottom of the screen. Most channels charge significant amount of

money for receiving such messages; these are premium services where senders' account is debited for an amount of money and credited to the receivers account). While such services allow viewers to say their mind, it is a source of additional revenue for TV channels as well as cellular service provider. A participant described his experiences:

I love the live coverage of political issues; it gives me a sense of involvement and I feel I am learning and participating... I frequently send SMS to TV channels that display my messages on current affairs at the bottom of the screen; I feel my SMS gives me voice and I can say things I believe in. I was extremely happy when I saw my message scrolling sideways at the bottom of my TV the first time. I paid 10 rupees for that message but I was very excited to see that others can see what I have to say. I feel as if my voice is heard. I send these messages specially when there is a political debate or a crisis is going on. Initially there used to be few messages but these days a lot of people send messages.

Politicians heavily used SMS facility to stay in touch with their constituents especially during the campaigns for general elections in February 2008. A participant gave his account of excitement when he got an SMS from his favorite candidate. He said he was going to vote for this candidate anyway but SMS made him feel closer.

ICT have changed how citizens get news. In addition to watching news on TV, several service providers offer service of free SMS for breaking news. A number of online news websites are available. A participant narrated:

I have not bought a newspaper in years. I get my news on internet and TV... I spend quite a bit of time online every day. Sometimes I watch cricket matches and sometimes I even watch movies.

ICT have been important in increasing opportunities for entertainment. The use of internet based entertainment content is limited to those who can afford to buy a computer and pay for internet connection. In some cases, availability of internet facility in the work place and universities has created opportunities for citizens to download music, movies, and play games. Opportunities for entertainment exist not only for those without an internet connect but also a source of revenue for service providers. For example, cellular service providers have subscription based services as well as pay-as-you-use services for providing access to musical ring tones, music libraries, religious music, movies clips (MMS – Multimedia Messaging Service), SMS, multi-player games, live games commentary (mostly cricket), and other on-demand content. A participant described his experiences of the use of these services:

I spend about 300-400 rupees [75% of his monthly phone bill] every month on ringtones and music alone. I always use facility for live commentary when Pakistani team is playing international cricket matches and I am unable to watch the game on TV. My phone does not have video capability and that's why I cannot use MMS services but I am saving money to buy a more expensive phone which has

more features. Some of my friends have those phones and they can even watch funny video clips, and movie clips.

Another participant who worked in a university described his use of internet service for watching online soap opera. He explained:

My work schedule does not allow me to watch my favorite episodes of TV dramas [soap opera]. Someone told me about a website which has episodes of all the programs I wanted to see. Now, whenever I get a break, I just go online and watch the programs I want to. This is a wonderful facility. That's the extent of what I do online though...

It is evident from the analysis and discussion of the narratives above that ICT have played an important role in enhancing citizens' quality of life by making improvement in opportunities for (1) education and learning, (2) healthcare, (3) political participation and (4) entertainment. The use of ICT in various aspects of citizens' lives has played an important role in overall socio-economic development. There are several areas of applications where ICT can further enhance people's quality of life.

10.2.4 Cultural Evolution – (“this is a big threat to indigenous culture”)

Introduction of ICT that were developed in the West carry implications for the local culture in developing countries. This dimension of socio-economic development is derived from the categories of codes that represent changes in social behavior,

Westernization/globalization of culture, family life, addiction of ICT use, pornography, nuisance, waste of time, unnecessary expense, lack of attention. Frequent references to the cultural evolution are found in citizens' narratives.

While efforts for localizing and 'aligning' technologies to the local customs and traditions can be observed, ICT based cultural evolution is inevitable. For some, these are the signs of progress and yet others consider it a threat to the indigenous culture, traditions and customs. Situations where ICT were considered to cause a cultural evolution included issues such as (1) gender segregation, (2) sexual conduct, (3) respect for parents and elderly, and (3). westernization of infrastructure such as transportation, communication, learning and healthcare. All of these do not necessarily bear negative connotation. However, when these developments are at odds with local customs, some participants portrayed them negatively.

All participants acknowledged the benefits of ICT growth. Some of the situations where ICT were regarded a threat to local customs were representative of the socio-cultural norms in Pakistan. Gender segregation is regarded as a cultural value and a symbol of respect for genders. Intermingling of genders is considered a sign of Westernization. For example, a woman in rural area said:

I have seen a lot of girls and boys making out on phone and even deciding on marrying without their parents' approval; this is very bad. It was unthinkable to marry without parents' blessings. Marriage used to be a mystery in several respects for both girls and

boys until the day they would get married. Sometimes the bride and the groom would meet for the first time [as in some arranged marriages] and live happily ever after. Sometimes even when they knew each other in the case of family marriage, 'silence' between the two was considered polite, and a show of mutual respect for each other. Things are changing now. It is good that bride and groom understand each other before marrying but I am just surprised on the amount of time girls and boys can spend on phone before parents give them blessings.

She admits that cell phones are very helpful in several aspects but doesn't want young girls and boys to be carrying phones around just to waste time in "useless" talk. She sees a major transformation in the social structure in rural areas where parents are losing control over their children in young age due to cell phones.

Behaviors like these are considered signs of westernization. Intermingling of genders is not even considered inappropriate in the developed world. It is common to expect boys and girls to have intimate relationship without parents' consent and approval. It is therefore important to consider that ICT may bring cultural evolution that is not approved by many citizens.

ICT growth has increased access to what was considered "outside culture" by the participants. From comments on the programming on TV channels to internet based content, citizens showed concern for the impacts of westernization and foreign culture on the upbringing of their children.

The religious values and cultural traditions prohibit people from indulging themselves in behaviors that are considered 'sexually inappropriate'. Access to

pornographic material has traditionally been limited. However, with access to the internet and multimedia messaging service on mobile phones, it is far easier to access such material discretely. A participant who runs an internet café shared his observation of the young boys and girls' internet usage. He said:

I mind my own business but at the end of the day, the server generates reports of most visited websites and pages. Pornographic content is at the top and free email services such as Hotmail, Yahoo and Gmail are grouped closely in the second place... Access to pornographic material has never been this easy. I see this as a major cultural shift which is troubling. The internet has a lot of benefits for everyone but we need to distinguish between good, bad and ugly.

The lack of privacy and nuisance due to cell phones, TV, internet and computers was also considered against the cultural values that emphasize politeness and respect for others. Phrases such as *"I cannot go to a park or anywhere else and have a quiet time; phones keep ringing everywhere"*, *"only time I get relaxed is when I shutdown my computer and cell phone"*, and *"I cannot concentrate on anything because of I am always getting emails and SMS – even in the middle of the night"* provide strong evidence that ICT growth is considered to play a role in the evolution of cultural values.

Family values are traditionally considered important in the lives of citizens. From giving up ones' own comforts for the future of children to taking care of the elderly were cherished by majority of participants. However, ICT growth has created situations

for some participants where they have to choose between economic opportunity and taking care of their families. For example, a participant in a rural area earned the reputation of an excellent project manager at her workplace. Due to the problems in IT administration, she was chosen to take the responsibility:

My boss did not give me a choice and wanted me to head the IT department. I told him that I didn't know a thing about computers but he said I could learn these things. I got a big raise too... I enjoy this job because I have learned a lot here but it has turned my family life upside-down and I cannot take care of my family and children as much as I used to do before... I feel bad that I cannot fulfill my responsibilities of taking care of my children in the same way that my mother did for my siblings and myself.

She carries her phone even when she is cooking food for her children just in case her services are needed during network and IT services disruptions.

In addition to pointing out the positive aspects of ICT growth, the narratives frequently describe ways that were considered against the indigenous values. For example, ICT as a reason behind unnecessary expense, wasting time, and a cause of lack of attention is in contrast to culture of saving for the rainy day, valuing time, and showing politeness by paying attention. It is clear from the qualitative evidence given above that ICT is major force behind evolving cultural values.

10.2.5 Personal Security and Criminal Use – (“I feel secure”)

Personal security is derived from categories of codes that represent sense of security, peace of mind, and in some cases fear of being robbed, harassment, sexual misconduct, stealing, online fraud, and ICT use for criminal activities. The notion of the role of ICT for personal security is developed from narratives such as *“Even if I don’t have to call anyone, my cell phone gives me a sense of security that I am not alone”* and *“cell phones give peace of mind that you can call anyone if you are in trouble.”* The notion of criminal use emerges from acts such as stealing money to pay for phone bill, fear of online scams, and news of ICT use for preying upon unsuspecting victims.

In the socio-cultural environment of Pakistan, it is not common for people to call police for things that might be considered police responsibility in the developed world. Traditionally, the role of police and law enforcement in society is portrayed negatively. Dependence on friends and family in the event of a problem, accident or unforeseen situation is traditionally considered more important. ICT provide a way of staying in touch with family friends who can be trusted in emergencies. The negativities associated with the role of police are rooted in the colonial system where police was used as a tool to protect interests of British Empire against the will of people.

This concept of personal security is in contrast to the developed world. In the developed world, once police is notified, there is an expectation of security, safety and protection for the person reporting the problem. This assumption might not hold true in

several developing countries where police departments and law enforcement agencies have the reputation of being corrupt institutions.

