Assessing the Acceptance of Information Technology: Applying Unified Theory of Acceptance and Use of Technology

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A thesis submitted in partial fulfillment of the requirements for the Degree of Master of Philosophy/Science in Management with specialization in Technology Management at the Faculty of Management Sciences
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DEDICATION

My Mother: Thank you for your unconditional support with my studies. I am honored to have you as my mother. Thank you for giving me a chance to prove and improve myself through all my walks of life. Please don't ever change. I love you.

My Father: Hoping that with this research I have proven to you that there is no mountain higher as long as Allah is on our side. This thesis will fulfill your dreams.

My Family: Thank you for believing in me and allowing me for further studies. You have been a great source of inspiration and motivation for me.

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Abstract

The primary objective of the current research is to assess Information Technology (IT) acceptance by investigating the determinants of modified Unified Theory of Acceptance and Use of Technology (UTAUT) model. A number of models are suggested in this regard, current study continues this tradition by applying an extended UTAUT model to assess IT acceptance in public sector organizations of Pakistan. An instrument was developed and five organizations were surveyed for data collection. A total of 241 responses were tested against the model. The results demonstrated that performance expectancy, effort expectancy, perceived personal utility and technical support were significant predictors of behavioral intention while social influence and training were insignificant. The study achieved its purpose by validating an extended UTAUT model. This study will produce useful insights into the factors that influence IT acceptance behavior and will provide new ideas in enhancing IT usage.

Keywords: Information Technology acceptance, Unified Theory of Acceptance and Use of Technology, Public sector organizations, Pakistan.

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ABBREVIATIONS

IT	Information Technology
IS	Information System
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
MM	Motivational Model
TPB	Theory of Planned Behavior
c TAM-TPB	combined Technology Acceptance Model and Theory of Planned Behavior
MPCU	Model of Personal Computer Utilization
IDT	Innovation Diffusion Theory
SCT	Social Cognitive Theory
UTAUT	Unified Theory of Acceptance and Use of Technology
ITAA	Information Technology Association of America
PU	Perceived Usefulness
PEOU	Perceived Ease of Use
PE	Performance Expectancy
EE	Effort Expectancy
SI	Social Influence
FC	Facilitating Conditions
TS	Technical Support
TRNG	Training
PPU	Perceived Personal Utility
BI	Behavioral Intention
PLS	Partial Least Square
SPSS	Statistical Packages for Social Sciences
MoIT	Ministry of Information Technology
MoST	Ministry of Science and Technology
PIA	Pakistan International Airlines
FBR	Federal Board of Revenue
HEC	Higher Education Commission

DECLARATION

I here by declare that this thesis, neither as a whole nor as a part thereof has been copied out from any source. It is further declared that I have prepared this thesis entirely on the basis of my personal efforts made under the sincere guidenance of my supervisor.

No portion of the work presented in this thesis has submitted in support of any application for any degree or qualification of this or any other university or institute of learning.

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To be submitted to the Faculty of Management Sciences International Islamic University Islamabad by the Supervisor.

FORWARDING SHEET

The thesis entitled "Assessing the Acceptance of Information Technology: Applying Unified Theory of Acceptance and Use of Technology" submitted by Mr. Yassir Mahmood in partial fulfillment of M.Phil degree in Management with specialization in Technology Management has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow him to submit this thesis for further process of as per IIU rules & regulations.

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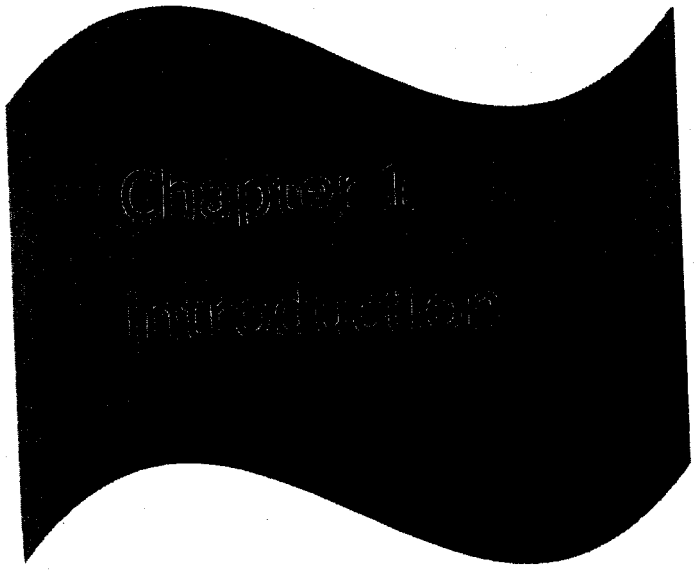

Chapter 1:
Introduction

1. Introduction:

"Information technology and business (organizations) are becoming inextricably interwoven. I don't think anybody can talk meaningfully about one without talking about the other" Bill Gates. It is generally accepted that the use of Information Technology (IT) offers great potential for individuals to improve their work quality and reduce the organizational expenses. The significance of IT can be seen from the fact that it has penetrated in every aspect of human life i.e., from business to leisure and even touched all spheres of society. It has brought some drastic changes in the organizations in current business practices and has provided plenty of resources to enhance the skills and abilities of individuals, and has been proven to be an essential source of competitive advantage and a strategic weapon required for a sustainable organization (Lam et al. 2007; Ebrahim and Irani 2005). Using IT tools, organizations have enabled themselves to have properly manage and administer their regular operations and activities. Enlighting its importance James O' Brien (2003) stated that IT plays a major role in the field of business to provide cognitive support to a company's phenomenal objectives for gaining advantages in sight. However, practices have shown that Information Technologies (ITs) must be managed and manipulated sensibly and efficiently if the enterprise has to see any benefit in turn (Dillon 2001; Thomas 2006). A better understanding is therefore essential that how people should use the IT. How and why individuals choose to adopt a new IT, has for ever been an important area of research. That's why Information System (IS) researchers are always keen to identify users' intentions towards IT leading to help in improving and maximizing the possible accepted level of the users.

Nowadays, organizations are investing heavily in ITs. Westland and Clark (2000) stated that 50 % of all the new capital investments are in the field of IT, but in spite of such a remarkable investment, the ratio of IT failure projects in certain cases are also very high. According to Standish Group International, Inc. study reports (2001) revealed that only 28% of all IT projects were completed within the scheduled time and budget. Moreover 49% of projects were observed involved in demanding an overbudget-expenditures, late and with fewer features and functions than initially specified, and a significant amount i.e., 23% of projects were declared cancelled. Despite of the evidence that IT plays a vital role in formulating strategy, the management is seriously concerned with such enormous investments are falling short of their completion (Norton 1995). The expected benefits from the investments in IT are realized only when they are adopted properly by their intended users. (Yi et al. 2006). Even with such high investments, the unsuccessful IT projects reveal that organizations lack in understandings of the factors that leads to successful implementation of IT projects (Lassila and Brancheau 1999). By understanding such factors that influences a user acceptance of IT, different strategies can be developed for its implementation in such a way that would improve the performance of individuals, leading to a logical conclusion.

The term IT evolved in 1970's as a concept*, has taken a natural growth from the basic usage of computers and processing of information in an industry. The scope of IT is very wide and getting momentum with each passing day. Parallel to its evolution, IS researchers are always keen to investigate the issues related to IT acceptance and usage. The importance of the researching user acceptance and proper usage of IT has been

*http://www.africa.oneworld.net

recognized since mid 1980 as it's a prerequisite for technology utilization.

The information technologies which are to be implemented must be accepted and used properly by employees in the organizations concerned, advancement in IT continues at a rapid pace but the problem of underutilized usage still exists (Venkatesh and Moris 2000; Igbaria and Tan 1997; Hamner and Qazi 2009). Thomas (2006) stated that identifying the factors that contribute to IT acceptance and usage is need of the day. The components which determine the users' perceptions about its coherence and practice, IS research has identified numerous factors affecting IT acceptance (like perceived usefulness, perceived ease of use, subjective norm, job fit, complexity, image, relative advantage, compatibility, self-efficacy, extrinsic motivation, intrinsic motivation). Many studies have examined users' acceptance of technology and using behavior, in this regard multiple models and theories have been developed to explain or predict IT true vision. Among which Technology Acceptance model TAM (Davis 1989), extended Technology Acceptance Model TAM 2 (Venkatesh and Davis 2000), Model of Personal Computer Utilization MPCU (Thompson et al. 1991) and Unified Theory of Acceptance and use of Technology UTAUT (Venkatesh et al. 2003) are prominent. The UTAUT is the latest model in the field of IT acceptance research which unified eight different models and theories (Theory of Reasoned Action TRA, Motivational Model MM, Theory of Planned Behavior TPB, combined Technology Acceptance Model and Theory of Planned Behavior c TAM-TPB, Model of Personal Computer Utilization MPCU, Innovation Diffusion Theory IDT and Social Cognitive Theory SCT). The UTAUT model explains that behavioral intention to use or not to use a technology is influenced by a person's perceived independent factors of performance expectancy, effort expectancy, and social

influence, further behavioral intention and facilitating conditions determines the actual usage. Originally developed in the USA, a number of researches have tested this model in technologically advanced countries. Gupta et al. (2007) in their study reported that UTAUT is most helpful model in identifying the factors that influence users' perceptions about IT acceptance in less developed countries. This was the prime reason which acted as an inspiration for this research to assess the level of IT acceptance in a developing country. This research is based on the UTAUT model and will add some new construct to it to investigate the behavioral intention of individuals about IT acceptance in a developing country like Pakistan.

In developing countries it is much needed to understand the utilization, the determinants, and acceptance of IT perceived by individuals (Anandarajan et al. 2002; Gupta et al. 2008; Dasgupta et al. 1999). By identifying the factors that influence the acceptance of IT, different strategies can be developed that may improve the performance of individuals. Lack of IT and computer acceptance and usage are considered as major problems for organizations (Roberts and Henderson 2000). Therefore it is much important to explore the factors which affect a users' decision to use or not to use ITs. From individual's perspective, the prior research on IT and computer acceptance and usage has addressed a lot of areas like: resistance to computers (Hirschheim and Newman 1988), computer anxiety (Venkatesh 2000), job satisfaction (Igbaria and Torasker 1994), extrinsic and intrinsic motivation to use computers (Venkatesh 2000), computer self efficacy (Venkatesh 2000; Compeau and Higgins 1995, Igbaria 1995), computer playfulness (Venkatesh 2000), computer experience (Davis and Venkatesh 2004; Taylor and Todd 1995; Hassan 2003), computer skills (Anandrajan et al. 2002), computer

satisfaction (Igbaria and Tan 1997) and end user computing (Wu et al. 2006). However, what personal benefits derived by individuals on effective computer usage got little attention.

