

**Analyzing the Use of UTAUT Model in Explaining an Online
Behaviour: Internet Banking Adoption**

A thesis submitted for the degree of Doctor of Philosophy

by

Kholoud Ibrahim Al-Qeisi

Department of Marketing and Branding, Brunel University

March 2009

ABSTRACT

Technology acceptance research is a constantly developing field. The disciplines that contributed to its development are either beliefs focused or system focused. The unified theory of acceptance and use of technology (UTAUT) combined both. The current research model proposes an extension to the UTAUT that accounts for online usage behaviour. The proposed research model is tested in two countries (UK and Jordan) to investigate the viability of the unified model of technology acceptance in different boundaries as a model of individuals' discretionary usage of Internet banking. The study also questions the roles of other determinants and moderators in this context.

Results found support for the effect of the proposed extension, website quality perceptions, on usage behaviour in both countries' models; the total effect of this extension exhibited website quality perceptions the most influential determinant of usage behaviour in both models and performance expectancy construct was second in effect. Social influence had no impact on the usage behaviour in both models, which is consistent with previous research that advocates a declining role of social influence under discretionary usage and increased experience conditions. Furthermore, the moderating role of performance expectancy previously established in TAM's research was supported in the UTAUT model in both countries' models. Moreover, both models reported a non-moderating effect of gender, which, is also in line with recent research findings that suggest declining gender differences under voluntary usage conditions and advanced experience. Education and income were moderators only for the UK model. Although the research findings demonstrated that both countries' models were "configurally" similar with respect to model specifications, the models' explanatory power for usage behaviour was dissimilar: the UK's model explanatory power exceeded that of Jordan's model presenting an opportunity for future research.

The current research contributes to knowledge in the field of technology acceptance research. It demonstrated that website quality perceptions, as a multi-dimensional concept, play an important role in the online usage context. It also demonstrated that the unified model of technology acceptance established in the western culture can be transferred to a non-western culture although with varying degrees of explanation power.

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Acknowledgement

First, I would like to dedicate this work for my parents and small family, who believed in my ability to accomplish this goal.

My special appreciation is to my mentor, Charles Dennis, for his support, insightful suggestions, and endless patience towards the end. I also extend my gratitude for Catherine Lee for her support turning this work into an acceptable academic style.

Finally, my gratitude is for all those who helped in collecting data and also the people who agreed to take part in the research.

Chapter One: Introduction

This chapter presents the theoretical research background, rationale for the study, research boundaries and locations for the study. It also introduces the reader to the research aim and objectives, and subsequently, the structure of the thesis.

1.1 Introduction to Research Area

Technology acceptance research is a constantly developing field, as new technologies keep evolving all the time. Two major disciplines have contributed to the development of models and theories addressing technology acceptance, adoption and usage. Psychology and Sociology focus on technology acceptance behaviour, whereas Information Systems focuses on systems' characteristics in relation to technology acceptance.

A significant body of research has its foundation in the Technology Acceptance Model (TAM), originally conceived by Fred Davis in 1986. TAM is an intention-based model derived from the Theory of Reasoned Action (TRA) but tailored to meet the broad needs of information technology research (Davis et al., 1989). Since its introduction, TAM has enjoyed wide acceptance and has proven to be a reasonably accurate predictor of both users' intentions to use an information technology and of their actual system usage. TAM has evolved through the years, and many researchers have tested the addition of new variables to the model in an attempt to increase its explanatory power. Venkatesh, along with Davis and other researchers (2003), integrated TAM with seven other dominant models in the field of technology acceptance and introduced the Unified Theory of Acceptance and Use of Technology (UTAUT). In the authors' words, the aggregated model is in an attempt to find a unified model that combines different perspectives in the field of technology acceptance research. The authors stated that an end to usage intentionality determinants research might have been reached with the models' three intentional beliefs: Performance Expectancy, Effort Expectancy, and Social Influences. Nevertheless, the ability to examine external variables' impact on the technology usage behaviour can be examined through a fourth determinant, Facilitating Conditions.

1.2 Rationale for the Current Research

Recently, the Internet has become a valuable means of reaching consumers everywhere, anytime. This new tool of communication has its own characteristics and means of exchange. The usage requirement of online technology is two-fold: on the one hand, there are the benefits that come with online access, such as speed, cost and efficiency from both users' and vendors' perspectives; on the other hand, there is the website design quality that facilitates and enhances the online behaviour. Perceived website quality is defined as "users' evaluation of a website's features that meet users' needs and reflect overall excellence of the website" (Aladwani & Palvia, 2002).

Prior to the unified model introduction, research employed technology acceptance models to investigate users' behaviour in the online context. Interestingly, although the UTAUT is a parsimonious and robust model, little research has utilized the model or attempted to examine its boundaries. The current research aims to fill this gap by examining the ability of the UTAUT model to explain online behaviour, while at the same time examining the unified model's boundaries.

1.3 Research Boundaries

The focus of this research is theoretical in nature: the enhancement of the unified technology model to account for online usage behaviour. As stated by the UTAUT authors, such enhancement can be infused through the facilitating condition factor, which should account for any external variable that might impact usage behaviour within the models' framework. The current research investigates the impact of website design quality features as determinants of usage behaviour. The boundaries of this study can be explained from different angles. First, the behaviour under investigation is online usage of banking services. In other words, the area of application for this model enhancement is the usage of Internet banking services, and the choice of this specific area of application is explained in the following section. Second, the investigation of such behaviour is limited to two locations that each present a different cultural context in order to investigate the viability of the unified model and its proposed extension in explaining

online usage behaviour in a non-western country compared to a western one. Third, the research investigation is targeting actual users of Internet banking in both locations. The justification behind this is related to the practicality of research objectives: previous technology acceptance research has excessively researched users' intentions and most reported explanatory power of various models is intention-specific; however, there is a huge gap between intentions and actual usage. From a business perspective, intentions to use are important in the early stages of system implementation; however, in the successive evaluation and development stages the actual usage behaviour presents powerful insights for businesses and facilitates information about systems' points of strength and weaknesses, which can be useful in analyzing current market positions and planning future differentiation strategies. Hence, this study is targeting actual Internet banking users in two locations to present current users' perceptions about online banking website quality and its impact on usage decision.

1.4 Locations for the Study

Technology in the general sense is not restricted to certain parts of the world; with the commercialization of the Internet, the concept of connectedness has taken on a new meaning. Modern multinational and transnational organizations are changing the face of competition. In order to maintain their existence, local organizations are bound to embrace new technologies, at least in the way they connect with customers and business partners locally and internationally (Kotler & Armstrong, 2008). The new channels of communication mandate assessment of target market recipients of such channels.

Although the notion of technology acceptance is universal, there is a certain reservation in terms of the viability of technology models established in the western world when applied to non-western cultures. The term western world often includes developed countries and covers nations within the four continents plus Australia and New Zealand. Western culture here refers to that feature in culture that focuses on science and technology and its ability to generate new processes, materials and material artifacts (Free Encyclopedia). However, elements of the western culture have had an influential role on

other cultures worldwide and many people equate modernization, which refers to adoption of technological progress, with westernization, which refers to adoption of western culture. While some countries have strong western influence in their cultures, they maintain largely different and distinctive cultural elements such as language, customs, religion (among other elements) and worldviews that are the product of their own local development rather than solely being western influenced.

It might be worth pointing out that these definitions are huge generalisations that, as such, have only limited value in research. Nevertheless, most consumer behaviour research published in the top journals is based on data from North America, with a limited amount from the UK, Western Europe, Australia and New Zealand. The under-researched geographical areas of Asia, Africa and the Middle East have cultures that may be considered to be fairly consistent, and few differences in consumer behaviour models are reported between them. It may therefore be important for models that may be affected by cultural differences to be evaluated in 'non-western' contexts.

Previous research on technology acceptance behaviour has been inconclusive regarding the applicability of a western-developed model of technology acceptance in other cultures (e.g., Straub et al., 1997; Rose and Straub, 1998; Straub et al., 2001; Anandarajan et al., 2000; Bagozzi et al., 2000; AL-Ghahtani, 2002 & 2003; Loch et al., 2003; Mao and Palvia, 2006; Wetzels and Schepers, 2007; McCoy et al., 2007). Consequently, examining technology acceptance models in non-western cultures, especially in this era of advanced technology, to overcome the gap between the two clusters (western and non-western) is worth investigation. The current study is located in Jordan as an example of a modern country and the UK as a western developed nation.

The Hashemite Kingdom of Jordan is a modern country with an economy thriving mainly on service industries such as communications, banking, insurance and health care. Numerous training projects, workshops, and conferences have been employed to promote IT in all sectors since the year 2000. High quality service and information access, aimed at leveraging the IT base, has been secured for the public at home, work and schools, and

appropriate infrastructure has been provided to improve electronic trade and information technology in the Kingdom (EU ESIS report, 2000). The Internet World Statistics (2008) reported that the Internet penetration rate in Jordan was 18.2 per cent in 2008, a four per cent increase over the previous year (based on ITU 2008 reports). Nevertheless, e-commerce or online purchase from local vendors still lags, mainly due to lack of a legislative umbrella that protects parties in online transactions and also the unavailability of specialized online payment collection companies that facilitate credit verification, authorization and exchange. Perhaps the basic form of e-commerce initiated by the banks in Jordan is providing consumers the ability to access their banking services online and pay bills, in addition to providing e-commerce cards or activating credit cards to be usable for online transactions. Nevertheless, a recent survey on Jordan Internet users and e-commerce revealed that 20.5 per cent of Internet users in Jordan are e-commerce users; the estimated number of Internet users who use e-commerce is more than 198,000, which is 3.42 per cent of the total population in Jordan, spending US\$181.2 million in e-commerce transactions in the past year (ITU, 2008).

The UK has typically served as a context for prior technology and innovation research (Rogers, 2003). According to the Internet World Statistics, the UK ranks among the top 47 countries with the highest Internet penetration rates, with a rate of 68.6 per cent (based on Nielson/NR, June 2008). The UK enjoys an advanced e-commerce trade climate. Internet sales by UK businesses rose to £163bn in 2007, which presents an increase of 30 per cent over 2006 sales (ONS report, 2008). According to the UK trade association for payments, almost 17 million people were banking online in the year 2006 and the figure looked set for increase (APACS, 2007).

The Digital divide (also called global divide) refers to the divergence in Internet access between industrial and developing societies (Norris, 2001); it can be exemplified by comparing the penetration rates of Internet between Jordan and the UK (18.2 per cent versus 68.6 per cent).

There are two potential contributors to the digital divide phenomenon: (1) the physical Information and Communication Technology (ICT) access such as number of PCs, amount of Internet band width, number of telephone lines, mobile phones and other information technologies; and (2) pricing: computer and Internet access prices (Fiser, 2005).

In order to understand the availability, ease and affordability of ICT, in addition to the time and money involved in obtaining access to key technologies in the Middle East, Wheeler (2004) conducted surveys in Jordan and Egypt; both surveys indicated that access to ICT is more affordable and more efficient in the Middle East than in Europe and North America, where it can cost double or triple what it costs in the Middle East and can take two to three times longer to obtain access. For instance, according to Wheeler, Jordan & Egypt, the ICT information given in Table 1-1 suggests that the Middle East is more of an information society than Europe in terms of ease and affordability of access to IT.

Table1-1: ICT information on Jordan and Egypt

IT and Everyday Life in Jordan:	IT and Everyday Life in Egypt:
<ol style="list-style-type: none"> 1. Getting a Mobile Phone-1 hour/ \$150 2. Getting Dial Up Internet Account- 20 min/\$7 for one month unlimited, 15\$ for each additional month unlimited. 3. Getting Satellite TV- Orbit-1 hour/\$35 month. 4. Internet café- 10 min. walk, \$2 per hour. 5. Credit Cards/Visa Electron accepted everywhere, even small shops. 6. Newspaper has special IT/Internet section. 	<ol style="list-style-type: none"> 1. Getting a mobile phone: Tourist SIM card 2 months, 70LE (at \$11.0); plus 100LE every 2 weeks at \$17). 30 Min. to find a store-not well advertised, but all the locals knew where to go. 2. Getting a dial up Internet account: 10 seconds (after discovering the free dial up Internet phone numbers 0777 numbers; charged as a local phone call-but no access fee). 3. Satellite TV: at \$ 30 a month for 3 months; 30 minutes for full installation. 4. Internet café: 5 minutes walk; 30 cents an hour. 5. Credit cards only accepted in shops/hotels/restaurants that cater to westerners 6. Newspapers have frequent coverage of IT/Internet related issues in both English and Arabic.

Source: Wheeler (2004)

Moreover, during the past five years, Jordan's IT sector witnessed a decrease in broadband Internet connecting prices. According to official figures from the Jordan Telecom Group, Jordan had 119,700 ADSL lines by the end of September 2008: 80 per cent of those are residential ADSL lines (ITU, 2008). Furthermore, a recent report on

Information Society, measuring the ICT Development Index components for Jordan, reported readings that indicate the long strides Jordan has made in past five years (ITU, 2009).

Table 1-2: Jordan ICT index readings

Fixed telephone lines per 100 inhabitant		Mobile cellular Subscriptions per 100 inhabitant		International Internet bandwidth per Internet user (bit/s)		Proportion of households with computer		Proportion of households with Internet	
2002	2007	2002	2007	2002	2007	2002	2007	2002	2007
12.8	9.9	23.2	80.5	293	831	16.4	25.1	5.0	10.5

Having demonstrated ICT levels in Jordan, comparing usage behaviour of Internet banking among current users in Jordan and the UK (with its high penetration rate of Internet and number of people banking online) serves as a convenient area of application for examining the proposed UTAUT model enhancement, as it provides a chance for investigating perceptions of users from different cultural perspectives: a non-western (developing) country and a western (developed) one.

1.5 Research Aim and Objectives

The research aim is to enhance knowledge and understanding in the area of technology acceptance while proposing a theoretical extension to the UTAUT model. Specifically, the main objectives of the research are:

1. Predict the viability of the UTAUT model in a non-western culture
2. Extend the UTAUT to account for the online usage behaviour, and
3. Examine the role of website quality perceptions in explaining online usage behaviour.

Additionally, the research objectives can be classified into theoretical, practical and academic criteria:

From a theoretical perspective, the research attempts to examine the viability of models established in western cultures when applied to non-western cultures; also, the research proposes an extension to the UTAUT model to account for online usage behaviour. This extension involves investigating the role of website design quality perceptions in inducing online usage.

From a practical perspective, the banking industry is interested in directing routine inquiries from banks' clients to the online channel, since it is more cost-effective for both parties. Correspondingly, bankers would benefit from assessing their websites' quality perceptions by actual users, as it provides insight for areas of improvement or different positioning.

From an academic perspective, the research would provide a base for future research to build on with respect to the proposed model extension and its application to other contexts.

1.6 Research Structure

The dissertation is organized into seven chapters:

Chapter two is dedicated to a review of the literature pertaining to technology acceptance models that led to the integrated model of the UTAUT. The eight models that comprised the integrated model and the work covering these models is discussed and evaluated.

Chapter three is divided into three parts. Part one focuses on studies that utilized technology acceptance models to investigate Internet banking adoption in different locations and the factors enhancing or hindering such behaviour. Part two discusses the cultural frameworks, with supporting evidence from research on technology acceptance conducted within those frameworks. Part three covers website design and features as determinants of online usage behaviour with empirical evidence supporting its importance.

Chapter four starts with addressing some research paradigms and different research approaches, leading to the formulation of the research's conceptual framework, research

questions and hypotheses. The chapter also describes the current research methods and research design.

Chapter five is dedicated to data analysis, which includes data screening, results of the two step structural equation modelling analysis and hypotheses testing results for both models.

Chapter six addresses the effect of moderators on the relationships among the models' constructs, using multiple group analysis, measurement invariance techniques and mean and covariance structure analysis.

Chapter seven is devoted to the discussion of findings and conclusions derived, in addition to reporting research contributions, implications and limitations.

Chapter Two: Theories and Models of Technology Acceptance

2.1 Introduction

This chapter presents the theories and models developed in different disciplines and used in predicting, explaining, and understanding individuals' acceptance and adoption of new products or technologies.

These models have evolved over the years and came as a result of persistent efforts of models' validation and extension that took place during the period each was presented. For example, Psychology contributed the Theory of Reasoned Action, TRA (Ajzen and Fishbein, 1980), which was extended to the Theory of Planned Behaviour, TPB (Ajzen, 1985), which also had an extension, the Decomposed Theory of Planned Behaviour, DTPB (Taylor and Todd, 1995); Information Systems contributed the Technology Acceptance Model, TAM (Davis, 1986), which is an extension of Theory of Reasoned Action; yet also has an extension TAM2 (Venkatesh and Davis, 2000) and the Unified Theory of Acceptance and Use of Technology, UTAUT (Venkatesh et al., 2003), which is an aggregation of other models including the aforementioned in addition to Rogers' Diffusion of innovations, DOI (1983), Bandura's Social Cognitive Theory, SCT (1989), Deci & Ryan's Motivational Model, MM (1985), and Triadis's Model of PC Utilization, MPCU (1979).

Hence, the coverage proceeding of the technology acceptance models is domain specific and within each domain a chronological organization of presentation is the utilized for tracking models evolvement and interconnections between them.

Although each model presented has a different investigative thrust towards the acceptance process, there are some common threads and themes among these models. Toward the end of the chapter, a summary is presented with emphasis on the differences between the various models (section 2.12).

2.2. Theory of Reasoned Action (TRA)

The earliest model used to explain technology acceptance was developed in the social psychology field. The work can be traced back to the period 1918-1970 when scientists were trying to explain individuals' behaviour through the impact of attitude. Their contributions ended with contradictory explanations regarding behaviour and attitude. Attitude has either a direct or an indirect effect on behaviour and attitude is either multidimensional factor or a unidimensional one. The work of Fishbein and Ajzen is a result of a research program that began in the late 1950s. Their work dealt with prediction of behaviour in laboratory and applied settings. Their approach served as integration of diverse theories and lines of research about attitudes, for example learning theories, expectancy-value theories, balance theory, theory of cognitive dissonance, and theories of attribution. They aimed at developing a theory that could predict, explain, and influence human behaviour (Ajzen & Fishbein, 1980). They introduced the theory of reasoned action in 1967, but over the years the theory has been refined, developed, and tested.

2.2.1. TRA Core Assumptions and Statements

This theory is based on the assumption that individuals are rational and will make systematic use of the information available to them to take action. Individuals consider the implications of their actions before they decide to engage or not engage in a given behaviour (Ajzen & Fishbein, 1980). The theory looks at behavioural intentions, rather than attitude, as the main predictor of behaviour. According to TRA, the most important determinant of an individual's behaviour is behavioural intentions. An individual's intention to perform behaviour is a combination of:

- Attitude towards performance of the behaviour, and
- Subjective norms.

The theory can be explained by model in Figure 2-1.

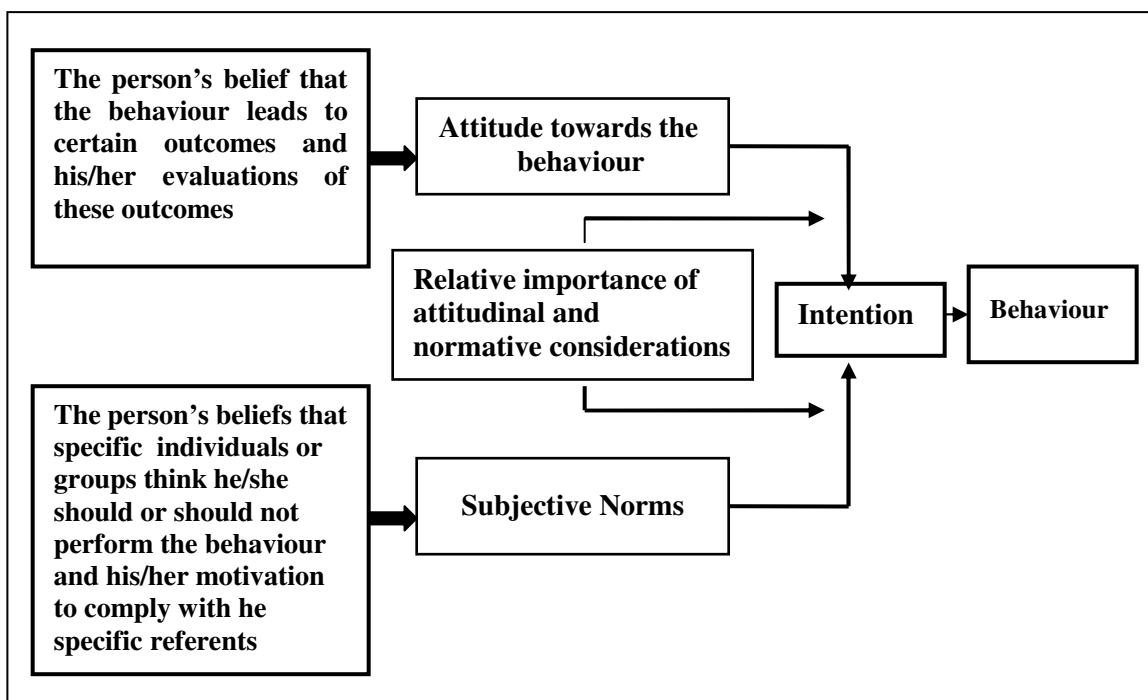


Figure 2-1: Factors determining a person's behaviour
Source: Ajzen& Fishbein (1980 p 8)

The major variables of the TRA model can be defined as follows:

Attitude towards the behaviour: refers to the degree to which performance of behaviour is positively or negatively valued.

Since attitude is formed on a set of beliefs about the object under investigation. It can be presumed that for any set of beliefs weighted by the evaluation of outcomes, attitude can be expressed as in equation 1-2

$$A_o = \sum_{i=1}^n b_i e_i \text{ ----- (1-2)}$$

Where A_o is the attitude towards some object "o"
 b_i is a belief about "o" [the subjective probability that "o" has attribute i]
 e_i is the evaluation of the attribute related to the belief about the object
 n is the number of beliefs the person holds about attitude.

Ajzen & Fishbein (1980) have demonstrated that an individual's attitude towards any object can be predicted with a high degree of accuracy from the knowledge of the individual's beliefs about the attitude object and the evaluation aspect of these beliefs. More specifically, the attitude is conceived as a sum of the beliefs multiplied by their respective evaluation aspect.

An example would be a person's attitude towards e-banking, assuming he/she has the following beliefs:

- (1) e-banking is risky
- (2) e-banking is cumbersome
- (3) e-banking is economic

According to Ajzen & Fishbien's model, this person's attitude towards e-banking is a function of the strength with which he/she holds these beliefs (the person's subjective probability that e-banking is related to the different attributes) and his/her evaluation of each attribute.

Subjective Norms: deal with the influence of social environment on behaviour. This can be defined as the person's perception that most people who are important to him/her think that he/she should or should not perform the behaviour in question.

According to the TRA, the general subjective norms are determined by the perceived expectations of a specific referent individual(s) or group(s) and by the person's motivation to comply with these expectations. This can be presented in equation 2-2:

$$SN = \sum_{i=1}^n b_i m_i \text{ ----- (2-2)}$$

Where b_i is the normative belief (one's belief that referent individual(s) or group (s) thinks he/she should/shouldn't perform the behaviour)
 m_i is the motivation to comply with referent i
 n is the number of relevant referent

Intention: is an indicator of a person's readiness to perform certain behaviour. Intention is considered to be the immediate antecedent of behaviour.

According to the TRA, there are two determinants to behavioural intentions: personal or attitudinal factors and social or normative factors. These two components in the theory can be presented in equation 3-2:

$$B \propto I = (A_B)W_1 + (SN)W_2 \text{ ----- (3-2)}$$

Where B stands for behaviour
 I is the intention to perform behaviour B
 A_B is the attitude towards performing behaviour B
 SN is the subjective norms
 W_1 is the empirical determined weight of attitude
 W_2 is the empirical determined weight of subjective norms

2.2.2 Limitations of the Theory of Reasoned Action

Ajzen (1985) noted that the theory was limited by what is called correspondence. In order for the theory to predict specific behaviour, attitude and intention must agree on action, target, context, time frame and specificity (Sheppard et al., 1988). The greatest limitation of the theory stems from the assumption that behaviour is under volitional control. That is, the theory only applies to behaviour that is consciously thought out beforehand. Irrational decisions, habitual actions or any behaviour that is not consciously considered cannot be explained by this theory

2.3 Theory of Planned Behaviour (TPB)

Because of the limitations of the theory of reasoned action, Ajzen (1985) proposed the theory of planned behaviour. The theory of planned behaviour is an extension of the theory of reasoned action, and as in the original theory of reasoned action, the central factor of the theory of planned behaviour is the individual's intention to perform a given behaviour.

The theory of planned behaviour addresses the issue of behaviours that occur without a person's volitional control. In fact, the theory of planned behaviour differs from the theory of reasoned action in its addition of the perceived behavioural control (PBC)

component that accounts for situations where an individual has less than complete control over the behaviour. This can vary across situations and actions (Ajzen, 1991)

The TPB places the construct of PBC within a more general framework of relations among beliefs, attitude, intentions and behaviour. PBC is held to influence both intention and behaviour as shown in Figure 2-2. PBC's effect on behaviour can be direct or interactive (through behavioural intention).

As specified in TRA, when the situation or behaviour affords a person complete control over behavioural performance, intentions alone should be sufficient to predict behaviour. Ajzen (1991) argues that under conditions where behavioural intentions alone would account for only a small amount of variance in behaviour, PBC should be independently predictive of behaviour. Both intentions and PBC are important to predict behaviour, but one may be more important than the other given the prevalence of certain conditions. Therefore, in situations where prediction of behaviour from intentions is likely to be hindered by actual (volitional) control, PBC should: (1) facilitate the implementation of behavioural intentions into action, and (2) predict behaviour directly (Armitage & Conner, 2001). As a result, PBC together with behavioural intention, can be used directly or indirectly to predict behaviour achievement.

Nevertheless, for accurate prediction, several conditions have to be met. First, the measures of intention and PBC must correspond to or be compatible with the behaviour that is to be predicted, and the specified context must be the same as that in which the behaviour of interest is to occur. The second condition for accurate behavioural prediction is that intentions and PBC must remain stable in the interval between their assessment and observation of behaviour, as intervening events may produce changes in intentions or perception of behavioural control. The third requirement for predictive validity has to do with accuracy of behavioural control; prediction of behaviour from perceived behavioural control should improve to the extent that perception of behavioural control realistically reflects actual control (Ajzen, 1991).

In order to explain and predict behaviour, TPB deals with the antecedents of attitude, subjective norms and perceived behavioural control. The theory of planned behaviour postulates that behaviour is a function of salient beliefs relevant to that behaviour. These salient beliefs are considered as the prevailing determinants of a person's intentions and actions. Figure 2-2 outlined these salient beliefs:

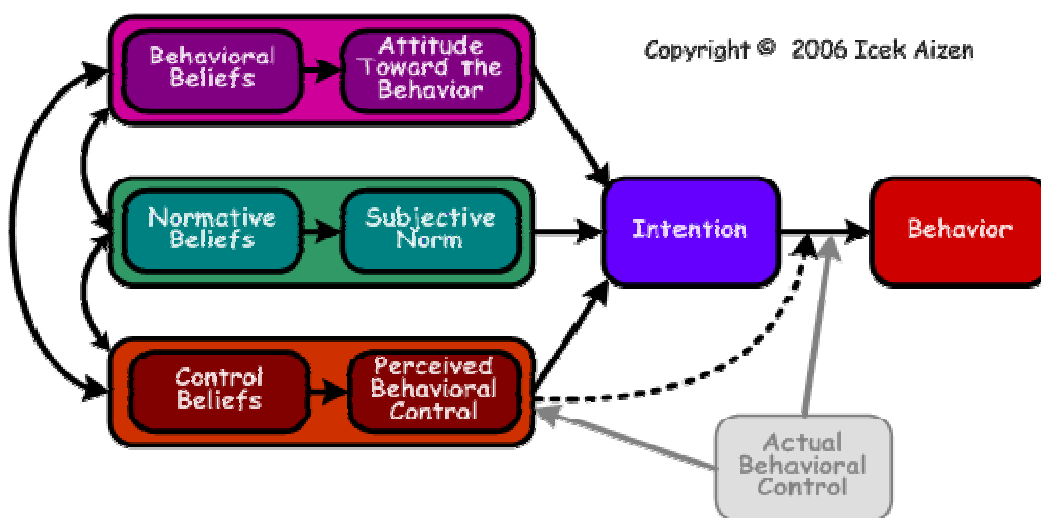


Figure 2-2: Theory of Planned Behaviour
Source: Aizen (2006)

In defining these antecedents Aizen (2006) summarized them as follow:

Behavioural beliefs: Assumed to influence attitude towards the behaviour, a behavioural belief is the subjective probability that the behaviour will produce a given outcome. Although a person may hold many behavioural beliefs in respect to certain behaviour, only a relatively small number are readily accessible at a given moment.

Normative beliefs: Refer to the perceived behavioural expectations of important influential referent individual(s) or group(s). It is assumed that normative beliefs, in combination with the person's motivation to comply with different referents, determine the prevailing subjective norm. In other words, the motivation to comply with each referent contributes to the subjective norm in direct proportion to the person's subjective probability that the referent thinks the person should or should not perform the behaviour in question.

Control beliefs: this type of beliefs has to do with the perceived presence of factors that may facilitate or impede performance of behaviour; each control factor enjoys a certain power. This perceived power contributes to the perceived behavioural control in proportion to the factors present in a given situation calling for the performance of behaviour. In other words, perceived behavioural control is the aggregation of the set of belief control factors, present at the situation, weighted by the factors' strength or power. Equation 2-4 demonstrates the relation:

$$PBC = \sum_{i=1}^n C_i P_i \text{ ----- (2-4)}$$

Where *PBC* stands for perceived behavioural control

C stands for control factors

P stands for power of the factor or belief strength.

The TPB has another salient construct (depicted in Figure 2-2) that may have a direct effect on behaviour and PBC. The construct named:

Actual behavioural control: Refers to the extent to which a person has the skills, resources, and other prerequisites to perform a given behaviour.

According to Aizen (1985), the success of any attempt to execute a behavioural plan depends on the efforts invested and the person's control over factors such as required information, skills, abilities, availability of a workable plan, willpower, presence of mind, opportunity and so forth. Correspondingly, successful performance of behaviour depends not only on a favourable intention but also on a sufficient level of behavioural control, which refers to perceived and actual controls. Since PBC refers to peoples' perceptions of their ability to perform a given behaviour and taking into consideration that their perception is dependent on the presence of a set of factors (control beliefs) that contribute to this perception (weighted by the strength of each factor), then this perception, if accurate, would serve or reflect the actual behavioural control (Ajzen, 2002). For example, the researcher thinks that statistics should not be that difficult to comprehend. If

good textbooks and intelligent software are available, in addition to allocating time and presence of mind needed to go through this material (resources), the researcher should be able to get a good grasp of the subject of statistics

PBC has received considerable attention in the literature. Ajzen (1991) assumed that PBC is most compatible with Bandura's (1977, 1982) concept of self-efficacy which is concerned with the judgment of how well one can execute courses of action required to deal with prospective situations. Ajzen recognized that most of the knowledge about PBC comes from the systematic research program of Bandura and associates. Their investigation which showed that peoples' behaviour is strongly influenced by their confidence in their ability to perform the behaviour in question lead to the conclusion that self-efficacy beliefs can influence choices of activities, preparation for an activity, efforts expended during the performance of activities, thought patterns and emotional reactions. Building on that, Ajzen assumed that self-efficacy is synonymous with TPB.

Armitage & Conner (2001) contradicted Ajzen in his assumption, taking proof from several studies suggesting that self-efficacy and PBC are not entirely synonymous. They presented evidence from Bandura (1992, cited in Armitage & Conner, 2001) who argued that control and self-efficacy are quite different concepts. He states that self-efficacy is more concerned with cognitive perception of control (based on internal control factors) whereas PBC reflects more general external factors. Armitage mentioned other studies that provide support for the distinction between the two concepts (e.g., White, Terry and Hogg, 1994; Whitel et al., 1994; O'Leary, 1995; and Manstead & Van Eekelen, 1998). Armitage & Conner stated evidence from their work that while self-efficacy and PBC account for equivalent proportions of variance in behaviour, self-efficacy explains somewhat more of the variance in intention than does PBC, implying that self-efficacy should be the preferred measure of "perceived control" within TPB. Armitage & Conner went as far as suggesting based on another work by both, (1999) that control beliefs as conceptualized by Ajzen (1991) are the antecedents of self-efficacy, but correlate only weakly with perceived control over behaviour.

Ajzen (2002) addressing some problems associated with measurement of PBC, stated that the PBC concept is not original to the TPB and that similar ideas of the concept are found in other models such as the model of interpersonal behaviour by Triandis (1979) where it takes the form of a “facilitated conditions” perspective. He also acknowledged the difference between self-efficacy and PBC at the general level and recognized the misleading effect in previous use of PBC interchangeably with self-efficacy. Ajzen suggested that to avoid misunderstandings of this kind, the term “perceived behavioural control” should be read as “perceived control over performance of behaviour”. Nevertheless, he argued that there is no inclination in Bandura’s theorizing that self-efficacy belief is restricted to internal factors. He went as far as stating that PBC in TPB refers generally to peoples’ expectations regarding the degree to which they are capable of performing a given behaviour, and the extent to which they have the pre-requisite resources whether these resources are internal or external. He stressed that TPB is concerned only with the extent to which those are believed to be present and perceived to facilitate or impede performance of the behaviour under consideration.

2.3.1 Limitations of TPB

Models such as TRA and TPB are not without criticism. For example, Eagly & Chaiken (1993) acknowledged evidence of other variables such as habit, perceived moral obligation and self identity, that may predict intentions and behaviour in the context of TRA model, yet the TPB did not address such variables. The TPB as a replacement for the volitional control limitation of TRA suggests behaviours are deliberate and planned, yet the TPB does not show how do people plan and how does planning mechanism relate to TPB.

Taylor & Todd (1995a), criticized TRA & TPB stating that the models require individuals to be motivated to perform a certain behaviour; this assumption may be problematic when studying consumer adoption behaviour, in addition to the assumption of an identical belief structure among respondents when it comes to performing a behaviour. Furthermore, TPB introduced one variable (PBC) as an answer to all non-controllable elements of the behaviour. Beliefs behind the (PBC) were aggregated to

create a measure for it. This aggregation has been criticized for not identifying specific factors that might predict behaviour and for the biases it may create. Taylor and Todd (1995a) introduce decomposed TPB to provide a better understanding of behaviour. Next theory provides a discussion of their work.

2.4 Decomposed Theory of Planned Behaviour (DTPB)

The decomposition of TPB is discussed through two types of effort presented by two separate studies. Genuine contribution is evident in the work presented by Taylor & Todd (1995) and more recently by Pavlou & Fygenson (2006).

2.4.1 Taylor & Todd's work on DTPB

As an extension to theory of planned behaviour, which was an improvement of theory of reasoned action, Taylor & Todd (1995a) proposed decomposing the constructs of TPB into detailed components. The decomposed theory of planned behaviour (DTPB) expands the TPB by including constructs from the diffusions of innovation (DOI) perspective. The decomposition of TPB constructs can be summarized in Figure 2-3.

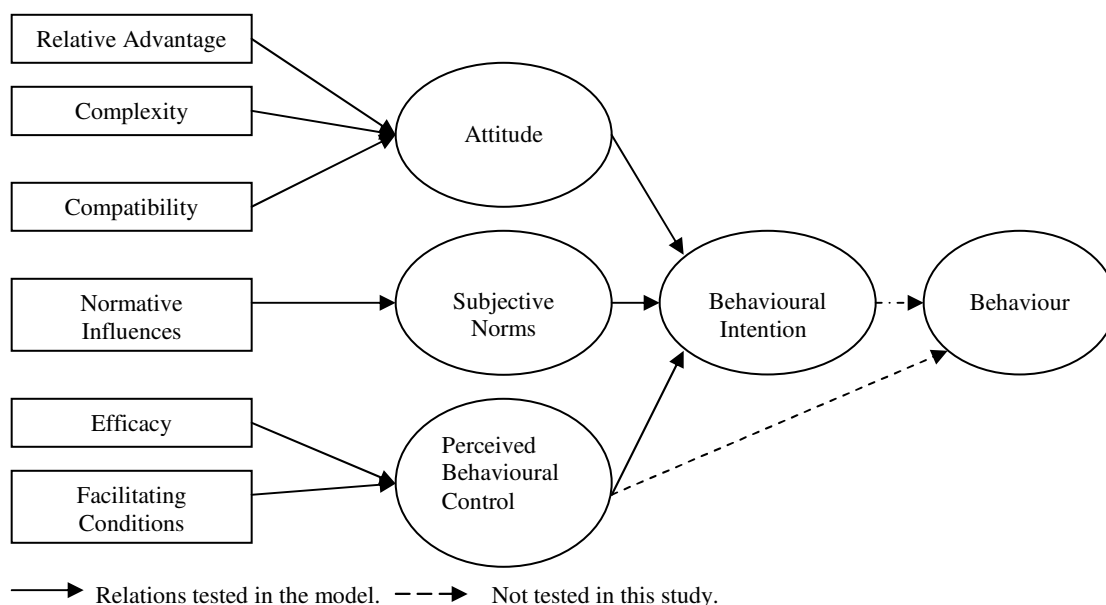


Figure 2-3: Theory of Planned Behaviour with beliefs decomposed.
Source: Taylor & Todd (1995a)

In their study, Taylor & Todd (1995a) aimed at examining the appropriateness of TRA, TPB and DTPB as models to predict consumer behaviour. Using the structural equation model, the results proved that pure TRA and TPB are capable of predicting behaviour, but the decomposed version is better at explaining this behaviour. They recommend the use of DTPB as a tool to affect certain aspects of behaviour that managers might need to change through systems design and marketing implementation strategies.

In their decomposition effort, Taylor and Todd depended on the previous research that established a consistent relation among the three characteristics of innovation (relative advantage, compatibility, and complexity) and adoption decisions in general and IT usage specifically (Moore and Benbasat, 1993, cited in Taylor & Todd, 1995a). For analysis purposes, they combined the relative advantage & compatibility based on similar treatments found in other research (e.g., Moore & Benbasat, 1991). A study of a crossover effect between decomposed beliefs was carried as well and the results showed that relative advantage & compatibility affected PBC, normative influences affected attitude, and facilitating conditions influenced subjective norms.

In the same year, Taylor & Todd (1995b) ran another study aimed at comparing the Technology Acceptance Model TAM (discussed in section 2.5) to traditional TPB and decomposed version (DTPB) in terms of their contribution to understanding IT usage. Their methodology included a field study of voluntary users of a student computer resources centre over a period of 12 weeks by business school students. In the decomposed version of TPB, Taylor & Todd used the model in Figure 2-4. In this model, Taylor and Todd combined the variables of TAM and Diffusion of innovation Theory DOI (discussed in section 2.7) in measuring the attitude construct of TPB. Constructs measurement were common across models; ease of use correspond to complexity, as derived from Rogers' Diffusion of Innovation Theory (DOI), and perceived usefulness correspond to relative advantage in DOI. Thus, they were operationalised in the same way for the analysis reported in their study.

The statistical measures showed that all these models provide a compatible fit to the data and that the predictive power of TPB model was roughly comparable to TAM whereas the DTPB, although it provided essentially the same fit as pure TPB, it indicated better

predictive power relative to TAM and TPB model. In terms of the models' ability to explain IT usage behaviour, the results showed that the three models were comparable. However, when behavioural intention is considered, the results showed improvement in explanatory power of both the pure and decomposed TPB compared to TAM.

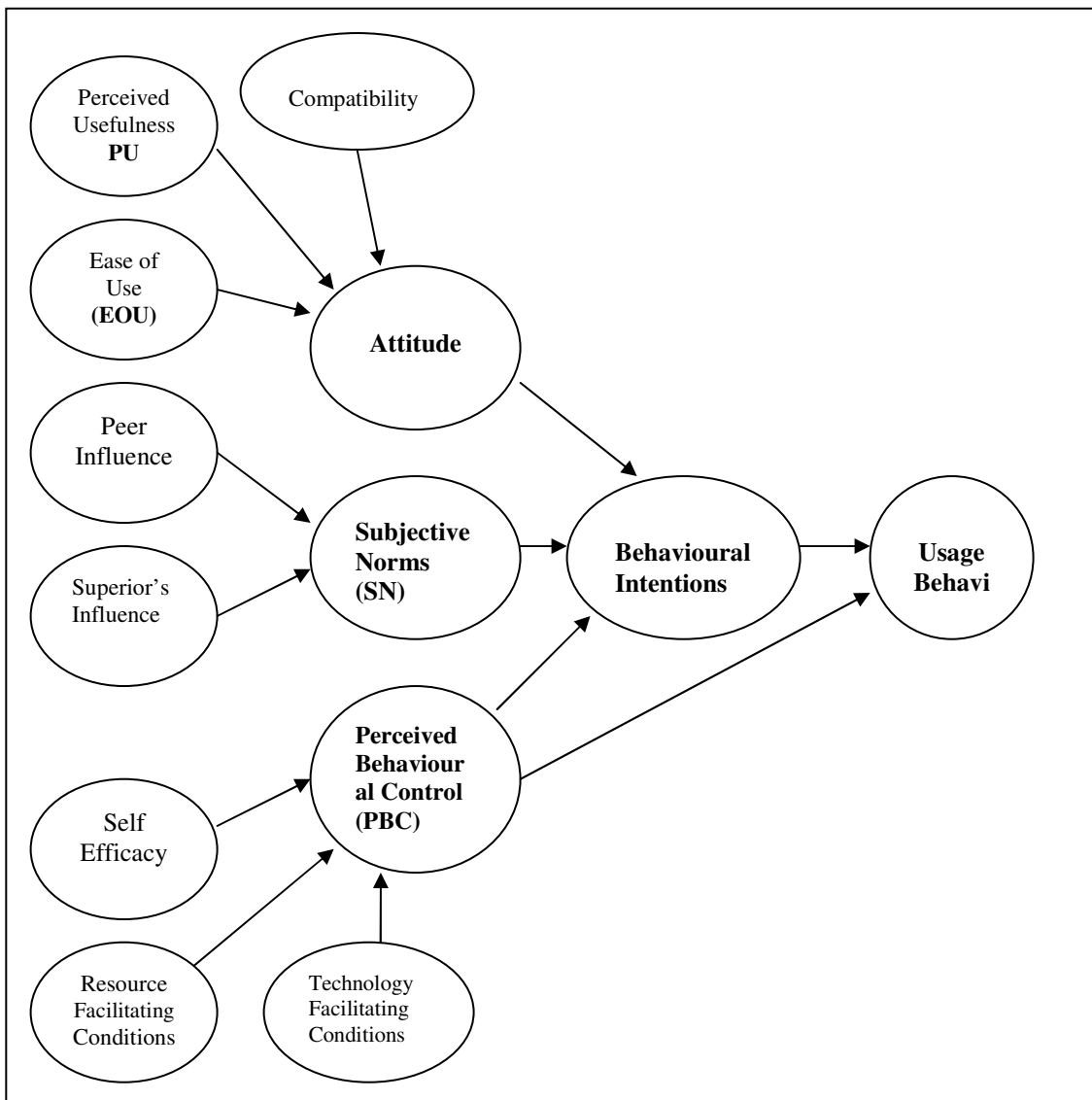


Figure 2-4: Theory of Planned Behaviour decomposed.
Source: Taylor & Todd (1995b)

In their results interpretation, Taylor and Todd attributed the predictive power of DTPB mainly to the following reasons: first, their inclusion of a variety of theoretically-based belief construct such as decomposing SN to peer and supervisor influence, and the inclusion of efficacy and resource factors for PBC; second, the measures of common

constructs in the three models in the same fashion, something that has not been done in previous studies that aimed at comparing the three models of TRA, TPB and TAM.

The authors ended their efforts with a comparison between the three models in an attempt to decide on the best model; DTPB is more complex than TPB by virtue of the additional construct it includes. Nevertheless, by decomposing the belief structure, the explanatory power of the model increased for BI. Moreover, the authors believe that the decomposed TPB with its unidimensional belief structures provides better diagnostic value for managers. It suggests specific beliefs that can be targeted to influence system usage. In comparing DTPB and TAM, both models include specific constructs which provide detailed understanding of behavioural intention and IT usage behaviour. In more detail, a comparison can be built on the following issues

Similarities:

- Attitude is part of both structures, only the decomposition is not the same.
- Attitude for DTPB is affected by: relative advantage, compatibility, and complexity while for TAM, attitude is affected by: perceived usefulness (similar to relative advantage) and perceived ease of use (opposite to complexity).

Differences:

- In TAM perceived usefulness has a direct effect on BI while in DTPB, attitude is the only factor that affects BI; its antecedent beliefs have no direct effect on BI.
- TAM focuses on system design characteristics and its particular use as a guide to design effort. DTPB model includes these design factors, but draws attention to normative control factors that can be worked with to facilitate implementation.

2.4.2 Pavlou & Fygenon's work on DTPB

Pavlou & Fygenon (2006) extended Ajzens' theory of planned behaviour to predict the process of e-commerce adoption. Their methodology followed a longitudinal study with a

group of e-shoppers. In addition, TPB was used to predict two inter-related behaviours of e-commerce adoption (getting information and purchasing). In their decomposition of TPB, they used the formative structure to decompose PBC which implies that PBC is viewed as a second-order factor formed by the first-order dimensions of self-efficacy (SE) and controllability. In this order a parsimonious view of PBC is maintained.

A different set of antecedents were used to explain the main constructs in TPB; Trust was proposed as an attitudinal belief for the behaviours of getting information and purchasing. Trust was also placed as a control belief for both behaviours, while product –value was added only in the purchasing model as an attitudinal belief. TAM beliefs of perceived usefulness (PU) and perceived ease of use (PEOU) were placed as attitudinal beliefs while PEOU was hypothesized to effect controllability and self efficacy for both behaviours. PBC was decomposed, as mentioned before, for controllability and self – efficacy. The controllability set of antecedents for the two behaviours were different; for getting information, the set included (download delay, time resources, and website navigation). For the purchasing behaviours; the set included (monetary resources, product diagnosticity, and information protection). As for self-efficacy, both behaviours included a belief around getting information skills and purchasing skills. The model also included control variables of past experience, habit, web vendor reputation, product price and demographics.

Results showed that PBC acts as a second-order formative structure formed by two distinct dimensions of SE and controllability. The implication for the TPB is that such a structure (second-order formative structure) should be applicable to virtually any behaviour, even if the impact of SE and controllability vary across behaviours. The findings also assured that TPB could be used to model the association between related behaviours. The behaviours are linked at intention and behaviour stages, while perceptions and beliefs remain strictly behaviour specific. This means that one behaviour can influence the other without violating TPB. Another finding was the role of past experience; empirical evidence showed the adequacy of TPB perceptions to reflect past

experience. This finding validates Ajzen's (1991) theoretical assertion, at least for the e-commerce interrelated behaviours of getting information and purchasing.

While Taylor & Todd's extension approach compared DTPB and its origins to TAM to assess the explaining power of the three models, Pavlou & Fygenson approach adds a new dimension to TPB as a measuring tool for two related behaviours. Although the two studies had different approaches, both still considered powerful extensions of TPB.

Next a discussion of models developed in Information System is presented; these models are as powerful as the psychology field models of TRA and TPB.

2.5 Technology Acceptance Model (TAM):

In a further extension of TRA, Davis (1986) introduced the technology acceptance model, which described an individuals' acceptance of information technology. The goal of TAM is to provide an explanation of the determinants of computer acceptance among users. TAM replaced TRA's attitude beliefs with the two technology acceptance measures: *Perceived usefulness* (PU) referring to the degree to which a person believes that using a particular system would enhance his/her job performance; and *Perceived ease of use* (PEOU) referring to the degree to which a person believes that using a particular system would be free from effort (Davis, 1989). TAM does not include TRA's subjective norms (SN) as a determinant of BI. Figure 2-5 demonstrates the original theoretical conceptualization of TAM including the attitude construct. However, based on empirical evidence, the final model excluded the attitude construct because it did not fully mediate the effect of PEOU on intention and the PU→BI link seemed more significant (Davis et al., 1989). TAM posits that PU is influenced by PEOU because, other things being equal, the easier a technology to use, the more useful it can be. Consistent with TRA, TAM suggests that the effect of external variables on intentions is mediated by PEOU & PU.

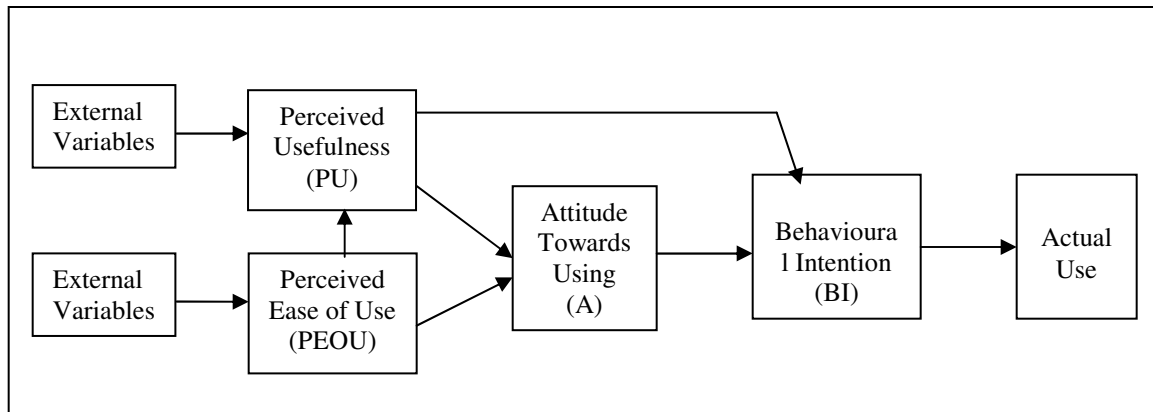


Figure 2-5: Technology Acceptance Model (TAM) Based on Davis et al. (1989)

The external variables in the model refer to a set of variables such as objective system design characteristics, training, computer self-efficacy, user involvement in design, and the nature of the implementation process (Davis, 1996). However, as TAM continued to evolve, new variables were introduced as external variables affecting PU, PEOU, BI, and actual use or behaviour. Among the most frequently referenced are: system quality, compatibility, computer anxiety, enjoyment, computing support, and experience (Lee et al., 2003). The relationship between TAM's four major variables (PU, PEOU, BI and B) is hypothesized to use PU as both: a dependent variable affecting BI directly; and as an independent since it is predicted by PEOU. Actual Use or Behaviour is usually measured by: amount of time using, frequency of use, actual number of usages and diversity of usage.

2.5.1. TAM Evolvement Over the Years

TAM has evolved beyond its original form during the past twenty years. Wixom & Todd (2005) illustrated TAM extension in three primary ways. The first approach involved including factors from related models (e.g., SN & PBC from TPB). The second approach involved introducing additional or alternative beliefs to the model (mostly from diffusion of innovation theory such as triability, compatibility, visibility or result demonstrability). The third approach involved examining external variables effecting PEOU & PU such as personality traits and demographic characteristics.

Han (2003) pointed out that since its introduction the TAM has progressed through three phases of development: **adoption**, **validation** and **extension**. In the adoption phase,

TAM was tested and adopted across a wide range of information system applications such as key office applications (e.g., Spreadsheet, Lotus 1-2-3, Word Perfect, Word, Excel); communication technologies (e.g., emails, voice mail, customer dialup system, and Fax); database systems; microcomputer; workstations; telemedicine technologies; and Internet-related IS applications (e.g., www information services, online services, virtual workplace systems, digital libraries). TAM based studies were also conducted in many organizations in various cultures (e.g., American financial institute, Canadian integrated steel company, accounting firms, public hospitals in Hong Kong, investment banks, ...etc). The validation phase of TAM took two directions; one was to validate TAM's PU & PEOU instruments to prove their psychometric properties and the other was to validate the causal links among TAM component constructs. The extension phase also was divided into two parts; one was for the extension of the two major constructs (PU & PEOU) while the other was about incorporating relevant variables as important antecedents of the two constructs PU & PEOU (Han, 2003).

According to a meta-analysis carried out by Lee et al. (2003), TAM evolvement (1986-2003) can be divided into four periods: **introduction**, **validation**, **extension**, and **elaboration**. Subsequent to TAM introduction in 1989, research around TAM was mainly channelled in two directions. One direction was keen on replicating TAM with other technologies to verify its parsimony. For example, Adams et al. (1992) examined TAM in five different applications (word processors, graphics, spreadsheets, e-mails, and v-mail) and found that, in general, TAM maintained its consistency and validity in explaining users' acceptance of information technology. The other direction was keen on comparing TAM with TRA, looking for a differentiation between the new and the original model and whether the latter is superior to the original. In the previous section (2.4.1), the example of the work on DTPB compared TAM and the original TPB. Taylor and Todd (1995b) found that DTPB and TPB gave a fuller explanation than TAM. However, they asked for caution in interpretations of findings due to the trade off between explanation power and complexity. TAM is more parsimonious than DTPB which consists of eight more variables. Davis et al. (1989) compared TRA with TAM in terms of how both models measured MBA students' relative facility with word

processors across two time periods, immediately after introduction of the system and 14 days later. They found that TAM better explained the intention of the users than did TRA.

In the model **validation** period, researchers wanted to confirm that TAM truly uses accurate measurement of user's acceptance behaviour under different technologies, situations and tasks. As mentioned before, Adam et al. (1992) replicated and extended the Davis' (1989) study by examining the application of the two factor model (PU & PEOU) to two classes of messaging techniques (electronic and voice mail) across 10 different organizations with a total of 118 users in study one and a total sample of 73 student users of Lotus1-2-3, WordPerfect, and Harvard Graphics in study two; and found both validity and reliability of PU and PEOU measurement across the different settings. Later, Segar & Grover (1993) argued that the results of Adams et al.s' (1992) suffered a measurement problem and unless the measurement model which postulates the relationship between observed measures and their underlying construct is both reliable and valid, its application in testing structural relationships may lead to equivocal results (Chin & Todd, 1995). Segar & Grover went as far as to provide an example by applying confirmatory factor analysis (CFA) to Adam et al.'s data. They re-validated the PEOU & PU scale and concluded that there was a measurement problem. By splitting the PU factor into two dimensions, they ended with a three-factor model for Davis' TAM (PEOU, PU and effectiveness). Sequential to that report, Chin & Todd (1995) refuted Segar & Grover's (1993) findings, stating that although there were grounds for their critique of Adam et al.s' work, their reasoning of applying classical statistic techniques were not. They criticized the addition of the third factor (effectiveness) to the model claiming that there was neither substantive theoretical rationale behind it nor a distinction between the PU and effectiveness construct and it was merely done for statistical considerations. After re-analyzing Adams' et al. (1992) data and a new independent set of data, Chin & Todd demonstrated that Davis' (1989) usefulness construct had reasonable psychometric property and that there was no empirical support or substantive rationale for the splitting of the construct into two dimensions. Studies in validation period were focused on investigating whether TAM instruments were powerful, reliable and valid. Segal & Grover (1993) argued that the inexistence of an absolute measure of PU & PEOU across

varying technologies and organizational contexts requires utmost caution of interpretation of perceptions related to technology usage.

During the **extension** period, research was extensively dedicated to introducing new variables postulating diversified relationships between the TAM constructs. According to Sun & Zhang (2006), technology acceptance models have limitations such as the explanatory power of the models and the inconsistent relationships among constructs. They believed that adding moderators to the TAM model may overcome such limitations. They pointed out several studies that called for the inclusion of some moderator factor (e.g., Venkatesh et al., 2003; Agrawal & Prasad, 1998). Venkatesh et al. (2003) tested eight models used for explaining technology acceptance behaviour and found that the predictive validity of six of the eight models significantly increased after the inclusion of moderators. They argued 'It is clear that the extensions (moderators) to the various models identified in previous research mostly enhanced the predictive validity of the various models beyond the original specifications' (Venkatesh et al., 2003)

Agrawal & Prasad explicitly criticized the absence of moderating influences in TAM in a call for more research investigating such effect (Sun & Zhang, 2006). Agrawal & Prasad (1999) extended TAM by investigating the mediating effect of individual differences (in particular: role with regard to technology, tenure in workforce, level of education, prior or similar experiences, and participation in training) as external variables between PU and PEOU beliefs, attitude and behavioural intentions. They found that of the five individual differences variables, only three had a significant effect on PEOU. The two that had no effect were participation in training and tenure of workforce and the latter had no such effect on PU as well. As for the PU belief, only participation in training had a direct effect while all others had only an indirect effect through the PEOU belief (this PEOU-PU relation is hypothesized by TAM). Another effort to extend the model was dedicated to identifying TAM's boundary conditions. Culture and voluntary versus mandatory settings were examined as well. Demographics such as education level, age and gender, in addition to experience as a personal characteristic, were addressed as moderators to the relationships in the models (Lee et al., 2003).

TAM continued to evolve and during the **elaboration** period, TAM studies were focused on developing a newer version that encompassed the external variables affecting PU & PEOU and overcame the limitations raised by previous studies. For example, in one year Venkatesh and Davis (2000) investigated the determinants of TAM's constructs PU & PEOU. Together they investigated the PU determinants and introduced a new model called TAM2 which is discussed in section (2.6). Later in the same year, Venkatesh (2000), worked on another extension to investigate the PEOU determinants in relation to a specific system (at introduction and after gaining experience with target system). He proposed a control/adjustment-based theoretical model. The model proposed set of anchors are: control processes (internal and external) conceptualized as computer efficacy and facilitating conditions respectively; intrinsic motivation conceptualized as computer playfulness; and emotion conceptualized as computer anxiety. The anchors influence early PEOU of a new system, but with increasing experience with the system, an individual is expected to adjust his/her PEOU of the system. The model was tested in three different organizations using three measurements taken over three months-period. Results showed that the proposed model of determinants of PEOU explained up to 60% variance in PEOU. The findings suggested that initial drivers of system-specific PEOU are largely individual difference variables and situational characteristics, whose effect becomes stronger with experience. This study served as a test to one of TAM's assumptions related to the mediation of effect of external variables on intention by the TAM constructs of PEOU & PU (Venkatesh, 2000). Three years later, in 2003, Venkatesh et al. developed an aggregated model of eight models that were used to explain the technology acceptance behaviour. The new model called the unified theory of acceptance and use of technology (UTAUT) is discussed in section (2.11)

Sun & Zhang (2006) proposed an extension to TAM and suggested ten moderating factors identified and categorized into three groups: organizational factors (voluntariness and the nature of task/ profession), technology factors (technology complexity, individual versus group technologies, and the purpose of using technology: work versus entertainment oriented) and individual moderators (intellectual capacity, cultural background, gender, age and experience). These factors' effects are to be studied within

the user technology acceptance model. Their proposed integrated model includes PU, PEOU and SN variables plus the three groups of moderators. Table 2-1 summarizes some of the main relevant research related to TAM.

Table 2-1: Summary of selected studies related to TAM.

Study	Technology investigated	Sample	Research objective	Results
Davis 1989	e-mail & file editor ; graphic systems	112 employee 40 evening MBA students	Development of valid measurement scale for PU & PEOU	Two 6 item scales with high reliability for the PU & PEOU.
Davis et al.1989	Word processor	107 MBA students.	Comparing TRA to TAM in predicting intentions to use and the role of attitude in mediating the effect of beliefs on intentions	Both models postulated that BI is the major determinant of usage behaviour. Attitude has no mediating effect between PU or PEOU and BI.
Davis et al. 1992	Word processing program+ Graphic system	200 + 40 MBA students	Testing enjoyment as a determinant of computer use	Usefulness & enjoyment explained 62% and 75% of variance in usage intentions and were found to mediate the effects on usage intention of PEOU & output quality.
Adams et al.1992	Voice and e-mail Software applications	118 employees / 10 different organizations 73 users.	Evaluating the psychometric properties of PU&PEOU while examining the relations between PU,PEOU and system Usage	Demonstrated validity and reliability of PU & PEOU measurement. Also, PU is a major determinant of system usage in study 1.
Igbaria et al.1995	Microcomputer usage	236 part-time MBA students	Investigating the impact of the individual, organizational, and system characteristics on usage through beliefs	Confirmed the effect of external variables on usage in addition to confirming previous relations among TAM constructs
Davis & Venkatesh 1996	WordPerfect+ Lotus	182 + 214 + 312 university students	Testing for any discernible effect on the psychometric properties of TAM's measurement	The 3 experiments showed that TAM measures in the group format best predict and explain user acceptance of IT.

Continued

Agrawal & Prasad 1999	Software applications in PC.	230 Technology literate employees	Investigated the role of personal differences with regard to technology acceptance	Validated the relationship between individual differences and technology acceptances mediated by the TAM beliefs.
Venkatesh 2000	Online help system Multi media system Windows 95	70 employees 160 employees 52 employees	Determinants of PEOU based on anchoring (self-efficacy, facilitating conditions, computer anxiety, and computer playfulness) and adjustment perspective ¹ moderated by experience	Anchor elements were used to form PEOU about a new system and with increased experience adjustments play an important role in determining system specific PEOU
Venkatesh & Morris 2000	Data & information retrieval system	246 employees from 5 different organizations	Investigating SN, experience & gender differences in the context of individual adoption & usage of technology at the work place	Women are influenced by PEOU & SN in making their adoption decisions while men consider PU only.
Wixom & Todd 2005	Data warehouse predefined reporting software.	456 employees from seven organizations from different industries.	The model explicitly distinguish the system based beliefs and attitudes (satisfaction perspective) from behavioural beliefs and attitudes (technology acceptance perspective).	Results supported the application of information & system satisfaction as external variables to traditional TAM
Sun & Zhang 2006	Meta Analysis		Provide a systematic analysis of explanatory and situational limitations of existing technology acceptance studies.	Extending TAM to include 10 moderating factors categorized into three groups: organizational, individual and technological factors.

¹ Anchors: factors that determine early perceptions about the PEOU of a new system; Adjustments reflect beliefs that are shaped based on direct experience with the target system.

TAM was developed after the introduction of information systems into organizations. Davis' approach differed from Aizen's approach. IS people claim that TAM is a model developed in IS field while TRA and TPB developed in the psychology field. During the past two decades TAM has become well-established as robust, powerful, and parsimonious model for predicting individuals' acceptance of new technologies. There have been 424 journal citations of the two articles that introduced TAM (i.e., Davis 1989; Davis et al., 1989) according to Social Science Citation Index® (Venkatesh & Davis, 2000). Nonetheless, the model is not without shortcomings which are discussed next.

2.5.2 Limitations of TAM

The most commonly reported limitation of TAM is the measurement of usage by relying on respondents' self-reporting and assuming that self-reported usage reflects actual usage. A second limitation is related to the type of respondents or the sample choice. In some studies, it was a university student sample or professional users, which made generalization difficult (Legris et al., 2003). Another shortcoming is that TAM provides only limited guidance about how to influence usage through design and implementation (Taylor and Todd 1995; Venkatesh et al., 2003). The model provides feedback on usefulness and ease of use but does not provide feedback about aspects of improvement that might enhance adoption such as flexibility, integration, completeness of information, and information currency. Such guidelines were at the core of TAM development but failed to receive the appropriate attention (Davis et al., 1989).

Sun & Zhang (2006) stated two major shortcomings of TAM studies: the explanatory power of the model and the inconsistent relationship among constructs. They examined data from 55 articles (chosen according to certain criteria), which indicated the vulnerability of explanatory power in two areas: the relatively low explained explanatory power of the model (40 per cent on average) (Sun & Zhang, 2003; Venkatesh et al., 2003) and the variation of explanatory power due to different methods used (e.g., field versus experimental studies). The experimental studies were conducted mostly with a convenience sample of students, which makes it far from being representative of a real workplace. The field studies were conducted in one shot (Sun & Zhang, 2003). Thus, the limitation indicated here is that technology acceptance studies are best carried out in a longitudinal approach since people's perceptions tend to change between technology introduction and actual usage.

The relationships between the major constructs of TAM showed an inconsistent pattern; in some studies the relations were statistically significant indicating TAM as a robust model, while other studies showed the opposite. For example, PEOU effects on attitude, behaviour intentions and usage were inconsistent. In addition, the relationship between PEOU and PU was significant in most studies; however, there were exceptions to that relationship and reasons were attributable to the type of users or their experience

(professional users have different intellectual capacities, and the more experienced the users are the less likely the effect of PEOU on PU).

Lee et al. (2003) cited the limitations as found in their meta analysis: using only a single information system for the research or a single subject (restricted subjects) such as one organization, one department, or MBA students; the use of a one-time cross-sectional study; and the testing of one task and not combining the tasks and testing them with the target IS. In an attempt to overcome these limitations, TAM2 was developed to cover for the absence of moderators in the original TAM.

2.6 Extension of the Technology Acceptance Model (TAM2)

Venkatesh and Davis (2000) extended the original TAM model to explain perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. As mentioned earlier, the original TAM model was based on Aizen's TRA model but did not include the subjective norms construct. Since TAM's introduction, consequent studies have built on TAM's promising robustness, trying to compare TAM to its origins and with other models used in explaining technology acceptance such as diffusion of innovation which is discussed in section 2.7. Previous studies agreed upon the need for adding other variables to serve as determinants of the major construct since the original model lacked such determinants for PU & PEOU. TAM2, an extension of TAM, includes additional key determinants of perceived usefulness and usage intention constructs which are meant to explain the changes in technology acceptance over time as individuals gain experience in using the targeted technology. Figure 2-6 shows the proposed model referred to as TAM2. The new model incorporates additional theoretical constructs covering social influence processes (subjective norm, voluntariness, and image) and cognitive instrumental processes (job relevance, output quality, result demonstrability, and perceived ease of use).

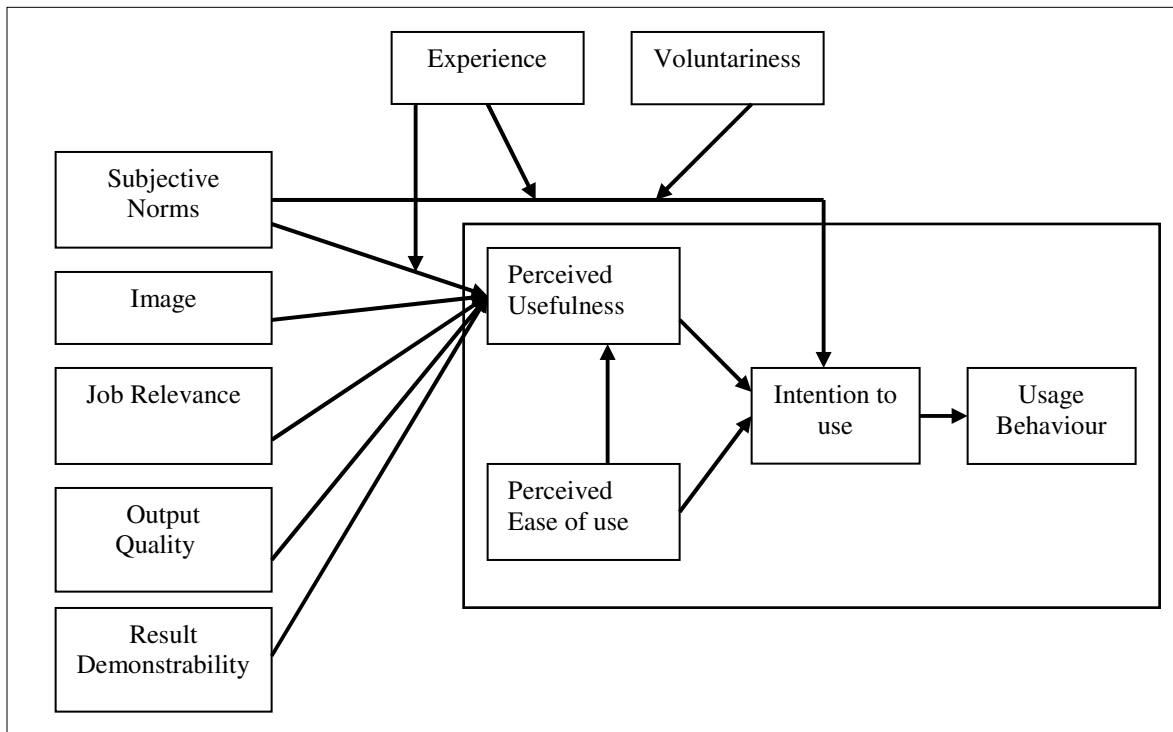


Figure 2-6: TAM2 – Extension of the Technology Acceptance Model

Venkatesh & Davis explained the role of social influences in computer usage contexts. According to them, TAM2 theorizes that the subjective norms direct effect on intention over PU & PEOU will occur in mandatory system usage settings. The model posits voluntariness as a moderating variable to distinguish between mandatory versus voluntary compliance with organizational settings. Nevertheless, subjective norms can influence intention through PU or what is called internalization. In addition, TAM2 theorizes that internalization rather than compliance will occur no matter whether the usage context is voluntary or mandatory. That is, even when usage is mandated by the organization, it is the user's perception of a system's usefulness through persuasive social information that will increase his/her intention towards adoption or usage of the system. On the other hand, through identification subjective norms will positively influence image. An individual will harbour intentions to use a target system if important members within his/her social group believe s/he should. TAM2 theorizes that identification such as internalization will occur whether system usage context is voluntary or mandatory. Experience is theorized to mediate the relations between subjective norms and intentions on one hand and subjective norms-PU (internalization) on the other. As mentioned

previously, the relation between SN and intention would be stronger in mandatory usage context and prior to implementation or at early stages of use. Yet, the relation is expected to weaken with gained experience during system usage. Experience would have the same effect on the SN-PU relation. In contrast, TAM2 does not theorize that experience affects the image-PU (identification) relation or that such relation might weaken over time.