From personal safety perspective, women are considered vulnerable especially when alone. Therefore, it is normal to see women accompanied by a family member as a safety mechanism. Sometimes, even a small child accompanying a woman can counter safety issues that arise from being alone. Cellular phones in particular are ICT devices that can be carried around easily and used discretely. A woman expressed these feelings:

I have never stepped out of my house alone. I will always have someone with me... maybe even a toddler. A companion is an assurance that someone is with me to take care of me if I find myself in an odd situation. Since I got this cell phone, I know I can call my family members anytime. Now, I feel OK to go out alone for shopping and to visit family members nearby. It is like someone is with me all the time. Its great to have a phone particularly in an emergency. If something were to happen to me, my family will immediately know that I need help.

In a previous section on 'quality of life', the narrative of the student at the university in Islamabad was also a piece of evidence that even in 'liberal' and 'open-minded' families, cell phones are considered an important safety mechanism.

However, a participant highlighted another aspect of personal security. This aspect involved being victim of the breach of personal security. He said:

I was once robbed; this dude wanted to snatch my cell phone... I know a few other people who were robbed for their phones. Even though regular cell phones are cheap, they can be quickly sold for some money.

Similar parts of narratives were coded as “fear of being robbed” but the frequency of this category of codes was relatively low, i.e., 14. Additionally, Pakistan Telecommunication Authority has activated a system where stolen and robbed phones can be permanently disabled after being reported as such.

There are, however, some behaviors where their inappropriateness might be considered universal. For example, in the narrative of a young barber who works at his father’s shop, several behaviors might be considered inappropriate and even unacceptable. His daily pocket money is Rs. 20, but his daily cell phone expense is Rs. 500. He calls prostitutes and spends hours in kinds of discussions that may be described as erotic at the very least. To satisfy his addiction, he steals money from the barber shop cash drawer.

I know it is wrong to steal money to pay for my cell phone bill but I cannot help it... my father sometimes suspect that I am stealing money from the drawer but I don’t leave a clue. I am quite expert at it now... I feel sad when I steal money but then my desires to speak with some woman takes me over and I cannot control myself... I just can’t overcome my addiction of speaking with women that I don’t even really know... my father wants me to get married but I have a lot of aspirations. I want to be famous and rich and have a good life... The cell phone makes me live a life of fantasy and I feel that I am

important because some women need me. I know it is not good but I cannot help it and don't know how to stop it.

ICT have the ability to create a world of fantasy where people can forget about the realities of life or think about the morality and legality of their ICT use. Similarly, stories of online fraud and the use of ICT for criminal activities could be heard from citizens' narratives. An educated old woman described:

My bank has provided me an online ID and password for my account... I have internet access and I use email to communicate with my siblings in other cities and countries... but I never log into my account online. I still do my financial transaction the old fashioned way with a 'passbook' [a small diary that is used to record banking transaction for customer's own record] and checks. I have read about people whose accounts were wiped clean by criminal people... I just don't want to take chances.

As described in Chapter 9, the cyber laws ordinance that became law in December 2007 was the result of the use of emails to lure Danial Pearl into a trap. Later on, a video of his beheading were posted online. The criminals were apprehended after their IP address was traced to the computer used for sending emails. However, it was already too late for Mr. Pearl. Currently, National Response Center for Cyber Crimes (NR3C) at the Federal Investigation Authority (FIA) is responsible for tracking, apprehending and prosecuting crimes that involve the use of ICT.

Based upon the analysis and discussion it is evident that citizens understand the use of ICT for personal security and criminal purposes. The sense of understanding of the dangers of ICT is significant. Therefore, its identification as a dimension of socio-economic development is appropriate and well grounded in the qualitative data.

10.3 Axial Model

Axial coding model allows for a diagrammatic representation of the themes identified by scaling up of the categories of codes. A number of methods are proposed in literature for the visual representation of the relationship between themes. The following model in Figure 17 represents socio-economic development which is the central theme of this chapter in the middle and arranges its dimensions that are grounded in data around it.

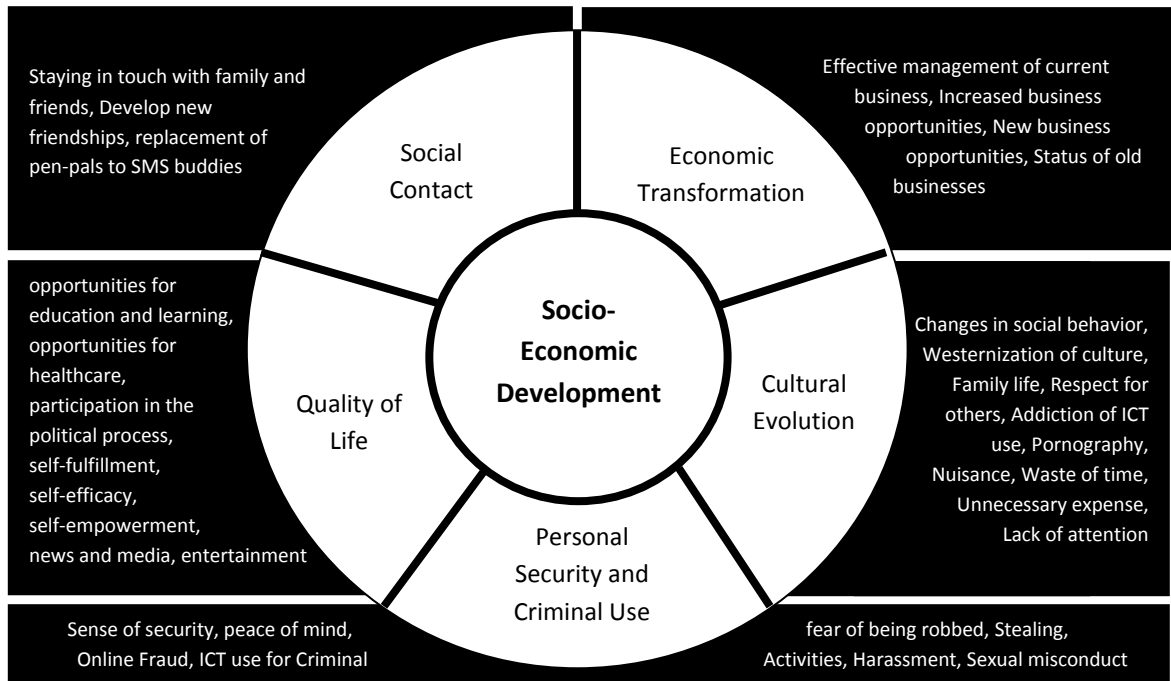


Figure 17: Axial Model of the Dimensions of Socio-Economic Development

10.4 Theoretical Integration

Theoretical integration is the process of relating an emerging theory to other theories in the same or similar field (Urquhart, Lehmann, and Myers, 2009). It allows comparing of substantive theory generated as a result of grounded analysis with other, previously developed, theories. It contributes to integration of theoretical foundation of a concept and help in the generation of formal theories.

In order to accomplish this task, the identification of the dimensions of socio-economic development is compared against the dimensions Madon (2000) identified. Her article is widely cited in information systems research on development and in developing countries. However, little work has been done to further the dimensions of socio-economic development that she had identified. She identified four dimensions of socio-economic development, i.e., (1) Social wellbeing, (2) Economic growth, (3) Political wellbeing, and (4) Physical Environment. Madon's (2000) theoretical model defines the concept of socio-economic development as well as its dimensions within the context of internet growth for the socio-economic development in developing countries. She identified application areas for internet within each of the four dimensions, i.e., (1) economic productivity, (2) health, (3) education, (4) poverty alleviation and empowerment, (5) democracy, and (6) sustainable development. Her model of the dimensions of socio-economic development is shown in Figure 18.

Madon's model is a basic axial model in which her five dimensions of socio-economic development are arranged around the central theme, i.e., [socio-economic] development.