This research has broadened the viewpoint of UTAUT model by making a few changes to it. First, the construct facilitating conditions which is one of important construct of UTAUT model, but the results of prior studies are inconsistent about its impact on actual usage. This study has some special consideration for this construct by studying it from two distinct dimensions i.e., technical support and training to investigate the abstruse relationship between facilitating condition and behaviorial intentions of IT users. Second, an extension being given to the UTAUT model by adding a new construct perceived personal utility, this construct is related with personal benefits gained by individuals on effective utilization of IT. In a developing country like Pakistan, this construct may produce some novel results. For assessing IT acceptance this study will address the behavior related to the use of computers in general and not in a specific way comparing to any other application or system, as computer technology is regarded as one of the important technology in a meta analysis undertaken by Marakas et al. (2010). Only public sector organizations were selected for this purpose. There are several reasons for taking public sector organizations. First public sector organizations are quite large and heavily populated. Second and the prime reason is that it is a common perception about the public sector organizations that they utilize IT tools to a much lesser extent comparing with the private sector organizations. This study will lead to investigate such a low IT using credibility.

1.1 Rationale of the Study:

Most of the IT/IS models have been developed and much studied in technologically advanced countries whose findings cannot be generalized to developing countries. In developing countries, there is still a need to explore the consequences of these models. The decision to accept or reject IT ultimately comes from the individual users. It is therefore, important to know what factors will affect their decision to accept or not to accept IT. This research will try to assess the acceptance of IT in public sector organizations of a less developed country like Pakistan by applying UTAUT model and will share such knowledge on IT acceptance, based on which organizations can develop strategies for IT implementation in such a way that will improve the performance of individuals. Employing the UTAUT model this study will identify such factors through which organizations can enhance the utilization of IT.

1.2 Research Questions:

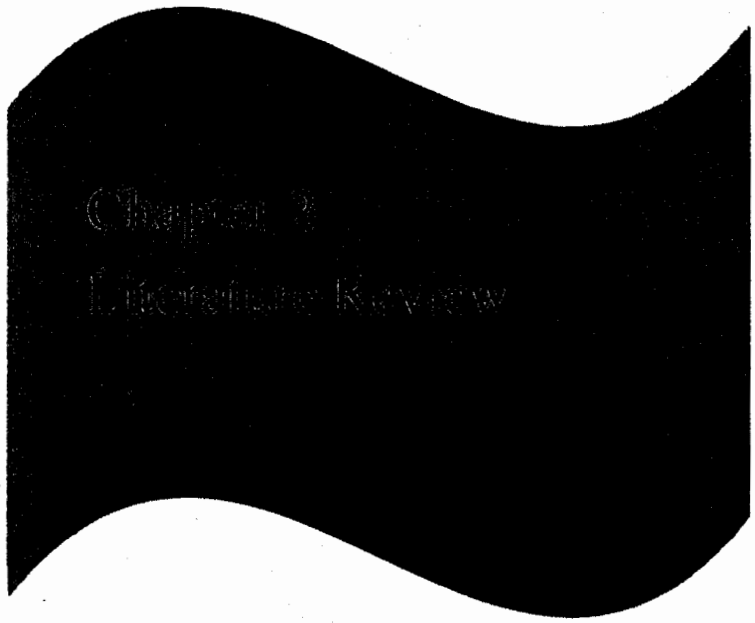
The study will focus to answer the following research questions:

- Do the UTAUT constructs have impact on individual's IT acceptance behavior in public sector organizations of Pakistan?
- Do the UTAUT constructs explain individual's perceptions about IT acceptance?
- Does an extension of UTAUT model by adding more independent variables from prior literature will be beneficial in explaining IT acceptance?

1.3 Research Objectives:

The main objective of the current research is to assess IT acceptance by investigating the determinants of modified UTAUT model. On reviewing literature this research has the following general objectives.

- Re-examine the UTAUT model to identify the factors that explian the perceptions of individuals about IT acceptance in public sector organizations of Pakistan.
- Extending the UTAUT model by adding a new construct "Perceived Personal utility" which deals with the personal benefits gained by the individuals on IT acceptance.


Chapter 2
Literature Review

2. Literature Review:

Oxford Advanced Learner's dictionary defines the IT as "the study or use of electronic equipment, especially computers, for storing, analyzing and sending out information". While Information Technology Association of America (ITAA) provides the definition of IT as "the study, design, development, implementation support or management of computer-based information systems, particularly software applications and computer hardware".

IT enables individuals to improve their productivity and efficiency, prior studies have concluded that IT could improve work processes, profitability and productivity of individuals (Anandrajan et al. 2002; Teo 2009; Deveraj and Kohli 2003; Kijsanayotin et al. 2009; Al-Gahtani et al. 2007; Venkatesh and Davis 2000). For a technology to be acceptable, it must fulfill the basic usability requirements and must be useful for its intended users (Dillon 2001). However research indicates that new ITs are not be fully accepted as the resistance to IT tools and computer systems by managers and professionals is a widespread problem (Roepke et al. 2000; Lee and Miller 1999; Igbaria 1990; Davis 1989; Ebrahim and Irani 2005). Such barriers get in the way of successful implementation of IT in an organization, and the same has been verified by (Davis 1989; Agarwal and Prasad 1997) that an effective usage of IT relies on positive intention towards acceptance.

Users' acceptance and usage is very much focused by the MIS implementation researchers to determine the success or failure of IT (Davis et al. 1989; Igbaria 1993; Thompson et al. 1991). The literature on IT acceptance is so rich that a number of models

and theories have been proposed over last 2 decades. Among which the most common and applied are TAM and UTAUT.

2.1 Technology Acceptance Model:

It is the foremost and most common model in the field of IT acceptance proposed by Davis in 1986. Based on Fishbein and Ajzen's (1975) Theory of Reasoned Action (TRA), it was formulated in an attempt to understand that why people accept or reject IT. The key purpose of TAM was to trace the impact of external factors on internal belief, attitudes and intentions. TAM suggests that Behavioral Intention (BI) predicts actual usage of technologies, while BI is influenced by one's attitude towards using IT, and attitude in turn is jointly determined by Perceived Usefulness (PU) and Perceived Ease of Use (PEOU). Furthermore PU has an independent effect on BI and PEOU has an effect on PU (see figure 1). In TAM, PU and PEOU are the two major factors that affect IT acceptance behavior. In short, TAM predicts that user acceptance behavior of IT is determined by two factors: PU and PEOU which have been verified in a number of studies (Szajna 1996; Pijpers et al. 2001; Wu et al. 2006; Yang and Yoo 2004; Teo 2009). Davis defined PU as "the degree to which a person believes that using a particular system would enhance his or her productivity" and PEOU was defined as "the degree to which a person believes that using a particular system would be free of efforts". TAM assumes that users' acceptance of any technology is determined by PU and PEOU. Both PU and PEOU have significant effects on users' attitude towards using the system. In subsequent studies (Venkatesh and Davis 2000) "Attitude" was dropped because it only partially mediate the effects of PU and PEOU on BI.

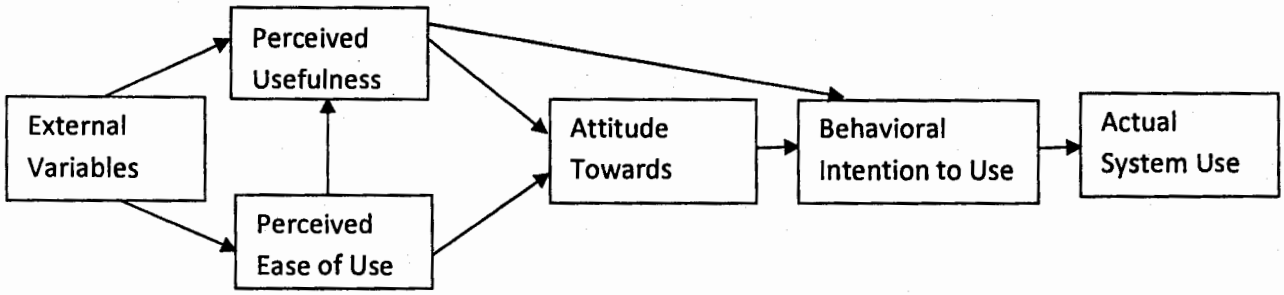


Figure 2.1: Technology Acceptance Model

Since its birth over the course of almost 20 years, researchers have attempted to add to TAM some substantial issues. Mathieson (1991) stated that it is inexpensive to apply TAM and its core constructs PU and PEOU are meaningful to any community regardless of their functional area. One so simple model has explained decisions and behavior fully across a wide range of technologies adoption situations. Many studies have replicated the TAM model (Adams et al. 1992; Segars and Grover 1993; Straub et al. 1997; Szajna 1996). A few have combined it with other theories to gain new insights like TAM-IDT (Wu and Wang 2005) and TAM-TPB (Taylor and Todd 1995; Mathieson 1991). While many studies have extended TAM for various situations by adding new constructs (Yang and Yoo 2003; Wu et al. 2007; Sun and Zhang 2006) and the most important extensions of all the times were TAM 2 (Venkatesh and Davis 2000) and TAM 3 (Venkatesh and Bala 2008).

In IS research field TAM got considerable attention and has been tested in several applications of IT with consistent results. To name a few: computers (Taylor and Todd 1995; Igbaria et. al 1997; Teo 2009), web course tools (Ngai et al. 2007), web retailing (Chen et al. 2002), online purchase intentions (Heijden 2003), the use of websites

(Lederer et al. 2000; Lin and Lu 2002), electronic mail (Szajna 1996; Straub et al. 1997), windows (Karahanna et al. 1999), word processor and spreadsheet (Chau 1996), World Wide Web (Gefen et al. 2003; Stafford et al. 2004), web browsers (Moris and Dillon 1997) and health care applications (Aggelidis and Chatzoglou 2009; Kijsanayotin et al. 2009).

TAM has some remarkable accomplishments since its inception. Venkatesh and Davis (2000) cited that the statistics of the institute for scientific information's social science citation index® demonstrated 424 journal citations until January 2000 to the two articles (Davis 1989; and Davis et al. 1989) that introduced TAM. Even after 2000 it was cited highly. In 2007 the same institute statistics showed that citations have crossed over 1700 while Google Scholar showed 500 citations (Venkatsh and Bala 2008). Also Bagozzi (2007) stated that to date the number of citation of Davis et al. (1989) is over 700, which is too high for a single article in an applied field. It proves TAM to be a robust, powerful and parsimonious model for predicting users' acceptance of technologies.