As for the cognitive instrumental process, TAM2 proposes that individuals rely on the match between their job goals and the outcomes of using the system (job relevance) as a basis for their evaluation of the system usefulness (usefulness perceptions). The same is valid when it comes to result demonstrability and output quality; if both are effective then the system used is perceived as useful. Such relation does not change with increased experience. The results of their four longitudinal studies carried out on four different systems at four organizations at three points in time showed that the new model, TAM2, explained 34-52 per cent of the variance in usage intention and up to 60 per cent of the variance in perceived usefulness.

The new model was tested and adopted by other disciplines. For instance, Ozag & Duguma, (2004) built on Venkatesh recommendation to further investigate organizational commitment processes, including person-job fit. The author introduced three cognitive processes as antecedents of perceptions of the usefulness and the adoption of technology in organizations. They included attribution /obligation, rationalization and investment.

In the health sector field, Chismar & Wiley-Patton (2003) tested the applicability of TAM2 to the acceptance of Internet and Internet-based health applications within 89 paediatric physicians. Results partially confirmed the model; however, a core construct of the model, perceived ease of use, was not supported by the findings. PEOU did not predict intention to use while PU was a strong determinant of intention to use. In their explanation of these findings the authors stated that in the medical context the important factor for intentions to adopt the new technology was usefulness, relevance and the output quality that is sufficient for the completion of the daily tasks. Furthermore, physicians have relatively high competency and capacity that allows them to comprehend new technology quicker than the average population and willing to adopt beneficial

applications of information technology even if they may not be easy to use. In addition, they have strong staff support for operating medical equipment and related technology which explains the lack of weight placed for PEOU.

Hart and Porter (2004) applied TAM2 to identify how user's cognitive processes influence the perceived usefulness of on-line analytical processing technology (OLAP) in South Africa. The three cognitive processes factors examined were result demonstrability, output quality, and job relevance. The results showed that the three cognitive processes as well as PEOU were significantly and positively correlated with PU.

Research has shown that the influence of some factors on intention to use IS varies at different stages in the IS implementation process. Prior to Davis' introduction of his model, Rogers (1983) introduced his diffusion of innovation theory stating the different stages of adoption, and correspondingly the different types of adopters according to the different characteristics of the technology (innovation). The diffusion theory by Rogers is discussed next.

2.7 Diffusion of Innovation Theory (DOI)

Diffusion is a process in which an innovation is communicated through certain channels over time among members of a social system. An *innovation* is an idea, practice or object that is perceived as new by an individual or other unit of adoption (the words innovation and technology are used as synonyms). Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas. *Communication* is a process in which participants create and share information with one another in order to reach a mutual understanding. New ideas possess a degree of uncertainty and thus are perceived as risky. An individual can reduce such uncertainty by obtaining information. Thus, *information* is a difference in matter-energy that affects uncertainty in a situation where a choice exists among a set of alternatives. From the previous definition of diffusion, four elements of diffusion can be detected: (1) innovation (2) communication channels (3) time and (4) social system (Rogers, 2003).

2.7.1 The History of Diffusion Research

The early work on diffusion can be traced back to sociologists (Gabriel Trade in France & George Simmel in Germany) and anthropologists (mainly groups in Britain & Germany-Austria) a century ago. These European diffusionists were some of the first scholars to use the term “diffusion”. The 1940s marked the original formulation of the diffusion paradigm (through the study of Ryan & Gross, 1943). During the 1950s a proliferation of diffusion studies took place in the USA. The 1960s involved the expansion of diffusion research in developing nations such as Latin America, Africa, and Asia. Different disciplines led to the development of the diffusion theory; the first involved was Anthropology. Other research traditions (series of investigations on similar topics whereby successive studies were influenced by the proceeding inquiries) that led to the expansion of this theory were: early sociology, rural sociology, education, public health /medical sociology, communications, marketing, geography, and general sociology (Rogers, 2003).

The two marked events that contributed to the theory’s development were the Iowa Hybrid Seed Corn study conducted by Ryan and Gross (Rogers, 2003) and Tarde’s analytical observations made from viewing legal cases and social trends. Tarde was far ahead of his time in his conceptions of diffusion; he used different concepts such as “imitation”, what is known today by “adoption”. Tarde also identified the adoption or rejection of innovations as a crucial outcome variable in diffusion research. He observed that the rate of adoption of a new idea usually followed an S-shape curve over time. The take off in the s-shape begins to occur when opinion leaders in a system use a new idea. Although he did not use today’s current words of regarding opinion leaders and diffusion networks, his key word of “imitation” implies that an individual learns about an innovation by copying others’ adoption of the innovation, what is known today as a social process of interpersonal communication network.

2.7.2 Description of DOI Theory

The purpose of the diffusion of innovation theory is “to provide individuals from any discipline interested in the diffusion of an innovation with a conceptual paradigm for

understanding the process of diffusion and social change” (Brown, 1999). Diffusion of innovation theory provides well developed concepts and a large body of empirical results applicable to the study of technology evaluation, adoption and implementation, as well as tools, both quantitative and qualitative, for assessing the likely rate of diffusion of a technology, and identifies numerous factors that facilitate or hinder technology adoption and implementation (Fichman, 1992). These factors include the innovation–decision process, attributions of the innovation and innovators’ characteristics:

2.7.3 Innovation Decision Process

The innovation-decision process is the process through which an individual (or other decision-making unit) passes from first knowledge about the innovation to formulating an attitude towards it, to a decision regarding adoption or rejection, to implementation of the new idea, and to confirmation of this decision. This process consists of five stages:

(1) **Knowledge:** when the individual (or other decision-making unit) is exposed to an innovation’s existence and gains an understanding of how it function. There are three types:

Awareness-knowledge: seeking information that an innovation exists. This may motivate individual(s) to seek the second or third type of knowledge. Such information seeking may also happen at persuasion and decision stages

How-to-knowledge: seeking information necessary to use an innovation properly. Lack of an adequate level of knowledge prior to trial and adoption is likely to result in rejection and discontinuance.

Principles-knowledge: seeking information dealing with the functioning principles underlying how an innovation works (e.g., microelectronics, which underlies the functioning of computers, the Internet, and consumer electronics).

Rogers argued that it is possible to adopt an innovation without principles-knowledge, but there is a danger of misusing a new idea which may result in discontinuance. In addition, individuals’ competence in judging the effectiveness of an innovation is facilitated by their understanding of the principles knowledge. He argued that awareness-knowledge

can be achieved through mass media, and that how-to-knowledge can be assigned to change agents who could play a distinctive and important role at the trial /decision stage in the innovation- decision process. He felt that principles-knowledge is more appropriate task for formal education.

(2) *Persuasion:* when the individual forms a favourable attitude towards the innovation. Individuals at this stage become psychologically involved; they seek information about the innovation, decide on credible message sources and interpret the messages they receive to develop a general perception of the innovation. They seek information from their peers to reduce the level of uncertainty around the new idea.

Rogers argued that the attitude a person forms about an innovation in this stage is expected to lead him/ her to a subsequent change in overt behaviour. Nevertheless, in many cases attitude and actions may be disparate (e.g., adoption of contraceptives in developing countries). Such attitude–use discrepancy is called the KAP gap (referring to “knowledge-attitudes-practice”). Thus, a favourable or unfavourable attitude towards an innovation does not necessarily lead directly or indirectly to an adoption or rejection of that innovation.

(3)*Decision:* when an individual engages in activities that lead to a choice to adopt or reject an innovation. Most individuals prefer to try an innovation first on small scale (when possible) before making the decision to adopt or reject it. Innovations that prove to have a relative advantage upon trial by an individual or a confident peer/ opinion leader, drive an individual to make the adoption/ rejection decision.

Rogers argued that the rejection decision can happen at any stage of the innovation-decision process. It can even occur after a prior decision to adopt. Such discontinuance can take either of two types (1) Active rejection, which consists of considering adoption (including trial of the innovation) but then deciding not to adopt and (2) Passive rejection (or non-adoption), which consists of never really considering the use of the new idea.

(4) *Implementation:* when the individual puts an innovation into use. Up until this stage, the individual involved in the innovation-decision process has been engaged in a mental exercise of thinking and deciding (except for the physical trial part). Implementation at this stage of the process involves overt behaviour change as the innovation is put to use. Problems may arise as to how to use it, as a result, individuals rely on a change agent to provide information and technical assistance as they begin using the innovation.

Rogers stated that during the implementation stage, the original idea may be re-invented. He mentioned reasons such as complexity and difficulty to understand that leads to simplification; ignorance and inadequate learning of adopters or users; many possible applications (e.g., computers & Internet); and local pride of ownership (Rogers, 2003). Re-inventions can be of benefit to adopters; such flexibility may reduce mistakes and encourage customization to fit the innovation to local conditions or changing environments. In the decision process, an individual might have more than an adopt/reject option; they may actively participate in the diffusion process.

(5) *Confirmation:* when the individual seeks reinforcement for an innovation-decision already made but may reverse the decision if exposed to conflicting messages about it. At the confirmation stage, individuals might seek to avoid a state of dissonance (or internal disequilibrium) related to the adoption of the new idea. They might, if they have already decided against the adoption of the new idea, become exposed to pro-innovation messages causing a state of dissonance that can be reduced by adopting the new idea. Or quite the opposite, they might experience a discontinuance; reject an innovation after having previously adopted it. There are two types of discontinuance: (1) replacement discontinuance referring to a decision to reject an idea in order to adopt a better one that supersedes it. (2) disenchantment discontinuance referring to a decision to reject an idea as a result of dissatisfaction with its performance (Rogers, 2003).

Rogers argued that individuals passing through the innovation-decision stages may not recognize when one stage ends and another starts. Thus, a sharp distinction between each stage should not be expected. In addition, innovation- decisions vary in the length of time

taken. Differences in adoption length are in part related to the innovation attributes and innovators' characteristics.

2.7.4 Attributes of the Innovation

Rogers (2003) pointed out that diffusion research has focused on “people” differences in innovativeness while less effort has been devoted to analyzing “innovation” differences. ‘Researchers in the past tended to regard all innovations as equivalent units from the viewpoint of their analyses’. Rogers stated that this oversimplification is dangerous and incorrect. Nevertheless, he recognized the need for a standard classification scheme of perceived attributes of innovation that can be described in universal terms, but recommended that measures of perceived attributes should be developed in each diffusion study rather than utilizing existing scales from previous investigations.

According to Rogers, individuals' perceptions of the attributes of an innovation and not the attributes as classified objectively by experts or change agents, affect the rate of adoption. Innovation attributes can explain the rate of innovation adoption. Most of the variance in the rate of adoption (49-87 per cent) is explained by the five perceived attributes of an innovation. These attributes are interrelated empirically but each is conceptually distinct, and the selection of these attributes is based on past research as well as a desire for maximum generality and succinctness:

Relative Advantage: is the degree to which an innovation is perceived as better than the idea it supersedes.

Compatibility: is the degree to which an innovation is perceived as consistent with existing values, past experiences, and needs of potential adopters.

Complexity: is the degree to which an innovation is perceived as relatively difficult to understand and use.

Trialability: is the degree to which an innovation may be experimented with on a limited basis.

Observability: is the degree to which the results of an innovation are visible to others.

Rate of adoption is the relative speed with which an innovation is adopted by members of a social system, usually measured by the number of individuals who adopt a new idea in a specified period of time. In other words, it is a numerical indicator of the steepness of the

adoption curve for an innovation. In addition to the five perceived attributes of an innovation, there are variables such as:

- (1) Type of innovation (optional, collective, or authoritative)
- (2) Communication channel (e.g., mass media or interpersonal)
- (3) Nature of social system (e.g., norms, degree of network interconnectedness, etc.)
- (4) Extent of change agents' promotion efforts.

Innovations requiring an organization innovation-decision are generally adopted less rapidly than an individual optional-decision. That is, the more people involved in making a decision the slower the rate of adoption. To speed up the rate of adoption, fewer people should be involved. When interpersonal communication channels are used rather than mass media channels, the rate of adoption is slowed. In addition, social system norms and network connectedness, agents' promotion efforts and changes within such efforts also affect the rate of adoption of an innovation at any stage of the process (Rogers, 2003).

2.7.5. Characteristics of Innovators

Individuals differ in their adoption patterns. They can be classified into categories according to the time they first begin using the new idea or on the basis of their innovativeness: the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of the system. The time element of the diffusion process allows for the classification of adopters into categories and drawing diffusion curves. The adoption of innovation usually follows a bell-shaped curve when plotted over time on a frequency basis. With this curve, the normal distribution is not symmetrical. There are three adopters' categories to the left of the mean and only two to the right:

(1) Innovators (2.5%): The salient characteristic of innovators is venturesomeness. They enjoy substantial financial resources, an ability to understand and apply complex technical knowledge, and can cope with a high degree of uncertainty about the innovation at the time of adoption. They play an important role in launching new ideas into a social system, and thus can be thought of as system gatekeepers when new ideas flow in.

(2) **Early Adopters (13.5%):** The salient characteristic of early adopters is respect. They are looked up to in the local social system. In this category are the highest degrees of opinion leaders whom potential adopters ask regarding information and advice about the new ideas. They serve as a role model for many members in the social system. For this reason, they are sought out by change agents for their capacity to trigger the critical mass when they adopt an innovation. They put their stamp of approval on the new idea by adopting it.

(3) **Early Majority (34%):** The early majority adopt new ideas before the average member of the system. Their salient characteristic is being “deliberate”. They may deliberate or take some time before completely adopting a new idea. They follow with deliberate willingness but seldom lead. They form an important link in the diffusion process since they mediate two categories of early adopters and late majority.

(4) **Late Majority (34%):** Contrary to the previous category, late majority adopt new ideas just after the average member of a system. Their adoption behaviour maybe a result of peer pressures (norms) or an economic necessity. Nevertheless, the adoption is made with scepticism and caution; they only adopt when most others in their system have already done so. Due to their scarce resources, they need to remove most of the uncertainty before they feel safe to adopt such innovation. That is why their salient characteristic is sceptical.

(5) **Laggards (16%):** They are the last in the social system to adopt; there are almost no opinion leaders among them. They rely on what has been done in the past to make decisions now; that is why their salient characteristic is tradition. They only interact with traditional people like themselves and are suspicious of change agents. Their resistance may be rational from their point of view; as because of their limited resources they can not afford to adopt an innovation that might fail (Rogers, 2003).

2.7.6. Research Applying the DOI Theory

Rogers' perceived attributes of an innovation have been the focal point of many studies specially those related to potential users' perceptions of information technology innovation and its influence on adoption. Among these, Tornatzy and Klein (1982) presented a meta analysis reviewing the innovation characteristics literature hypothesizing that perceived innovation characteristics can predict the adoption and implementation of various innovations. The ten innovation attributes most frequently addressed in the reviewed articles included Rogers', as well as, cost, communicability, divisibility, profitability, and social approval. Having noted that some attributes were closely related, e.g., compatibility and observability or divisibility and trialability, the study ended with recommendations of an improved measurement of the various attributes in order to reduce the number and the need for further research to demonstrate that perceived characteristics of an innovation are consistently related to innovation adoption and implementation across settings.

In the stream of these suggestions, Moore and Benbasat (1991) in recognizing the inadequate measurement of constructs that tied up IS research, developed an instrument designed to measure users' perceptions of IT innovations, individuals' initial adoption of IT in organizations and technology diffusion within organizations. Thus, in such a context, the authors added another two constructs: voluntariness of use, defined as "the degree to which use of innovation is perceived as voluntary, or of free will"; and, image defined as "the degree to which use of an innovation is perceived to enhance one's image of status in one's social system". Noting that Rogers' definitions of innovation attributes were based on the perception of the innovation itself, and not on perceptions of actually using the innovation, the authors suggested small changes in the wordings of definitions (e.g., the definition of relative advantage to read "the degree to which **using** the innovation is perceived as being better than **using** its precursor"). They also changed the name from innovation attributes to perceived characteristics of innovation (PCI). The authors searched extant literature related to PCI looking for scales already developed and evaluated them in terms of their validity and reliability. Instrument development was

carried out in three stages including item creation, scale development, and instrument testing.

The results revealed a parsimonious 34-item instrument comprising seven scales including compatibility; relative advantage; result demonstrability; visibility; ease of use; trialability; and image, all with acceptable levels of reliability.

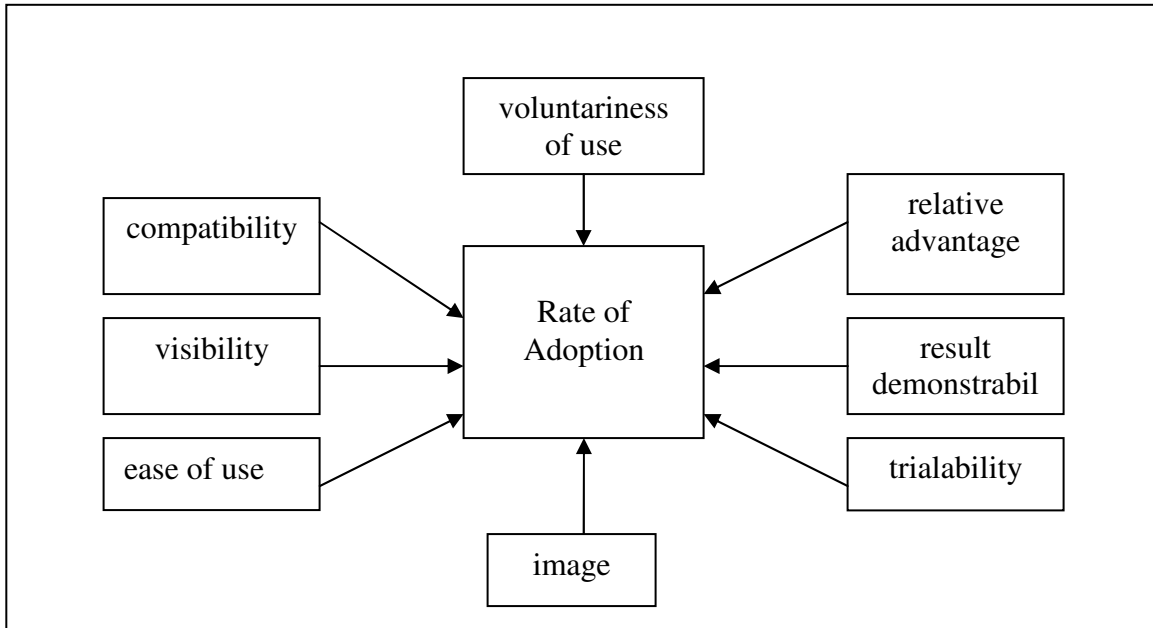


Figure 2-7: The seven scales in Moore & Benbasat's study (1991)

On the other hand, results showed compatibility, perceived usefulness (relative advantage) and ease of use (complexity) to be the most influential for continued usage decisions, where demonstrability result, image, visibility, and trialability were not significant in determining usage of personal workstations. The authors recommended using the instrument to investigate how perceptions affect individuals' actual use of IT as well as other innovations (Moore and Benbasat, 1991).

Agarwal and Prasad (1998) suggested adding a new construct to illuminate the relationships in the technology acceptance models. The construct, personal innovation, was hypothesized to exhibit moderating effects on individuals' perceptions about a new technology. The authors differentiated between global innovation and domain specific innovation, which was defined in the field of information technology as personal innovation in information technology (PIIT): "the willingness of an individual to try out

new information technology”. They argued that the effects of PIIT were manifested in technology acceptance behaviour through the relationships with beliefs or perceptions; moreover, they proposed that PIIT serves as a key moderator for the antecedents as well as the consequences of perceptions. As an antecedent moderator, PIIT determines the alternative source of information used by an individual for the development of perceptions. As a consequence moderator, PIIT describes the risk-taking propensity referred to by Rogers (1995) in respect of innovators and early adopters being able to cope with high levels of uncertainty. Thus, individuals with high PIIT are more prone to take risks. Building on the work of Tornatzky and Klein (1982) which found only three innovation characteristics (relative advantage, complexity, and compatibility) consistently related to technology acceptance, Agarwal & Prasad developed a model which hypothesized relations between PIIT and other technology acceptance constructs, where PIIT moderated the relation between information about new IT from alternative channels; perceptions about new IT including relative advantage, ease of use (complexity) and compatibility; and, intentions to use the new IT.

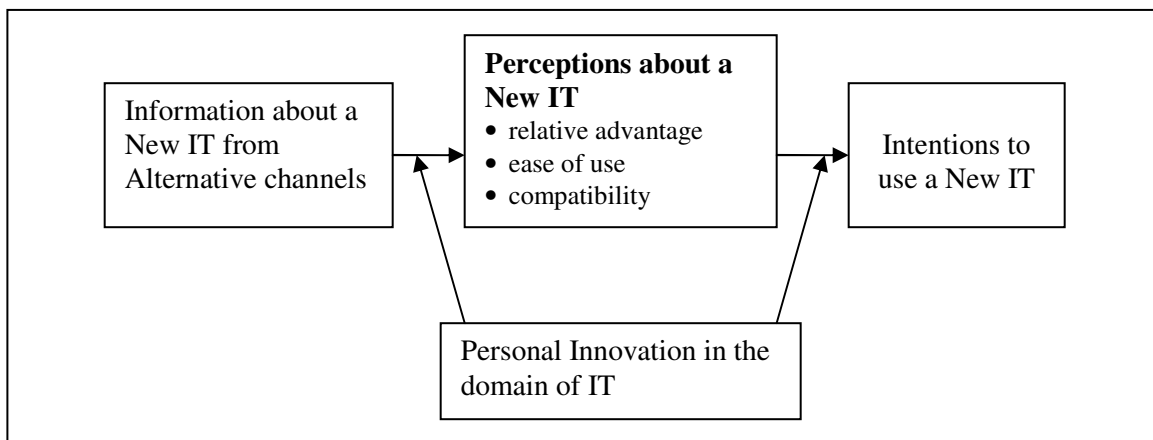


Figure 2-8: A hypothesized relationship between PIIT and other technology acceptance constructs
Source: Agarwal & Prasad (1998)

Although the authors had theorized PIIT would exhibit a moderating influence on the relationships between the three salient perceptions and usage intentions, the results for their sample and technology test showed significant moderation was observed only for compatibility. Despite the outcomes of the study, the authors supported the notion that

PIIT potentially represents a construct that might be salient for examining innovation behaviour with respect to computing technology (Agarwal & Prasad, 1998).

Karahanna et al. (1999) combined diffusion of innovation and attitude theories in a theoretical framework to examine differences in pre-adoption and post-adoption beliefs and attitudes. Their study provided empirical examination of the influences of a comprehensive set of innovation attributes on both adoption and usage behaviour. These attributes included Rogers' with PU and PEOU replacing relative advantage and complexity respectively; image; and result demonstrability which were in Moore & Benbasat's (1991) study mentioned earlier. Karahanna et al. differentiated between adoption and usages where adoption is the inclination to use IT based on one's beliefs about it and attitudes developed accordingly, and usage or continued usage refers to attitudes developed after adoption fostering the tendency to continue with usage. An individual's intention to adopt (or continue usage of) the IT is determined by two factors: one reflecting personal interests and one reflecting social influence. The first referring to attitudes or personal evaluation of performing the behaviour, which may be formed based on three general classes of information: information concerning past behaviour, affective information, and cognitive information (Zanna & Rempeel, 1988 cited in Karahanna et al., 1999). The second, social influences (subjective norms), refers to the individual's perception of the social pressures to adopt or not adopt (to continue or not continue using) the IT. Krahanna et al. pointed out the close similarity between subjective norms and communication networks in Rogers' diffusion of innovation theory and sited two types of social influences (1) information influence, which occurs when individuals accept information as evidence and reality, and (2) normative influences, which occur when individuals conform to expectations of others, indicating that social influence operates through three kinds of processes (identification, internalization, and compliance). The research findings suggested that social norms alone induce initial adoption while sustained usage decisions, when non-mandated, are based solely on attitudinal considerations. Further, in the absence of IT knowledge prior to adoption, both instrumentality and non instrumentality beliefs influence attitude towards adoption. With

experience and gained knowledge about the technology, only instrumentality beliefs of PU and perceptions of image enhancement influence attitude (Krahanna et al., 1999).

2.7.7 Limitations of DOI Theory

DOI theory tries to explain the innovation decision process, factors determining the rate of adoption, and categories of adopters. It helps in predicting the likelihood rate of adoption of an innovation. Nevertheless, it has been argued that the theory does not provide evidence on how attitude evolves into accept/reject decisions, and how innovation characteristics fit into this process (Karahanna et al., 1999; Chen et al., 2002).

Conversely, Rogers stated that rejection decisions can happen at any stage in the decision process and that attitudes are formed along the way in the Knowledge-Reinforcement path, he did not fully explain the role innovation attributes can play in forming these attitudes. However, it is important to remember that an innovation has different categories of adopters; it is unrealistic to expect one model to be able to generalize how positive or negative attitudes can be formed in respect of innovation attributes, stages of adoption and categories of adopters.

Although TAM and DOI originated in different disciplines, the two theories have obvious similarities. As reported in the studies above and elsewhere, the relative advantage attribute of innovation is often considered to be the PU construct in TAM, and the complexity attribute is similar to PEOU concept in TAM. This suggests that TAM and DOI reconfirm and often complement each other (Chen et al., 2002). Yet other theories found in DOI a way to implement changes or make new ideas acceptable among individuals. The next section discusses social cognitive theory (SCT) which focuses on the possibility of making changes in individuals' behaviour and relies on concepts related to those introduced by Rogers. Then, the link between SCT and DOI is discussed through Bandura's (2006) chapter on the integration of SCT and social diffusion theory (referring to Rogers' DOI).

2.8. The Social Cognitive Theory

The social cognitive theory (SCT) stemmed from the social learning theory (SLT) which was launched in 1941 by Miller and Dollard's publication of *Social Learning and Imitation* when they introduced the principle of learning through "Models". Currently, subsets of theories based on SLT with emphasis on cognitive variables assert that human cognition mediates between stimulus and response, placing individual control over behavioural responses to stimuli. Although there are several versions of SLT, they all share three basic tenets:

Tenet (1): Response consequence such as reward / punishment influence an individual's behaviour.

Tenet (2): Observational learning (vicarious learning) whereby humans can learn by observing others, in addition to learning by personally participating in an act.

Tenet (3): Identification: individuals likely to model behaviour observed by others they identify with or are emotionally attached to.

Many authors have contributed to the development of SLT over the years, among them Albert Bandura who led the efforts on cognitive SLT development. His theory was the first to incorporate the notion of modelling (vicarious learning) as a social learning form. In addition, he introduced several other important concepts: reciprocal determinants, self-efficacy, and the idea that a significant temporal variation in time lapse could occur between cause and effect. He renamed his version of social learning theory, social cognitive theory (SCT) (Brown, 1999).

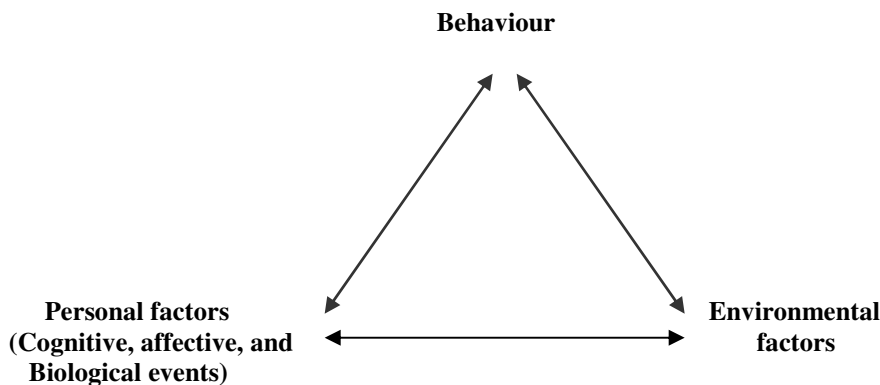
Bandura, in his documentation of the evolution of the social cognitive theory, pointed out that prior to the breakthrough in behaviourism attempted by Miller & Dollard in 1941, the prevailing analysis of learning focused on learning through the effects of one's actions. The explanation mechanism involved finding a connection between a stimulus and a response and through reward/punishment systems. Miller & Dollards' work produced what is known as social modelling; in their book "*Social Learning and Imitation*" they recognized models and interpreted them as a special form of discrimination learning [a model provides a social clue → observer matches response → reinforcement system strengthens the tendency to behave imitatively]. Bandura felt that Miller and Dollard's

studies of modelling and imitation revealed an alternative way by which humans acquired competences and knowledge; but he also thought that such a process suffered deficiencies surrounding determinants, mechanism, and scope. He launched a research program on observational learning and tested the above deficiencies. The results showed that observational learning did not require response enactment or reinforcement. He stated that social modelling operates through four cognitive sub-functions (*attention* → *representation* → *enactive translation* → *motivation*) (Bandura, 2005).

2.8.1 SCT Components of Concepts

Social cognitive theory encompasses a large set of factors that operate as regulators and motivators of established cognitive, social, and behavioural skills. Among the key factors are:

Reciprocal Determinism: according to SCT, human behaviour is the result of a triadic, dynamic, and reciprocal interaction of environment, personal factors, and behaviour.



Bandura argued that some sources of influence are stronger than others and the interaction between the three factors would differ based on the individual, the particular behaviour being examined and the specific situation in which the behaviour occurred (Pajares, 2002). For instance, personal factors-behaviour interaction involves the influence of the individual's thoughts and emotions, biological properties (such as sex, ethnicity, temperament, and genetic dispositions) and his/ her actions. The individual's expectations, beliefs, self-perceptions, goals, and intentions shape and direct his/her behaviour. The second interaction of a bi-directional nature also occurs between the

individual's characteristics and the environment. Within such interactions, human expectations, beliefs, and cognitive competencies are developed and modified by social influences (conveying information, activating emotional reactions through factors such as modelling, instructions and persuasion) and physical structures (such as age, size, race, sex, and physical attractiveness) within the environment. The final interaction occurs between behaviour and the environment; a person's behaviour is a product of the environment and vice versa. Thus, behaviour determines which of many potential environmental influences come into play and what forms they will take. In turn, the environment partly determines which form of an individual's behaviour is developed and activated (Bandura, 1989).

Vicarious Capacity: humans learn from direct experience as well as from observing others. Through observational learning, individuals can develop ideas about formation of behaviours without the need to perform them. This results in gaining knowledge while saving time, resources, mobility and sparing individuals what could be a devastating or fatal mistake (if one should learn solely through trial and error). According to Bandura, learning from models can take various forms, including new behaviour patterns, judgment standards, cognitive competencies and generative rules for creating new forms of behaviour, styles of inquiry, information processing skills, and standards of self-evaluation. Observational learning is guided by four component sub-functions that evolve with maturation and experience: attention span, retention processes, motor reproduction processes, and motivational processes. Individuals selectively observe actions / behaviours in their environment, code them into symbols and use them as a guide for future actions. The model and individual's characteristics affect the type and amount of observation experienced. It is most likely that individuals selectively attend to models and behaviours they identify with—such observed behaviours can only be modelled if retained in the individual's memory. Retention is made by actively transforming and restructuring the information conveyed by observing models and events into rules and conceptions for memory representation. In the third sub-function, behavioural production process, symbolic conceptions are translated into appropriate actions. According to the fourth sub-function, motivational process, people do not usually perform all they learn. Performance

of observationally learned behaviour is influenced by three types of incentive motivators: direct, vicarious, and self-produced (Bandura, 1989).

Forethought: According to SCT, most human behaviour is positive and regulated by anticipatory. Through this forethought capacity, individuals are capable of motivating themselves and guiding their actions relying on anticipation of outcomes. SCT believes that previous experiences create expectations of outcomes related to performing certain behaviour. Therefore, expectations more than actual outcomes motivate the occurrence of that behaviour again. The capacity to extrapolate future consequences from known facts enables people to take corrective actions that avert future disasters. The symbolizing capacity allows a person to present future events cognitively in the present and thus behaviour can be influenced especially when forethought is translated into incentives and actions through a self-regulatory mechanism.

Self-Regulatory Capability: SCT proposes that people have control over their own thoughts, feelings, motivations and actions. This internal control mechanism is called a self-regulation capacity that governs what behaviour is performed and allows gradual substitution of internal for external controls of behaviour. Self-regulation occurs through the interplay between social standards and moral standards along with self-produced internal influences (motivations to set goals and attain them). According to Bandura, three factors seem to determine the degree of self-motivation: self-efficacy; feedback; and anticipated time to goal attainment. If a person feels capable of achieving a goal, she / he is likely to work harder and give up less easily than a person with low self-efficacy. Feedback not only enables a person to adjust her / his efforts to make them more realistic but also feedback enhances a person's self efficacy. Eventually, timely or proximal goals are more effective than distal ones in enlisting self-motivation. Social and moral standards also regulate behaviour. People develop moral standards from a variety of influences such as direct instructions, feedback on behaviours from significant others, and modelling of moral standards by others. Standards are also developed from institutionally organized systems such as religion, education, media, and legal and political agencies. Nevertheless, people do not passively absorb all the standards of behaviour to which they

are exposed. Instead, they internalize standards from models similar to themselves, from their perception of their locus of control, and from the value they assign to the activity involved in that behaviour. It is through the process of self-regulation that pro-social behaviour can be internally maintained.

Self-Reflective Capability: self-reflection is a distinctive human characteristic that enables people to analyze their experiences and scrutinize their thought processes and modify their thinking. People not only gain understanding through reflection, they verify their thinking, monitor their ideas, act on them or predict their occurrences, judge from the results the adequacy of those thoughts and alter them accordingly. Four models of thought verification can be distinguished (enactive, vicarious, persuasory, and logical). Bandura believes that among the types of thoughts that affect human action, the most central or pervasive is people's judgments of their capability to exercise control over events that affect their lives. Bandura argues that beliefs about personal efficacy affect life choices, level of motivation, and quality of functioning. People's beliefs about their efficacy are developed through four main sources of influence: performance mastery experiences; seeing people similar to oneself manage task demands successfully (vicarious experience); social persuasion that one has the capabilities to succeed in given activities; and, inferences from physical and emotional states indicative of personal strengths and vulnerabilities. Bandura ordered these antecedent factors according to the magnitude of the effect with performance mastery believed to be the strongest of change and emotional arousal the weakest (Bandura, 1989; Marakas et al., 1998). Self-efficacy is defined as: ***“Peoples judgments of their capabilities to organize and execute courses of action required to attain designed types of performances. It is concerned not with the skills one has but with judgment of what one can do with whatever skills one possesses”*** (Bandura 1986, p391).

In his agentic perspective of SCT, Bandura (2001) stated that efficacy beliefs are the foundation of human agency and unless people believe that they can produce desired results and prevent harmful ones through their actions, they have little incentive to act or preserve in the face of life difficulties. People develop adequate ways to deal with

reoccurring situations; they act on their perceived efficacy without requiring continuing directive or reflective thought (e.g., learning driving skills in congested traffic). Once a skill is routinized, efficacy belief is no longer an important factor to develop that skill. Thus, as long as people believe in their ability to perform a given activity, they act habitually on that belief until significant changes occur in task demands or situations; then their belief of personal efficacy is promptly reappraised as a guide for action under changing conditions (Bandura, 1997). Furthermore, self-efficacy can vary across activities, situations, and circumstances and thus can not be measured by an omnibus test. It has been found that the predictive capability of a self-efficacy estimate is strongest and most accurate when determined by specific domain-linked measures rather than with general measures (Marakas et al., 1998)

2.8.2 Self-Efficacy and Computing

SCT is considered a valid model of individual behaviour, widely accepted and empirically validated (Igbaria & Iivari, 1995; Compeau & Higgins, 1995a). Of specific interest is the role of self-efficacy judgment in inducing or deterring certain behaviours. This factor has been researched along with other factors in the IS / IT domain to explain individuals' acceptance or adoption of various technologies.

An empirical study by Compeau and Higgins (1995a) was carried out to develop and validate a measure of computer self-efficacy and to assess both its impact and antecedents. The authors explained three distinct but interrelated dimensions of self-efficacy: magnitude, strength, and generalizability. The magnitude of self-efficacy refers to the level of task one believes oneself able to obtain and the higher the magnitude the more complex tasks one would expect to accomplish. Self-efficacy strength refers to the level of conviction about one's judgment of his/ her efficacy as well as his/her resistance to disconfirmation. Frustrated individuals will lower their sense of efficacy while those with a higher sense of efficacy will not be deterred by difficult problems and will overcome whatever obstacles are presented. Generalizability of self-efficacy indicates the extent to which perceptions of self-efficacy are limited to particular situations (some

people think they can perform a task under particular conditions while others feel they can execute the job under any circumstances or perform behaviours that are slightly different). The authors defined computer self-efficacy as the judgment one has of his/her capability to use the computer, in a sense to apply the dimensions as follows:

- Magnitude can be interpreted to reflect the level of capability expected. Individuals with high magnitude self-efficacy might perceive themselves as able to accomplish difficult computing tasks with less support and assistance than those with lower judgments of self-efficacy.
- Strength of computing self-efficacy refers to the level of conviction about the judgment or the confidence one has in one's ability to perform various computing tasks. Of course, individuals with high computer self-efficacy perceive themselves as able to accomplish more difficult tasks and display greater confidence in performing them.
- Generalizability refers to the degree to which the judgment about computing self-efficacy is limited to a particular domain of activity such as different hardware or software configurations. Thus, individuals with high computer self-efficacy generalizability would expect to be able to use different packages and different systems while those with low computer self-efficacy generalizability would perceive their capabilities to be limited to a particular software package or computer system.

The research model was developed with reference to SCT and IS literature identifying the linkages between cognitive determinants. These are: self-efficacy and its two sources of information, encouragement by others (verbal persuasion) and the actual use of others; outcome expectations (derived from IS research); affective responses of individuals towards using computers (affect represents enjoyment while anxiety represents apprehension or negativity), and usage of computing technology. Technical support was added based on the author's interest in researching computer usage in an organizational context. The research findings supported the social cognitive perspective on computing behaviour and self-efficacy played an important role in shaping individual's feelings and behaviours. Individuals with high self-efficacy used computers more, derived more enjoyment, and experienced less anxiety around computers. What is more, outcome

expectations in relation to job performance had a significant impact on affect and use of computers. Similarly, affect and anxiety had a significant impact on computer use. Furthermore, the analysis showed the mediating role of self-efficacy and outcome expectations in the processing of environmental information; encouragement by others as well as others' actual use of computers influence a behaviour indirectly through their influence on self-efficacy and outcome expectations. One unexpected result was reported regarding the negative influence of support on self-efficacy and outcome expectations. Nevertheless, from a measurement point of view, the data analysis provided evidence of the computer self-efficacy construct validity measure (Compeau & Higgins, 1995a).

Later in 1999, Campeau et al. ran a longitudinal study to overcome the reported limitation of the previous study (the use of cross sectional survey data). They revealed that the pragmatic concern of their latter study was the fact that the reciprocal nature of the relationships between cognitive determinants (self-efficacy and outcome expectations), affective factors (affect and anxiety), and usage, made drawing causal conclusions more difficult. Thus, the authors tested a model of individual reactions to computing technology in a longitudinal context to enable them to make stronger causal arguments regarding the observed relations as well as to understand whether the influences of self-efficacy and outcome expectations on usage were short or enduring ones. The model used was a subset of the former study (1995a). Only this model elaborated outcome expectation while the former elaborated self-efficacy information sources. Compeau and Higgins (1995b) found the outcome expectations construct to be multidimensional, incorporating both performance-related and personal outcomes expectations. Performance-related outcomes are those associated with job improvement when using computers (mostly efficiency and effectiveness). Personal outcome expectations relate to expectations of change in image, status, or reward expectations (such as promotion, raise, or praise). The study was carried out over one-year interval. The results agreed with the former study. Self-efficacy and performance-related outcome expectations were capable of predicting behaviour responses and self-efficacy was a strong and significant predictor of computer usage anxiety or enjoyment. On the other hand, personal outcome expectations had a positive correlation with usage but had a

negative correlation with use of the indirect path. The implication was, in the absence of other sources of information, people with higher perceptions of personal benefits of IT would use it more. However, when other expectations like self-efficacy and performance-related outcomes are considered, the net contribution of the personal outcome expectations would be negative (Compeau & Higgins, 1999).

Based on social cognitive theory, the two authors investigated the role of modelling in a training programme in developing computer skills compared to a traditional lecture-based program. A research model based on SCT was formulated, with prior performance and behaviour modelling directly impacting self-efficacy, outcome expectations, and performance. While self-efficacy was posited to influence outcome expectations and performance, outcome expectations was also posited to influence performance. The research design consisted of eight research subject groups (managers and professionals with little prior computer experience) who completed a two day training course covering Lotus and WordPerfect. Two groups received modelling training for both packages, two groups received exclusively non-modelling training, and the remainder received modelling training for one package and non-modelling training for the other. The data were assessed through four separate models, based on the day of training and the software package and all subjects received substantial training in the use of the software package. The modelling intervention was implemented through a 20 minute videotape with a model performing an introductory exercise on the computer.

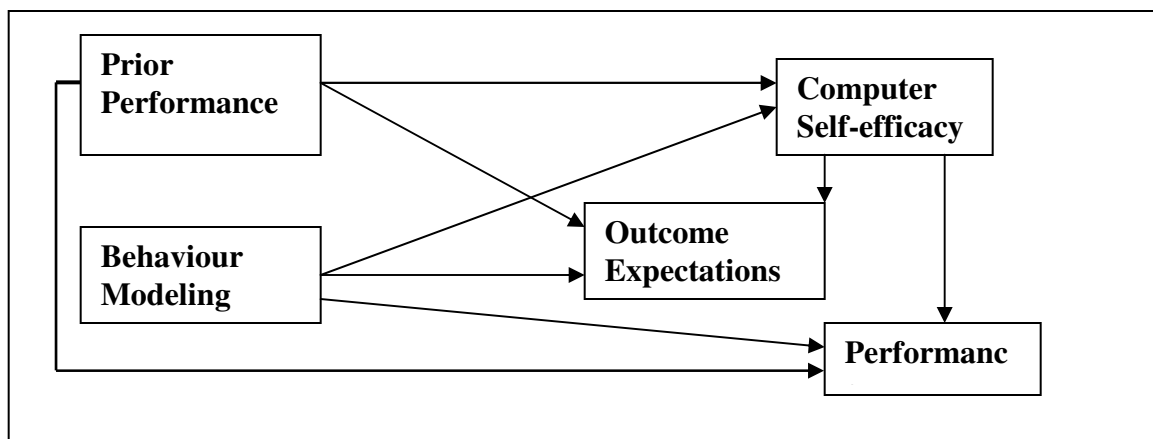


Figure 2-9: SCT Modelling Behaviour
Source: Compeau & Higgins (1995b)

Contrary to the authors' expectations, the result did not provide support for the model as presented; however, some aspects of the model received strong support while other aspects did not. Behaviour modelling, in general, had an important influence on self-efficacy, outcome expectations, and performance under some conditions. The modelling effect was only significant for Lotus training, yet subjects in the modelling condition for spreadsheets developed higher self-efficacy and exhibited higher training performance than those in the non-modelling condition. Modelling also influenced outcome expectations in two out of the four models tested. The impacts of self efficacy on both outcome expectations and performance were supported by the data but the outcome expectations-performance path was negative as if suggesting that individuals with high expectations exhibited lower performance. The authors blamed the time horizon over which outcome expectations and performance were measured as a possible explanation for these unexpected results. Prior experience had a significant impact on self-efficacy for Lotus training and on performance for both software packages. The authors acknowledged internal and external validity limitations and also acknowledged the research contribution in providing evidence of the mediating role of self-efficacy in explaining the influence of behaviour modelling on performance (Compeua & Higgins, 1995b).

Igbaria & Iivari (1995) introduced an extension to TAM by incorporating self-efficacy and its determinants (experience and organizational support) as an external variable affecting computer anxiety, TAM constructs (PEOU & PU), and usage of computer technology. The results confirmed earlier research on TAM which showed high internal consistency of PEOU & PU measures and their satisfactory discriminant validity. Additionally, results supported SCT perspective of computing behaviour. Self efficacy was found to play an important role in shaping individuals' beliefs and behaviours and results also supported Bandura's conjecture of experience as the most influential determinant of self-efficacy. Nevertheless and contrary to TAM, computer experience was found to have a strong direct effect on usage with total effect being second highest after the effect of PU. Computer experience and organizational support affected self efficacy, which had a significant direct effect on computer anxiety and PEOU. Results

suggested that PEOU plays an important role in mediating the relationships between PU and experience, anxiety, and self-efficacy.

An investigation of the possible influence of computer attitude and self-efficacy on behaviour intentions through TAM's constructs of PEOU and PU was carried out by Chau (2001). The two variables (self-efficacy and attitude) were added to the model as external variables but the proposed augmented TAM did not find a positive impact of computer attitudes on PEOU or PU. On the other hand, computer self-efficacy had a small negative effect on PU and no effect on PEOU. Nevertheless, the overall model explained half of the variance in behavioural intentions which, according to other research results (e.g., Igbaria & Iivari, 1995), is relatively higher (Chau, 2001).

Marakas et al. (1998) studied the computer self-efficacy (CSE) construct in a meta analysis of 40 papers written between the years 1987-1996, which were chosen after meeting certain criteria. The objectives were to present conceptual models of CSE at both general and task specific level and use the two models to proffer guidelines for both measurement and manipulation of the construct. According to literature review, CSE can be operationalised at both the general computing behaviour (GCSE) level and at the specific computer application level with the latter branching in the application environment (e.g., Windows 95) and a specific application (e.g., spreadsheet, database). Marakas et al. argued that the differentiation of CSE at these levels allows for the measurement of individual ability assessments on each level separately, and that GCSE and CSE are distinct theoretical constructs, and as such, cannot be treated interchangeably from either a measurement or manipulation perspective. Moreover, they argued that accurate measures or effective manipulation of the CSE construct to draw conclusions regarding the nature of change in perception requires a conscious effort made by the researcher to identify and control the effects of all known antecedents or consequent factors associated with CSE. In their efforts to present an integrated model of empirical findings that comprehensively defines the multifaceted nature of CSE in terms of its antecedents, consequents, and moderating factors, the authors grouped the various factors and issues in the following order:

- a) Initial or prior performance characteristics and attribution of cause.
- b) Task characteristics and situational support
- c) Perceived effort and persistence
- d) Vicarious experience, verbal persuasion, and feedback
- e) Computer anxiety, emotional arousal, and emotion-focused coping
- f) Assigned / self-set goals, anchors, and goal commitment
- g) Gender
- h) Age
- i) Time
- j) Direction following behaviour

Although most of Marakas et al.'s (1998) discussion about the above variables took a training design perspective in order to enhance CSE and construct measurement instrument, there are some reported relations that might be useful points of consideration for future research about SE construct. Marakas et al. reported a reciprocal relationship between CSE and performance; CSE increases and so does performance with improvement in successes and, in the same way, GCSE increases as indicated by the GCES model. In discussing attribution of causes, Marakas et al. pointed out that if any meaningful measure of change in CES is to be made, careful consideration should be given to the present task-relevant experience gained and test-pre-test must be ascertained (or should be used as a control variable). Marakas et al. criticised Compeau and Higgins's (1995) study for using a single perceptual measure of experience collected from each subject rather than assessing the subjects' skill sets using more objective measures. Moreover, the study reported the accepted negative relationship in SE literature between emotional arousal and SE performance and at high levels of arousal reduced computer performance is recognized. Further, anxiety experienced in relation to a task performance situation tends to generate further anxiety through an anticipatory self-arousal process. Thus, subsequent estimations of CSE are negatively impacted by this cycle of anxiety-producing experience with a computer.

Another interesting result revealed by the meta analysis is the gender-age effects on CSE. The salient gender-related factor in SE estimation was found to be the degree of

subject masculinity / femininity rather than biological gender per se. In addition, different studies found variation regarding age effect on CSE; some showed significance while others showed non-significance. Interestingly, however, a balance between male-female subjects was evident for those showing a significant relation whereas those which did not find significance tended to be gender imbalanced. This suggested that the gender effect regarding CSE might serve to mask other known effects of lesser effect size. The authors argued that any or several distinct factors can serve to influence the degree of any change in CSE, for example, CSE measures are subject to a *level effect* (in other words, once a certain level of CSE is attained, further manipulations yield smaller changes in subsequent estimations). Similarly, *variability* in work task knowledge and skill requirements can effect changes in CSE. If ability is more important than efforts, then generation of immediate changes in CSE will be limited; however, if performance is dependent on efforts, persistence or goal commitment, then immediate change in CSE could lead to immediate performance increase. Correspondingly, *locus* is another factor affecting changes in CSE (different individuals perceive determinants of performance in different weights or levels). Finally, *controllability* can affect changes in CSE; the more the individual believes that causes of performance are uncontrollable, the lower will be their estimation of CSE (Marakas et al., 1998). The authors developed a five step framework for use when developing a measure of CSE. The framework includes:

- All questions must **focus on the subject's perceived ability** to perform a specific task without regard to outcome expectations or derived benefits.
- All questions must elicit estimations of ability within a **task-specific** rather than a general context
- Specific questions must avoid ability assessments that include **cross-domain** or **general domain skills**.
- The **level of analysis (LOA)** of the requested estimation of perceived ability **must agree** with the level of analysis of the task and subsequent performance measure.
- The ordering of questions must **avoid inappropriate or unnecessary anchoring** with regard to perceived rather than actual increasing levels of task difficulty or complexity. (Johnson & Marakas, 2000)

Johnson and Marakas (2000) employed the derived model of the CSE construct proposed in 1998 by Marakas et al. and offered a replication for the original Compeau and Higgins study (1995b) regarding behaviour modelling effect on performance. Similarly, they introduced an extension to Compeau & Higgins' work by providing theoretical explanations for issues that contributed to the unexpected results and proposed a modified model that can accurately reflect both SCT and the constructs of interest.

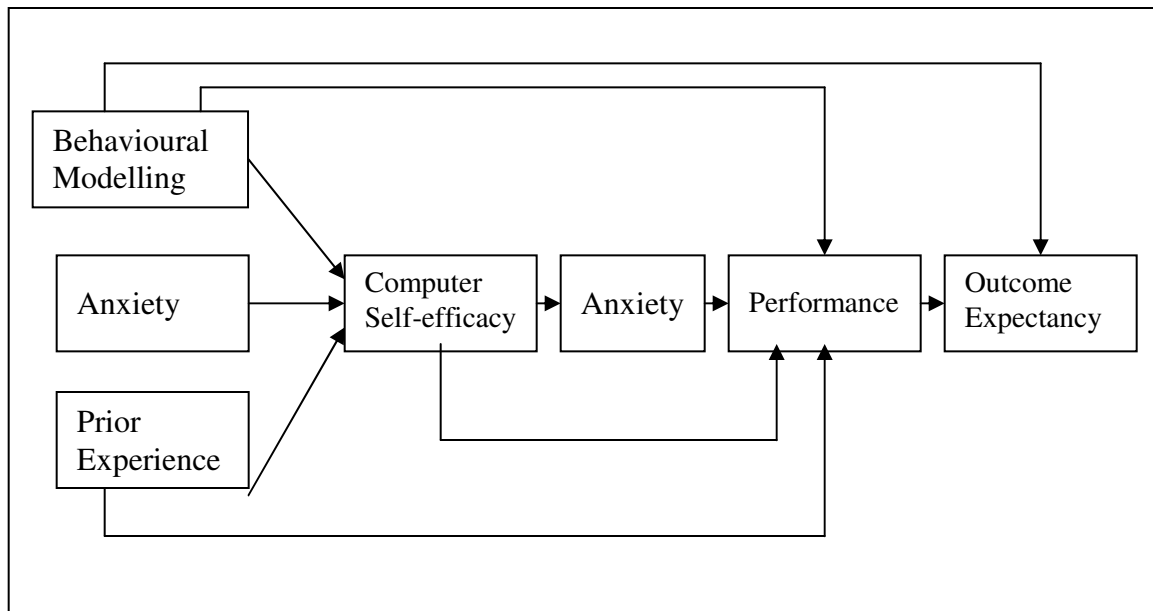


Figure 2-10: The Proposed Model (derived from Marakas et al. 1998)
Source: Johnson & Marakas (2000)

Johnson & Marakas noted that measuring of CSE after modelling refers to increases in performance due to modelling; however, some increase in performance might be enactive mastery and its influence on CSE. They attributed the non-significant and negative results found in Compeau & Higgins study (regarding word-processing training) to the effect of enactive mastery, which was neglected in the measurement of CSE.

The revised model supported the findings of the original study. However, comparing the two CSE measures used, each instrument captured a different level of change in CSE. The Marakas et al. measures were more effective at capturing changes in CSE throughout the experiment, being able to capture the relationship with prior experience to a great extent and to what they believed to be due to enactive mastery effect. On the other hand, the Compeau & Higgins measure was able to predict performance to a greater extent and was influenced more by modelling training, suggesting that their measure may be more

able to capture changes in CSE due to vicarious experience. The findings also confirmed that self-efficacy play an important role in the acquisition of computer skills. The authors suggested, based on the findings of both studies, CSE should be regarded as a critical variable when comparing multiple training methods or measuring any changes in acquired skills (Johnson & Marakas, 2000).

Drawing upon the conceptual ideas of Marakas et al. regarding GCSE and CSE, Agarwal et al. (2000) examined the development of self-efficacy beliefs over time within a software training environment using a longitudinal study. They cited published studies (1986-1996) and defined CSE antecedents and consequences reported in these studies. Antecedents included *social influences*, *demographic variables* (such as computer experience and prior performance) and *beliefs* related to self-perception of ability. Consequences included: *outcomes* (such as actual performance, satisfaction, and learning); *beliefs* (such as affect, anxiety, outcome expectations, ease of use and perceived behavioural control); and *behaviours* (such as system use and early adoption). Nevertheless, the authors decided to focus on individual personality traits: personal innovativeness with information technology (PIIT) (Agarwal & Prasad, 1998). Figure 2-11 illustrates the research model.

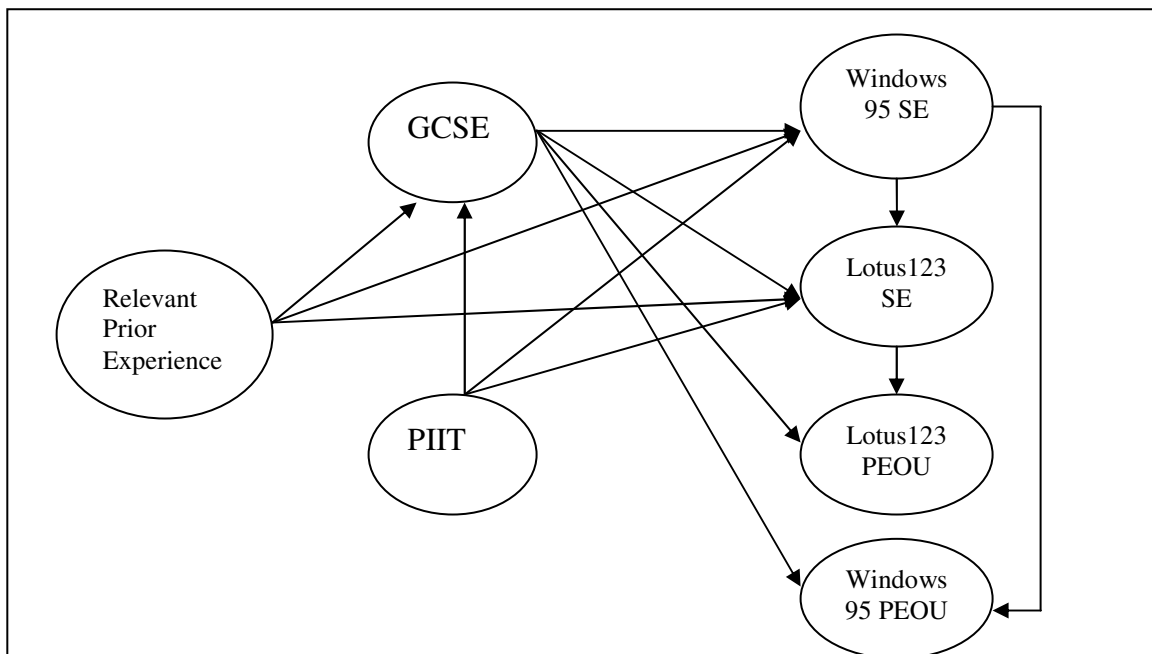


Figure 2-11: Research model of Agarwal et al. study
Source: Agarwal et al. (2000)

In their research model, prior experience stands as a controlling variable, the key dependent variable is beliefs about new technology (or perceived ease of use). The authors hypothesized that within a training context, pre-training general computer self-efficacy (GCSE) would be a predictor of software-specific-self-efficacy (SSE) developed through the training imparted, and, after controlling for prior experience and pre-training GCSE, post training SSE beliefs developed after training on the first software package would influence post-training SSE beliefs developed with the next software package in the training sequence. In addition, they hypothesized that personal innovativeness in the IT domain would influence pre-training GCSE beliefs as well as post-training SSE beliefs with specific software and after controlling for GCSE, SSE for a specific package would influence the PEOU of that software package.

The finding showed that GCSE beliefs have a significant influence on SSE beliefs and SSE beliefs developed with the first package of software tend to significantly influence SSE beliefs about subsequent packages (carryover effect) and become the major predictor of beliefs about PEOU of subsequent software. Therefore, the accumulated SSE beliefs with different software packages begin to displace the effects of GCSE beliefs that the individual possessed at the beginning of the training sequence. Moreover, the results showed that prior experience had a significant effect only on GCSE, and not on SSE for either software packages (an unexpected result) and that PIIT was significantly related to GCSE beliefs and SSE beliefs for one software package and not the other, implying a need to further refine the conceptualization of PIIT or conduct additional studies to ascertain similar patterns of effect (Agarwal et al., 2000).

2.8.3 The Linkage between SCT and DOI Theory

Bandura in 2006 wrote a chapter on the integration of social cognitive theory and social diffusion theory (referring to Rogers' Diffusion of Innovation Theory). He states:

“Social cognitive theory distinguishes among three separable components in the social diffusion of innovation. This triadic model includes the determinants and mechanisms governing the acquisition of knowledge and

skills concerning the innovation; adoption of that innovation in practice; and the social networks through which innovations are promulgated and supported” (Bandura 2006, p 119).

According to Bandura, the revolutionary advances in communications and Internet technology are changing how knowledge is acquired and thus, altering the social diffusion processes. Video systems feeding off satellite communication are dominating the dissemination of symbolic environments. New ideas, values, and behaviour styles are being rapidly diffused on a global scale. Moreover, the growth in electronic media has increased the role of observational learning in peoples’ lives especially the symbolic modelling functions as a key tool in innovation diffusion particularly in the early stages.

In applying the observational learning process to innovation diffusion, Bandura states that observational learning is governed by three sub-functions: attentional, representational, and productive processes. Through the attentional process, an individual selects what to observe in the profusion of modelling and what information to extract from the ongoing modelled event. An individual’s capacity to learn by observation depends on his/her cognitive skills, perceptions, and value preferences. Thus, due to these variations in individuals’ orientations, individuals are not equal in their rate of adoption. Another factor related to observational learning is the model affect; modelling affects acquisition and receptivity to innovations in several ways. One approach is demonstrating or describing new ways of thinking and behaving. Modelled benefits may accelerate diffusion simply by weakening the restraints of the more cautious potential adopters. Models also can alter the observers’ values by displaying preferences and evaluation reactions. Thus, models not only exemplify and legitimate innovations; they also serve as advocates of innovations through encouraging others to adopt them.

With the many media options, individuals can access an unlimited variety of modelled attitudes, values, beliefs and styles of behaviour in the comfort of their homes/ offices. Using Internet posting, blogging, and podcasting they have unrestricted access to virtually all life aspects of models and they can take part in that world and become models for others. Bandura states that , to be a member in the virtual world, an individual needs to have a robust sense of efficacy, and self-directive capacity to access, process,

and evaluate the huge amount of information provided on the Internet; SCT provides guides for building such personal efficacy and the cognitive skills needed to utilize this media productively and creatively.

Bandura also refers to the value of the Internet as a means to expand access and build social networks for creating knowledge among members through collaborative learning (SCT agentic perspective distinguishes among three modes of human agency: personal, proxy, and collective (Bandura, 2001)). However, he acknowledges that human agency does not come with a built-in value system and Internet freelancers can also use the unfiltered forum to propagate hate and to mobilize support for detrimental social purposes.

Another major component in Bandura's triadic model is the personal factors which determine whether people will adopt in practice what they have learned by observation. Bandura stresses that unless people believe they have the efficacy to do what is needed to gain the expected benefits of a given innovation, they have little incentive to adopt or continue to adopt in the face of any difficulties they might encounter. Therefore perceived self-efficacy is a key factor in adopting new technologies. Bandura believes that activities which exceed perceived capabilities appear complex while activities that are perceived to fall within capabilities are viewed as doable; and that peoples' belief in their personal efficacy varies across diverse types of innovations. Furthermore, perceived self-efficacy influences the adoption of new technologies whether meant for household, leisure, or workplace utilization; and operates at both pre-purchase and post-purchase stages of the buying decision process.

Bandura also ties the adoption decision to incentive motivators; in SCT, incentive motivators take three forms: material, social, and self-evaluative. In the adoption process, material incentives take the form of tangible benefits or created outcome expectations. Here, the effect of the Model attitude on other prospect adopters can work in three dimensions: advocate, dissuade, and dampen intentions. Social incentive refers to the fact that many innovations serve as a mean to gain social recognition and status. People who strive to distinguish themselves from the common and the ordinary tend to adopt new styles in clothing, grooming, recreational activities and forms of conduct in

order to achieve distinctive social standing. Adoptive behaviour is also partly governed by self-evaluative reactions. People adopt innovations that are compatible with their value system and self-concept and resist those that violate their social and moral standards or conflict with their self-conception.

The structure of the social network is the third key component that affects the diffusion process. Networks differ in the number and patterns of structural linkages between clusters. The role played by members differs according to their position and the status they occupy in any network. One individual could be engaged in more than one network and, as a result, might play a different role in each. Networks serve as a channel through which individuals get to know about innovations and convey information regarding new ideas. Different innovations attract different networks; and one innovation might be carried out through different sets of networks through its diffusion process. Hence, an individual with many social ties is apt to adopt innovations faster than someone with few ties and as one's personal network increases, so does his/ her adoption rate.

Bandura advocates that the course of diffusion is best understood by understanding the interactions among psychological determinants of the adoption behaviour, the attributes of innovations that might hinder or enhance adoption and the network structures that provide the social pathway of influence.

Next a discussion of the motivational model theory is presented; it makes ties with Davis' technology acceptance model and self-determination theory (SDT).

2.9 The Motivational Model (MM)

Motivation research has yielded many theories. Self-Determination Theory (SDT) by Deci and Ryan (1985) posits that self-determination is a human quality that involves the experience of choice, having choices and making choices. Deci et al. (1991) differentiate between the tenet of SDT and other theories claiming that SDT distinguishes between self-determined and controlled types of intentional regulation. They stated that motivational actions are self-determined to the extent they are engaged in wholly

volitionally and endorsed by one's sense of self, whereas actions are controlled if they are compelled by interpersonal or intra-psychic force. When behaviour is self-determined, the regulatory process is choice, but when it is controlled, the regulatory process is compliance. Another point of differentiation, SDT addresses the energization and direction issue of behaviour which was neglected by previous theories. SDT postulates that individuals have innate human needs of:

competence which involves understanding how to attain various external and internal outcomes and being efficacious in performing the requisite actions;

relatedness which involves developing secure and satisfying connections with others in one's social surroundings; and

autonomy (or self-determination) which refers to being self-initiating and self-regulating of one's own actions.

Thus, the satisfaction of such needs contribute to the notion of people being motivated (as apposed to amotivated). However, the satisfaction of the autonomy need is necessary for people to be self-determined rather than controlled (Deci et al., 1991). Behaviour can be seen as intrinsically or extrinsically motivated. Intrinsically motivated behaviours are the type an individual might engage in for the pleasure and satisfaction derived from performing them without expectation of material rewards. On the other hand, extrinsically motivated behaviours pertain to a variety of behaviours that are engaged in as means to an end and not for their own sakes (Vallerand and Bissonnette, 1992). According to Deci and Ryan, there are four types of extrinsic motivation which can be ordered along a self-determination continuum. They are: **external, introjected, identified and integrated** form of regulation. Their argument around these types was built on the concept of internalization, defined as a proactive process through which people transform regulation by external contingencies into regulation by internal processes (Deci et al., 1991). In other words, internalization refers to people's "taking in" a value or regulation, and integration refers to the further transformation of that regulation into their own so that, subsequently, it will emanate from their sense of self. Internalization and integration are relevant for the regulation of behaviours across the life span. In nearly every setting people enter, certain behaviours and values are prescribed, behaviours that are not of interest and values that are not spontaneously adopted.

Accordingly, SDT has addressed the issues of (a) the processes through which such non-intrinsically motivated behaviours can become truly self-determined, and (b) the ways in which the social environment influences those processes (Ryan and Deci, 2000).

Apart from intrinsic and extrinsic motivation, Deci and Ryan (1985) claim that a third construct (amotivation) must be considered to fully understand human behaviour. Individuals are amotivated when they perceived a lack of contingency between behaviour and outcomes or when there is an experience of incompetence and lack of control. Amotivation behaviour is neither intrinsically nor extrinsically motivated. Self-Determination Theory proposes that psychological needs and the social environment will determine one of many potential motivations. Each different motivation can have varied effects on our thoughts, behaviours, and feelings. These motivations are believed to fall along a single continuum and are all connected with each other (Deci and Ryan, 1985). According to SDT, amotivation is the first and lowest category on the continuum; the next category is extrinsic and the last is intrinsic which is considered the ideal motivation as one is said to be operating in a self-determined fashion, or internally centred (Ryan & Deci, 2000). Figure 2-12 shows the type of motivation styles as indicated by SDT.

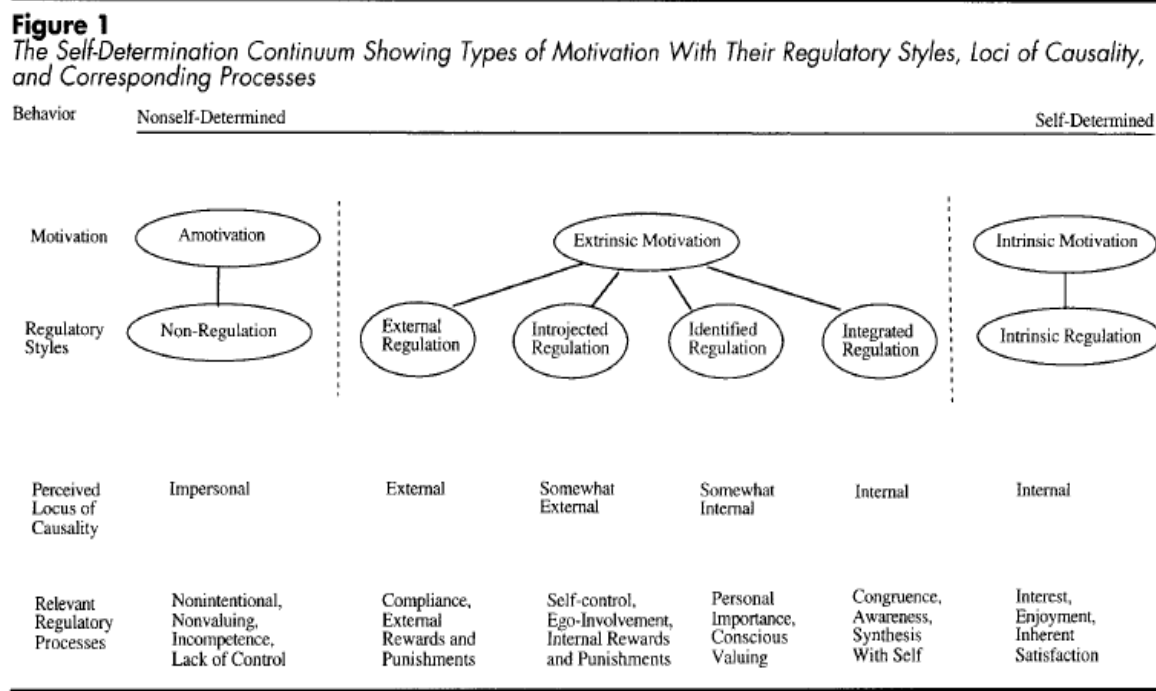


Figure 2-12: Deci & Ryan's Self-Determination Continuum

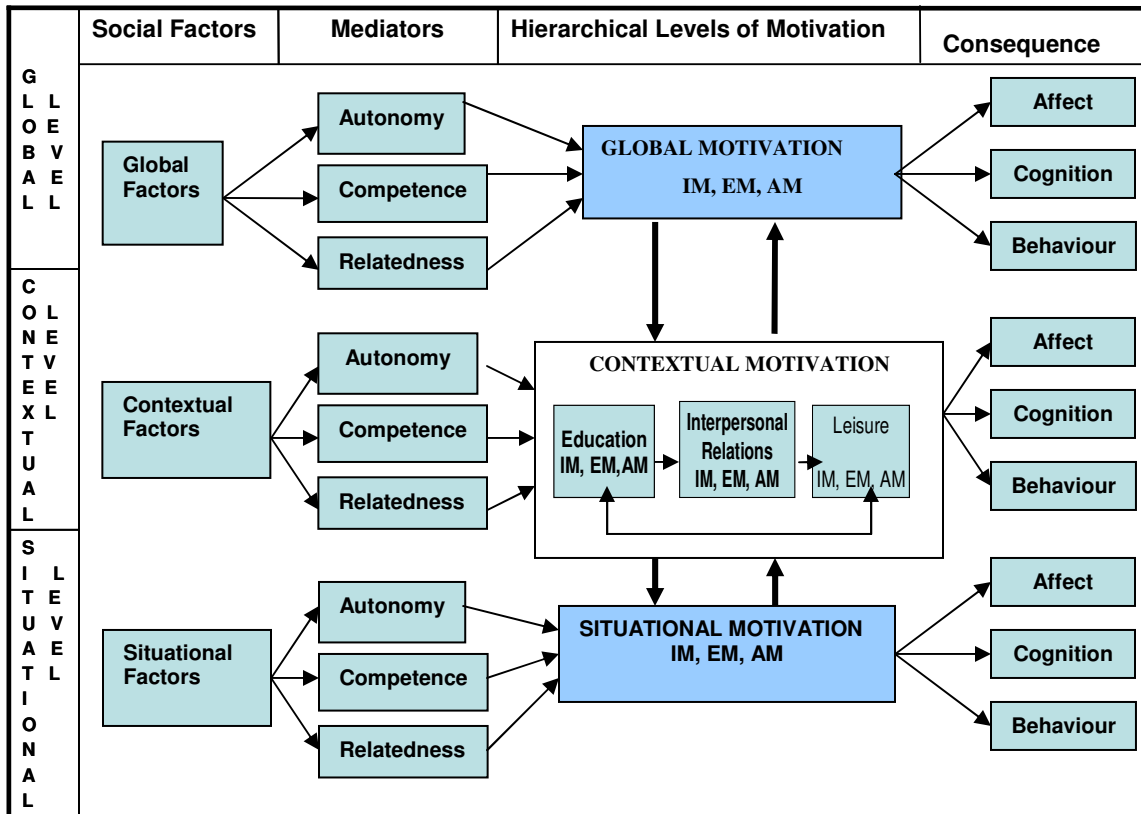
Source: Ryan and Deci (2000)

SDT has evolved over the years (1975-2000) in the form of mini-theories. It comprises four mini-theories: the first, *Cognitive Evaluation Theory (CET)* was formulated to describe the effect of social contexts on people's intrinsic motivation. CET describes contextual elements as autonomy supportive (informational), controlling, and amotivating; and links these types of contextual elements to the different motivations. The second, *Organismic Integration Theory (OIT)* concerns internalization and integration values and regulations. OIT was formulated to explain the development and dynamics of extrinsic motivation; the degree to which individuals experience autonomy while engaging in extrinsically motivated behaviours; and the processes through which people take on the values and mores of their groups and culture. The third, *Causality Orientation Theory (COT)* was formulated to describe individual differences in people's tendencies to orient toward the social environment in ways supporting their self-determination. COT allows for prediction of experience and behaviour from enduring orientations of a person. Finally, *Basic Needs Theory (BNT)* was formulated to explain the relation of motivation and goals to health and well-being. This was done in part by describing associations of value structure and regulatory styles to psychological health across time, gender, situations, and culture (Deci and Ryan, 2002).