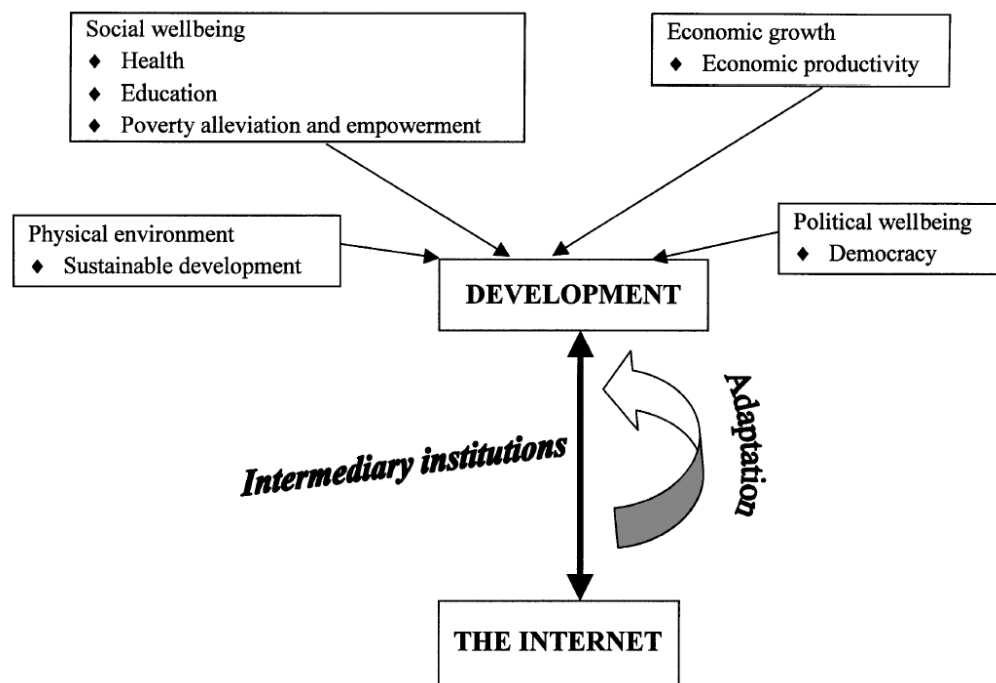


Figure 18: Internet and Socio-economic Development – Conceptualizing the Interaction (Source: Madon, 2000)

The dimensions of socio-economic development in this research extend Madon's (2000) dimensions in the following manner:

1. **Economic Growth vs. Economic Transformation:** Madon's notion of economic growth is derived from application of the internet for economic

productivity. She emphasizes that the internet like other ICT is an opportunity that can potentially have a positive impact on businesses. The terms, economic growth in conjunction with economic productivity, are not value neutral. The positive impacts of ICT were found true in the narratives of citizens in the present research; however, citizens also recognized negative impact of ICT on some businesses. Economic productivity does not sufficiently address the demise of old business models and regimes with the introduction and adoption of ICT. Therefore, this chapter extends Madons' notions of economic growth and productivity with the use of a more encompassing term, i.e., economic transformation. Economic transformation can address the impact of ICT on business whether it is positive or negative. Additionally, economic transformation addresses poverty alleviation (which Madon identified as part of social wellbeing dimensions) by highlighting the role of ICT in increased entrepreneurial opportunities for poor citizens.

2. **Social Wellbeing and Political Wellbeing vs. Quality of Life:** Madon derives social wellbeing as a dimension of socio-economic development from internet applications in the areas of education, health, poverty alleviation and empowerment. The political wellbeing dimension is derived from application of internet for democracy. This chapter identifies "quality of life" as a more encompassing dimension. Awareness

covers all ICT application areas that Madon identified as part of social and political wellbeing dimensions. The qualitative evidence from the citizens' narratives demonstrates ICT applications in education, healthcare and political speech (democracy) and entertainment. It is therefore logical to combine social and political dimensions into one more comprehensive and encompassing dimension.

3. **Physical environment:** Madon derived physical environment as a dimension of socio-economic development from her conception of sustainable development. This research did not find evidence for sustainable development as a concern in citizens' narratives. Therefore it is not included as a dimension in the model given in figure 17. In Pakistan, the ICT growth has been rather fast (teledensity grew from 2.8% in 2000 to 60.40% in March 2009). The fast paced development has resulted in a continuous introduction of new ICT products and services. Insights from officials who make or influence government's ICT policies also demonstrate that the ICT growth so far has not yet been saturated. There is recognition among government officials and citizens alike that more growth is evident. This means that without particular attention to sustainable development, growth will continue to happen until all ICT products and services available in the developed countries are also available in developing countries.

4. **Personal Security and Criminal Use, Cultural Evolution:** Madon does not recognize personal security and criminal use of ICT as a dimension of socio-economic development. Similarly Cultural Evolution is not recognized as a dimension of socio-economic development by Madon. The theoretical groundedness in citizens' narratives provides this research advantage of understanding and building on how citizens in developing countries feel and think. Personal security might be taken for granted in the Western world whereas in developing countries 'fear of being robbed' and not have police to come out and help presents a real threat to the socio-economic development of citizens. ICT based cultural evolution has been a recent and vivid phenomenon in developing countries. It is therefore a contribution of this research to identify two dimensions of socio-economic development that are real to people in developing countries and have not been discussed in past literature.

The above discussion demonstrates that the identification of five dimensions of ICT based socio-economic development is grounded in the qualitative data from citizens' interviews. This contribution has implications for further research in ICT for development and ICT in developing countries, where evaluations of ICT applications need to consider their impact on the socio-economic development of citizens.

10.5 Relationship between ICT Growth and Socio-Economic Development

In order to develop a comprehensive model of relationship between ICT growth and socio-economic development, dimensions of ICT growth (from Chapter 8) and antecedents of ICT growth (Chapter 9) are combined with the dimensions of socio-economic development (Chapter 10). The model shows inter-dependent relationship between ICT growth and socio-economic development in Figure 19.

There are some cyclical relationships evident in the model. For example, the dimensions of socio-economic development such as social contact, economic transformation and quality of life have a role in increasing awareness of ICT benefits. The qualitative evidence demonstrated that awareness of ICT benefits increases as ICT growth permeates.

The relationship between personal security and criminal use of ICT and law enforcement challenges was discussed earlier. This dimension of socio-economic development creates further challenges for law enforcement, which ultimately results in ICT growth. There are several factors that affect cultural evolution in a developing country. However, globalization, identified as an antecedent of ICT growth, plays a role in increasing access to foreign cultures, traditions and values. The impact of globalization can be understood in the form of participants' comments

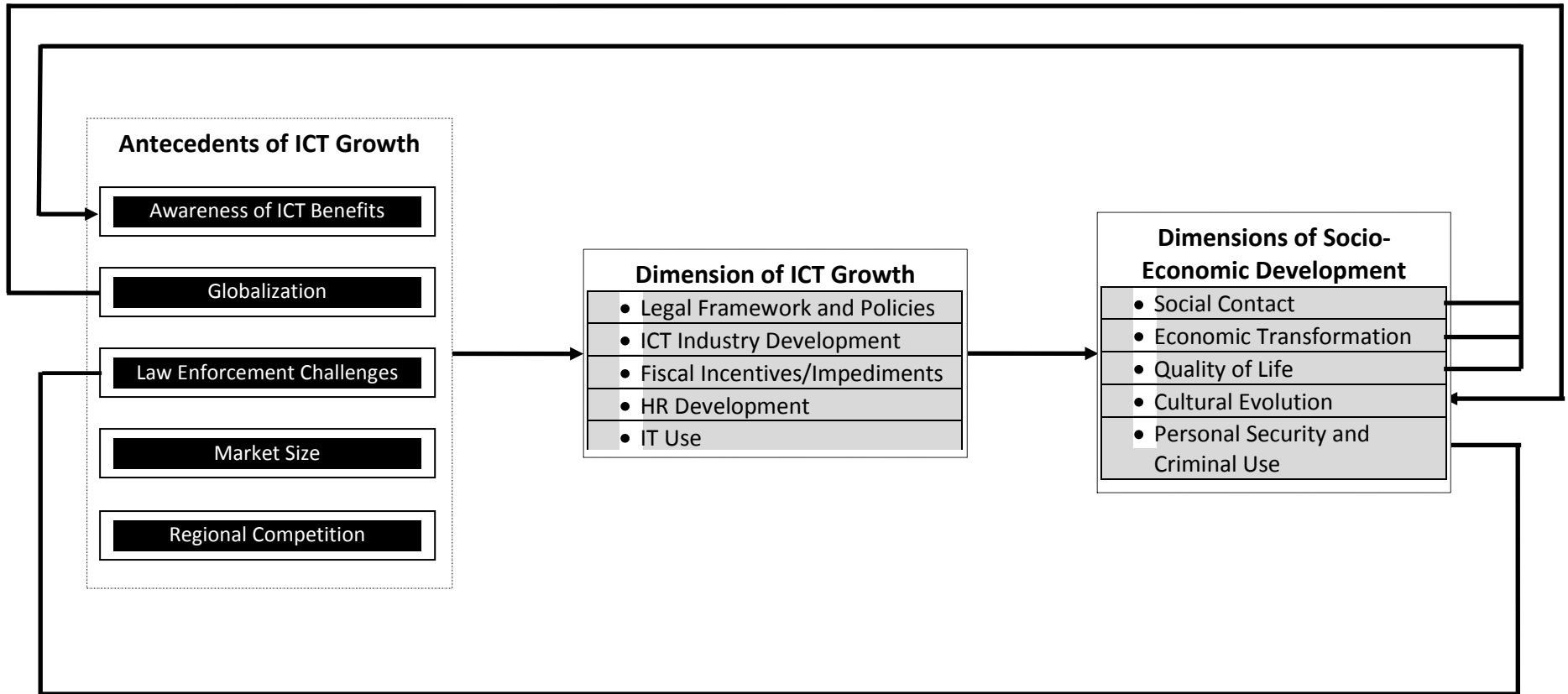


Figure 19: Theoretical Model of the Relationship between ICT Growth and Socio-Economic Development

about the Westernization and threats to local culture.