Regardless of the significance of TAM, it has a few limitations as well. A critical review of TAM undertaken by Legris et al. (2003) concluded that TAM should be integrated with other variables in order to provide a diversified view of technology adoption. Moreover Chuttur (2009) criticized TAM for limited explanatory and predictive power and lack of any practical value. The main limitations of TAM are: first, in their model neither Davis (1989) nor Davis et al. (1989) fully investigated the external factors that may influence user's perceptions of IT acceptance (Bhattacherjee and Sanford 2006). Second TAM didn't include Subjective Norms (an important factor of

TRA) on the grounds that it is less relevant in the IT acceptance context, hence it fails to explain the influence of colleagues, family members or other referents on individual's BI (Yi et al. 2006). Though in subsequent studies subjective norm was added to it like in TAM 2 by Venkatesh and Davis (2000). Third TAM is less applicable in the early stages of design where designers are trying to determine how best to design a technology so that it will be acceptable for users (Dillon 2001). Fourth TAM explanatory power is very limited (Sun and Zhang 2006), original TAM study explained just 40% variance while subsequent studies have just between 15% and 45% of variance explained. Fifth and final TAM fails to explain barriers that hinder technology adoption (Taylor and Todd 2001).

2.2 Unified Theory of Acceptance and Use of Technology:

In recent times, an impressive effort has been made to the IT acceptance literature. On the basis of integration of eight competing models/theories in the existing literature of IT acceptance, an empirical study was undertaken by Venkatesh et al.2003 to propose a unified model, the new model was named as Unified Theory of Acceptance and Use of Technology (UTAUT). The eight competing models/theories were Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Innovation Diffusion Theory (IDT), Social Cognitive Theory (SCT), Technology Acceptance Model (TAM), Motivational Model (MM), Combined Technology Acceptance Model and Theory of Planned Behavior (c-TAM-TPB) and Model of Personal Computer Utilization (MPCU) (consult table 1 for each model/theory details). UTAUT postulates that four core constructs Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Facilitating Conditions (FC) act as determinants of IT use behavior, while the four moderators age, gender, experience and voluntariness of use influence the key

relationship in the model. Further more the PE, EE and SI are direct determinants of Behavior Intention (BI), while FC and BI then jointly predict actual usage (see fig 2). Briefly the model explains that what perceptions influence an individual's BI to use or not to use IT. During its development, the model was tested in four different organizations (entertainment, telecomm, banking and public administration) over a period of six months. By synthesizing essential elements from different models Venkatesh et al. (2003) stated that the objective was to get a unified view of individual's behavior about IT acceptance and usage.

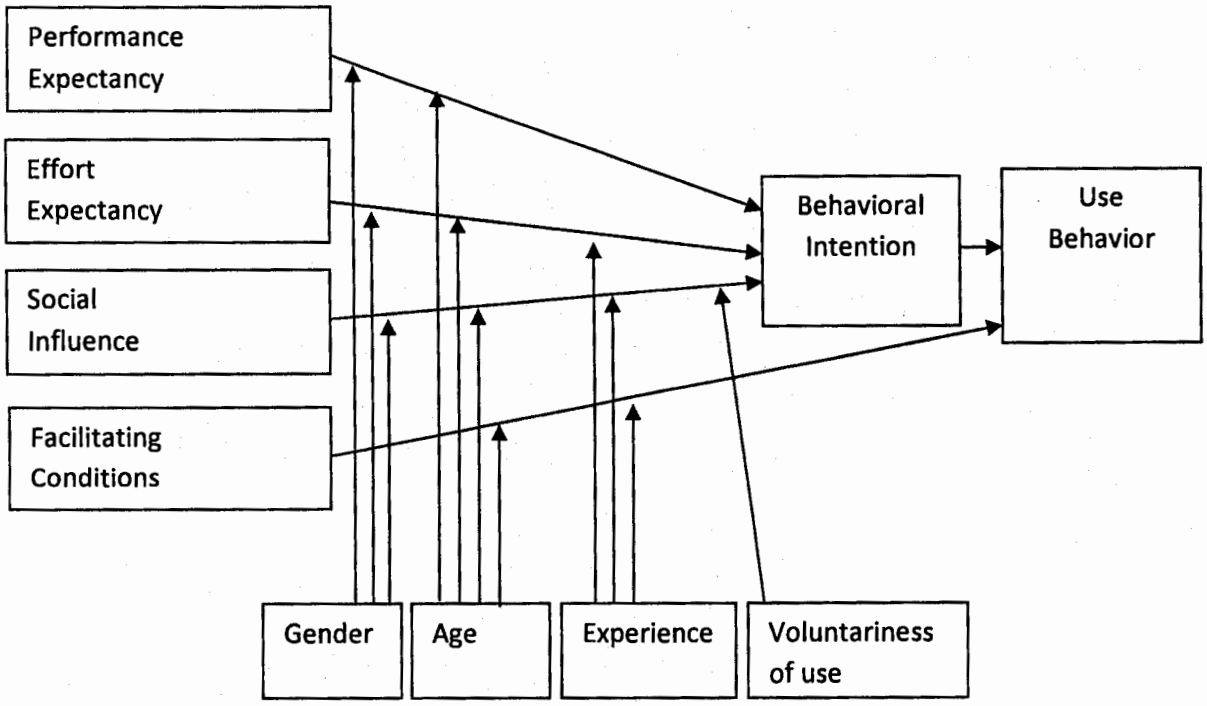


Figure 2.2: Unified Theory of Acceptance and Use of Technology

Table 2.1 Prior Models and Theories (adapted from Venkatesh et al. 2003)

S.No	Model/Theory	Core construct
1.	**Theory Of Reasoned Action (TRA):** Developed by Fishbein and Ajzen (1975). An Influential theory of human behavior, it has been applied to predict a wide range of behaviors.	Attitude Towards Behavior, Subjective Norm.
2.	**Technology Acceptance Model (TAM):** Davis (1989) adapted TRA to predict IT acceptance and usage on the job.	Perceived Usefulness, Perceived Ease of Use.
3.	**Motivational Model (MM):** Davis et al. (1992) applied motivational theory in IS field to study new technology adoption and use.	Extrinsic Motivation, Intrinsic Motivation.
4.	**Theory of Planed Behavior (TPB):** By extending TRA Ajzen (1991) present this theory to predict intention and behavior about different technologies.	Attitude Towards Behavior, Subjective Norm, Perceived Behavior Control.
5.	**Combined Technology Acceptance Model and Theory of Planned Behavior (c-TAM-TPB):** Different constructs of TAM and TPB were combined by Taylor and Todd (1995).	Attitude Towards Behavior, Subjective Norm, Perceived Behavior Control, Perceived Usefulness.
6.	**Model of PC Utilization (MPCU):** Thompson: et al. (1991) derived this model from the theory of human behavior (1977) developed by Triandis. The basic purpose was to predict PC utilization, however model is applicable to study a variety of ITs.	Job fit, Complexity, Social Factors, Long-term consequences, Affect towards Use, Facilitating Conditions.
7.	**Innovation Diffusion Theory (IDT):** The theory originally published by Rogers (1962) has been adapted by Moore and Benbasat (1991) to IS context to study individual technology acceptance.	Relative Advantage, Ease of Use, Image, Visibility, Voluntariness of Use, Compatibility, Results Demonstrability.
8.	**Social Cognitive Theory (SCT):** A powerful theory of human behavior developed by Bandura (1986). In IS context Compeau and Higgins (1995) applied it to study the computer utilization.	Outcome Expectations- Performance, Outcome Expectations-Personal, Self Efficacy, Affect, Anxiety.

UTAUT is a promising theory that explained 70% of variance in BI and 50% in actual usage (Venkatesh et al. 2003), which is higher than any single, combined or extended model in IS research field. The same has been verified by Niehaves and Plattfaut (2010) that UTAUT gives a high degree of variance to explain individual's IT acceptance and usage behavior comparing with any other model in IS/IT field. While Schaupp (2009) and Gupta et al. (2003) stated that it is the most predominant and comprehensive theory in evaluating the acceptance of a new technology in an

organization. UTAUT has been tested in a number of previous researches (Kijsanayotin et al. 2009; Wang et al. 2009; Wills et al. 2008). Its applicability has been confirmed in several fields like e-govt services (Alshahfi and Weerakkody 2009; Al-Awadi and Moris 2008; Hung et al. 2006), information kiosks (Wang and Shih 2009), charismatic leadership (Neufeld et al. 2007), health information system (Fitterer et al. 2010; Kijsanayotin et al. 2009), e-file adoption (Schaupp et al. 2009), smart card applications (Loo et al. 2009), picture archiving and communication system (Duyck et al. 2008), multi cultural studies (Oshlyansky et al. 2007; Al-Gahtani et al. 2007; Bandyopadhyay 2007), mobile learning (Wang et al. 2009), information and communication technology (Gupta et al. 2008; Birch and Irvine 2009), electronic library services (Tibenderana and Ogao 2008) and podcasting (Lee and Lin 2008). A few studies have extended the UTAUT model like: Wang et al. (2009) added two constructs to the model to study the mobile learning in Taiwan, similarly Wang and Wang (2010) added three new constructs to study the mobile internet acceptance behavior of individuals.

Despite the significance of UTAUT, it has been criticized by a few researchers, Bagozzi (2007) stated that 41 independent variables for predicting intentions and at least 8 variables for predicting behavior is "reaching a stage of chaos" in technology adoption. Raaij and Schepers (2008) criticized the UTAUT model that it is a less parsimonious model. Furthermore they pointed that combining items from different models can be construct problematic, as disparate items were grouped together in a single psychometric construct.

Chapter 3
Theoretical Framework

3. Theoretical Framework:

3.1 Why UTAUT Model:

After a comprehensive literature review of both models, this research will apply UTAUT model to assess the IT acceptance behavior of individuals. There are several reasons for selecting UTAUT model.

1. The UTAUT model has accounted 70% of variance in usage intention, which is greater than any individual, combined or extended model in IS research area.
2. In a bibliometric comparison of the two models Dwivedi et al. (2010) stated that researchers are diverting their focus from TAM to UTAUT. Because UTAUT offers the TAM constructs along with two extra constructs thus providing a more deep understandings.
3. The comprehensiveness and valid reliability of UTAUT model (AlAwadi and Morris 2008) were the encouraging points to adapt it for the current research.