In 2000, Vallerand expanded Self-Determination Theory into the Hierarchical Model of Motivation. This model defined motivation along the same SDT continuum, but posited that motivation operated at three levels. These were the global (personal) level, the contextual (domain) level, and the situational (state) level.

Vallerand in a comparison between Deci & Ryan's SDT and his hierarchical model of motivation, acknowledged a large degree of agreement between the two. However, he underscored some areas in which the two models differ:

- *The importance of a hierarchical structure of motivation process*
- *The role of psychological needs in the motivational sequence*
- *Individual differences in needs*
- *The different role of the need for relatedness (Vallerand, 2000).*



IM = Intrinsic Motivation, EM = Extrinsic Motivation, AM = Amotivation

Figure 2-13: The Hierarchical Model of Intrinsic and Extrinsic Motivation

Source: Vallerand (2000)

The motivation model posits that motivation must be considered from multidimensional perspectives. Vallerand proposes five postulates that are vital to the hierarchical model. The first indicates that all three motivations (IM, EM, and AM), which play a critical role in an individuals' psychological processes, should be examined when measuring motivation. The second postulate states that these motivations (IM, EM, and AM) exist in each individual at the global, contextual and situational levels. The third postulate states that motivation at any level results from two sources: social factors and environmental conditions; and, the motivation transferred between levels. In other words, global motivation can affect contextual motivation which can influence situational motivation. Vallerand also assumes that the impact of social factors is mediated at each level by perceptions of competence, autonomy, and relatedness. The fourth postulate indicates that there is a recursive effect specifically from a lower level to the level above. The final

postulate states that motivation leads to important behavioural, cognitive, and affective consequences (Vallerand, 2001)

2.9.1 The Motivational Model and Technology Acceptance.

Davis, Bagozzi and Warshaw (1992) tested the motivational model of technology acceptance based on Deci's extrinsic and intrinsic motivation and found them to be key drivers of an individual's intention to perform the behaviour of technology usage. Davis's study was about extrinsic and extrinsic motivation to use computers in the workplace. From this perspective:

- Extrinsic motivation to use a technology in work will be supported by expected or anticipated reward (e.g., raise or bonus) provided that the technology is perceived as useful in achieving these goals.
- Intrinsic motivation to use technology refers to the perceived enjoyment of using the technology regardless of the performance outcome that might be obtained.

The findings showed that people's intentions to use computers at the workplace are influenced mainly by their perceptions of how useful the computers are for improving their job performance, and secondarily by the degree of enjoyment they experience using them. The study also pointed out that the positive interaction observed between usefulness and enjoyment implies that enjoyment has a greater effect on intentions when computer systems are perceived to be more useful. In other words, increasing the enjoyability of a system would enhance the acceptance of useful systems but have less of an effect on acceptance of useless systems (Davis et al., 1992).

Igbaria et al. (1996) integrated and examined the relative influence of the three motivators, perceived usefulness, perceived playfulness or fun and social pressures, on an individual's decisions to use microcomputers. Their conceptual model was based on the motivational model in Figure 2-14

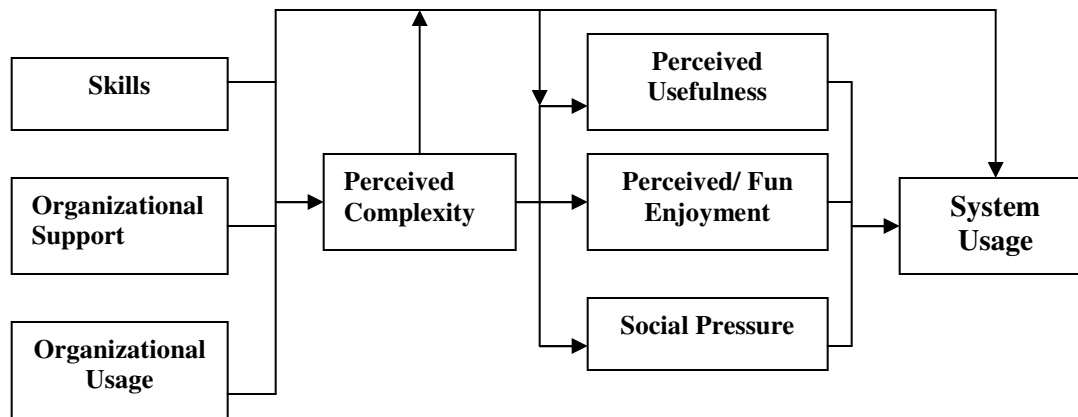


Figure 2-14: The Motivational Model of Microcomputer Usage.
 Source: Igarria et al. (1996)

The findings confirmed previous results regarding the key motivating role of PU in promoting technology usage (microcomputers in this study). The results also indicated the incentive properties of anticipated enjoyment and normative social pressures in stimulating usage. Additionally, results indicated moderate to strong support for the proposed linkages among the model variable. Perceived complexity was a key intervening variable linking the antecedent variables, skills, organizational support and usage, with perceived usefulness, perceived enjoyment, and social pressure; and its direct effect on usage. The authors acknowledged that the model only explained 28 per cent of the variance in usage and that the unexplained 72 per cent suggest the need for additional research to incorporate other potential measures such as self-efficacy, user involvement and participation, and task characteristics.

Venkatesh (1999) compared traditional training methods with training methods that include a component aimed at enhancing intrinsic motivation. He stressed the importance of improving training methods during the early stages of learning and using the technology to foster the ease of use which should lead to acceptance and usage. Based on previous research in psychology which suggested that intrinsic motivation during training leads to beneficial outcomes, and the insufficient attention given in IS research to this aspect (instead emphasis was on imparting knowledge to potential users), Venkatesh investigated the effect of playfulness during the training session on causing positive perceptions about the ease of use of the tangible technology among trainees. Using a

game-based- training approach and the technology acceptance model (TAM) of Davis (1989), the findings showed that users in the game –based training intervention, when compared to those in the traditional training intervention, had a more enjoyable experience during training and were more likely to perceive the system to be easier to use, which lead to enhanced behaviour intention to use the technology. They were also more strongly influenced by perceived ease of use (PEOU), compared to perceived usefulness (PU), in determining behavioural intentions. This result contradicts prior TAM research and suggests, according to Venkatesh, that the appropriate priming of users increases the salience of PEOU, and that PEOU effect on behavioural intention is different depending on the type of training intervention; thus, suggesting that the PEOU - behavioural intention relationship is moderated by training. Nevertheless, Venkatesh recommended additional research to carefully examine how different constructs may interrelate with such results.

Venkatesh and Speier (1999) built on Davis et al.'s results and investigated the role of mode as an external variable in the motivational model of Davis et al. (1992). In particular, the study investigated how positive and negative mood state during training is likely to influence employees' motivation to use specific computer technology taking into consideration the affect of situational and social factors on motivation as stated by Vallerand's hierarchy model. Venkatesh & Speier relied on literature which indicated that in regard to computer technology training an individual's perception of enjoyment of use of technology is likely to be influenced by mood. Furthermore, positive moods, in general, have been shown to enhance perceptions of a given task and satisfaction resulting in increased intrinsic motivation. On the other hand, negative moods bring individuals to be less motivated to perform well in demanding tasks, more pessimistically assessing themselves or their knowledge and other relevant aspects of the situation including external resources. Venkatesh & Speier also investigated the long term effect of mood on computer usage after training and its sustainability. The longitudinal nature of their study dictated measurement at four points in time: pre-experiment, post training, after six weeks of continued use and after twelve weeks of continued use. The pre-experiment measurement was focused on gathering information regarding a participant's

mood, computer self-efficacy, work experience, prior computer experience and demographic information. Post training measurement included mood, user reaction to technology, and a knowledge test. Measurement of after training periods included collecting information similar to post-training, in addition to perceptions of usage and actual usage behaviour measures. The experimental approach was applied using a control group and videos to test the effects of positive and negative moods on trainees in three different offices of a participating organization. The findings indicated that positive moods at the time of training resulted in short term increases in intrinsic motivation and intention to use the technology, however, these effects were not sustained over the period of six weeks. On the other hand, negative moods at the time of training resulted in decreased intrinsic motivation and intentions to use the technology in the short term and these effects persisted six weeks later, even after active use of the technology (Venkatesh and Speier, 1999).

In a successive study, Venkatsh, Speier and Moris (2002), reanalyzed the data from both earlier studies (Venkatesh 1999; Venkatesh and Speier, 1999) to develop an integrated model of technology acceptance. The integration aimed at extending the knowledge by integrating core concepts of technology acceptance and motivational models and examining them longitudinally; understanding the role of pre training and training interventions, “user acceptance enablers” (UAEs) as termed by authors, in the context of the integrated model; and, empirically testing the new model to compare its explanatory power with existing models. The authors, building on previous research, built their research model as shown in Figure 2-15.

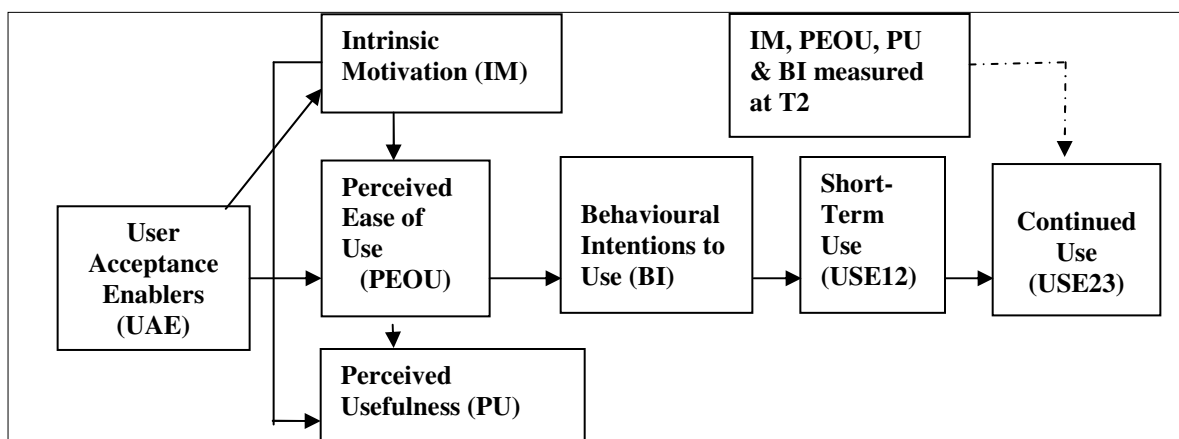


Figure 2-15: The proposed integrated model of technology acceptance and motivational model
Source: Venkatesh et al. (2002)

In order to test the proposed model, data from both previous studies were analyzed and pooled. A structural equation modelling (SEM) technique was used to analyze the data. SEM results supported the hypothesized influences: IM would influence PEOU and PU; PEOU would influence PU; and IM, PEOU, and PU would all have significant positive effects on BI, however, there was partial support for the last hypothesized relationship. IM was found to affect BI indirectly through both PU and PEOU. The authors claim this indirect role of IM is a critical one in understanding short-term acceptance or rejection decisions of new users. As for the longitudinal effect, only immediate use was a significant predictor of continued use. Eventually, the authors highlighted the importance of early perceptions (i.e., short-term) formed immediately following training and how critical they are for both continued usage and acceptance decisions. Therefore, managers should consider training as an essential component in the technology acceptance equation (Venkatesh et al., 2002).

The self-determination theory motivational model (extrinsic versus intrinsic motivation) has a conceptual link to technology acceptance as seen in the work discussed earlier. The IS domain has yet another theory to explain technology acceptance: the Model of PC Utilization, which was derived from the Psychology field specifically the work of Triandis.

2.10 The Model of PC Utilization (MPCU)

Inspired by the lack of consensus or synthesis among different disciplines in describing the relationship of attitude, values, and other acquired behavioural dispositions to act or behave, Triandis (1979) presented a framework to describe how behaviour occurs and what variables induce human behaviour. The framework included variables that are general and abstract enough to be relevant to any investigation in any culture. Triandis described *behaviour* having objective *consequences interpreted* inside individuals and causing them to feel *reinforced*. He argued that reinforcement affects the *perceived consequences* of the behaviour in two ways: it changes the *perceived probabilities* of the behaviour (that the behaviour will have particular consequences); and, it changes the *value of these probabilities* (upon which, intentions to behaviour are determined). In

Triandis' framework, there are other determinants of behaviour such as habit; relevant arousals (caused by genetic / biological factors or interpretation of past history); facilitating conditions; personality or individual perceptions of subjective culture variables (norms, roles, and values) and social factors; and previous experiences of the individual with particular behaviours resulting in an affect on the behaviour which leads to intentions. Figure 2-16 illustrates some of the relations in Triandis' framework.

According to Triandis, behaviour has many actual consequences and only some of them are perceived by the individual. He distinguished between perceived consequences and actual consequences. The first are those anticipated by the individual and the second are those that occur after the behaviour has taken place and are interpreted by the individual as desirable or undesirable depending on the total evaluation of the situation.

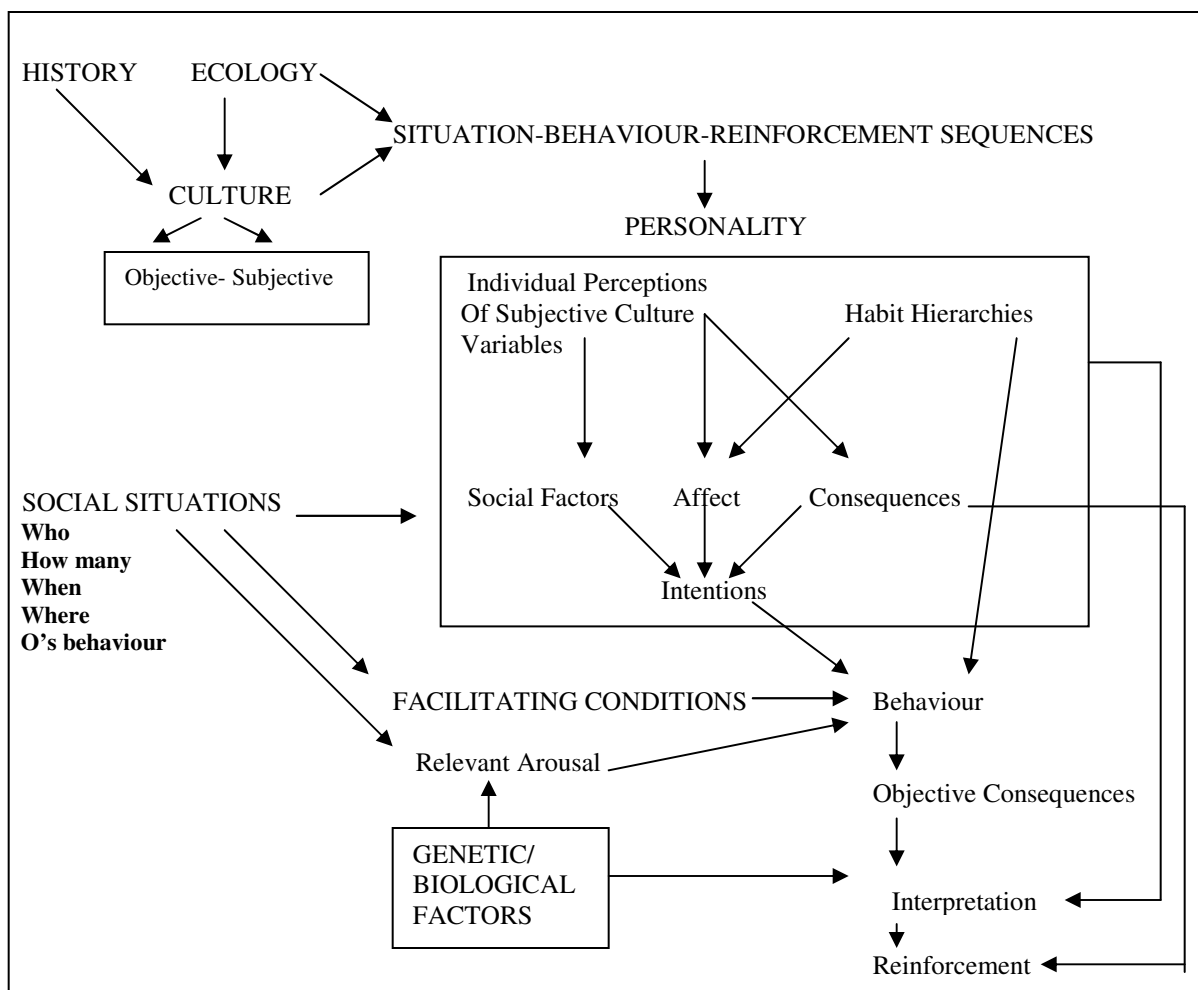


Figure 2-16: Triandis' theoretical framework
Source: Triandis (1979)

Interpretation of consequences depends on how many values are considered important by the individual: the more the number, the more flexible the interpretation. Triandis thinks that values interact with the situation to lead to particular interpretations of the consequences of one's actions. Furthermore, he believes that the behaviour-consequence-reinforcement sequence is likely to result in revisions of both perceived consequences and their value. When a particular consequence occurs unexpectedly, the individual is likely to see a higher probability of connection between behaviour-consequence (the same is true for consequences that were expected but did not materialize). Also, the value assigned to the consequences of behaviour is often different before and after it is experienced. Triandis believes that the behaviour-consequence-reinforcement sequence feeds back into the person-system.

The framework emphasised important cultural aspects such as education, abundance of resources and distribution of resources, and cultural complexity in developing an individual's behaviour. Triandis proposed framework indicated that attributes of ecology-culture-society determine attributes of persons (attributes and values), which determine their behaviours; and depending on the outcomes of this behaviour, attitudes and values change (Triandis, 1979).

Based on Triandis proposed framework, Thompson et al. (1991) conducted an initial test of a model of personal computer (PC) utilization using a subset of Triandis' framework. In their model, the authors implied that utilization of a PC would be influenced by individuals' feelings (affect) toward using PCs, social norms, habits, the expected consequences, and the facilitating conditions. They examined the direct effects of social factors, affect, perceived consequences, and facilitating conditions on behaviour. Behavioural intentions were excluded because actual rather than predictive use was of interest and habits were excluded from the model because of measurement issues. The model testing took place at one organization and for that, the dimensions of perceived consequences for utilizing personal computers at the work place included two near-term consequences (complexity and job fit) and long-term consequences such as planning for the future.

The sample was exclusive to professionals and managers who use PCs in their jobs voluntarily (as opposed to being required to do so). The findings showed that social factors, complexity, job fit, and long-term consequences had a significant effect on PC use while affect and facilitating conditions showed no such influence. Explaining the results, the authors indicated that PCs are seen as tools by managers so the affect aspect does not apply here; as for the facilitating conditions, the authors indicated a measurement issue.

Later in 1994 Thompson et al. extended their work of 1991 by considering the role of experience with personal computer usage. Experience was modelled with direct, indirect, and moderating influences. Figure 2-17 illustrates the relationships proposed in the conceptual model.

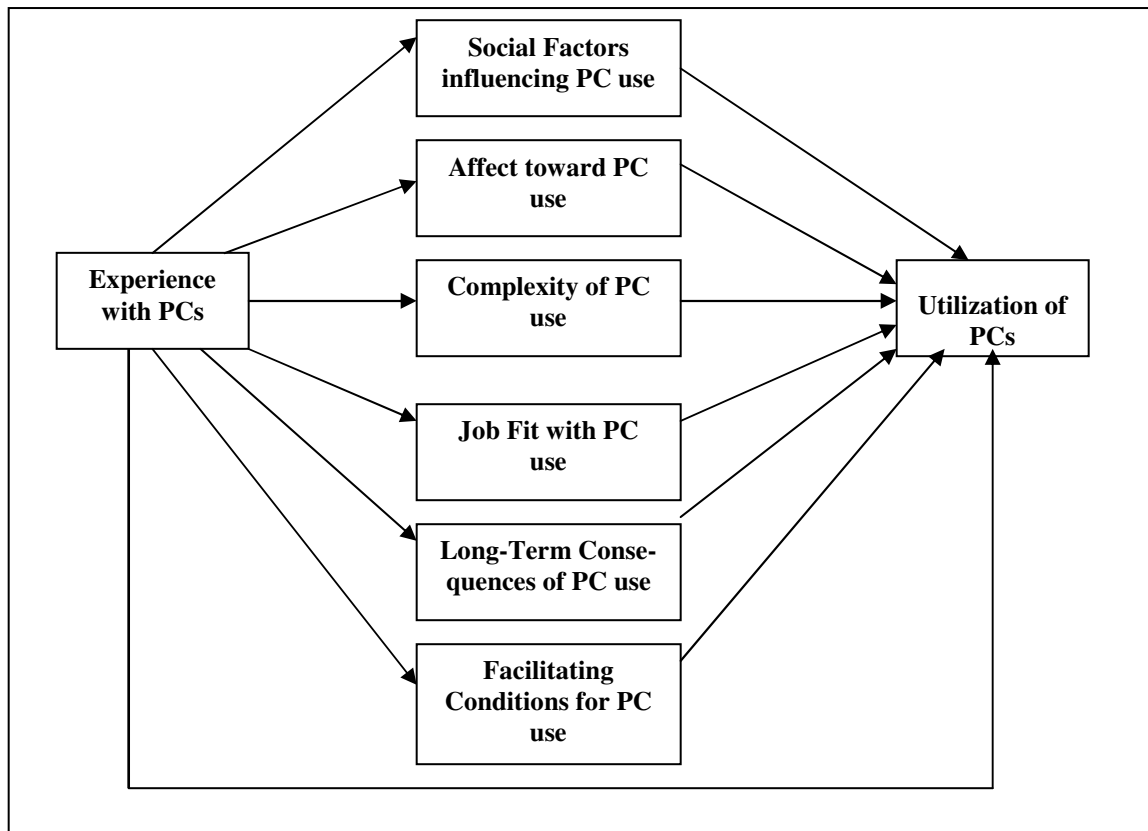


Figure 2-17: Factors Influencing the Utilization of Personal Computers
Source: Thompson et al. (1994)

The limitations acknowledged in the previous study were rectified in the latter (e.g., this sample covered eight organizations in different industries). The findings provided support for those obtained in previous research and also showed that the direct influence of

experience on utilization was both statistically and substantively significant, which confirms with belief that past use would be expected to influence current use directly. Conversely, the indirect effect was generally small through any given belief component which implies that little information was gained with respect to additional prediction of behaviour. However, the moderating influence of experience on the relations between the antecedents (except for job fit construct) and utilization was generally strong. For inexperienced respondents, social factors and affect had a stronger influence on utilization of PC than for experienced respondents, while experienced respondents showed a stronger effect of long-term consequences on utilization. The unexpected result was that both inexperienced and experienced showed the same effect of job fit construct on PC utilization. The authors recommended that at the introduction period of a new IT, the following should be stressed: the need for applications to current job (job fit); professional development (social norms); ease of use (complexity); and positive feelings towards the technology (affect). On the other hand, as experience grows both individuals and organizations should shift their emphasis on applications to current job, future benefits, and professional development (Thompson et al., 1994).

Pare and Elam (1995) attempted to identify the factors which influence the decision by knowledge workers (discretionary users) to use personal computers (PCs) on an on-going basis. They replicated and extended Thompson et al.'s (1991) study which was the initial test of a model of PC utilization using a subset of Triandis' framework. In their framework, the authors chose to include attitudinal beliefs as a determinant for PC usage based on Triandis' work of 1971 and his argument of the separation of the cognitive and affective components of attitude. They decomposed the affective component into enjoyment and anxiety hypothesizing a path from belief (the cognitive component) to both enjoyment and anxiety. Facilitating conditions was composed into two types: organizational and departmental. Habits were not operationalised but rather explained as the frequency of routine behaviours related to PC usage (e.g., daily checking of e-mail) as well as computer-related activities such as consulting computer-oriented magazines and watching TV documentary programs on computers, revealing the individual's inherent

interest in computers. For this reason, the causal link between habits and affect, which was in the Triandis' original model, was not suitable for their study.

The findings showed that perceived consequences (in particular, perceived usefulness which resembles job fit in Thompson et al.'s 1991 study), affect (anxiety), internal belief and habit were the dominant predictors of computer usage; while social norms, organizational facilitating conditions, and resource proximity (a subset of departmental facilitating conditions) were of less importance. Contrary to Thompson et al.'s findings, this research found a positive and significant relationship between facilitating conditions and PC usage (Pare and Elam, 1995).

Bergeron et al. (1995) applied Triandis' framework of value, attitude, and behaviour to explain Executive Information System (EIS) adoption behaviour. The authors focused on a subset of the model included six variables: habits, perceived consequences, affect, social factors, facilitating conditions and behaviour. Habit was operationalised by assessing the individual's experience with the EIS, and perceived consequences of EIS use on the executive's work; affect was constituted by the person's satisfaction with the information provided by the system, with the ease of access and with the assistance the person received. Social factors were operationalised by measuring the individual's work group influence. The availability of a hotline to help executives in their use of the EIS, as well as the degree of sophistication of the EIS constituted the facilitating conditions. Finally, behaviour was operationalised by measuring frequency of EIS use and internalization of use. EIS experience was used as a proxy for habits. Executives who had been using organizational applications for a greater length of time were seen to have better attitudes in terms of user comprehension and participation.

Results indicated that internalization of EIS use is a more appropriate measure of behaviour than frequency of EIS use. Thus, the behaviour of EIS users is determined in order of importance by: the perceived consequences of using EIS, the affect component, social factors (work group influence in regard to EIS), habits (EIS experience) and by facilitating conditions (the sophistication of EIS products) (Bergeron et al., 1995)

An extension of Triandis' model (the subset of the model which indicates that intentions towards behaviour is a function of affect, social factors, and perceived consequences, while behaviour is a result of intentions, habit and facilitating conditions) was presented by Chang and Cheung (2001). Based on previous studies (Thompson et al., 1991; 1994), the authors modified and extended the model for the purpose of comparison and assessment. The research model combined the original Triandis' subset model and the three perceived consequences (near-term, long-term and complexity) adopted from Thompson et al.'s work. Additionally, the authors hypothesized a direct path from facilitating conditions to intention (in the Triandis' original model the path was from facilitating conditions to behaviour). The authors compared three different sets of the model:

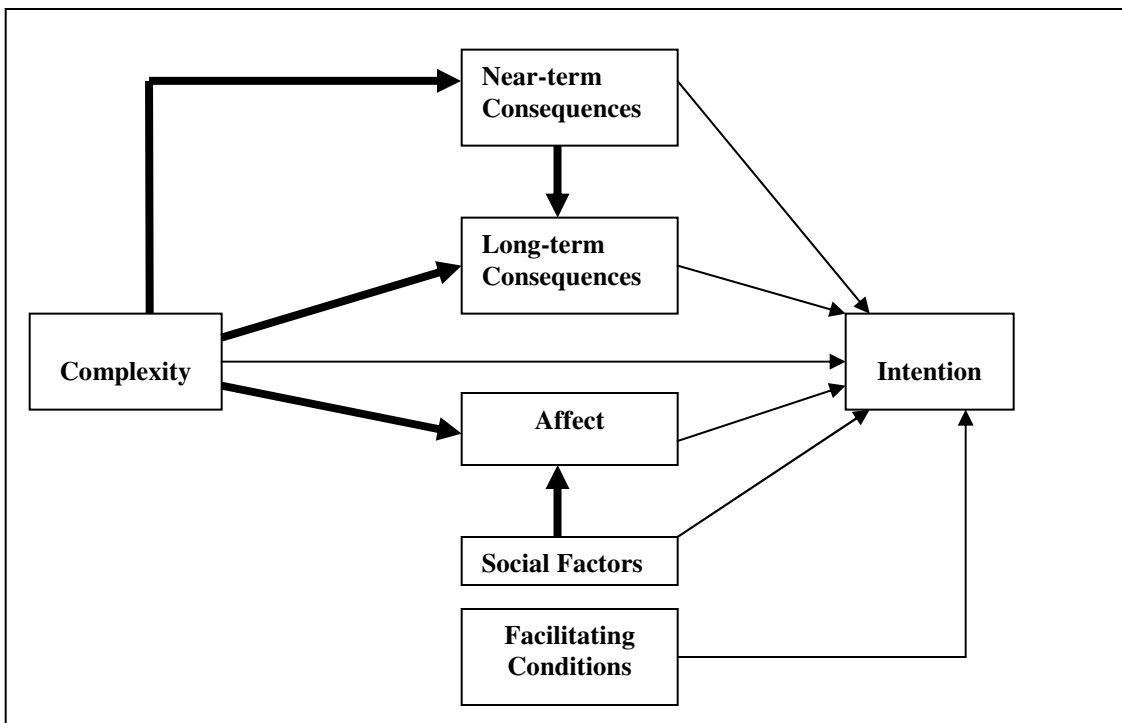


Figure 2-18: Triandis' Extended Model of Choice
 Source: Chang & Cheung (2001)

The first model, included Triandis' original subset as adopted from Thompson's work, where affect, social factors and consequences (as decomposed by Thompson et al.) directly affect intention.

The second included the first model plus the direct path from facilitating conditions to intentions.

The third included the first and second plus a direct path from complexity to near-term consequences, long-term consequences, and affect, in addition to a direct path from social factors to affect and from near-term to long-term consequences (the thick arrows in Figure 2-18).

The findings showed that although the theoretical constructs in the first model were useful in explaining intention to use the Internet/www, it did not fit the data well. The third model provided a better fit. The additional paths were all significant except for the one from complexity to long-term consequences. The authors stated: “the new model shows the interrelationships among the determinants; thus, provides a better picture of the dynamics of intention formation” (p9). However, the relative weight of factors affecting the intention to use is different; the study found the affect construct the most important determinant of intentions to use the Internet/www but second to social factors, when direct and indirect paths are considered, followed by near-term consequences and facilitating conditions. Complexity was found to have no direct effect on intentions but it did affect intention indirectly through its effect on perceived near-term consequences and the affect constructs (Chang and Cheung, 2001). It is worth mentioning that Cheung et al. (2000) ran the same test for the proposed extension of Triandis’ model and the results were completely different. The construct of facilitating conditions was found to be the most important factor affecting Internet and www usage, followed closely by social factors. Complexity had a direct negative impact on Internet usage, as well as an indirect impact through its effect on perceived near-term consequences (Cheung et al., 2000).

The Model of PC Utilization is only a subset of Triandis’ model of value, attitude and behaviour, that is, behaviour is determined by peoples’ beliefs, affect toward the object (cognitive and affective components of attitude), by what people think they should do (social norms), and by the expected consequences of the behaviour. Facilitating conditions and habit are also good predictors of behaviour. The MPCU is best used to understand and explain computer usage behaviour in a voluntary environment.

Next we discuss the unified theory of acceptance and use of technology, which is an integration of the eight models already discussed.

2.11. The Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) noticed that IS or IT researchers were confronted with a choice among a multitude of models and were bound to choose constructs across models or choose a favoured model, thus ignoring the contribution from alternative ones. They felt the need for a synthesis in order to reach a unified view of users' technology acceptance.

Venkatesh et al. reviewed and compared the eight dominant models that have been used to explain technology acceptance behaviour. These models included TRA, TPB, TAM, combined TAM - TPB, DOI, SCT, MM, and MPCU (discussed in previous sections). Upon review, the authors reported five limitations of prior model tests and comparisons and addressed them in their work; they included:

- The technologies studied were simple and individual-oriented as opposed to complex and sophisticated organizational technology.
- Most participants in these studies were students except for a few studies.
- Time of measurement was general and in most studies well after acceptance or rejection of the usage decisions so individuals' reactions were retrospective.
- The nature of measurement was in general cross-sectional
- Most of the studies were conducted in voluntary usage contexts making it rather difficult to generalize results to mandatory settings.

The authors then empirically compared the eight models in longitudinal field studies conducted in four different organizations among individuals that were introduced to a new technology in the workplace. The measurement was carried out at three different points in time: post training, one month after implementation and three months after implementation; while actual usage behaviour was measured over the six-month post-training period. The data was divided into two samples for the eight models according to the mandatory and voluntary settings. The authors also studied the affect of some moderating variables that have been reported in previous research to effect the usage decision. These were experience, voluntariness, age, and gender. Results showed that, with exception to MM and SCT, the predictive validity of the models increased after including the moderators. The authors then examined commonalities among models and

found seven constructs to be significant direct determinants of intention or usage in one or more of the individual models. They hypothesized that four of them play a significant role as direct determinants of user acceptance and usage behaviour. Based on user acceptance literature and results of models' comparison, attitude, computer self-efficacy, and anxiety were hypothesized not to have a direct effect on behavioural intention. The constructs that do have a direct effect on behavioural intentions and usage are: performance expectancy, effort expectancy, social influences, and facilitating conditions. The relationship among these constructs is shown in Figure 2-19

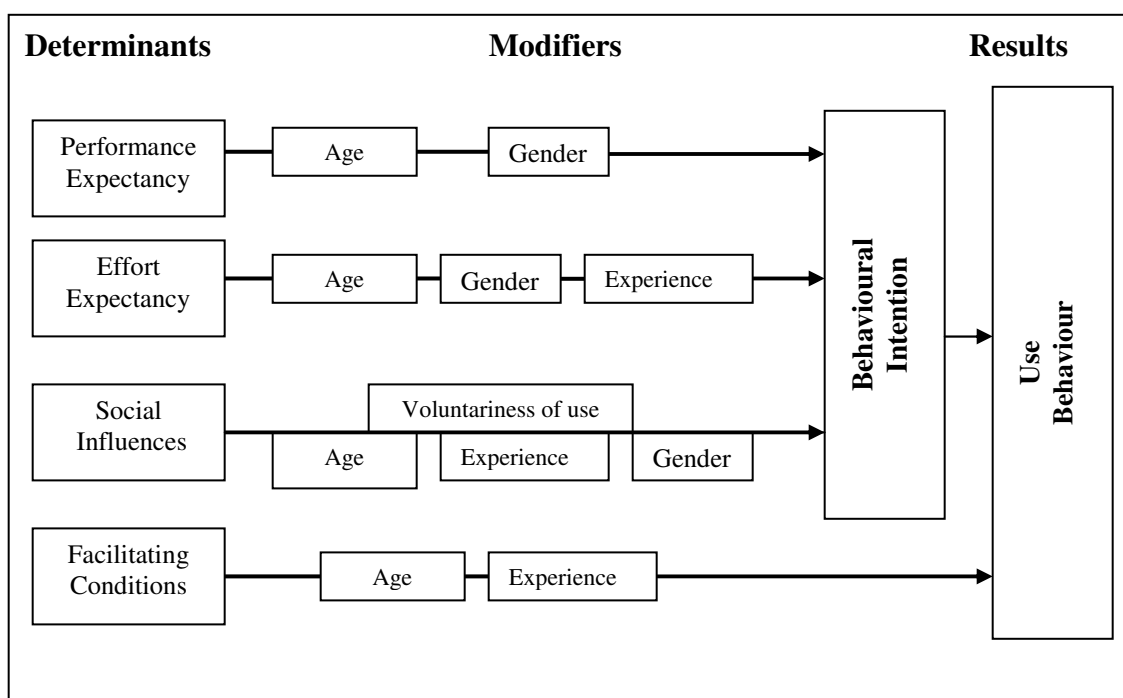


Figure 2-19: The Unified Theory of Acceptance and Use of Technology
 Source: Venkatesh et al. (2003)

The constructs in the model were defined and related to similar variables in the eight models as follows:

Performance Expectancy (PE) is the degree to which an individual believes that using the system will help him/her to attain gains in job performance. The constructs in the other models that pertain to performance expectancy are: perceived usefulness (TAM, and combined TAM-TPB), extrinsic motivation (MM), job-fit (MPCU), relative advantage (DOI), and outcome expectancy (SCT). This construct, within each individual

model, was the strongest predictor of intention and remained significant at all points of measurement in both voluntary and mandatory settings.

Based on the literature, the influence of performance expectancy on behavioural intention is hypothesized to be moderated by gender and age; such an effect would be stronger for men, particularly younger workers.

Effort Expectancy (EE) *is the degree of ease associated with the use of system.* The constructs in the other models that capture the same concept are: perceived ease of use (TAM), and complexity (DOI and MPCU). The construct in each individual model was significant in both voluntary and mandatory settings, and as expected from the literature it was significant only during the post training measurement.

Based on the literature, the influence of effort expectancy on behavioural intentions is hypothesized to be moderated by gender, age, and experience; such an effect would be stronger for young women and older workers at early stages of experience.

Social Influence (SI) *is the degree to which an individual perceives that important others believe he/she should use the new system.* Similar constructs are represented in existing models: subjective norms (TRA, TAM2, TPB/DTPB, and combined TAM-TPB), social factors (MPCU), and image (DOI). The comparison between models found that this construct behaved similarly; it is insignificant in voluntary contexts and becomes significant when use is mandatory. The literature explained that in mandatory contexts the effect is attributed to compliance and appears to be important only in the early stages of individual experience and when rewards/ punishment are applicable; in contrast, social influence in voluntary contexts operates by influencing perceptions about the technology (what is known as internalization and identification)

Equally, based on the literature, the influence of social influences on behavioural intentions is hypothesized to be moderated by gender, age, voluntariness and experience;

such an effect would be stronger for women, particularly in mandatory settings in the early stages of experience.

Facilitating Conditions (FC) *is the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system.* This definition captures three different constructs in existing models: perceived behavioural control (TPB/DTPB and combined TAM-TPB), facilitating conditions (MPCU), and compatibility (DOI). The comparison between models revealed that the relationship between intention and this construct in each model is similar in both voluntary and mandatory settings in the first training period but such influence disappears in the second period (one month after implementation).

Based on the literature, when both performance expectancy and effort expectancy constructs are present, facilitating conditions become insignificant; and consistent with TPB/DTPB facilitating conditions are also direct antecedents of usage (an attribute found also in MPUC). This effect is expected to increase with experience with technology as users find multiple avenues for help and support. Hence, the influence of facilitating conditions on usage is hypothesized to be moderated by age and experience; such an effect would be stronger for older workers, particularly with increased experience.

The empirical test of the original data (collected from four organizations) and the cross-validation using new data (collected from two additional organizations) provided strong support for UTAUT. The new model was able to account for 70 percent of the variance in usage intention, which is considered a measure improvement over any of the original models where the maximum was around 40 per cent. The authors acknowledged a limitation of content validity due to measurement procedures and recommended that future research should be targeted at more fully developing and validating appropriate scales for each of the constructs with emphasis on content validity and revalidating or extending UTAUT with the new measures (Venkatesh et al., 2003).

The following section provides a discussion of studies adopting the UTAUT framework in their research design.

2.11.1 Research Applying the UTAUT Model

A test for the invariance of the new measurement scale of the UTAUT instrument was carried out by Li and Kishore (2006). Their quest was to test whether the key constructs in the TUAUT model were invariant across different population subgroups. The area of application for their study was Web log system users. Hence, the difference in subgroups is based on the demographic characteristics: user's gender, user's general computing knowledge, user's specific Web log-related knowledge, user's experience with Web logs, and user's usage frequency of Web logs. Based on previous literature, they hypothesized that the UTAUT four key constructs would remain invariant across male and female groups, low and high computing general knowledge users, users with or without particular Web log knowledge/ experience, and users with low and high frequency use of Web logs.

Data analysis consisted of three stages. The first comprised dividing the data based on the five demographic dimensions into two fairly balanced groups for each dimension. With a test of goodness to fit index (0.09), the second stage involved the measurement of equivalent-item-factor loadings (also called measurement of tau-equivalence) across two groups under each dimension. The third stage was testing full- equivalence under each dimension.

The findings indicated that users with different experience and knowledge in computing and Web log use have the same interpretation of the instruments of performance expectancy and effort expectancy. On the other hand, social influence is not interpreted similarly among users with high or low frequency of Web log usage; nor are the scores of facilitating conditions instrument comparable for users with different levels of web log experience and usage frequency from the perspective of statistical significance, although they are comparable for computing and Web log knowledge. However, the authors argued that this statistical significance does not mean that the difference in true score between these subgroups is high in magnitude. Gender statistical results showed that

instrument of effort expectancy and facilitating conditions are comparable, while the case is not so for the performance expectancy and social influence instruments.

The authors recommended caution in interpreting the findings since the instrument pertaining to the UTAUT constructs has invariant true scores across most subgroups in the context of acceptance of online community Web log systems. They also indicated the need for more invariant studies about the UTAUT constructs that were not found to be invariant in this study (Li and Kishore, 2006)

Wang and Yang (2005) extended the UTAUT to fit with their study, online stocking in the financial market, by adding the personal trait construct to the model. They treated this extension in two ways by exploring the role personal traits play in the UTAUT model as indirect or intervening. The personal traits studied were the big five factors (or FFM) categorizing personality traits into: extraversion, conscientiousness, agreeableness, neuroticism, and openness. In their research design, the personality traits were hypothesized to affect intention to adopt online stocking indirectly through UTAUT constructs in the first design model and in the second model to moderate the effect of UTAUT constructs on intention to adopt online stocking. For simplification purposes, the other moderators in the original UTAUT model were removed except for Internet experience.

The results showed that the variance explained in the intervention was very low compared to the moderating effect which was (60 per cent) suggesting that personality traits play more important roles as moderators than external variables. For the first model design, results suggested that among the five different personality traits, the extraversion trait affected intention through the four key constructs of UTAUT. Openness trait, however, affected intention through the effort expectancy construct as well as facilitating condition construct. As for the second model design, the results found Internet experience and openness personality trait unexpectedly moderating the relationship between the performance expectancy construct and intention to adopt online stocking with negative effect. The trait of agreeableness with Internet experience moderates the social influence-intention relationship with positive effect as does the trait of conscientiousness with Internet experience, which moderates the social influence- intention relationship but in a

negative manner. Finally, neuroticism with Internet experience was found to significantly moderate the facilitating conditions-intention relationship with positive effect. The authors recommended that future research may reconsider the moderators in the original UTAUT to supplement the model (Wang and Yang, 2005).

The UTAUT was adopted to explain mobile advanced services and device adoption on an individual level and mass use context. The Carlsson et al. (2006) objective was to examine the factors affecting the intention to use and factors affecting the use of mobile devices/services. The effect of attitude toward using mobile device/ services and mobile device/services anxiety on behavioural intention and the use of mobile services were examined in addition to the original paths in the model.

The results showed that performance expectancy and effort expectancy had a strong direct effect on intention to use mobile devices and such an effect was weakened when attitude was added to the model, which indicated that attitude explains part of the intention to use the mobile device. Social influences also had a significant positive crude effect on intention; however, the effect was not sustained in all models examined. Anxiety did not have a direct effect on intention but rather the influence was mediated by other variables such as performance expectancy and social influences. Attitude did not have a direct effect on intention which confirms the original model assumption that with presence of effort expectancy and performance expectancy, attitude would not have a direct effect on intention.

Moreover, when analyzing the actual use of three different mobile services, intention to use had a significant positive direct influence on the use of the studied services but when the model was adjusted for the other variables (EE, PE, FC, anxiety, and attitude) the direct effect of intention disappeared. The authors argued that these results showed the central part played by these variables in the influence of behavioural intention on the use of mobile services. Using logistic regression models, the results showed, for all occurrences studied, that incorporating behavioural intention into the model would diminish the effect of independent variables on the use of mobile services (with one exception when FC is the independent variable for one of the services studied, ring tones). Thus, the assumption that PE, EE, SI, FC, anxiety and attitude affect usage

through behavioural intentions is partly correct. Likewise, facilitating conditions did not have a direct influence on the use of mobile services nor an indirect effect through behavioural intention.

The authors acknowledge that the results obtained do not support in all cases the original UTAUT hypotheses. Thus, their earlier reservation on the use of the UTAUT for explaining both behaviours of intention/ usage of mobile devices and mobile services in an asynchronous manner was fairly justified. The authors argued the need for the need of modification or extension of the model used to account for the differences in the adoption behaviour of the mobile devices and services (Carlsson et al., 2006).

Knutsen (2005) used a subset of the UTAUT to explore the relationship among expectations related to performance of a new mobile service, efforts needed to utilize new mobile services, and how these constructs affect attitudes toward new mobile services. The research design consisted of performance expectancy (PE) and effort expectancy (EE), age as an antecedent to the UTAUT constructs, and attitude as a subsequent of the two constructs of UTAUT. Also, effort expectancy was hypothesized to affect performance expectancy.

Data was collected in two time periods: pre-launch of the trial service and two weeks after the m-service trial. The empirical results significantly verified the relationship between PE-EE and attitude as well as between EE-PE. Results also suggested that PE and EE are strong determinants of attitude toward new mobile services. Increased age was found to be connected to lower levels of anticipated ease with new mobile services. However, age appeared to have a positive effect on PE indicating that older individuals have higher expectations towards new mobile services (Knusten, 2005).

The UTAUT was formulated by leading researchers in the technology acceptance domain. The model was formulated based on conceptual similarities among eight dominant models in the field. According to its authors, the UTAUT is a definitive model that synthesized what is known and advances cumulative theory while retaining a parsimonious structure. Although published studies adopting this model are still scarce,

this does not undervalue the power of this model compared to all other technology acceptance models.

To sum up this chapter, section 2.12 provides a summary of the common threads and identifies the similarities and differences found among the previously discussed models that are dominant in the area of technology acceptance literature.

2.12 Summary of the Technology Acceptance Models

The previous discussion of each model has indicated its evolution and documented how the first three models were extended when limitations were identified by research. TRA was extended into TPB which later was extended to DTPB, which plays a middle role in the evolution scenario since it combines TPB and another extension to TRA: TAM (owned by IS), and Rogers' Diffusion of Innovation (DOI). The other models can be traced to the Psychology discipline, which probably explains the presentation of variables such as social pressure, self-efficacy, and affect in the other set of models utilized in the explanation of technology adoption domain.

The common determinants among the technology models are illustrated in Table 2-2

Table 2-2: Determinants of behaviour in technology acceptance models

Model	Determinants of behaviour
TRA	individuals' perceptions + attitudes towards the behaviour + social influences
TPB	attitude toward behaviour + subjective norms + perceived behavioural control (PBC)
DTPB	attitude decomposed to relative advantage (perceived usefulness), complexity (ease of use) and compatibility + subjective norms + PBC decomposed to self-efficacy and facilitating conditions (Taylor & Todd, 1995a & b)
TAM	PU + PEOU
DOI	innovation attributes + innovators' characteristics
SCT	self-Efficacy + outcome expectations + affect (Venkatesh, 1999)
MM	intrinsic motivation (enjoyment +fun) + perceived benefits (PU) + external pressure i.e., social pressure (Igbarial, 1996)
MPCU	peoples' beliefs + affect + social norms + perceived consequences + habit + facilitating conditions.
UTAUT	effort expectancy + performance expectancy + social influence + facilitating conditions

The following list summarises the similarities / differences and strength / limitations of each of the previously discussed models

1. TAM and DOI differ from SCT; TAM postulates that positive outcome expectations would encourage computer technology usage (yet TAM did not specify how such expectations would influence behaviour). The TAM and DOI perspective focuses on beliefs about outcomes of using technology. SCT, on the other hand, recognizes that beliefs about outcomes may not be sufficient to induce behaviour (especially if individuals have doubts about their ability to perform). In this aspect SCT and TPB enjoy an extant similarity
2. SCT and TPB incorporated beliefs (other than those related to outcomes) which might influence behaviour. SCT donated the self-efficacy concept while TPB incorporated the PBC as an independent variable influencing behaviour. The variable was decomposed to self- efficacy and facilitating conditions by Taylor and Todd (1995a & b). The self-efficacy came from Banduras' SCT framework and the facilitating condition was derived from Traindis' framework.
3. TAM, DOI and TPB enjoy a point of similarity; basically, they share a unidimensional view of the causal relations between the constructs and the belief that the environment influences cognitive beliefs, which in turn influence attitude and behaviour. SCT, on the other hand, acknowledges the reciprocal interaction among environment, personal factors (cognitive perceptions) and behaviour. Thus, an individual's judgment of his/her self-efficacy can be viewed as a cause and effect (at one point of time measurement).
4. MPCU shares a common attribute with TAM and TRA, the volitional control in explaining and predicting behaviour, although Traindis' framework proposed that the volition level tends to decrease as the level of habit (in performing the behaviour) increases.

5. Triandis and Bandura both argue for the separation of cognitive and affective components of attitudinal beliefs.
6. Intrinsic motivation in the motivational model (MM) is similar to the constructs of enjoyment and anxiety (affective components in Bandura's SCT and Triandis' MPCU).

This chapter has presented and discussed the literature on technology acceptance theories and models, in particular, the eight models that were integrated to found the UTAUT model. An important observation to be noted from this review is the ability to distinguish between two types of models. On one hand, we can find models that advocate and enjoy parsimony (such as TAM) but lack the comprehensiveness needed to consider them sufficient or complete. On the other hand, there are models that are comprehensive and cover a majority of constructs contributing to the acceptance behaviour (such as Triandis 1979; and Vallerand, 2000) but are considered complex and impractical to apply in a single investigation. Between these two extremes, the UTAUT is considered parsimonious and comprehensive since it can explain more of the variance in usage intentions than any of its predecessor models. This research sets out to apply the UTAUT to enable a better understanding of technology acceptance in a virtual environment: the online behaviour. The following chapter is dedicated to the presentation and discussion of a scholarly literature that has utilized some of the previously discussed models as a means to explain individuals' online behaviour with regard to a specific technology acceptance area of application: Internet banking.

Chapter Three: Research Using Technology Acceptance Models

3.1 Introduction

Following the presentation and discussion of the leading models in the technology acceptance field, this chapter presents the research that incorporates these models to investigate Internet banking adoption. The chapter is divided into three parts. Part one focuses on the studies that utilized technology acceptance models to investigate the Internet banking adoption in different locations and the factors enhancing or hindering this behaviour. Part two discusses the cultural frameworks with supporting evidence from research on technology acceptance research conducted in different cultures. Part three covers the website design and features as determinants of online usage behaviour with empirical evidence supporting its importance.

3.2. Part One: Research on Internet Banking Using the Technology Acceptance Models.

While there is a rich literature on banking online and financial services and their adoption, this section covers only studies that investigated consumers' usage or adoption of Internet Banking (IB) within a framework consistent with the aforementioned eight behavioural models integrated into the UTAUT.

Based on the **Theory of Reasoned Action** (TRA) conceptual framework, Wan et al. (2005) investigated factors that influenced bank consumers' adoption of four major banking channels in Hong Kong: branch banking, ATM, telephone banking, and Internet banking (IB). The study focused on the influence of demographic variables and psychological beliefs about attributes of each banking channel. According to TRA, adoption of banking channels would be positively associated with beliefs about the extent to which each channel possesses these positive attributes.

The attributes investigated were categorised as: convenience (efficiency of service delivery, convenience of location and operating time, and speed in delivering service); informativeness (provision of financial service, information, and professional

consultation); user-friendliness (ease of use and clarity of service instructions); and, assurance (security of consumer information and accuracy of transaction information). Demographic variables that were investigated comprised: gender, age, income, education and occupation.

Confirmatory factor analysis results showed that beliefs about the internet banking level of convenience were the highest among other channels while beliefs about its assurance were lower than telephone and ATM channels. The correlation analysis to link beliefs about the four channels with their adoption showed a prevailing positive association for the two channels of ATM and IB, insignificant correlation for the branch channel and a moderate positive one for telephone banking. The analysis of demographic variables showed that for the IB channel, the effect of gender was marginally significant; males were more likely to adopt IB than were females. IB adoption was the highest among middle adulthood and lower for younger and older customers. Customers with moderately affluent household income relied more heavily on IB while the very affluent distributed their channel usage evenly among branch, telephone, and Internet banking channels. Moderately educated customers used IB more frequently. Finally, adoption of IB channel was higher in the high-level category of occupations (including managers and professionals) than in other categories (Wan et al., 2005).

The two versions of **Theory of Planned Behaviour** (pure TPB and decomposed DTPB) were examined and compared to the Theory of Reasoned Action (TRA) in an attempt to study individuals' beliefs, attitudes, subjective norms, and perceived behavioural control (PBC) and how they can influence intention toward Internet banking in Taiwan. The DTPB was adopted from Taylor and Todd's study (1995b). Shih and Fang's (2004) argument was that Internet banking is a technological innovation and thus the decomposed TPB model gives a more satisfactory explanation of adoption intention.

Using survey techniques, a questionnaire was distributed to consumers at 53 Taiwanese banks after testing the measure on a pilot sample of MIS graduates. Applying various goodness to fit tests (such as CFI, NNFI and RMSEAI, and cross-validation index), analytical results showed that both versions of TPB exhibited a reasonable fit to data; the decomposed TPB model has better explanatory power for behaviour intention, attitude,

and subjective norm than the pure model and TRA model. The findings showed that intention to adopt IB can be explained by attitude in both models, however, in DTPB model, only relative advantage and complexity were related to attitude. The path from subjective norm to intention was insignificant for both TRA and TPB. In addition, self-efficacy was the only component that was a significant determinant of PBC; the path from PBC to intention was insignificant for the pure TPB model. Authors explained the results of subjective norms and PBC in line with the experience the sample respondents had with the internet which made them confident about command of computer skill and thus may not be influenced by people important to them or by facilitating conditions (Shih and Fang, 2004).

Another research framework based on the **Decomposed Theory of Planned Behaviour** (DTPB) (Taylor & Todd, 1995b) was used to identify the attitudinal, social and perceived control factors that would influence adoption of internet banking services in Singapore. The authors decomposed attitude according to Rogers's **Diffusion of Innovation Theory** with the exception of observability attribute of innovation since it does not apply to IB services. Figure 3-1 illustrates the variables and their dimensions.

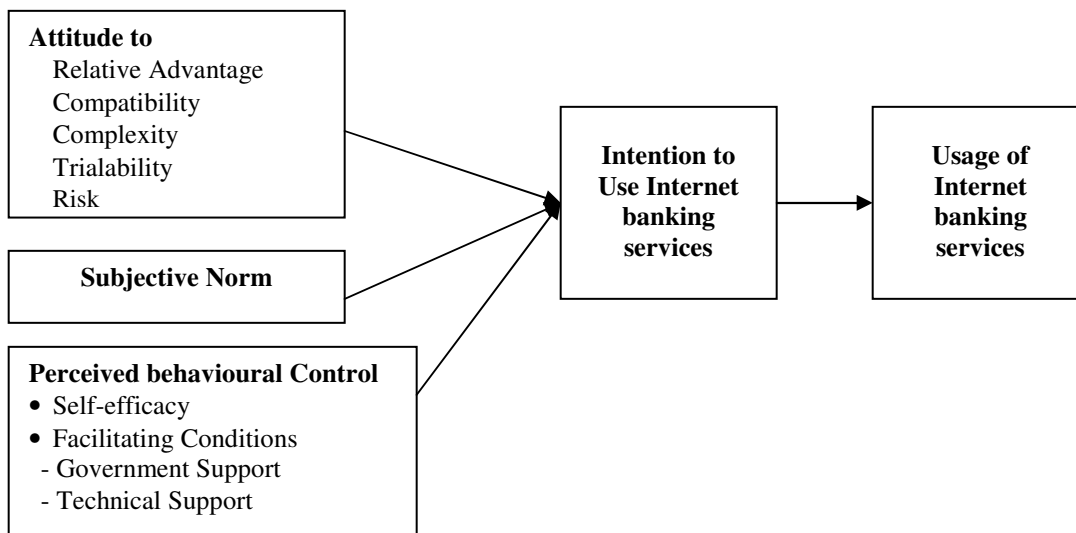


Figure 3-1: Framework for the Adoption of Internet Banking
Source: Tan and Teo (2000)

The research design consisted of an online survey targeted toward online banking users. The finding showed that intention to adopt IB services can be predicted through attitudinal beliefs and perceived behavioural control but not through subjective norms.

The significant attitudinal beliefs were relative advantage; compatibility with consumer's values, experience and needs; trialability; and risk. Only perceived complexity had no influence on intention, the authors suggested an explanation related to the fact that the Internet was still new at that time and users had yet to try it and thus were unable to effectively assess its complexity. Subjective norm had no influence on intention to adopt IB; a possible explanation is that relevant information is readily available (from banks), which makes reliance on other sources unnecessary. With regard to PBC, both self-efficacy and government support were found to be important, simply because of the government role in providing the needed infrastructure in Singapore (Tan and Teo, 2000).

Again, based on the **Decomposed Theory of Planned Behaviour (DTPB)** developed by Taylor and Todd (1995a & b), a study to identify factors that encourage consumers to adopt Internet banking services in Thailand was carried out with the objective of developing a strategy for banks to maximise the Internet banking adoption rate. The research model Figure 3-2 includes variables and dimensions of the study.

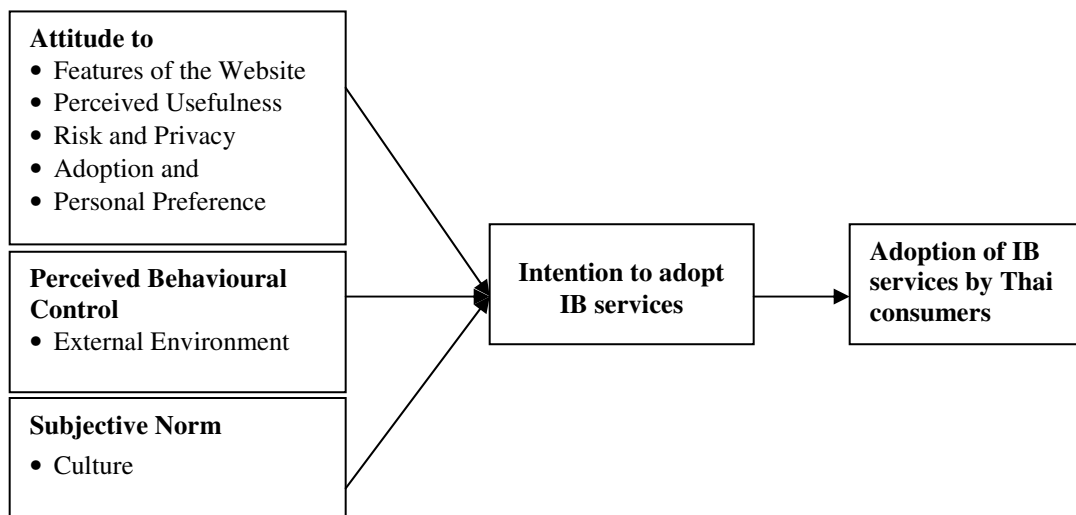


Figure 3-2: Decomposed Theory of Planned Behaviour and Internet banking adoption in Thailand
Source: Jaruwachirathanakul & Fink (2005)

The researchers extended the research by categorizing the above variables into two groups based on the ability / inability of banks to facilitate adoption. This was done to meet the second research objective of identifying strategies that banks could adopt to

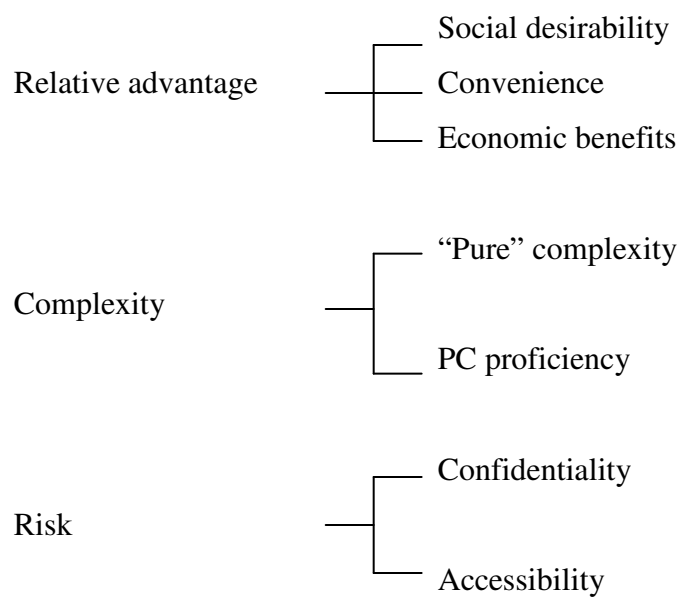
maximise IB adoption. The first groups is bank related (can be controlled by the bank) namely perceived usefulness, adoption features, online bank features, and risk & privacy. The second group is outside the bank's control and reflects compatibility with consumer's personal preferences, the external environment and Thai culture.

The study also investigated the impact of moderating factors on adoption factors. They were age, gender, education levels, income, Internet experience and Internet banking experience. Quantitative research in the form of a questionnaire survey was conducted to meet the research objective. The survey was restricted to large firms where Internet access was provided to employees. The study found that the intention and the adoption of Internet banking by Thai consumers was encouraged by attitudinal factors and impeded by a perceived behavioural control factor, but not by subjective norms (culture). The attitudinal factors that encouraged the adoption of IB in Thailand most were: "features of the website" and "perceived usefulness", while the most significant impediment to adoption was a perceived behavioural control, namely "external environment".

As for the moderating variables, with the exception of respondents' age groups, all moderators had a statistically significant impact on factors influencing IB adoption. However, it was found that the most important moderators were income and Internet experience as they each affected each of the most significant encouragement and impediment factors. The study ended with recommendations for banks to use a "push" strategy for encouragement factors, and a "pull" strategy for the impediment factors (Jaruwachirathanakul & Fink, 2005).

Another study on the Singapore Market took place in 2003 using Rogers's **Diffusion of Innovation Theory** as a theoretical base. The objective was to gain more understanding about characteristics of IB as perceived by adopters and non adopters. Gerrard and Gunningham (2003) first interviewed two groups of IB adopters and non adopters and based on the responses to the interview questions and literature available at the time of survey, two characteristics of innovation (trialability and observability) were found not to be relevant in their study and both characteristics were excluded at that stage. A survey of

240 customers (111 adopters versus 129 non adopters) and factor analysis with varimax rotation was used to establish the dimensions appropriate to modelling the adoption of IB. The results revealed five factors that were labelled and split into dimensions as follows:



The results showed that adopters perceived IB to be significantly more convenient, less complex, and more compatible for them and to require a higher level of PC proficiency. However, both adopters and non adopters were not significantly different with respect to accessibility and confidentiality. Both were concerned about the bank's system being insecure. Both groups, also, were neutral in their perception about social status and whether it would reflect a higher level should they be known to have adopted IB. Finally, adopters were found to be more financially innovative than non adopters (Gerrard and Gunningham, 2003).

Using Rogers' (1983) **Diffusion of Innovation Theory** (DOI) and Davis' (1989) **Technology Acceptance Model** (TAM), Kolodinsky et al. (2004) explored factors affecting the adoption of or intention to adopt three e-banking technologies (preauthorized debits, phone banking, and PC banking) and changes in these factors over a time period (1999-2003). The authors used a data set from the Federal Reserve Board in

USA. Adoption was viewed as a continuum ranging from adopters to those who would never adopt selected services. The results of socioeconomic variables showed that income and education played a strong role in the adoption of the selected services. Those with higher income or expected increase in income had an increased probability of intent to adopt or of already using phone and PC banking. Those in their middle age were less likely to adopt PC banking than the youngest group of consumers (35 years and below). College educated were more likely to adopt phone and PC banking than less educated. With respect to e-banking characteristics, trialability was not significant for any of the three services; however, relative advantage and compatibility were significant across all e-banking services. Simplicity was significant and positive only with PC banking and observability was only positively associated with an increased probability of adopting phone banking. Adoption changed over time but the impacts of factors on adoption did not change (Kolodinsky et al., 2004).

An extension of the **Technology Acceptance Model (TAM)** was adopted to assess some of the critical variables that contribute to consumer acceptance of self-service technologies (SST). Four antecedent beliefs were proposed as predictors of attitude toward SST. In addition to TAM's two major constructs (PU and PEOU), two new antecedent beliefs (risk and need for interaction) were expected to extend the research based on TAM. The model was tested across three different technologies: ATM, phone banking, and online banking. Curran and Meuter (2005) collected a preliminary convenience sample and surveyed a group of respondents for each technology. Upon validation of the instrument, a full scale survey was undertaken by phone and a sample was contacted in a three state region in northeast USA.

The results showed that adoption varied widely between technologies tested. Significant differences were detected between attitudes for each technology with ATM being better thought of, by consumers, than phone banking and the attitude toward online banking was slightly negative and significantly more negative than the other two SST. With respect to antecedent beliefs, perceived usefulness (PU) was a significant predictor of attitude for only two SST, ATM and phone banking. Perceived ease of use (PEOU) was a significant predictor for attitudes toward ATM only. Risk was an important determinant of attitude

toward online banking but not ATM or phone banking. Finally, none of the three technologies (ATM, phone and online banking) models provided any evidence supporting the significant need for interaction as an antecedent belief to attitude. The authors commented that multiple factors need to be considered when introducing technologies into the service encounter and that the salient factors may vary among technologies and their stages in the adoption process (Curran and Meuter, 2005).

Another **TAM** extension was presented by Pikkarainen et al. (2004), a model of six factors posited to have an effect on acceptance of online banking. The model was based on literature related to technology acceptance and focus group interviews with business professionals from the banking sector. The model proposed that online banking acceptance can be influenced by variables derived from TAM (PU and PEOU) and four other variables namely perceived enjoyment (intrinsic motivation), information about online banking, security and privacy, and the quality of Internet connection. .

Data for the study was collected through a survey conducted in Finland in 2002. Questionnaires were filled out in three different places (at university classes, at two barber shops, and at a medium sized retail company). This resulted in a well distributed sample in terms of demographic information. With the use of factor analysis, five factors were identified, suggesting that all variables except quality of Internet connection have an impact on the acceptance of online banking.

The results of regression analysis conducted on the five factors indicated that PU and the amount of information on online banking were found to be the most influential factors explaining the use of online banking services. Moreover, security and privacy were found to have a relatively weak relationship with the acceptance. The study ended with managerial contributions on the planning of an online banking website and service selection (Pikkarainen et al., 2004)

An extension to **TAM** was also presented by Eriksson et al. (2005) to investigate consumers' acceptance of Internet banking in Estonia. The authors added the trust variable to the model based on previous studies drawing on social exchange theory which argues that a model of technology acceptance with more social dimensions requires that

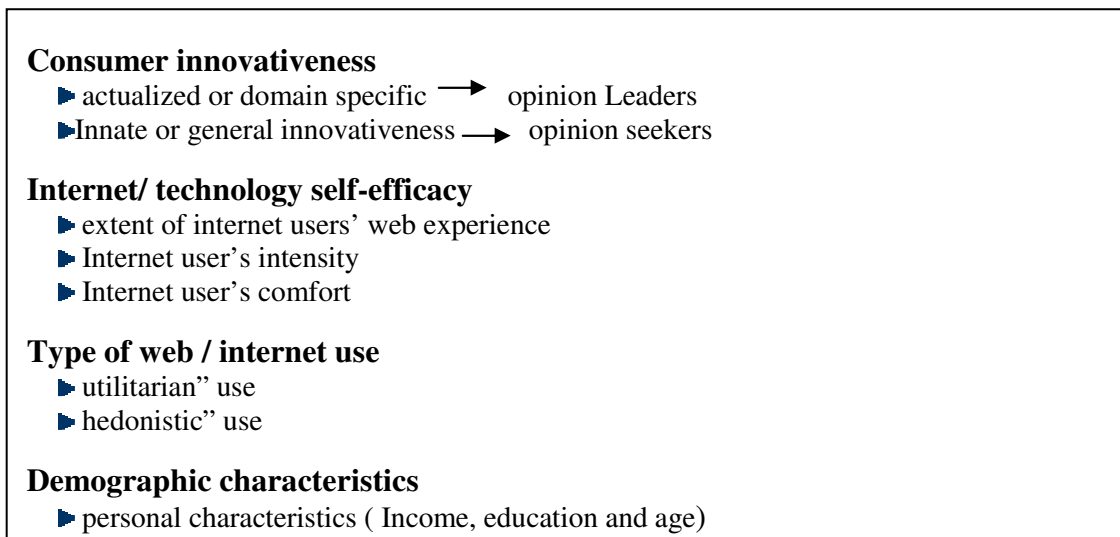
trust be included as an antecedent to perceived usefulness and ease of use. In addition, the model adopted by this study excluded behavioural intention construct claiming that it would not have any subsequent information loss.