Socio-Economic development is shown along with its five dimensions, i.e., social contact, economic activity, personal security, awareness, and negative impact. Personal security also affects one of the antecedents of ICT growth, i.e., law enforcement challenges. Awareness which is identified as a dimension of socio-economic development in this chapter was also identified as an antecedent of ICT growth. This model is a visual representation of the comprehensive theory of ICT based socio-economic development.

The understanding of the dimensions of socio-economic development has implication for policy development. As shown in Figure 19, use of ICT for social contact, economic transformation, and improvements in the quality of life help in raising awareness of ICT benefits. ICT for personal security and criminal use have a role in creating law enforcement challenges. These antecedents affect dimensions of ICT growth such as legal framework and policies development, ICT industry growth and others.

It can be inferred from qualitative evidence presented in Chapters 8, 9 and 10 that policy makers can pay attention to citizens' understanding of socio-economic development in policy making. Appropriate policies can increase the realization of ICT benefits for citizens.

The identification of the dimensions of socio-economic development can potentially help in appropriate products and services design. It is evident that ICT service

providers already have some understanding of products and services that are more valuable for citizens. However, a conscious appreciation of these dimensions can potentially benefit citizens as well as help bottom line for products and service providers.

10. 6 Summary

This chapter has made three major contributions. (1) Qualitative evidence is provided for the identification of five dimensions of socio-economic development from citizens' narratives, (2) the dimensions of socio-economic development identified in this chapter are evaluated against a set of dimensions developed by Madon (2000) in the context of internet and socio-economic development. This evaluation not only advances Madon's understanding of the dimensions of socio-economic development but also introduces new dimensions of socio-economic development. (3) A theoretical model of the relationship between ICT growth and socio-economic development is developed. The model integrates dimensions and antecedents of ICT growth with dimensions of socio-economic development.

CHAPTER XI

SUMMARY AND CONTRIBUTIONS

This chapter consists of six sections. The first section provides an overview of the research study. The second section outlines contributions made to bodies of knowledge in (1) ICT for development and ICT in developing countries, (2) advancing theoretical framework on government policy evaluation (i.e., extended design-actuality gaps framework), (3) historical perspective of ICT growth in Pakistan, (4) identification of the antecedents of ICT growth, (5) theoretical integration of ICT based socio-economic development, and (6) use of qualitative research methods in IS research. The third section provides an overview of a related project which will analyzed in depth in the future (i.e., narratives of children). The fourth section evaluates the merits of this study according to a set of criteria suggested by Urquhart, Lehmann, and Myers (2009). The fifth section provides insights implications of this research for practice and theory. It also discusses limitations of the study and future research agenda. The last section consists of a brief conclusion.

11.1 Overview of the Research

11.1.1 Background

The research on Information Communication Technologies (ICT) for development considers the role of ICT growth in the socio-economic development important. However, questions such as antecedents of ICT growth and the relationship between ICT growth and socio-economic development are not sufficiently addressed in the literature. The lack of historical evidence for ICT growth presents problems in developing a theoretical foundation for government ICT policy development and evaluation in developing countries. This study therefore aimed at addressing these issues in depth within the context of ICT based socio-economic development in a developing country, namely Pakistan.

11.1.2 Research Method

Grounded theory method (Glaser & Strauss, 1967; Strauss & Corbin, 1990) was used for data collection and analysis of government's ICT policy documents, interviews with 54 officials making and influencing these policies, narratives of 35 citizens, and focus groups involving 11 citizens. The data collection was done in three phases from December 2006 to January 2009 in Islamabad, Lahore and Multan regions in Pakistan. The research participants were selected using a method called theoretical sampling that determines where to sample next in study (described in Chapter 6). The interviews were recorded

on a video tape and imported in qualitative analysis software, QSR NVivo 8.0, to facilitate analysis. Observations and notes were taken in cases where recording was not allowed by the participants.

11.1.3 Historical Review of ICT Growth

A timeline of ICT growth in Pakistan was developed which covers ICT growth between 1850 and 2009 with special emphases on the recent ICT policy development since 1990. The ICT growth since 1850 is divided into five eras based upon distinct characteristics. A brief description of the political environment and salient features of each era provide insights in developing historical perspective of ICT growth in areas that are now part of Pakistan. The first era (i.e., 1850-1946) is pre-independence era and highlights ICT growth by colonial powers in order to keep a tight hold over the local population. The second era (i.e., 1947-1987) identifies the time period where ICT systems inherited from colonial powers were used as propaganda tools for the military dictators. This era also features government's tight control of ICT growth in order to prevent its use for espionage after two wars with India in 1965 and 1971. The third era (i.e., 1988-1999) exhibits a major shift in government's ICT policies towards deregulating and liberalizing the ICT sector. The telecommunication reorganization act and ordinance of 1991 and 1994 provide legal protection for the changes in the regulatory regime. The fourth era (i.e., 2000-2003) features specific policy development for various ICT sectors and the impact of changes in

regulatory framework becomes visible in the form of increase in foreign direct investment. The fifth era (i.e., post 2003) shows massive deployment of ICT services throughout the country. Changes in teledensity and socio-economic development start to emerge.

There are lessons for developing countries from this experience, i.e., (1) deregulation and liberalization of ICT sector can attract foreign direct investment, (2) influx of technological knowledge, and expertise in ICT operations and services can be achieved with appropriate policy development , (3) socio-economic development of citizens is possible with increased access to ICT products and services, and (4) ICT growth may have fiscal advantages for the governments, in the form of taxes on ICT products and services.

11.1.4 Analysis of ICT Policies and Extension of Design-Actuality Gaps Framework

The analysis of qualitative data suggests design-actuality gaps in government's ICT policy design and citizens' actuality. In addition to policy analysis, the research suggests three extensions to the design-actuality framework. The discussion suggests that there are four major sources of design-actuality gaps, i.e., (1) lack of citizens' involvement in policy design, (2) inter-agency coordination and inconsistent policies, (3) political instability – changes in government interests, and (4) lack of protection for private sector business interests. The analysis has practical implications for both policy

makers/influencers and academic researchers for policy making and policy evaluation.

11.1.5 Identification of Antecedents of ICT Growth

The study identifies nine antecedents of ICT growth from analysis of the interviews with officials making/influencing government's ICT policies (Figure 15). These antecedents are classified as external and internal based upon the government official's level of control on these antecedent in develop countries. These antecedents are scaled up in four themes. The implications for policy makers include watching for internal and external antecedents to design ICT policies that are in line with international and local environment.

11.1.6 Development of the ICT based Socio-Economic Development Theory

The study develops a theory of ICT based socio-economic development by developing model of relationships between antecedents and dimensions of ICT growth and dimensions of socio-economic development (Figure 19). The model shows qualitative cause and effect relationships between different factors (themes) and has implications for policy design as well as further research on ICT for development and ICT in developing countries.

11.2 Contributions and Implications for Theory and Practice

This research highlights the importance of developing a holistic understanding of the historical perspective and antecedents of ICT growth for ICT policy design. It also suggests that political instability and lack of citizen involvement during policy design

leads to design-actuality gaps which are detrimental to ICT based socio-economic development of citizens. These aspects have implications for policy makers and provide them a theoretical foundation for ICT policy design and evaluation. The research has implication for theory in several respects. First, it develops a theoretical foundation for several constructs such as antecedents of ICT growth and dimensions of socio-economic development. Second, the theoretical integration of these constructs to extend existing literature is an important implication for theory development.

The implications for ICT products and service providers are many. For example, the identification of the dimensions of socio-economic development in developing countries can allow for appropriate ICT product and service design for the customers. This will not only increase revenue for the ICT service providers but also help in further socio-economic development of citizens.

The study makes contributions to different bodies of knowledge particularly in the areas of ICT for development, ICT in developing countries, historical growth of ICT in Pakistan, design-actuality gaps framework, theoretical integration of ICT based socio-economic model, and qualitative research methods in information systems research. These contributions have practical implications for future research as well as ICT policy development. Some of these are discussed below:

11.2.1 Contributions to literature on ICT for Development and ICT in Developing Countries

The literature on ICT for development and ICT in developing countries consists of case studies of specific information systems implementation and evaluation of the success and failure of these systems (Heeks, 2002; Walsham and Sahay, 2007). This research contributes to literature on ICT for development and ICT in developing countries in a broader perspective by evaluating ICT policies at a national level. This contribution is consistent with Walsham and Sahay's (2007) call for developing a broader perspective of ICT for development and ICT in developing countries.

11.2.2 Contributions to Existing Theoretical Framework on Government Policy Evaluation

The literature on policy evaluation is enriched by enhancing a method to assess policy development success in terms of policy design and citizens' actuality. This research contributes to the design-actuality gaps framework by introducing the concept of *dimensional gaps* and *elemental gaps*. The extended framework explains gaps between government's ICT policies and citizens' actualities in the case of a developing country, namely Pakistan. This contribution extends Heeks' (2002) framework and can explain gaps when the *design* and *actuality* dimensions or the *elements* of each dimension might not be

the same. This flexibility allows for a greater depth in the assessment process and in identifying ways to bridge gaps.