3.2 Proposed Research Model of Study:

To investigate individual's behavior about computer acceptance, this study has extended the UTAUT model by adding a new construct (see fig 3) and some other changes, which are:

1. The moderators (age, gender, experience and voluntariness of use) are removed. As far as "age" and "gender" are concerned, this study has no interest in age and gender differences of individuals towards computer acceptance. This research is based on a single time survey, so "experience" can not be included as moderator, since Venkatesh stated this experience is "based on point of measurement and

doesn't reflect 'actual experience' or knowledge. It simply notes the ordinal nature of early experience (post training) to several months after its implementation" (V. Venkatesh, personal communication, September 20, 2008). Those public sector organizations which have been targeted in this study, the usage of computer technology was not voluntary there. Since this study considered mandatory usage of computers, so "voluntariness of use" moderator is also removed. The removal of moderators is not a new idea. Several previous studies have either fully removed (Lee and Lin 2008; Neufeld et al. 2007), reduced (Gupta et al. 2008; Birch and Irvine 2009; Wang et al. 2009; Wang and Shih 2009) or changed (Loo et al. 2009; Alshafi and Weerakokody 2009; AlAwadhi and Morris 2008; Niehaves and Plattfaut 2010) the moderators in UTAUT model.

2. Studying the facilitating conditions in terms of two (Technical support and Training) specific dimensions. Lee and Lin (2008) emphasized that appropriate dimensions are needed to be defined for facilitating conditions construct as its impact is very limited in the UTAUT model.
3. The model has been given an extension by adding a new construct named "Perceived Personal Utility" identified from the prior literature (Hamner and Qazi 2009) for the purpose to investigate the personal benefits gained by individuals for utilizing their efforts in using the IT. In several contexts the UTAUT model has been extended by adding new constructs in previous researches (Lee and Lin 2008; Neufeld et al. 2007; Wang et al. 2009; Loo et al. 2009). The model even explained a more higher variance when extended (Niehaves and Plattfaut 2010).

4. This study didn't include the "use behavior" construct and is limited to only one dependent variable i.e., BI of individuals. The reason is that the same is very difficult to measure and may not produce the real results. Further many researches (Kijsanayotin et al. 2009; Niehaves and Plattfaut 2010; Al-Awadi and Morris 2008) have claimed that BI is the best predictor of use behavior, by measuring BI means one have measured the actual usage behavior.

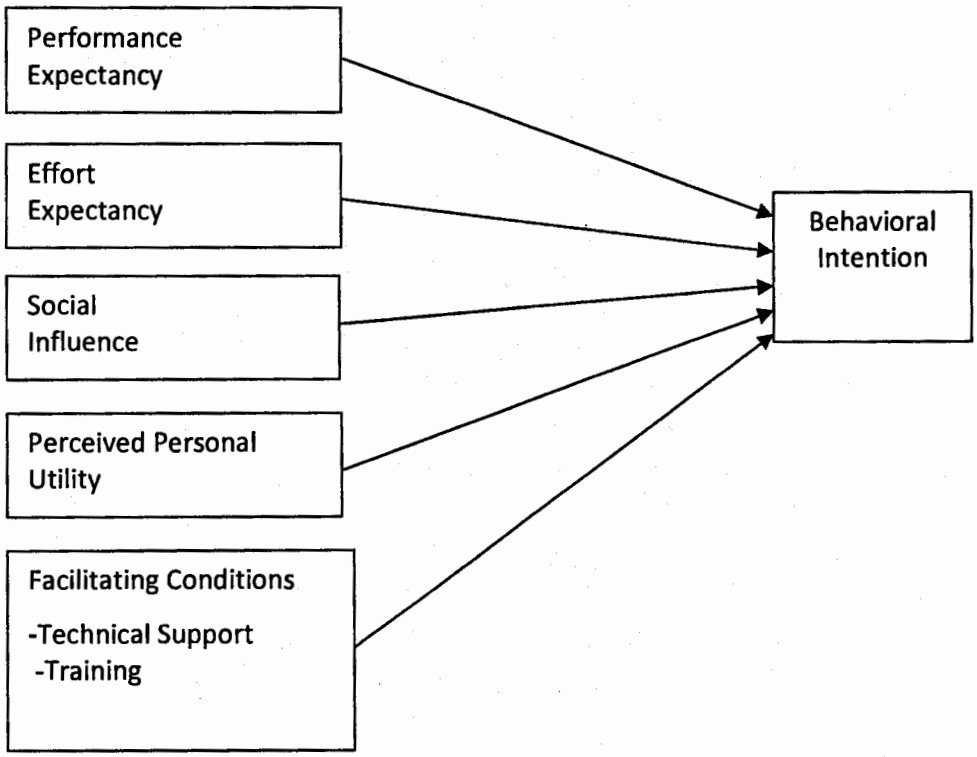


Figure 3.1: Proposed Research Model

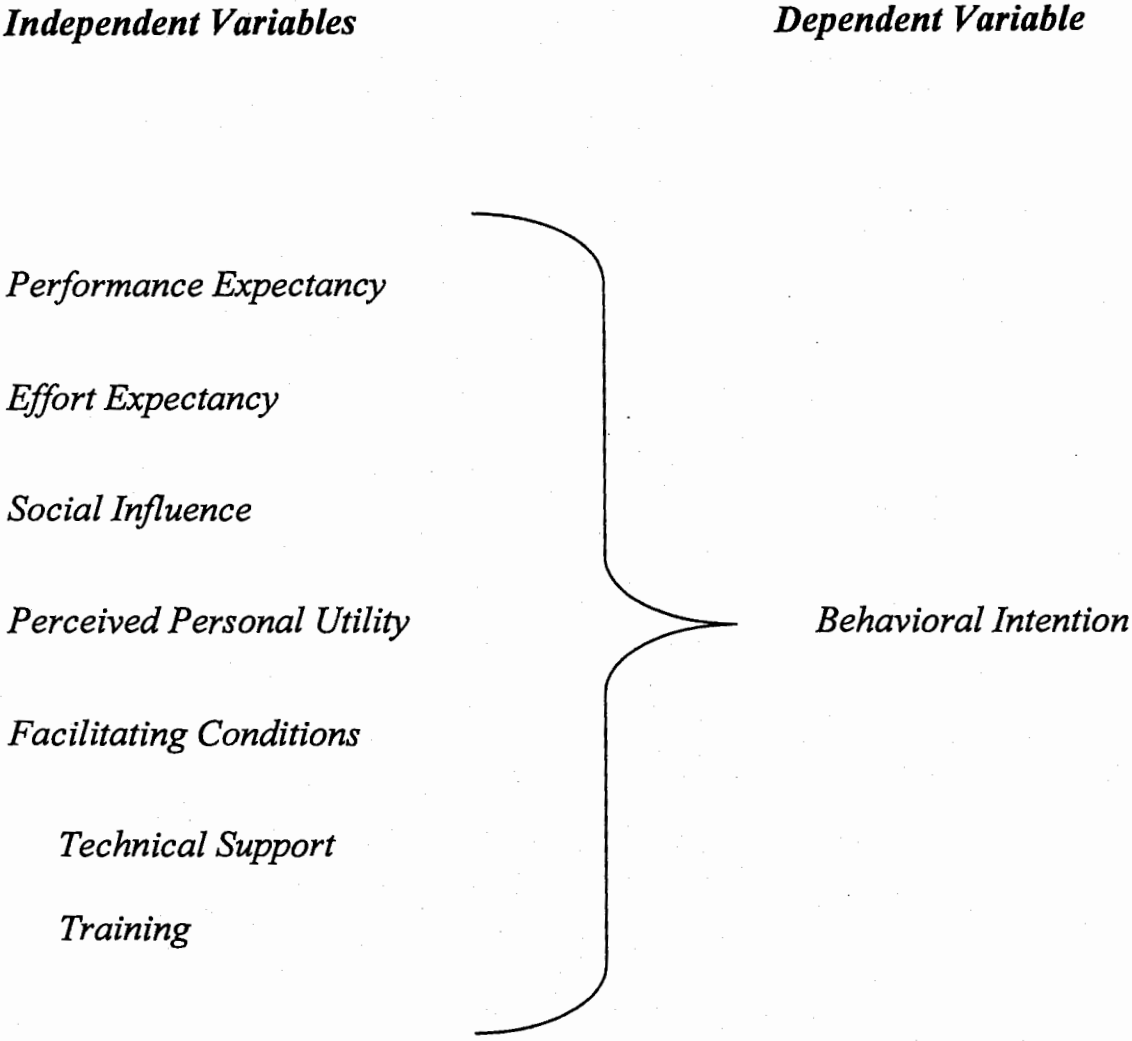


Figure 3.2: Nature of Variables

3.3 Operationalization of Research Variables

3.3.1 Performance Expectancy:

Performance Expectancy (PE) is defined as "The degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al. 2003). These are the perceptions of individuals that deal in enhanced personal performance. Similar constructs (see table 3) in other models are perceived usefulness (TAM, TAM 2, C-TAM-TPB), outcome expectations (SCT), relative advantage (IDT), job-fit (MPCU), and extrinsic motivations (MM). In earlier studies, PE was shown to be a strong predictor of BI (Al-Gahtani et al. 2007; Wang and Shih 2009; Niehaves and Plattfaut 2010; Birch and Irvine 2009; AlAwadi and Morris 2008), while Loo et al. (2009) found a negative relationship between performance expectancy and behavioral intention. Adapting PE to computer acceptance context, suggests that individuals thinks that computer are useful because it improve their performance and accordingly they accomplish their tasks more quickly and flexibly. Hence the first hypothesis for this research is proposed as:

H1: Performance expectancy has positive impact on behavioral intentions to accept computers.

Table 3.1: Related Constructs in Prior Literature

Core Constructs	Related Constructs	Models/Theories/References
Performance Expectancy	Perceived Usefulness	TAM
	Extrinsic Motivation	MM
	Job-fit	MPCU
	Relative Advantage	IDT
	Outcome Expectations	SCT
Effort Expectancy	Perceived Ease of Use	TAM
	Complexity	MPCU
	Ease of Use	IDT
Social Influence	Subjective Norm	TRA, TPB, C-TAM-TPB
	Social Factors	MPCU
	Image	IDT
Perceived Personal Utility	Net Benefits	Delone and Mclean (2003)
	Expected Benefits	Tibenderana and Ogao (2008)
	Perceived Benefits	Wu (2009)
Facilitating Conditions	Perceived Behavioral Control	TPB, C-TAM-TPB
	Facilitating Conditions	MPCU
	Compatibility	IDT

3.3.2 Effort Expectancy:

Effort Expectancy (EE) is defined as "The degree of ease associated with the use of the system" (Venkatesh et al. 2003). It is related with the perceptions of individuals that using the system will be free from physical and mental efforts. This construct concept is similar to the perceived ease of use (TAM, TAM 2), ease of use (IDT) and complexity (MPCU). Many previous studies have shown that EE has significant influence on BI (Wang et al. 2009; Wang and Shih 2009; Birch and Irvine 2009; Al-

AlAwadi and Morris 2008), while Niehaves and Plattfaut (2010) reported a weak relationship between EE and BI. Based on UTAUT, it is expected that individual's use of computers depends highly on whether or not computer system is easy to use, so the second hypothesis of the study is:

H2: Effort expectancy has positive impact on behavioral intentions to accept computers.