A questionnaire was distributed through the banks in Estonia covering issues such as consumer experience with computers, their usage of Internet banking (IB), and factors that had convinced them to use IB, along with several attitude questions. Factor analysis generated four components that were used to examine what influenced the consumer's usage of IB (Trust, Perceived usefulness, Ease of use, and Usage). The findings showed that perceived usefulness was a primary reason for IB usage by Estonian bank customers; perceived ease of use did not directly increase the use of Internet banking, but lead to greater perceived usefulness which then increased the usage. Moreover, the study ended with a proposed modified model which included trust as an emphasis on the social exchange process that is central to technology acceptance and IB adoption as shown in this study. Trust is also considered as a determinant of PEOU and PU; and PEOU is the determinant of PU which directly impacts usage (Eriksson et al., 2005).

TAM was also combined with adoption of innovation framework to explore the relationship between consumer innovativeness, self-efficacy, and attitude toward online banking adoption. In creating the conceptual research model, the researchers addressed aspects of *consumer innovativeness* (actualized or domain specific and innate or general innovativeness). A hypothesis was developed that *innate or general marketplace* innovation characteristics would be positively related to online banking adoption. Also taking into consideration opinion leaders' effect on adoption, a sub-hypothesis was developed indicating either a positive or a negative relation to banking adoption with regard to opinion leadership and opinion seeking behaviour.

As for *Internet / technology self-efficacy and experience*: the extent of Internet users web experience; Internet user's intensity; and Internet user's comfort were hypothesized to have a positive influence on online banking adoption. In addition, the *Type of web / Internet use* aspect was dealt with through two hypotheses. One indicated that "utilitarian" use would be positively related, while the other indicated "hedonistic" use

would be negatively related to online banking adoption. Finally, *Demographic characteristics* were thought to have an impact, namely personal characteristics, household income, education, and age levels.



Data was collected by recruiting 349 participants from three college campuses in eastern U.S. The sample represented a wide variety of demographic segments with computer experts, professionals, and graduates or undergraduates taking business courses. The survey instrument (questionnaire) was administered on the Internet (university server hosted).

Results showed that personal innovativeness characteristics were all related to online banking adoption. The innate measure of general market innovation, however, showed an unexpected relationship (a negative impact on adoption). Domain specific innovativeness per Internet issue, on the other hand, supported the hypothesis, as opinion leadership was positively related to online banking adoption. However, opinion seeking relationship was negatively related. With regard to Internet self-efficacy, the three variables of technology comfort, length, and intensity of web usage revealed the expected directional path of positive relationship to online banking adoption. Unexpectedly, however, only intensity of web usage was significant. For the two "*type of use*" measures, results were as predicted (utilitarian information search behaviour is positively related and hedonistic use is negatively related). Findings involving demographic characteristics showed that

income was the only personal characteristic positively and significantly related, while education and age were not (Lassar et al., 2005).

An extension of **TAM** was adopted to examine the factors that determine intention to use online banking in Malaysia Borneo. Guriting and Ndubisi (2006) extended the TAM to include two components affecting both (PU) & (PEOU). The components were computer self- efficacy and prior computing experience. The data collection method was based on personally administered questionnaires with customers of banks in Malaysia Borneo. Participation was purely voluntary. The survey ran for two weeks. Volunteer enumerators were posted at the premises of the participating banks inviting customers at the bank to complete a survey form. The questionnaire items were adopted from prior studies.

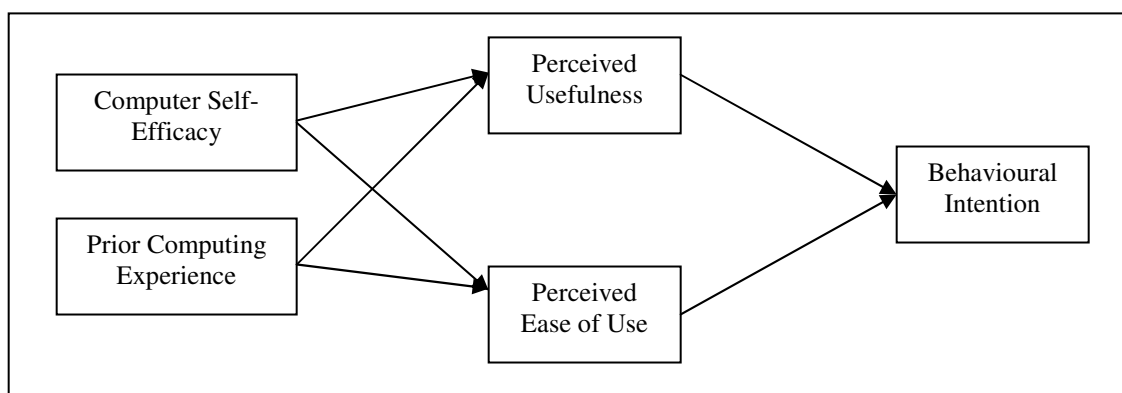


Figure 3-3: Extended TAM for Online Banking
Source: Guriting and Ndubisi (2006)

By measuring the mediation effect of perceived usefulness and perceived ease of use, results indicated a mediation effect of perceived usefulness in the relationship between computer self-efficacy and behavioural intention. In the case of prior general computing experience, the results of testing ruled out any mediation effect. Conclusively, there was no indirect positive relationship between prior general computing experience and behavioural intention through perceived usefulness. A limitation of result non-generalizability was acknowledged by the authors due to the small size of sample (Guriting and Ndubisi, 2006)

An adaptation of Rogers' **Diffusion of Innovation Theory** and Vallerand's **Motivation Model** to examine the potential facilitators of Internet banking adoption in Malaysia was presented in the same year by Ndubisi and Sinti (2006). They investigated the impact of attitude decomposed to innovation characteristics (e.g., importance to banking need, compatibility, complexity, trialability, and risk) and IB site features such as utilitarian and hedonic orientation on Internet banking adoption by Malaysian bank consumers.

Data was collected via an online questionnaire. The survey lasted for one month, and the questionnaire items were adapted from different sources. Attitude and adoption items were adapted from Taylor and Todd (1995) and Tan and Teo (2000). The system's design characteristics were adapted from Davis et al. (1992).

The findings showed that attitudinal disposition and webpage features can predict Internet banking adoption. Four attitudinal factors had strong influences on adoption namely: importance of banking needs, compatibility, complexity, and trialability. Risk, on the other hand, had a weak influence. These results indicated that adoption of internet banking depends on the perceived salience of the technology in meeting banking needs, compatibility of the technology to users' lifestyles, style of managing finance, etc., and ability to try out the technology before making any long term commitment. Complexity is inversely related to adoption, which means that the easier or less complex the system is to use, the greater will be its adoption.

Another finding showed that Internet banking adoption was motivated by utilitarian outcomes rather than hedonistic outcomes; hence the authors recommended that since customers attach greater importance to the transaction related features of the IB website than to the entertainment features, a good strategy to enhance adoption would be to emphasize the utilitarian orientation and minimize investment in the hedonic orientation (Ndubisi and Sinti, 2006).

Table 3-1: Summary of IB Acceptance Studies

Authors / year	Model used	Research Context	Subjects' No.	Data collection method	statistics	Results/ Comments
Wan et al. (2005)	TRA	Hong Kong	150 Banks' managers 164 individuals	- Interview - Questionnaire	CFA + Correlation	-Psychological beliefs about channel attributes were more predictive of ID adoption. - Demographics were strongly associated with adoption
Shin & Fang (2004)	TPB + DTPB+ TRA	Taiwan	425 Personal Banking Customers	Questionnaire	SEM	- DTPB has better explanatory power for BI, attitude, & SN than TRA & pure TPB models.
Tan & Teo (2000)	TPB + DOI	Singapore	454 online users	Online questionnaire	FA + Multiple Linear regression	- Intentions to adopt IB can be predicted by attitude and PBC but not by SN.
Jaruwachirathanakul & Fink (2005)	DTPB	Thailand/ Bangkok	528 Internet users in Large companies	Questionnaire survey	T- test + ANOVA	- Attitude factors of website features & PU were the most to encourage IB adoption. - Moderators such as income and Internet experience had sig. impact on IB adoption.
Gerrard & Cunningham (2003)	DOI	Singapore	-8 IB user + 8 non users -240 downtown employees	Interviews questionnaire	FA	- Adopters and non adopters had similar beliefs about desirability, confidentiality, accessibility, and economic benefits.
Kolodinsky et al. (2004)	TAM+ DOI	USA	Data used from national census	Survey	Bi-variate+ order probit analysis	- Relative advantage & compatibility were sig. for all types of e-banking -Moderators affect the e- banking adoption.
Curran & Meuter (2005)	TAM	Northern USA	628 Individuals	Random telephone questionnaire	SEM	-The impact of attitude antecedents beliefs (usefulness, ease of use, need for interaction, & risk) varied depending on the technology adopted (e.g., risk was important determinant of attitude towards online banking but not ATM).

Continued

Authors / year	Model used	Research Context	Subjects' No.	Data collection method	statistics	Results/ Comments
Pikkarainen et al. (2004)	TAM	Finland	268 students + individuals+ employees.	Questionnaire	CFA+ regression analysis	- in addition to TAM's two construct, perceived enjoyment, information, and security & privacy had an impact on the IB -adoption.
Eriksson et al. (2005)	TAM	Estonia	1831 bank customers	Questionnaire	PCA+ SEM	- Confirmed TAM's findings regarding PU & EOU. - Trust is an antecedent of PU & PEOU
Lassar et al. (2005)	TAM	Eastern USA	349 business school students	Internet survey	Logistic regression	- Positive relation between internet's related innovativeness and online banking.
Guriting & Ndubisi (2006)	TAM	Malaysia Borneo	133 Banks customers	questionnaire	Multiple regression	- PU & PEOU are strong determinants of BI to adopt IB. - Self efficacy & prior computer experience have an indirect effect on BI through PU & PEOU.
Ndubisi & Sinti (2006)	TAM + MM	Malaysia	126 Internet Individuals users	Online questionnaire	FA + regression analysis	- Attitudinal factors (compatibility, complexity, trialability , and risk) play a sig. role in IB adoption - Utilitarian orientation had a sig influence on adoption but not hedonic orientations.

3.3 Summary of Internet Banking Studies

A general overview of the previous studies reveals an interesting point: the inclusion of the constructs of usage and intention in the models varied among researchers. Some studied intention to adopt/use and others studied acceptance/usages through self-reporting. The studies in general followed a quantitative approach based on survey. The tools employed were in general: interviews, self administered questionnaires and online surveys. A variety of models were employed to examine banks' consumers behaviour towards online banking in various locations worldwide; hence the generalizability of these models across cultures has not been fully investigated or covered so far in the literature review. The next part is devoted to exploring this.

3.4 Part Two: The Cultural Dimension and Technology Acceptance Research

The study of users' acceptance of technology is a complex issue especially given it is a multi-disciplinary subject pertaining psychological, technical, and social contexts (Day, 2006). The difficulty is increased if one considers studying such behaviour across more than one cultural context. There are comparatively few studies in the Information Systems field attempting to explore the relationship between culture and IT usage (Merchant, 2007).

Culture, as a concept, seems to have solicited little agreement with respect to an appropriate definition, particularly on the ontological status of the concept (Lonner & Adamopoulos, 1997). Although there are many definitions of the concept of "culture" in the social science literature, none of these has been embraced by a substantial number of social scientists. According to Lonner & Adamopoulos, this definition inconsistency has led to the treatment of culture in research, almost by default, as a moderator variable. This, in turn, has a profound implication on the future of cross-cultural research because it assigns a control function to the culture variable, renders it to a secondary status as a theoretical variable and deprives it of strong explanatory power.

A number of dominant frameworks or models are used in the study of culture. Although these efforts attempt to create a universal set of values or dimensions that can be used to study culture some of these frameworks are far from being comprehensive or universal (Lonner & Adamopoulos, 1997). The authors stress some of these “theoretical structures” are, at best, describing research data rather than predicting them. This constitutes a danger, since they are so broad in the range of human experience (that they attempt to capture) that they can explain most patterns of obtained data with relative ease, but they have little ability to discriminate among other possible explanations for the specific phenomena.

The most referred-to frameworks within the study of culture are presented in the next section with a brief overview of the content of each. First, Table 3-2 summarizes an outline for the most known cultural values and dimensions introduced by major contributors.

Table 3-2: Overview for the most known cultural dimensions

Cultural Dimensions	Contributor
Power Distance	Hofstede (1997)
Individualism/Collectivism	Hofstede (1997)
Masculinity/ Femininity	Hofstede (1997)
Uncertainty Avoidance	Hofstede (1997)
Long- Term Orientation	Hofstede (1997)
Confucian Work Dynamism	Chinese Cultural Connection (1987)
Conservatism	Schwartz (1994)
Intellectual Autonomy	Schwartz (1994)
Affective Autonomy	Schwartz (1994)
Hierarchy	Schwartz (1994)
Egalitarianism	Schwartz (1994)
Mastery	Schwartz (1994)
Harmony	Schwartz (1994)
Universalism/Particularism	Trompenaars & Hampden-Turner (1998)
Individualism/Communitarianism	Trompenaars & Hampden-Turner (1998)
Neutral/ Emotional	Trompenaars & Hampden-Turner (1998)
Specific/Diffused	Trompenaars & Hampden-Turner (1998)
Achievement/Ascription	Trompenaars & Hampden-Turner (1998)

Continued

Attitude to Time	Trompenaars & Hampden-Turner (1998)
Attitude to Environment	Trompenaars & Hampden-Turner (1998)
Communication Context	Hall (1989); Hall & Hall (1987)
Perception of space	Hall & Hall (1987); Hall (1989)
Monochronic/ Polychronic	Hall (1989)
Nature of people	Kluckhohn & Strodtbeck (1961)
Person's relationship to nature	Kluckhohn & Strodtbeck (1961)
Person's relationship to other people	Kluckhohn & Strodtbeck (1961)
Primary mode of activity	Kluckhohn & Strodtbeck (1961)
Perception of space	Kluckhohn & Strodtbeck (1961)
Person's temporal orientation.	Kluckhohn & Strodtbeck (1961)

Source: Zakour (2008)

A resemblance is reported among a number of the dimensions in these frameworks (Zakour, 2008). Table 3-3 shows the dimensions in each framework vertically, with those bearing resemblance arranged horizontally.

Table 3-3: Similarities among Cultural Dimensions

Hofstede (1997)	Schwartz (1994)	Trompenaars & Hampden-Turner (1998)	Chinese Cultural Connection (1987)	Hall (1989)	Kluckhohn & Strodtbeck (1961)
Power Distance	Hierarchy/ Egalitarianism	-	-	-	-
Individualism/ Collectivism	Autonomy	Individualism/ Communitarianism	-	-	Rational Orientation
Masculinity/ Femininity	Mastery/ Harmony	Achievement/ Ascription Inner-directed/ Outer-directed	-	-	Man-Nature Orientation
Uncertainty Avoidance	-	-	-	-	-
Long- Term Orientation	Conservatism	Attitude to Time	Confucian Work Dynamism	Time Perception	Time Orientation
-	-	Specific/ Diffuse		Space (personal space & Territory)	Space Orientation (Public & Private)
-	-	-	-	High/Low Context	-

Source: Zakour (2008)

3.4.1 The Different Frameworks to Understanding Culture

As noted from Table 3-3, there are similarities between the different frameworks in defining cultural dimensions. The first three frameworks are cited by most researchers in cross-cultural studies and are reviewed next.

3.4.1.1 Hofstede's Cultural Dimensions

According to Merchant (2007), IT researchers have primarily relied on Hofstede's cultural dimensions (1997) when investigating aspects of cultural influences. Hofstede's cultural dimensions were used to measure work-related values and were based on national cultural differences. Hofstede examined psychological characteristics of people from different cultural groups at IBM sites in 40 countries, asking employees about their attitudes and preferences. Based on the pattern of given answers, he extrapolated what he argues were the underlying cultural dimensions. Table 3-4 shows definitions and measured traits associated with these dimensions.

Table 3-4: Hofstede's dimensions: definitions and measuring traits.

Dimension	Definition	Measured Traits associated
Power Distance	How cultures handle inequality- the emotional distance between those of differing status.	(1) Employee fear of expressing disagreement (2) Superiors have autocratic or paternalistic style (3) Preference for autocratic or paternalistic style
Individualism & Collectivism	Individualism: ties between individuals are loose, each looks after oneself. Collectivism: ties are integrated into strong, cohesive in-groups	Individualist: (1) Personal time (2) Freedom (3) Challenge Collectivist : (1) Training (2) Physical conditions (3) Use of skills
Masculinity/ Femininity	The extent to which a society displays stereotypical male & female values. Masculinity: assertive, competitive, tough Femininity: nurturance, focus on relationships & living environment.	Masculinity: (1) Earnings (2) Recognition (3) Advancement (4) Challenge Femininity: (1) Good relationships (2) Corporation (3) Desirable living area (4)Employment Security

Continued

Uncertainty Avoidance	The extent to which one feels threatened by uncertainty or the unknown	(1) Level of job stress (2) Rule orientation (3) Desire for job stability
Confucian dynamism	Long term (dynamic) or short term (static) orientation as related to virtue.	Long term orientation: (1) Persistence (2) Hierarchy (3) Thrift (4) Sense of shame Short term orientation: (1) Personal Steadiness (2) Protecting "face" (3) Respect for tradition (4) Reciprocation of favour

Source: Shaules (2007)

Many researchers (e.g., Struab et al., 1997; Al-Ghahtani, 2002) argued for the use of Hofstede's cultural dimensions for exploring the impact of cultural differences on adoption and use of IT-based innovations. For example, the technology acceptance model would be a weaker predictor of technology use in cultures with a high score on the uncertainty index than it would be for cultures with a low uncertainty avoidance score (or uncertainty avoidance scores would be inversely related to computer acceptance technology). In societies with low scores on power distance, computerised means of communication are employed by individuals, whereas in societies with high scores on power distance, the computerised resources of communication are not favoured. The effect of individualism on technology acceptance is similar to that of power distance index; collectivist workers are disposed against computerised means of communication (individualism scores are proportionally related to computer technology acceptance). Finally, the societies that score high on masculinity (assertiveness) would not favour computerised communications as would societies that score low on masculinity, where such a medium would be more acceptable.

Ford et al. (2003) questioned ways that IS research has been using Hofstede's dimensions and whether the IS field has been able to build strong theory and generalisable managerial practices from this framework. Using citation analysis to examine how Hofstede's framework has been used by IS researchers (1980-1999), the authors report that the IS research that has used Hofstede's dimensions has tended to focus on

managerial aspects of IS (staffing and planning) and types of IS. Also, within the IS managerial issues, technology adoption (TAM) and technology transfer were the key subjects for articles, with TAM validity across cultures other than North American culture being a common topic. The analysis showed that for that period, the majority of the IS research on the influence of national culture has been concentrated on a small number of countries where a typical study compares how a particular theory is applicable to the US and to another one or two countries (usually Asian). Finally, the authors conclude that IS research and Hofstede's national culture dimensions were moving toward closer integration.

Since Hofstede's dimensions have been adopted across various contexts and societies, they are, to some degree, generalisable. According to Ford et al. (2003), Hofstede's original book (1980) had been cited nearly 1700 times in the Social Science Citation Index (SSCI) and the majority of the citations occurred within general and international management; in addition, several citations were within organizational behavior and marketing.

Nevertheless, Hofstede's work has been criticized on a number of issues. One issue is that Hofstede's study was limited only to sampled IBM employees. It has been argued that using homogenous corporate culture across national boundaries might have confounded country differences (Shackleton & Ali, 1990). Other issues cited are reducing culture to an overly simplistic five dimension conceptualization; failing to capture the flexibility of culture over time; and ignoring within-country cultural heterogeneity (Sivakumar and Nakata, 2001, cited in Kirkman, 2006). McSweeney (2002) subjected Hofstede's work to a detailed dissection, challenging the entire claim for national culture. In addition to his critiques of methodology, McSweeney states that the work was based on fallacious assumptions that led to inaccurate empirical descriptions, regardless of the quality of data and the statistical manipulations used. Hence, McSweeney believes that Hofstede's claims are excessive (they claim more in terms of identifiable characteristics and consequences than is justified) and unbalanced (there is too great a desire to "prove" a priori conceptions rather than evaluate the adequacy of the findings). Hofstede's

refutation of McSweeney's critiques only evoked further critiques of the validity of work (Hofstede, 2002; McSweeney, 2002).

In summary, Hofstede's dimensions measure and discriminate among national cultures but do not discriminate among individual persons. Moreover, most of the dimensions' items refer to work values. They do not measure the range of human values relevant in many life domains. Hofstede's scale is not intended for use in linking individuals' value orientations to their opinions or behavior (Schwartz, 2003).

3.4.1.2 Schwartz's Cultural Values Orientations

Correspondingly, Schwartz (1992; 1994), Schwartz & Sagie (2000) and Schwartz & Bardi, (2001) conducted large scale survey studies and presented an elaborate theoretical framework for cultural value orientations across nations, the Schwartz Value Survey (SVS). The surveys consisted of examining individuals' value preferences in a number of countries, asking participants (students and teachers) to rate the importance of 56 different value types serving as guiding principles in their lives. Schwartz found universals in the content of individuals' values and his value theory derived ten distinct individual motivational types of values, organized along two basic dimensions, conservation vs. openness to change and self-transcendence vs. self-enhancement. The ten individual values identified within these two dimensions are likely to be recognized implicitly in all cultures. The theory also specified interrelations of conflict and compatibility among the ten values that give structure to the value system. Although the theory discriminates ten value types, it postulates that at more basic levels, the values form a continuum of related motivations and this continuum gives rise to the circular structure (Schwartz & Sagiv, 1995). This conception of cultural dimensions as forming an integrated system distinguishes Schwartz's approach from others (e.g., Hofstede, 1980, conceptualized his dimensions as independent and assessed them as orthogonal factors). According to Lonner & Adamopoulos (1997) Schwartz's framework is unlike most cross-cultural frameworks; it incorporates content-based elements, structural elements and dynamic elements, and does not stop at describing the specific content of value

categories, but defines structural relationships among categories based on expectations of conflict or compatibility.

Also, using the multidimensional scaling procedure, Schwartz (1994) found seven value types on the cultural level among the nations sampled. The seven country values were later summarised into three dimensions: Embeddedness vs. Autonomy; Hierarchy vs. Egalitarianism; and Mastery vs. Harmony (Schwartz, 1999; 2003; 2007). The validity of the seven cultural value orientations and the relations among them were assessed with extra data gathered from school teachers and college students together constituting 67 nations and 70 different cultural groups. By combining the two teachers and students samples, Schwartz calculated scores on the seven cultural value orientations for 67 national groups, and by obtaining cross-national comparison of cultures, a cultural distance between nations was produced (Schwartz, 2004). This mapping portrays 75 per cent of the world's nations on the seven dimensions, enabling comparison among these nations on the basis of the seven cultural value orientations summarized in Table 3-5.

Table 3-5: Schwartz's seven cultural orientation value types.

Value Type	Description
Conservatism	The person is viewed as embedded in a collectivity, finding meaning in life largely through social relationships, though identifying with the group and participating in its shared way of life. A cultural emphasis on maintenance of the status quo, propriety, and restraint of actions or inclinations that might disrupt the solidarity group or the traditional order (e.g., Social order, respect for tradition, family security, and self-discipline).
Autonomy: Intellectual & Affective	The person is an autonomous, bounded entity and finds meaning in his / her own uniqueness, who seek to express his/her own internal attributes (preferences, traits, feelings) and is encouraged to do so. Schwartz distinguishes between two types of autonomy: Intellectual Autonomy emphasizes on the independent ideas & rights of the individual to pursue his/her own intellectual directions (e.g., curiosity, broadmindedness, and creativity). Affective Autonomy emphasizes the individual's independent pursuit of affectively positive experience (e.g., pleasure, exciting life, varied life).
Hierarchy	In high hierarchical cultures, differential allocation of fixed roles and of resources is the legitimate, desirable way to regulate interdependencies. People are socialized to comply with the obligations and rules and sanctioned if they do not. A cultural emphasis on the legitimacy of an unequal distribution of power, roles and resources (e.g., social power, authority, humility, wealth).

Continued

Egalitarianism	In high egalitarianism cultures, Individuals are portrayed as moral equals, who share basic interests and who are socialized to transcend selfish interests, cooperate voluntarily with others, and show concern for everyone's welfare (e.g., equality, social justice, freedom, responsibility, honesty).
Mastery	In high mastery cultures, people actively seek to master & change the natural & social world, to assert control & exploit it in order to further personal or group interest. A cultural emphasis on getting ahead through active self-assertion (e.g., ambition, success, daring, competence).
Harmony	High harmony cultures accept the world as it is, trying to preserve rather than change or exploit. The culture emphasis is fitting harmoniously in the environment (e.g., unity with nature, protecting the environment, world of beauty).

Source: Smith & Schwartz (1997)

According to Hanges & Dickson (2004, cited in Halverson & Tirmizi, 2008), Schwartz's work has two major strengths. First, it is theory driven and based on understanding philosophical, religious, and empirical literature from different cultures and societies. Second, it carefully considers prior works on culture and builds on them (e.g., Kluckhohn, 1961). Other advantages cited for the Schwartz data, compared to that of Hofstede, are being more recent and using two matched samples in addition to being obtained from various regions, including socialist countries such as Eastern Europe. Additionally, Schwartz's framework is derived theoretically, whereas Hofstede's was derived empirically (Ng et al., 2007). On the other hand, Schwartz argues that his framework is more comprehensive than that of Hofstede (Schwartz, 2006). In addition, Schwartz claims that Hofstede's four dimensions are included within his set of value orientations (Schwartz, 1994; Smith et al., 2002).

3.4.1.3 Trompenaars & Hampden-Turner's Cultural Model

Similarly, using the dimensional approaches to cultural definition, Trompenaars (1994) conducted a large scale survey study involving thirty companies in fifty nations (Gallita et al., 2006). The theoretical framework developed by Trompenaars & Hampden-Turner (1998) is an attempt to explain cultural differences in terms of the fundamental challenges humans face when organizing social communities. Their approach is different

from that of Hofstede in that the latter's approach is described in terms of psycho-emotional programming, while Trompenaars & Hampden-Turner's approach is focused on internal logics used by different cultural groups to explain their value choices. The notion that people are not aware of their own socialization and value orientation is the vital element to Trompenaars & Hampden-Turner's conceptualization of culture. The authors see culture basically as the way groups solve their problems and reconcile dilemmas, enabling them to survive. Also, they propose that value orientations present a cultural group's solution to basic human problems that manifest from living together and interacting with the environment (Shaules, 2007). Trompenaars & Hampden-Turner's value orientations were derived primarily from the work of previous sociologists and anthropologists (Kluckhohn & Stodtbeck, 1961; Parsons & Shils, 1951, cited in Thomas, 2002).

The authors visualize culture as layers of an onion with basic cultural assumptions, the out-of-awareness element of culture, being located at the centre, while the more obvious parts of culture such as language, food, buildings, fashion, etc. are in the outside layer. In between, there are the norms, which are defined as the mutual sense a group has of what is right and wrong and the values which reflect a cultural group definition of good and bad and serve as criteria to choose between alternatives. Hence, norms define how one should behave, while values define how one wants to behave. Nevertheless, this imaging of cultures should not imply the thought of deep national culture as a fixed, quantifiable, predicted quantity. According to Trompenaars & Hampden-Turner, a deep cultural phenomenon is not a set of rules that people follow, but hidden interpretive frameworks (Shaules, 2007). Table 3-5 summarizes Trompenaars & Hampden-Turner's seven value orientations.

Trompenaars and Hampden-Turner's theory of Dilemma can be exploited to recognize differences among cultures and organizations (as cultural groups); however, the authors extended their research by giving more attention to ways of reconciling cultural differences and showing how managing complexity in a heterogeneous environment is a major challenge for international managers and corporate leaders. Moreover, reconciling

is a critical component of long term success and lends itself to creating a competitive advantage over other approaches. The authors advocate that as business becomes more global and diverse, culture becomes the defining issue; hence, focus on measuring the benefits of integrating cultural differences and facilitating realisation of benefits should achieve competitive advantage (Trompenaars & Woolliams, 2005).

Table 3-6: Trompenaars & Hampden-Turner's value orientations

Value dimension	Dilemma Type	Dilemma
Universal vs. Particular	Relationships between people	Should behaviour be regulated by universal rules, or an emphasis on particular context?
Individualism vs. Communitarianism	Relationships between people	Which contributes more to the common good? Emphasizing the development of the individual even at the expense of the group, or emphasizing the well being of the group even at the expense of the individual?
Affective vs. Neutral	Relationships between people	Should emotions be expressed freely or controlled?
Specific vs. Diffuse	Relationships between people	To what degree should we separate our lives into different realms or compartments?
Status of achievement vs. Performance	Relationships between people	Should status be awarded based on standards of achievement defined by individual, or standards that are formally recognized by society?
Time orientations	Relationships between people & Time	Does time follow a discrete, linear progression, or is it cyclical and adaptable to the needs of particular events?
Internal vs. external control	Relationships between people & Nature	Are humans fundamentally in control of nature & their own destiny, or is fate beyond human control?

Source: Shaules (2007)

Culture is a critical variable in explaining how social groups and individuals are different. Over the past three decades, progress in cultural research is evident through the development of a broadly shared framework conceptualizing the values that underlie cultural orientations across nations and presenting a key to understanding cultural differences. Studies within these frameworks have focused particularly on contrasts between cultures along a number of dimensions (Smith et al., 2003). However, the introduction of several alternative frameworks to study cultural differences among nations has provoked researchers to engage in a heated debate over which framework is

more comprehensive, parsimonious, and methodologically valid (Magnusson & Wilson, 2008). The following examples of such are illustrative but not exclusive:

Magnusson & Wilson (2008) examined alternative cultural distance constructs based on the cultural-value frameworks of Hofstede, Schwartz and Trompenaars (from the US perspective) for the purpose of investigating whether the more recently developed frameworks are more useful than the traditional Hofstede construct. The findings showed that Hofstede's cultural distance construct compares favorably to other indices.

Ng et al. (2007) used Hofstede's four dimensions and Schwartz's seven value orientations to calculate country distance scores for 23 countries and assessed the congruency between the two bases of cultural distance, in addition to their relationship with international trade figures, in order to understand how each framework predicts the amount of trade between countries. The results showed the two bases of cultural distances were not congruent in the trade context and that Schwartz-based cultural distance is superior to Hofstede's in predicting the amount of trade between countries.

Having presented the three common cross-cultural frameworks developed for assessment of cultural values and differences among these dimensions, the next section is devoted to presenting some of the studies that investigated technology acceptance in contexts other than the western world.

3.4.2. Research on Technology Acceptance in Different Cultural Contexts

The technology acceptance literature comprises models that have been established and developed in the western world and there has been a general concern about the explanatory value of the technology acceptance models when applied to non-western countries (Struab et al., 1997; McCoy et al., 2007). This section is dedicated to investigating literature related to this aspect of technology acceptance in different countries.

Straub et al. (1997) compared **TAM** across three different cultures (Japan, Switzerland and USA). The study was conducted in the airline industry among employees using the same technology (e-mail). The study was based on the argument that TAM would not necessarily hold across cultures. Hofstede's cultural dimensions were selected as a point of differences among the three countries hypothesizing that TAM would predict the American experience but would not be able to satisfactorily predict well the Japanese. Switzerland was chosen as a middle country between the US and Japan reading score on Hofstede's dimensions in relation to the computer-based media support index. It was hypothesized that the differences between the Swiss and the US model would not be statistically significant.

The results revealed that TAM was significant in explaining usage behaviour of email technology for both American and Swiss' cultures but not for Japanese. The PU construct was significant for both USA and Switzerland but not for Japan while PEOU construct was significant for all three. A possible explanation for this was that PEOU exerts only an indirect effect on usage (through PU) and its impact becomes less important over time. The results suggest that TAM may not hold equally well across cultures (Straub et al., 1997).

Hill et al. (1998) in a later year carried out a study of the Arab world. It was a qualitative study dedicated to the assessment of Arab culture and information technology transfer (ITT). Through focus groups with young Arab students enrolled in US universities and personal interviews with Arab businessmen and women residing in US, the authors presented linkages between information technology transfer and the sociocultural factors that support or impede successful transfer. Among those factors were social class and the degree of non-Arab influence associated with IT (outside technology influence on Arab social structure). The authors pinpointed the challenge faced by the Western world when transferring technology to this region, to understand the manner in which ITT takes place in Arab societies and the influence of sociocultural factors on ITT (Hill et al., 1998).

Rose and Straub (1998) investigated the applicability of **TAM** to the Arab world. They investigated whether explanations for IT diffusion (specifically TAM) which originated

in the developed world would also apply to developing nations and cultures. The technology investigated was general computing usage in five Arab countries (Jordan, Lebanon, Egypt, Sudan, and Saudi Arabia). The sample consisted of knowledge workers in various sectors such as airline, public and healthcare, and the organizations included in the sample presented IT diffusion at relatively high and low ends of the spectrum. Data was gathered through structured questionnaire. The hypotheses were tested using the partial least square method and the findings showed that PEOU is strongly related to PU and both TAM constructs impact system usage. PU mediates the relationship between PEOU and system use and the overall explained variance of the dependent variable (system usage) was slightly above 40 per cent, comparing favourably to prior TAM studies.

The results indicated that TAM transferred successfully to the Arab world. Nevertheless, the authors advised that caution must be used when interpreting these findings justifying bringing attention to the fact that social and cultural norms are also good predictors of technology use, hence, it is possible that overemphasis of rational factors could lead to setbacks rather than cultural acceptance. The Arab world as indicated in Hill et al.'s study (1998) has such a complex culture that practitioners and vendors should follow certain implementation and effectively tailored training strategies (Rose and Straub, 1998).

In a subsequent study, Staub et al. (2001) investigated how cultural influences impact the adoption of new technology and constraints placed on such adoption in the Arab world, using the same countries as the sample (Jordan, Egypt, Lebanon, Sudan and Saudi Arabia). The cultural aspect studied was the *Arab sense of time* which was supplemented with other beliefs in order to test the research model through a robust procedure. Two research questions were investigated: whether cultural beliefs influence the transference of IT in the Arab world, and whether contact with technologically advanced cultures impacts ITT and systems outcome. The samples were drawn from countries, organizations and individuals across the spectrum of IT penetration comprising professional and knowledgeable workers (e.g., mobile workforce) in urban areas across these countries. The individuals in the sample had spent considerable time in non-Arab countries working on higher degrees. This was considered one measure of technological

culturation (referring to the cultural exposure and experience that individuals have with technology originally developed in other countries) in addition to less formal measures such as reading foreign technology journals (or other resources), travelling for business or pleasure and keeping contact with family abroad in non-Arab countries.

Data collection methods consisted of conducting three focus groups with Arab student studying in Atlanta (USA) and structured interviews were tailored for Arab-American business persons including scenario creation techniques to assess participants' cultural beliefs and values, technology culturation and systems outcomes. Data analysis revealed the existence of two technological culturation variables (informal and formal). Using Linear Structural Relations modelling (LISREL), the results showed that the informal technology culturation (TC) factor had a significant impact on system outcomes whereas the formal did not. Further analysis suggested that both culture specific beliefs (sense of time) and technology culturation significantly affect information technology transfer, and that cultural beliefs and values showed a much stronger effect than did technology culturation. Based on their results, authors extrapolated that successful transfer of IT into organizational / business workplaces in culturally and socially diverse countries requires an understanding of the micro-level beliefs, norms, and actions within the framework of national and international macrostructures (Straub et al., 2001).

Drawing on the theoretical work of Hill et al. (1998) and Straub et al. (2001), Loch, Straub and Kamel (2003) investigated the diffusion of the Internet in the Arab world focusing on the role of social norms and technological culturation. The study investigated two types of behavioural acceptance (individual and organizational). The sample consisted of savvy Arab Internet users attending a conference on the Internet in Egypt. Measurement for the subjective norm took a formative form and was measured by the extent of time spent by employees using the internet and how well computers were accepted in Arab societies (which differs from the traditional measurements of SN in technology acceptance models previously mentioned).

Results showed that the sample did not report significant exposure to the Internet (70 percent only used the Internet for email services); a strong majority of respondents also indicated that its acceptance was not without significant reservation. 46 percent expressed

concern that family and community life might be threatened by the internet, while 58 percent disagreed that computers were well-accepted in Arab society and 40 percent disagreed that that the Internet would have a positive impact on the Arab family and community ties. Nevertheless, the social norms along with technological curation explained 47 percent of the variance in the model (Loch et al., 2003).

Al-Gahtani (2003) investigated Rogers's innovation attributes as potential contributing factors to computer adoption in Saudi Arabia. The study attempted to test whether the innovation diffusion research originated in technologically developed societies is viable when applied to less developed countries. The sample consisted of knowledge workers in both public and private medium and large organizations of different managerial levels across a wide spectrum of industries across the Saudi Kingdom. A questionnaire was administered to collect data. Findings showed that the innovation attributes descended in the following order according to their strength in explaining computer use in the Saudi sample: observability, compatibility, complexity, relative advantage, and trialability. The results differed from the western results where relative advantage is normally the strongest attribute related to usage behaviour (equal to PU in Davis' TAM). The results indicated that diffusion of innovation research is supported in developing nations although the relative impacts of these attributes on computer adoption may differ among societies (Al-Gahtani, 2003).

Anandarajan et al. (2003) investigated the application of **TAM** in different cultures, an extension where social pressure (coming from TAM's origins, TRA) and perceived enjoyment (intrinsic motivation) were added to the model. This motivational model then was applied to Nigeria (a less developed country) to examine the factors which motivate bank employees to use microcomputers.

The authors acknowledged the cultural differences between less developed countries and developed ones; hence they hypothesized different directions for the relationships between the model variables. They stated that cultural dimensions such as abstractive versus associative indicate a different pattern of perception and thinking that affect various aspects of individuals' behaviour. They explained that in abstractive cultures,

which prevail in North America and Europe, individuals' thinking and behaviour take a linear pattern using a rational cause and effect paradigm to create perception; while in associative cultures, which are found in regions such as Africa, Asia, and the Middle East, perceptions and behaviour are often diffuse (i.e., they utilize associations among events that may not have a logical basis). Thus, they hypothesized that in associated cultures such as Nigeria, and contrary to results from abstractive cultures, perceived usefulness (PU) would be negatively related to microcomputer usage and so would perceive enjoyment.

The data for this study was gathered through a questionnaire administered to employees in six banks in Lagos. Data analysis using partial least square (PLS) was used to test the hypothesized relations among the study variables. Results showed that perceived usefulness (PU) and perceived enjoyment were not factors which motivated bank employees to use microcomputers in Nigeria (both had no direct effect on usage). By contrast, social pressure was a strong motivating factor for microcomputer usage. In addition, the antecedent variable of perceived ease of use (PEOU) had a strong influence on PU as well as microcomputer usage. The authors explained the results in light of the cultural differences; contrary to the western world, Nigerian culture is dominated by low individualism and moderate to high uncertainty avoidance. Individuals are mainly oriented by work only as much as needed to be able to live; thus bank employees in this study followed their managers' directives and used computers regardless of accrued benefits.

The authors stated that the result of their study led to an interesting question regarding TAM boundaries, suggesting that TAMs' external validity (generalizability) in other cultures is questionable (Anandarajan et al., 2000).

Bagozzi et al. (2000) investigated the usefulness of the **TRA** model (generalizability of TRA) for fast food restaurant patronage decisions among eastern and western samples depending on social setting (eating alone or among friends) and cultural orientation (independent versus interdependent). The authors expected that since TRA was developed in the western world that it would apply more fully to US/ Italy than to Japan/ China. Furthermore, the magnitude of the effect on intentions and behavioural

expectations would be greater for Western than Eastern world, more variation in the dependent variable would be explained for Western than for Eastern cultures, and the effect of subjective norms on intentions and behavioural expectations would be greater for Eastern than Western cultures.

Data collection took place in the four countries with undergraduate students as the unit of analysis. Results were partly consistent with expectations, attitude and past behaviour predicted intentions and behaviour expectations except for China, where subjective norms were a stronger predictive for eating alone or with friends. Also, results showed that attitude and past behaviour had a stronger impact on intentions and behaviour expectations for the American than any other group. Likewise, the effect of subjective norms on intentions and behavioural expectations was greater for the Chinese than for Americans and Italians, as hypothesized, but the effect was of equal magnitude for Americans, Italians, and Japanese, contrary to predictions. The explained variance in intention and behavioural expectations across cultural groups showed, as expected, a greater amount of explained variance for Western than Eastern cultures (for American specifically) (Bagozzi et al., 2000).

Mao and Palvia (2006) tested an extended model of IT acceptance in a Chinese cultural context. Their model was a combination of TRA, DOI and TAM, hypothesizing that behavioural beliefs of TAM and DOI constructs (PU, EOU, compatibility, visibility, trialability, result demonstrability and image) would have a positive effect on attitude while normative beliefs would have a positive effect on subjective norms, which would effect behavioural intentions. A direct path from PU to behavioural intention was also included since it had been established in TAM literature. A cross sectional survey was carried out in 30 Chinese companies examining email technology usage. Results showed that the research model demonstrated good predictive power. Salient behavioural beliefs, except for EOU, trialability and image, were significant determinants of attitude. The authors explained such results in light of Hofstede's cultural dimensions and provided two reasons for the PEOU result: they suspected that EOU is a short-term oriented belief which may not be salient for Chinese IT users who tend to focus on long-term beliefs and also the negative connotation in the construct that undermines the importance of learning

which is a treasured long-term value for Chinese culture. For these two reasons, the authors suspect that EOU is an implicit rather than explicit requirement for technology acceptance in China. As for the result of trialability, it is consistent with previous findings, which indicates that trialability is only salient before adoption and afterwards it become irrelevant. Finally, image result can be explained by the lack of authority and email thus is not perceived as a status symbol. Other results showed that the comparative strengths of usefulness, attitude and subjective norms on behavioural intentions are different. The authors found usefulness effect on intention to be the strongest (resulting from experience). Nevertheless, between attitude and subjective norms, norms play a more important role than attitude in influencing intention. The authors saw this as an indicator of collective culture where people base their behaviours more on others thinking than on their own attitudes (Mao & Palvia, 2006).

A meta-analysis was carried out to investigate the influence of the subjective norm variable in TAM based research, the influence of using students as population, applying the research model to the usage of a specific type of technology, and the culture aspect influence on the effect size of TAM's relationships. In constructing the effect size, articles that were published after the publication of TAM in 1989 were considered according to certain criteria (empirical testing, holding the integrity of TAM construct relationships, having a well described research methodology, and the availability of cross-sectional correlation matrix for analysis purposes).

The resulting articles/ studies were further categorized accordingly: student versus non student samples, microcomputer versus non microcomputer technology, and Western versus non-Western users. Western users covered studies in North America, Europe, Australia and New Zealand while non-Western users covered the rest of the world.

The conceptual model included the two TRA variables (TRA constitutes the origins of TAM): attitude and subjective norm in addition to TAMs' variables of PU, PEOU, behaviour intention, and actual use. All possible relationships between the six variables were included in a correlation analysis (yielding a total of 15 pair-wise correlations), which resulted in varied findings. Only two relationships involving the subjective norm relation with PEOU and attitude were insignificant, however most relations were

significant. Therefore, the availability bias was calculated and results showed that two further relations were insignificant as well: subjective norm - actual use and attitude - use. However, all other pair-wise relations were significant, which confirms the fact that they play a key role in determining technology adoption. Results indicated that using a student sample seriously affected the relationships. Students displayed a moderating effect such that the relationships displayed stronger effect size for students than for non-students. Also, the technology under consideration was found to have a moderating effect with correlation being lower in a microcomputer than a non-microcomputer setting. Finally, comparison of Western versus non-Western studies showed that seven out of the fifteen pair-wise relationships were affected. Subjective norm had a larger impact on behavioural intention in the Western studies which is an interesting result since Western countries are characterized by individualism, with lower power distance indicators according to Hofstede's dimensions. Furthermore, PU seemed important in Western cultures, while PEOU had more relevance in non-Western studies. This is contrary to what Mao and Palvia (2006) reported for their results on China, a non-Western country, which showed PU to be the most important determinant for behavioural intentions. However, the findings of this meta-analysis confirm previous results where TAM generalizability is concerned (Schepers and Wetzels, 2007).

Srite (2006) examined technology acceptance behaviour across two cultures, the US and China, using an extended version of TAM, which includes the subjective norms variable. The author examined Hofstede's cultural dimensions on the research model separately for the two cultures and then used the scores to explain the differences across the results. Based on a T-test, the cultural scores for both countries were not significantly different on two dimensions, power distance and uncertainty avoidance, but were significantly different on masculinity and collectiveness (with China scoring higher on both).

Data were collected using student subjects at a large university in the US, where international Chinese students were solicited to complete the survey, in addition to a random sample from US nationals. Analysis using PLS was carried out for the separate samples, and results showed that subjective norms affect behavioural intention for the

Chinese sample. The opposite was true for the US sample. The author justified this on the basis that China's cultural score is high on collectivism, whereas the US score is high on individualism. A second major difference between the two samples was the influence of perceived ease of use on behavioural intention to use, which was insignificant for Chinese sample. The author justified this on the basis of Hofstede's dimension of masculinity, indicating that the US is less masculine than China (based on the cultural scores) in the sense that they might be more concerned with perceived ease of use, which places less emphasis on instrumental goals and more on quality of life. However, this line of explanation failed to justify the result for the perceived usefulness-behavioural intentions path, which was significant for the US sample but not so for the Chinese sample. The author suspects that other non-measured constructs might be impacting this relationship so that it overwhelms the effect of masculinity/femininity. The author suggests computer efficacy, quality of life, or perceived behavioural controls as potential candidates for this inhibitor.

Moreover, the author suggests another explanation, such as that perceived ease of use and perceived usefulness, is less important in a collectivistic culture; however, there is a need for more research on this aspect.

McCoy et al. (2007) used cultural dimensions provided by Hofstede's cultural framework to understand their implications on the TAM and whether TAM holds for countries that score very high or low on Hofstede's four dimensions. A sample of students from colleges and universities in the US and abroad using online teaching techniques were solicited to complete an online survey. Data were rank ordered for each cultural dimension, enabling the grouping of the top high and the top low groups (400 responses each) for each dimension. Path analysis revealed that certain paths did not hold significant for all cultural groups. For instance, perceived usefulness-behavioural intention (PU-BI), EOU-BI and EOU-PU paths were not significant for people who scored low on the uncertainty avoidance cultural dimension. Paths PU-BI and PEOU-BI were not significant for people who scored high on power distance, and the PEOU-BI path was insignificant for people who scored high on both masculinity and collectiveness.

Such results demonstrate that the TAM model did not hold across all countries and that caution is needed when applying TAM in at least 20 countries.

Merchant (2007) explored IT adoption and its relationship with national culture among employees within three different countries, the US, France and China. The study relied upon a conceptual framework outlined by Harrison (1975). The choice of framework was based on its strength compared to alternative frameworks, mainly for being directed to employees currently on the job, in addition to the availability of a measurement scale for the four organizational dimensions: power orientation, role orientation, task orientation and person orientation. Merchant added to the Harrison scale questions related to technology acceptance model (TAM), asking respondents to consider new technology introduced into their organization that they directly interacted with. The exploratory factor analysis showed that TAM's constructs did not load as they should for China and France; hence TAM was not validated in these countries successfully within the context of Harrison framework. The author attributed this to cultural differences.

An attempt to validate the unified theory of acceptance and use of technology (UTAUT) model across nine culturally diverse countries was the focus of Oshlyansky et al.'s (2007) study. Data on general use of websites were collected from undergraduate and postgraduate students from all countries sampled. The country list included the US, UK, South Africa, Saudi Arabia, New Zealand, Malaysia, India, Greece and Czech Republic. The model examined for this study has excluded some variables. Since the research did not seek to predict usage or acceptance of a particular application, behavioural intention to use was dropped, as it is intended as a predictor of use, and facilitating conditions was excluded because the chosen technology, websites, would be available and accessible to all participants. To ensure that these changes did not affect the overall validity of UTAUT, an analysis of the data from English-speaking only countries (New Zealand, UK and US) was done. The UTAUT instrument was translated into six languages: Arabic, Czech, Dutch, French, Greek and Malay. Only native participants were used in the analysis to ensure a truly representative homogeneous country sample. The samples were matched for age, education and access to technology and were equally balanced by

gender. A country-by-country analysis of UTAUT provided evidence that the questionnaire was working as intended in each of the sample countries and that translation did not hinder the performance of UTAUT. Principal Component Analysis was used to determine factors in the data set. All factors loaded together across the sampled countries, although some constructs had different amounts of influence in some samples. For example, social influence variable only emerged for the Saudi Arabia sample, indicating that this variable has greater weight on website acceptance in that country than in the other countries sampled. On the other hand, the anxiety variable did not load only for the Czech sample indicating that anxiety is not a strong influence on website acceptance in that country. However, the results showed that the UTAUT model is robust enough to withstand translation and to be used cross-culturally, outside its original country and language of origin, indicating that the UTAUT model can be useful in providing insight into cross-cultural technology acceptance differences.

Singer et al. (2008) applied Hofstede's four cultural dimensions to test the ability of CitiBank's websites to respond to the cultural imperatives in countries where they have established business branches. The focus of the study was on testing the ability of managers at Citibank to address the cultural proclivities that affect TAM's constructs (perceived usefulness and perceived ease of use) at different country locations. A second objective was to understand how culture impacts the attributes of the bank website in terms of language, people and background. Data were collected on a number of banks websites in 63 countries and 45 Citibank country-specific websites. In each country, Hofstede's cultural dimensions were defined as the difference between world values and the value for that specific country. By comparing the readings for the other banks' mean scores to those scores of the Citibank website and using ANOVA analysis, the findings showed that the form and content of international online banking web sites are sensitive to the cultural factors of individualism, masculinity, power distance and uncertainty avoidance. Moreover, the use of language, individuals and background displays were all seen as factors sensitive to the cultural constructs. Citibank websites were not less competitive in that respect, as they, too, have adapted their sites to language, people and background, to local preferences and with respect to Hofstede's four cultural attributes.

3.5 Summary of Cultural Dimension and Technology Acceptance Research

A review of the common frameworks utilized in the examining of cross-cultural differences was briefly presented, with supporting literature on where these frameworks stand in the field of cross-cultural studies. Cultural influence on the information systems discipline was also presented, and literature on culture impact on acceptance and use of technology was briefly reviewed. From this brief review, it seems that not all research examining models of technology acceptance in cross-cultural contexts is conceptualized or based on the aforementioned cultural values and dimensional frameworks of Hofstede, Schwartz, or Trompenaars. Most literature on technology acceptance that focused on the viability or transferability of the models to other non-western nations has done so by examining the models without examining culture (not a moderator, not a main variable effect or comparing the examined locations on the national cultural scores). Nevertheless, both approaches of investigating culture and technology acceptance have one thing in common: neither could establish that technology acceptance models developed in the US are fully transferable or applicable to all other nations, and some research even showed that it is not fully applicable in other western nations such as France (e.g., Merchant, 2007).

This leads to the conclusion that cultural values are not necessarily universal in this context and that local culture has a bearing on the choices made by individuals.

3.6 Part Three: Online Behaviour and Websites' Quality

The pervasiveness of the Internet in all business domains and the importance of this channel in producing the promised benefits that materialize with the Internet presence demand the efficient design of the access gate or the website. A stream of prior research is dedicated to website design and quality that promotes online behaviour. . A review of some of the research in this area follows, relating to banks' websites, portals or other service and product providers interested in e-business.

Bauer et al. (2005) investigated the concept of service quality in e-banking portals and developed their service quality model. A portal here refers to an integrated business model where consumers have a one-point shop for the financial services provided by a bank. Portals add advantages compared to simple websites since they are regarded as holistic business models. Hence, portal quality was conceptualized as the extent of perceived performance of three fundamental service components delivered by the portal. These dimensions include: *core service quality* which includes offering a broad and deep range of classic bank products (payments, bonds, and stocks), ease of use, comprehensiveness, credibility and trustworthiness, security of payment and data transfer, and, reliability of technical potential/ tangibles; *additional services quality* which is explicitly demanded by the consumer such as offering branded financial products, offering online loans, and , experience quality and entertainment; *Solution services quality* which reflects the provider's responsiveness to consumer problems and includes variety, offering non-bank products and services, providing individual advice and recommendations, personalizing information and conditions, providing interactive decision support tools; and, offering newsgroups/ communities.

The quality items were then measured according to a performance-only scale developed by Cronin and Taylor (1992) with their SERVPERF approach and advocated by Huizingh (2002, as cited in Bauer et al., 2005) for assessing websites. Using exploratory factor analysis resulted in minimising the 80-item instrument into six dimensions: security and trust, basic services, cross-buying services, added value, transaction support, and responsiveness. Later the six dimensions were categorized under the three portal dimensions mentioned before as illustrated in Figure 3-4.

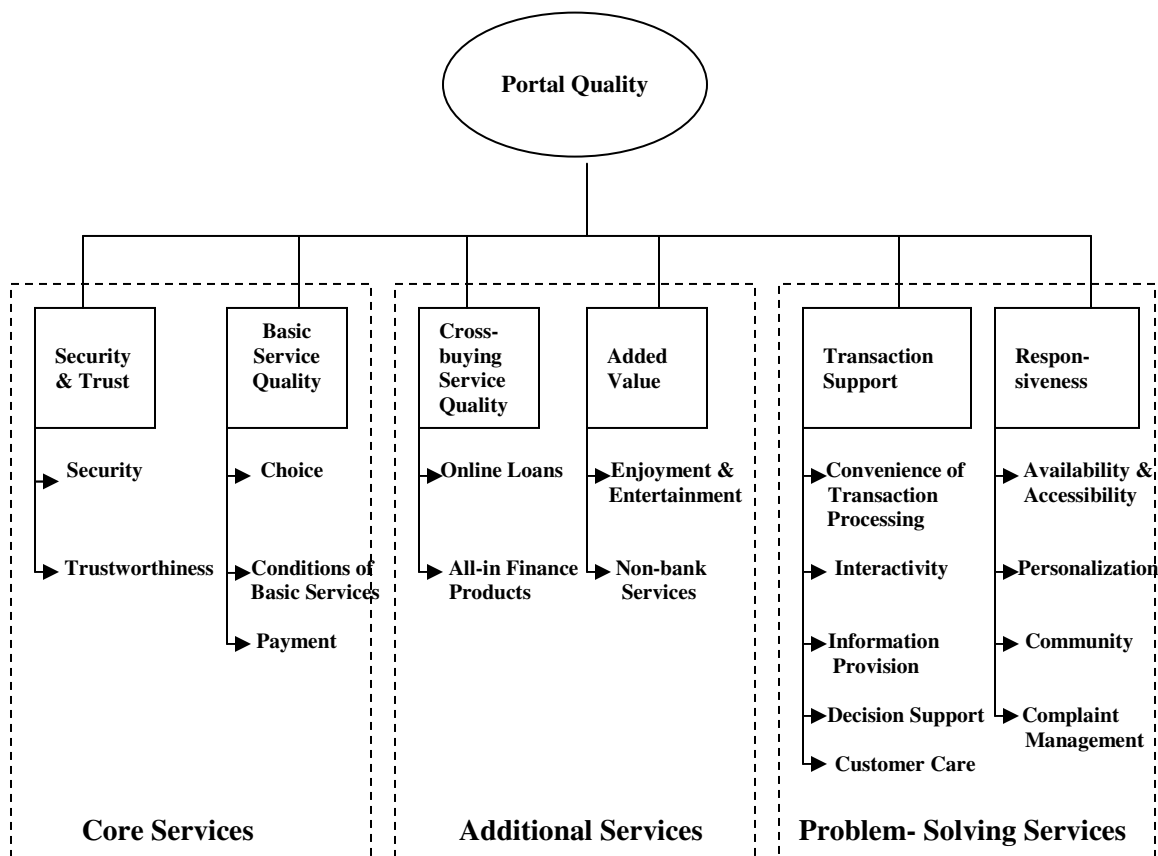


Figure 3-4: The validated measurement model of portal quality

Source: Bauer et al. (2005)

The authors acknowledged that the assumption of a universal perception of service quality on the Internet was not adequate; instead the assumption of varying quality dimensions across industries was confirmed. Consequently, the e-banking portal quality could not be described as a one-dimensional customer rating; instead, it represented a multi-dimensional and multi-factor construct, which is composed of partial quality judgement with regard to the portal's diverse service categories (Bauer et al., 2005).

Website quality, services quality, trust and overall satisfaction were investigated by Floh and Treiblmaier (2006) as antecedents to online banking loyalty. The framework of their study included one exogenous variable (website quality), three mediating variables (service quality, overall satisfaction, trust) and five moderating variables (gender, age, involvement, variety seeking behaviour, and technophobia). Website quality was

measured from users' perspective and covered dimensions such as design, structure, and content. Service quality was reflected through affective measure.

A survey and mailed questionnaires were administered to a random sample of Austrian online banking and financial industry customers. The data was split into two samples. Sample one was used for testing hypotheses and sample two was used for validating the structure of the final model. The results confirmed that the loyalty of e-banking consumers is directly affected by satisfaction and trust in an online context, which in turn are determined by website quality and service quality. Website quality had a direct and indirect impact on both satisfaction and trust. Among the factors that accounted for the perceived quality of the website, avoidance of downtimes was extremely important.

Moderators such as gender suggested that the influence of website quality –service quality- overall satisfaction is significantly higher for men than for women. Service quality for men is more important in explaining satisfaction. Results related to age showed a moderating positive effect for this variable with all links hypothesized. Younger respondents rated the importance of website quality and service quality significantly higher than elderly people. The moderating role of involvement showed that high- involvement people have a higher perception of website quality and service quality and more loyal to an online bank than low-involvement people. Variety seeking moderator effect showed mixed results while technophobia had a negative moderator effect on the relationship between service quality and satisfaction. Service quality is more important for people with low technophobia (Floh and Treiblmaier, 2006).

Gan et al. (2006) examined consumers' choices between electronic banking and non-electronic banking in New Zealand. The consumer decision-making process regarding the use of electronic banking was hypothesized to be a function of service quality with its dimensions of reliability, assurance, and responsiveness; perceived risk factors such as financial risk, performance risk, physical risk, social risk, and psychological risk; user input factors such as control, enjoyment, and intention to use; price factors referring to costs such as costs associated with e-banking and bank charges; service product characteristics such as core services, service features, service specifications, and service targets; individual factors referring to consumer knowledge, and consumer resources;

and finally, demographic variables such as age, gender, marital status, education, annual income, ethnic background, area of residence, and employment level.

Data for the study was obtained through a mail survey sent to households to gather information on their decision to use e-banking versus non-banking services. The sample was systematically drawn from the 2003 telephone book. The sample profile showed that nearly 73 percent were e-banking users, while 27 percent considered themselves as non users. The distribution of the two groups in terms of demographic variables were similar (particularly in terms of marital status, gender, ethnic background, and area of residence) but were different in terms of age, occupation, annual income, and education qualification. The non users were older and encompassed a higher proportion of retired respondents. Their annual income was slightly lower than e-banking users as was their education qualifications compared to users’.

The results of the analysis indicated that service quality dimensions and user input factors have a positive impact on consumers’ likelihood to use electronic banking. Perceived risk factors were found to have a negative effect on e-banking use probability. Demographic variables such as age, employment, education, income, and residence were also significant in explaining the respondents’ probability of using e-banking services. For example, senior consumers are more risk adverse and prefer a personal banking relationship. High income respondents prefer to deal directly with the bank staff for complex transactions and handling large sums of money and for security reasons. In addition respondents who reside in a rural area were positively linked to e-bank usage. Finally, white collar, unemployed, students and house persons had a strong probability of using e-banking services since it presents a low cost channel due to reduced travel costs (Gan et al., 2006)

Aladwani and Palvia (2002) developed an instrument that captures key characteristics of website quality from the user’s perspective. Perceived web quality was defined as a user’s evaluation of a website’s features meeting the user’s needs and reflecting overall excellence of the website. By reviewing the academic literature and relevant trade press

articles, the authors acknowledged the literature was fragmented and concentrated on one aspect of website quality, however, they identified three dimensions of web quality: technical adequacy, web content, and web appearance. The scale design focused on constructs' validity and reliability analysis and the formulation of a questionnaire including the items measuring the constructs. Data collection and factor analysis of the 30 item instrument revealed that there were four web quality dimensions instead of three. It was found that the web content is a two-dimensional construct: *specific content* reflecting concerns related to finding specific details about products, customer support, privacy policies, and other important information; and *content quality* dealing with attributes as information usefulness, completeness, accuracy and so forth.

To verify and validate the four dimensions of perceived web quality, the 25 item instrument was tested to a new data set. The four dimensions explained 67 per cent of the variance in perceived web quality. According to the authors the instrument is precise, easy to use and can be utilized to evaluate web quality at an aggregate level (Aladwani and Palvia, 2002).

In latter years, Aladwani (2006) proposed a model that has its root in Davis' TAM and considered as an extension of the earlier work carried out by Aladwani and Palvia (2002). The model examined the influence of the four sub-dimensions of website quality on attitudes and purchase intentions of web consumers. The four dimensions to web quality are defined as:

- 1- ***Technical Quality***: refers to technical characteristics of the website such as security, ease of navigation, search facilities, site availability, valid links, personalization or customization, speed of page loading, interactivity, and ease of access.
- 2- ***General Content Quality***: refers to characteristics such as content usefulness, completeness, clarity, currency, conciseness, and accuracy.
- 3- ***Specific Content Quality***: refers to characteristics found on the website such as finding contact information, a firm's general information, product/service details, consumer policies, and customer support.

- 4- ***Appearance quality***: refers to characteristics of the website such as attractiveness, organization, proper use of fonts, colours and proper use of multimedia.(Aladwani, 2006)

The author hypothesized links between website quality dimensions and attitudes towards the website, and another direct link between website quality and intention to purchase. The research model acknowledged the relationship between purchase intentions and the actual purchase from the website but did not test this relationship due to limitations related to the selected sample. Using stepwise regression, the results showed that the dimensions were significant predictors of consumers' attitudes with specific content and appearance quality dimensions having a higher effect size on website attitude than technical and general content quality dimensions. The results also showed that only consumers' attitudes and technical quality had a significant influence on consumers' intentions to purchase from the website (Aladwani, 2006).

Blake et al. (2005) investigated how websites can be configured to attract online shoppers, specifically initial shoppers. The objective of their study was to explore the types of website features that draw innovators and experienced users. In their study they reported on findings from other studies concerned with website features that have a bearing on consumers' perceptions such as security and the correlate risks, approval of referent others, feature organization, quality of content, price, recognisability and / or desirability of brand, and time delay/ download speed. Other functional features specified by Srinivasan et al. (2002, cited in Blake et al., 2005) that impact consumer loyalty to a site included: (1) customization; (2) content interactivity; (3) cultivation; (4) care; (5) provision of structure to facilitate exchange of opinions/information; (6) product variety; and (7) character (i.e., text, graphics, slogans, etc. projecting an image or personality of the merchant).

Other functions include navigability, communication utility, entertainment value, convenience, flow, and interactivity. Also from consumers' point of view, features that individuals employ to evaluate a site's appeal include three dimensions of entertainment,

informativeness, and organization of the site. Alternatively, consumers might use four criteria: ease of use, aesthetic design, processing speed and security.

In their research framework, the authors depended on Rogers's theory (DOI) for innovation attributes that tend to affect rate of adoption, and features suggested by Torkzadeh & Dhillon (2002) which proposed that consumers value websites based on four fundamental factors (shopping convenience; internet ecology; customer relations; and product value) and five means factors (product choice; online payment; vendor trust; shopping travel; and shopping error). Internet ecology and shopping travel were removed from the measuring scale since they clearly related to consumer online shopping evaluation rather than to comparative evaluation of particular websites.

The authors had expectations regarding the effect of innovativeness and Internet experience on the appeal of website features. They expected that effect would be different for two types of features: form ("how one gets" that is the form of the shopping interaction) and substantive features ("what one gets" such as cost, product quality, post purchase services, etc.). The results of discriminant analysis revealed such a pattern. High innovative users wanted website features that make shopping more convenient (form features) and highly experienced users were more keen than less experienced users on features related to product value (substantive features). The results also showed that more innovative and more experienced individuals would have stronger preferences for the typical website than would others, and would have a higher propensity for online shopping than individuals who are high on only one of the two characteristics, innovativeness and experience (Blake et al., 2005).

Lee and Lin (2005) developed a research model to examine the relationships among e-service quality dimensions and overall service quality, customer satisfaction and purchase intentions. The study aimed at identifying the main influence on online shopping service quality, using a modified version of the SERVQUAL model. The research model included website design, reliability, responsiveness, trust, and personalization as dimensions for the dependent variable e-service quality. It was hypothesized that these

dimensions would have a direct effect on overall service quality and customer satisfaction. A direct link was also hypothesized between overall service quality and customer satisfaction as well as a direct link from overall service quality and customer satisfaction to purchase intentions. A questionnaire was used to collect data from final year undergraduates in Taipei, Taiwan attending a course in e-commerce which involved buying a book online. The results showed that all e-service quality dimensions are positively related to overall service quality and customer satisfaction except the personalization dimension which showed no significant relations. The other paths hypothesized in the model were found to be significant. According to the strength of significance the dimensions can be listed as: trust, reliability, responsiveness, and website design. The author concluded that website design is an important means to provide customer usefulness and ease of use during an online transaction process and thus should not be underestimated. Particularly, website design should be readable, and the user interface should be visually appealing and organized allowing the users to navigate the website easily (Lee and Lin, 2005).

Bauer, Falk, and Hammerschmidt (2006) developed a comprehensive framework to capture all relevant quality aspects of the e-service. The “eTransQual” is a transaction process-based approach that captures service quality in online shopping. It takes into account the reportedly missing aspects in previous approaches: enjoyment of website use (hedonic intrinsic motivation) and after-sale support. The research model consisted of the transaction stages depicted in Figure 3-5. A questionnaire was used to collect data from one market research company’s online panel. Applying confirmatory factor analysis along with reliability analysis to the data collected, the results showed the extracted five quality dimensions of eTransQual which were defined as: responsiveness, reliability, process, functionality/ design, and enjoyment. The model also contained elements of measurement for each dimension.

Relationships were tested between the eTransQual quality dimensions and the dependent variable: overall service quality of the website, perceived value, and customer satisfaction.

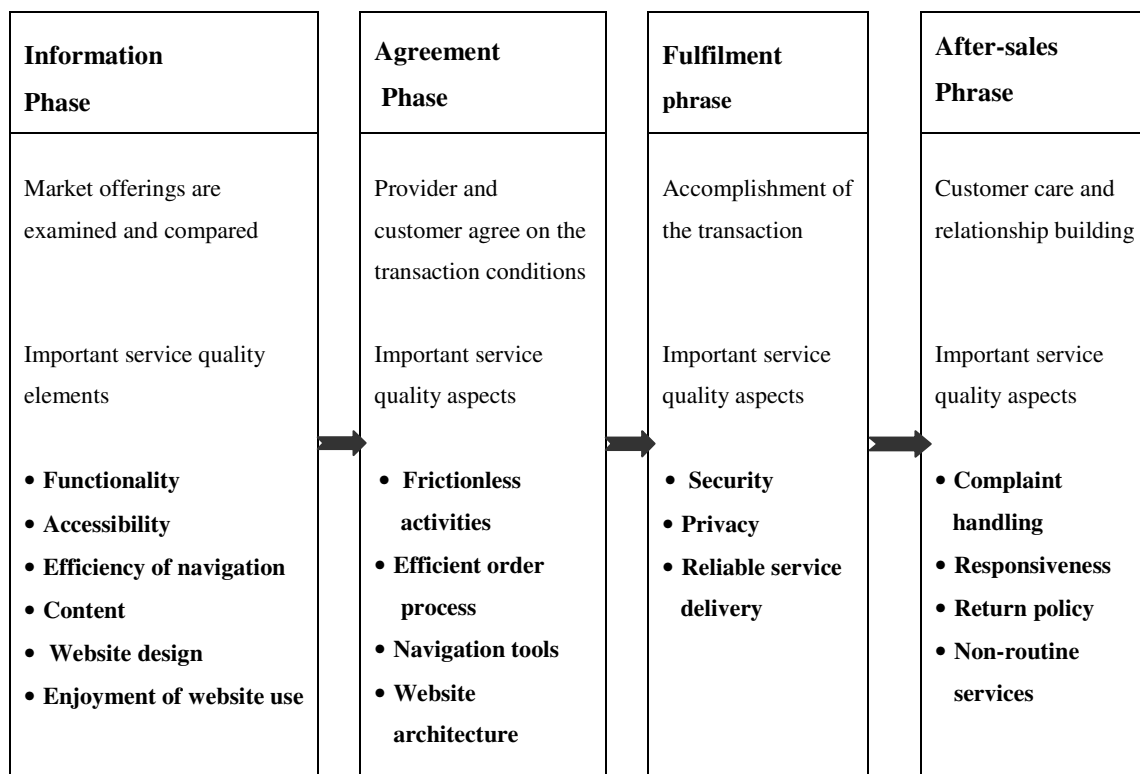


Figure 3-5: “eTransQual”- Transaction Stages
Source: Bauer, Falk, and Hammerschmidt (2006)

Results showed that all dimensions had a strong significant impact on the overall service quality judgement with the reliability dimension being the strongest followed by functionality /design, responsiveness, and enjoyment and process. On the other hand, functionality/ design followed by reliability then process were the strongest factors predicting consumers’ perceived value. As for customer satisfaction, reliability, function/design, responsiveness, followed closely by process were the strongest factors affecting consumer satisfaction. Reliability seemed to be the most powerful driver for all independent. Based on the dimensions measurement, the authors concluded that the aesthetic appeal of the website and its relation to user’s judgment of the functionality and usability of the website were important. They stated that the findings suggested that users strongly associate the efficiency of a website and the quality of the content with the visual appeal of the website design (Bauer et al., 2006).