The recommendations for ICT policy design in this research can potentially benefit governments in enhancing citizens' quality of life, socio-economic development, and poverty alleviation.

11.2.3 Contributions to Historical Perspective of ICT Growth in Pakistan

The lack of literature on the historical growth of ICT in Pakistan is sparse and only covers ICT growth in the recent past -1990s onwards (Baqir and Pervez, 2000; Mujahid, 2002; Gao and Rafiq, 2009). This research has made significant contributions to literature on this subject by extending the historical review to 1850s when the first telegraph system was laid down in areas that are part of Pakistan now. The study also contributes to historical perspective of ICT growth by developing a time-line and identifying five eras along with salient features of each era.

This contribution has implication for practice in allowing future policy makers to understand the history of ICT growth in areas that are now part of Pakistan. The identification of five eras along with review of the political environment and salient features has implications for future research.

11.2.4 Contributions to the identification of Antecedents of ICT Growth

This study contributes to the literature on the antecedents of ICT growth. Current literature addresses these antecedents in fragments whereas this study puts these antecedents in the context of ICT growth and socio-economic development in a developing country. The classification of these antecedents as internal and external in terms of level of control is valuable for policy designers in formulating ICT policies.

The implication for practice includes understanding of external and internal antecedents which can potentially help policy makers in policy making and evaluation process. The identification of antecedent that play important role in ICT growth has implications for future research which can further refine the understanding of role of these antecedents.

11.2.5 Contributions to Theoretical Integration of ICT based Socio-Economic Development

This study contributes to the development of ICT based socio-economic development model by theoretically integrating dimensions and antecedents of ICT growth with dimensions of socio-economic development. This contribution provides theoretical foundation for policy designs that consider a holistic view of antecedents, policy design and consequences for governments, businesses, and citizens in developing countries.

This contribution has implication for future research that can benefit from the identification of elements and dimensions of ICT based socio-economic development. Further understanding of the relationship between these dimensions and their elements can allow policy makers in understanding the impacts of their policies.

11.2.6 Contributions to the Use of Qualitative Research Methods in IS Research

The study contributes to the use of qualitative research methods in IS research by developing exemplars of grounded theory and narrative research. The study also contributes to the use of historical research method by providing an example of how it can be used in the context of historical review of ICT growth in developing countries.

As an example, in the final phase of data analysis, transcription of interviews can be avoided because of the facility to directly analyze data in audio and video format. The use of video and voice during the analysis phase was particularly helpful due to the preservation of contextual richness of interviewing environment that transcripts cannot contain. Identification and successful use of this facility has implications for future research. Qualitative researchers can use methods developed in this dissertation to increase quality of their analysis without losing richness of the interviewing environment during the transcription process.

11.3 Narratives of Children

Although the research design did not include obtaining narratives of children, an opportunity developed where narratives from children could be collected. The narratives of children are particularly interesting and insightful for a number of reasons. Older citizens in Pakistan have closely observed the historical evolution of ICT growth in Pakistan. It is therefore important to understand their point of view in evaluating situations when they did not have ICT access and when they did. However, for some children ICT such as internet, computers, cellular phone, TV and radio are common household necessities. These children grew up using these technologies in their everyday lives. One might expect these children to be a source of rich descriptions of how their and their family's lives are enriched socially and economically due to ICT. Interviewing children presents a challenge because of the requirements set forth by an institutional review board when minor research participants are involved. Additionally, from a logistics point of view, it was difficult to interview children in Pakistan in the short amount of time during the data collection phases.

However, an opportunity developed in which the editor of a weekly children magazine (from the regional bureau of a national daily newspaper, Nawa-i-Waqat) offered to extend considerable help in this regard through story writing, essay writing and drawing competitions in the children's magazine. Children were invited to participate in these competitions. Figure 20 shows the advertisements that were published in the magazine on January 12 and 19, 2009. The topic of three categories of

competition was “role of modern ICT in your life”. The children were allowed to participate in more than one category. The competition attracted a total of 62 entries from 29 boys and 33 girls from families with various income and education levels in rural and urban areas in Multan region. Table 24 shows the gender distribution of boys and girls who participated in this competition. These children were between the ages of 7 and 14 years.

	Narrative/Stories	Essays	Drawings	Total
Boys	11	11	7	29
Girls	7	13	13	33
Total	18	24	20	62

Table 24: Gender distribution of participants in three competitions

Three winners in each category were selected independently by the magazine editor and staff. These children were given certificates, trophies and books as prizes in a ceremony on January 26, 2009 (Figure 21). The author sponsored these prizes. These narratives, essays and drawings have not been analyzed but will be included in future research.



Figure 20: Newspaper advertisement inviting children to participate in a narrative writing contest on “role of ICT on our lives” in three categories i.e., narrative, essay and photo essay. (Source: The daily Nawa-i-Waqt, Jan 12 and 19, 2009)



Figure 21: Winners of the narrative writing contest (three top winners for each of three categories). Certificates, books and trophies sponsored by the author were given away as prizes. (Source: The Daily Nawa-i-Waqt, Jan 26, 2009)

11.4 Trustworthiness and Evaluation of the Study

Trustworthiness is an important aspect of maintaining credibility of a qualitative study and avoiding validity threats. Creswell (1998) suggests a number ways to increase the trustworthiness of a qualitative research.

- **Triangulation** of data sources such as extensive review of ICT policy, interviews with government officials, citizens' narratives and focus groups enhance trustworthiness of this dissertation. Triangulation ensures that the emerging data patterns for interpretation are derived from multiple sources.
- **Rich, thick descriptions** of the research context, analysis and conclusions provide additional support for the trustworthiness of qualitative research. Numerous quotes and narratives are provided in Chapters 7 thru 10 to support analysis and conclusions.
- **Memoing** is another way of increasing trustworthiness of qualitative research. Memos are written to reflect upon emerging themes and potential subjectivities. Extensive notes were written during data collection and analysis.
- **Prolonged engagement** ensures that enough time is spent with the research participants to understand and reflect upon their point of view. The data collection lasted from December 2006 to January 2009 which gave adequate

time to understand, reflect and analyze the issues addressed in this dissertation.

- **Member checking** also provides a way of increasing trustworthiness of a qualitative study. During the time in between data collection phases, analysis and findings were discussed with some research participants (some of them were acknowledged in the acknowledgments section) for their opinion of the quality of data collection, analysis and conclusions.
- **Peer debriefing** is a mechanism that allows for feedback from other researchers outside the study who may or may not have knowledge of the research case and contexts. Reviews from external researchers (some of them were acknowledged in the acknowledgments section) were solicited for review on parts of this research that were pertinent to their area of expertise.
- **Tying findings to existing literature** is done throughout the dissertation. Particularly, extensions to existing frameworks enhances trustworthiness of this study.

Another way of ensuring trustworthiness of the study is to closely follow guidelines for a particular research method. A number of guidelines are available that help in the evaluation of a qualitative study. This dissertation is assessed against a set of five guidelines for conducting qualitative research provided by Urquhart, Lehmann, and Myers (2009). These guidelines include the following:

1. **Constant comparison** – constantly comparing instances of data in particular category with other instances of data in the same category,
2. **Iterative conceptualization** – increasing level of abstraction by relating categories of codes through the process of theoretical coding,
3. **Theoretical sampling** – purposeful selection of where to sample from next in study
4. **Scaling up** – process of grouping higher level categories together into broader level themes, and
5. **Theoretical integration** – relating the newly developed theory to other theories in the same or similar field.

These guidelines serve as a criterion to judge the quality and effectiveness of developing and enhancing new and existing theoretical frameworks. Table 25 provides a description of the five guidelines, and an assessment of how those guidelines have been followed to increase trustworthiness of the study.

Guidelines for conducting grounded theory studies in IS	Description of the Guideline	How this study fulfills requirements of the guideline
Constant comparison	Constantly comparing instances of data labeled for particular category with other instances of data in the same category	This guideline is satisfied by constantly comparing categories from different set of data (such as policy documents) to interviews with citizens and policy making/influencing officials. Comparisons made with categories (dimensions) and codes (elements) discovered from the interviews with citizens.
Iterative Conceptualization	Increasing level of abstraction by relating categories through the process of theoretical coding.	Axial coding method was used in order to relate categories of codes (dimensions) and key concepts (elements of <i>design</i> and <i>actuality</i> dimensions).
Theoretical sampling	Purposeful selection of where to sample from next in study. It ensures comprehensive nature of theory and truly grounding it in data.	Theoretical sampling done for other policies that affect ICT policies and actions plans as research progressed. Theoretical sampling done at the level of citizens selection along four dimensions i.e., gender, domicile, income and education. Theoretical sampling done for the selection of policy making/ influencing officials.
Scaling up	It is a process of grouping higher level categories into broader level themes. It enhances generalizability of the study.	Organization of categories into themes done for the three data sets, i.e., policy documents, interviews and focus groups with citizens and interviews with policy making/influencing officials. These themes are further scaled up in the final generalized theory.
Theoretical Integration	Relating theory to other theories in the same or similar field. It is the process of comparing substantive theory generated with other, previously developed, theories. It contributes to theoretical integration in discipline and help in the generation of formal theories.	The chapter discusses findings within the context of <i>design-actuality gaps</i> framework. The chapter contributes to further development of the framework by theoretical integration of <i>country context gaps</i> and <i>hard-soft gaps</i> into <i>performance gaps</i> and proposing two more types of gaps, i.e., <i>dimensional gaps</i> and <i>elemental gaps</i> .
Table 25: Assessment of the Trustworthiness of this Research		

11.5 Limitations

In order to increase the trustworthiness of the study, several steps were taken. However, the analysis and conclusions are mostly drawn by a single researcher. One can expect similar findings from another researcher collecting the same data and employing similar analysis methods. However, as in any other study, a degree of personal subjectivity can be expected in the interpretation of the data and findings.