3.3.3 Social Influence:

Social Influence (SI) is defined as "The degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al. 2003). Related constructs in other models are: subjective norm (TRA, TAM 2, TPB, C-TAM-TPB), social factors (MPCU) and image (IDT). The behavior of individuals is influenced by the way in which they believe others will view them, resulting in acceptance of IT (Venkatesh et al. 2003). It is the general social pressure on individuals to perform or not to perform a particular act, as Peers' attitude and encouragement has a positive affect on acceptance of new technologies. Prior research suggested that it plays a crucial role in human behavior and in decision making to use a technology (Mathieson 1991; Venkatesh and Davis 2000; Bandyopadhay 2007). The effect of SI on BI has been shown to be significant in several previous technology acceptance and usage studies (Wang and Shih 2009; Wang et al. 2009; Schaupp et al. 2009), and a weak relationship between SI and BI has been reported by Niehaves and Plattfaut (2010) while a negative relationship by Loo et al. (2009). Based on the above literature it is expected that SI will be a significant determinant of BI to use computers, so the third hypothesis of the study is:

H3: Social influence has positive impact on behavioral intentions to accept computers.

3.3.4 Facilitating Conditions:

Organizational Facilitating Conditions (FC) are defined as "the degree to which an individual believes that a satisfactory level of organizational and technical infrastructure exists to support the use of the system" (Venkatesh et al. 2003). Related constructs in other models are perceived behavioral control (TPB, C-TAM-TPB), facilitating conditions (MPCU) and compatibility (IDT). These are the perceptions of individuals which are related to the availability of skills, resources and opportunities needed to use the information technologies. In common, FC refers to the elements (administrative support, information or material available, technical support) in an IT established environment, which determines an individual desire to accomplish a task (Teo 2009). It has been considered by Thompson et al. (1991) as one of the most important factors in the acceptance of technology, user satisfaction and in promoting more positive attitudes towards computer usage. A number of studies reported that lack of facilitating resources inhibits IT utilization (Birch and Irvine 2009).

In the original UTAUT model and Niehaves and Plattfaut (2010) found limited impact of FC in UTAUT model, but Lee and Lin (2008) emphasized that FC impact on BI may be significant if appropriate dimensions are defined for it. An intense review of literature was undertaken and this study taken only two specific dimensions of FC which are:

1. Technical Support
2. Training

3.3.4.1 Technical Support:

Technical Support (TS) explained by Lee and Lin (2008) as "the availability of a designated person for help when user of a technology has questions". Technical support consist of provision of helpdesk, hotlines and online support services (Ngai et al. 2007; Teo 2009), and Igbaria et al. (1995) concluded that high level of such support will promote computer acceptance to a greater extent. So the fourth hypothesis is proposed as:

H4: Technical Support has positive impact on behavioral intentions to accept computers.

3.3.4.2 Training:

Training is defined as, "Users' perception of the training programs on information systems' usage before its introduction and during its operation period".(kijsanayatin et al. 2009). The importance of training for IS success has been widely recognized (Igbaria et al. 1997; Aggelidis and Chatzaglou 2009). External variables such as user training influences user beliefs about using the system (Jones and Hubbana 2006). As training increases a person ability to use the IS also increases, and the trainee comfortable with using it (Compeau et al. 1999). Thompson et al. (1991) stated that by giving training to individuals, is helpful in minimizing the potential barriers towards personal computers acceptance. Training programs promotes individuals perceptions about the acceptance and usage of computers, and its shortage may produce problems for individuals resulting in their reluctance towards computing technologies (Igbaria 1997). Aggelidis et al. (2009) enlightens the importance of training that it helps users to increase their knowledge about IS, so that they are more likely to form a positive behavior to use it in their work. Hence we propose the fifth hypothesis as:

H5: Training has positive impact on behavioral intentions to accept computers.

3.3.5 Perceived Personal Utility:

Perceived Personal Utility (PPU) is defined as "the individual's personal benefits gained from the use of computer technology" (Hamner and Qazi 2009). PPU is included in this study to the UTAUT model as one of independent construct which is mainly concerned with the personal benefits like opportunity to earn more, amount of financial compensation and job security of individuals. PPU and Performance Expectancy (PE) do look similar but in fact they are much different from each other. PPU is the personal benefits gained from the usage of computer technology, while PE is the benefits to the organization (Hamner and Qazi 2009). Individuals are always interested in their personal benefits that can be gained from a utility. If they are utilizing their efforts in a system or task, in return they expect some satisfaction or happiness. In this regard, this research added this PPU construct to the UTAUT model to check how individuals perceive the benefits derived from the acceptance and usage of personal computers. Fryk (2009) stated that work related perquisites are important for IT users. Further, he concluded these can lead to many positive results in traditional and public organizations. In a study of user acceptance and use of e-library services (IT tool) Tibenderana and Ogao (2008) reported that individuals have formidable attraction towards e-library services as they expect to derive benefits from it. Hamner and Qazi (2009) found a positive relationship between PPU and computer technology usage, consistent to that, the sixth hypothesis of this study is composed as:

H6: Perceived Personal Utility has positive impact on behavioral intention to accept computers.

3.3.6 Behavioral Intention:

Behavioral Intention (BI) is defined as "The persons' subjective probability that he or she will perform the behavior in questions" (Fishbein and Ajzen 1975). The general explanation given in different models (TAM, TAM 2, UTAUT, TPB, TRA) for BI, is that it is the motivation and willingness shown by an individual to exercise efforts to perform the target behavior. BI is the strength of individuals to perform the specific behavior. In current study it is associated with the end users' intention to accept the usage of computer systems. TRA, TAM and UTAUT have postulated that BI is the major determinant of usage behavior. Many studies have highlighted its importance and verified that it is the best predictor of actual usage (Venkatesh et al. 2003; Kijsanayotin et al. 2009; Niehaves and Plattfaut 2010; Al-Awadi and Morris 2008), also the findings of Lam et al. (2007) imply that an effective usage of IT depends on positive behavior towards acceptance of IT.

Chapter 4

Research Methodology

4. Research Methodology:

4.1 Sample:

To assess the acceptance of IT such as computers by individuals this quantitative research utilized survey data collection from 348 respondents who constantly use IT tools (computers) in their daily official duties. The research was conducted in public sector organizations of Pakistan. Only five public sector organizations were selected which are: Pakistan International Airlines (PIA), Federal Board of Revenue (FBR), Higher Education Commission (HEC), Ministry of Information Technology (MoIT) and Ministry of Science and Technology (MoST). These are such organizations which use computers to greater extent as compared to others*. The offices in Islamabad (capital city) were surveyed only as this city has the central offices of these organizations, which provides multicultural diversity and represent the human resource from the whole country. After selection of organizations, for data collection convenient sampling technique was used due to time and financial constraints. A total of 348 respondents were selected as sample (n=348) across these five organizations.

4.2 Measures:

Based on the review of literature, an instrument was developed (see Appendix A) in order to investigate the impact of performance expectancy, effort expectancy, social influence, facilitating conditions and perceived personal utility on behavioral intention towards acceptance of IT. The native language of the respondents selected for this study is not English. So maximum efforts were carried out to compose a questionnaire with

*www.pak.gov.pk

Simple words. In this regard some questions were slightly changed for a better understanding.

The constructs performance expectancy, effort expectancy, social influence, facilitating conditions and behavioral intentions were measured on seven point Likert scale (as Venkatesh et al. 2003 used the same Likert scale). The construct perceived personal utility adopted from Hamner et al. (2009) was also measured on same Likert scale. The details of the scale is as follow: completely disagree (1)- mostly disagree (2)- slightly disagree (3)- neutral (4)- slightly agree (5)- mostly agree (6)- and completely agree (7). The particulars of items of core constructs and their justification with respect to reference are given in table 3.

4.3 Procedure:

After the approval of the top management of the selected five government organizations, staff were approached and requested to fulfill the questionnaire. They were informed about the purpose of the research. Questionnaires were personally administered to respondents of respective organizations. A responsible person was allocated in each organization, to whom the subjects were requested to submit the filled up questionnaire.

4.4 Data analysis

Although in the original UTAUT model Partial Least Square (PLS) was used as a data analysis technique, but this study will use regression analysis to test the proposed research model. The reason for not using the PLS is that Gupta et al. (2008) reported in their study that PLS is for relatively small sample sizes while for large sample sizes regressions analysis is best suited. Further more in recent times a number of different

studies have used multiple regressions data analysis technique to test the UTAUT model (Gupta et al. 2008; Carlson et al. 2006; Wang and yang 2005). This study too, has a large sample size so regressions data analysis technique was used.

After collection of data, its reliability was verified through Cronbach's Alpha, which is one of the most popular reliability technique in use nowadays. It determines the internal consistency or average correlation of items and its value ranges between 0 and 1. Cronbach's alpha generally increases if the intercorrelations among items is high.

Descriptive statistics were carried out as it describe the main features of collection of data quantitatively. Correlation analysis were conducted in order to check the intercorrelations between variables. Regression is a statistical measuring technique that determines the strength of the relationship between dependent and independent variables. This study too will explore the strength of relationship between dependent and independent variables so regression tests are best suited for hypothesis testing. All results and analysis were calculated using Statistical Packages for Social Sciences (SPSS) 15.

Table 4.1: Items of Construct

Construct	Items	Reference
Performance Expectancy	I Find the computers useful in my job.	Venkatesh et al. (2003)
	Using the computers enable me to accomplish tasks more quickly.	
	Using the computers increases my productivity.	
	If I use the computers, It will increase my chances of getting a raise.	
Effort Expectancy	My interaction with the computers is clear and understandable.	Venkatesh et al. (2003)
	It is easy for me to become skillful at using the computers.	
	I find the computers easy to use.	
	Learning to operate the computers is easy for me.	
Social Influence	People who influence my behavior think that I should use the computers.	Venkatesh et al. (2003)
	People who are important to me think that I should use the computers.	
	The senior management of my organization is helpful in use of computers.	
	In general, the organization has supported the use of computers.	
Perceived Personal Utility	Use of Personal Computer Technology gives me the opportunity to earn more.	Hamner and Qazi (2009)
	The amount of financial compensation for use of Computers is justified.	
	Use of Personal Computer Technology will make my job more secure.	
Technical support	A person is available for assistance with hardware or software difficulties.	Igbaria et al. (1997)
	Fax, E-mail and Web-based enquiries can be made, when there is technical problem.	
	When I need help to learn how to use computers, someone is there to teach me.	
Training	The content of training that I received before computers usage was satisfactory.	Igbaria (1990)
	The duration of training that I received before computers usage was satisfactory.	
	The way of training that I received before computers usage was satisfactory.	
	Overall, the training I received for computers usage was sufficient.	
Behavioral Intention	I intend to use the computers in future.	Venkatesh et al. (2003)
	I predict I would use the computers in future.	
	I plan to use the computers in future.	