Delon & McLean (1992) developed what was, afterwards, called D&M IS Success Model, where they argued that the MIS purpose is to achieve IS use and user satisfaction, which leads to achieve the organizational sought impact, IS success. Their efforts resulted in a model, which propose system quality (measurement of the information processing system itself) and information quality (measurement of information system output) as antecedents to use and user satisfaction. During 1992-2002 the model was tested and referenced beyond the authors' expectation, which encouraged them revisit the D&M IS Success Model in a second publication reporting ten years of update. In their 2003 article, they supported the addition of service quality to system quality and information quality as a component of IS success and this was included in the updated version of their model. They stated that System Quality in the online environment measures characteristics such as usability, availability, adaptability, reliability and response time (i.e., download time), which are qualities valued by users of e-commerce; Information Quality captures the web content issues of e-commerce such as personalisation, completeness, relevancy, ease of understanding and security; and Service Quality reflects the overall support delivered by service providers such as empathy, assurance, and responsiveness. Usage, in the same context, measures nature of use, navigation pattern, number of site visits, and number of transactions executed (Delon & McLean, 2003).

Nelson et al. (2005) developed and tested a model that explains how various systems and information attributes influence information and system quality; consequently, system and information satisfaction, and ultimately, user satisfaction. The model comprised nine fundamental determinants of quality in information technology context. The four determinants that describe information quality (the output of an information system) are: accuracy defined as the degree to which information is correct, unambiguous, meaningful, believable and consistent; competence defined as the degree to which all possible states relevant to the user population are represented in the stored information; currency defined as the degree to which the information precisely reflects the current state of the world it represents; and format defined as the degree to which information is presented in a manner that is understandable and interpretable to the user and thus aids in the completion of a task. The five determinants that describe system quality (the

information processing system required to produce the output) are: accessibility, defined as the degree to which a system and the information it contains can be accessed with relatively low effort; reliability, defined as the degree to which a system is dependable (e.g., technically available) over time; response time, defined as the degree to which a system offers quick task-related (or timely) responses to requests for information or action; flexibility defined as the degree to which a system can adapt to a variety of user needs and to changing conditions; and integration defined as the degree to which a system facilitates the combination of information from various sources to support business decisions (Nelson et al., 2005).

Wixom & Todd (2005) developed an integrated model that distinguished beliefs and attitudes about using the system in an attempt to build a theoretical logic that links the user satisfaction and technology acceptance literature. Their model comprised TAM's constructs (PEOU, PU, attitude, and intention behaviours) and Nelson et al. determinants of information and system quality in the user satisfaction model. They hypothesized that the determinants of information and system (object-based beliefs) impact information and system satisfaction (object-based attitudes), which impact PEOU & PU (behavioural beliefs) that, in turn, impact attitude (behavioural attitude) and finally intentions. The results showed that the proposed influences of object-based attitudes on behavioural beliefs are demonstrated by the significant relationships between information satisfaction and usefulness, and between system satisfaction and ease of use. Hence, the findings supported the applicability of information and system satisfaction as external variables to the traditional TAM beliefs about usage behaviour (Wixom & Todd, 2005).

Schaupp et al. (2006) investigated four variables believed to impact website satisfaction. These variables included: *information quality* defined as the degree to which information produced by the website is accurate, relevant, complete, and in the format required by the user (this was measured through the attributes of: content, accuracy, and format); *system quality* defined as the degree to which the system is easy to use for the purpose of accomplishing some task; *perceived effectiveness* defined as the degree to which individuals believe that using the website will help them accomplish some task; and

social influence defined as the degree to which an individual perceives that others believe he/she should use the website. Website satisfaction was defined as the degree to which the user is satisfied with the website in question.

Two categories of website goals were chosen to perform an initial comparison (online community and information specific search). A survey was conducted among actual users of such websites. Results for the information specific search websites showed that information quality, system quality, and perceived effectiveness were significant predictors of website satisfaction. This was found a significant predictor of intention to reuse the website. Results for the online community showed that information quality, perceived effectiveness, and social influence were significant predictors of website satisfaction. This was found a significant predictor of behavioural intentions. System quality was not found to significantly predict website satisfaction (Schaupp et al., 2006).

Ahn et al. (2007) investigated the effect of playfulness on user acceptance of online retailing and usage. The authors also tested the relationship between the web quality constructs: system quality, information quality, and service quality, and perceptions of playfulness, usefulness, and ease of use. The scale measures were derived from previous research i.e., Aladwani & Palvia (2002). Structural equation modelling results showed that the three web quality constructs had significant impact on behaviour intention to use mediated by user's intrinsic beliefs, such as playfulness, ease of use, usefulness, and attitude.

3.7 Summary of Online Behaviour and Websites' Quality

From the previously presented studies on website quality, a summary is drawn with regard to the importance of the website quality, the dimensions investigated, and the resemblance that is noted among these dimensions.

As indicated by the work of Floh & Treiblmaire (2005), website quality, with its dimensions of design, structure and content, is an important factor for achieving customer satisfaction. However, information quality of content, accuracy, format, system quality,

perceived effectiveness and social influences have different weights in achieving website satisfaction. Information quality and perceived effectiveness are important factors when assessing website satisfaction. Social influence is important for the community's satisfaction assessment, while system quality is important for search engine websites (Schaupp et al., 2006).

On the other hand, website quality dimensions: technical quality, specific content quality, general content quality, and appearance quality are utilized to assess the website quality on an aggregated level (Aladwani and Palvia, 2000). Furthermore, the four dimensions are also significant predictors of consumers' attitudes, which can influence intentions of online purchase (Aladwani, 2006).

The website form features relating to shopping interaction are more attractive to innovators, while substantive features (such as cost, product quality, and post purchase services) are more attractive to experienced users in the www context. More experienced and innovative individuals have stronger preferences for typical websites and a higher tendency to shop online than individuals who are either innovative only or experienced only (Blake et al., 2005).

Alternatively, the e-service dimensions of trust, reliability, responsiveness, and website design are significant factors in predicting overall service quality and customer satisfaction, which leads to a behavioural intention of purchase in the online context (Lee & Lin, 2005). On the other hand, e-service quality dimensions of reliability, assurance, and responsiveness have an impact on the decision to use e-banking services which represents a form of online behaviour (Gan et al., 2006). However, because e-service quality is considered a multi-dimensional construct that includes partial quality judgement with regard to service categories in a bank's portal, factors such as reliability, function or design, responsiveness and process strongly affect consumers' satisfaction, with reliability being the most powerful driver. Furthermore, the aesthetic appeal of the website is important in relation to a user's judgment of the functionality and usability of the website, and users strongly associate the efficiency and quality of the content of a

website with the visual appeal of the website design (Bauer et al., 2006). Finally, E-TransQual dimensions of responsiveness, reliability, process, functionality (design) and enjoyment are important for achieving overall service quality judgment. The dimensions of reliability, functionality, and responsiveness are important for achieving customer satisfaction while functionality and reliability are important in accessing customers' perceived value (Bauer et al., 2006).

In addition to website quality perceptions effect on users' satisfaction, website quality perceptions have also been reported to effect behavioural intention and usage decisions (Delon & McLean, 1992 and 2003; Nelson et al., 2005; Wixom & Todd, 2005; and Ahn et al., 2007).

Thus far, a review has been presented covering the studies on Internet banking, the cultural dimension and technology acceptance and the features of products on the virtual world of the Internet. The next chapter is devoted for research methods and design and addresses different research approaches, the approach adopted by this study and the research framework, in addition, to research design features.

Chapter Four: Research Design and Methods

4.1 Introduction

The chapter starts by discussing some paradigms and different research approaches, such as mixed methods research, that are inherent in the Social Science and Information Systems research. Based on this discussion, a choice is made for the approach adopted by the current research. Following this selection, a conceptual framework is presented, based on the extensive discussion of the technology acceptance models, the studies utilizing these models in regard to Internet banking, the cultural dimension of technology acceptance and the online website design quality that were discussed in the previous chapters. Moreover, research hypotheses are drawn and operational definitions and the research instrument are presented. Finally, aspects of research design and methods are discussed, followed by issues pertaining to compatibility and equivalence, research ethics and statistical tools used.

4.2 General Research Approaches

There are several dichotomies and paradigms that have underlined research approaches used in the study of information systems and social science, e.g., positivism versus interpretivism, quantitative versus qualitative, induction versus deduction, and exploratory versus confirmatory (Fitzgerald & Howcroft, 1998). A paradigm is a set of assumptions that provides a conceptual framework or a philosophical one for world view, thus, enabling organized study of the world around us (Suppe, 1977, cited in Deshpande, 1983). A paradigm serves a number of purposes: (1) it guides professionals as it indicates important issues challenging any discipline; (2) it develops models and theories that permit practitioners solve these issues; (3) it establishes criteria for tools such as methodology, instruments, and data collection that would enable solving these issues; (4) it provides the principles, procedures, and methods to be considered when similar issues (phenomena) appear again (Filstead, 1979, cited in Deshpande, 1983).

While addressing the epistemological side of paradigm development, philosophers were trying to answer the fundamental question: how do you know for certain that what we know is true? In that respect, different schools of thought were polarized. The most obvious example of this is positivism versus interpretivism (interpretivism has several names, e.g., constructivism or naturalism (Tashakkori & Teddlie, 2003)). Although the supporters for each school of thought emphasize the differences in the two approaches and tend to categorize them in a way that makes them look mutually exclusive (dichotomies), many advocates are in favour of more practical approaches that do not accentuate such differences and clearly recognize common beliefs existing in both approaches; thus, the call for a complementary approach that makes the most of both approaches (e.g., Weber, 2004; Hart, 2002; Lin 1998; Fitzgerald & Howcroft, 1998; Lee, 1991).

In the following sections, a brief view of four dichotomies is presented. The first is based on the epistemological level (Fitzgerald & Howcroft, 1998).

4.2.1 Positivism versus Interpretivism

Weber (2004) cites the metatheoretical differences between positivist and interpretivist research approaches based on: (1) Ontology, which deals with the fundamental of being since researchers need to know what is and what exists to be able to research it; hence, ontology studies the nature of reality. Positivism assumes that the researcher and reality are separate, while interpretivism assumes that the researcher and reality are inseparable. In the same vein, the ontological position that views observer-independence of reality is that of realism and the opposite is anti-realism (Stahl, 2008); (2) Epistemology, which refers to the knowledge or theory of knowledge; positivism assumes that objective reality exists beyond the human mind, whereas interpretivism assumes that knowledge of the world is intentionally built through lived experiences or social construction of the world; (3) Research Object, which refers to the thing (phenomena) being studied. Positivism assumes that the objects researched have inherent qualities that exist independently of the researcher, whereas interpretivism assumes that a research object is interpreted in light of

meanings structured by the researcher's lived experience; (4) Research Methods refer here to the research design for obtaining data about the objects of study. Positivists tend to use a number of methods as preferred research methods: laboratory experiments, field experiments and surveys. They seek to gather large amounts of data and normally employ statistics and content analysis to detect underlying regularities. Interpretivists tend to use case studies, ethnographic studies, phenomenographic studies and ethnomethodological studies as their preferred research methods and normally use hermeneutics and phenomenology to decipher indirect meanings and reflect on hidden ones; (5) Truth, which refers to the researchers' beliefs regarding their findings. Positivists regard the outcomes in light of theory of truth, which states that the truth or falsity of a statement is determined only by how it relates to the world, and whether it accurately describes (i.e., corresponds with) that world. Nonetheless, interpretivists subscribe to a notion of truth about their findings (interpretations) of a phenomena when that interpretation confirms the meanings given to the phenomena through the researcher's lived experience; (6) Validity, which refers to validity of measures and validity of the measurement process. Positivists are supposedly collecting data that are true measures of a reality (the idea here is that a one-to-one mapping exists between measures and the phenomena under investigation); thus, the data collected is valid. However, the methodologies of positivism have articulated different types of validity checks: i.e., construct validity, internal and external validity and statistical conclusion validity. Interpretivists are more concerned that their claims of knowledge acquired via the research are defensible; in other words, the evidence presented should be able to be examined, as well as the process used, the research context, and perhaps some of the researcher's life-world to conclude that the claims made are reasonable. Others should not agree with the claims but should be willing to concede that the conclusions are plausible; and (7) Reliability of the research outcomes or the research conduct. Positivists believe that a study is reliable if the results can be replicated by other researchers, and they attribute lack of reliability to number of factors such as the researcher's bias, inconsistency of the procedures employed, differences in contexts where research was applied and measurement errors. Interpretivists believe that the research is reliable if the researcher can demonstrate interpretive awareness.

According to Weber (2004), the alleged metatheoretical differences between the two approaches of positivism and interpretivism are spurious. Weber states that the differences lie in the choice of methods: a researcher who is considered a positivist would use research methods such as experiments, surveys and field studies, while researchers labelled interpretivists are inclined to use methods such as case studies, ethnographic studies, phenomenographic studies, and ethnomethodological studies. Weber suspects that the different choice of research methods is due to a number of factors, such as type of training provided for the researcher, social pressures associated with advisors and colleagues, and preferences for obtaining certain types of insight during the research conduct. Weber concludes that it is time to put the rhetoric of positivism versus interpretivism to rest, as it serves no useful purpose but instead promotes prejudice in research evaluation. Furthermore, he adds, the researcher's goal is to improve our knowledge of a certain phenomena while at the same time acknowledging that different research methods and data analysis techniques have their own unique strengths and weaknesses, depending on our existing knowledge about the phenomena.

Table (4-1) summarises some of alternative information systems research methods and articulates points of weaknesses and strengths.

According to Hart (2002), laboratory experiments, field experiments, surveys (aiming at statistical significance), simulation, formal theorem proof, and case studies (arguable) are some of the research methods adopted within the positivist basis, whereas action research, grounded theory, ethnographic studies, case studies (also arguable), and meta-analysis (a hybrid) are adopted within the interpretivist basis.

Table 4-1: Some alternative Information Systems research methods

Approaches	Key Features	Strengths	Weaknesses
Laboratory Experiments Galliers (1992)	Identification of precise relationship between chosen variables through a designed laboratory settings using quantitative analytical techniques with a view to making generalisable statements applicable to real -life situations	Ability to isolate and control small number of variables which may then be studied intensively	The identified relationships might have a limited extent in the real world due to the oversimplification of the experiment situation and the isolation from most variables that are found in the real world
Field Experiment Galliers (1992)	Extension of the laboratory experiments into the real world of organizations/society (more realistic environment)	Greater realism versus laboratory and less artificial /sanitized environments.	Difficulty of finding organizations prepared to be experimented on; plus, replication inability due to difficulty of control with only the studied variables being altered.
Surveys Galliers (1992)	Obtaining a snapshot of practice, situations, or views at particular point in time via questionnaires or structured interviews from which inferences can be made; using quantitative analytical techniques regarding relations exist in past, present and future.	Ability to study greater number of variables; reasonably accurate description of real world (from a variety of viewpoints); and more easy/ appropriate generalization.	Gaining little insight regarding the causes or processes behind the studied phenomena and the possibility of respondent or researcher bias occurring.
Case Study Galliers (1992)	An attempt to describe the relationships that exist in reality, usually within one or group of organizations. Primary source of data is interviews supplemented by documentary evidence.	Capturing “reality” in greater details & analyzing more variables than is possible using the above approaches.	Restriction to a single event/ organization; difficulty of generalization given problems of getting similar data from statistically meaningful number of cases; and different interpretations of events by individual researchers/ stakeholders.
Ethnographic studies Myers (1999)	Immersion of a fieldworker within a certain setting, gaining an insiders’ familiarity with, and gathering descriptions of, given areas of activity using participatory observation, conversation analysis among other techniques.	The most “in-depth” or “intensive” research method. Rich insights into the human, social, and organizational aspects of information systems. Allows researchers to question what they take for granted (assumptions).	Takes a long time to do the fieldwork, analyze material and write up findings. It lacks breadth as it studies one organization or culture. Difficulty of developing a general model from one ethnographic study

Continued Table 4-1: Some alternative Information Systems research methods

<p>Phenomenographic studies Marton & Booth (1997)</p>	<p>Focus on the essence of experiences and the subsequent perceptions of a phenomenon via interviews with a small, purposive sample with the researcher working toward an articulation of the interviewee’s reflections on experience that is as complete as possible.</p>	<p>Simplifies & assists subject & researcher to get to the heart of what & how a phenomenon or topic is understood. Emphasizes variation of how respondents experience & conceive the world</p>	<p>Requires strong iterative data analysis which involves the continual sorting and resorting of data and ongoing comparisons between data and the developing categories of description, and humans do vary in their experiencing and thinking about themselves and the surrounding world.</p>
<p>Ethnomethodological studies¹ Marcon & Gopal (2008)</p>	<p>Empirical study of the methods that people use, the “how”. Seek to describe these practices (the methods) individuals use in their practical actions.</p>	<p>Practical orientation: helps being responsive to problems of interest to the practitioners.</p>	<p>Does not produce a theoretical basis for understanding activities.</p>
<p>Action Research² Galliers (1992)</p>	<p>An attempt to obtain results of practical values to groups that the researcher allies with, while at the same time adding theoretical knowledge. Uses applied research: participatory observation & stimulus action</p>	<p>Practical & theoretical emancipated benefits for both researcher and researched organization. Biases of researcher are made known</p>	<p>Similar to case study. Adds responsibility on the researcher when objectives are at odd with other groups. Research Ethics are the key issue</p>

Notes:

¹ George Psathas (1995) identifies five different yet complimentary types of ethnomethodological studies: organization of practical actions & reasoning; organization of talk-in-interaction (conversation analysis); talk-in-interaction within institutional or organizational settings; study of work (activity); and the haecceity of work (what makes an activity what it is?)

² Baskerville & Wood-Harper (1998) define five characteristics of action research in all various forms to be carried out in multivariate social settings; highly interpretive assumptions about observation; researcher intervention; participatory observation; and study of change in the social setting after intervention.

Fitzgerald & Howcroft (1998) acknowledge that while there may be paradigm non-commensurability at the ontology and epistemology levels, some pluralism is possible at lower methodological levels and at the axiological (value) level. The authors argue that pluralism strategy allows for efficient paradigms to be applied in a research solution and also allows for the use of different methods, as appropriate. The authors cite a number of studies where, from practical perspective, IS researchers adopted the pluralist approach, using a qualitative approach in interviews, followed by a quantitative survey or vice versa; hence, indicating that the two approaches, qualitative and quantitative, are not opposites but should be integrated to provide a richer picture and possibly strengthen the findings.

Mingers (2001) argues for the desirability of pluralism and its adoption within IS research, stressing the need for consideration of different dimensions of the real situation (material, social, and personal); consideration of the tasks involved in different stages of a research study; and consideration of the research context of the researchers (capabilities and characteristics) in designing the methodology for any research. The author identified four inherent problems related to usage of a multi-method research: paradigm incommensurability, dominant research culture, cognitive and psychological barriers and practical barriers. However, the author stated that these problems can be alleviated when research is organized into programs where individual projects' (which largely use mono-methods) results and conclusions are linked to other researches that adopted a different approach; hence, the overall program becomes rich and multi-method.

There are a number of ways in which multi-method strategy can occur (Bryman, 2004). Triangulation is one way and involves combining data sources to study the same social phenomena (Tashaokkri & Teddlie, 2003). Although the term triangulation has come to assume a variety of meanings, the association with the combined use of two or more research methods within a strategy of convergent validity is the most common (Bryman, 2004). Denzin (1978, cited in Johnson et al., 2007) defines four types of triangulation: *Data triangulation* (involves gathering data at different times and situations, from different subjects);

Investigator triangulation (involves using more than one field researcher to collect and analyse the data relevant to a specific research object); *Theory triangulation* (involves making explicit references to more than one theoretical tradition to analyse data); and *Methodological triangulation* (involves the combination of different research methods). Denzin also defined two forms of methodological triangulation: *within-methods* triangulation, which involves making use of different varieties of the same method, and *between-methods* triangulation, which involves making use of different methods, such as “quantitative” and “qualitative” methods in combination. Sieber (1979, cited in Johnson et al., 2007) defined ways in which qualitative and quantitative methods can be combined effectively at different stages of the research process, as explained in the following section. Fitzgerald & Howcroft (1998) describe three methodological paradigms (Table 4-2): each is discussed in turn.

Table 4-2: Summary of methodological dichotomies

<p>Qualitative Determining what things exist rather than how many there are. Thick description. Less structured & more responsive to needs & nature of research situation</p>	<p>Quantitative Use of mathematical & statistical techniques to identify facts and causal relationships. Samples can be larger & more representative. Results can be generalised to larger populations within known limits of error</p>
<p>Induction Begins with specific instances which are used to arrive at overall generalisations which can be expected on the balance of probability. New evidence may cause conclusions to be revised. Criticised by many philosophers of science, but plays an important role in theory/hypothesis conception.</p>	<p>Deduction Uses general results to ascribe properties to specific instances. An argument is valid if it is impossible for the conclusions to be false if the premises are true. Associated with theory verification/falsification & hypothesis testing</p>
<p>Exploratory Concerned with discovering patterns in research data, & to explain/understand them. Lays basic descriptive foundation. May lead to <i>generation</i> of hypotheses</p>	<p>Confirmatory Concerned with hypothesis testing & theory verification. Tends to follow positivist, quantitative modes of research</p>

Source: Fitzgerald & Howcroft (1998)

4.2.2 Qualitative versus Quantitative

Other paradigms that are based on the positivism-interpretivism juxtapositions are quantitative versus qualitative paradigms.

The quantitative paradigm is based on positivism, with an ontological position advocating the existence of only one truth (an objective reality), which is independent of human perceptions. From an epistemological perspective, the researcher (observer) and research object investigated are independent entities, in the sense that the researcher is able to study the phenomena without being influenced by it or vice versa. Quantitative research employs empirical research under the belief that all phenomena can be reduced to empirical indicators that represent the truth. The research techniques employed by quantitative research include randomization, highly structured protocols, and administered surveys (oral or written) with a limited range of predetermined responses. Normally, the sample size collected for a quantitative research approach is larger than that used for a qualitative research.

On the other hand, the qualitative paradigm is based on interpretivism, with an ontological position that advocates the existence of multiple realities (truths) based on a person's construction of reality. From an epistemological perspective, a human's mind plays an important role in shaping reality and external referents produce few guides on which to compare truth. Contrary to quantitative paradigm, the researcher and the researched object are interactively linked in the sense that findings are mutually created based on the contextual situation shaping the enquiry and reality does not exist prior to the investigation activities or ceases to exist when no longer a focal of investigation. Qualitative research emphasizes processes and meanings and uses techniques that include in-depth interviews, focus groups and participant observation.

The differences between the two paradigms extend beyond the philosophical and methodological debates to cover science language use differences. For example, the validity issue for a qualitative research is a label applied to an interpretation or description with which one agrees, whereas for a quantitative research the term would mean that results correspond to how things really are in the world. In the same way, the phrases "research has shown..." and "the results indicate..." refer to an accurate reflection of reality from the quantitative paradigm perspective, while they announce an

interpretation that itself becomes reality from the qualitative paradigm perspective (Sale et al., 2002).

The call for multi-method research on the methodological level is one solution to paradigms' incommensurability. Sale et al. (2002) argue that because the two paradigms do not study the same phenomena, qualitative and quantitative methods cannot be combined for cross-validation purposes or triangulation purposes; however, both paradigms can be combined for complementary purposes. Advocates for this combination state that different methods have different strengths; thus the combination would produce more than what each method could offer in isolation. Morgan (1998) argues that the mixing can be carried out on the technical aspect (means of generating knowledge), which can be done without violating basic paradigmatic assumptions. Morgan suggested a matrix approach for linking qualitative and quantitative research on the data collection level, where the classification is based on two types of decisions: priority and sequence. The first decision requires deciding which method would be the principal and which would be the subordinate, whereas the sequence decision addresses which sequence is chosen in that context. The four choices resulting from the Priority-Sequence matrix as depicted in Table 4-3 present different complementary combinations of the two approaches. Choice one of the matrix shows research designs in which a smaller preliminary qualitative study provides complementary assistance in developing a larger quantitative study. In such studies, the principal method is quantitative, but the use of a qualitative method at the beginning is a means to improve the effectiveness of the quantitative research that follows. The classical example of such a complementary approach is beginning a survey research project with a focus group (qualitative method) to develop/check the content of the questionnaire. This sequence would use the strengths of qualitative methods for exploratory work to help ensure that the survey is covering the important topics appropriately.

Table 4-3: The Priority- Sequence Model

		Priority Decision	
		Principle Method: Quantitative	Principle Method: Qualitative
Sequence Decision	Complementary Method: Preliminary	1. Qualitative Preliminary Purpose: Smaller qualitative study helps guide the data collection in a principally quantitative study <ul style="list-style-type: none"> • Can generate hypotheses; develop content for questionnaires and interventions, etc. Example: use of focus groups to help develop culturally sensitive versions of technology acceptance questionnaire.	2. Quantitative Preliminary Purpose: Smaller quantitative study helps guide the data collection in a principally qualitative study <ul style="list-style-type: none"> • Can guide purposive sampling; establish preliminary results to pursue in depth, etc. Example: A survey of different managerial level of an IT intensive site for more extensive stratified data collection
	Complementary Method: Follow-up	3. Qualitative Follow-up Purpose: Smaller qualitative study helps evaluate & interpret results from a principally quantitative study <ul style="list-style-type: none"> • Can provide interpretation for poorly understood results; help explain outliers. Example: In-depth interviews help to explain why one organization generates higher level of employee technology satisfaction / adoption	4. Quantitative Follow-up Purpose: Smaller quantitative study helps evaluate & interpret results from a principally qualitative study <ul style="list-style-type: none"> • Can generalize results to different samples; test elements of emergent theories, etc. Example: An industry survey of different level of information technology department pursues earlier results from a case study.

Source: Morgan (1998) with example adaptation to reflect research in IT domain.

In choice two, these designs use small-scale preliminary quantitative methods to help guide the decisions a researcher makes in the larger qualitative research project. The classic example is a preliminary survey or census of the field to guide selection of sites and information, provide a contextual understanding and help focus the analysis of large amounts of qualitative data (e.g., tabulation from a preliminary survey reveals interesting patterns of association; a detailed qualitative analysis can provide a richer understanding of why and how these patterns exist).

In choice three, the research designs use qualitative methods that complement a principally quantitative research effort; however, the sequence here is different (from choice one), the qualitative methods serve as a follow-up to the quantitative study and typically provide interpretive resources for understanding the results from a quantitative

research (e.g., provide insight into why strongly-held hypotheses did not prove valid in survey research).

In the final choice, the research designs use complementary quantitative studies to follow up on research projects that are principally qualitative. The quantitative methods in this order provide a means to expand on what was learned through the qualitative study. The classic use for this design is to explore the generalisability or transferability of conclusions from qualitative research (Morgan, 1998).

Sieber (1973, cited in Johnson et al., 2007) had a different perspective on how the two approaches can complement each other at different stages within the research process. At the research design stage, quantitative data can help qualitative components, identifying members of a representative sample and spotting outlying observations. Equally, qualitative data can help quantitative components with conceptual as well as instrumental development. At the data collection stage, quantitative data can provide baseline information and help avoid elite bias, whereas qualitative data can help facilitate assessment of generalisability of quantitative data and give a new perspective on findings. Finally, at the data analysis stage, qualitative data can play an important role in interpreting, clarifying, describing and validating quantitative results, in addition to grounding and modifying the theoretical perspective.

Over the years the terms multi-methods, triangulation and mixed methods appeared in the journals as approaches for facilitating a combination of qualitative and quantitative research that is intended to end the pragmatic war (Maxwell & Loomis, 2003, cited in Tashakkori & Teddlie, 2003). The latter concept, mixed methods, was described as an outgrowth of the triangulation of methods movement (Dunning et al., 2008). The concept of mixed methods has been defined in a number of ways. In a general sense, Johnson et al. (2007) define mixed methods as the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration. As a research type, the authors state that a mixed methods study would

involve mixing within a single study; on a program level, it would involve a mix of methods within a program of research and that mixing might occur also across a set of closely related studies.

In defining types of mixed methods research, Johnson et al. (2007) place the three approaches on a continuum as depicted in Figure 4-1.

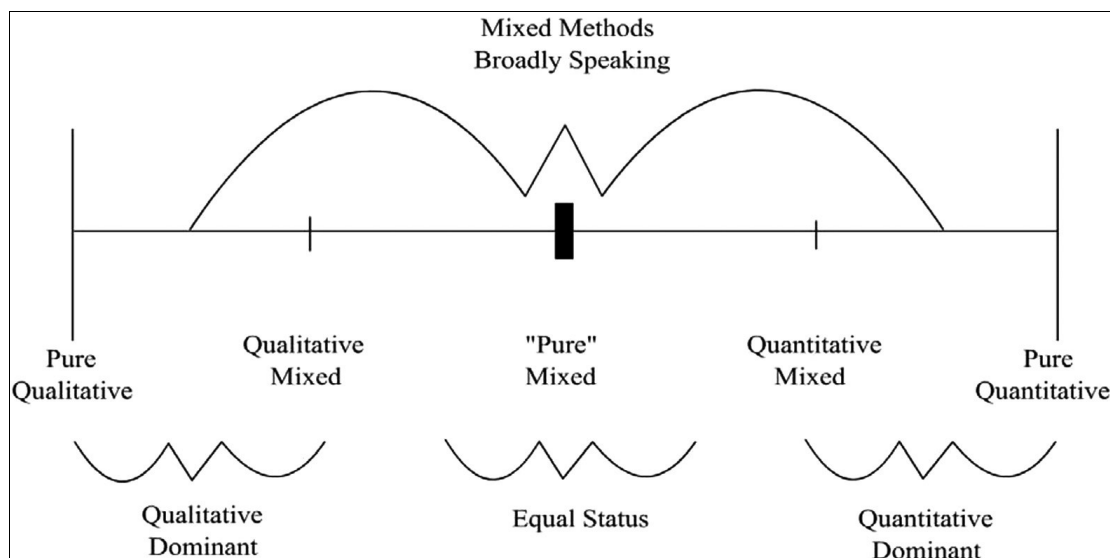


Figure 4-1: Graphic of the three major research paradigms, including subtypes of mixed methods research

Source: Johnson et al. (2007)

The graphic defines at each extreme and at the centre the pure research approaches (paradigms) and the area in between the three pure research poles represents the different combinations of the two extremes. In other words, mixed methods research falls in the area between the centre and the extremes in both directions. A researcher that self-identifies as a mixed methods researcher and takes logic and philosophy of mixed methods research as a starting point falls in the area around the centre of the continuum, equal status. Qualitative dominant mixed methods research fits a researcher who believes in qualitative view of the research process but recognises that additional quantitative approaches and data would likely benefit most research projects. Quantitative dominant mixed methods research fits a researcher who believes in a quantitative view of the

research process and also believes it is important to include qualitative approaches and data, which are likely to benefit most research projects.

Mixed methods research approaches, combining qualitative and quantitative methods, described are but one way of addressing the mix or the combination of qualitative and quantitative methods. This design is a typological one that encourages pragmatic, logical, linear flow and concentration on a number of issues: the balance of qualitative and quantitative methods used in the research design, the priority method decision and sequence decision, and the stage in the research design when this mix would take place. Some typological authors (e.g., Creswell, 2003; Tashakkori & Teddlie, 2003) have proposed research designs that consider the purpose of mixing methods throughout the research design and implementation processes. On the other hand, Maxwell & Loomis (2003) present an approach to mixed methods that differs fundamentally from typologies in more than one way: the interactive design of a study and the conceptual analysis of fundamental differences between the qualitative-quantitative approaches. Maxwell & Loomis (2003) see design of a study as consisting of five different components, including purpose, conceptual framework, research questions, methods and validity strategies. Maxwell (1996, cited in Maxwell & Loomis, 2003) refers to this design as a systematic or “interactive” model (because the components are connected in a web or a network rather than being connected linearly or in a cycle sequence), and while all of the five components can influence other components of the design, the research questions play the central role. In the interactive model design, the research questions are not seen as the starting point or guiding component of the design; rather, they are seen as the heart of the design because they are linked directly to the other four components. Thus, research questions need to inform and be responsive to all the other components of the design. The focus of the interactive design is on the relationships between qualitative and quantitative approaches both within and across the five components.

Conceptual analysis distinguishes between two approaches to explanation: variance theory and process theory. Variance theory deals with variables and correlations among them and ideally involves precise measurement of differences and correlations between

variables; hence, it lends itself to research that employs extensive pre-structuring of the research, probability sampling, quantitative measuring, statistical testing of hypotheses and experimental or correlational design. Process theory deals with events and processes that connect them: it is based on an analysis of the causal processes by which events influence each other. Thus, the process theory is less compatible with quantitative and lends itself to in-depth study of a few cases or a small number of individuals and textual forms of data that retain the contextual connection between events. Maxwell & Loomis (2003) view the qualitative-quantitative distinction as grounded in the distinction between two contrasting approaches to explanation, variance theory and process theory. The authors also stress that the systematic or interactive approach is not a challenge to the typological approach; instead, it should be seen as complementary in the provision of tools and insights.

Table 4-4 briefly lists some alternative data collection techniques used in both qualitative and quantitative approaches (and mixed methods) and articulates points of weaknesses and strengths for each. Structured interviews are other forms of data collection techniques; the emphasis is on obtaining answers to carefully phrased questions. Interviewers are trained to deviate only minimally from the question wording to ensure uniformity of interview administration. The communication tools of structured interviews are varied, including personal or face-to-face interviews, telephone interviews, or interviews conducted through the medium of the PC. Each has its advantages and disadvantages in terms of clarity, time, cost, interviewer training and computer literacy. Questionnaires are also a data collection technique, which is an efficient mechanism when researchers know exactly what is required and how to measure variables of interest. Questionnaires can be administered personally, mailed to the respondents, or electronically distributed; each method of communication has its advantages and disadvantages with respect to ease, reach, time, cost, response rate and computer literacy (Sekaran, 2003).

Table 4-4: Data collection techniques

Collection Technique	Description	Advantages	Disadvantages
Observation Frechtling & Sharp (1997)	methods by which individual (s) gather firsthand data on programs, processes, or behaviors being studied.	<ol style="list-style-type: none"> 1. Provide direct information about behavior of individuals and groups 2. Provide good opportunities for identifying unanticipated outcomes 3. Permit evaluator to enter into and understand situation /context 4. Exist in natural, unstructured & flexible setting. 	<ol style="list-style-type: none"> 1. Expensive - time consuming 2. Need well-qualified, highly trained observers; may need to be content experts 3. May affect behavior of participants 4. Selective perception of observer may distort data 5. Investigator has little control over situation 6. Behaviour (s) observed may be atypical.
In-depth interviews Frechtling & Sharp (1997)	A dialogue between a skilled interviewer and an interviewee. Its goal is to elicit rich, detailed material that can be used in analysis.	<ol style="list-style-type: none"> 1. Usually yield richest data, details, new insights 2. Permit face-to-face contact with respondents 3. Provide opportunity to explore topics in depth 4. Afford ability to experience the affective as well as cognitive aspects of responses 5. Allow interviewer to explain, clarify questions, that yields useful responses 	<ol style="list-style-type: none"> 1. Expensive and time-consuming 2. Need well-qualified, highly trained interviewers 3. Interviewee may distort information through recall error, selective perceptions, desire to please interviewer 4. Flexibility can result in inconsistencies across interviews 5. Volume of information too large; maybe difficult to transcribe and reduce
Focus Group Frechtling & Sharp (1997)	Combine elements of both interviewing and participant observation.	<ol style="list-style-type: none"> 1. Quick & relatively easy to set up. 2. Allows observation of group dynamics, discussion, and firsthand insights into the respondents' behaviors, attitudes, language, etc. 3. Useful in gaining insight into a topic that may be more difficult to gather through other data collection methods. 	<ol style="list-style-type: none"> 1. Susceptible to facilitator bias. 2. Discussion can be dominated or sidetracked by a few individuals. 3. Data analysis is time consuming and needs to be well planned in advance. 4. Does not provide valid information at the individual level. 5. Information is not representative of other groups.
Document Studies Frechtling & Sharp (1997)	Existing records often provide insights into a setting and/or group of people that cannot be observed or noted in another way	<ol style="list-style-type: none"> 1. Available locally and inexpensive 2. Grounded in setting and language in which they occur 3. Useful for determining value, interest, positions, political climate, public attitudes, historical trends or sequences 4. Provide opportunity for study of trends over time. 	<ol style="list-style-type: none"> 1. May be incomplete 2. May be inaccurate; questionable authenticity 3. Locating suitable documents may pose challenges 4. Analysis may be time consuming 5. Access may be difficult

4.2.3 Inductive versus Deductive

The deductive and inductive approaches are two broad methods of reasoning. The deductive reasoning is narrower in nature and is concerned with testing or confirming hypotheses. Deductive reasoning is a set of techniques for applying rigorously testable theories in the real world in order to assess their validity (Lancaster, 2005). Deduction is a process by which researchers arrive at a reasoned conclusion by logical generalization of a known fact. This process comprises a number of steps and is considered the building block of the scientific method; hence, it is called the hypothetico-deductive method (Sekaran, 2003). The first step in the deductive process is the generation of theories and hypothesis. The generation of ideas could be based on personal experiences or could be theories and hypotheses that stemmed from a literature search that brought together ideas of others. It could also stem from a desire to find a solution to an existing problem. The second step after generation of theories and hypotheses in the deductive process is operationalisation of the concepts in the theories or hypotheses in such a way that those concepts can be measured through empirical observations. The next step in the process involves identifying and deciding between alternative techniques or approaches for measuring the operationalised concepts, which also include the selection and design for research methodology to be used (e.g., research instrument, sampling plan, data collection methods, and methods of analysis and interpretation of empirical observations & measurements). The final step in the deductive process would be the falsification and discarding step, in which researchers decide the extent to which chosen theories and hypotheses are falsified and the extent to which parts of these theories or hypotheses, if any, remain yet unfalsified (Lancaster, 2005). Hence, deduction is the process of drawing from logical analysis inferences that purport to be conclusive.

Inductive reasoning, on the other hand, is a process of reasoning in which the premises of an argument are believed to support the conclusion but do not ensure it. In other words, under inductive reasoning, researchers observe certain phenomena and on this basis arrive at conclusions; they logically establish a general proposition based on observed phenomena (Sekaran, 2003). Inductive reasoning is more open-ended than deductive reasoning. The inductive process is comprised of steps that can be thought of as opposite

to the deductive approach, moving from specific observations to broader generalizations and theories. In inductive reasoning, researchers begin with specific observations and measures, start to detect patterns and regularities, formulate some tentative hypotheses that can be explored, and finally end up developing some general conclusions or theories (Trochim & Donnelly, 2005). According to Teddlie & Tashakkori (2003) researchers agree, to different degrees, on the possibility of having both inductive exploratory questions and deductive confirmatory questions in the same study; quantitative questions are deductive hypothesis testing questions while qualitative questions are predominantly inductive. Thus, in any mixed methods research, qualitative or quantitative has elements of both inductive and deductive components.

Most arguments combine both deduction and induction. Deduction supplies the shape of the argument and induction establishes agreement about one or more stages in the argument. The two forms of reasoning are connected in the observation stage: the researchers may observe patterns in the data that lead them to develop new theories/hypotheses (induction). Hence, inductive and deductive reasoning are interrelated: inductive is used to prove that a causal relationship exists and to establish premises (facts) on which deduction is built. Causal relationships are often established by induction or else exist within the premises of deduction (Huber & Snider, 2005).

4.2.4 Exploratory versus Confirmatory

Exploratory-confirmatory dichotomies are two types of research. Authors suggest that confirmatory studies are employed when researchers are seeking to test (confirm) a pre-specified relationship, whereas exploratory studies are utilized when researchers are interested in defining possible relationships in the most general form and then allowing multivariate techniques to estimate any resulting relationship(s). In other words, when employing exploratory research, the researcher is not looking to “confirm” any relationships that are specified prior to the analysis, rather s/he allows the method and the data to define the nature of the relationships existing between the models’ variables (Hair et al., 2006).

Correspondingly, a confirmatory strategy of research can be described as one that envisions empirical analysis as a process of confirming or disconfirming previously stipulated hypotheses, whereas in an exploratory research strategy, theory and evidence are closely intertwined. Hypotheses may be suggested by prior theory, intuition or the evidence itself, and should be adjusted to reflect the evidence at hand. Hence, the strategies employed by confirmatory models of research design and exploratory models of research design are in direct opposition to each other. An exploratory research strategy is best understood as a process of mutual adjustment whereby the end concepts, theories and evidence are properly aligned. Confirmatory research strategy is usually favoured by researchers with experimental and theoretical interests, whereas exploratory research strategy is usually favoured by those with a behavioural or interpretivism orientation. Researchers adopting the exploratory strategy usually keep issues of conceptualization, theorization, and investigation open in order to be sensitive to the evidence at hand. The process is one of discovery, with a goal of enhancing the fit between theory and evidence (Gerring, 2001).

According to Gerring (2001), most social science research falls between exploratory and confirmatory ideals, and confirmatory is the generally favoured model of analysis. Nevertheless, both research models are not without limitations. Exploratory research can be thought of as inductive (Meyers et al., 2005) in nature, with advantages such as flexibility in hypotheses generation and not requiring more than data to support them. However, the process of exploratory research makes theory falsification difficult; hence, results are over-fitted with great chance of bias. On the other hand, confirmatory research relies on statistical inferences and the deductive approach, (Meyers et al., 2005) with hypotheses first outlined and then tested to answer specific questions. This highlights the advantages of the confirmatory analysis of providing precise information while using well-established theory and methods. Nevertheless, the disadvantages of confirmatory research strategy lie in the analysis being driven by preconceived ideas and the difficulty of noticing unexpected results.

Stebbins (2001) argues that exploratory and confirmatory methodological reasoning in social science are probably more similar than different, despite the sharp divergence in their goals. The author illustrates some differences between the two approaches of reasoning in terms of goals: exploratory aims to generate new ideas and merge them together to form a theory that emerges directly from data, whereas confirmatory research's goal is to test hypotheses with the validity of the test hinging on the quality of the research design. Exploratory research is flexible and open-minded, whereas confirmatory relies on control of variables and prediction of outcomes using hypotheses. The author is convinced that the similarities between exploration and confirmation far outnumber their differences, with differences being founded in the antinomies of induction vs. deduction, flexibility vs. control, and prediction vs. open-minded. According to Onwuegbuzie & Teddlie (2003) both exploratory and confirmatory research can be qualitative or quantitative. Caswell et al. (2003), in defining stages in the process of research and approaches taken in both qualitative and quantitative approaches, describe the first stage of the process (research problem and data questions) within the qualitative approach to be confirmatory outcome based, whereas the same stage within the quantitative approach is exploratory process based and descriptive of phenomena of interest. Data collection and method stage for the quantitative confirmatory approach includes instruments, observation, documents, score oriented closed-ended process, and pre-determined hypotheses, whereas the list for qualitative exploratory approach includes interviews, documents, observation, audiovisual participant determined process, open-ended process and text/image oriented methods. The data analysis stage for the quantitative confirmatory approach includes procedures such as descriptive statistics and inferential statistics, whereas the qualitative exploratory approach list of procedures includes descriptive (identify themes and categories) and looking for connectedness among categories/themes vertically and horizontally. The last stage in the research process, data interpretation, focuses on generalization and prediction based interpretation of theory for the quantitative confirmatory approach, whereas the focus for the qualitative exploratory approach the focus is on particularization (contextualizing), large sense making, personal interpretation and asking questions.

Nevertheless, using mixed methods research makes room for the exploratory inductive process that begins with empirical evidence of the particular phenomena

and proceeds to a level of abstraction, theorization, generalization and the confirmatory deductive process of theories' hypothesis testing (Rocco et al., 2003).

In the previous section a brief explanation was offered for a number of paradigms or dichotomies, where the researcher produced arguments, pros and cons, and current views with respect to these issues. In the following section, the approach followed by the current research project is presented, based on the issues discussed above.

4.3 The Approach Adopted by Current Study

According to Hall & Howard (2008), researchers need be motivated to acknowledge paradigmatic differences while attentively selecting the methods that provide the greatest opportunity for cross-paradigm communication within the study design. Other authors advise that researchers adopt a perspective compatible with their research interest and at the same time remain open to the use of other interests (Orlikowski & Baroudi, 1991). Webber (2004) suspects that the different choice of research methods is largely due to factors such as type of training provided for the researcher, social pressures associated with advisors and colleagues and preferences of obtaining certain types of insight during the research.

Based on the arguments presented in the previous sections and from the extant literature critically reviewed and presented in chapters two and three, a number of points can be shown as leading to the choice of an approach for the current study. First, from the vast body of research on technology acceptance it seems that technology acceptance research has a dominant theoretical drive which is positivist in nature.

Second, according to Maxwell & Loomis (2003), interactive design and content analysis define the research approach: the current research purpose is defined as predicting the viability of a model and the model comparison between two culturally different contexts of a technology acceptance behaviour, this purpose requires the means of a more structured, well-defined framework, precise measurement (prior development of instrument standardization), comparison of variables, establishing relationships between variables and making inferences from samples to populations, all of which can be seen under the qualitative research umbrella. Furthermore, the

content analysis is one of variance analysis, looking for differences between groups; as such, a qualitative research is the most appropriate for such an investigation. Additionally, validity issues associated with type of investigations are to be obtained through statistical conclusion validity, on the construct level (construct validity) and causal validity (control of external variables). In the current study the external variable under investigation is experience with internet banking (the study is restricted to users only).

Third, the major thrust of the current research project is to test hypotheses related to the proposed model extension, as well as a number of hypothesized relationships that were previously established in the technology acceptance context; hence, the theoretical thrust of the current research is deductive in nature and the use of inductive reasoning is excluded from the interpretation of results when compared to previous findings from literature.

Fourth, the current study follows a confirmatory strategy of research, one that envisions empirical analysis as a process of confirming or disconfirming previously stipulated hypotheses in the technology acceptance context.

Fifth, the current study aims to conduct a number of group comparisons; this test is effectively using Structure Equation Modelling technique, which is utilized only through statistical packages. Moreover, the researcher is versed in statistics, which makes it a personal preference to work with a qualitative approach.

However, in compliance with Hall & Howard (2008) advocates, the researcher is not ignorant of the limitations of one approach and the benefits of a mixed methods research. Hence, following the categorization of Johnson et al., and although the current research is quantitative dominant, the current research is also quantitative mixed. To elaborate on this point, the researcher is also quoting Morgan's (1998) categorization in establishing that the current research is quantitative in principal with a preliminary qualitative study using focus groups to help adjust culturally sensitive versions of technology acceptance questionnaires' content.

The following sections are devoted to defining the research conceptual framework development and research design and methods.

4.4 The Conceptual Framework:

Chapter two and three have presented the models frequently used in explaining behaviours related to new technologies' adoption. Although TRA, TPB and TAM are the most used models for explaining technology acceptance, these models are criticised for their relatively low explanatory power in terms of behavioural intentions, which ranged 30-40 per cent only. The integrated acceptance model presented by Venkatesh et al. (2003) reports an explanatory power amounting 70 per cent. While many studies utilized the technology acceptance models in investigating various systems' adoption in different contexts, very few have utilized the UTAUT model. This research utilizes the UTAUT model and proposes an extension to the model that integrates a construct, which complements the online behaviour investigated.

In the previous chapter, section 3.6, a discussion of the effect of web design, features, and quality aspects that influence the online behaviour was presented. This study is adopting the website quality perceptions scale developed and validated by Aladwani and Palvia (2002). Their model is an aggregated scale of different aspects of website features and presence that affect the online behaviour and comprises four dimensions: technical quality, specific content quality, general content quality, and appearance quality. The validated 25-item measuring scale is considered appropriate and can be incorporated with the UTAUT measurement scale without jeopardising the parsimony principle; a quality that cannot be achieved if any of the other scales were employed i.e., Bauer (2006) eTransQual.

Nevertheless, a similarity exists between the dimensions measured by Aladwani & Palvia (2002) and other dimensions found in the other models proposed and discussed earlier (section 3.6). For example, service quality dimensions investigated by Gan et al. (2006) such as reliability, resembles accuracy in the Internet banking context; responsiveness matches how fast e-banking respond to clients needs compared to traditional methods in addition to timeliness; and assurance resembles security in e-

banking. These dimensions are similar to the items comprising Aladwani & Palvia (2002) technical quality features which investigate characteristics of website quality such as security, ease of navigation, site availability, interactivity, and ease of access (among others) and general content that refers to content usefulness, completeness, clearness, currency, conciseness, and accuracy.

Design, structure and content dimensions reported by Floh & Treiblmaier (2006) are similar to general content, and appearance features in Aladwani & Palvia (2002) set of dimensions. Form features and substantive features reported by Blake et al. (2005) are similar to the technical and specific content features. Website design, reliability, responsiveness, trust and personalisation dimension of SERVQUAL (Lee & Lin, 2005) are similar to the technical, appearance and content dimensions of Aladwani & Palvia (2002). Information quality and System quality measures developed by Delon & Mclean (1992) are encompassed within the four dimensions of the scale adapted from Aladwani and Palvia (2002) but to a broader extent; however, the empathy service quality dimension (Delon & Malean, 2003) is not presented.

Therefore, this study is adopting Aladwani and Palvia's (2002) perspective with regard to the website quality dimensions and aims at treating this variable and its dimensions as a replacement to the dimensions of the "facilitating condition" variable in the original UTAUT model as shown in Figure 4-2.

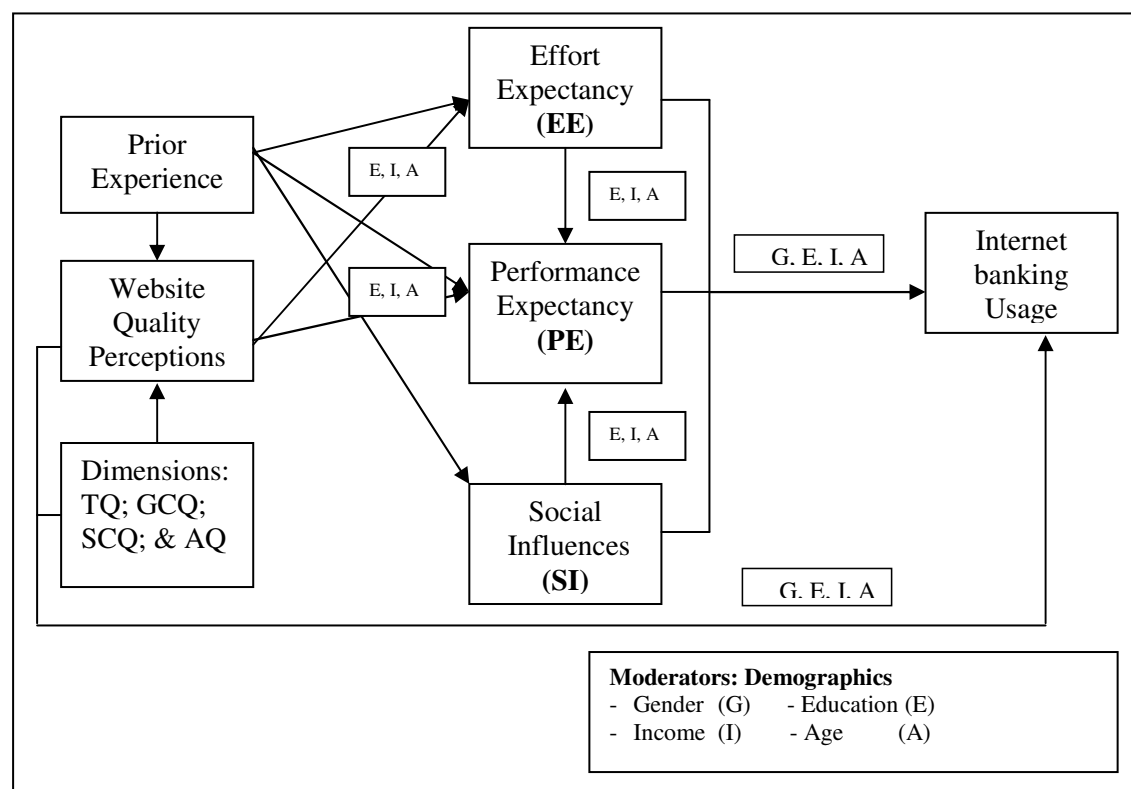


Figure 4-2: The Study's Proposed Research Model.

The proposed research model shows the direction of the hypothesized relationships among the proposed extension of the UTAUT. However, before addressing the hypotheses, the research questions are articulated.

4.4.1 Research Questions

The current research attempts to answer particular questions pertaining to the relationships among the UTAUT construct: PE, EE, SI, and Usage. These constructs, as demonstrated in the conceptual framework, resemble other constructs in the eight models comprising the aggregated model. To a certain extent, the UTAUT constructs are similar to those comprising the TAM model. Hence, the first set of research questions addresses the nature of these relations.

1- Do the previously established relationships between TAM's constructs prevail in the UTAUT model? In other words, do EE and SI have an impact on PE, and does PE mediate the effect EE and SI have on Internet banking usage?

As established in the literature, website design and quality has a considerable impact on individuals' behaviour over the www. The second set of research questions are related to the impact of website quality perceptions on the UTAUT key constructs.

2- What impact does website quality perceptions have on the PE, EE and IB usage?

The original model of the UTAUT treated experience, gender, and education as moderators. Based on the literature, experience also poses as an antecedent to the beliefs about technology acceptance. In addition other demographics have showed a moderating impact on the online behaviour. Therefore, the next set of research questions is related to the impact of experience, as an antecedent, and the impact of income and age, in addition to gender and education, as moderators.

3- How does prior experience impact PE, EE, SI, and WQ in the proposed model?

4- Do gender, education, age, and income moderate the relationships among the proposed model constructs?

Finally, previous technology acceptance research reported inconsistency in respect to the applicability of the technology acceptance model to non-western nations. The last research question is related to this issue.

5- Does the proposed research model apply to both the UK and Jordan?

4.4.2 Research Hypotheses

Research hypotheses can be divided into three categories: the relations among the key constructs in the extended model; experience hypothesized effects in the proposed model; and the effect of moderators.

4.4.2.1 Key Constructs Hypothesized Relations

This set of hypotheses cover the relations among independent variables in the proposed research model: PE, EE, SI, and WQ and the dependent variable. Also, it covers a subset of hypotheses with regard to the relationship between the website quality dimensions and the dependent variable, Internet banking usage.

The UTAUT model consists of four key constructs and four moderators. This study is proposing a link between effort expectancy (EE) and performance expectancy (PE), and between social influences (SI) and performance expectancy (PE). The authors of the UTAUT defined performance expectancy as *the degree to which an individual believes that using the system will help him / her to attain gains in job performance* and acknowledged that this construct is similar to other constructs in the integrated models such as TAM's perceived usefulness (Venkatesh et al., 2003). TAM research has resulted in a link between PU and PEOU, with the latter being an antecedent of

the former. The effort expectancy construct in UTAUT is defined as *the degree of ease associated with the use of system*, and is similar to TAM's PEOU as acknowledged by the authors. Thus, the first hypothesis examines such link in the proposed model.

H1: *Effort Expectancy will have a positive effect on Performance Expectancy.*

TAM2 has provided more understanding of PU determinants and found that social norms are antecedents to PU. In the UTAUT, social influences is defined as *the degree to which an individual perceives that important others believe he / she should use the new system*, and is acknowledged as similar to the social norms construct of TRA, TPB and TAM2. In the UTAUT the link SI- PE was not established or tested. Hence, based on the previous research, the second hypothesis examines the existence of this link.

H2: *Social Influences will have a positive effect on Performance Expectancy.*

The mediating role played by performance expectancy to the relationship between effort expectancy, social influences and the dependent variable, IB usage, is examined by the third hypothesis

H3: *PE will mediate the relations between EE-Usage and SI –Usage.*

The UTAUT model established a link between facilitating conditions and usage behaviour without the mediating effect of behavioural intention. IS research reported a direct link between system quality and usage (Delon & Mclean, 1992 & 2003) and also, an indirect effect on intentions to use through usefulness and ease of use (Davis, 1989; Igarria et al., 1995; Schaupp et al., 2006; Lee & Lin, 2005). The fourth hypothesis examines the mediating role of PE and EE between WQ and IB usage, while the fifth hypothesis examines the direct impact of WQ on IB usage.

H4: *Website quality perceptions will have an indirect effect on IB usage through PE and EE constructs.*

H5: *Website quality perceptions will have a direct impact on IB usage.*

Four sub-hypotheses are built around website quality and its four dimensions (technical, general content, specific content, and appearance) in relation to the Internet banking actual usage.

A stream of studies related to website design and features demonstrate the importance of the virtual existence, from both users and competition perspectives. In the Internet banking environment, system characteristics are considered of most importance, specifically functional features of the bank website (Ndubisi & Sinti, 2006). Although other studies (e.g., Davis et al., 1992; Ndubisi & Sinti, 2006) investigated the hedonic and utilitarian role in the online behaviour, the applicability of the hedonic features is currently limited in the banking industry web presence. These hedonic features might include music, games, entertainment, and animation on the website. The focus of the banks' website is currently restricted to utilitarian aspects of the web services. Literature has also indicated that system security is important with regard to online transactions by both users and non-users (Gerrard & Gunningham, 2003). Risk was found an important determinant of attitude toward online banking (Curran & Meuter, 2005). At the same time, other studies reported a weak influence of risk as a potential facilitator to Internet banking adoption (Ndubisi & Sinti, 2006). Furthermore, security and privacy were found to have a relatively weak relationship with acceptance of online banking (Pikkarainen et al., 2004). Nevertheless, concerns about information security and privacy remain the major barrier to electronic commerce applications (Aladwani, 2001; George, 2002); it makes consumers sceptical about online transactions. Information security refers to consumers' belief about the web vender's ability to fulfil security requirements, e.g., authentication, encryption, and non repudiation (Cheung & Lee, 2001). Information protection is defined as consumers' beliefs about the web vender's ability to safeguard their personal information from security and privacy preaches. When consumers feel comfortable with the way the bank website protects their personal information and financial details, they overcome any psychological barrier to engage in the online banking services.

Security is among the technical aspects of a website. There are other aspects that are deemed important in the online behaviour context as discussed in section 3.6. Another feature that relates to the technical quality of a website is the navigability defined as the ability of the user to move around the site easily and efficiently, that is without, getting lost (Harrison & Dennis, 2002). If navigation choices are unclear, visitors may elect to hit the "Back" button on their first (and final) visit to a website but once they

enter, the real challenge begins. It is not easy to allow first-time visitors to get the maximum advantage of a site. Useful navigational structure facilitates traffic on the website. It also enables consumers to find the right set of products and compare among alternatives. Hyperlinks can be considered part of the navigation system. Though, if the site has too many hyperlinks, the chances are that the navigator will stray from the homepage. Thus, it is plausible to always have links to all other pages, full network structure, either in the beginning of the page or at the bottom or both if the web page is lengthy. Search facilities are considered also as navigation means. It enables the site browser to look up the desired term or word instead of trying the icons or drop down lists; it is a function that can be used to find specific information within that site but not the entire web (Huizingh, 2000). Different users have different methods of finding information: experts tend to prefer or rely on search facilities while beginners tend to prefer or use icon and link browse (Hanson, 2000)

Personalisation refers to any process that changes the functionality, interface, information content, or distinctiveness of a software system to increase its relevance to an individual; this distinctiveness is sometimes referred to as customisation and personalisation or explicit and implicit personalisation (Hiltunen et al., 2004). According to Hanson (2000), personalisation is a special form of product differentiation; it transforms a standard product or service into a specialized solution for an individual. It changes product design from an inherent compromise to a process of deciding which features benefit specific individuals. Hanson looks at the personalisation process along a continuum. At the beginning, there is no personalisation but there is homogeneity (mass marketing stage). Aided with choice assistance, a differentiation stage begins; then, with design options, starts a stage of customisation, which eventually leads to a stage of relationship building with individual customers (powerful personalisation).

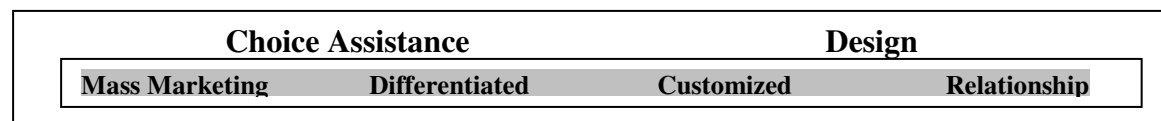


Figure 4-3: The Personalisation Continuum.
Source: Hanson (2000)

Customised or personalised options on the banking websites refer to setting up the preferred preferences such as changing the password (both login and transaction),

changing of own profile, changing the date format, and changing address, phone number, and primary accounts. Individuals who do their banking online are attracted to the convenience of the Internet and the customisation it can offer. The bank client could apply online for additional financial products such as credit card, loans, and mortgages. The personal page could include (beside personal information, account information, and investment profile) up to date financial news and stock quotes, in addition to personalized and relevant news articles or stock information. The client should also be able to communicate with the bank through the queries forum personal loans.

Interactivity is another aspect of the technical quality and refers to the interaction between the site and the user of that site and goes to the core of computer-mediated communication environment (Dennis et al., 2004). Interactivity is looked upon as a two way communication: from the viewer to the firm and vice versa. Some authors even emphasized the ability of the individual to control the communication and learn from this feature of interactive process (Merrilees, 2002). Merrilees & Fry (2003) found a relation between interactivity on the site and e-trust. The result showed that interactivity is a powerful influence on e-trust; the higher the users rating of interactivity on the site, the greater their perception of e-trust on the site.

Availability round the clock (convenience), accessibility, and the wide range of financial facilities on the Internet banking was found, among other attributes, the most important quality attributes in the perceived usefulness of Internet banking among users (Liao & Cheung, 2002). Another character of the technical aspect of a website is the download delay. Download delay is negatively related to time needed to perform a task, which have shown to negatively impact intentions to use a system (Mawhinney and Lederer 1990; Pavlou & Fygenson, 2006).

Based on the above, the technical quality aspect of the website quality perceptions is hypothesized to affect Internet banking usage behaviour

H5.1 Technical quality (TQ) will have a positive effect on usage behaviour.

General content quality, a dimension of website quality, refers to the features of the overall content of the website with respect to: usefulness, completeness, clearness, currency, conciseness, and accuracy (Aladwani, 2006).

Information quality on the website refers to the degree to which information produced by the website is accurate, relevant, complete, and in a format desired by the user. Schaupp et al. (2006) found that the quality of information provided on the website plays a vital role in satisfying end users. Liao & Cheung (2002) argue that individuals would be especially concerned about precision in the sense of expected accuracy in money transfer and accounts involved in the e-banking context. They found accuracy the most important factor affecting consumer willingness to use e-banking. Agrawal & Venkatesh (2002) reported the importance of the website content, specifically, the relevance of substantive information contained on a website, its completeness as assessed by information depth and breadth, and its currency. There are several factors affecting quality content and are determined by the quality of the information provided on the website. The factors include: information relevance, timeliness, accuracy, currency or being up to date, clarity, and accessibility. Detailed information is also important, but might result in delays in downloading speed. The complete yet concise characteristic of information provided on a website might be of a more suitable description (Chaffey et al., 2006).

Based on the above argument, the general content quality of the website with its elements of: usefulness, completeness, clearance, currency, conciseness, and accuracy, is hypothesized to affect Internet banking usage behaviour

H5.2 General content quality (GCQ) will have a positive effect on usage behaviour.

Specific content quality, another aspect of website quality, refers to information found on the website related to the retailer such as contact information, retailer general information, products/services details, customer policies, and customer support information (Aladwani, 2006). Agrawal & Venkatesh (2002) report the importance of the website content for the website visitor and its contingent upon the task being accomplished. Hanson (2000) argues that privacy statements on the website clarify to customers what type of information is being collected and how it is to be used; it also

set the broad guidelines the site follows in handling information collected from individuals. The type of information included on a website basically cover who we are, what we do/ what products and services are available, where to find us (locations and branches), and how to contact us (Chaffey et al., 2006). In a business-to business context, company related information that defines and illustrates the company's identity reinforces the buyers (users) trust in the company and encourages fulfilment of transactions; buyers are more willing to do business with people they affiliate with (Karayanni & Baltas, 2003). For example, users maybe inclined to buy/use services from a socially responsible company. Banks are now adopting the green banking approach (saving on paper and energy by switching to online delivery of statement and charges summaries). Finally, in an online banking context, customer service information on the website refers to availability of email link or forum where enquiries related to bank services or transaction, chargers and other concerns can be communicated by online bank clients to customer services. Correspondingly, frequently asked questions (FAQ) that might answer some of the general inquiries made by customer are means of customer support. Online customer support can achieve cost reduction for both banks and clients and can also be used to achieve customer satisfaction (Hanson, 2000).

Based on the above argument, the availability of specific content quality information on the bank website such as contact information, general bank information, products and services information, customer policies, and customer service information is hypothesized to affect Internet banking usage behaviour

H5.3 Specific content quality (SCQ) will have a positive effect on usage behaviour.

The last aspect of website quality dimensions is appearance quality which refers to the site's attractiveness, organization, readability, and appropriate use of colours and multimedia. According to Chaffey et al. (2006), three basic factors, related to design and structure, determine the effectiveness of an e-commerce site: coherence translated into design simplicity, readability, topics or products categorizing, absence of information overload, adequate font size, and un-crowded presentations; complexity which means using different categories of text; and legibility which refers to keeping

the same style (use of colours, images, typography layout) of the home page (same menu or site map) on all other pages, in a sense that users do not feel drifted to another site. Ease of use, in the online context, is considered an advantage of a good navigation system that is rooted in the organization scheme adopted for site design. Flow is another concept that depends on the navigation quality of the site and governs the site usability. It describes how easy it is for users to find the information or experiences needed as they move through the site pages. Aspects like consistency of user interface, simplicity, and context are important for a site's ease of navigation.

Website design elements related to atmospheric cues such as graphics, visuals, audio, colour, static or 3D display of product presentations, and videos, are believed to improve sites' attractiveness and individuals' experiences (Harrison & Dennis, 2008). According to Karayanni & Baltas (2003), the use of fast loading multimedia i.e., use of frames, animation, banners, are more effective than audio-video elements in achieving increased site performance.

Based on the above argument, appearance quality of a website, with its elements of: attractiveness, organization, readability, appropriate use of colours and multimedia, is hypothesized to affect Internet banking usage behaviour

H5.4 Appearance quality (AQ) will have a positive effect on usage behaviour.

4.4.2.2 Experience Hypothesized Effect.

According to Venkatesh et al. (2003), the UTAUT model has four moderators: gender, age, experience and voluntariness. In the current study:

Voluntariness is excluded since the behaviour under consideration is discretionary and totally voluntary (the context is non-organizational and the unit of analysis is Internet banking individual users).

Experience is treated as an antecedent based on previous research. Agarwal et al. (2000) considered experience or prior experience as antecedent of general computer self efficacy belief. Literature, also, shown that expertise and proficiency among respondents influence the use of technology (Novak et al., 2000). Experience was also reported to have an impact on perceived usefulness (Compeau and Higgins, 1995; Taylor and Todd, 1995c; Johnson & Marakas, 2000). Additionally, users' prior

general computer experience affects their perceptions of ease of use (Gruiting & Ndubisi, 2006). Agrawal & Prasad (1999) found positive relationship between similar system experience and PEOU. Therefore, hypotheses six and seven address the expected effect of experience on both effort expectancy and performance expectancy:

H6: Prior Experience will have a positive effect on Effort Expectancy.

H7: Prior Experience will have a positive effect on Performance Expectancy

Experience was also found to affect social factors which influence PC usage (Thompson et al., 1994). Therefore, hypothesis eight addresses this link.

H8: Prior Experience will have an effect on Social Influences.

Experience was also found to affect perceived behavioural control (Taylor and Todd, 1995b; King & Dennis, 2003). Therefore, this study investigates the role of prior experience (computer & Internet knowledge) as an antecedent to website quality perceptions. The argument here is: experienced users in respect to computer and Internet knowledge would appreciate the quality of the website design in terms of the four dimensions: technical, general and specific content, and appearance.

H9: Prior Experience will have a positive effect on Website Quality perceptions.

4.4.2.3. The Effect of Moderators.

This study also investigates the impact of some demographics as moderators to the relationships among the constructs in the proposed model. Marketers are normally interested in studying demographics such as the populations' size and growth rates in cities, regions and nations; age distribution and ethnic mix; educational levels; household patterns; and regional characteristics and movements; in addition to, individuals' economic status such as purchasing power and income distribution. Internet banking studies, adopting the technology acceptance models, have reported investigation of moderators such as gender, education, income and age (e.g., Wan et al., 2005; Jaruwachirathanakul & Fink, 2005; Kolodinsky et al., 2004; and Lasser et al., 2005). Correspondingly, the current study is investigating gender, age, education

and income based on the reported impact these demographic have on Internet banking behaviour in the literature.