The data were collected from three regions in Pakistan. Measures were taken to ensure diversity of backgrounds for research participants (theoretical sampling of citizens and officials from different stakeholders, interviewing in four languages). However, given the amount of diversity (religious, social customs, beliefs, background) in different regions (such as Baluchistan, North West Frontier Province, Sindh and Northern areas) of Pakistan, one can expect limitations with the representativeness of the research participants. Additionally, less participation from some stakeholders such as NGOs (Non-Governmental Organizations) and electronic and print media is a limitation.

The data consisted of 35 citizens' narratives and two focus groups. While the data was insightful and considered adequate by qualitative researchers, limitations with the "sample size" can be expected. The data collection lasted from December 2006 to January 2009. However, most of the collection was done in smaller time periods (December 2006-January 2007, April-May 2008, December 2008-January 2009) which created problems of logistics. Some participants were interviewed more than once, but

the limited time for data collection in each phase limited the possibility of more repeat interviews.

The issues addressed in this study, such as role of ICT policies in ICT growth, are evaluated at a national scale. While individual ICT projects such as the case of electronic identification cards and electoral roles were considered, lack of specific case studies is a limitation of this study.

11.6 Future Research

Following conference and journal papers based upon the dissertation contents are planned and will be submitted for publication shortly:

- Historical Perspective of ICT Growth in Pakistan
- A Qualitative Inquiry of the Antecedents of ICT growth in Developing Countries: The Case of Pakistan
- Extended Design-Actuality Gaps Framework: Evaluation of Government Policies and ICT Growth in Developing Countries
- Citizens' Perspective of ICT based Socio-Economic Development in Developing Countries
- Extending Dimensions of ICT based Socio-Economic Development
- ICT Growth in Developing Countries: Using Actor-Network Theory to Understand

- Narrative in Grounded Theory Research: Citizens' Understanding of ICT based Socio-Economic Development
- Role of ICT in Raising Political Awareness Among Citizens in Developing Countries
- Computerized Electoral Rolls and Democratic Participation: The Case of Election Commission of Pakistan
- Actor-Network Theory Perspective: Policy Development and Evaluation Process
- Application of ICT for Law-Enforcement and Anti-Terrorist Activities: The Case of Pakistan
- Technology Driven Public Service Delivery and Management: Implications, Initiatives and Implementations in Developing Countries

Due to the emerging nature research on ICT for development, prospects for further studies are numerous. Apart from involving more stakeholders and participants with diverse backgrounds, further in-depth studies can be pursued on various aspects of the contributions made in this dissertation. For example, while identification of the dimensions of ICT growth provides theoretical foundation, future research may develop further understanding of specific dimensions (such as ICT and quality of life).

Future research can also be conducted in developed countries on aspects of ICT based socio-economic development on the basis of gender, education, income,

domicile, ethnicity, race, religion and other factors. Comparative studies can also be conducted where data is collected from more than one country.

Some research questions that future research can address include developing an in-depth understanding of individual antecedents identified in Chapter 8. For example: How does globalization impact ICT based socio-economic development and quality of life improvements in people's lives. Additionally, data from other countries can provide result in more diverse set of environment.

This research has made two notable contributions in the application qualitative research methods in data collection, management, and analysis, i.e., (1) the use of narratives for citizens' interviews, and (2) the use of voice and video files during analysis to preserve contextual richness of interviewing environment. Future research can further explore the use of these innovations and discover more ways to enhance the analytical power of qualitative methods.

11.7 Conclusion

This research has addressed an important issue in information systems research. Information communication technologies can potentially play a significant role in the socio-economic development of billions of people around the world, particularly in developing countries. Despite the technological advancements, cost of ICT services and devices, lack of experience in formulating ICT policies, human aspect of the use of ICT, and other issues identified in this dissertation impede realization of their benefits.

This research has practical and theoretical implications for policy makers, citizens, and future research on ICT for development and ICT in developing countries. It provides a rich theoretical foundation to policymakers in developing and evaluating ICT policies. It encourages involvement of citizens and business representatives in the policy design process. The development of sound theoretical foundation and extensions of existing theoretical models have implications for future research and theory development.

REFERENCES

- Abbott, L. *Theories of Industrial Modernization and Enterprise Development: A Review*, 2002, Industrial Systems Research.
- AIOU, Allama Iqbal Open University, Retrieved from www.aiou.edu.pk on March 20, 2008.
- Ahmed, S., Adams, A., Chowdhury, M. and Bhuiya, A. "Gender, socioeconomic development and health-seeking behaviour in Bangladesh", *Social Science and Medicine* (51:3), 2000, pp. 361-371.
- Alvarez, R., and Urla, J., "Tell me a good story: Using narrative analysis to examine information requirements interviews during the ERP implementation", *The Database for Advances in Information Systems* (33:1), 2002, pp. 38-52.
- Amin S., *Unequal Development: An Essay on the Social Formations of Peripheral Capitalism*, 1976, Monthly Review Press.
- Azari, R. and Pick, J.B. Technology and society: socioeconomic influences on technological sectors for United States counties, *International Journal of Information Management*, (25:1), 2005, pp. 25-37.
- Baqir, M.N. and Parvez, S. "IT Policy", *Computer News*, (4:10), 2000, pp. 15-31.
- Baqir, M.N., Latif, A. "Role of Information Communication Technologies in Economic Development: Case Studies of Orange County (California), North Carolina and

- Pakistan”, International Conference of the Global Information Technology Management Association 2007, Napoli, Italy.
- Baqir, M.N., Babu, R. and Palvia, P. “Silent Revolution: Historical Perspective of ICTs Growth and Socio-Economic Development of Pakistan,” Annual Meeting of the National Decision Sciences Institute, Phoenix, Arizona, 2007.
- Bartis, E., and Mitev, N., "A multiple narrative approach to information systems failure: a successful system that failed", *European Journal of Information Systems* (17:2), 2008, pp. 112-123.
- Best, M. and R. Kumar. "Sustainability Failures of Rural Telecenters: Challenges from the Sustainable Access in Rural India (SARI) Project," *Information Technologies and International Development* (4:4), 2008, pp. 31-45.
- Blakely, E.J. "Community Development Research: Concepts, Issues, and Strategies", Human Sciences Press, New York, NY, 2000.
- BSNL, History of Information Communication Technologies in India, Access from www.upw.bsnl.co.in/saharanpur/history.html on March 22, 2008
- Campbell, M.J. "New Technology and Rural Development The Social Impact", *The Journal of Asian Studies*, (49:2), May, 1990, pp. 354-355.
- Carr, N., “IT Doesn't Matter”, *Harvard Business Review*, (81:7), 2003, pp. 109-112.
- Casey, K. “The New Narrative Research in Education”, *Review of Research in Education*, (21:1995), 1995, pp. 211-253.

- Chae, B., and Poole, M.S., "The surface of emergence in systems development: agency, institutions, and large-scale information systems", *European Journal of Information Systems* (14:1), 2005, pp. 19-38.
- Choudhury, A., Zaman, S. and Harahap, S., "An Evolutionary Topological Theory of Participatory Socioeconomic Development", *World Futures: Journal of General Evolution*, (63:8), 2007, pp. 584 – 598.
- Cresswell, J., *Qualitative inquiry and research design: Choosing among five traditions*, SAGE Publishers, Thousand Oaks, CA, 1998.
- Cresswell, J. W. *Qualitative Inquiry and Research Design*, Second edition, Sage, Thousand Oaks, CA, 2006.
- Creswell, W. and M. Brown. "How Chairpersons Enhance Faculty Research: A Grounded Theory Study," *Review of Higher Education* (16:1), 1992, pp. 41-62.
- Danzgler, J. "Computers and the Frustrated Chief Executive," *MIS Quarterly* (1:2), 1977, pp. 43-52.
- Davidson, E., "Changing Frames or Framing Change? Social Cognitive Implications of Organizational Change during IT Adoption", *Proceedings of the 1997 HICSS*, 1997. pp. 475-484.
- Davis, F., "User acceptance of information technology: Systems characteristics, user perceptions and behavioral impacts", *International Journal of Man-Machine Studies* (38:3), 1993, 475-487.