Chapter 5

Results & Data Analysis

5. Results and Data Analysis

This section of research contains the results of the study which are based on analysis of data. The flow of this section is as follow. First part is about the description of demographic data, the second part is about the reliability analysis and last is about the analysis of items of the core constructs of the model.

5.1 Description of Demographic Data

5.1.1 Frequency of Responses:

A total of 348 questionnaires were distributed among the respondents across five organizations. Only 269 respondents returned the questionnaire. The response rate was 77.29%. Out of 269 responses 28 were discarded as they were either incomplete or unreadable. A total of 241 (see table 5.1) usable questionnaire were coded for final data analysis.

Table 5.1: Respondents Across Organizations

Organization	Frequency	Percentage
Ministry of Science and Technology	47	19.51%
Higher Education Commission	61	25.31%
Ministry of Information Technology	38	15.76%
Federal Board of Revenue	54	22.41%
Pakistan International Airline	41	17.01%
Total	241	100%

5.1.2 Descriptive Analysis w.r.t Gender:

The sample consists of 187 male respondents which is 77.59% of the total sample and 54 female respondents which is just 22.41% of the total sample (see table 5.2).

Table 5.2: Gender wise frequency of respondents

Gender	Frequency	Percentage
Male	187	77.59%
Female	54	22.41%
Total	241	100%

5.1.3 Descriptive Analysis w.r.t Age

The respondents' age details are shown in table 5.3, which depicts that respondents are fairly young. 14.93% have the age between 18 and 25 years while 56.43% have age between 25 and 35 years. The respondents whom age was between 35 and 50 years were 26.14% and a minor i.e., 2.48% of respondents were above the age of 50. There was not even a single respondent whom age was below 18 years.

Table 5.3: Age wise frequency of respondents

Age Group	Frequency	Percentage
Under 18	0	0%
18-25	36	14.93%
25-35	136	56.43%
35-50	63	26.14%
Above 50	6	2.48%
Total	241	100%

5.1.4 Descriptive Analysis w.r.t Education

After analysis of educational level of respondents, it is summarized (consult table 5.4) as the subjects are highly qualified. Only 4.56% have high school and 13.69% have college level certificates while the rest have higher degrees of education. A good ratio of respondents i.e., 37.34% have bachelor's and 41.49% have master's degrees. A few respondents have even doctorate degrees which is 2.91% of the total sample.

Table 5.4: Educational Level of Respondents

Educational Level	Frequency	Percentage
High School	11	4.56%
College Level	33	13.69%
Bachelor Degree	90	37.34%
Master Degree	100	41.49%
Doctoral	7	2.91%
Total	241	100%

5.1.5 Descriptive Analysis w.r.t Job Position

From job position perspective, subjects were categorized in two groups (details in table 5.5). Group one contains employees who have the BPS between 4 and 15 (these scales are normally considered as clerical and non officer scales), while in group two such employees are placed who have the BPS 16 or greater (these scales are normally considered as officer scales). Accordingly 71.37% of the respondents are in group one, while 28.63% are in group two.

Table 5.5: Job Position of Respondents

BPS	Frequency	Percentage
4-15	172	71.37%
16 and Greater	69	28.63%
Total	241	100%

5.2 Descriptive Analysis w.r.t Financial Compensation and Training

The results of dichotomous variable frequency distribution are "1. Do you get financial compensation for using personal computer technology at job?" only 27 (11.2%) respondents answered this question with "yes" while the rest i.e., 214 (88.8%) respondents replies were "no". While for "2. Have you received any training before using computers at job?" the "yes" answer was given only by 55 (22.83%) respondents, while majority 186 (77.17%) respondents reply was "no" (refer table 5.6). The purpose of these two questions was to find out that how many respondents were trained and compensated for computer technology acceptance.

Table 5.6: Descriptive Analysis w.r.t Financial Compensation and Training

Items	Replies	Frequency	Percentage
Financial Compensation	Yes	27	11.2%
	No	214	88.8%
Training	Yes	55	22.82%
	No	186	77.17%

5.3 Reliability Analysis

Reliability determines the extent to which a scale bring out consistent results. One of the most popular reliability statistics in use today is Cronbach's alpha. It determines the internal consistency or average correlation of items and its value ranges between 0 and 1. Cronbach's alpha generally increases if the intercorrelations among items is high. The closer Crocnbach's alpha value to 1 shows higher internal consistency of the items in scale. Researchers generally recommend that Cronbach's Alpha values of 0.90 or greater are excellent, up to .80 is considered as good, while values of 0.60 to 0.70 are acceptable. Values below 0.5 are considered unacceptable (Hinton et al. 2004). Table 5.7 shows the variables, the number of items and their reliabilities. The variables effort expectancy, social influence, training and behavioral intentions have the alpha values greater than 0.90 which are regarded as excellent. Performance expectancy and technical support have the alpha values 0.83 and 0.82 respectively which are considered as good. Only one variable i.e., the perceived personal utility has relatively low alpha value of 0.62 but that's still acceptable.

Table 5.7: Reliability Analysis

Variables	No. of Items	Cronbach's Alpha
Performance Expectancy	4	0.839
Effort Expectancy	4	0.921
Social Influence	4	0.924
Technical Support	3	0.828
Training	4	0.947
Perceived Personnel Utility	3	0.621
Behavioral Intention	3	0.958

5.4 Mean Analysis of Core Constructs:

Mean analysis (see table 5.8) were carried out in order to get useful information regarding the perceptions of individuals about computer acceptance and usage. The mean value of performance expectancy was 5.50 while its Standard Deviation (SD) was 1.33. The mean value indicates that individuals are agreed to improved performance expectancy due to computer usage and the mean can only deviate by 1.33 upwards or downwards. The variable effort expectancy has a mean value of 5.79 while SD=1.22, which demonstrates that users are agreed to the fact that computers are easy to use. Third independent variable was Social influence, its mean value is 1.93 and SD=0.80, which shows that on average users disagree to peers effect on their computer usage behavior. Under the construct facilitating conditions, technical support has the mean value 5.82 and SD=0.81, which refers that for computer usage technical support was provided, while training has mean value of 3.49 and SD=1.12, indicating that users were disagree to the fact that they were given any training. The last independent variable i.e., the perceived personal utility has a mean value of 4.17, and SD=1.17, which shows that users are almost neutral on perceptions of any personal benefits derived from computers usage. The dependent variable which is behavioral intention has the mean value 5.71 and SD=1.28, which verifies that individuals have the intentions to use computers.

Table 5.8: Mean Analysis of Core Constructs

	PE	EE	SI	TS	TRNG	PPU	BI
Mean	5.50	5.79	1.93	5.82	3.49	4.17	5.70
Std. Deviation	1.33	1.22	0.80	0.81	1.12	1.17	1.28
Minimum	1.00	1.25	1.00	1.67	1.00	1.00	1.00
Maximum	7.00	7.00	5.25	7.00	7.00	7.00	7.00

Note: PE=Performance Expectancy, EE=Effort Expectancy, SI=Social Influence, TS=Technical Support, TRNG=Training, PPU=Perceived Personal Utility, BI=Behavioral Intention.

Table 5.9: Descriptive Statistics of Items of Core constructs

Items	N	Min	Max	Mean
I Find the computers useful in my job.	241	1	7	6.26
Using the computers enable me to accomplish tasks more quickly.	241	1	7	5.95
Using the computers increases my productivity.	241	1	7	5.74
If I use the computers, It will increase my chances of getting a raise.	241	1	7	4.06
My interaction with the computers is clear and understandable.	241	1	7	5.74
It is easy for me to become skillful at using the computers.	241	2	7	5.71
I find the computers easy to use.	241	1	7	5.77
Learning to operate the computers is easy for me.	241	1	7	5.98
People who influence my behavior think that I should use the computers.	241	1	7	2.47
People who are important to me think that I should use the computers.	241	1	7	2.91
The senior management of my organization is helpful in use of computers.	241	1	7	0.93
In general, the organization has supported the use of computers.	241	1	7	1.43
A person is available for assistance with hardware or software difficulties.	241	1	7	6.54
Fax, E-mail and Web-based enquiries can be made, when there is technical problem.	241	1	7	4.78
When I need help to learn how to use computers, someone is there to teach me.	241	1	7	6.17
The content of training that I received before computers usage was satisfactory.	241	1	7	4.08
The duration of training that I received before computers usage was satisfactory.	241	1	7	3.62
The way of training that I received before computers usage was satisfactory.	241	1	7	3.25
Overall, the training I received for computers usage was sufficient.	241	1	7	3.01
Use of Personal Computer Technology gives me the opportunity to earn more.	241	1	7	4.63
The amount of financial compensation for use of Computers is justified.	241	1	7	2.81
Use of Personal Computer Technology will make my job more secure.	241	1	7	5.06
I intend to use the computers in future.	241	1	7	5.85
I predict I would use the computers in future.	241	1	7	5.71
I plan to use the computers in future.	241	1	7	5.57

5.5 Correlation Analysis

Correlation matrix shows the linear association between variables. Table 5.10 revealed that significant positive association existed between performance expectancy, effort expectancy, technical support, training, perceived personal utility and behavioral intention for computer acceptance. While the association between social influence and behavioral intention is insignificant but positive. After comprehensive analysis it is depicted that performance expectancy has a strong significant linear association with behavioral intention ($r=0.840$, $p<0.05$), this means that performance expectancy and behavioral intention moves in one direction by 0.840. Effort expectancy too has a strong significant linear association with behavioral intention ($r=0.745$, $p<0.05$) and these also move in one direction by 0.745. The social influence and behavioral intention has positive but insignificant association ($r=.121$. $p>0.05$). The two sub factors of facilitating conditions i.e., technical support and training showed positive association with behavioral intention for computer usage ($r=0.206$, $p<0.05$) and ($r=0.210$, $p<0.05$) respectively. The last variable which is perceived personal utility also expressed positive association with behavioral intention to use computers ($r=0.197$, $p<0.05$).