Gender

Previous studies reported that males were more likely to adopt Internet banking than were females (Wan et al., 2005). Venkatesh et al. (2000; 2005) and Morris & Venkatesh (2000) reported that decision making processes by males and females are different with respect to acceptance research in the pre-training phase. Gender moderated the relationships between attitudinal beliefs-intention behaviour (IB); social norm-IB; and perceived behavioural control-IB. All these relations were significant for females, whereas, only attitudinal beliefs-IB were significant for males. Interestingly enough, there were no gender differences in the short term usage (one to five months) of implementation. These results were obtained in an organizational behaviour rather than consumer context.

Other researchers have extended Hofstede (1991) masculinity to technology acceptance research indicating that it is related to perceived usefulness and arguing that Davis (1989, 1993), Davis et al. (1992), and Venkatesh & Davis (2000) viewed perceived usefulness as a mental representation of instrumentality ,certain actions, for achieving desired goals. In other words, masculinity captures goal orientation and affects usefulness through an assessment process that links instrument acts such as using certain technology to achieve a certain goal such as performance improvement (Hassanien et al., 2008). Other findings were reported (inspired by the same argument) that men are more task-oriented than women and motivated by achievement goals. Correspondingly, males are more driven by perceived usefulness (PE in the research model) while females are driven by perceived ease of use and subjective norm (Venkatesh & Morris, 2000).

Venkatesh et al. (2003) reported gender as a moderator to the relationships between PE- intention (stronger for men), EE-intention (stronger for women), and SI-intention (stronger for women under mandatory use conditions only); however, since the current study is carried out under none mandatory usage conditions, the latter relationship is not investigated. Moreover, the current research model excluded behavioural intentions owing to the fact that actual usage behaviour is being investigated. Previous research also found gender to effect perceptions of website

quality; Floh and Treiblmaire (2006) reported that men's estimates of website quality were significantly lower than females and their satisfaction with e-banking was explained more by service quality. Thus, building on the finding related to the moderating effect of gender in the UTAUT (whilst keeping in mind results from recent findings with respect to the TPB theory indicating that gender differences tend to decline with sustained usage and increased experience (Morris et al., 2005), it is hypothesized that

H10: Gender will moderate the relationships among the proposed model constructs

More specifically:

H10.1: PE-IB usage effect is stronger for males than females

H10.2: EE-PE effect is stronger for females than males

H10.3: SI- PE effect is stronger for females than males

H10.4 WQ-IB effect is stronger for females than males.

Education

Computer knowledge is also related to educational level. Innovators are usually younger, educated, and wealthy or with access to plentiful resources (Rogers, 2003). Previous research also reported a positive impact of higher levels of education in respect to computer training environments, computer ease (versus anxiety) and positive attitudes (Zmud, 1979; Howard, 1988; Davis & Davis, 1990; and Igbaria & Parasuraman, 1989 cited in Sun & Zhang, 2006). Agarwal & Prasad (1999) report that levels of education are positively associated with PEOU beliefs but not with PU; hence, lower levels of education are expected to be more sensitive to effort expectancy owned to technology here present a barrier. Additionally, increased educational levels lead to increased e-banking adoption (Al-Ashban & Burry, 2001; Stavins, 2001 cited in Gan et al., 2005). Furthermore, increased education and experience empower users and decrease the effect of social influence on their behaviour (Burton-Jones & Hubona, 2006). Contrary to Agarwal & Prasad (1999), the authors argue that education leads to positive association with PU and greater education should increase PEOU by reducing anxiety and improving attitude. Hence, it is hypothesized that:

H11: Education level will moderate the relationships among the proposed model constructs

More specifically:

H11.1: PE- IB usage is stronger for individuals with higher levels of education than those with lower levels.

H11.2 SI-PE is stronger for individuals with lower level of education than those with higher levels

In view of the targeted population in this study, actual users of Internet banking, it is assumed that those with lower levels of education would rely on their computer and Internet experience, and website quality perceptions in making usage behaviour decision, in addition, EE influence on PE would be greater with increased education. Therefore it is hypothesized that:

H11.3: WQ-IB direct and indirect (through PE) paths are stronger for individuals with lower levels of education than those with higher levels, and

H11.4: EE-PE is stronger for individuals with higher levels of education than those with lower levels of education.

Income

The results from the previous studies related to Internet banking showed that income is a significant determinant of choices between various channels. The higher income individuals might have the need to access their online banking much more than middle income individuals, however, they prefer to use the branch for complex transactions (Gan et al. 2005). Wan et al (2005) found that adoption of Internet banking was associated with moderate income household while low income households rely on branch banking and high income household tend to use all channels available to them. Lassar et al. (2005) also reported that income positively affects e-banking adoption. Dennis et al (forthcoming), state that income and education are correlated in the sense that higher education is associated with higher income levels. Thus, it is hypothesized that:

H12: Income will moderate the relationships among the proposed model constructs

More specifically:

H12.1: PE-IB is stronger for higher income users than lower income users

H12.2: SI-PE is stronger for lower income users than higher income users

H12.3: WQ-IB direct and indirect paths are stronger for lower income users than higher income users.

H12.4: EE-PE is stronger for higher income users than lower income users.

Age

Gan et al. (2006) study reported that senior consumers, being more risk averse, prefer a personal banking relationship. Wan et al. (2005), found that Internet banking adoption was highest among middle adulthood and lower for younger and older customers. Dennis et al. (forthcoming) argue that younger consumers seek more information than older ones; however, the latter show more product satisfaction and loyalty. In organizational context during sustained usage, older workers are driven by attitude beliefs and perceived behavioural control toward using technology, while younger workers are only influenced by attitude beliefs toward technology usage (Venkatesh et al., 2000; Morris & Venkatesh, 2000; and Morris et al., 2005). Venkatesh et al. (2003) reported that age was a moderator for the relationships within the UTAUT model. The path PE-behavioural intention was stronger for younger workers; social influence-behavioural intention was valid for older worker under mandatory use conditions; and facilitating conditions-usage effect was stronger for older workers with increased experience. More recently, Floh and Treiblmaire (2006) reported that younger people rated the importance of website quality and service quality significantly higher than did elderly people. Therefore, based on the current research model, it is hypothesized:

H13: Age will moderate the relationships among the proposed model constructs

More specifically;

H13.1: WQ-IB direct and indirect paths are stronger for younger adult than older adults.

H13.2: PE-IB is stronger for younger adults than older adults

Given that the current research is targeting actual Internet banking users, behavioural intentions are excluded from the research model. The assumption is that a causal relationship between intentions and usage exists; hence, there is no point in including behavioural intentions in the model unless continued usage is investigated.

4.5 Instrument Development and Design

This section presents the constructs' measurement for the proposed research model, the instrument development, instrument translation into Arabic language and instrument pre-testing.

4.5.1. Constructs' Measurement

The difference between the term “construct” and the term “variable” is related to the measurement. By giving an actual measure (e.g., score on scale), the operational definition of the construct turns it into a variable (Ghauri et al., 2004). Operationalizing a concept to become measurable is done by looking at behavioural dimensions or properties donated by the concept, which are then translated into observable and measurable elements in order to develop an index of measurement for the concept (Sekaran, 2003). Operational definitions for the key constructs in the proposed model were specified by Venkatesh et al.'s (2003) work (refer to section 2.11), Aladwani and Palvia's (2002) and Aladwani's (2006) work (refer to section 3.6). This study is adopting the combining both instruments measuring the constructs in the proposed research model. Measurement items for performance expectancy, effort expectancy, social influences and behavioural intentions are adapted from Venkatesh et al.'s (2003) study with some adjustment to reflect the specific target behaviour, Internet banking usage. Measurement items for website quality construct and its dimensions were adapted from Aladwani and Palvia's (2002) and Aladwani's (2006) scale.

4.5.2. Instrument Development

The design of the research instrument consisted of three pages and a cover letter, which indicated the purpose of the study and contact details for the researcher and the

supervisor. The measuring instrument consisted of four parts. Part one covered respondents' computers and Internet knowledge level of experience. Part two covered the demographic variables. Part three and four covered the empirical measurements for the constructs in the proposed model. The variables are measured as follows in the research instrument:

Experience: refers to individuals' level of experience and is measured through self-assessment of one's general computer and Internet knowledge. The Internet usage behaviour in general was elaborated on by including two more questions measuring Internet experience in years and daily use per hours. Q1 – Q4 of part one cover computer and Internet knowledge with five choices that range from very poor- very good, while Internet adoption and daily use are measured in a four level scale.

Demographics: refer to gender, education, marital status, occupation, age, income and place of residence. Q5- Q11 of part two covers these variables in the Arabic version and Q5- Q12 in the English version. The English version includes questions about a respondent occupation, household income and nationality or culture. The Arabic version measured income on the individual level to reflect the current behaviour. Only gender, age, education and income comprise the moderator in this study as these are the most relevant to the behaviour under investigation as reported in the literature pertaining to Internet Banking; other demographics serve the profile description for the samples.

Performance Expectancy: this variable measures the degree to which an individual believes that using Internet banking will help him/her attain gains in performing banking tasks through the Internet channel. Statements 1-4 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

Effort Expectancy: this variable measures the degree of ease associated with the use of Internet banking. Statements 5-8 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

Social Influences: this variable measures the degree to which an individual perceives that important others believe he/she should use Internet banking and also measures bank staff support in usage of the Internet channel. Statements 9-12 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

Technical Quality: this variable measures the technical characteristics of the website such as security, ease of navigation, search facilities, site availability, valid links, personalisation or customisation, interactivity, and ease of access. Statements 13-20 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

General Content Quality: this variable measures the characteristics of banks’ websites content in general such as content usefulness, completeness, clarity, currency, conciseness, and accuracy. Statements 21-26 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

Specific Content Quality: this variable measures specific content characteristics found on a website such as finding contact information, a bank’s general information, product/service details, consumer policies, and customer support. Statements 27-31 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

Appearance Quality: this variable measures characteristics of the website appearance such as attractiveness, organization, proper use of font, colours and proper use of multimedia. Statements 32-36 of part three measure this variable using five point Likert scale ranging from (1) “strongly disagree” to (5) “strongly agree”.

Actual usage: this variable measures actual usage of Internet banking facilities. Q13 and Q14, of part four measure Internet banking usage in terms of years of adoption and weekly usage pattern. In addition, Q15 measures typical banking services carried out on the Internet channel using three patterns of frequency (rarely- occasionally- constantly).

4.5.3 Instrument Translation into Arabic Language

Back translation is a procedure commonly used in cross-cultural survey to test the accuracy of the translation (Brislin, 1970 & 1980). The research instrument with its valid set of items was translated from English to Arabic by an accredited bilingual. The Arabic version was then checked by an MIS PhD student for terminology checking. Upon satisfactory review, the Arabic version was back translated into English by a bilingual working for the Foreign Affair Ministry in the Media Section. The final copy was compared to the original instrument to check validity of the translation process. Minor variations were detected but did not alter meanings and slight modifications were necessary since English is the business language in Jordan. After translation is completed, a field tests was carried out to ensure comprehension of all questions by subjects.

4.5.4 Instrument Pre-Testing

Two stages of pre-test took place for the Arabic version of the research instrument. In the first stage, a focus group from Ph. degree students at Brunel University was assembled (from different disciplines including marketing, CIS, English Literature, and Engineering; two where non-users of Internet banking). The instrument was thoroughly discussed to ensure clarity of statements and comprehension of construct measurement. The focus group discussion revealed the adequacy of most statements measuring the model constructs except for a pointed ambiguity with regard to one marketing concept, customisation. The concept was purely English and there was no equivalent word to match in Arabic; thus, a lengthy statement (17) was used to describe the concept and to that effect, one member of the focus group found it still unclear. A point was taken to try to make the statement more clear or to keep it in mind at the analysis stage. In the confirmatory factor analysis, measurement model fit and validity, this statement (TQ5) was not represented in both samples due to high covariance with TQ4; thus, both indicators were deleted. The second stage of the pre-

testing process took place in Jordan with a convenient sample of fourteen individuals working at a communication company. Each of the respondents completed a first version of the questionnaire and provided feedback about the process (e.g., time, clarity of direction and wording of measures). In general, the respondents indicated that the questionnaire was clear and easy to complete. Following the pre-test, minor modifications to the instrument were made (e.g., excluding what looked like a duplicate statement). The focus group procedure was not carried out for the UK sample since the instrument was established originally in the English language; however, the instrument was pilot tested for clarity of wording, directions, and time with a group of twelve university graduate students and staff. The feedback came positive and thus the data collection was preceded.

4.5.5 Compatibility and Equivalence of Research Instrument

Cross-national survey projects compare data collected from different countries, and to warrant comparison, the studies must be sufficiently compatible. The most common approach is to use a design of identical sets of questions. That is, taking a source questionnaire with questions that are applicable everywhere and adapting them through translation (Harknees, 1999). Nevertheless, Douglas & Nijssen (2003) advise caution using borrowed scales in cross-national studies; indicating that concept compatibility is a prerequisite for valid cross-cultural comparisons (Berry, 1980). According to Malhotra et al. (1996), compatibility can be attained through adopting universals from other disciplines or by demonstrating equivalence of psychometric concepts and data across cultural groups. According to one typology, comparability comprises three parts: construct equivalence; measure equivalence; and sampling equivalence. Construct equivalence focuses on establishing validity of theoretical propositions in all cultures under investigation. Measure equivalence proposes that instruments should be as similar as possible in terms of producing data of equivalent meaning. Sampling equivalence advocates methodologies to ensure that samples produce results that are generalisable to the cultures studied. Measure equivalence can be divided further into three components: calibration equivalence, translation equivalence, and scale equivalence. Calibration equivalence is achieved when units of weights and measures (e.g., money, colours, shape...etc) are essentially equal in all cultural instruments. Translation equivalence involves transforming verbal and non-

verbal stimuli into parallel forms with nearly identical meanings. Finally, scale equivalence is attaining similar meanings and interpretations for scores obtained in dissimilar cultural or language contexts (Douglas & Craig, 1983). In a review of multiple dimensions of equivalence that must be addressed when conducting comparative survey research, Johnson (1998) outlined the types of equivalences referenced in the literature and categorized them into two major categories: interpretive and procedural equivalences.

Interpretive equivalence is primarily concerned with similarities in how abstract or latent concepts are interpreted across cultures. Examples are: functional, definitional, semantic, linguistic, meaning, contextual, idiomatic, experiential, theoretical, and finally substantive equivalences. Procedural equivalence is concerned with the measures and procedures used to cross-cultural comparisons. Johnson (1998) classified procedural equivalences into subtypes: forms focusing on cross-cultural consistency of measurement such as exact, lexical, literal, verbal, vocabulary, indicator, stimulus, and text equivalence, which each implies a strict similarity of question wording across language groups; and forms emphasizing the applicability of mechanically identical procedures across groups such as formal, instrument, item, psychometric, syntactic, and grammatical-syntactical equivalence. Furthermore, Johnson (1998) organized the methods available for establishing equivalence around four stages of survey research project: question development stage, questionnaire presenting stage, data collection stage, and finally data analysis stage.

In this study, issues with regard to compatibility and equivalence are addressed in the manner described by both Malhotra et al. (1996) and Johnson (1998). In the development stage of the research instrument, the back translation is employed to ascertain measure equivalence at this stage (later in the analysis stage measurement invariance is tested which aims to confirm whether or not, under different conditions of observing and studying a phenomena, measurement operations yields measures of the same attribute (Steenkamp & Baumgartner, 1998). Additionally, the two stages of instrument pre-testing (focus group and pilot sample) are used to verify measures interpretation and comprehension. In the research design stage (procedural), the sampling design and data collection is to follow a similar approach in both markets as discussed in the coming section. Furthermore, in the Data analysis stage measurement validity and measurement invariance are addressed through the use of the statistical

package AMOS version7. Applying the structural equation modelling analysis using confirmatory factor analysis enables comparing groups by testing measurement invariance, which involves testing equivalence of measured constructs in two (or more) independent groups to assure that the same constructs are being assessed in each group (Chen et al., 2005).

4.6 Research Design

Bryman & Bell (2007) argue that research design provides a framework for the collection and analysis of data stating that design reflects decisions about the priority being given to a range of dimensions of the research process. On the other hand, they consider research methods as the techniques for collecting data which can involve specific instruments such as self-completed questionnaires or structured interviews. De Vaus (2001) stated: “the function of a research design is to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible”. Sekaran (2003) argued that research design involves a series of rational decision-making choices regarding the purpose of the study (exploratory, descriptive, hypothesis testing), its location (i.e., the study setting), the type of investigation, the extent of researcher interference, time horizon, and the level to which the data will be analyzed (unit of analysis). In addition, decisions have to be made regarding the sampling design, how data is to be collected (data collection methods), how variables will be measured and analyzed to test the hypotheses (data analysis). According to Sekaran (2003), the methods are part of the design; thus, she agrees with Bryman & Bell (2007) that methods are meant to describe data collection.

Correspondingly, based on Sekaran’s definition of research design, this study is conducted for the purpose of testing the hypotheses derived from the conceptual framework presented. It is believed that studies employing hypotheses testing purpose usually tend to explain the nature of certain relationships, or establish the differences among groups or the independence of two factors or more in a situation. Hypotheses testing offer an enhanced understanding of the relationships that exist among variables.

As for the type of investigation, a correlation study is chosen to delineate the variables associated with the research objectives and identify the important determinants of online behaviour (Internet banking) in a non-western nation as compared to a western nation. In terms of the settings, this study is conducted in a non-contrived setting. It is considered a field study with minimal interference from the researcher.

The study's horizon refers to conducting a longitudinal versus cross-sectional study. A cross-sectional, also called one-shot study is done when data is gathered just once over a period of time such as days, weeks, or months in order to answer a research question. When data is collected at more than one point in time, the study is considered longitudinal (Creswell, 2003). According to de Vaus (2001), longitudinal studies are more feasible when there is a need to describe the pattern and direction of change and stability (at an individual level). Additionally, it can be used to establish a temporal order of events; unlike cross-sectional studies that only reveals correlation among variables but the correlation does not explain the links. Longitudinal studies establish developmental effects and historical effects. Cross-sectional designs have three distinctive features: there is no time dimension, only differences between groups rather than change are measured; there is reliance on existing differences rather than change following intervention and there is no allowance for differences to emerge over time; and grouping individuals in the sample is based on existing differences or according to a category of the independent variable to which they happen to belong rather than random allocation. This study is a cross-sectional survey where data is collected at one point in time from samples to determine relationships between variables at the time of the study. Although the researcher acknowledges the limitations of this type of investigation, it is beyond the timeframe of this research project to make use of a longitudinal study.

4.7 Research Approach

Research approach or research strategy describes the pattern of assumptions, ideas and techniques that characterize quantitative and qualitative research (Bryman and Bell, 2007). Quantitative and qualitative research has distinctive approaches, but they also have similarities and areas of overlap, and can be brought together in various ways. Depending upon the definition of the problem and the nature of the information

being sought, researchers choose one of these two approaches, or a combination of them (Punch, 1998). As defined in section 4.3 the principle approach adopted by this study is quantitative in principle with preliminary qualitative focus group technique. Also, the research uses deductive and inductive reasoning while applying a confirmatory research strategy.

Quantitative research generally is considered to be more formalized and structured than qualitative research. The quantitative approach is summarized by Creswell (1994) as: “An inquiry into a social or human problem, based on testing a theory composed of variables, measured with numbers, and analyzed with statistical procedures, in order to determine whether the predictive generalizations of the theory hold true”. According to Bryman & Bell (2007), the main steps in qualitative research process can be summarised in the order depicted in Figure 4-4:

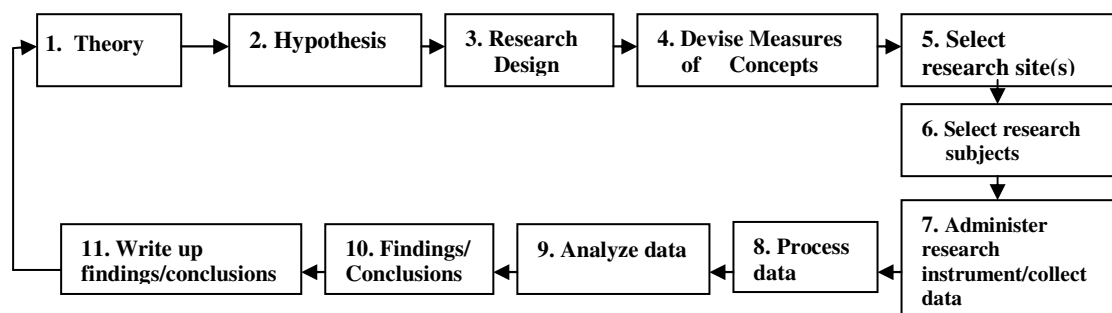


Figure 4-4: The process of Quantitative Research.
Source: Bryman & Bell (2007)

4.8 Data Collection Methods

According to McDaniel & Gates (2006), marketing research employs different methods for collecting data. In addition to focus groups and depth interviews, surveys are also common and popular. Surveys range between the use of non-Internet survey forms and Internet survey methods. The first type of surveys can be administered through a number of techniques: door –to-door interviews (rarely used today) and the equivalent “executive interviews” when the sample consists of managers, mall intercept interviews, telephone interviews, self administered questionnaires, ad hoc mail surveys, and mail panels. Sekaran (2003) adds observing people and phenomena

as a means to survey data collection methods stating that each method has its advantages and disadvantages.

Table 4-5 Questionnaire mode of data collection

Mode of data collection	Advantages	Disadvantages
Personally administered questionnaires Sekaran (2003)	Ability to rapport & motivate respondent. Doubts can be clarified Less expensive when administered to a group of respondents High response rate ensured Respondent Anonymity is high	Organizations may be reluctant to give company time for the survey with groups of employees assembled for the purpose.
Mail Questionnaires Sekaran (2003)	Anonymity is high Wide geographic regions can be reached Respondent can take more time to respond at convenience. Can be administered electronically, if desired	Response rate is almost always low. A 30per cent rate is quite acceptable. Cannot clarify questions. Follow-up procedures for non-responses are necessary.
Electronic Questionnaires Sekaran (2003)	Easy to administer; Can reach globally; Very inexpensive Fast delivery; Respondents can answer at their convenience like the mail questionnaire.	Computer literacy is a must Respondents must have access to the facility Respondent must be willing to complete the survey

The population for this study consists of individual users of Internet banking services in Jordan and UK. Technology acceptance research was criticised for using student samples, which adds limitations to generalizability on the findings, this research is targeting actual users in none discretionary conditions. Although a controlled environment where actual behaviour can be measured by means of observation or electronic observation would enhance the generalizability of the findings, the resources necessary for this option are not available to the researcher. The current study utilizes self-reported usage behaviour as a pragmatic (though limited) solution to the research requirements.

Due to the wide geographical distribution of samples, it would not be economical or time-efficient to conduct face-to-face or telephone interviews. The closest alternative is one sent by e-mail but this choice is not possible since email addresses are not always accessible or existing. Since this base of consumers is widely spread and in the absence of a sampling frame due to the lack of census or a readily available list of this type of users, this study adopts the convenience sample approach.

The sample size decision is made based on the statistical tool to be used, structural equation modelling technique. Although large samples generally tend to produce more reliable solutions, the sample size decision must be made based on a set of

factors related to the model complexity, expected rate of missing data, and estimation procedures used (Hair et al. 2006). The size of minimum 200 usable responses per country is the target set for this study taking into consideration the model complexity and the guidelines of researchers for applying multiple group analysis.

Sampling procedures for the two countries followed similar paths: three cities were chosen as best representative of the two communities. In Jordan, the chosen three main cities (Amman, Zarka, and Salt) are considered representative communities reflecting different live pattern in the Hashemite Kingdom. Respondents were recruited at the centres of these cities, where banks branches are normally located. A snowball approach was, also, employed through acquaintances to solicit Internet banking users. Four hundred questionnaires were circulated; only three hundred and nine were retrieved from which 85 were discarded for being incomplete. The response rate was 77 per cent; 224 was the number of responses used for data analysis. Similarly, in the UK, the three cities (Uxbridge, Harrow, and Central London) that were chosen to extract the sample are also considered representative communities reflecting different living patterns in the United Kingdom. A convenience sample was extracted from shopping areas in these locations. A snowball approach was, also, employed through acquaintances and willing volunteers (colleagues). Out off the five hundred and ten copies distributed only two hundred and thirty were retrieved from which 206 were usable. The response rate was 45 per cent.

4.9 Samples Descriptions

Sample description enables the researcher to obtain a comprehensive look at the respondents' profiles and assess the need for further treatment such re-categorization.

4.9.1 UK Sample Description

The descriptive analysis for part one and three of the research instrument revealed the characteristics of the sample with regard to computer and Internet experience, demographics, culture or country of origin, and banking services carried out on the Internet banking channels (refer to Appendix for tables of frequency).

The level of computer and Internet experience showed that the sample is more knowledgeable about Internet (80 per cent ranged between good-very good) than computers (78 per cent ranged between good-very good) with 80 per cent adoption range of more than 3 years at a daily usage rate of more than 4 hours.

The demographic analysis based on gender classification showed that females comprised 36.3 per cent of the sample size while males comprised 63.4 per cent. On the marital status level, 50 per cent are singles while 41 per cent are married and the remaining either separated/divorced (4 per cent) or in a relationship (5 per cent). The sample can be divided into three educational levels based on the responses: 30 per cent are bachelor degree holders; 40 per cent are with higher education qualifications; and the remainder are below bachelor level (18 per cent diploma & 12 per cent high school). On the income basis, the majority (45 per cent) has annual income level between £15000-34000 while 36 per cent has a level between £35000 and more than £45000; the remaining are divided between an income level that is less than £15000 (12 per cent) and those who do not wish to reveal such information (6 per cent). Based on the type of occupation, the majority (48 per cent) are working in the private sector while 35 per cent are employed by the public sector; the non-workers comprised 11 per cent while those who own a business comprised 4 per cent and 2 per cent are freelancing. The types of occupations held by respondents are classified into four groups based on the following criteria:

- (1) low level occupations including labourers and clerks;
- (2) students;
- (3) high-autonomy occupations, including the self employed, home duties, the unemployed, and the retired; and
- (4) high level occupations, including managers and professionals (Wan & Chow 2005).

The majority of respondents (48 per cent) were in the fourth category of high level occupations followed by the low level occupation (29 per cent); high autonomy occupations (12 per cent); and students (8 per cent). The remaining (4 per cent) refrained from providing occupation details.

The sample distribution according to location was almost balanced: 38 per cent in Uxbridge, 32 per cent in Harrow, and 31 per cent in central London. Collected information related to Internet banking usage revealed that the majority (59 per cent)

of respondents have been using the Internet channel for more than three years while (41 per cent) have been using it for less than two years. On a weekly basis, 39 per cent of respondents browse their online accounts once a week while 27 per cent check between 2-3 times and 25 per cent check more than 4 times. The remaining 9 per cent do not check weekly. The final set of descriptive analysis is related to the banking services carried out on the Internet banking channel. Online banking services are categorized (using principle component factor loadings) into basic and advanced services. Basics included: transaction and balance enquiries; statements' enquiries; transferring between accounts; and paying bills. Advanced services included: requesting credit card; cheque book, applying for loans, travelling and insurance services; and online stock trade. The frequency descriptive analysis showed that basic services are highly utilized through the online channel compared to more advanced services, with the majority scoring high on occasional and constant utilization for transaction & balance enquiries, and statement enquiries followed by transfers between accounts and billing (32 per cent and 39 per cent respectively). The utilization of online advanced services rate was moderate, with occasional utilization ranging between 20 per cent (credit card, Loan request and travel & insurance) and 27 per cent (cheque book request) while stock trade over Internet banking facilities scored 27 per cent of occasional utilization (refer to the tables in Appendix).

4.9.2 Jordan Sample Description

Similarly, Jordan's sample descriptive analysis for the first and third part of the research instrument revealed the characteristics of the sample with regard to computer and Internet experience, demographics, IB adoption/ usage, and banking services carried out on the Internet banking channels (refer to Appendix for tables of frequency).

Computer and Internet experience levels showed that the sample is nearly as knowledgeable about Internet (66 per cent ranged between good-very good) as computers (63 per cent range between good-very good); 50 per cent scored within adoption range of more than 3 years and the other 50 per cent were divided between less than a year and 1-2 years of Internet usage. 26 per cent reported a daily usage rate

of 3 hours or more while the remaining numbers were divided (36 per cent and 38 per cent) between non-usage and 1-2 hours only.

Females comprised 40 per cent of the sample against 60 per cent for males. The majority of the sample is educated: 56 per cent have a bachelor or higher education. 67 per cent are below the age of thirty and the remaining 33 per cent are above that age. Nevertheless, 46 per cent are singles and 42 per cent are married while divorced and others comprised 12 per cent only.

In respect of employment type, 56 per cent were employed by the private sector while 19 per cent by the public sector; 17 per cent freelancing and 7 per cent unemployed at the time of survey. On the income level, the majority (65 per cent) were between a monthly income level of JD500 and less, while 35 per cent earned more than JD500/month. Sample distribution according to respondents' area of residence was fairly balanced: Zarka 26 per cent; Amman 32 per cent; Salt 39 per cent; and the remaining 3 per cent resided in other areas.

Information related to Internet banking usage showed that the majority of respondents (80 per cent) were new to Internet banking usage or adoption, with usage rate ranging between >1-2 years, which was not surprising taking into consideration that the Internet accessibility at household level was made available on wide scale only recently (less than 4 years). On a weekly basis, 40 per cent of respondents browse their online accounts once a week while 31 per cent check between 2-3 times and 12 per cent check more than 4 times. The remaining 7 per cent do not.

The final set of descriptive analysis is related to the banking services carried out on the Internet banking channel. Using principle component factor loadings, the nine services loaded into two sets: basic and advanced services. Basics included: transaction and balance enquiries, statements' enquiries, and transferring between accounts. Advanced services included: travelling and insurance services, applying for loans, requesting credit card, cheque book, paying bills, and online stock trade. The frequency descriptive analysis showed the basic services, namely transaction and balance enquiry, and statement enquiry, were the constantly utilized services over the Internet banking channel with scores of 47 per cent and 40 per cent. Money transfer

scored highest on occasional utilization (35 per cent). Among the advances services; paying bills and requesting cheque books scored high on the occasional type of utilization (27 per cent) and requesting credit (22 per cent) followed by stock trade over the Internet banking facilities (19 per cent). The remaining scores were high for the rare type of utilization (refer to the tables in Appendix).

4.10 Ethical Considerations

Each survey contained a cover letter explaining the purpose of the study, indicating that participation was voluntary and that responses would be treated confidentially. Also, participants were free to withdraw at any time and the contact details of the researcher and supervisor were given in the cover letter should respondents have any ethical concerns.

An application was submitted to Brunel Business School Research Ethical Committee and approval was received for the research project.

4.11 Statistical Tools and Data Analysis Approaches.

The study is applying the Structural Equation Modelling (SEM) technique to test the proposed relations among the variables in the model. This technique is considered adequate for the type of investigation carried out by this study since it allows for answering questions that involve multiple regression analysis of factors among a single measured dependent variable and a group of measured independent variable (Ullman 2007).

According to Haire et al. (2006), SEM is used to test theoretical models. A structural equation model normally consists of two types of models:

- The measurement model that represents the theory and which specifies how measured variables come together to represent latent factors. That is, the model implies that variates represent the factors, and
- The structural model which represents the theory specifying how constructs are related to other constructs in the model.

The SEM technique also allows for comparing two groups and two models which makes it an adequate tool for testing the hypotheses and achieving the objectives of the study.

Confirmatory factor analysis (CFA) is a multi- group analysis that assesses equivalence, especially if the groups represent samples from different countries. CFA enables assessment of metric invariance and scalar invariance. Both types of invariance help in assessing equivalence among countries' samples as the case in this study. Additionally, CFA can also be used to assess measurement invariance in respect to gender and other demographic variables, which is part of the investigation carried out in this study. Latent mean structure analysis is also applicable when means' differences are assessed among groups. Statistical Package for the Social Sciences (SPSS) issue 15 and its supplement standard AMOS 0.7. are the software used for data screening and data analysis.

This chapter covered different research approaches, the approach adopted by this study, research framework, research questions and hypotheses, and methodology. The next chapter is dedicated to the samples' screening and data analysis.

Chapter Five: Data Analysis

5.1 Introduction

This chapter presents the assessment and testing of the proposed research model using structural equation modelling. The analysis process consists of two steps. Step one involves the assessment of the measurement model where model fit and validity is tested; based on satisfactory results, step two proceeds with hypotheses testing.

Hair et al., (2006) argue that the two steps approach has an advantage over the one step approach because it assures that good constructs measures are represented in the valid structural model. Schumacker & Lomax (2004) also report a two-step model-building approach: a measurement model followed by the structural model. The measurement model specifies the relationships among measured (observed) variables underlying the latent variables while the structural model specifies the relationships among latent variables as posited by theory. The measurement model provides an assessment of convergence and discriminant validity, and the structural model provides an assessment of nomological validity.

Equally, this chapter presents group analysis for establishing invariance between the two groups or data sets. Discriminant validity for the measurement model is tested first. Based on the result, the structural model proceeds and measurement invariance (group analysis) is investigated between the two data sets. Failure to achieve discriminant validity calls for separate data set analysis.

However, prior to subjecting the data sets for the two steps structural equation modelling procedures, the data sets are first screened for multivariate assumptions to ensure conformity before engaging in the confirmatory factor analysis and the model structural testing.

The next section presents the results of the screening.

5.2 Data Screening

Prior to analysis, research instrument items were examined, through SPSS statistical package, for accuracy of data entry, missing values, outliers and normality. Routine pre-analysis screening procedures for assessment of multivariate assumptions were carried out using the multiple regression and residual analysis. The findings and treatment of these issues are presented next for both samples.

5.2.1. Jordanian Sample

Missing data were below 5 per cent only thus were replaced with the mean value (Schumacker & Lomax, 2004; Hair et al., 2006). For most of the multivariate assumptions check, residual analysis was applied to check for outliers, normality, linearity, homoscedasticity, and multicollinearity.

Univariate and multivariate outliers were examined using the residual analysis and no univariate outlier cases with residual above 3.29 were found. Four multivariate outliers were detected on the Mahalanobis distance measure and were checked against regression analysis using a dummy variable to assess their influence. The resulting R^2 value was small (.164) and when turned into a tolerance reading ($1 - R^2 = .836$) the output was high indicating that the outliers has little effect on the rest of the independent variables (Hair et al., 2006); thus, it was concluded that the multivariate outliers were random and there was less danger in retaining them (Garson, n.d). The decision was further supported when each multivariate outlier was regressed alone to assess its influence both on independent variables (IVs) and on the dependent variable (DV) once deleted.

AMM samples	224	w-out case 1	w-out case 12	w-out case 148	w-out case 149	w-out all
R^2	.147	.141	.145	.147	.147	.137

According to Hair et al. (2006), influential observations strongly influence the regression results; however, they are not necessarily bad in the sense that should be deleted. The adjusted R^2 is useful in comparing models between different data sets because it compensates for the difference in samples sizes. Judging from the effect of

deleting any of the outliers on the regression R^2 results, the decision is in favour of not deleting any, based on the criterion that deletion would not improve the regression R^2 .

The descriptive analysis revealed that the data skewness and kurtosis were within the acceptable value of ± 1 ; hence, does not call for remedy by data transformation (Hair et al., 2006). Furthermore, the expected normal probability plot was employed to assess multivariate normality; the normal P-P plot of the regression standardised residual looked normal

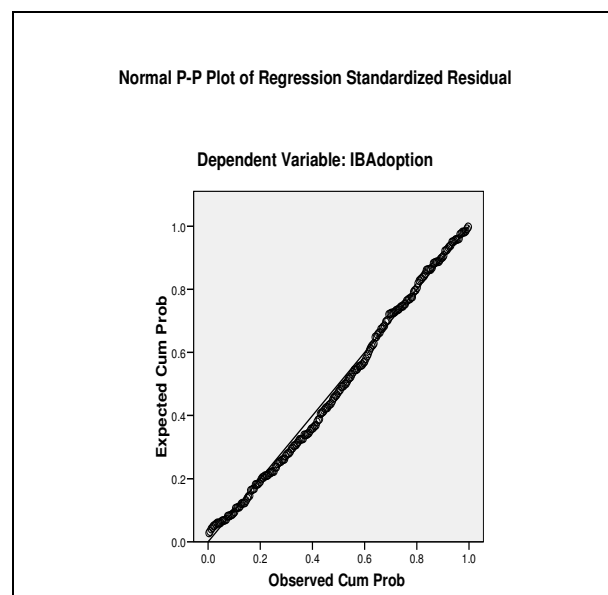


Figure 5-1: AMM Normal P-P Plot of Regression Standardised Residual

Examination of the residuals scatter plot provides a test for assumptions such as normality, linearity and homoscedasticity between the dependent variable (DV) scores and errors of predictions. Linearity is diagnosed when residuals have a straight-line relationship with predicted DV scores. If nonlinearity is present, the overall shape of the scatter plot would be curved instead of being linear. Produced bivariate scatter plots for independent variables (IVs) and the DV all showed a straight line relationship. The homoscedasticity assumption means that the standard deviations of error of prediction are approximately equal for all predicted DV's scores; the band enclosing the residual is approximately equal in width at all values of the predicted DV. Thus, when the band becomes wider at larger predicted values heteroscedasticity is diagnosed (Tabachnick & Fidell, 2007). The residuals scatter revealed that the

assumption of linearity was met but also heteroscedasticity was diagnosed (the scatter-plot takes the fennel shape). Heteroscedasticity occur when some variables are skewed while others are not and can also result from the interaction of an IV with another variable that is not part of the regression equation; however, heteroscedasticity does not invalidate the analysis but weakens it. The “experience” variable in the current data set is treated as an antecedent to the IVs and is not part of the regression equation; therefore it might be causing such heteroscedasticity.

Multicollinearity and singularity are related to the correlation matrix and they occur when variables are highly correlated (0.9 and above). Bivariate and multivariate correlations were examined and none bivariate correlations above 0.8 were found between the IVs. Multivariate correlation was assessed through the residual analysis and the coefficients output. Although the tolerance readings were all above .2 and the variance inflation factors (VIF) were below .4, the condition index and variance proportions produced by the collinearity diagnostic output indicated the existence of multicollinearity. One dimension had a reading near 30 (the cut off level) indicating a serious problem; in addition, two variance proportions (above .5) resided with the same dimension. The strategies for dealing with multicollinearity include centring one or more of the variables (Belsely et al., 1980). Other options include running the principal component factor analysis and using the components as predictors instead of the original variables (Tabachnick & Fidell, 2007). Instead, this study is adopting the confirmatory factor analysis (CFA) where estimation procedures include a direct correlation for measurement errors; thus, the relationships among constructs are estimated more accurately. CFA often eliminates the need to summate scales because SEM computes factor scores for each respondent (Hair et al., 2006).

5.2.2 UK Sample

Similarly, the research instrument items were statistically examined for accuracy of data entry and missing values. Missing values were below 5 per cent on the Likert scale items; thus replacement with the mean value was applied (Tabachnick & Fidell, 2007; Hair et al., 2006).

Univariate outliers were examined using the descriptive analysis with standardised residuals saved and then screened for values above 3.3. The univariate outliers' scores were changed to the items or the outlying cases so that they deviate but not as much as they did, i.e., one unit larger than the next extreme score in the distribution (Tabachnick & Fidell, 2007). Multivariate outliers were detected through the residual analysis with the Mahalanobis distance (case 73) and case wise diagnostics (case 112). The resulting outliers were coded as dummies and regressed against the IVs to assess their influence. The R^2 value (.077) was small indicating no danger in retaining the outliers. Then, a regression was run for the IVs against the DV without one outlier case at a time and the resulting R^2 was best (.406) when case 112 was deleted compared to the other options of deleting or keeping both against deleting one only.

UK samples	207	w-out 73	w-out 112	w-out both
R^2	.384	.378	.406	.401

Based on the resulting improvement in R^2 after deleting case 112, the decision is in favour of keeping only outlier 73 and deleting 112. The data screening proceeds with the new sample file of 206 observation.

Normality was first assessed through the descriptive analysis where skewness and kurtosis outputs indicated an acceptable level of normality (± 1) and that no transformation remedy was required. Further assessment was carried out through the residual analysis using the expected normality P-P plot for the regression residuals.

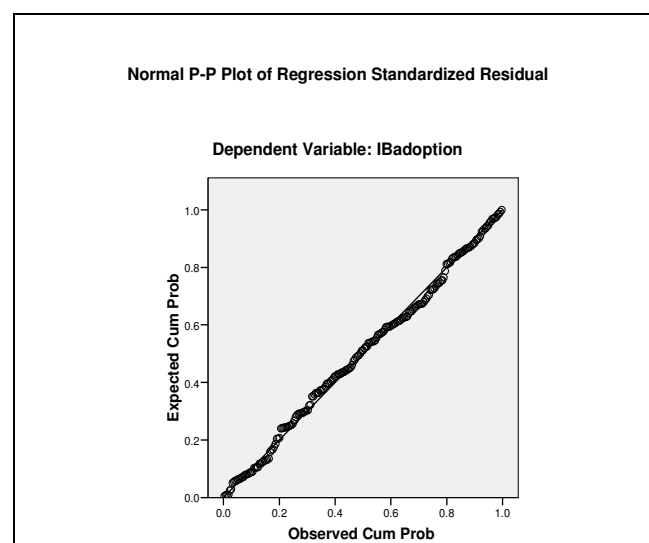


Figure 5-2: UK Normal P-P Plot of Regression Standardised Residual

The plot revealed an acceptable level of normality where the standardised predicted value formed a line with the standardised residuals.

Moreover, the scatter plot provided additional confirmation to the normality level of data in the UK sample. Linearity and homoscedasticity were assessed: linearity was present, but heteroscedasticity was also present (the scatter plot took the funnel shape).

The assessment of bivariate collinearity detected by the correlation matrix revealed that no correlation between any two items was above 0.8; thus, bivariate high collinearity did not exist. Multivariate collinearity was also assessed through the residual analysis and the coefficients output. The tolerance readings were above .2 except for the social influence variable (1.756), which also had the only variance inflation factors (VIF) reading above .5. The condition index -with variance proportions produced by the collinearity diagnostic output- indicated the existence of multicollinearity. Two dimensions had readings above 30 but one dimension had two variance proportions (.55 and .53), which are above the cut off level, .5. However, no treatment was applied until the results of CFA analysis produced the more accurate estimates.

After clearing the assumptions for multivariate analysis, the base is set for applying multivariate analysis; namely the two steps SEM approach: confirmatory factor analysis to assess the measurement model fit and validity followed by the structural model to test the prescribed relationships in the research model.

5.3 Measurement Model Assessment and Confirmatory Factor Analysis (CFA)

Model assessment can be achieved by three approaches: the exploratory factor analysis approach, the confirmatory factor analysis approach and the hybrid approach (Ahire & Devaraj, 2001). Hair et al. (2006) argue that confirmatory factor analysis approach differs from exploratory factor analysis (EFA) approach in that the latter extracts factors based on statistical results not on theory and can be conducted without prior knowledge of the number of factors or which items belong to which construct. Whereas with CFA, both, the number of factors within a set of variables and which

factor each item will load highly on, is known to the researcher before results can be computed. CFA as a tool enables the researcher to either confirm or reject the preconceived theory. Furthermore, CFA provides an assessment of fit while EFA does not. Ahire & Devaraj (2001) validated the advantages of CFA but also highlighted the merits of EFA in detecting unidimensionality issues and multidimensional sets within constructs measurements compared to CFA which is only capable of detecting unidimensionality problems without indications of the dimensions. The authors recommend, after empirical testing of the two measurement scales, the use of a hybrid approach. One that combines both approaches, only starts with EFA and proceeds with CFA for its multiple advantages.

This study is applying the CFA approach to assess the measurement model. The measurement model was drawn on the AMOS (version 7) graphics. In CFA, distinguishing between dependent and independent variables is not necessary for the measurement stage. CFA is run with all variables linked as shown in Figure 5-3 where measured variables are shown in rectangular shapes by labels that match statements 1-36 on the Likert scale. Latent variables are shown in the oval shapes. Two-headed connections indicate covariance between constructs. One-headed connectors indicate a causal path from a construct to an indicator.

The CFA framework allows or accommodates multiple group models testing. The groups can be formed from an overall sample by dividing it either randomly (in case of cross validation) or based on a meaningful characteristic such as demographic variable (namely gender, age groups, education level, and income among others). Notably, groups are not always divided after the fact; many times different populations are sampled with the aim of testing for similarities and differences between those populations (Hair et al., 2006). According to Arbuckle (2006), data for multigroup analysis can be organized in a variety of ways: one option is to keep all the data in one file and include group membership variables.

In the current study, and in order to reach a baseline model that fits both samples, the two data sets were combined in one file and used as the working file. The process of measurement model fit and validity is applied next and if a measurement model with acceptable fit and established validity is reached, then the second stage, structural

model testing, is carried out followed by the measurement invariance analysis to investigate measurement equality or differences between the two samples.

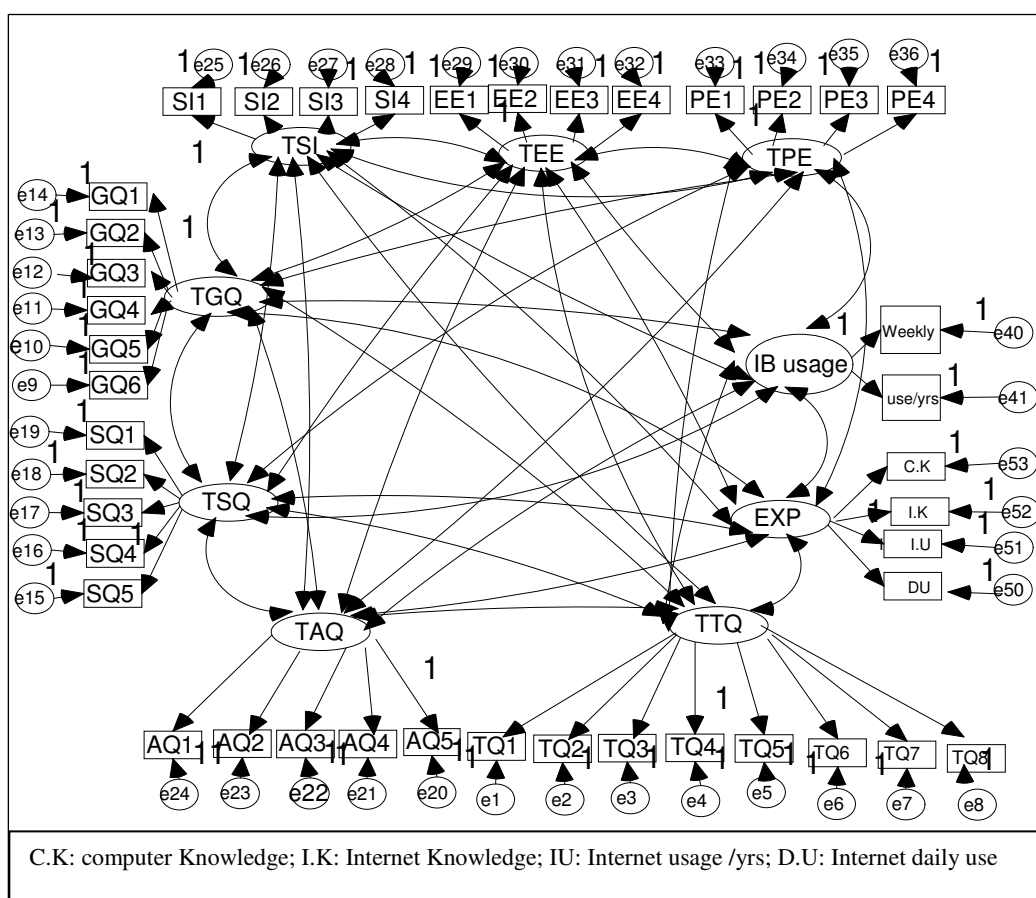


Figure 5-3: CFA measurement theory model for Internet banking usage.

5.3.1 Measurement Model Fit

Running the maximum likelihood estimate for the working file revealed significant Chi-square statistics where $\chi^2 = 1908.099$ with 783 degrees of freedom indicating that the model should be rejected. However, relying on chi-square statistics for assessing model specifications can be misleading (MacCallum, 1990; Byrne, 2001; Schumacker & Lomax, 2004; Hair et al., 2006) in more than one way and especially:

1. The larger the sample size, the more likely the rejection of the model and the more likely a Type II error (rejecting something true).

2. In very large samples, even tiny differences between the observed model and the perfect fit model may be found significant.
3. The chi-square fit index is also very sensitive to violations of the assumption of multivariate normality.

For these reasons, the chi-square goodness of fit (GOF) is not used as a sole indicator of model fit (Hair et al., 2006). Several other GOF measures were developed to overcome problems with chi-square. One of the fit statistics to address this problem is the χ^2/df ratio or the normed chi square in an attempt to make it less dependent on sample size. Literature is divided over what is indicative of good fit. Some state that the relative chi-square should be in the 2:1 or 3:1 range for an acceptable model; others say 2 or less or 3 or less reflects good fit or acceptable fit (Carmines & McIver, 1981) while others insist relative chi-square less than 1.0 is poor model fit (Byrne, 2001). The other goodness of fit indices can be categorized into three sets: absolute; incremental; and parsimony fit measures (Hair et al., 2006).

Absolute fit indices are direct measures of how well the proposed model reproduces the observed data or fits the sample data. Examples of such indices include root mean square residual (RMSR) which measures the average of the residuals between individual observed and estimated covariance and variance terms. Lower RMSR and standardised root mean square residual (SRMSR) values represent better fit and higher values represent worse fit (Hair et al., 2006). A value less than .05 is widely considered good fit and below .08 adequate fit. In the literature one will find rules of thumb setting the cut off at < .10, .09, .08, and even .05, depending on the authority cited (Garson, n.d). Another fit index that is commonly cited is root mean square error of approximation (RMSEA), which takes into account the error of approximation in the population (how well would the model, with unknown but optimally chosen parameter values, fit the population covariance matrix if it were available?). It explicitly tries to correct for both model complexity and sample size by including each in its computation. Values less than 0.05 indicate good fit and values as high as .08 represent reasonable errors of approximation in the population. AMOS also reports the 90 per cent confidence interval around the RMSEA value along with the closeness to fit p value. The narrow interval values around the RMSEA value with

insignificant p value ($p > .05$) is indicative of how well the model fits the data (Byrne, 2001).

Incremental or comparative fit indices differ from absolute fit indices in that they assess how well a specified model fits relative to some alternative baseline model (most commonly referred to as null model), which assumes all observed variables are uncorrelated. This class of fit indices represents the improvement in the fit by the specification of related multi-item constructs. An example of the incremental fit indices is comparative fit index (CFI) which ranges between 0-1 with higher values indicating better fit. Values less than .90 are not usually associated with a model that fits well (Byrne, 2001; Hair et al., 2006).

Parsimony fit indices are designed specifically to provide information about which model among a set of competing models is best, taking into consideration the model fit relative to its complexity. Thus, a parsimony fit measure can be improved either by a better fit or a simpler model (fewer estimated parameters paths). The most widely applied parsimony fit index is parsimony normed fit index (PNFI) which is derived from the incremental fit index (NFI: normed fit index) only adjusted by multiplying it times the parsimony ratio ($PR = \text{degrees of freedom used by the model} : \text{total degrees of freedom available}$). PNFI with relatively high values represents relatively better fit (Hair et al., 2006).

AMOS prints 25 different goodness-of-fit measures and the choice of which to report is a matter of dispute among methodologists. Hair et al. (2006) recommend reporting Chi squared statistics in addition to another absolute index such as RMSEA and an incremental index such as CFI. When comparing model of varying complexity, they recommend adding PNFI measure. Others report GFI or more recently, SRMR, instead.

Following these guides, the model fit indices for the total sample in the initial CFA run produced the following indices: GFI= .818 CFI =.895 and RMSEA=.058 with 90 per cent confidence interval (low .055; high .061) indicating room for further improvement or model refinement.

5.3.1.1 Model Refinement Criteria

The model refinement process includes scanning the output and applying the following criteria to achieve the better fit:

- Standardised regression weights (S.R.W) values should be above 0.5 (preferably above .7).
- Squared multiple correlations (SMCs) should be above the cut off value of 0.5
- Standardised residual covariances (S.R.C) should be above 2.58 or below - 2.58 -what is known as the absolute value $|2.58|$ (Byrne, 2001), and
- Modification indexes (MI) that reveal high covariance between measurement errors accompanied by high regression weights between these errors' construct are candidate for deletion (Byrne, 2001; Hair et al., 2006)

In the current run, all values in the S.R.W output were above .6 except for three items (AQ5, SI4, and TQ5), which had values below .6 (.536, .563, and .574 respectively). The SMCs values had some items below the cut off level; and the MI output had the following readings indicated the need for measurement refinement:

Table 5-1: AMOS selected text output- Modification indices for pooled data

Errors	MI- covariance	Path	MI-regression weight
e27 ↔ e28	39.383	SI4 → SI3	25.496
		SI3 → SI4	20.896
e4 ↔ e3	37.257	TQ4 → TQ3	21.157
		TQ3 → TQ4	22.654
e5 ↔ e3	36.802	TQ5 → TQ3	23.730
		TQ3 → TQ5	20.889
e15 ↔ e16	29.335	SQ5 → SQ4	13.355
		SQ4 → SQ5	12.911

According to Byrne (2001), only those items that demonstrate high covariance plus high regression weight in the modification indexes should be candidate for deletion. As for the other criteria, if an item proves to be problematic on most of the levels mentioned above, then it is also candidate for deletion. Based on that, the following items (TQ3, TQ4, TQ5, TQ6, SQ4, SQ5 and SI4) were deleted. SI3 was kept because

deleting it results in variable TSI being presented by two items only, which might cause un-identification problems. The other candidates for deletion based on being problematic on the first three assessment criteria were (AQ5 and Daily Usage).

After the deletion of those items, a re-run of CFA resulted in the following model fit indexes: CMIN = 1064 with df = 459 and CMIN/df ratio = 2.318; GFI = .872; CFI = .930; and RMSEA = .055 with 90 per cent confidence interval (.051 and .060).

Since the model fit results were acceptable within the criteria cited for those indices, the next step was to check the model fit indexes for both samples separately to see if the measurement model fit each country sample (Byrne, 2001). The model fit output readings were acceptable for the separate samples.

Table 5-2: AMOS selected text output: Fit statistics for each sample separately.

AMM	UK
CMIN = 803	CMIN = 881.259
Df = 459 and	Df = 459 and
CMIN/df = 1.750	CMIN/df = 1.919
GFI = .826	GFI = .805
CFI = .910	CFI = .918
RMSEA = .058 (Low90=.051 Hi90=.065)	RMSEA = .067 (Low90=.060 Hi90=.074)

5.3.2 Constructs' Validity

The next step is to check the constructs validity. In other words, the extent to which the measured variables actually represents the theoretical latent construct those measures are design to measure (Hair et al., 2006). Construct validity can be assessed through convergent validity, discriminant validity, and nomological validity.

Convergent validity of a construct is the extent to which indicators of a specific construct converge or share a high proportion of variance in common. Convergent validity can be estimated by factor loadings, variance extracted and reliability. In the total sample output, convergent validity is present after applying the required modification; all items loadings in the standardised regression weights output are

above 0.6 where the criteria is to be at least above 0.5. Variance extracted measures are all above 0.5 except for a few, which are divided into two groups. The first include SI3, Internet usage, and IB weekly usage, which can not be deleted otherwise a problem of un-identified model might arise. The second group includes AQ4 and TQ1, which were not problematic on the rest of the deletion criteria (according to Byrne, an items that has a standardised regression weight and AVE below .05 plus a standardised residual covariance with other items above $|2.58|$ is candidate for deletion).

Reliability coefficient was run on SPSS for each set of items comprising a construct and the results are presented in Table 5-3.

Table 5-3: Cronbach alpha reliability results for the pooled data file.

Constructs	Reliability	If item deleted	Improved alpha
TPE	$\alpha = .893$		
TEE	$\alpha = .861$		
TSI	$\alpha = .818$	SI3	.871
TTQ	$\alpha = .836$		
TGQ	$\alpha = .892$		
TSQ	$\alpha = .788$		
TAQ	$\alpha = .851$		
Experience	$\alpha = .865$	Internet usage	.899
IB usage	$R = .55$		

Construct reliability should be .7 or higher to indicate adequate convergence or internal consistency (Hair et al., 2006). The dependent variable was measured by two items thus the reliability check was assessed by inter-item correlation (R). Although reliability could be improved for TSI and Experience if certain items were deleted, the process might lead to model un-identification.

Discriminant validity is the extent to which a construct is truly distinct from other constructs. There is more than one way to assess discriminant validity. A conservative approach is to compare the average variance extracted (AVE) by a construct's scale items with the squared inter-scale correlation for that construct. If the AVE is consistently higher than the squared inter-scale correlations of the construct, discriminant validity is supported (Hair et al., 2006).

When CFA is run, AMOS output does not produce the constructs' AVE. It was calculated according to the formula: AVE equals the total of all squared multiple correlations of a construct's items divided by the number of items.

$$AVE = \frac{\sum_{i=1}^n \lambda^2_i}{n}, \text{ where } \lambda \text{ represents the squared multiple correlations and } n \text{ represents}$$

the number of items (Hair et al., 2006). Table 5-4 shows the results.

Table 5-4: Correlation matrix for the major constructs (pooled data file)

	TTQ	IB usage	TSI	TEE	TPE	EXP	TAQ	TSQ	TGQ
TTQ	.570	.345	.213	.546	.554	.156	.569	.442	.681
IB usage	<i>.587</i>	.451	.106	.386	.420	.473	.213	.210	.270
	<i>7.416</i>								
TSI	<i>.461</i>	<i>.325</i>	.631	.235	.145	.037	.193	.251	.196
	<i>7.185</i>	<i>4.800</i>							
TEE	<i>.739</i>	<i>.621</i>	<i>.485</i>	.609	.591	.328	.305	.323	.383
	<i>9.349</i>	<i>7.682</i>	<i>7.555</i>						
TPE	<i>.744</i>	<i>.648</i>	<i>.381</i>	<i>.769</i>	.689	.294	.334	.293	.331
	<i>9.705</i>	<i>8.002</i>	<i>6.360</i>	<i>9.916</i>					
EXP	<i>.395</i>	<i>.688</i>	<i>.192</i>	<i>.573</i>	<i>.542</i>	.700	.068	.129	.101
	<i>6.188</i>	<i>8.205</i>	<i>3.413</i>	<i>7.992</i>	<i>7.890</i>				
TAQ	<i>.754</i>	<i>.462</i>	<i>.439</i>	<i>.552</i>	<i>.578</i>	<i>.260</i>	.593	.445	.629
	<i>8.814</i>	<i>6.112</i>	<i>6.803</i>	<i>7.536</i>	<i>8.051</i>	<i>4.356</i>			
TSQ	<i>.665</i>	<i>.458</i>	<i>.501</i>	<i>.568</i>	<i>.541</i>	<i>.359</i>	<i>.667</i>	.556	.517
	<i>8.687</i>	<i>6.123</i>	<i>7.549</i>	<i>7.928</i>	<i>7.967</i>	<i>5.630</i>	<i>8.320</i>		
TGQ	<i>.825</i>	<i>.520</i>	<i>.443</i>	<i>.619</i>	<i>.575</i>	<i>.318</i>	<i>.793</i>	<i>.719</i>	.579
	<i>9.874</i>	<i>7.003</i>	<i>7.180</i>	<i>8.611</i>	<i>8.502</i>	<i>5.285</i>	<i>9.244</i>	<i>9.267</i>	

Note: values on the diagonal are the constructs' calculated AVE. The values below the diagonal are the constructs implied correlations with the t-value (critical value) shown in italic on the line below. Values above the diagonal are the squared correlations.

Table 5-4 shows that the dependent variable, IB usage, has a lower AVE value (.451) than the squared correlation value of the experience variable (.473). Also, TGQ variable has a lower AVE value (.579) compared to the squared correlation values of variables TTQ (.681) and TAQ (.629). These results indicate a discriminant validity problem.

Nomological validity refers to the degree that the summated scale makes accurate predictions of other concepts in a theoretically based model. Nomological validity is tested by examining whether the correlations among the constructs in the measurement theory make sense. Thus, this validity is tested in the structural model.

The measurement model provides an assessment of convergent validity and discriminant validity, and the structural model provides an assessment of nomological validity (Schumacker & Lomax, 2004).

Since the combined sample (pooled data file) showed a problem with discriminant validity, and in absence of more refinement, it is worth checking validity for the two samples separately.

5.3.2.1 Measurement Validity for Jordan Sample

The validity check is carried out in this stage by applying the measurement model reached above to the Jordanian sample data set to see if the data behave differently with regard to convergent and discriminant validity.

With regard to convergence validity, all item in the standardised regression weights output showed that items loadings are above .5. However, in the squared multiple correlations output, a number of items had a reading below .5. The reliability check depicted in table 5-5, showed all readings were above .7 except for the dependent variable being measured with two items. If some items were deleted reliability would improve for two constructs, experience and social influence, but with the caution that a problem of un-identification might result.

Table 5-5: Jordanian sample cronbach alpha reliability results

Constructs	Reliability	If item deleted	Improved alpha
TPE	$\alpha = .844$		
TEE	$\alpha = .802$		
TSI	$\alpha = .796$	SI3	.847
TTQ	$\alpha = .781$		
TGQ	$\alpha = .862$		
TSQ	$\alpha = .780$		
TAQ	$\alpha = .816$		
Experience	$\alpha = .862$	Internet usage	.872
IB usage	R= .539		

The discriminant validity check presented in Table 5-6 showed that for the Jordanian sample, dimensions of website quality are correlated. Furthermore, the technical quality dimension correlates with two other key constructs in the model: performance expectancy and effort expectancy. This was not evident in the combined sample and shows that a different treatment might be needed for the Jordanian sample to achieve discriminant validity.

Table 5-6: AMOS selected text output: Correlations matrix (all constructs) for AMM sample

	TTQ	IB usage	TSI	TEE	TPE	EXP	TAQ	TSQ	TGQ
TTQ	.514								
IB usage	.132	.561							
TSI	.324	.040	.597						
TEE	.579	.145	.377	.526					
TPE	.581	.149	.166	.453	.649				
EXP	.114	.389	.019	.211	.251	.687			
TAQ	.601	.058	.219	.287	.289	.033	.556		
TSQ	.610	.142	.193	.366	.419	.120	.581	.541	
TGQ	.830	.123	.215	.430	.381	.092	.681	.726	500

Note: values on the diagonal are the constructs' calculated AVE. The values below the diagonal are the constructs' squared correlations.

5.3.2.2 Measurement Validity for the UK Sample

Correspondingly, the same measurement model is applied to the UK data set to check if data behave differently with regard to the validity check. As for convergent validity, all items in the standardised regression weights output were above .5. However, in the squared multiple correlations output some items were below .5. The reliability check depicted in Table 5-7 showed that all constructs have reliability readings higher than 0.8 except for the dependent variable. Additionally, reliability would improve for TSI TAQ and Experience if some items were deleted; however, it might result in un-identification problem.

Table 5-7: UK sample cronbach alpha reliability results

Constructs	Cronbach alpha	If item deleted	Improved alpha
TPE	$\alpha = .928$		
TEE	$\alpha = .906$		
TSI	$\alpha = .850$	SI3	.913
TTQ	$\alpha = .888$		
TGQ	$\alpha = .921$		
TSQ	$\alpha = .800$		
TAQ	$\alpha = .881$	AQ4	.892
Experience	$\alpha = .826$	Internet usage	.930
IB usage	R = .542		

The discriminant validity check presented in Table 5-8 shows that for the UK sample dimensions of website quality are discriminately different.

Table 5-8: AMOS selected text output: Correlations matrix (all constructs) for UK sample

	TTQ	IB usage	TSI	TEE	TPE	EXP	TAQ	TSQ	TGQ
TTQ	.720								
IB usage	.462	..571							
TSI	.130	.101	.687						
TEE	.308	.396	.078	.748					
TPE	.416	.508	.085	.520	.806				
EXP	.124	.311	.066	.404	.258	.681			
TAQ	.507	.353	.181	.158	.287	.065	.738		
TSQ	.257	.278	.329	.225	.179	.149	.319	.582	
TGQ	.536	.329	.181	.180	.187	.058	.581	.336	.686

Note: values on the diagonal are the constructs' calculated AVE. The values below the diagonal are the constructs' squared correlations.

The results of the discriminant validity for the separate samples indicate that the two samples need to be treated differently. For example, the Jordanian sample would benefit from aggregating the dimensions into one factor (Perceptions of Website Quality) while the UK sample can be tested on the structural model with un-aggregated dimensions.

Having failed to establish discriminant validity on the measurement model level for the combined samples file, and with supporting evidence from separate samples validity check, it is decided to carry out a separate measurement model analysis for both samples and proceed with the measurement model testing separately on the basis of different model specifications for each sample.

5.4 The UK Sample Analysis

The two steps approach, starting with measurement model and then the structural model are applied to the UK sample in the following sections.

5.4.1 Measurement Model Fit

In order to assess the impact of the website quality dimensions on Internet banking usage, at first the dimensions were treated as independent variables and incorporated in the measurement model for general assessment before structural model testing.

Thus, the assessment of the measurement model with the UK data set followed the same refinement criteria in order to reach the best items–variables representation. The refinement process requires applying the four folded criteria: achieving standardised factor loadings (regression weights) and squared multiple correlations (SMCs) values above 0.5 level; achieving standardised residual covariance matrix with values below the absolute value of 2.58; and modification indices with low covariance between error measures and low regression weights between its reflecting constructs (Hair et al., 2006). The refined model resulted in the following items-variables presentation

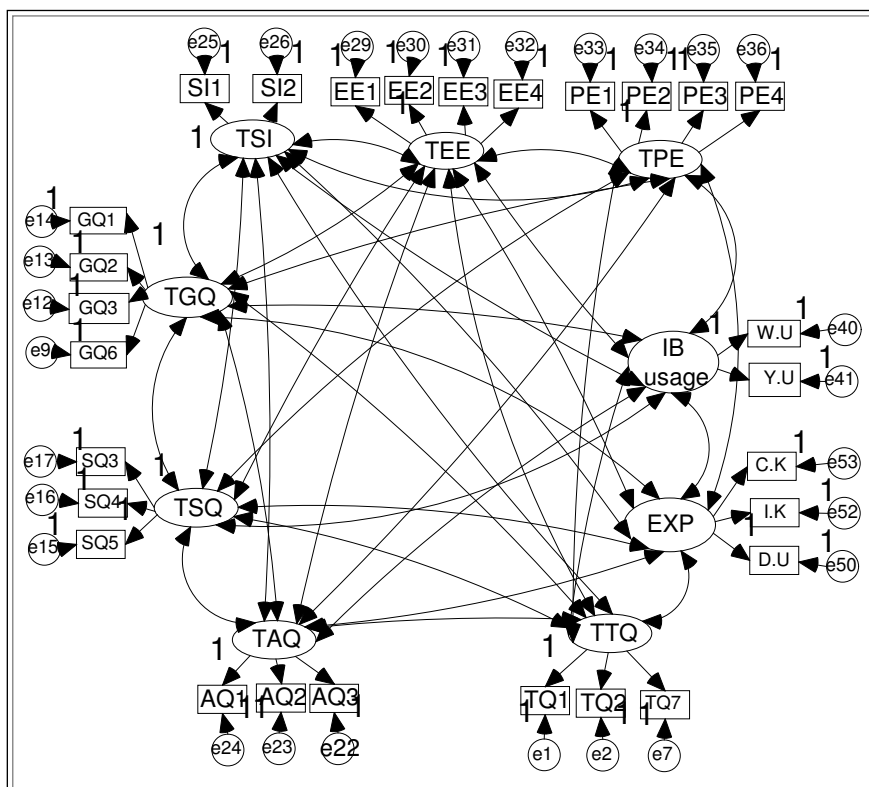


Figure 5-4: The refined measurement model- UK data set.

The model fit statistics were: CMIN= 525.223 with $df = 315$ and a ratio = 1.667 which is < 2 indicating a good fit. Other absolute fit indices: SRMR = .0526; GFI = .854 indicating an adequate fit. The incremental indices: NFI= .890 and CFI = .952 also indicate a good fit. Finally, RMSEA = .057 with 90 confidence interval (.048 and .066) and P close= .089 which indicates a good fit. The over all model fit indices indicate an acceptable fit. The second level of checking was the standardised factor loadings (regression weights), SMCs, and reliabilities estimates as shown in Table 5-9.

Table 5-9: UK standardised Factor Loadings (Regression weights), Variance extracted, and Reliability Estimates.

	TGQ	TSQ	TAQ	TTQ	TPE	TEE	TSI	EXP	IB usage
GQ1	.853								
GQ2	.857								
GQ3	.886								
GQ6	.745								
SQ3		.812							
SQ4		.818							
SQ5		.867							
AQ1			.823						
AQ2			.896						
AQ3			.857						
TQ1				.773					
TQ2				.867					
TQ7				.770					
PE1					.851				
PE2					.917				
PE3					.909				
PE4					.826				
EE1						.788			
EE2						.877			
EE3						.883			
EE4						.826			
SI1							.896		
SI2							.937		
I.K								.950	
C.K								.913	
D.U								.579	
W.U									.626
I.U/yrs									.866
AVE	70.1 %	69.3 %	73.8 %	64.8 %	76.9 %	71.3 %	84.1 %	69.1 %	57.1 %
Reliability α	.902	.866	.892	.838	.928	.906	R =.840	.826	R =.542

From the table, the lowest standardised loading is .579 linking Experience to the item Daily Internet usage. The reliability of experience can be improved if this item is deleted but it was kept in order to maintain a representation of three items per construct. Weekly usage is the second item below the preferable cut off level of .7, but since the dependent variable is measured with two items only and its extracted variance is above .5, the lower reading does not seem problematic at this stage. The variance extracted estimates for the constructs' measurement are all exceeding .5. Constructs' reliabilities ranged between .826 for the Experience construct and .928 for TPE indicating adequate reliability. TSI and IB usage are represented with two items each, thus the reliability estimates are expressed by the inter-item correlations (R).