- de Vreede, G., Jones, N., Mgaya, R. J., "Exploring the Application and Acceptance of Group Support Systems in Africa", *Journal of Management Information Systems* (15:3), 1999, pp. 197-234.
- Dominguez, J., Horan, T., Hackler, D., Chatterjee, S., Walrod, W., Hilton, B., Smith, W. and M. Brite, *The Information and Communication Technology Comprehensive Economic Development Strategy: ICT CEDS for Orange County, California*, Economic Development Administration, U.S. Department of Commerce. Retrieved from http://www.wrjgroup.com/projects/ICTCEDSReport/ICTCEDS_2006.pdf on Feb 2, 2007
- Dube, L., and Robey, D., "Software stories: three cultural perspectives on the organizational practices of software development", *Accounting, Management and Information Technologies* (9:1999), 1999, pp. 223-259.
- Eggleston, K., Jensen, R., and Zeckhauser, R. "Information and Communication Technologies, Markets and Economic Development", Chapter in *The Global Information Technology Report 2001-2002: Readiness for the Networked World*, Oxford University Press, USA, 2003.
- Fiedler, F., *A Contingency Model of Leadership Effectiveness: Advances in Experimental Social Psychology* (Vol.1), 1964, Academic Press, New York.
- Gao, P. & A. Rafiq. "The Transformation of the Mobile Telecommunications Industry in Pakistan: A Developing Country Perspective," *Telecommunications Policy*, (2009), forthcoming doi:10.1016/j.telpol.2009.03.001

- Gallup, J., *Geography and Socioeconomic Development*, Background paper examining the state of the Andean region for the Andean Competitiveness Project. Retrieved from http://www.cid.harvard.edu/archive/andes/documents/bgpapers/geography_socioeconomicdevelopment.pdf on March 23, 2008.
- Gerhan, D. and S. Mutula. "Testing a recent model of ICT in development: Botswana and its university", *Information Technology for Development* (13:2), 2007, pp.177-197
- Gibbs, D. and Tanner, K. "Information and Communication Technologies and Local Economic Development Policies: The British Case", *Regional Studies*, (31:8), 1997, pp. 765-774.
- Gichoya, D., Hepworth, M., and R. Dawson. "Factors Affecting the Success and Failure of Government ICT Projects in Developing Countries," *Proceedings of the 2nd International Conference on E-Government*, 2006, Dublin, Ireland.
- Glaser, B.G. & Strauss, A.L. "*The Discovery of Grounded Theory: Strategies for Qualitative Research*", Aldine Publishing Company, Chicago, IL, 1967.
- Goldsworthy, D., "Thinking Politically about Development", *Development and Change* (19:3), 1988, pp. 505-536.
- Grimsley, M., Meehan, A., "e-Government information systems: Evaluation-led design for public value and client trust", *European Journal of Information Systems* (16:2), 2007, pp. 134-165.

- Hardy, A. "The role of the telephone in economic development", *Telecommunications Policy*, (4:1), 1980, pp. 278–286.
- HEC, Higher Education Commission of Pakistan, Retrieved from <http://hec.gov.pk/> on April 22, 2008.
- Heeks, R. "Using competitive advantage theory to analyze IT sectors in developing countries: a software industry case analysis," *Information Technologies and International Development* (3:3), 2006, pp. 5-34.
- Heeks, R. "Information Systems and Developing Countries: Failure, Success and Local Improvisations," *The Information Society* (18:2), 2002, pp. 101-112.
- Hirschheim, R., and Newman, M., "Symbolism and information systems development: myth, metaphor and magic", *Information Systems Research* (2:1), 1991, pp.29-62.
- Houtman, D., *Class and Politics in Contemporary Social Science: "Marxism Lite" and Its Blind Spot for Culture*, 2004, Aldine Transaction.
- Hunter, M. G., Beck, J. E., "Using Repertory Grids to Conduct Cross-Cultural Information Systems Research", *Information Systems Research* (11:1), 2000, pp. 93-106.
- Hsieh, J.J.P.A., Rai, A. and Keil, M., "Understanding Digital Inequality: Comparing Continued Use Behavioral Models of the Socio-Economically Advantaged and Disadvantaged", *MIS Quarterly*, (32:1), 2008, pp. 97-126.
- ITU, International Telecommunication Union, Retrieved September 23, 2008, from <http://www.itu.int>

- Jacobs, G., Macfarlane, R. and Asokan, N., "Towards a Comprehensive Theory of Social Development". *Human Choice: World Academy of Art & Science*, 1999, retrieved from http://www.icpd.org/development_theory/comprehensive_theory_of_social_development.htm on August 12, 2008
- Jaffee, D., *Levels of Socio-economic Development Theory*, 1998, Praeger Publishers, West Port, CT.
- Joseph, D., Kok-Yee, N., Koh, C., and Soon, A., "Information Technology Professionals: A Narrative Review, Meta-Analytic Structural Equation Modeling, and Model Development", *MIS Quarterly* (31:3), 2007, pp. 547-577.
- Kleine, D. "The Ideology Behind the Technology – Chilean Microentrepreneurs and Public ICT Policies," *Geoforum* (40:2), 2009, pp 171-183.
- Kozma, R., "National policies that connect ICT-based education reform to economic and social development," *Human Technology*, (1:2), 2005, pp. 117-156.
- Kuechler, W. L., and Vaishnavi, V., "So, Talk To Me: The Effect of Explicit Goals on The Comprehension of Business Process Narratives", *MIS Quarterly* (30:4), 2006, pp. 961-A16.
- Levina, N., Vaast, E., "Innovating Or Doing As Told? Status Differences and Overlapping Boundaries In Offshore Collaboration", *MIS Quarterly* (32:2), 2008, pp. 307-332.
- Lewis, A., "Economic Development with Unlimited Supplies of Labour", *The Manchester School*, (22:2), 1954, pp. 139-191.

- Lorsch, J., Morse, J. *Organizations and Their Members: A Contingency Approach*, 1974, Harper & Row, New York.
- Mujahid, Y.H. "Digital Opportunity Initiative for Pakistan", *Electronic Journal on Information Systems in Developing Countries* (8:6), 2002, pp. 1-14.
- Madon, S., "The Internet and socioeconomic development: exploring the interaction", *Information technology and people*, (13:2). 2000, pp. 85-101.
- Mehra, B. "Bias in qualitative research: Voices from an online classroom", *The Qualitative Report*, (7:1), 2002, Retrieved from <http://www.nova.edu/ssss/QR/QR7-1/mehra.html> on September 10, 2008.
- Mason, R. O., McKenney, J. L., Copeland, D. G., "Developing an Historical Tradition in MIS Research", *MIS Quarterly* (21:3), 1997, pp. 257-278.
- Mason, R. O., McKenney, J. L., Copeland, D. G., "An Historical Method for MIS Research: Steps and Assumptions", *MIS Quarterly* (21:3), 1997, pp. 307-320.
- Marceil, J. C. "Implicit Dimensions of Idiography and Nomothesis: A Reformulation," *American Psychologist* (32:2), 1977, pp. 1045-1055.
- Markovits, C., *A History of Modern India 1480-1950*, 2005, Anthem Press.
- Metcalf, T., *The Aftermath of Revolt India, 1857-1870*. 1991, Riverdale Co.
- Ministry of IT and Telecom. Broadband Policy, Available at <http://www.moitt.gov.pk>. Accessed on September 23, 2006.
- Ministry of Science and Technology. IT Policy, Available at <http://www.most.gov.pk>. Accessed on September 23, 2006.

- Mir, H. (2008). A Telephonic Interview to a TV news program on the issue of tribal areas in Pakistan, Retrieved from <http://pkpolitics.com/2008/09/19/hamid-mir-on-fata-situation>. on September 20, 2008.
- Mistry, J., "A Conceptual Framework for the Role of Government in Bridging the Digital Divide", *Journal of Global Information Technology Management*, (8:3), 2005, pp. 20-28.
- Moody, J.W., Blanton, J. E., Cheney, P.H., "A Theoretically Grounded Approach to Assist Memory Recall During Information Requirements Determination", *Journal of Management Information Systems* (15:1), 1998, pp. 79-98.
- Mujahid, Y.H. "Digital Opportunity Initiative for Pakistan", *Electronic Journal on Information Systems in Developing Countries*, (8:6), 2002, pp. 1-14.
- Mustonen-Ollila, E., Lyytinen, K., "How organizations adopt information system process innovations: a longitudinal analysis", *European Journal of Information Systems* (13:1), 2004, pp. 35-48.
- NADRA, National Database and Registration Authority, Retrieved from <http://www.nadra.gov.pk> on April 10, 2008.
- Olsson, T. "Appropriating Civic Information and Communication Technology: a Critical Study of Swedish ICT Policy Visions," *New Media & Society* (8:4), 2006, pp. 611-627.
- Ong, W., *Orality and Literacy: The Technologizing of the Word*, 1998, Routledge, London, UK.