Table 5.10: Correlation Matrix

	PE	EE	SI	TS	TR	PPU	BI
PE	1.000						
EE	0.665	1.000					
SI	0.029	0.114	1.000				
TS	0.076	0.034	0.062	1.000			
TR	0.300	0.007	0.029	0.300	1.000		
PPU	0.277	-0.028	0.059	0.037	0.257	1.000	
BI	0.840**	0.745**	0.121	0.206**	0.210**	0.197**	1.000

**p<0.01,

Note: PE=Performance Expectancy, EE=Effort Expectancy, SI=Social Influence, TS=Technical Support, TRNG=Training, PPU=Perceived Personal Utility, BI=Behavioral Intention.

5.6 Hypothesis Testing

To evaluate the theoretical relationship between the core constructs of the research model empirical tests were carried out. For this purpose regressions analysis were carried out using SPSS version 15. Regression determines whether predictors account for variability in a dependent variable. This section explains the regression analysis, interpretation of the beta (β) coefficient, F-test, and evaluation of R-square. All the independent variables are expected to be significantly associated with the dependent variable.

Table 5.11: Regression Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.891	.795	.789	.58923

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	314.120	6	52.353	150.791	.000
	Residual	81.243	234	.347		
	Total	395.363	240			

Regression Analysis

Variables Description	B	T-Statistics
PE	0.579****	13.31
EE	0.339****	7.59
SI	0.087*	1.81
TS	0.250****	5.12
TRNG	-0.040	-1.43
PPU	0.027**	2.01

****p<0.0001, ***p<0.01, **p<0.05, *p<0.10

Note: PE=Performance Expectancy, EE=Effort Expectancy, SI=Social Influence, TS=Technical Support, TRNG=Training, PPU=Perceived Personal Utility, BI=Behavioral Intention.

H1: *Performance expectancy has positive impact on behavioral intentions to accept computers.*

According to statistical results performance expectancy has significant positive impact on the behavioral intention as marginal change in the mean of performance expectancy will ultimately increase the mean of behavioral intention by 0.579 (β=0.579, t=13.31>2, p=.000<0.05). So the first hypothesis of the study is accepted.

H2: *Effort expectancy has positive impact on behavioral intentions to accept computers.*

The second variable Effort expectancy also has significant positive impact on the behavioral intention as the positive beta value shows that one standard deviation increase in effort expectancy will 0.33 increase in behavioral intention (β=0.339, t=7.59>2, p=.000<0.05). So the second hypothesis is also accepted.

H3: *Social influence has positive impact on behavioral intentions to accept computers.*

The independent variable Social influence has insignificant impact on behavioral intention (β=0.087, t=1.81<2, p=0.070>0.05). So the third hypothesis is rejected.

H4: *Technical Support has positive impact on behavioral intentions to accept computers.*

The first sub factor of facilitating conditions which is technical support has significant positive impact on behavioral intention as marginal change in its mean value will increase the mean of behavioral intention by 0.250 (β= 0.250, t= 5.12>2, p=.000<0.05). Hence the fourth hypothesis is accepted.

H5: *Training has positive impact on behavioral intentions to accept computers.*

The second sub factor of facilitating condition is training, which has insignificant impact on behavior intention, also the beta value is negative which suggests that one unit increase in training will decrease behavioral intention by -0.04 (β= -0.04, t= -1.43<2, p=0.151>0.05). Therefore the fifth hypothesis is rejected.

H6: *Perceived Personal Utility has positive impact on behavioral intentions to accept computers.*

The last independent variable which is perceived personal utility has also significant positive impact on behavioral intention (β=0.027, t= 2.01>2, p=0.020<0.05). Thus the last hypothesis is also accepted.

5.6.1 F-Statistics:

The F-value is statistically significant typically if $p < .05$, this verifies that the regression model (the predictors) did a good job predicting the outcome variable. In current research case F statistics shows the significance level of overall model i.e., significantly less than 0.05. This means independent variables have significant impact on dependent variable (behavioral intention) at 95% confidence interval.

5.6.2 Evaluation of the R-Square:

It is also known as the Coefficient of determination and its value shows how well the model fits the data. R-square value normally falls in the range somewhere between 0.0

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Appendix A

Research Questionnaire
About
Assessing the Usage of Information Technology

This questionnaire is purely made for research purpose. You are duly requested to read and answer these questions with full concentration so that I may be able to build my research on reasonable and reliable grounds.

Organization_____

BPS_____ **Designation**_____

Gender
☐Male ☐Female

Age
☐ Under 18 ☐ 18-25
☐ 25-35 ☐ 35-50
☐ Above 50

Education Level
☐ High School ☐ College Level
☐ Bachelor Degree ☐ Master Degree
☐ Doctoral

Q.1 Do you get financial compensation for using personal computer technology at job?

☐Yes☐No

Q.2 Have you received any training before using computers at job?

☐ Yes ☐ No

The scale for questions is:

Completely Disagree	Mostly Disagree	Slightly Disagree	Neutral	Slightly Agree	Mostly Agree	Completely Agree
1	2	3	4	5	6	7

Note: Please tick the appropriate answer.

S.NO	Questions	Scale
Q.3	I Find the computers useful in my job.	1 2 3 4 5 6 7
Q.4	Using the computers enable me to accomplish tasks more quickly.	1 2 3 4 5 6 7
Q.5	Using the computers increases my productivity.	1 2 3 4 5 6 7
Q.6	If I use the computers, It will increase my chances of getting a raise.	1 2 3 4 5 6 7
Q.7	My interaction with the computers is clear and understandable.	1 2 3 4 5 6 7
Q.8	It is easy for me to become skillful at using the computers.	1 2 3 4 5 6 7
Q.9	I find the computers easy to use.	1 2 3 4 5 6 7
Q.10	Learning to operate the computers is easy for me.	1 2 3 4 5 6 7

Q.11	People who influence my behavior think that I should use the computers.	1	2	3	4	5	6	7
Q.12	People who are important to me think that I should use the computers.	1	2	3	4	5	6	7
Q.13	The senior management of my organization is helpful in use of computers.	1	2	3	4	5	6	7
Q.14	In general, the organization has supported the use of computers.	1	2	3	4	5	6	7
Q.15	A person is available for assistance with hardware or software difficulties.	1	2	3	4	5	6	7
Q.16	Fax, E-mail and Web-based enquiries can be made, when there is a technical problem.	1	2	3	4	5	6	7
Q.17	When I need help to learn how to use computers, someone is there to teach me.	1	2	3	4	5	6	7
Q.18	The content of training that I received before computers usage was satisfactory.	1	2	3	4	5	6	7
Q.19	The duration of training that I received before computers usage was satisfactory.	1	2	3	4	5	6	7
Q.20	The way of training that I received before computers usage was satisfactory.	1	2	3	4	5	6	7
Q.21	Overall, the training I received for computers usage was sufficient.	1	2	3	4	5	6	7
Q.22	Use of Personal Computer Technology gives me the opportunity to earn more.	1	2	3	4	5	6	7
Q.23	The amount of financial compensation for use of Computers is justified.	1	2	3	4	5	6	7
Q.24	Use of Personal Computer Technology will make my job more secure.	1	2	3	4	5	6	7
Q.25	I intend to use the computers in future.	1	2	3	4	5	6	7
Q.26	I predict I would use the computers in future.	1	2	3	4	5	6	7
Q.27	I plan to use the computers in future.	1	2	3	4	5	6	7

Q. 28 In your opinion how computers usage can be enhanced at your organization?
Ans._____

_____

Q.29 What are factors that should be focused to improve computers usage at your organization?
Ans._____

_____

Comments (if any)_____

_____

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and 1.0. (an R-square close to 1 indicates that we have accounted for almost all of the variability with the variables specified in the model). In case of this research, R^2 is 0.794 which is quite high and signify that model of study is good fit. Furthermore it verifies that the dependent variable is explained 79.4% by independent variables of the research model.

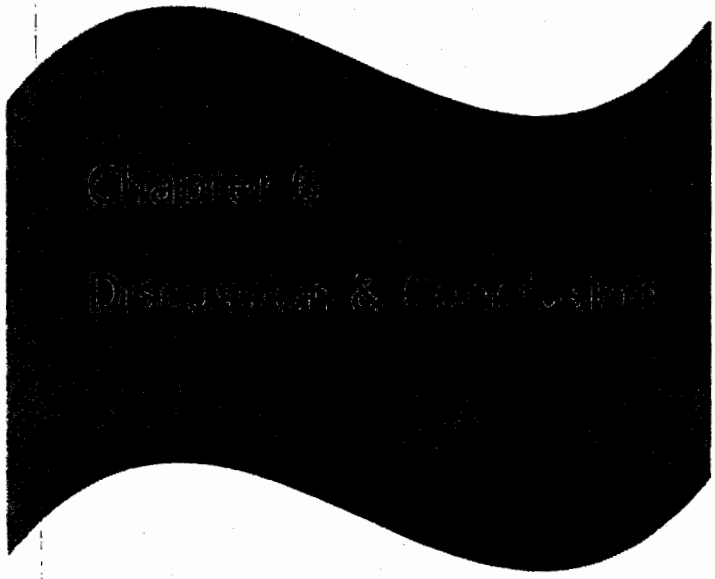
Adjusted R square is the proportion of the variation in the dependent variable accounted by the predictors. Ideally its value should be same or very near to the value of R square. In this research case its value is 0.789 (0.794 - 0.789=0.005 or 0.5 %) which can be interpreted as if model had been derived from population rather than a sample so it would account for only 0.5 % less variance.

Table: 5.12 Hypothesis Testing

Hypothesis	Relationship	Coefficient		p-Value	Supported
H1	PE→BI	0.579	13.31	0.000	Yes
H2	EE→BI	0.339	7.59	0.000	Yes
H3	SI → BI	0.087	1.81	0.070	No
H4	TS → BI	0.250	5.12	0.000	Yes
H5	TRNG→BI	-0.040	-1.43	0.151	No
H6	PPU →BI	0.027	2.01	0.021	Yes

Note: PE=Performance Expectancy, EE=Effort Expectancy, SI=Social Influence,

TS=Technical Support, TRNG=Training, PPU=Perceived Personal Utility, BI=Behavioral Intention.