5.4.2 Assessment of Validity

The results of standardised loadings estimates are all above .7 except for two items, which does not seem to significantly harm model fit or internal consistency. The AVE results are all above 0.5 and the reliability estimates all exceed 0.7. Thus; enough evidence is shown to support convergent validity.

The AVE method is used to assess discriminant validity. The implied correlation matrix along with the average extracted variance is shown in Table 5-10.

Table 5-10: Correlation matrix for the major constructs -UK sample

	TTQ	IB usage	TSI	TEE	TPE	EXP	TAQ	TSQ	TGQ
TTQ	.648	.449	.118	.487	.533	.206	.490	.393	.468
IB usage	.670	.571	.100	.396	.508	.311	.263	.257	.242
TSI	.344	.317	.841	.083	.082	.067	.166	.277	.157
TEE	.698	.629	.288	.713	.582	.394	.200	.280	.201
TPE	.730	.713	.287	.763	.769	.250	.307	.285	.198
EXP	.454	.558	.259	.628	.500	.691	.065	.143	.063
TAQ	.700	.513	.407	.447	.554	.254	.738	.340	.588
TSQ	.627	.507	.526	.529	.534	.378	.583	.693	.282
TGQ	.684	.492	.396	.448	.445	.251	.767	.531	.701

Note: values on the diagonal are the constructs calculated AVE. The values below the diagonal are the constructs implied correlations. Values above the diagonal are the squared correlations.

All the squared constructs' inter-scale correlations are lower than the constructs' average variance extracted, which support discriminant validity for the measurement model.

5.4.3. The Structural Model

Having established measurement model fit and validity, the next step is testing the structural model; that is testing the hypothesized theoretical model or the relationships between latent constructs. The structural model differs from the measurement model in that the emphasis moves from the relationships between latent constructs and measured variables to the nature and magnitude of the relationships between constructs (Hair et al., 2006)

The transition from the measurement model to the structural model implies specifying which constructs are related to each other and the nature of each relation. Figure 5-5 depicts the hypothesized theoretical model.

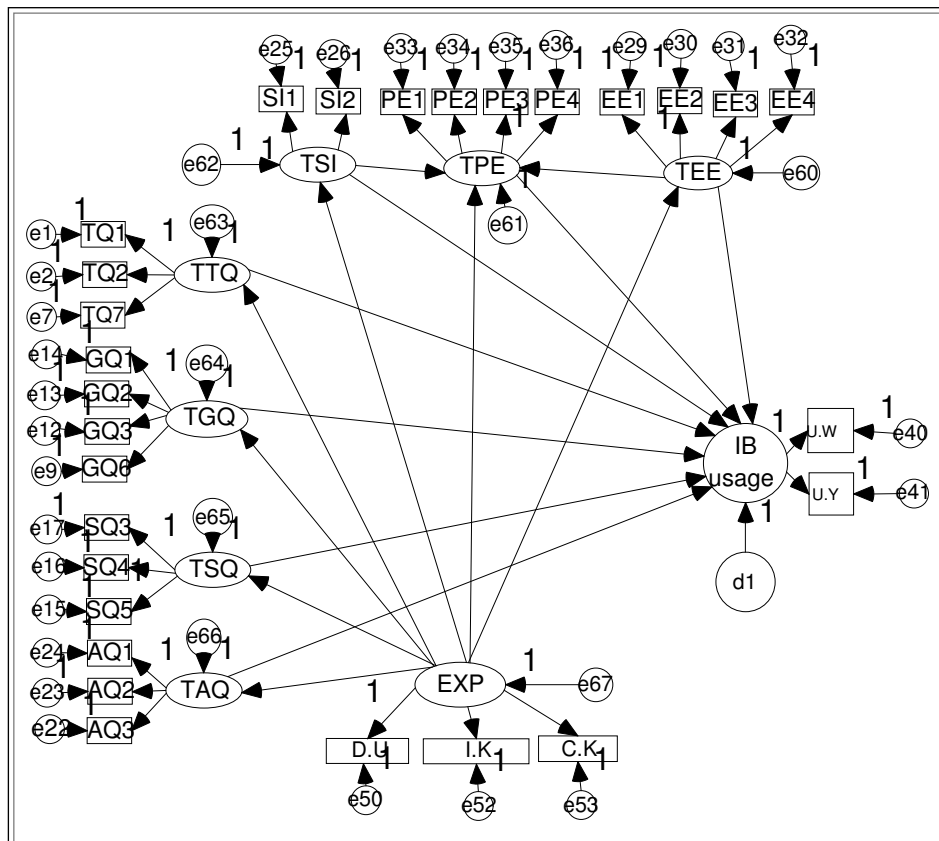


Figure 5-5: The Structural model (1) for the UK sample

The model fit indices for the first run were: CMIN = 920.296 with $df = 337$ and $CMIN/df = 2.731$; GFI = .751; CFI = .868; and RMSEA = .092 all indicating a poor fit and that there is room for refinement. Looking at the regression weights estimates, all paths between web quality dimensions and IB usage were insignificant:

Table 5-11: AMOS selected text output: regression weights for insignificant paths: UK structural model (1)

Paths	Estimates	Standard error	Critical Ratio	P value
TTQ- IB usage	.189	.129	1.466	.143
TGQ - IB usage	.081	.084	.964	.335
TSQ- IB usage	.040	.078	.513	.608
TAQ- IB usage	.000	.089	.002	.998

In other words, website quality dimensions have no direct impact on the IB usage. These findings indicate the lack of support to the sub-hypotheses H5-1; H5-2; H5-3; H5-4 with regard to dimensions impact on the Internet Banking usage.

Results from modification indices-regression weights, after model refinement, show that the dimensions are correlated (Table 5-12); thus supporting the decision of treating website quality dimensions as first order factors. According to Chen et al. (2005), a second- order model is applicable when the lower order factors are substantially correlated with each other, and when there is a higher order factor that is hypothesized to account for the relations among the lower order factors.

Table 5-12: Selected AMOS text output for UK model (1) Modification Indices

Paths			MI	Par change
TAQ	→	TTQ	51.406	.461
TSQ	→	TTQ	27.864	.330
TGQ	→	TTQ	49.054	.450
TTQ	→	TAQ	39.718	.496
TSQ	→	TAQ	30.011	.388
TGQ	→	TAQ	76.217	.637
TTQ	→	TSQ	24.619	.400
TAQ	→	TSQ	34.319	.438
TGQ	→	TSQ	26.927	.388
TTQ	→	TGQ	37.935	.482
TAQ	→	TGQ	76.286	.635
TSQ	→	TGQ	23.569	.343

The proceeding analysis incorporates the website quality concept as a higher order structure.

5.5 CFA for Second-Order Website Quality Structure.

In order to introduce a higher order structure into the research model, literature dictates that CFA is run first for the first order and then a higher order is introduced followed by the incorporation of the higher order into the hypothesized research model (Byrne, 2001). Following these steps, a CFA run to the first order constructs resulted in the following model specifications:

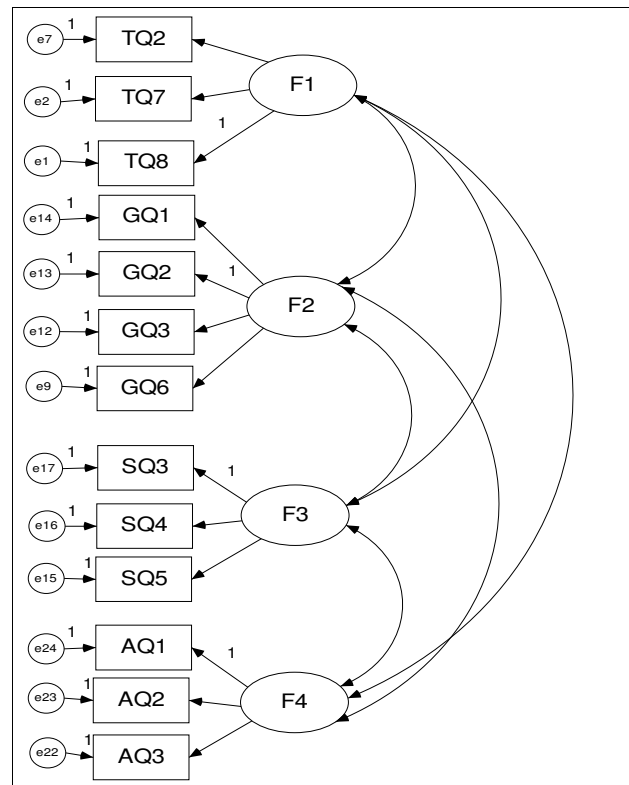


Figure 5-6: Website quality First-order model for UK sample

The first order specifications for the Technical Quality dimension differs a little from what resulted in the first CFA run (when web quality dimensions were assessed in the measurement model). Nevertheless, the model fit indices indicate a good fit: CMIN = 86.190 with $df = 59$ and CMIN/ df ratio = 1.461; Standardised RMR = .0354 and GFI = .940; NFI = .956 and CFI = .986; and RMSEA = .047 with 90 per cent confidence interval of (.023 and .068) and a PCLOSE = .558. These readings permit proceeding to the second stage, introducing the higher order factor: website quality perceptions.

The first run after introducing the second order factor revealed a need for modifications: deleting the special content quality dimension (TSQ) because it has a factor loading (squared multiple correlations) below 0.5. The hypothesized higher-order model presented in Figure 5-7 was specified in the following way: (a) each item have a none zero loading on the first-order factor (TTQ, TGQ, and TAQ) that it was designed to measure and a zero loading on each of the other first-order factors; (b) error terms associated with each item are uncorrelated; and (c) all covariance between each pair of the first-order factors would be explained by a higher order factor. The model fit statistics were:

CMIN = 45.921 with $df = 32$, $P = .053$ and $CMIN/df = 1.435$. The insignificant p value indicates that the model is accepted; additionally, the $CMIN/df$ ratio is < 2 which confirms the same decision. $GFI = .960$, $NFI = .970$ and $CFI = .991$; all above $.90$. Standardised $RMR = .0240$; within the acceptable range (below $.05$ or more relaxed range below 1). $RMSEA = .046$ with 90 per cent confidence interval of $(.000$ and $.074)$ and a $PCLOSE = .558$ an insignificant value indicating that the $RMSEA$ value lies within the 90 per cent confidence interval.

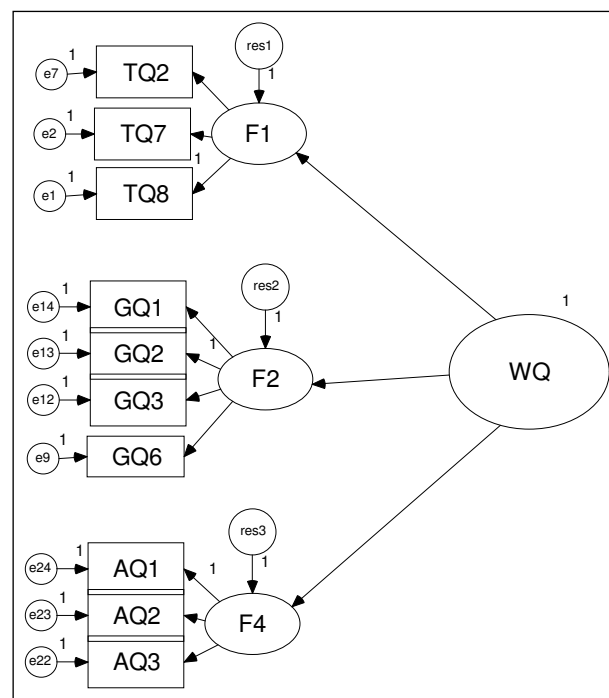


Figure 5-7: UK higher-order model of the website quality perceptions factorial structure

Model notes degrees of freedom indicate that the model is over-identified: more sample moments than parameters to be estimated (as shown below) and that it is safe to proceed with the analysis.

Number of distinct sample moments:	55
Number of distinct parameters to be estimated:	23
Degrees of freedom (55 - 23):	32

However, with hierarchical models, it is critical to check the identification status of the higher order portion of the model (Byrne, 2001). In this model, with three-order factors, there are:

$$\text{Sample moment} = (n(n + 1)) / 2 = 6 \quad \text{where } n = 3$$

Free Parameters: 0 error variances (these are set to 1)
 +3 factor variances
 +0 factor covariances (these are set to 0)
 +3 regression coefficients

6 total free parameters

Degrees of Freedom= Sample moments – Free parameters = 0

With zero degrees of freedom, the model is just-identified. Thus, prior to testing for the validity of the hypothesized structure shown in Fig. 5-7, the just-identification issue at the upper level of the model need to be addressed first. One approach to resolve the issue of just-identification in the model is to place equality constraints on particular parameters known to yield estimates that are approximately equal. Critical ratio differences, in AMOS output, are considered a powerful and unique exploratory mechanism for detecting parameters candidate for the imposition of equality constraints. The critical ratio differences output provides a list of estimates for the pair-wise differences among all parameters (Byrne, 2001). In order to determine the candidate parameters for equality constraints, first a look at the variance readings in the estimates output is needed.

Table 5-13: Selected AMOS text output for the second-order factor variance: estimates, C.R, and labels for Critical Ratios of Differences.

	Estimates	C.R	Label
Res1	.169	5.078	Par-11
Res2	.114	3.646	Pa1-12
Res3	.112	3.943	Par-13

The first order residuals related to F1 (TTQ) and F2 (TGQ) has estimated values that are almost identical; however the estimate reading related to F4 (TAQ) residual is not that different from the other two. The final decision on which parameters to constrain as equal must be determined from the actual critical ratio difference values, which are extrapolated from AMOS output: par11- par12 (-1.120); par 11- par13 (-1.24); par12 – par13 (-.041). Next, the critical ratios are compared to the standard normal distribution to test whether the two parameters are equal in the population. Given that the values are less than 1.96, the hypothesized pair-wise variance equality could not be rejected (Byrne, 2001). Thus, it seems reasonable to constrain variances related to

the three residuals to be equal. As such, the higher order level of the model will be over-identified with two degrees of freedom. In other words, the variance will be estimated for one residual and then the same value will be held constant across the other two residual variances (Byrne, 2001).

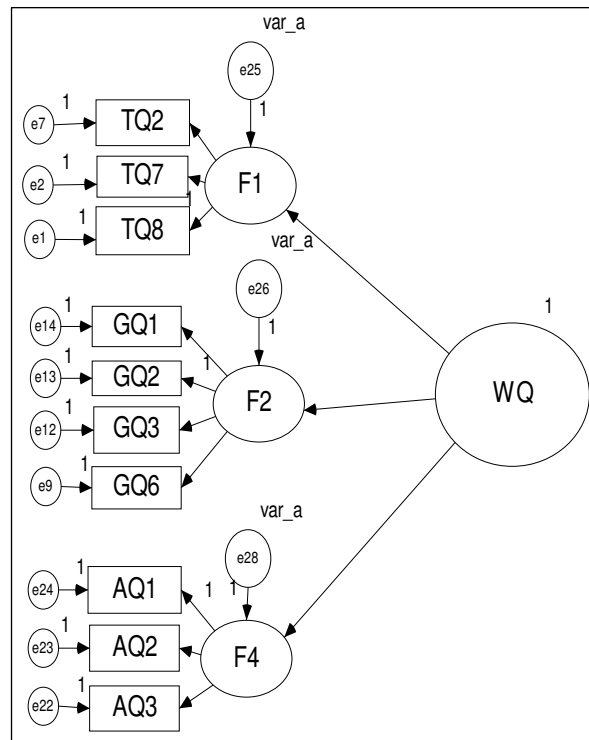


Figure 5-8: Final model of higher-order factorial structure for website quality perceptions – UK sample

After re-specifying the model, a run of the model's goodness of fit statistics resulted in the readings: $CMIN = 47.832$ with $df = 34$, $P = .058$ and $CMIN/df = 1.407$; $GFI = .958$, $SRMR = .0272$, $NFI = .969$ and $CFI = .991$; $RMSEA = .045$ with 90 per cent confidence interval (.000 and .072) and a $PCLOSE = .595$. All indicating a good fit. Additionally, all factor loadings are above .7 and the SMC's are above 0.6. Thus, based on these results, the model can be considered to best represent the structure of website quality item scores for the UK sample.

Having established that, the next step is to incorporate the website quality structure into the research model and assess measurement model fit and validity.

5.6. Measurement Model with Second-Order Structure

Running the CFA for the research model after incorporating the website quality perceptions higher-order structure and applying the refinement criteria mentioned previously (section 5.3.1.1) resulted in the measurement model depicted in Figure 5-9.

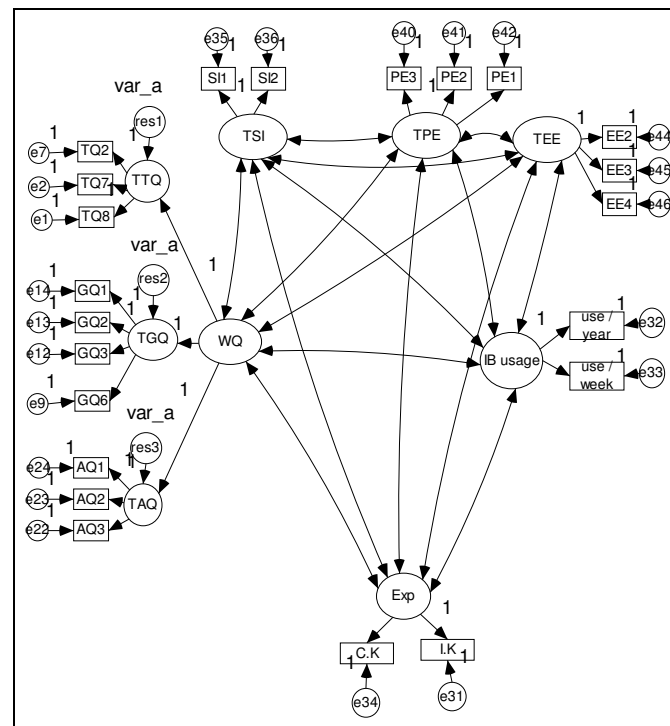


Figure 5-9: UK measurement model with higher-order structure

The model fit statistics are indicative of a good fit: CMIN = 293.707 with $df = 195$, and CMIN/ df ratio = 1.506; GFI = .891 and SRMR = .0545; NFI = .921 and CFI = .972; and RMSEA = .050 with 90 per cent confidence interval (.038 and .061) and PCLOSE = .506.

As for measurement model validity, the results of the standardised loadings estimates are all above .7 except for IB usage-use/week (.629), which does not seem to significantly harm model fit or internal consistency. The SMC's are all above 0.5 and the reliability estimates all exceed 0.7 as shown in Table 5-14.

Table 5-14: UK higher-order measurement model: standardised Factor Loadings (Regression weights), Variance extracted (SMC's), and Reliability Estimates.

	TGQ	TAQ	TTQ	TPE	TEE	TSI	EXP	IB usage
GQ1	.850							
GQ2	.848							
GQ3	.881							
GQ6	.743							
AQ1		.829						
AQ2		.903						
AQ3		.859						
TQ8			.884					
TQ7			.862					
TQ2			.791					
PE1				.860				
PE2				.939				
PE3				.892				
EE2					.887			
EE3					.893			
EE4					.813			
SI1						.870		
SI2						.966		
LK							.966	
C.K							.900	
U / W								.629
U/yrs								.862
AVE	70.0 %	74.7 %	71.7 %	80.6 %	74.9 %	84.5 %	87.1 %	56.9 %
Reliability	.902	.892	.883	.924	.897	R=.840	R=.930	R=.542

Thus; enough evidence is shown to support convergent validity. Discriminant validity is assessed through the AVE method and the results shown in Table 5-15 indicate evidence of discriminant validity. The table also shows the first order variables correlate with the higher order, which is expected.

Table 5-15: Selected AMOS text output for Implied (all variables) correlation matrix – UK second-order measurement model.

	TSI	TEE	TPE	Exp	IB usage	WQ	TAQ	TGQ	TTQ
TSI	.845	0.059	0.060	0.062	0.100	0.189	0.139	0.139	0.139
TEE	.242	.749	0.520	0.394	0.402	0.276	0.203	0.203	0.203
TPE	.245	.721	.806	0.242	0.483	0.387	0.284	0.284	0.284
Exp	.249	.628	.492	.871	0.300	0.103	0.076	0.076	0.076
IB usage	.316	.634	.695	.548	.569	0.373	0.275	0.275	0.275
WQ	.435	.525	.622	.321	.611	.735	0.734	0.734	0.734
TAQ	.373	.450	.533	.275	.524	.857	.747	0.540	0.540
TGQ	.373	.450	.533	.275	.524	.857	.735	.700	0.540
TTQ	.373	.450	.533	.275	.524	.857	.735	.735	.717

Note: values on the diagonal are the constructs calculated AVE. The values below the diagonal are the constructs implied correlations. Values above the diagonal are the squared correlations.

Having established measurement model fit and validity, the next step is to test the structural model.

5.7. Testing the Structural Model with the Second-Order Structure

Running the structural model and applying the refinement criteria mentioned previously resulted in the following final model:

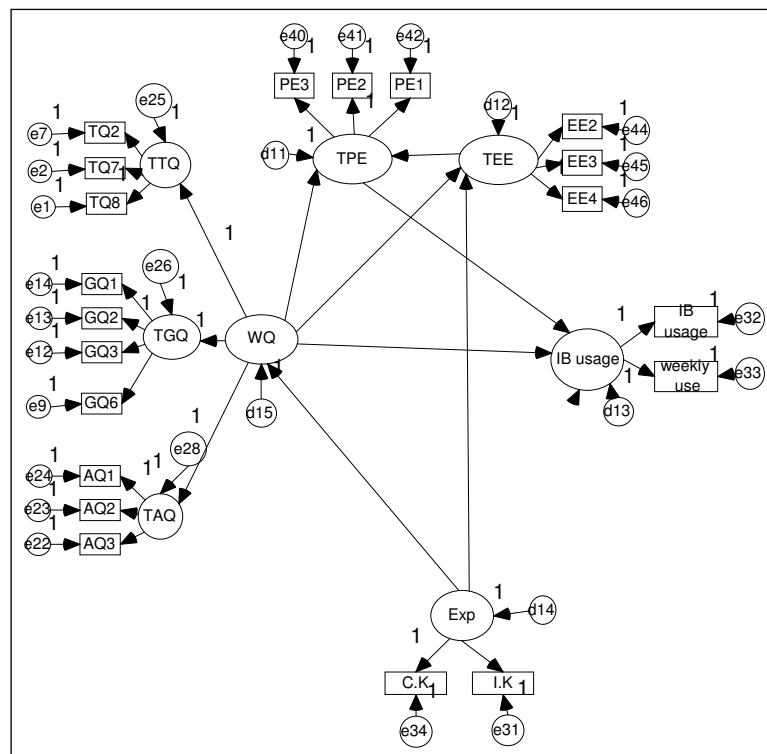


Figure 5-10: UK Final Structural model with Website Quality represented as a higher-order factor

The final model consists of four constructs in addition to the higher order factor of website quality perceptions. The social influence construct was excluded from the model as it proved to have no substantive impact on the other constructs. The model fit indices readings are: CMIN = 239.754 with $df = 162$ and a $CMIN/df = 1.480$, which is < 2 indicating a good fit; $GFI = .899$ and $SRMR = .0539$, both within the acceptable ranges; $NFI = .929$ and $CFI = .975$, also within the acceptable ranges; and $RMSEA = .048$ with 90 per cent confidence interval (.035 and .061) and $PCLOSE = .569$, which is insignificant thus indicating that 90 per cent confidence that the $RMSEA$ value falls within these two interval values.

5.7.1 Hypotheses Testing for UK Sample

All the hypothesized paths in the model are significant as shown in Table 5-16. The hypothesized link between effort expectancy-performance expectancy is supported (H1).

Table 5-16: Selected AMOS text output for UK model estimates

H	Paths			Estimate	S.E.	C.R	P
H9	Exp	→	WQ	.288	.064	4.487	***
H6	Exp	→	TEE	.446	.059	7.564	***
H4	WQ	→	TEE	.362	.070	5.189	***
H1	TEE	→	TPE	.751	.096	7.812	***
H4	WQ	→	TPE	.455	.094	4.821	***
H5	WQ	→	IB usage	.437	.145	3.021	.003
H3	TPE	→	IB usage	.616	.103	5.966	***

Note: *** p<.001; ** p<.01; * p<.05.

On the other hand, the social influence–performance expectancy path was not supported (H2). Additionally, the mediating role of PE between EE-IB usages is significant but since social influence–performance expectancy was insignificant, the mediating role of PE between SI-IB usage was not supported. As a result, H3 is partially supported. WQ impact on PE and EE (H4) is supported and WQ-IB usage path (H5) is, also, supported.

The paths from experience to website quality perceptions and effort expectancy are both significant. The hypothesized path from experience to performance expectancy is not supported, thus, was deleted and not shown in the output. In summary, paths Exp-EE (H5) and Exp-WQ (H8) are supported, while Exp-PE (H6) is not supported. Exp-SI (H7) was actually supported but since social experience had no impact on the other constructs in the model it was excluded from the final model. Standardised factor loadings (regression weights) indicate the strength of the direct paths in the model and their impact on the dependent variable is shown in Table 5-17. Performance expectancy has the highest direct impact on IB usage compared to website quality perceptions. Experience has the highest direct impact on effort expectancy compared to website quality perceptions.

Table 5-17: Selected AMOS text output for UK standardised regression weights

Paths			Estimate
Exp	→	WQ	.340
Exp	→	TEE	.517
WQ	→	TEE	.356
TEE	→	TPE	.556
WQ	→	TPE	.331
WQ	→	IB usage	.265
TPE	→	IB usage	.513

Nonetheless, the standardised estimates indicate the direct paths only, whereas, the standardised total effects give a more comprehensive picture of variables' impacts in the model.

Table 5-18: Selected Amos text output for UK standardised total effect

	Exp	WQ	TEE	TPE
WQ	.340	.000	.000	.000
TEE	.638	.356	.000	.000
TPE	.467	.529	.556	.000
IB usage	.330	.536	.285	.513

Table 5-18 shows that web quality perceptions have the highest impact on Internet banking usage (.536) followed by performance expectancy (.513). Experience has its greater impact on effort expectancy (.638) followed by performance expectancy (.467).

Thus far, the two steps of structural equation modeling analysis have been applied to the UK data set. The measurement model testing revealed that the hypothesized research model enjoyed a validity level that permitted proceeding with the structural model testing. The structural model testing revealed the need to aggregate the dimensions of website quality and thus a higher-order structure for the website quality perceptions was tested and incorporated in the measurement model. A re-run of the measurement model with the higher-order structure was carried out and refinement criteria was applied until a satisfactory measurement model was reached and tested for convergent and discriminant validity. Finally the structural model with the website quality higher-order structure was investigated and hypotheses were tested. The

results were reported and the discussion of these results will take place in chapter six along with the results from the Jordanian data set.

5.8 The Jordanian Sample Analysis

As with the UK sample, the two steps approach, measurement model and structural model, are applied to the Jordanian data set. First the measurement model fit and validity are tested.

5.8.1. Measurement Model Fit.

Testing the impact of website quality dimensions, as independent variables, and applying the assessment and refinement criteria mentioned previously in section 5.3.1.1, resulted in the final model depicted in Figure 5-11.

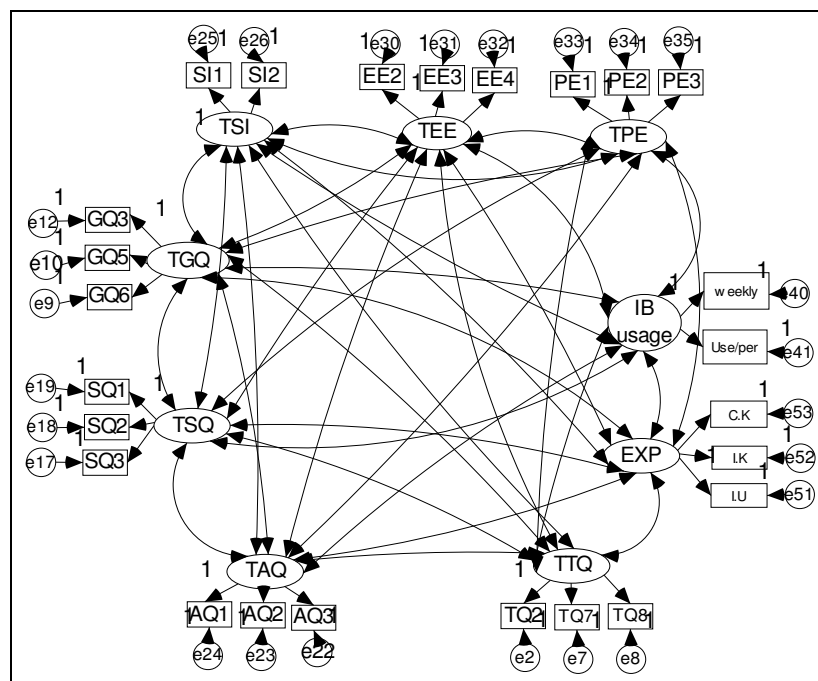


Figure 5-11: The refined measurement model for the Jordanian sample.

The model fit statistics readings are: CMIN = 347.109 with df = 239 and CMIN / df ratio = 1.452 which is less than 2 indicating a good fit. Absolute fit indices such as SRMR = .045 and GFI = .890 indicating an adequate fit. The incremental indices: NFI = .886 and CFI = .961 also indicating good fit. Finally, RMSEA = .045 with 90 per

cent confidence interval (.034 and .055) and PCLOSE = .783 indicating a good fit. The over all model fit indices indicate an acceptable fit.

Table 5-19 summarizes the other AMOS output indicators of good fit. The table shows that all factor loadings are above .7 except for three items: EE2, Internet usage per years, and TQ8 with readings: .642, .640 and .663 respectively. The average variance extracted values are all above .5. Reliability ranges between .862 and .756 indicating adequate reliability. TSI and IB usage are presented by two items each and thus their reliability estimates are expressed by the inter-item correlation (R). Experience reliability can be improved if one item (internet usage rate) was deleted; however, this decision is delayed for the time being.

Table 5-19: Jordanian standardised factor loadings (Regression Weights), Variances Extracted, and Reliability Estimates.

	TSQ	TAQ	EXP	TPE	TEE	IB usage	TGQ	TSI	TTQ
SQ3	.719								
SQ2	.717								
SQ1	.778								
AQ3		.710							
AQ2		.790							
AQ1		.734							
I.K			.874						
C.K			.879						
I.U			.725						
PE1				.740					
PE2				.872					
PE3				.799					
EE2					.642				
EE3					.775				
EE4					.752				
W.U						.842			
IB.U/ yrs						.640			
GQ3							.709		
GQ5							.777		
GQ6							.789		
SI1								.848	
SI2								.867	
TQ2									.770
TQ7									.713
TQ8									.663
AVE	57.6 %	55.6 %	68.7 %	64.9 %	52.6 %	55.9 %	57.6 %	73.5 %	51.4 %
Reliability α	.780	.785	.862	.842	.767	R= .539	.799	R= .735	.756

Having established an acceptable fit for the measurement model the next step is to assess the measurement model validity, in particular, convergent and discriminant validity.

5. 8.2 Assessment of Validity

Convergence validity is supported as evident in Table 5-18. The results of standardised factor loadings exceed or are close to .7 except for one item; the results of average variance exceed 0.5; and the results of reliability α also exceed .7.

Discriminant validity is investigated through the average variance extracted method (AVE) shown in Table 5-20.

Table 5-20: Selected AMOS text output for Implied (all variables) correlation matrix – Jordan

	TGQ	TSI	TTQ	IB usage	TEE	TPE	EXP	TAQ	TSQ
TGQ	.576	.119	.692	.136	.429	.398	.087	.637	.726
TSI	.345	.735	.284	.040	.362	.135	.015	.181	.158
TTQ	.832	.533	.514	.132	.579	.581	.114	.604	.593
IB usage	.369	.200	.364	.559	.147	.150	.392	.058	.142
TEE	.655	.602	.761	.383	.526	.452	.210	.288	.362
TPE	.631	.368	.762	.387	.672	.649	.251	.289	.413
EXP	.295	.121	.337	.626	.458	.501	.687	.034	.120
TAQ	.798	.426	.777	.241	.537	.538	.185	.556	.576
TSQ	.852	.398	.770	.377	.602	.643	.346	.759	.576

Note: values on the diagonal are the constructs calculated AVE. The values below the diagonal are the constructs implied correlations. Values above the diagonal are the squared correlations with bold indicating covariance.

The table above shows that TTQ has covariance with TEE and TPE in addition to the other website quality dimensions. The deletions of TTQ might help achieve discriminant validity. Nevertheless, the covariance among TAQ, TSQ and TGQ requires considering a higher-order structure for the website quality perceptions factor. Unless the discriminant validity issue is solved, the hypothesis and model testing can not be carried out at this stage. Thus, the decision calls for the re-structure of the theoretical model and presenting the higher-order structure.

To begin with, first order structure is examined and then the higher-order structure is presented into the measurement model.

5.9 CFA for the Second-Order Website Quality Structure

As with the UK sample, the start is by running the CFA for the first order, and then the higher-order is introduced followed by the incorporation of the higher-order structure into the hypothesized research model (Byrne, 2001). Following these steps, a CFA run to the first order constructs resulted in the specifications depicted in Figure 5-12 and the model fit readings are: CMIN= 84.897 with $df = 38$ and CMIN/df ratio = 2.234, which although >2 is still within the ranges cited previously in section 5.3.1; Standardised RMR = .0391 and GFI = .934; NFI = .928 and CFI= .958 indicating good fit; and RMSEA = .074 with 90 per cent confidence interval (.053 and .096). Although RMSEA close to the higher range of .08, the other fit indices present good fit.

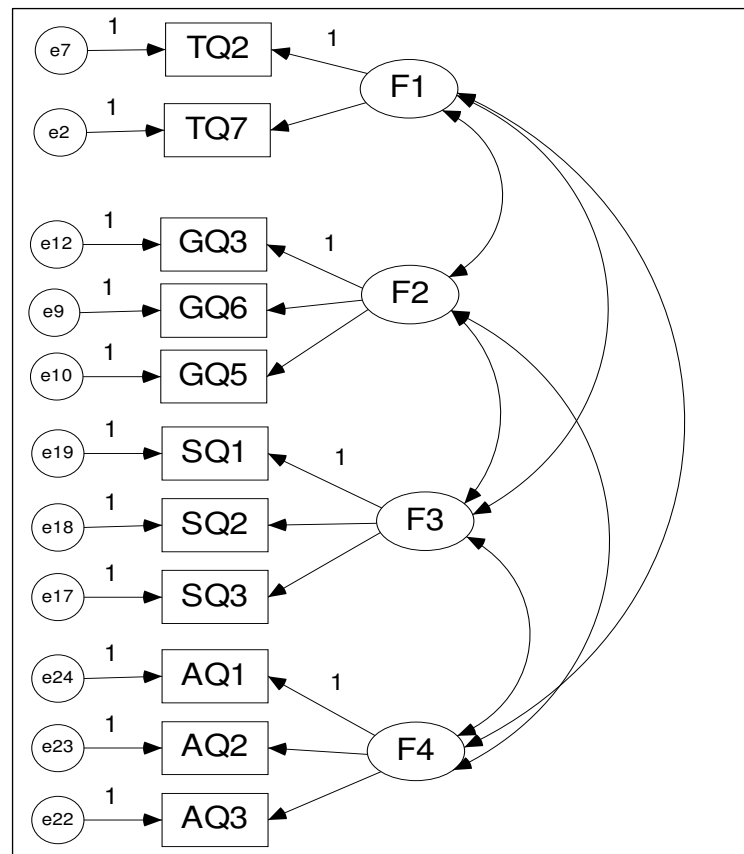


Figure 5-12: Website Quality First-Order Model-for Jordanian sample

Having reached a satisfactory first-order model, the next step is to introduce the higher-order factor and check the model specifications again. The first run of the higher-order structure revealed satisfactory model specifications thus there was no need for model modification. The higher-order structure model is specified in the

following way: (a) each item have a none zero loading on the first-order factors (TTQ, TGQ, TSQ, and TAQ) that it was designed to measure and a zero loading on each of the other first-order factors; (b) error terms associated with each item would be uncorrelated; and (c) all covariance between each pair of the first-order factors would be explained by a higher order factor.

The model's standardised regression weights are above .5 and the SMC's are also above .7. The model fit statistics are: CMIN= 84.921 with df = 40 and CMIN/df ratio = 2.123; Standardised RMR = .0392 and GFI= .934; NFI= .928 and CFI = .960, all indicating a good fit; and RMSEA = .071 with 90 per cent confidence interval (.050, .092) and PCLOSE = .051 indicating an adequate fit.

The model notes degrees of freedom indicate that the model is over-identified: more sample moments than parameters to be estimated (as shown below). Thus, it is safe to proceed with the analysis.

Number of distinct sample moments:	66
Number of distinct parameters to be estimated:	26
Degrees of freedom (66- 26):	40

However, with hierarchical models, it is critical to check the identification status of the higher order portion of the model (Byrne, 2001). In this model, with four-order factors, there are:

$$\text{Sample moment} = (n(n + 1)) / 2 = 10 \quad \text{where } n = 4$$

Free Parameters: 0 error variances (these are set to 1)
 + 4 factor variances
 + 0 factor covariances (these are set to 0)
 + 4 regression coefficients

8 total free parameters

$$\text{Degrees of Freedom} = \text{Sample moments} - \text{Free parameters} = 10 - 8 = 2$$

With 2 degrees of freedom, the model is over-identified; thus it is safe to proceed and incorporate the higher-order structure into the measurement model. The higher-order structure statistics are the same as those of the first order model.

5.10. Measurement Model with Second-Order Structure

Running the CFA for the research model after incorporating the website quality higher-order structure and applying the refinement criteria mentioned previously in section 5.3.1.1 resulted in the measurement model depicted in Figure 5-13

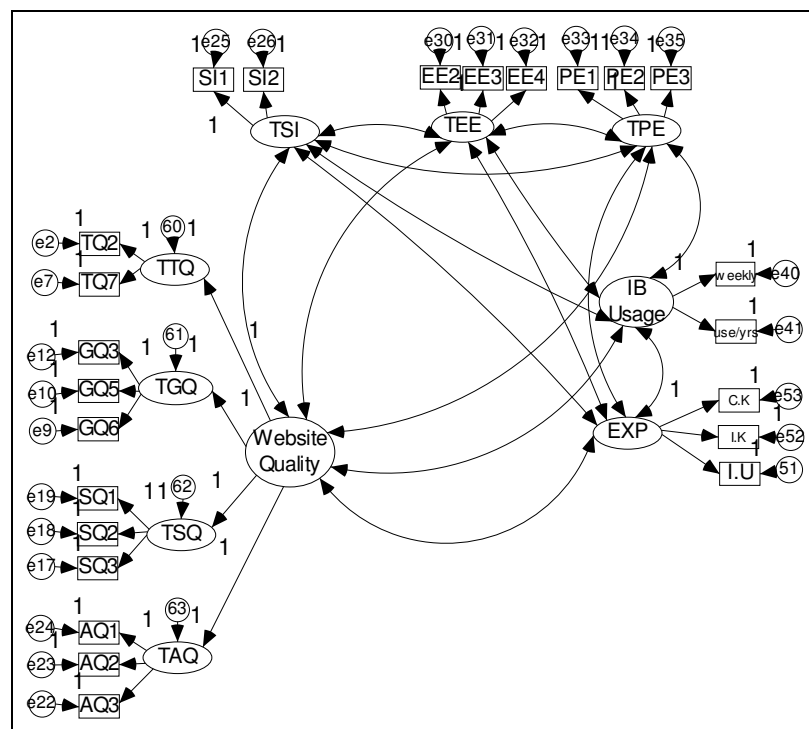


Figure 5-13: Jordanian measurement model with Higher-order structure

The model fit indices are indicative of good fit: CMIN = 353.586 with $df = 236$ and CMIN/ df ratio = 1.498; standardised RMR = .0503 and GFI = .885; NFI = .878 and CFI = .955; and RMSEA = .047 with 90 per cent confidence interval (.037, .057) and PCLOSE = .663.

The standardised loadings estimates are all above .7 except for use/yrs (.635) and EE2 (.646), which do not seem to significantly harm model fit or internal consistency. The SMC's are all above 0.5 except for 3 items that were kept in fear of un-identification issues. The reliability estimates all exceed 0.7. Reliability for constructs presented with two items only is measured by the inter-item correlation (R).

Statistical results such as factors' loadings and variance extracted in addition to constructs' reliability are used to investigate convergent validity as mentioned previously section 5.2.2. Table 5-21 presents these results.

Table 5-21: Jordan second-order measurement model: standardised Factor Loadings (Regression weights), Variance extracted (SMC's), and Reliability Estimates.

	WQ	TGQ	TSQ	TAQ	TTQ	TPE	TEE	TSI	EXP	IB usage
TAQ	.842									
TTQ	.915									
TGQ	.927									
TSQ	.871									
GQ6		.779								
GQ5		.776								
GQ3		.732								
SQ3			.725							
SQ2			.699							
SQ1			.742							
AQ1				.756						
AQ2				.792						
AQ3				.720						
TQ7					.723					
TQ2					.776					
PE1						.741				
PE2						.867				
PE3						.803				
EE2							.646			
EE3							.772			
EE4							.752			
SI1								.853		
SI2								.862		
LK									.873	
C.K									.880	
I.U									.725	
U/ W										.848
U/ yrs										.635
AVE	56.0 %	58.2 %	52.2 %	57.3 %	56.3 %	64.8 %	52.6 %	73.5 %	68.7 %	56.2 %
Reliability α	.904	.799	.780	.785	R = .563	.842	.767	R = .735	.862	R = .539

Enough evidence is shown to support convergent validity. Discriminant validity is assessed through various methods that reflect different levels of stringency; the average variance extracted (AVE) method is a conservative approach which compares constructs' average variance extracted (AVE) with the squared inter-scale correlation for that construct. Table 5-22 presents these comparisons and an evidence of discriminant validity. The table also shows the first order variables correlate with the higher order, which is expected.

Table 5-22: Selected AMOS text output for Implied (all variables) correlation matrix – Jordan higher-order measurement model.

	W.Q	Exp	IB usage	TSI	TEE	TPE	TAQ	TTQ	TSQ	TGQ
W.Q	.560	0.118	0.158	0.223	0.521	0.526	0.709	0.837	0.759	0.859
Exp	.343	.687	0.389	0.015	0.209	0.253	0.084	0.099	0.089	0.101
IB-usage	.398	.624	.562	0.040	0.144	0.150	0.112	0.132	0.120	0.135
TSI	.472	.122	.200	.735	0.364	0.137	0.158	0.187	0.169	0.192
TEE	.722	.457	.380	.603	.526	0.453	0.370	0.437	0.396	0.448
TPE	.725	.503	.387	.370	.673	.648	0.372	0.440	0.398	0.452
TAQ	.842	.289	.335	.398	.608	.610	.573	0.594	0.537	0.610
TTQ	.915	.314	.364	.432	.661	.663	.771	.563	0.635	0.719
TSQ	.871	.298	.346	.411	.629	.631	.733	.797	.522	0.651
TGQ	.927	.318	.368	.438	.669	.672	.781	.848	.807	.582

Note: values on the diagonal are the constructs calculated AVE. The values below the diagonal are the constructs implied correlations. Values above the diagonal are the squared correlations.

Having established measurement model fit and validity, the next step is to test the structural model.

5.11. Testing the Structural Model with the Second-Order Structure

The first run of the structural model revealed a need for deleting TSI because negative variance was associated with SII's error term (e25) in addition to the insignificant path between TSI- TPE. The structural model presented more than one solution; thus running specification search resulted in choosing the model that best represents the factorial relations in accordance with the conceptual framework and theoretical backgrounds, especially in respect to the key variable (performance expectancy) and the dependent variable. The chosen solution is depicted in Figure 5-14.

The model fit statistics are: CMIN= 321.692 with df = 182 and CMIN/df ratio = 1.768; Standardised RMR = .067 and GFI = .880; NFI = .868 and CFI = .937; and RMSEA = .059 with 90 per cent confidence interval (.048 and .069) and PCLOSE = .088, all indicating an acceptable fit.

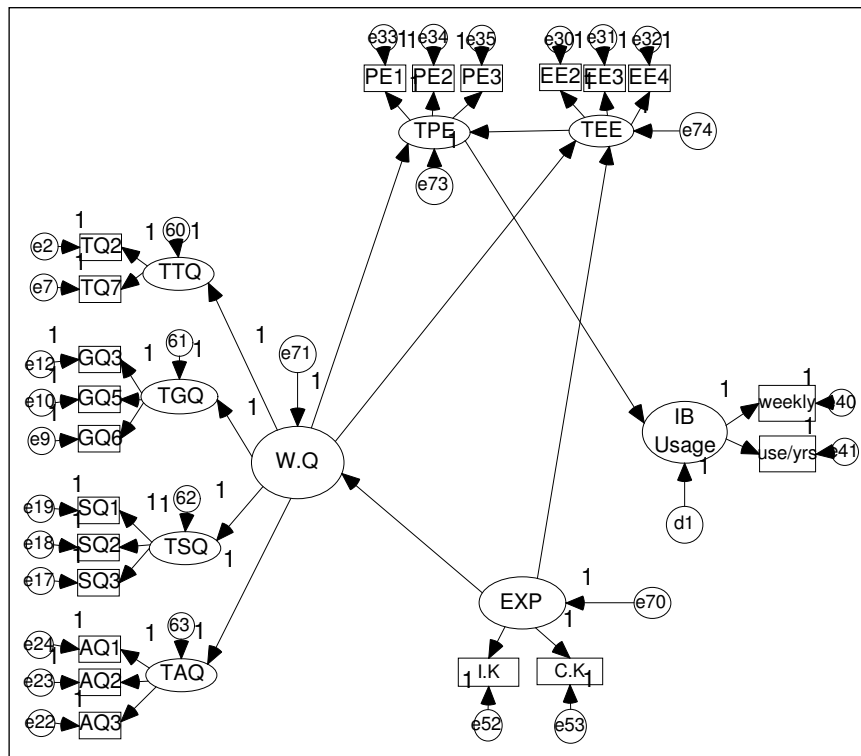


Figure 5-14: Jordan structural model with higher-order structure.

5.11.1 Hypotheses Testing for the Jordanian Sample

The factor loadings (regression weights) output indicates that the hypothesized paths among the major constructs and the dependent variable are significant.

Table 5-23: Selected AMOS text output for Jordan model estimates

Paths				Estimate	S.E.	C.R.	P
H9	EXP	→	WQ	.267	.057	4.661	***
H6	EXP	→	TEE	.201	.050	4.039	***
H4	WQ	→	TEE	.562	.082	6.846	***
H4	WQ	→	TPE	.528	.127	4.162	***
H1	TEE	→	TPE	.520	.153	3.396	***
H3	TPE	→	IB usage	.421	.083	5.069	***

Note: *** p<.001; ** p<.01; * p<.05.

The hypothesized direct path between effort expectancy and performance expectancy was supported (H1). The hypothesized path between social influence and performance expectancy was not supported (H2). The mediating role of PE between EE and IB-usage is significant; however, since the path between social influence and PE was insignificant, the mediating role of PE between IS and IB-usage was not supported. Thus, H3 is partially supported. The direct path between WQ and IB-usage is

insignificant; hence, H5 is not supported. Nevertheless, website quality perceptions hypothesized path with PE and EE is supported and the mediating roles of PE and EE between WQ and the dependent variable is supported, through EE-PE and PE-IB paths (H4)

Experience impact as an antecedent is supported by the significant direct paths between experience and effort expectancy (H6) and between experience and website quality perceptions (H9). The hypothesized path between experience and performance expectancy (H7) is not supported. Correspondingly, the hypothesized path between experience and social influence (H8) was supported but since social influence hypothesized paths with PE and is insignificant; social influence variable was removed from the final model.

Table 5-24 shows the standardised factor loadings (regression weights), which reports the standardised direct effect between the model constructs.

Table 5-24: Selected AMOS output- Standardised factor loadings for Jordanian sample

Paths			Estimate
EXP	→	WQ	.344
EXP	→	TEE	.287
WQ	→	TEE	.621
WQ	→	TPE	.445
TEE	→	TPE	.396
WQ	→	TAQ	.841
WQ	→	TTQ	.910
WQ	→	TGQ	.932
WQ	→	TSQ	.873
TPE	→	IB-Usage	.412

The output shows that PE has the largest and the only direct impact on the dependent variable (.412). Website quality perceptions have a larger impact on EE (.621) than on PE (.445). Experience has a larger impact on WQ (.344) than on EE (.287).

Table 5-25 reports the standardised total effects (direct effects and indirect effects); thus gives a comprehensive indication of the regression weights among the model variables. Reading vertically, experience has its largest effect on EE (.501) followed by PE (.351) and then WQ (.344) with a minor difference (.007) between the last two.

Table 5-25: Selected AMOS text output- Standardised total effect for Jordanian sample.

	EXP	WQ	TEE	TPE	IB_ Usage
W Q	.344	.000	.000	.000	.000
TEE	.501	.621	.000	.000	.000
TPE	.351	.691	.396	.000	.000
IB_ Usage	.145	.285	.164	.412	.000

Website quality perceptions have its larger effect on PE and EE with the latter being less affected by a small difference of .07. EE has a larger impact on PE than on the dependent variable. PE still has the largest impact on the dependent variable compared to other variables in the model.

The model for the Jordanian sample is similar configurally to the model for the UK sample (although not necessarily metrically). The difference is that, owing to the need to demonstrate discriminant validity, the website quality dimensions were aggregated into a higher-order structure for the Jordanian sample. The higher-order testing revealed the ability of keeping a representation for the four dimensions; thus, the structural model was tested with the higher-order website quality structure and hypotheses were tested accordingly.

Although the early investigation of the proposed research model when applied to a combined data set file revealed a need for a different treatment and a separate sample analysis, the resulting models of this separate analysis show a considerable amount of similarity between the two samples' structural models: variables TPE, TEE, EXP, and IB usage are represented in both models with similar indicators. Furthermore, in both models TSI was found to be redundant, and was removed from the final models. Additionally, both models were re-structured to incorporate a higher order factor (WQ) with one first-order, TAQ, having identical indicators; TTQ and TGQ being partially equivalent (two common indicators in both samples' higher structure); and TSQ only represented in one structure (Jordan). For the purpose of drawing a model that best reflects both countries' samples, keeping only those paths that are common in both models, the model in Figure 5-15 is the closest that represents both samples. Running the multiple group analysis resulted in regression weights that are statistically and significantly different for both samples.

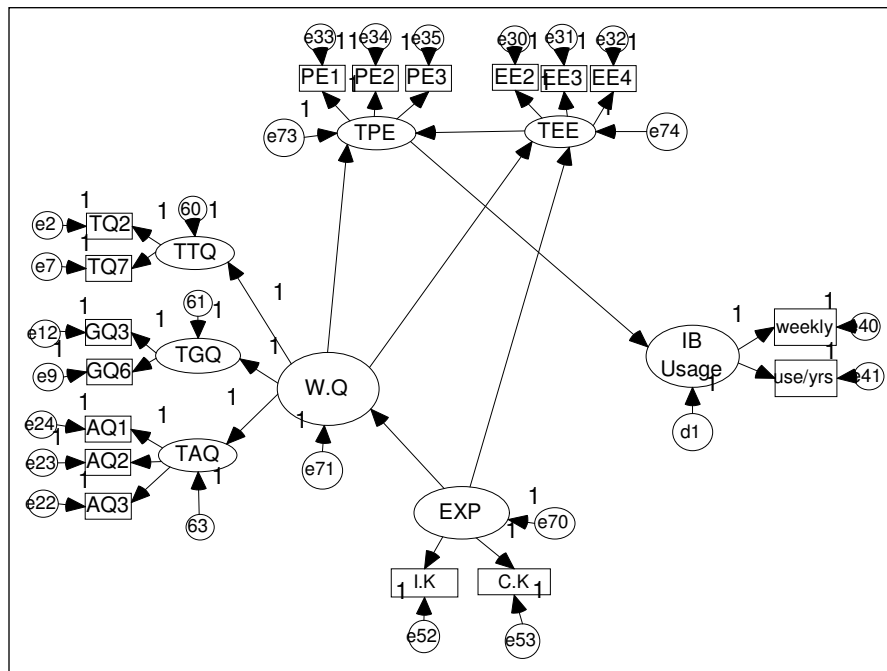


Figure 5 -15: Near-Configurally invariant model of Internet banking usage for Jordan and UK sample

This model is the closest that can be approximated to represent the two countries' samples because: (1) it is nested within the models for both samples (2) if we accept the higher-order configurations, the higher-order latent variable (WQ) has a more than adequate number of indicators, and (3) all paths are significant. Furthermore, since the model in Figure 5-15 is nested within both models, discriminant validity and convergent validity have been established already.

Hence, configural invariance can be demonstrated between the UK and Jordanian's samples based on a rigorous conceptual framework. Consequently, as previously demonstrated for the combined data file set, measurement invariance between the UK and Jordanian's samples cannot be demonstrated. The multiple group analysis showed that differences in measurement weights are statistically significant: CMIN = 34.318 with $df = 10$ and p value = .000, indicating non-invariance between the two country samples.

This conclusion about the two models advances knowledge on this topic. First, in the use of current study framework that involved testing for the impact of the website quality dimensions on the UTAUT model. Second, the fact that higher-order website

quality structure has not been proposed previously and presents an opportunity for future research.

The next chapter investigates the moderating effect of certain demographic variables on the research model for each country sample. The moderating role is investigated by applying multi-group analysis; testing the measurement invariance between groups using the analysis of covariance structure (ANCOV); and using the analysis of means and covariance structure (MACS) as applicable.

Chapter Six: The Effect of Moderators

6.1 Introduction

This chapter presents the effect of moderators on the research model. The moderators investigated here are the demographic variables and in specific variables such as income, gender, age, and education. The impact of these moderators on the relations among the variables in the model is investigated through multi-group analysis and measurement invariance. Measurement invariance, defined as the extent to which items or subscales have equal meanings across groups (French & Finch, 2006), is investigated through two levels. The first level investigates the equivalence of the psychometric properties of the instrument (i.e., configural, metric, and measurement error). The second level investigates group differences using latent means and covariance analysis. Multiple-group or multi-sample confirmatory factor analysis (MCFA) is a common method for examining levels of measurement invariance (French & Finch 2006). Configural invariance, factor loading, intercept, and residual invariance are the most commonly tested forms of invariance for first-order factors' models. Configural invariance refers to the examination of whether the same item is an indicator of the same latent factor in each group, although the factor loadings might differ among the groups. Thus, having similar but not identical indicators per variable allows for variable presentation in each group and indicates achieving configural invariance. Factor loadings invariance (also known metric invariance, Hair et al., 2006) is a step further from configural invariance and refers to whether the loadings of each item on the underlying factor are equal in the two groups (identical unit of measurement). Hence, only when metric invariance is achieved, factorial invariance is the next level to be checked. Factorial invariance enables for the comparison of the relations between the factor and other external variables especially across groups. Nevertheless, the configural level of invariance does not require that the scales of factors have a common origin (intercepts), which if so, leads to the second level of invariance investigation, mean and intercept invariance analysis. The intercept represents the origins of the scale and when equalized among the groups, the groups' means can be compared. Intercept invariance examination enables determining whether any difference between groups on factor means is a true group

difference or a measurement artefact (Chen et al., 2005). Consequently, the invariance analysis process followed in this chapter is as follows:

Using AMOS multiple group covariance structure analysis to assess measurement invariance produces four levels of invariant output: measurement weights; structural weights; structural residuals; and measurement residuals. Only the first two levels of invariance are checked for the purpose of this investigation.

When the measurement weights invariance is achieved, the next step is to check scalar invariance using mean and covariance structure (MACS) analysis to assess differences in mean scores or compare means between the two groups.

In case where the measurement weights are non-invariant; the next step would be to allocate the variant factor loadings (by constraining one factor equal at a time). In other words, measurement weight invariance answers for item-variable presentation in each model and item loading on related variable. This type of invariance is named metric invariance (Hair et al., 2006). Hence, if measurement weights are not significantly different across the groups under investigation, it is assumed that the metric is reasonably non-invariant.

If the structural weights level of invariance is not established, the next test would be to check which paths are non-equivalent between the groups; using path constraining (one at a time) to locate the path differences. This is assessed by the significance of changes in chi square ($\Delta\chi^2$). In other words, if constraining a path produces a significant change ($\Delta\chi^2$) indicated by a p value $<.05$, it is concluded that the two groups do not have factorial invariance with regard to that path.

6.2 Steps in Applying the MACS Analysis

Applying the MACS analysis requires adding constraints to the MACS model. The process, in first-order structure, involves the following steps: (1) all factor loadings (except those fixed to one) are constrained equal between the two groups (2) one group is treated as a reference group, where its latent means are constrained to zero,

(3) the latent mean of the other group is estimated and compared to the reference group, (4) all factor intercepts are constrained equal between the two groups (Arbuckle, 2006).

In higher-order structure, constraints are imposed as follows: (1) all first-order factor loadings (except those fixed to 1.0) and intercepts are constrained equal between groups, (2) all higher-order factor loadings are constrained equal between groups, (3) all higher-order intercepts are constrained equal between groups (intercepts at the higher level actually represent the means of the first-order latent factors and by virtue of specification is constrained to zero in both groups as discussed next), and (4) the higher-order factor mean is estimated for one group and fixed to zero for the reference group.

However, In higher-order structure, under-identification is a common difficulty in testing for latent mean intercept (i.e., intercepts of the first-order) as the number of estimated intercepts exceeds the number of number of observed measures in a single group (Byrne & Stewart, 2006). In reviewing the UK model, Figure 6-1, there are 13 intercepts (10 observed variable intercepts; 3 latent factor intercepts) associated with the higher-order structure of WQ and only 10 observed variables. Likewise, in reviewing the Jordanian model, Figure 6-2, there are 15 intercepts (11 observed variable intercepts; 4 latent factor intercepts) associated with WQ higher-order structure and only 11 observed variables.

Thus, this situation must be addressed before proceeding with invariance testing of the higher-order model intercept. Byrne (2006) addressed this issue of under-identification and described three model specifications that can be used in testing latent mean differences related to higher-order factor structure. One proposed strategy, which is applicable to the current study models, is to constrain the first-order latent factor intercept to zero.

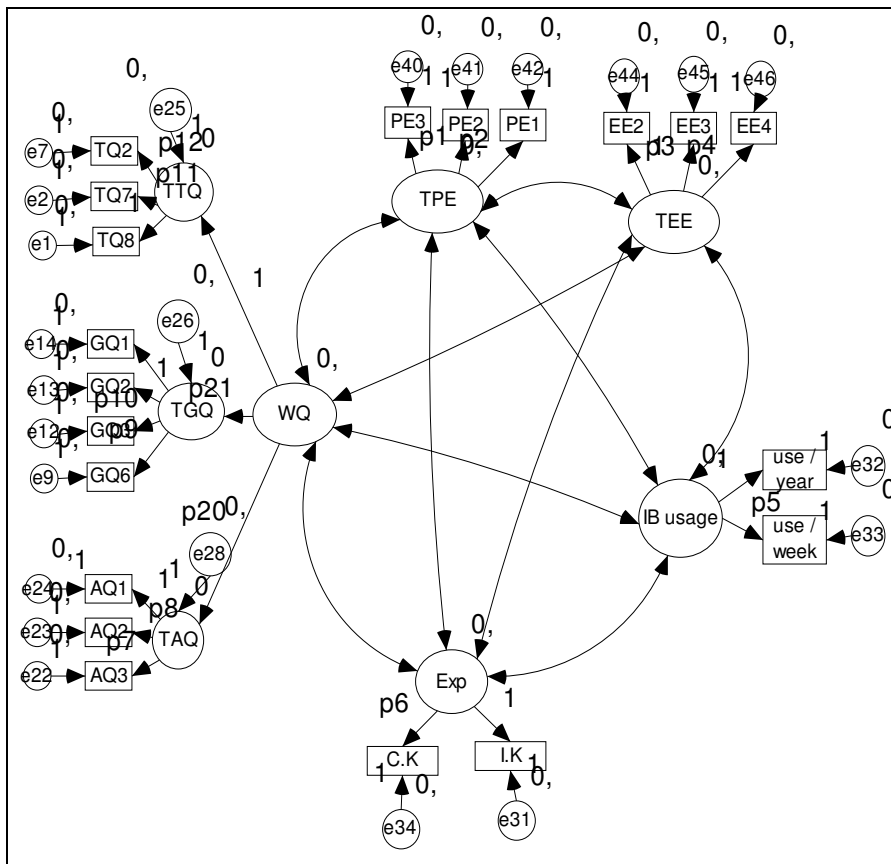


Figure 6-1: UK's Mean and covariance structure.

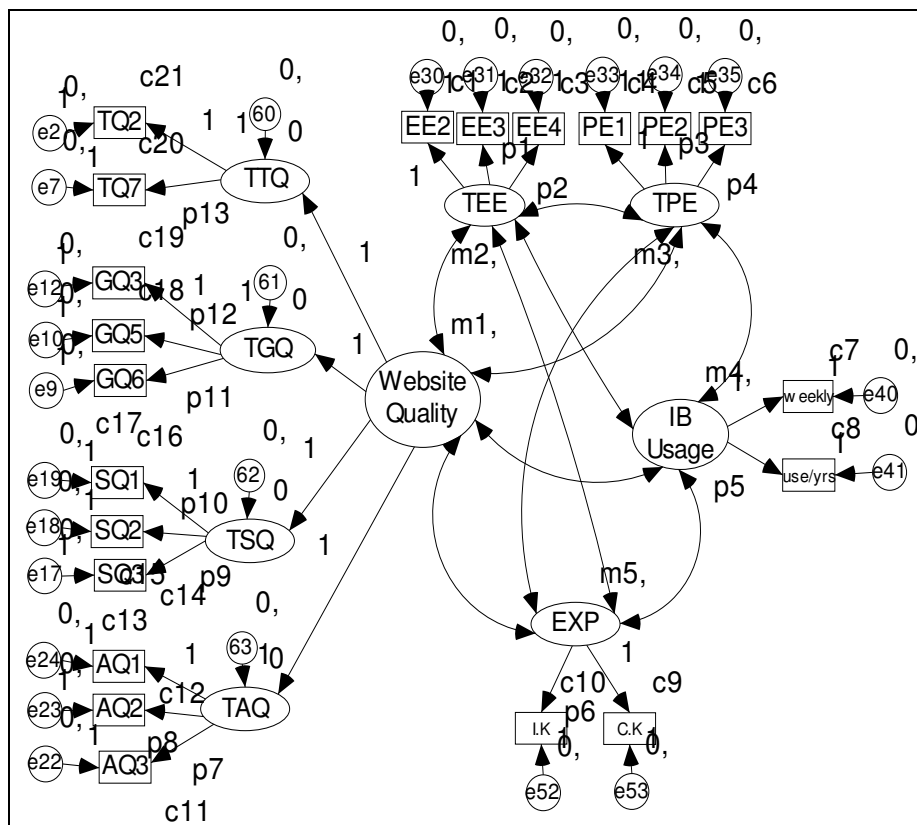


Figure 6-2: Jordan's mean and covariance structure

Accordingly, the first-order latent means are constrained to zero for both groups (within the multiple group analysis), which is the same as constraining the three latent factors' intercepts equal across groups. As such, the number of estimated intercepts is reduced from 13 to 10 (in the UK sample) and from 15 to 11 (in the Jordanian sample); thereby, rendering a just-identified structure that is testable. In this case, the higher-order factor mean is sufficient to account for mean differences across all website quality items while hypothesizing the three latent means to be approximately equal in magnitude (Byrne & Stewart, 2006).

Finally, the z test value serves as the test for significance of the latent factor mean differences between the two groups (Chen et al., 2005). If the mean estimates of the non-reference group are positive, it is concluded that this group have higher means than the reference group, and if mean estimates were negative, the reference groups is concluded to have higher means (Byrne & Stewart, 2006).

In this chapter, the measurement invariant investigation for the demographic variables is divided into two parts. Part one covers the UK sample and part two covers the Jordanian sample.

6.3 Part One: The UK Sample

Prior to investigating the impact of the four demographic moderators, the data set for these variables, except for gender, is recoded into two groups using the median split approach (Hair et al., 2006) to enable or facilitate the running of the group analysis examination

6.3.1. Gender Impact

The UK sample is distributed into 131 males and 75 females. In other words, there are nearly as twice many males as females. Following the guidelines (Byrne, 2001; Hair et al., 2006), the final structural model depicted in Figure 6-3, is applied first to males and females separately to examine if each group can achieve an adequate fit separately (Hair et al., 2006).

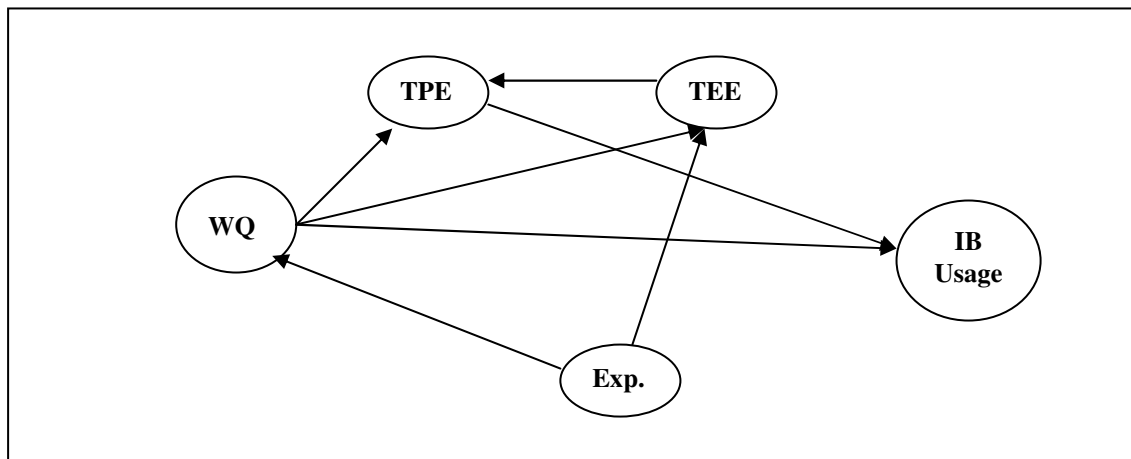


Figure 6-3: The UK Covariance Structure Model

The males' sample fit statistics reading are: CMIN = 216.020 with df =162 and CMIN/df ratio = 1.333; standardised RMR = .0588; CFI =.973; and RMSEA =.051 with 90 per cent confidence interval (.031 and .068) and PCLOSE =.463. The females' sample fit statistics are: CMIN = 206. 879 with df =162 and CMIN/df ratio = 1.277; standardised RMR = .0893; CFI = .962; and RMSEA = .061 with 90 per cent confidence interval (.032, .085) and PCLOSE = .234, all indicating a good fit.

Having established a satisfactory model fit for gender samples, a group analysis test for factor structure equivalence is run for the two groups simultaneously rather than separately. The estimates (coefficients) output and critical ratio (*t-value*) are reported in Table 6-1.

Table 6-1: The UK's un-standardised estimates and critical ratio for gender groups

paths	Males		Females		Notes
	Estimates	C.R	Estimates	C.R	
Exp - WQ	.305	4.012 ***	.213	1.577 n/s	The path is not sig. for females
Exp - TEE	.554	7.442 ***	.270	3.014 **	
WQ - TEE	.305	3.423 ***	.415	4.267 ***	
TEE - TPE	.727	7.258 ***	.848	3.584 ***	
WQ - TPE	.426	3.984 ***	.493	2.679 **	
WQ - IB	.265	1.545 n/s	.593	2.334 *	The path is not sig. for males
TPE - IB	.761	5.902 ***	.422	2.467 *	

Note: *** p<.001; ** p<.01; * p<.05.

All paths are significant for both gender groups, except WQ-IB for males and Exp-IB for females.

AMOS model comparison text output revealed that the two groups (males and females) are invariant. Assuming model unconstrained to be correct, the measurement weights between the two gender groups are invariant (equal) as indicated by the insignificant p value ($>.05$)

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	15.859	.257	.004	.005	.000	.000

Assuming the measurement model to be correct, the two genders are invariant on the structural weights as well. The reading also shows an insignificant p value ($>.05$), which indicates invariance between the two groups.

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	7	9.729	.204	.003	.003	.000	.000

In this level, it is assumed that the factor loadings are equal between the two groups. Assuming that the structure weights are correct, the structural residuals are invariant between the two groups, indicated by the insignificant p value reading:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural residuals	8	7.969	.437	.002	.002	-.001	-.001

Most researchers stop at the structural weights level of investigation and assume that examining residual invariant is more stringent than necessary (Byrne, 2004; Byrne & Stewart, 2006). Accordingly, the residual invariance is not tested in the following sections.

Historically, evidence of invariance has been based on differences in χ^2 test; if the value of $\Delta\chi^2$ is statistically insignificant, it is suggested that the constraints specified in the more restricted model hold true. More recently, researchers have argued that the

$\Delta\chi^2$ value is as sensitive to sample size and non-normality as the χ^2 statistic itself, thereby render it an impractical and unrealistic criterion on which to base evidence of invariance. Consequently, there has been a tendency to argue for evidence of invariance based on the Δ CFI value between models being insignificantly small. In other words, the differences in CFI should not exceed .01 (Cheung & Rensvold, 2002; Byrne et al., 2007). In light of the latest trends, the model fit statistics output for the multiple group analysis revealed satisfactory results in respect to Δ CFI (being less than .01) as shown in Table 6-2. Accordingly, it is concluded that the model is operating equivalently across males and females.