- Orlikowski, W., and Iacono, S., "Research Commentary: Desperately Seeking the "IT" in IT Research—A Call to Theorizing the IT Artifact", *Information Systems Research* (12:2), 2001, pp. 121-134.
- Orlikowski, W.J., "CASE Tools as Organizational Change: Investigating Incremental and Radical Changes in Systems Development", *MIS Quarterly* (17:3), 1993, pp. 309-340.
- Oxford English Dictionary, Retrieved from <http://www.oed.com/> on September 19, 2008.
- Pauleen, D. J., "An Inductively Derived Model of Leader-Initiated Relationship Building with Virtual Team Members", *Journal of Management Information Systems* (20:3), 2003, pp. 227-256.
- Peshkin, A. In Search of Subjectivity – One's Own, *Educational Researcher*, (17:7), 1988, pp. 17-21.
- Pick, J. B. and Azari, R. "Global Digital Divide: Influence of Socioeconomic, Governmental, and Accessibility Factors on Information Technology", *International Journal of Information Technology*, (31:1) pp. 2.
- Porra, J., Hirschheim, R., Parks, M.S., "The History of Texaco's Corporate Information Technology Function: A General Systems Theoretical Interpretation", *MIS Quarterly* (29:4), 2005, pp. 721-746.
- POST. *ICT in Developing Countries*, retrieved on April 1, 2009 from <http://www.parliament.uk/documents/upload/postpn261.pdf>, 2006.

- Potter, R.B., Binns, T., Elliott, J.A. and Smith, D., *Geographies of Development*, Prentice Hall, 2004
- Pozzebon, M., and E. Heck. "Local adaptations of generic application systems: the case of Veiling Holambra in Brazil", *Journal of Information Technology* (2006:21), 2006, pp. 73-85.
- PTA (Pakistan Telecommunication Authority). 2006. Telecom Indicators, Available at <http://www.pta.gov.pk>. Accessed on September 25, 2006.
- PTCL (Pakistan Telecommunication Company Limited). 2006. Annual Company Report, Available at <http://www.ptcl.com.pk>. Accessed on September 25, 2006.
- Preston, P. *Development Theory: An Introduction to the Analysis of Complex Change*, 1996, Wiley-Blackwell.
- Puri, S., "Integrating Scientific with Indigenous Knowledge: Constructing Knowledge Alliances for Land Management in India," *MIS Quarterly* (31:2), 2007, pp. 355-379.
- Qureshi, S. "Movement in the information technology for development debate: How can it meet the challenges of global competition?", Editorial in the *Journal of Information Technology for Development*, (10:2003), 2003, pp. 147-149.
- Ramos, A., "Social values dynamics and socio-economic development", *Portuguese Journal of Social Science* (5:1), 2006, pp. 35-64.
- Riessman, C.K. "*Narrative Analysis*", SAGE Publications, New York, NY, 1993.
- Rostow, W.W., "*The Stages of Economic Growth: A Non-Communist Manifesto*", 3rd Edition, Cambridge University Press, 1990, USA.

- Roy, M. C., and Lerch, F. J., "Overcoming Ineffective Mental Representations in Base-rate Problems", *Information Systems Research* (7:2), 1996, pp. 233-247.
- SafetyNetTele, Retrieved from www.safety.net.pk on March 22, 2008.
- Samarajiva, R. and Zainuddin, A., *ICT Infrastructure in Emerging Asia: Policy and Regulatory Roadblocks*, SAGE Publications, New Delhi, India, 2008.
- Saunders, C. "Information Systems in Developing Countries: Editor's Comments", *MIS Quarterly* (31:2), 2007, pp. iii-vi.
- Scott, J.E., "Facilitating Interorganizational Learning with Information Technology", *Journal of Management Information Systems* (17:2), 2000, pp. 81-113.
- Sheikh, M. N. (2006). *Telecommunication Laws in Pakistan: Historical Background and Development*. Retrieved from <http://ezinearticles.com/?Telecommunication-Laws-in-Pakistan&id=362110> on March 5, 2009.
- Sillince, J. "A contingency theory of rhetorical congruence," *Academy of Management Review* (30:3), 2005, pp. 608-621.
- Strauss, A. and Corbin, J., *Basics of qualitative research: Grounded theory procedures and techniques*, 1990, SAGE Publishers, Newbury Park, CA.
- Strauss, A. and Corbin, J. *Grounded Theory Methodology: An overview*. In Denzin, N.K. and Lincoln, Y.S. (eds.) *Handbook of Qualitative Research*, 1994, SAGE Publishers, London.
- Subrmanian, R. "India and Information Technology: A Historical and Critical Perspective", *Journal of Global IT Management*, (9:4), 2005.

- Szirmai, A., *The Dynamics of Socio-Economic Development: An Introduction*, 2005, Cambridge University Press.
- TelMedPak, Retrieved from www.TelMedPak.com on March 22, 2008
- UNCTAD, Policies for ICT Growth, retrieved on April 12, 2009 from <http://www.unctad.org/Templates/Page.asp?intItemID=3994>, 2009.
- Urquhart, C., Lehmann, H. and M. Myers. "Putting the 'theory' back into grounded theory: guidelines for grounded theory studies in information systems," *Information Systems Journal*, 2009, forthcoming.
- VU, Virtual University of Pakistan, Retrieved from www.vu.edu.pk on March 22, 2008.
- Wallerstein, I., *World-Systems Analysis: An Introduction*, 2004, Duke University Press.
- Walsham, G., *Making a World of Difference: IT in a Global Context*, 2001, Wiley & Sons.
- Walsham, G., and Sahay, S. "Research on Information Systems in Developing Countries: Current Landscape and Future Prospects", *Information Technology for Development*, (12:1), 2006.
- Walsham, G., and Sahay, S. "Foreword: Special Issues on Information Systems in Developing Countries", *MIS Quarterly* (31:2), 2007, pp. 7-24.
- Willing, N. *Top 10 Emerging Mobile Markets*, Retrieved on March 23, 2009 from http://www.unstrung.com/document.asp?doc_id=119630&page_number=1&site=, 2007.
- World Bank, Glossary, Retrieved on September 30, 2008 from <http://www.worldbank.org/depweb/english/beyond/global/glossary.html>

- Yildiz, M. "E-government Research: Reviewing the Literature, Limitations and Ways Forward", *Government Information Quarterly*, (24:2007), 2007, pp. 646-665.
- Yin, R.K., *Case Study Research: Design and Methods*, 1984, SAGE Publishers, Beverly Hills, CA.
- Zahedi, F., Van Pelt, W.V., Srite, M., "Web Documents' Cultural Masculinity and Femininity", *Journal of Management Information Systems* (23:1), 2006, pp. 87-128.
- Zhang, J., and Faerman, R., "Distributed Leadership in the Development of a Knowledge Sharing System," *European Journal of Information Systems* (16:2007), 2007, pp. 479-493.

APPENDIX: INTERVIEW PROTOCOLS

ICT based Socio-Economic Development in Pakistan Interview Protocol – Public Officials

Antecedents of ICTs Growth

- What milestones led up to the current state of ICT industry?
- Who played the key roles in bringing about these changes?
- Why did indigenous and foreign investors decided to make huge investments in Pakistan despite the apparent political instability of the region?
- What conditions were favorable to changes in the regulatory and legislative regime?
- How did the subsequent events unfold?
- What was the result?
- How did it bring about social and economic change in the country?
- How has the ICT industry evolved itself during the last few years?
- What future prospects do you foresee for the ICT industry growth in Pakistan?
- What lessons other developing countries can learn from Pakistani example?

Socio-Economic Development

- What socio-economic development goals are behind ICT growth efforts in Pakistan? To what extent those goals have been met?
- What kind of social development do you observe due to ICT growth?
- Apart from those employed in the ICT sector, how do you see ICT contributing to the economic development of ordinary citizens particularly women, poor, those living in rural areas and illiterate/less educated etc?
- A lot of people still do not have access to (quality) ICT – e.g. internet penetration is alarmingly low, public schools still lack basic computing resources; what should be done to bring these segments of society into the mainstream?
- What bearing do ICT based socio-economic development have on the overall development of the country?
- In your opinion, how are ICT growth and socio-economic development related?

ICT based Socio-Economic Development in Pakistan

Interview Protocol – Citizens

Narrative method will be used for data collection and analysis of the transcripts from these interviews. Casey (1995) and Riesman (1993) suggest asking an open-ended question, keeping quiet and letting the interviewee narrate their story within the broader context of research. Therefore interview protocol will consist of the following question:

- I am studying the relationship between ICT growth and socio-economic development; please tell me the story of your life.

Riesman (1993), suggests having a few back up question in case the interviewee is unable to coherently tell their story within the research context. However, the use of these questions should be minimal so that the respondent can speak their mind and not just address the specific probes. Following would be my back up questions:

- How have ICT changed your life economically during the last few years if at all?
- How have ICT changed your life socially during the last few years if at all?
- What kind of ICT are part of your daily life?
- How do these technologies help you perform the daily business of your life?
- How would you imagine your life without ICT?

We will have the option of returning to the storyteller for clarifications in the story or to ask specific questions that pertain to the researcher's interests. Thus our first attempt would be to provide the storyteller with the flexibility and choice to narrate his/her story in a way that is most comfortable to him/her.