Chapter 6
Discussion & Conclusions

6. Discussion:

The primary aim of this research was to determine the perceptions of individuals about IT acceptance (in this case computers) and validate the UTAUT model. For this purpose individuals were accessed in public sector organizations of Pakistan. Results of the study suggested that the extended model may provide useful insights in evaluating IT acceptance. The reliability of the instrument of the extended model suggests that internal consistency exists for several items and they are highly reliable. Also the goodness-of-fit value confirms that the modified model have explained behavioral intention of individuals about computer acceptance with greater likelihood. Consistent with prior research, higher level of behavioral intention about computer acceptance was found in this study.

Performance expectancy refers to the beliefs of individuals that use of the system will improve his/her performance. The findings of this research stated that performance expectancy has significant impact on behavioral intention, and it was also the strongest predictor of behavioral intention. Furthermore, the results generated by previous studies (Al-Gahtani et al. 2007; Wang and Shih 2009; Birch and Irvine 2009; Al-Awadi and Morris 2008) also reported a strong relationship between performance expectancy and Behavioral Intentions. This yields that individuals are highly attracted towards computer acceptance for improved performance. So it is concluded that individuals with high performance expectations are more likely to accept computer comparing with those who have low performance expectations.

Effort expectancy refers to the degree of ease associated with the use of the system. The findings suggests that effort expectancy has a strong effect on behavioral intentions, which refers to the fact that individuals strongly believe that less efforts are required in computer usage. The results generated by this study are also consistent with previous research findings (Wang et al. 2009; Wang and Shih 2009; Birch and Irvine 2009; Al-Awadi and Morris 2008).

Social influence depicts the social (peers, family, colleagues) pressure on individual to use a system. After analysis of data, this variable was found insignificant which indicates that individuals don't accept any pressure or influence from their peers and other influencing persons. This result was unexpected as it contradicts the previous studies (Wang and Shih 2009; Wang et al. 2009; Schaupp et al. 2009). This may be due to;

1. Subjects were not new users of computer technology, in fact a number of years passed when the sampled organizations were computerized.
2. The second reason may be, that the subjects of this research are relatively highly qualified (graduates=37% and masters=41%) and generally more qualified individuals accept less pressure from their peers and colleagues for using computers.
3. On further investigation it was noticed that, in the research instrument in the general comments area and two open ended questions (1. In your opinion how computers usage can be enhanced at your organization? And 2. What are factors that should be focused to improve computers usage at your organization?) most of the individuals have specifically mentioned and suggested that every concerned

person in the organization should be allotted a separate computer. This justifies the fact that individuals have often to share a single computer for official work in public sector organizations of Pakistan, but they have the strong dislike towards this computer sharing and wish to be the single user of computer. As a result, they neither want their peers (office colleagues) to use their computer nor they accept any pressure from them.

These are the only sighted reasons that justifies the insignificance of this variable. Hence when there is no pressure on users, social influence loses its significance which result in an insignificant relationship between social influence and behavioral intention.

Facilitating conditions are resources, skills and infrastructure in the environment to use a system. In this study these are specifically examined from two dimensions which are:

1. The first dimension which is technical support was found to have a significant impact on behavioral intention to use computers. This verifies that technical support was provided to the individuals when needed. The findings are consistent with previous studies (Igbaria et al. 1997). Individuals always need help when there is any technical problem, the availability of experts to handle these problems is considered important by the respondents.
2. The second dimension i.e., training was found to be insignificant, the analysis of data revealed that training has negative impact on behavioral intention (β= -0.04, t= -1.43<2, p=0.151>0.05). This means that increase in training will decrease the behavioral intention of computer usage. On the analysis of dichotomous variable frequency distribution, it is verified that only 22.82% respondents got training

before starting to use computers at their job, while the rest 77.17% reported that they hasn't received any training that may be the reason for its insignificance. If proper training is provided to the individuals in public sector organizations the results may have been different. Here an important point is that from educational institutes and other related fields individuals got enough skills so that using computers is easy for them as in the absence of training subjects still reported that computer usage is easy for them (as the impact of effort expectancy on behavioral intention is very high).

Perceived Personal Utility (PPU) which refers to the personal benefits (like earning more and job security) gained by individuals on using computers. Our results buttress that it has significant impact on individual's behavioral intention. The results can be interpreted as individuals do believe that computer technology enables them to earn more and will make their job more secure. Personal benefits are always a matter of concern for any individual and in this study the respondents consider personal benefits as important as other things. Organizations should encourage such policies which might promote fair compensation and rewards for securing personal benefits of individuals.

6.1 Answers to Research Questions

The Research Questions posed by this study were answered whose details are as follow.

RQ 1. Do the UTAUT constructs have impact on individual's IT acceptance behavior in public sector organizations of Pakistan?

The UTAUT constructs were found to be valid and a strong association between predictors and predicted variable was confirmed by this study (except for social influence

and training). In addition, performance expectancy, effort expectancy and facilitating conditions (only Technical Support) were found to have significant impact on individual's behavioral intention about IT acceptance, while social influence and facilitating conditions (only Training) were insignificant.

RQ 2. Do the UTAUT construct explain individual's perceptions about IT acceptance?

A number of important factors have been identified by this research that explained IT acceptance behavior significantly. For instance performance expectancy, effort expectancy, technical support and perceived personal utility were found to be significant predictors of behavioral intentions. In addition, social influence and training were found insignificant factors which depicts that individuals are under no social pressure when they use computers. Furthermore, they reported that no training programs exist and personal benefits aren't justified in public sector organizations of Pakistan.

RQ 3. Does an extension of UTAUT model by adding more independent variables from prior literature will be beneficial in explaining IT acceptance?

On extending the UTAUT model to the context personal benefits by employing new variables, this study has shared a high variance (79.4%) to the current IT acceptance literature. This justifies the extension given by this research to the UTAUT model.

6.2 Key Findings

A number of key research findings are discovered by this study.

What was known before?

- UTAUT is a valid and the most frequent model to study the IT acceptance behavior.
- Extension to UTAUT model is beneficial and may produce useful insights for practice and research.

What this research has added to the knowledge of research?

- Specifying the construct Facilitating conditions is possible, and may open new directions if proper dimensions are identified.
- Personal benefits are important in terms of evaluating individual's behavioral intentions about IT acceptance.
- Extending UTAUT gives higher variance if extended by adding new constructs.

6.3 Conclusion

IT is a vital part for any organization, the need is to explore such factors that are critical for its sequential usage by exploring the factors affecting personal computers acceptance in public sector organizations of Pakistan. This research made a number of substantial contribution to the field of IT acceptance research. Using a modified UTAUT model this study validated its core constructs and discovered a few new constructs that may open insights in studying IT acceptance behavior. Some of findings are consistent with

previous studies while some are new. The UTAUT constructs performance expectancy and effort expectancy were found to have strong impacts on behavioral intention, while no impact of social influence was found on behavioral intention. The novel and important findings includes that technical support was found to be important predictor of users' behavioral intention for computer acceptance. Furthermore training which is generally considered as a vital source for any technology acceptance and usage, was found insignificant. Perceived Personal utility which is personal benefits gained has also positive impact on behavioral intention indicating that individual's thinks that they are less rewarded for utilizing their efforts in the usage of computer technology.

The findings in the research are instructive in the sense that it can help both practitioners and researchers to recognize the vital constructs of computer acceptance. Providing easy to use systems, training, technical support and developing a fair compensation policy will maximize the computer acceptance, these necessary steps are required to ensure computer technology infusion in public sector organizations of Pakistan.

6.4 Implication for Research

- This research provided enough proof about the fact that UTAUT is a valid and reliable model for assessing IT acceptance.
- The core constructs were found to be valuable in explaining individual's behavioral intentions about computer acceptance, likewise the new constructs added were also found to be significant predictors.
- On extending the model it even explained a higher variance, which validates the extension and suggests that model can be extended to specific contexts.

6.5 Recommendations for Policy Makers

A few recommendations are suggested for policy makers and high authorities of Govt. organizations.

- Due to the individual's high perceptions of performance and effort expectancies about the computers, authorities should focus on every possible plan that may enable individuals to use computers in a more easy way to meet their expectations, this may be achieved by providing best hardware and software packages.
- Training, and technical support must be provided to individuals for an enhanced computer acceptance and usage.
- Individuals do believe that the efforts they consume in the usage of computer technology are less rewarded. Managers and authorities should focus on fair financial compensation policies for individuals in order to meet individual expectations and organizational goals.

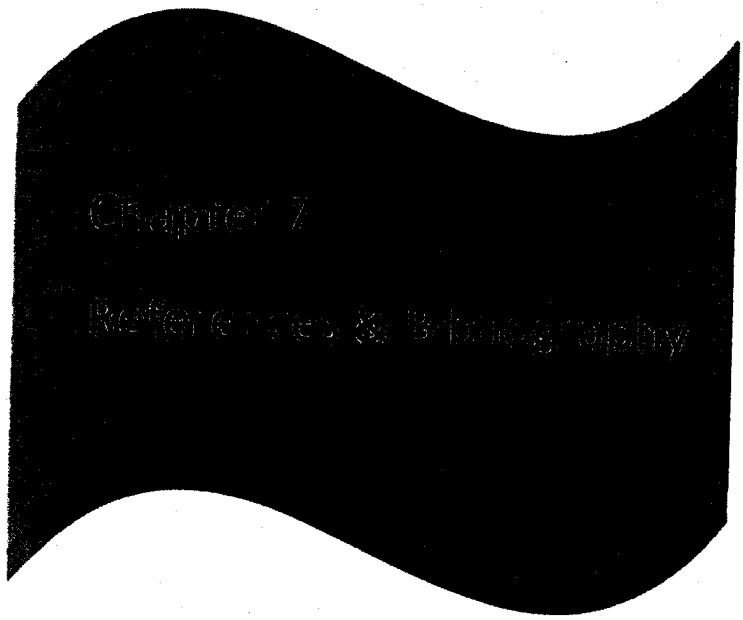
6.6 Limitations and Future Research

Like most of the researches this research too has some limitations, future researches might be undertaken to overcome these limitations.

- Data was collected through a self reported questionnaire, hence the responses may not be very correct. This is not a serious limitation as self reported data collection is very common research method nowadays.
- Although this study extends UTAUT model, any future research will be more beneficial if it take into account some special consideration for personal benefits

and facilitating conditions. Also for more detailed reasons for the insignificance of social influence in the UTAUT model.

- The current study was based on a single time frame. In future any longitudinal research will be more useful in order to study more in depth individual's behavioral intentions about computer technology.
- The original UTAUT model was tested across several technologies, while this study only tested computers (IT tool), further research might test the modified model applicability with other IT tools.
- This study subjects were individuals from public sector organizations of Pakistan. These results may not be applicable to other population that differs in nature of organization (like private) and job. Future research may overcome this limitation by taking sample from both public and private sector organizations of Pakistan.


Chapter 7
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