Table 6-2: Selected AMOS output text: Model fit statistics- Baseline Compression- UK – gender

	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	Δ CFI
Unconstrained	.880	.860	.969	.963	.969	
Measurement weights	.876	.860	.968	.964	.968	.001
Structural weights	.873	.860	.967	.963	.967	.001
Structural residuals	.871	.861	.967	.964	.967	.000
Measurement residuals	.861	.858	.962	.962	.962	.005
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

An important consequence of establishing measurement weights invariance is the possibility to carry out the subsequent tests of invariance, differences in structural weights and latent means. This second level of investigation involves estimation of means on observed and latent variables using the mean and covariance structure (MACS) analysis (Byrne & Stewart, 2006). Applying the guidelines mentioned in section (6.2), and using AMOS graphics while constraining the female group to be the reference group, the scalar invariance showed males' means scores are positive indicating that males have higher mean scores compared to the females' reference group.

Table 6-3: Selected AMOS output text: Scalar estimate - means (UK males)

	Estimate	S.E.	C.R.	P
WQ	.193	.094	2.039	.041
TPE	.148	.122	1.211	.226
TEE	.142	.110	1.287	.198
Exp	.370	.104	3.552	***
IB usage	.437	.150	2.920	.004

The output also shows that except for TPE and TEE mean scores, the mean scores of major variables are higher for males than they are for females and these differences are statistically significant ($p < .05$). Whereas, the mean scores of variables TPE and TEE are not statistically different; thus, it cannot be said that males and females differ on their means on these two latent variables.

According to Byrne et al. (2007), multiple fit indices are suggested for assessing model goodness of fit in reporting results of MACS, which include CFI, SRMR, and RMSEA. The model fit statistics readings for these indices are CFI = .969, standardised RMR = .0548 and RMSEA = .037 with 90 per cent confidence interval (.026 and .047) and PCLOSE = .986, all indicating a good fit.

In summary, the invariant result at the structural weights level indicates that factor loadings for the structural paths are not significantly different between males and females. Thus, the hypothesized moderating effect of gender (H10) is not supported for the UK sample.

6.3.2 Education Impact

The sample descriptive frequencies for the education variable showed the possibility of dividing the sample into three levels (i.e., three levels: below bachelor degree level, bachelor degree level, and above bachelor degree level). However, when tested separately one group produced a solution that is not admissible (not unexpected with the small sample size). Thus, responses of the two groups: below bachelor degree level and bachelor level were compared for invariance.

Running the structural model estimates for each group separately resulted in the following fit statistics for the first education group (below bachelor degree level): CMIN = 213.156 with $df = 162$ and CMIN/ df ratio = 1.316; standardised RMR = .0730; CFI = .947; and RMSEA = .073 with 90 per cent confidence interval (.043, .099) and PCLOSE = .096, all indicating an acceptable fit. The fit statistics for the second education group (bachelor degree level) are: CMIN = 234.151 with $df = 162$ and CMIN/ df ratio = 1.445; standardised RMR = .0888; CFI = .906; and RMSEA = .085 with 90 per cent confidence interval (.060, .109) and PCLOSE = .015; (although

significant but there is no modification indices to improve the readings). Overall, the readings produce an adequate fit.

Having established an acceptable model fit for both groups, the next step is running the multiple group covariance analysis (MCOVA). The estimates and critical ratio for the two educational levels are reported in Table 6-4.

Table 6-4: The UK's un-standardised estimates and critical ratio for education level groups

paths	Below Bachelor Level		Bachelor Level		Notes
	Estimates	C.R	Estimates	C.R	
Exp → WQ	.557	4.532 ***	.164	1.635 n/s	Path is not sig. for Bachelor
Exp → TEE	.263	1.612 n/s	.449	4.625 ***	Path not sig. for below bachelor
WQ → TEE	.635	3.305 ***	.265	2.016 *	
TEE → TPE	-.128	-.775 n/s	.885	4.242 ***	Path not sig. for below bachelor
WQ → TPE	1.480	6.282 ***	.458	2.507 *	
WQ → IB	1.908	2.480 *	1.015	3.791 ***	
TPE → IB	-.513	-1.047 n/s	.116	.690 n/s	Path is not sig. for Bachelor

Note: *** p<.001; ** p<.01; * p<.05.

Three paths are not significant for lower level of education while two only for the higher level as shown in Table 6-4 notes.

Assuming the unconstrained model to be correct, the measurement weights are invariant as evident from the insignificant p value (>.05).

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	11.816	.543	.006	.007	-.003	-.004

The next level of invariance is at the structural weight level, the output shows that the two groups are non-invariant (not equal) on this level. The significant p value reading indicates such inequality between groups.

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	7	28.635	.000	.013	.016	.010	.012

In order to support this conclusion, the change in CFI is less than .01 in the measurement weights. While for the structural weights, the change is above .01, which is indicative of no-invariance as concluded earlier.

Table 6-5: Selected AMOS output text: Model fit: Baseline Compression- UK- education

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	ΔCFI
Unconstrained	.789	.753	.932	.917	.929	
Measurement weights	.784	.756	.932	.921	.930	.001
Structural weights	.770	.746	.919	.909	.918	.012
Structural residuals	.764	.745	.915	.907	.914	.004
Measurement residuals	.752	.746	.911	.909	.911	.003
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

Having established invariance in the first level (measurement weights level), running the MACS is appropriate to assess mean difference between the two groups. After applying all the constraints to the first and higher-order variables (as per section 6.1), and treating bachelor degree level of education as the reference group. The results shown in Table 6.6 indicate that education level below bachelor degree has negative estimates indicating that the reference group has higher means scores than the below bachelor degree level of education.

Table 6-6: Selected AMOS text output: Scalar means estimates- UK education

	Estimate	S.E.	C.R.	P
WQ	-.544	.104	-5.232	***
TPE	-.784	.142	-5.515	***
TEE	-.628	.131	-4.808	***
Exp	-.480	.127	-3.773	***
IB usage	-.839	.179	-4.675	***

All variables have a significantly different means scores (p values <.05). The model fit statistics also indicate a good fit: CFI = .930; standardised RMR= .0735; and RMSEA = .054 with 90 per cent confidence interval (.041 and .066) and PCLOSE = .288.

The second level of invariance, the structural weights, proved to be non-invariant. In order to locate the non-equal paths, Byrne (2001) dictates a procedure calls for

unlabeled structural path coefficients (meaning they are no longer constrained to be equal) and retest for invariance between the two groups. By freeing one path at a time, non-invariance is checked in relation to a particular path. Model invariance between the two groups is accepted using fit statistics. Therefore, a set of re-runs for measurement invariance are applied with one path constrained at a time. Table 6-10 shows the outcome of the non-invariance located.

Table 6-7: Path equivalence check with changes in chi square for UK – Education.

Paths	Below Bachelor		Bachelor		Invariance		
	estimates	C.R	estimates	C.R	$\Delta \chi^2$	Δdf	p
Exp - WQ	.557	4.532 ***	.164	1.635 n/s	6.655	1	.010
TEE-TPE	-.128	-.775 n/s	.885	4.242 ***	17.779	1	.000
Exp-TEE	.263	1.612 n/s	.449	4.625 ***	1.026	1	.311
WQ-IB usage	1.908	2.480 *	1.015	3.791 ***	1.358	1	.244
TPE-IB usage	-.513	-1.047 n/s	.116	.690 n/s	3.097	1	.078
WQ-TPE	1.480	6.282 ***	.458	2.507 *	15.229	1	.000
WQ-TEE	.635	3.305 ***	.265	2.016 *	2.832	1	.092

Note: *** p<.001; ** p<.01; * p<.05

Results show that three paths are significantly different between the two educational level groups: Exp-WQ, TEE-TPE and WQ-TPE. The path differences with respect to EE-PE support sub-hypothesis H11.4. The regression estimates for individuals with higher levels of education is stronger than that for those having lower levels of education. Likewise, WQ-PE path differences partially support H11.3. The regression weights are higher for users with lower level of education. However, H11.1 found no support; on the contrary, this path PE-IB usage is non-significant for both levels of education. H11.2 is not supported since the social influence variable has been deleted owing to the non-significant relation with PE.

In summary, the hypothesized moderating effect of education (H11) is partially supported for the UK sample.

6.3.3 Income Impact

The income variable frequencies revealed two approximately equal groups divided at income level £34000. The income variable is re-coded into two groups: less than £35000 income level and £35000 and more income level. Applying the structural model to each group separately, group one fit statistics are: CMIN= 224.073 with df = 162 and CMIN/df ratio = 1.383; standardised RMR= .0677, CFI = .967; and RMSEA =.057 with 90 per cent confidence interval (.038 and .075) and PCLOSE = .252, all indicating an acceptable fit. The second group fit statistics are: CMIN= 208.533 with df = 162 and CMIN/df ratio = 1.287; standardised RMR= .0764; CFI = .954; and RMSEA = .062 with 90 per cent confidence interval (.033, .086) and PCLOSE = .212, indicating an acceptable fit.

Having established satisfactory model fits for both groups, running the group analysis resulted in the estimates and critical ratio presented in Table 6-8. The table shows that all paths are significant except WQ-IB for income level 1 and Exp-WQ for income level 2.

Table 6-8: UK's un-standardised estimates and critical ratio for income level groups

paths	Income 1		Income 2		Notes
	Estimates	C.R	Estimates	C.R	
Exp - WQ	.339	4.084 ***	.142	1.156 n/s	Path not sig. for income level 2
Exp - TEE	.335	4.018 ***	.520	5.101 ***	
WQ - TEE	.543	5.113 ***	.214	2.278 *	
TEE - TPE	.678	5.179 ***	.495	4.059 ***	
WQ - TPE	.638	4.324 ***	.218	2.212 *	
WQ - IB	.435	1.654 n/s	.427	2.592**	Path not sig. for income level 1
TPE - IB	.528	3.120 **	.554	2.854 **	

Note: *** p<.001; ** p<.01; * p<.05

AMOS text output revealed that the two groups are invariant with regard to the two income levels. Model comparison text output shows that, assuming the unconstrained model to be correct, measurement weights are invariant (equal) between the two groups as indicated by the insignificant p value (> .05).

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	20.277	.089	.006	.007	.001	.001

In order to assess invariance at the means level, latent mean structure analysis is performed. The same constraining guidelines mentioned in section (6-2) are applied here with level income 2 treated as the reference group. The output statistics revealed that the income level 1 has lower means score compared to the reference group, as shown in Table 6-9.

Table 6-9: Selected AMOS selected output text: Scalar estimates- means -UK income

	Estimate	S.E.	C.R.	P
WQ	-.213	.097	-2.201	.028
TPE	-.493	.103	-4.803	***
TEE	-.338	.110	-3.087	.002
Exp	-.474	.103	-4.621	***
IB usage	-.741	.142	-5.233	***

In other words, mean scores, for individuals with higher income level, are higher than mean scores of the lower income level and such differences are statistically significant as indicated by the p values (<.05). The model fit statistics also support the invariance conclusion: CFI = .961, standardised RMR = .0600 and RMSEA = .041 with 90 per cent confidence interval (.031 and .051) and PCLOSE = .923, indicating a good fit.

The second level covariance structure (ANCOV) invariance analysis involves investigating the structural weights invariance. Assuming the measurement model to be correct, the readings for the structure weights invariance revealed a non invariance result.

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	7	22.487	.002	.007	.008	.004	.005

The significant p value (<.05) indicates that the structural weights are not similar between the two groups.

In order to allocate the non-equivalent paths, a process of constraining one path equal, between the two groups, and checking for changes in chi square is applied. Significant changes indicate non-equivalent paths (Hair et al., 2006).

Table 6-10: Path equivalence check with changes in chi square- UK – Income.

Paths	Income1		Income2		Invariance		
	estimates	C.R	estimates	C.R	$\Delta \chi^2$	Δdf	p
Exp - WQ	.339	4.084 ***	.142	1.156 n/s	1.443	1	.230
TEE-TPE	.678	5.179 ***	.495	4.059 ***	1.306	1	.253
Exp - TEE	.335	4.018 ***	.520	5.101 ***	2.055	1	.152
WQ-IB usage	.435	1.654 n/s	.427	2.592 **	.006	1	.938
TPE-IB usage	.528	3.120 **	.554	2.854 **	.012	1	.913
WQ-TPE	.638	4.324 ***	.218	2.212 *	4.994	1	.025
WQ-TEE	.543	5.113 ***	.214	2.278 *	30.364	1	.007

Note: *** p<.001; ** p<.01; * p<.05

As noted from Table 6-10, two paths are significantly different between the two income groups, WQ-TPE and WQ-TEE. These results support H12.3 only partially, as the direct path from WQ-IB usage is not statistically different between the two levels of income. However, the indirect paths through PE and EE are supported and significantly higher for individuals with lower levels of income. PE-IB usage (H12.1) and EE-PE (H12.4) found no support as indicated from the paths' invariance results. SI-PE (H12.2) also found no support because SI is not presented in the final model.

In summary, the hypothesized moderating effect of income (H12) is partially supported for the UK sample.

6.3.4 Age Impact

The age variable descriptive frequency allows dividing the responses into three sizeable groups: ages 21-30; 31-40; and more than 41yres. However, when the structural model was tested for each group separately, only the first two groups produced a good statistical fit. Thus, the group comparison is carried out for the first two groups.

When the model is applied to age group 21-30 years, the model fit statistics readings indicate a good fit: CMIN = 217.447 with df =162 and CMIN/df ratio = 1.342; standardised RMR =.087; CFI =.951; and RMSEA = .069 with 90 per cent confidence interval (.042 and .092) and PCLOSE = .108. Likewise, statistics for the second age group (31-40 years) also indicate a good fit: CMIN = 219.773 with df = 162 and CMIN/df ratio = 1.357; standardised RMR = .0830; CFI = .933; and RMSEA = .076 with 90 per cent confidence interval (.048 and .100) and PCLOSE= .062.

Having established satisfactory fit indices for each age group, it is safe then to proceed with multigroup covariance analysis. The estimates and critical ratios output show two paths are insignificant for the younger group while three paths are insignificant for the older group as shown in Table 6-11.

Table 6-11: The UK's un-standardised estimates and critical ratio for age groups

paths	Age 21-30		Age 31-40		Notes
	Estimates	C.R	Estimates	C.R	
EXP→WQ	.117	1.145 n/s	.350	2.862 **	Path not sig. for younger group
EXP→TEE	.447	4.630 ***	.501	4.718 ***	
WQ→TEE	.413	3.167 **	.195	1.738 n/s	Path not sig. for older group
TEE→TPE	.756	5.509 ***	.780	4.099 ***	
WQ→TPE	.510	3.300 ***	.219	1.443 n/s	Path not sig. for older group
WQ→IB	.447	1.935 n/s	.432	1.776 n/s	Path not sig. for both groups
TPE→IB	.587	3.844 ***	.686	3.274 ***	

Note: *** p<.001; ** p<.01; * p<.05

AMOS output for model comparison showed that the two age groups are invariant. Assuming the unconstrained model to be correct, the statistics for model measurement weights show that the two groups are invariant as indicated by the p value (>.05).

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	8.656	.798	.004	.004	-.004	-.005

Assuming the measurement weights model to be correct, the structural weights statistics readings are also invariant as indicated by the insignificant p value (>.05).

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	7	6.978	.431	.003	.003	-.001	-.001

To alternatively illustrate invariance, Δ CFI is reported in Table 6-12, which shows that Δ CFI values do not exceed .01 (Cheung & Rensvold, 2002; Byrne et al. 2007).

Table 6- 12: Selected AMOS text output- Model fit: Baseline comparisons -UK age MCOVN.

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	Δ CFI
Unconstrained	.817	.785	.945	.934	.944	
Measurement weights	.813	.789	.947	.939	.946	.002
Structural weights	.810	.790	.947	.940	.946	.000
Structural residuals	.807	.792	.947	.942	.946	.000
Measurement residuals	.794	.789	.940	.939	.940	.004
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

Having established invariance on the measurement weight level, the next logical step is to check the latent mean structure differences to assess mean differences between the two age groups. The MACS analysis is run after applying the same constraining criteria mentioned in section (6.2), while treating the older group as the reference group. The outputs of the scalar means show the reference group have higher mean scores than the non-reference group. WQ and Exp mean scores are not significantly different, (p value $>.05$) while TPE, TEE, and IB mean scores are statistically significant.

Table 6-13: Selected AMOS text output- Scalar estimate: means for age group1

	Estimate	S.E.	C.R.	P
WQ	-.144	.109	-1.323	.186
TPE	-.327	.134	-2.444	.015
TEE	-.298	.133	-2.242	.025
Exp	-.183	.124	-1.475	.140
IB usage	-.490	.172	-2.853	.004

The model fit statistics are indicative of good fit: CFI = .951, Standardised RMR = .0548 and RMSEA = .046 with 90 per cent confidence interval (.032 and .058) and PCLOSE = .697, all indicating a good fit.

In summary, the invariant result at the structural weights level indicates the structural paths are not significantly different between the two age groups; thus, age hypothesized moderating effect (H13) is not supported for the UK sample.

Thus far, investigating demographics (gender, education, income, and age) moderating role in the UK model is completed. The next section investigates this role in the Jordanian model.

6.4 Part Two: The Jordanian Sample

As with the UK sample, prior to investigating the impact of the four demographic moderators, the data set for these variables, except for gender, is recoded into groups based on the median split approach (Hair et al., 2006) to enable or facilitate the running of the group analysis. The Jordanian sample covariance structure model is depicted in Figure 6-4:

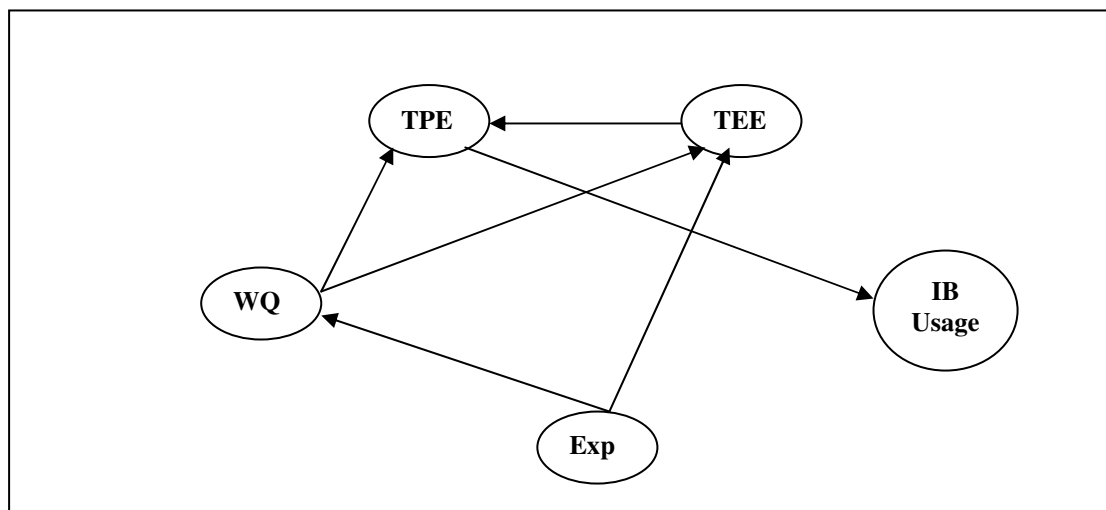


Figure 6-4: The Jordanian covariance structure model

6.4.1. Gender Impact

Sample descriptive analysis revealed that male participants exceed female participants, 60 and 40 per cent respectively. Thus, prior to running the multiple group analysis, the covariance structure model is run for each sample separately to ensure model fit.

The male sample fit statistics are: CMIN = 271.461 with df =182 and CMIN/df ration = 1.492; standardised RMR= .0741; CFI = .931; and RMSEA =.061 with 90 per cent confidence interval (.045 and .075) and PCLOSE = .126, indicating a good fit. The female sample fit statistics are: CMIN =325.815 with df = 182 and CMIN/df ratio = 1.790; standardised RMR= .0831; CFI = .860; and RMSEA = .095 with 90 per cent confidence interval (.078, .111) and PCLOSE = .000 indicating a low fit.

On suspicion that such low fit might be due to inadequate sample size, AMOS model fit output produces the Hoelter critical N statistics that indicate the largest sample size for which one would accept, at the .05 level a model with this chi-square statistic and this many degrees of freedom (Hoelter, 1983 cited in AMOS 0.7 references guide). The Hoelter readings indicate that the sample size is adequate (89) and exceeds the size indicated in Hoelter's guide (58).

Hence, the regression weights estimates show that all paths are significant except WQ-TPE. Modification indices, in the regression weights part, indicate a link Exp-IB usage. This path is not hypothesized, thus, applying it is postponed at this point. The research implications for the possible Exp-IB path are discussed in section 7.6 in the following chapter.

The multiple group analysis running with factor structure equivalence tested for the two groups simultaneously produced the estimates and critical ratios reported in Table 6-14.

Table 6-14: Jordan's un-standardised estimates and critical ratio for gender groups

paths	Males		Females		Notes
	Estimates	C.R	Estimates	C.R	
Exp - WQ	.292	4.046 ***	.223	2.383 *	
Exp - TEE	.203	3.224 ***	.223	2.956 **	
WQ -TEE	.489	4.395 ***	.640	5.537 ***	
WQ -TPE	.670	4.196 ***	.169	0.484 n/s	Path not sig. for females
TEE -TPE	.447	2.255 *	.818	2.668 **	
TPE -IB	.526	4.691 ***	.279	2.263 *	

Note: *** p<.001; ** p<.01; * p<.05

The path estimates are indicative that males and females are similar with regard to paths estimates except for path WQ-TPE, which is insignificant for females.

AMOS model comparison, measurement invariance, revealed that the two genders are invariant on the measurement level.

Assuming model unconstrained to be correct; the measurement weights statistics indicate invariance. The p value ($>.05$) indicates that the two genders are equal on the measurement level.

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	9.928	.700	.004	.004	-.005	-.005

Assuming the measurement weights to be correct, the structural weights are also invariant between the two genders as evident from the p value ($>.05$)

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	6	7.747	.257	.003	.003	-.001	-.001

Table 6-15 show the changes in CFI, with further constraining of models. The changes do not exceed .01, which support the measurement invariance results in based on p value ($>.05$).

Table 6-15: Selected AMOS text output: Jordan -Gender- Comparison baseline- changes in CFI

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	Δ CFI
Unconstrained	.782	.748	.902	.884	.899	
Measurement weights	.778	.753	.902	.889	.901	.002
Structural weights	.775	.754	.901	.890	.900	.001
Structural residuals	.775	.758	.904	.896	.903	.003
Measurement residuals	.767	.763	.903	.901	.903	.000
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

Based on this result of measurement weights invariance, it is possible to run the MACS analysis to test for mean score difference between the two gender samples. Constraining the females' means to zero and treating this group as the reference

group, result in lower readings for the males' mean scores, and for variables WQ and PE. The other variables, as shown in Table 6-16, have higher mean scores (for males) than females' scores.

Table 6-16: Selected AMOS text output: MACS- gender- Jordan

	Estimate	S.E.	C.R.	P
WQ	-.110	.095	-1.154	.249
EXP	.097	.135	.720	.471
TPE	-.136	.113	-1.202	.229
TEE	.009	.092	.098	.922
IB_usage	.063	.118	.533	.594

The critical ratio is less than (± 1.96) and p values ($>.05$), which means the two groups do not differ on their means on all the latent variables. The model fit statistics reading are: CMIN = 570.322 with df = 384 and CMIN/df ratio = 1.485; standardised RMR = .0614; CFI = .920; and RMSEA = .047 with 90 per cent confidence interval (.038 and .055) and PCLOSE = .743, indicating a good fit.

In summary, the invariant result at the structural weights level indicates that the structural paths are not significantly different between males and females. Thus, the hypothesized moderating effect of gender (H10) is not supported for the Jordanian sample.

6.4.2 Education Impact

Like the UK sample, the education variable for the Jordanian sample is recoded into two groups: Diploma degree level and bachelor & beyond degree level. The model fit indices for group 1 (diploma degree) are: CMIN = 287.195 with df = 182 and CMIN/df ratio = 1.578; standardised RMR = .0845; CFI = .877; and RMSEA = .090 with 90 per cent confidence interval (.070 and .110) and PCLOSE = .001 indicating a low fit. However, the modification indices have no suggested refinement to improve fit. On suspicion of size inadequacy and checking the Hoelter indices reveal that the sample size (72) is adequate (at $p=.05$) compared to the size guideline in the output (54).

The estimates output shows all paths are significant except for WQ-TPE. Hence, this level of fit is acceptable. The model fit statistics for the second group (bachelor degree) are: CMIN = 320.050 with df = 182 and CMIN/df ratio = 1.520; standardised RMR = .0843; CFI =.875; and RMSEA =.078 with 90 per cent confidence interval (.064 and .092) and PCLOSE =.001 (indicating low confidence that the reading fall within these intervals). Although modification indices suggest adding Exp-IB path to the model, there is no theoretical justification for adding that path. Hence, this level of fit is accepted. The research implication of the Exp-IB path is discussed in section 7.6 in the following chapter.

Running of the multiple group covariance analysis produced the regression weights estimates depicted in Table 6-17. The table shows that all paths are significant for bachelor and above group while two paths are not significant for the diploma education level, Exp-EE and WQ-PE.

Table 6-17: Jordan's un-standardised estimates and critical ratio for education level groups

paths	Diploma		Bachelor& above level		Notes
	Estimates	C.R	Estimates	C.R	
Exp - WQ	.398	3.180 ***	.165	2.319 *	
Exp - TEE	.130	1.337 n/s	.226	3.161 **	Path not sig. for Diploma level
WQ - TEE	.512	4.005 ***	.558	4.463 ***	
WQ - TPE	.273	1.276 n/s	.457	2.427 *	Path not sig. for Diploma level
TEE - TPE	.812	2.403 *	.563	2.482 *	
TPE - IB	.421	2.794 **	.302	2.643**	

Note: *** p<.001; ** p<.01; * p<.05

Running the measurement invariance analysis, the out put results showed that: assuming the model unconstrained to be correct, the measurement weights are invariant, with p value >.05. In other words, the two groups are invariant on the measurement level.

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	5.947	.948	.002	.003	-.007	-.009

Assuming the model measurement weights to be correct, the second level of invariance, structural weights, is also invariant. Amos output readings are:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights		4.120	.660	.002	.002	-.003	-.003

The p value is insignificant ($>.05$) indicating that the structural weights are invariant. This is illustrated by changes in CFI (Δ CFI), which are below .01.

Table 6-18: Selected AMOS text output: Jordan-education, Comparison baseline- Δ CFI

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	Δ CFI
Unconstrained	.745	.706	.879	.857	.876	
Measurement weights	.743	.713	.882	.866	.880	.004
Structural weights	.741	.716	.883	.869	.881	.001
Structural residuals	.739	.720	.884	.874	.882	.001
Measurement residuals	.729	.725	.882	.880	.882	.000
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

Having established measurement weights invariance, the next step is to run MACS to assess mean score differences between the two groups while treating the second group (Bachelor and above degree) as the reference group. Amos output shows that the diploma degree level group has lower mean scores than the high educational level. Based on the critical ratio and p values, as shown in Table 6-19, the non-reference group mean scores are statistically different from the reference group in respect to variables: EXP and IB-usage. On the other hand, the two groups cannot be said differ on their means on the latent variables: WQ, TPE, and TEE.

Table 6-19: Selected AMOS text output: Scalar estimated means- education- Jordan

	Estimate	S.E.	C.R.	P
WQ	-.149	.105	-1.425	.154
EXP	-.620	.141	-4.382	***
TPE	-.224	.117	-1.914	.056
TEE	-.136	.095	-1.435	.151
IB_usage	-.465	.129	-3.617	***

The model fit indices are: CMIN = 582.696 with df = 385 and CMIN/df ratio = 1.513; standardised RMR = .0680; CFI = .899; and RMSEA = .051 with 90 per cent confidence interval (.043 and .059) and PCLOSE = .401, all indicating a good fit.

In summary, the invariant result at the structural weights level indicates that the structural paths are not significantly different between the two levels of education. Thus, the hypothesized education moderating effect (H11) is not supported for the Jordanian sample.

6.4.3 Income Impact

The income variable is recoded into two categories: those earning less than JD500 per month (equal to JD 6000 annually) and those earning above JD 500 per month. The model run for the first income group resulted in fit statistics: CMIN= 287.710 with df =182 and CMIN/df ratio = 1.581; standardised RMR = .0712; CFI = .924; and RMSEA =.064 with 90 per cent confidence interval (.049 and .077) and PCLOSE = .059. The fit statistics for the second income group are: CMIN= 265.003 with df = 182 and CMIN/df ratio = 1.456; standardised RMR =.0955. ; CFI = .891; and RMSEA =.077 with 90 per cent confidence interval (.056 and .096) and PCLOSE = .021. Despite the modest fit, the modification indices do not suggest modifications to the model. Overall, model fit statistics are within acceptable levels.

Having reached an acceptable model fit for the two groups, a run of multiple group analysis to assess factor structure equivalence for both groups simultaneously rather than separately is carried out.

Table 6-20: Jordan's un-standardised estimates and critical ratio for income level groups

paths	Income 1		Income 2		Notes
	Estimates	C.R	Estimates	C.R	
Exp - WQ	.301	3.863***	.170	1.778 n/s	Path not sig. for income level 2
Exp - TEE	.132	2.039*	.208	2.340 *	
WQ - TEE	.563	5.625***	.599	3.735 ***	
WQ - TPE	.777	4.574***	.337	1.779 n/s	Path not sig. for income level 2
TEE - TPE	.127	.657 n/s	.598	3.019 **	Path not sig. for income level 1
TPE - IB	.298	2.853 **	.394	1.662 **	

Note: *** p<.001; ** p<.01; * p<.05

The models' estimates and critical ratios reported in Table 6-20 show that all paths are significant for income level one except for TEE-TPE path, while two paths are insignificant for income level 2: Exp-WQ and WQ-TPE.

Results of group analysis showed that the two groups are equivalent in respect to measurement weights. Assuming the unconstrained model to be correct; the measurement weights reading are:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	19.882	.098	.008	.009	.000	.000

The p value (>.05) indicates that the two groups are equal on the measurement weights. The next level of invariance analysis output is the structural weights. Assuming model measurement weights to be correct, the p value (>.05) indicates structural weights invariance between the two groups:

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	6	4.829	.566	.002	.002	-.002	-.002

To further assess the measurement invariance results, the changes associated in CFI reading revealed that such change have not exceeded the stated level of .01 for the first two invariance levels as shown in Table 6-21.

Table 6-21: Selected AMOS text output: Model fit- Baseline Comparisons- Jordan –Income

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	Δ CFI
Unconstrained	.785	.752	.914	.899	.912	
Measurement weights	.778	.752	.911	.899	.909	.003
Structural weights	.776	.754	.911	.901	.910	.001
Structural residuals	.773	.757	.912	.904	.911	.001
Measurement residuals	.753	.749	.896	.894	.896	.015
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

Having established invariance on the measurement weights level, it is possible then to check for mean score differences between the two income levels using the MACS

analysis while treating income level 2 as the reference group. The results show that the mean scores for the first income group are lower than the mean scores of the reference group (all estimates are negative). Also, the critical ratios and the p values show that the mean scores are significantly different between the two income levels in respect to all latent variables except one, WQ.

Table 6-22: Selected MOS text output: Scalar means estimates- Jordan-Income

	Estimate	S.E.	C.R.	P
WQ	-.101	.093	-1.080	.280
EXP	-.588	.125	-4.707	***
TPE	-.422	.111	-3.815	***
TEE	-.312	.093	-3.365	***
IB_usage	-.632	.116	-5.467	***

The fit statistics for the MACS are: CMIN = 540.585 with df = 385 and CMIN/df ratio=1.404; standardised RMR = .0585; CFI = .928; and RMSEA = .043 with 90 per cent confidence interval (.034 and .051) and PCLOSE = .925, all indicting a good fit.

In summary, the result of invariance at the structural weights level indicates that factor loadings are not significantly different between the two levels of income. Thus, the hypothesized income moderating effect (H12) is not supported for the Jordanian sample.

6.4.4. Age Impact

The age variable is also recoded into two groups of age: 30 years and below; above 31 years. Running the model for each group separately resulted in fit statistics for age group1: CMIN= 318.716 with df = 182 and CMIN/df ratio=1.751; standardised RMR= .0790; CFI =.909; and RMSEA = .071 with 90 per cent confidence interval (.058 and .084) and PCLOSE = .057, all indicting an acceptable fit. The fit statistics for the second age group are: CMIN= 262.465 with df =182 and CMIN/df ratio = 1.442; standardised RMR = .0734; CFI = .894; and RMSEA = .077 with 90 per cent confidence interval (.055 and .097) and PCLOSE = .023. Despite the modest fit, there are no meaningful modifications suggested by the modification indices. Overall, the model fit statistics are within acceptable ranges.

Running the multiple group analysis resulted in the models' estimates and critical ratios reported in Table 6-23.

Table 6-23: Jordan's un-standardised estimates and critical ratio for age level groups

paths	Age group1		Age group 2		Notes
	Estimates	C.R	Estimates	C.R	
Exp - WQ	.240	3.441***	.307	3.104**	
Exp - TEE	.194	3.258***	.195	2.302*	
WQ - TEE	.547	5.420***	.549	3.889***	
WQ - TPE	.611	3.938***	.322	1.481n/s	Path not sig. for age group 2
TEE - TPE	.432	2.333*	.740	2.543*	
TPE - IB	.389	3.975***	.497	2.995 **	

Note: *** p<.001; ** p<.01; * p<.05

All paths are significant for age group one while one path is insignificant for age group two, the path linking WQ-TPE. Running the multiple group analysis to test for structural fit equivalence for the two groups simultaneously resulted in equivalent measurement invariance. Assuming that the unconstrained model is correct, both groups' measurement weights are equal as evident from the non-significant p value readings (>.05).

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Measurement weights	13	9.114	.764	.003	.004	-.005	-.006

Assuming that the model measurement weights are correct, the structural weights are also invariant as well (p value>.05).

Model	DF	CMIN	P	NFI Delta-1	IFI Delta-2	RFI rho-1	TLI rho2
Structural weights	6	2.193	.901	.001	.001	-.003	-.003

To check further the measurement invariance results, Table 6-24 shows the changes in CFI, which do not exceed the .01; thus supporting the measurement invariance results.

Table 6-24: AMOS selected text output- Model fit: Baseline comparisons- Age- Jordan

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI	ΔCFI
Unconstrained	.784	.750	.906	.889	.904	
Measurement weights	.780	.755	.907	.895	.906	.002
Structural weights	.779	.758	.909	.898	.907	.001
Structural residuals	.777	.761	.910	.902	.909	.002
Measurement residuals	.764	.760	.902	.900	.902	.007
Saturated model	1.000		1.000		1.000	
Independence model	.000	.000	.000	.000	.000	

Having established measurement invariance, it is possible to check the latent mean score differences between the two age groups. Running the MACS analysis while constraining age group 2 to be the reference group, the scalar mean scores show that the younger group (age 30 and below) has lower mean scores than the older group (age 31 and above).

Table 6-25: Selected MOS text output: Scalar means estimates- Jordan-Age

	Estimate	S.E.	C.R.	P
WQ	-.147	.095	-1.541	.123
EXP	-.148	.131	-1.126	.260
TPE	-.225	.111	-2.027	.043
TEE	-.185	.093	-1.978	.048
IB_ usage	-.196	.128	-1.538	.124

Additionally, the two age groups statistically differ on mean scores of latent variables TPE and TEE, although, they do not differ significantly on WQ, EXP and IB-usage.

The model fit statistics are: CMIN = 545.601 with df = 385 and CMIN/df = 1.416; standardised RMR = .0622; CFI = .929; and RMSEA = .043 with 90 per cent confidence interval (.035 and .051) and PCLOSE = .911, overall indicating good model fit.

In summary, the result of invariance at the structural weights level indicates the structural paths are not significantly different between the two age groups. Thus, the hypothesized age moderating effect (H13) is not supported for the Jordanian sample.

Thus far, the demographics and their impact on the Jordanian model are checked and results presented on two measurement invariance levels. The measurement weights invariance results were followed by a mean and intercept invariance analysis to assess the mean differences between the invariant groups.

This chapter reported the effect of moderators on the models of the two countries' samples. Chapter seven is devoted to the discussion of results reported in chapters five and six together with conclusions.

Chapter Seven: Discussion and Conclusions

7.1 Introduction

This research started with three main objectives aiming to: (1) predict the viability of the UTAUT in explaining technology acceptance behaviour in a non-western country, (2) extend the UTAUT to account for online usage behaviour, and (3) examine the role of website quality perceptions in explaining online usage behaviour. In order to answer the research objective, the researcher applied a research strategy as explained next.

The study started by investigating the applicability of multiple group comparison for the two culturally different samples. When faced with discriminant validity issue related to perceived structural differences between the two samples' models, the samples' analyses was run separately.

Based on the insignificant results regarding the paths linking each web quality dimension with the dependent and the existence of high covariance between these dimensions, a higher-order website quality structure was introduced and incorporated successfully in both models. However, the two models' structures are not identical. The Jordanian structure has a full presentation of all four dimensions (technical, general content, special content, and appearance quality), while the UK structure lacks the special content quality dimension. Apart from this, the two models have similar items-variable representation for the other four variables comprising the research models: performance expectancy, effort expectancy, experience and Internet banking usage (the dependent variable). Both models also excluded the social influence variable owned to its insignificant impact on performance expectancy.

The Jordanian model specification search suggested a less powerful linkage from the main variable (performance expectancy) to the dependent should the path web quality-IB usage be present. As a result, the specification search decision was in favour of the stronger more powerful path estimates of PE-IB usage.

With respect to the impact of moderators, both samples showed measurement weights invariance between gender, education, income and age groups. Hence, latent mean structure analysis was performed to calculate mean differences between related demographic groups for each sample.

In this chapter, the discussion is organized around the hypotheses testing results and findings in respect to the re-structuring of the proposed research model. Part one is dedicated to the general model specification. Part two is dedicated to the discussion of the model's extension, website quality higher-order structure. Part three discusses the impact of moderators on the relationships in the research model. Alternative models are discussed in respect to the role of experience as a direct determinant of usage, followed by the role of moderators in improving the models' explanation power. Subsequently, the research limitations, the implications for future research, the implications for practice and research contributions are presented. The chapter concludes by addressing the fulfilment of the research objectives.

7.2 Part One: Discussion of Results Related to the UTAUT Structure

The research model structure closely representing the two country models is depicted in Figure 7-1. The discussion in this part covers findings in respect to the major variables in the research model: effort expectancy, performance expectancy, social influences, and their relationship with the dependent variable, Internet banking usage, in addition to a discussion on the role of experience as an antecedent to the independent variable.

7.2.1 Effort Expectancy-Performance Expectancy Link

The hypothesis testing supports the link between TEE–TPE (H1), equivalent to that between TAM's constructs: PEOU-PU.

According to UTAUT, the effort expectancy variable is defined as the degree of ease associated with the use of a system (Venkatesh et al., 2003), and resembles other constructs in the aggregated models comprising the UTAUT such as TAMs'

perceived ease of use, Diffusion of Innovation (DOI) and Model of PC Utilization's (MPCU) complexity construct (refer to section 2.11).

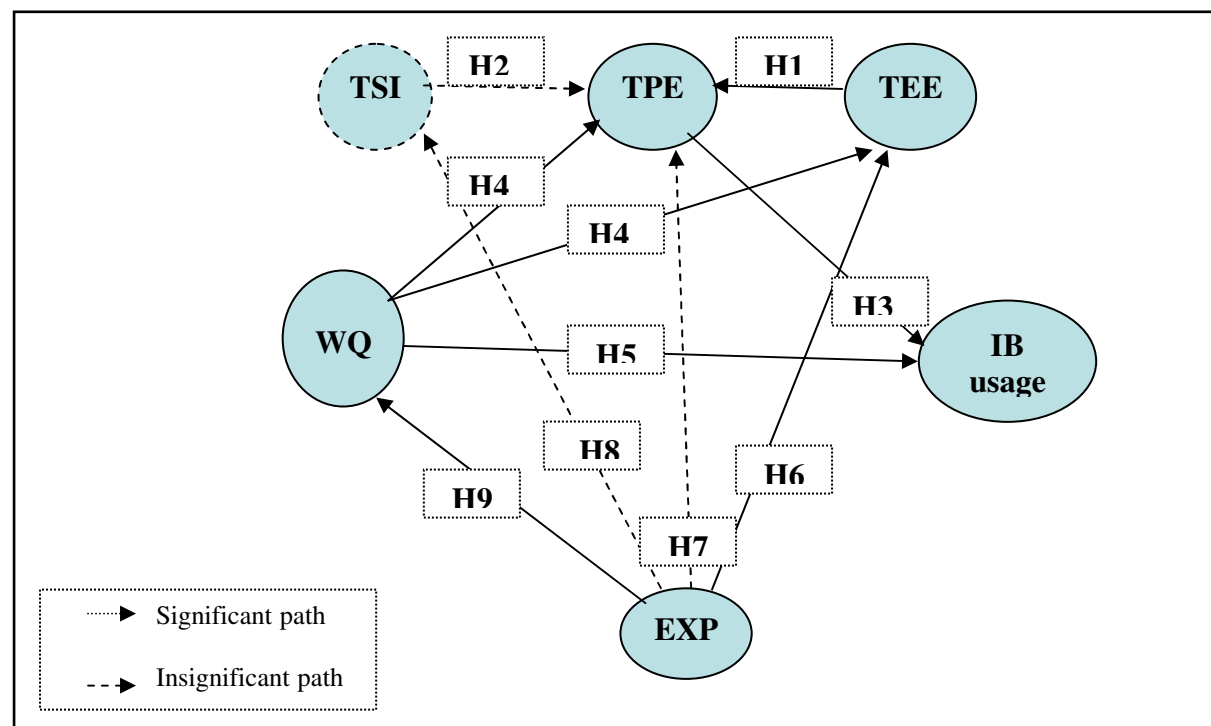


Figure 7-1: Structural Model with Hypotheses depicted on paths

In the current research model, specifications for the effort expectancy variable (TEE) resulted in three indicators measuring the degree of ease associated with Internet banking system/technology for both samples (the UK & Jordan). These indicators cover users' characteristics that measure the degree of effort required for Internet banking such as skilfulness, ability to use and learn system-usage and system-interactions.

The performance expectancy variable is defined as the degree to which individuals believe that using the system will help them attain gains in job performance (Venkatesh et al., 2003), and resembles other constructs such as TAM's perceived usefulness, the Motivation Model's extrinsic motivation construct, the MPCU's job-fit construct, the DOI's relative advantage construct, and the Social Cognitive Theory's (SCT) outcome expectancy construct. In this model, specifications for the performance expectancy variable (TPE) resulted in three indicators measuring the perceived performance gains related to the use of Internet banking. These indicators

cover characteristics of Internet banking channel related to usefulness, speed, and time effectiveness regarding task accomplishment.

Therefore, the hypothesized link between EE-PE is grounded in the literature related to the technology acceptance research and to TAMs' research in particular. PEOU has shown a significant effect on PU in the majority of studies (i.e., Davis, 1989; Davis et al., 1989; Taylor & Todd, 1995b). Nevertheless, the relationship between PEOU-PU showed inconsistency; in some studies it was statistically significant indicating TAM as robust model, while other studies showed the opposite.

An explanation might lie in the types of users (professionals vs. non-professionals), especially the more experienced, who are less likely to transfer their perceptions of ease of use to conclusions about system usefulness (Sun & Zhang, 2006). In this study, respondents are current users of Internet banking and from different career spectrum; however, experience was not examined as a moderator. Moreover, the moderating effect of profession, which was run for the UK data set (the Jordanian data set lacked such information) showed none significant difference. Nevertheless, this study found support for the EE-PE linkage in both samples' models.

7.2.2 Social Influence-Performance Expectancy Link

The social influence variable in the UTAUT model is defined as the degree to which an individual perceives that important others believe she/he should use the new system (Venkatesh et al., 2007), and resembles other constructs in the aggregated models comprising the UTAUT such as subjective norms in TRA, TAM2, TPB/DTPB, and combined TAM-TPB; social factors in MPCU; and image in DOI. In this model, social influence specifications in the measurement model refinement stage resulted in keeping only two indicators measuring this variable (important others in friends and family circles). Professionally important opinion influencers were excluded due to cross loadings and high covariance between measurement errors (section 5.3.1.1). However, specification in the structural model stage resulted in deletion the other indicators (family and friends). The path SI-PE estimates in both models were insignificant. The findings are supported by previous research. Although social norms (SN) is a determinant of PU in TAM2 and affects intention to use a

system indirectly through perceived usefulness, the SN-PU impact tends to vanish under voluntary usage conditions. This implies that users may depend on their own beliefs rather than on others' opinions or they may use their direct experience with a system to form their intentions or perceptions of usefulness (Venkatesh & Davis, 2000; Venkatesh et al., 2003). Morris & Venkatesh (2000) report similar effects: social norm influences become weaker overtime. Furthermore, Taylor and Todd (1995c) concluded that the relative influence of subjective norms on behavioural intention is expected to be stronger for users with no prior experience. Similarly, Karahanna & Straub (1999) argued that inexperienced potential system adopters are influenced by social norms more than are current experienced users. This study investigated individual actual experienced users of Internet banking under discretionary usage conditions; therefore, the insignificant impact of social influence on performance expectancy result confirms previous findings reported in the literature (Karahanna & Straub, 1999; Taylor and Todd, 1995c; Venkatesh & Davis, 2000; Venkatesh et al., 2003). In conclusion, this study found no support for the SI-PE (H2) relationship.

7.2.3 The Mediating Role of Performance Expectancy

The mediating role of performance expectancy between EE-IB and SI-IB (H3) is partially supported in this study; more specifically, only the mediating role of performance expectancy between EE-IB is supported.

Literature has shown perceived ease of use impact on behavioural intention and usage to be inconsistent, especially, in relation to the role of experience as a moderator and system complexity (Sun & Zhang, 2006; Igarria et al., 1997). In other words, perceived ease of use will have an influence on usage or behavioural intentions when technology is more complex and individuals are less experienced. In this study, respondents are actual users; hence it is assumed that they have experience with the system and therefore do not find it complex. Prior research has, also, shown that perceived ease of use (PEOU) is a significant antecedent of perceived usefulness and thus can affect acceptance of systems indirectly through perceived usefulness (Davis et al., 1992).

Literature also reports PU as a strong determinant of usage, if not the most important. In the current study and for the UK model, the PE-IB standardized direct effect is .513 (Table 5-17), while the standardised total effect of WQ-IB is higher (.536) followed by PE impact, which is similar to that of the direct effect (Table5-18). As for the Jordanian model, PE-IB is the only direct path that connects the independent variables with IB usage, and the path's standardized total effect is .412 (Table 5-23). Thus, PE is the most important determinant for the Jordanian sample and the UK.

In conclusion, this study found support for the mediating role of PE with respect to EE-IB usage relationship in both models, while the mediating role of PE between SI-IB usage is not supported as SI-PE (H2) was not supported.

7.2.4. Experience Impact in the extended UTAUT

Experience was measured in the research instrument by four indicators assessing computer and Internet knowledge in addition to Internet usage in years and on a daily basis. Computer and Internet knowledge were the only indicators representing the experience variable in the final models' specifications. Experience was hypothesized as an antecedent in the research model based on previous research. The data analysis showed that experience has a measurable direct impact on effort expectancy in both models (H6); thus, supporting and confirming previous research findings. On the other hand, the hypothesized path Exp-PE was not supported in both models (H7), thus, disconfirm findings reported in previous studies (e.g., Compeau and Higgins, 1995; Taylor and Todd, 1995c; Johnson & Marakas, 2000). Interestingly, in the original study of the UTAUT model, experience was not hypothesized to moderate the relation between performance expectancy and intentions but was hypothesized to moderate the relationship between effort expectancy and behavioural intention (Venkatesh et al., 2003). In the current study, effort expectancy mediates the relationship between experience and performance expectancy. This confirms previous findings related to the impact of prior general computer experience on perceived ease of use (Gruting & Ndubisi, 2006). Building on the other findings concerning PEOU-PU link and PU-usage link, it is safe to assume that the experience-PE link is indirect and mediated by EE.

The impact of experience on social influence (H8) was supported by both models, which confirms previous research that reported such impact (e.g., Thompson et al., 1994). However, social influence was not present in the final structural model as explained in section 7.2.2.

Equally, both models reported experience impact on website quality structure (H9) with almost equal standardized direct effect (.340 and .344 for UK and Jordan respectively). This confirms previous research related to experience impact on facilitating conditions (Taylor & Todd, 1995b; King & Dennis, 2003), which was replaced by the website quality structure in the current study.

In conclusion, this study found support for H6, H8, and H9 related to the direct impact of experience on effort expectancy, social influences and website quality perceptions (respectively), for both country samples, but not the direct impact of experience on PE (H7). Rather, the study reported the indirect impact of experience on performance expectancy through effort expectancy.

7.3 Part Two: Discussion of Results Related to the WQ Structure

Website quality can be defined as the quality of the website's design and architecture consisting mainly of four dimensions of design quality: technical quality, general content quality, special content, and appearance quality. These dimensions were empirically tested within the online context and TAM (Aladwani, 2006). In the current study, website quality replaced facilitating conditions construct in the original UTAUT model. According to Venkatesh et al. (2008) facilitating conditions is a construct that reflects an individual's perception about her/his control over the behaviour. They state that facilitating conditions, in general refers to individuals' perceptions of the availability of technological and or organizational resources that can remove barriers to using a system. Furthermore, facilitating conditions, as reported in the UTAUT, emphasize the role external factors (e.g., resources) have on usage directly without the mediation of behavioural intention (Venkatesh et al., 2003).

In the current study, usage is investigated under discretionary conditions, the organizational context is irrelevant here and thus, the website quality dimension

replaced the technological resources. Based on this argument, website design and architecture is a technical form of support in the online behaviour framework. The website quality dimensions scale was incorporated into the UTAUT scale. The items retained represent the website characteristics regarded important by the Internet banking users within both countries: technical quality aspects such as ease of navigation and ease of access were retained for both models whereas loading speed was retained only for the Jordanian sample. General content quality aspects such as clarity and accuracy were important for both samples; however, conciseness was retained by the Jordanian model, and usefulness and completeness by the UK model. The special content quality dimension was only regarded important by the Jordanian sample. The characteristics appreciated were: the ability to find contact information, general bank information, and details about products and services. This might indicate that the respondents from Jordan rely on banks' websites to obtain such information while the same is not true for the UK respondents. Appearance quality features such as website attractiveness, organization, and readability were appreciated by both samples.

The hypothesized direct impact of each dimension separately on the Internet banking usage was not supported by the results for the UK sample. A higher-order structure was introduced based on the high covariance among the website quality dimensions. The Jordanian model incorporated the website quality higher-order structure based on the discriminant validity issue at the measurement model and the high covariance among its dimensions. Model specifications resulted in retaining four dimensions in the Jordanian model, while the UK model excluded the special content quality dimension.

The relationship between the higher-order factor and the three first order dimensions is powerful, for the UK model, as indicated by the standardized regression weights estimates: .829, .845, and .889 for technical quality, general content quality and appearance quality respectively. For the Jordanian model, the values are: .910, .932, .873, and .841 for technical quality, general content quality, special content quality, and appearance quality respectively.

The hypothesized direct path between website quality perceptions and Internet banking usage was supported in the UK model (H5), but not supported in the Jordanian model. Previous research indicated the direct and indirect effect of external variables on usage behaviour. Davis (1989) explicitly suggested that system quality affects usage as an external factor through perceived usefulness beliefs and perceived ease of use beliefs. Taylor & Todd (1995a) and Venkatesh et al. (2003) supported the established direct link between facilitating conditions and usage behaviour. Delon & Mclean (1992 and 2003) argued that information quality, system quality and service quality influence intentions to use and system usage. Nelson et al. (2005), reported that information and system quality directly impact system use. In other words, both the direct and indirect impact of website quality on IB usage is supported for the UK model, confirming previous research. On the other hand, the position is less clear for the Jordanian sample, because including the direct path would result in PE-IB usage becoming insignificant. On balance, only the indirect path is retained in order to ensure that the effects of the other independent variables are retained in the model.

The hypothesized paths between WQ-EE and WQ-PE are supported in both models, which confirm findings from previous research, especially in IS research. Lederer et al. (2000) found information quality to predict usefulness. Wixom & Todd (2005) found significant relationships between information satisfaction and quality satisfaction on one hand and TAM's constructs on the other. Ahn et al. (2007) found website quality (measured by: system, information, and service quality) to impact PEOU and PU. According to Ahn et al. (2007), IS research sees the website as an information system and hence, focuses on system and information quality, while marketing, specifically service research, sees a website as service provider and thus, focuses on the service quality dimensions. The authors stated that despite the differences in approaches, Website Quality and System Quality measurement categories are a balanced option of system, information and service quality.

The hypothesized role of EE and PE as mediators to the effect of WQ on IB usage is supported in both models, which confirms findings from previous research. MacFarland & Hamilton (2004) found system quality to impact system usage directly and indirectly through perceived ease of use and perceived usefulness. Igbaria et al. (1995) found system quality to influence usage through PU and PEOU.

In summary, evidence has been presented above for the direct and indirect effect of website quality on usage, which broadly reflects prior findings related to information and system quality research. Both models found support for (H4); however, (H5) found support only in the UK model. Moreover, the total effect of website quality is powerful in both models as shown in Table 7-1. The standardised total effect is highest for WQ-usage in both models; however, the reading is greater for Jordan

Table 7-1: Selected AMOS text output: Standardized total effect for both country model

	UK				Jordan			
	Exp	WQ	TEE	TPE	Exp	WQ	TEE	TPE
WQ	.340	.000	.000	.000	.344	.000	.000	.000
TEE	.638	.356	.000	.000	.501	.621	.000	.000
TPE	.467	.529	.556	.000	.351	.691	.396	.000
IB usage	.330	.536	.285	.513	.145	.285	.164	.412

7.4 Part Three: Discussion of Results Related to the Impact of Moderators

This section is devoted to the discussion of the impact of moderators on the relationships in the model. The moderators refer to respondents' demographics such as gender, education level, income level, and age. The discussion is organized around the impact of each demographic variable in both models.

7.4.1 Gender Impact

The measurement invariance testing for both models resulted in gender invariance on the measurement weight level and the structural weight level indicating that gender is not a moderator for Internet banking usage and this result is consistent across the two countries' models.

The UK sample latent mean analysis showed that males have higher mean scores compared to females and that these scores are significantly different with respect to website quality, experience and Internet banking usage (Table 6-3), which indicates that these variables are rated higher by males than by females.

In view of the recent research findings (Morris et al., 2005; Venkatesh et al., 2003; Morris & Venkatesh, 2000) and the fact that respondents in the current research are actual users with prior computer and Internet knowledge, the non moderating effects of gender confirm the conceptualization that under discretionary conditions and with increased experience, gender differences tend to fade away. The gender results in the current study confirm findings reported in similar conditions.

7.4.2 Education Impact

The measurement invariance testing for both countries' models resulted in education invariance on the measurement level; however, only the Jordanian model is invariant on the structural weights level.

The UK latent mean analysis indicated that respondents with a bachelor degree level have significantly higher mean scores than individuals with below bachelor level (Table 6-6). The hypothesized moderating effect of education on the path PE-IB usage (H11.1) was unsupported; both levels of education produced insignificant path estimates. Also, the hypothesized moderating effect of education regarding path SI-PE (H11.2) was unsupported because estimates were insignificant. On the other hand, the hypothesized moderating effect of education regarding path EE-PE was supported. The regression weights indicated that effort expectancy was negatively related to performance expectancy for individuals with lower levels of education, which confirms previous findings: less educated people would find the technology cumbersome and strenuous to learn. Hence, such people are expected to rely on their experience as well as perceptions of website quality to make decisions related to usage. This argument is supported by the significant structural path differences found for Exp-WQ, which also showed higher regression estimates for individuals with lower levels of education (.557) versus higher levels (.164). Likewise, the hypothesized moderating effect of education regarding WQ-IB indirect path through PE was supported. The regression weights estimate for individuals with lower levels of education was higher (1.48) than estimate for those with lower levels (.458). Consistent with the previous argument, individuals with lower levels of education would rely on their experience and perceptions of website quality to form decisions

regarding Internet banking usefulness. The findings are conveniently illustrated in the Table 7-2 of total effects.

Table7-2: AMOS selected text output: total effect for education- UK

	Below Bachelor				Bachelor			
	Exp	WQ	TEE	TPE	Exp	WQ	TEE	TPE
WQ	.557	.000	.000	.000	.164	.000	.000	.000
TEE	.616	.635	.000	.000	.493	.265	.000	.000
TPE	.746	1.399	-.128	.000	.511	.693	.885	.000
IB usage	.680	1.190	.066	-.513	.226	1.096	.103	.116

The total effect output demonstrate that individuals with lower levels of education rely on their experience in making judgments about website quality perceptions more than do those with higher levels of education. Moreover, the impact of website quality on performance expectancy is significantly higher for individuals with lower levels of education than those with higher levels (.094 differences). Additionally, the impact of effort expectancy on performance expectancy is lower for individuals with low levels of education (negatively related) than is for higher levels of education.

Performance expectancy is negatively related to IB usage for lower levels of education; hence, perceptions of website quality and individuals' computer and Internet experience are the determinants of IB usage for individuals with lower levels of education. Perceptions of website quality, experience and performance expectancy (respectively) are the determinants of IB usage for individuals with higher levels of education.

The findings support previous research that Internet users and e-shoppers are mainly educated and are more comfortable using non-store channels. This confirms expectations as education is often positively correlated with individual level of Internet literacy (Li et al., 1999; Burke, 2002). Dennis et al. (forthcoming) argue for the role of education in e-shopping stating that well educated individuals would utilize information resources more than less educated. Moreover, adoption of Internet banking (IB) is significantly associated with the educational level and IB is more frequently used by people with moderate levels of education (Wan et al., 2005). Correspondingly, as consumers increase their education and qualification levels, their adoption of e-banking increases (Gan et al., 2006).

As for the Jordanian model, the latent mean structure showed that respondents with a bachelor degree and above have higher mean scores than those with a diploma. Two scores were statistically different, experience and Internet banking usage (Table 6-19), indicating that these two variables are rated higher by the higher level of education group. On the structural weight invariance, the Jordanian model showed invariance between the two groups of education, and it can be concluded that education is not a moderator for the Jordanian sample. This result is perhaps a product of differences in groups' ranges between the two countries' models. Particularly, the lower education group, in the UK model, comprised high school and diploma levels whereas this group, in the Jordanian model, comprised diploma only. The diploma or bachelor qualifications (education groups for Jordan sample) are not highly different and both are more than adequate to ensure respondents knowledge and ability to utilize computers. Perhaps the wider variation in the UK lower level enabled a more emphatic comparison for the two education groups.

7.4.3 Income Impact

The measurement invariance analysis showed that both countries' models are invariant on the measurement weights level; only the Jordanian model showed invariance on the structural weights.

The UK latent mean analysis showed that the higher income group have higher mean scores compared to the lower income group. All mean scores were significantly different, indicating that the variables were rated higher by higher income group.

On the structural weights level, the UK model showed non-invariance. The paths that were significantly different: WQ-PE and WQ-EE (Table 6-10). Hence, income moderating effect regarding WQ-IB usage path (H12.3) was supported. The regression estimates for the lower income group were significantly higher than those for the higher income group regarding paths WQ-PE and WQ-EE. These results can be explained in line with results for the education levels. As pointed out by Dennis et al. (forthcoming), income and education are correlated seeing that less educated individuals usually earn less. Hence, these individuals rely on their perceptions of website quality to make judgments about system ease of use and usefulness (the latter

directly impact IB usage). This result makes up for the link between WQ and IB usage, which was not significantly different between the two income groups. Moreover, H12.1 and H12.4 found no support indicating that income has no impact on PE-IB or EE-PE paths. H12.2 also found no support because SI was not represented in the final model.

The total effects output show that WQ-IB usage, WQ-PE and WQ-EE effects are significantly higher for the lower income group compared with the higher income group.

Table7-3: AMOS selected text output: total effect for Income- UK

	Income 1				Income2			
	Exp	WQ	TEE	TPE	Exp	WQ	TEE	TPE
WQ	.339	.000	.000	.000	.142	.000	.000	.000
TEE	.520	.543	.000	.000	.550	.214	.000	.000
TPE	.569	1.007	.678	.000	.303	.324	.495	.000
IB usage	.448	.966	.358	.528	.229	.607	.274	.554

These findings demonstrate income is a moderator for the UK sample. This confirms previous research findings: moderately affluent individuals rely more heavily on Internet banking than do the very affluent; the latter distribute their channel usage evenly among branch, telephone and Internet banking (Wan et al., 2005). Dennis et al. (2008) argue that individuals with high income are also highly educated and rely on cognitive cues when making buying decision, while less educated less fortunate individuals rely on satisfaction cues. Correspondingly, consumers with higher household income tend to shop more online compared to lower income consumers and are perhaps more experienced or knowledgeable about websites functionality, transactions' smoothness and efficiency.

The latent mean analysis, for the Jordanian sample, revealed results similar to the UK sample. The mean scores for people with higher income level is significantly higher than for those with lower income levels, and these scores are significantly different except for one variable, WQ. However and since the structural weights are invariant, income is not a moderator for the Jordanian sample. A possible explanation for such result might be that respondents are actual users and apparently educated and computer literate regardless of their earning power in contrast to the UK where

income tends to be more directly related to education levels. Moreover, the reported effect of income as a moderator in previous research is specifically inferred from research related to the banking options preferred by different income spectrums.

7.4.4 Age Impact

The invariance analysis showed that both countries' models are invariant at the measurement level and the structural weights level. Hence, age is not a moderator for Internet banking usage behaviour in both contexts.

The UK latent mean analysis showed that the older age group mean scores were significantly higher than the mean scores of the younger group, except for two variables, website quality and experience (Table 6-13). This indicates that performance expectancy and effort expectancy are rated higher by the older adults. The Jordanians latent mean analysis showed results similar to the UK sample. However, only two of the mean scores were significantly difference indicating that effort expectancy and performance expectancy are rated higher by the older respondents.

The results can be interpreted in light of the age ranges comprising the two groups in the two countries' samples. The lack of a wider range for age groups makes the comparison less effective. The age groups are within close ranges, which might be the reason behind the non-invariance results in both structural models. Previous research on demographic segmentation with respect to age reports wider ranges for "Young", "Middle aged" and "Old aged". For example, Morris et al. (2005) refer to age ranges <39 as young and ≥ 40 as old based on the research that suggests 40s (and over) represent the "older" or "maturing" workforce. In the current study, the two age groups in both countries' samples, according to this age categorization, fall within the "Younger age": less than 40 for the UK sample whereas for Jordanian sample, the second age group is less than 41 (refer to appendices for frequency tables).

This part of discussion covered the impact of moderators, specifically gender, education, income and age, on the models in both countries. It is concluded that demographics exhibit no moderating effect, for the Jordanian sample, in the context of

the extended UTAUT. However, education and income are moderators for the UK sample. The findings regarding gender none moderating effects confirm previous research findings: with increased experience and under none mandatory usage condition, the gender differences tend to disappear (Morris et al., 2005).

7.5 Discussion of Results in Relation to Research Questions

The previous discussion of results can be categorized around three points that help answer the research questions.

First, the unified model structure: both models have exhibited similar results in respect to model specifications and goodness of fit. The hypothesized interdependent relationships among the unified technology acceptance model are supported for both models. The mediating role of performance expectancy between effort expectancy and usage behaviour was supported for both models. Additionally, both models did not find support for the influence of social factors on Internet banking usage behaviour. Experience as an antecedent affected effort expectancy and website quality perceptions in both models. Based on these results, research questions one, three, and five are answered.

Second, the model's proposed extension: the multidimensional and interdependent nature of the website quality perceptions construct resulted in introducing website quality as a higher-order factor that accounts for the covariance in its dimensions. The higher structure was successfully incorporated into both models with one point of difference related to the representation of the dimensions in each model. All four dimensions were retained for Jordan, whereas the UK model retained only three (omitting the special content quality dimension). The impact of website quality structure on key constructs in the unified model found support in both countries' models. However, the direct impact of website quality perceptions on usage behaviour was supported only for the UK model. These results answer research question two.

Third, the effect of moderators: both models exhibited similar results related to the absence of the moderating effect of gender and age. However, education and income showed a moderating effect for the UK model only, which, in the case of western cultures such as the UK, confirmed previous research findings. The observation that

the moderating effects of education and income vary between the two countries must be viewed with caution, due to the impossibility of comparing like-with-like education and income categories. These results answer research question four.

7.6. Alternative Models

The proposed research model is clearly a construction of factors that follows the stream adopted in IT and IS technology acceptance research. The technology acceptance literature has shown experience to have an important influence on several key constructs (i.e., Davis et al., 1989; Taylor & Todd, 1995c). The role of experience in previous research was mostly a moderator to beliefs-intention-acceptance relations, and of a direct impact on PEOU (Venkatesh, 2000). In this study, experience is measured through individuals' self reported computer and Internet knowledge. The final models, in both countries' samples, supported the impact of respondents' general computer and Internet knowledge (the exogenous) on website quality perceptions and effort expectancy (endogenous). The current study is based on cross-sectional samples of current users; therefore, it can not be claimed that the results demonstrate causal relationships. Consequently, to more fully assess the aptness of the proposed research model, alternative models are examined to determine the degree to which each predicts and explains usage. Modification indices suggest that experience is a direct determinant of Internet banking usage. Applying this modification to the two models (UK and Jordan) resulted in an altered emphasis for determinants (i.e., performance expectancy and website quality perceptions) impact on IB usage. The following section presents the alternative models, where the Exp-IB usage path is added in both countries' models.

7.6.1 UK Alternative Model

Running the model estimates after the addition of Exp-IB usage path, revealed that all path estimates were significant, and model fit statistics indicated a good fit. Table 7-4 compares fit statistics between the models before and after adding the extra Exp-IB usage path.

Table 7-4: Model fit statistics – UK final and alternative

With Exp –IB usage path	Without Exp-IB usage path
$\chi^2 = 227.526$ df = 161 and $\chi^2/df = 1.413$ GFI = .904 and SRMR = .0539 NFI = .932 and CFI = .979 RMSEA = .045 (.030 and .058) and PCLOSE = .728	$\chi^2 = 239.754$ df = 162 and $\chi^2/df = 1.480$ GFI = .899 and SRMR = .0595 NFI = .929 and CFI = .975 RMSEA = .048 (.035 and .061) and PCLOSE = .569

The alternative model with the added path Exp-IB usage can be a nested model within the final model, the added path reduced the degrees of freedom by one. The calculated chi squared difference $\Delta\chi^2$ is larger than 3.84 ($239.754 - 227.526 = 12.228$), thus the alternative model presents a significantly better fit (Hair et al., 2006).

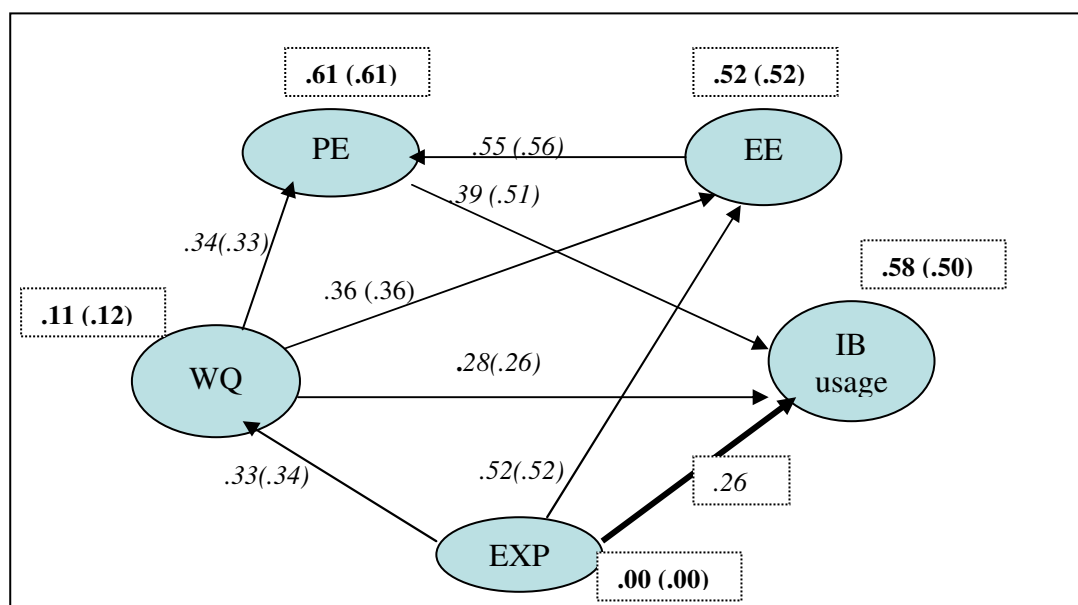


Figure 7-2: Statistics for UK final and alternative model. Note: SMCs are depicted in bold for the alternative model & in brackets for the final model. Standardised regression estimates are depicted in italic for alternative model & in brackets for final model.

The regression weight estimates, shown in Table 7-5, indicate that all paths are significant (as in the original model without the Exp-IB usage path).

Table7-5: AMOS selected text output for UK alternative model estimates

Paths				Estimates	S.E	C.R	P
H9	Exp	→	WQ	.279	.065	4.322	***
H6	Exp	→	TEE	.451	.059	7.662	***
H4	WQ	→	TEE	.364	.069	5.243	***
H1	TEE	→	TPE	.745	.096	7.758	***
H4	WQ	→	TPE	.462	.094	4.896	***
	Exp	→	IB-usage	.347	.097	3.573	***
H5	WQ	→	IB-usage	.436	.137	3.171	.002
H3	TPE	→	IB-usage	.449	.109	4.112	***

Note: *** p<.001; ** p<.01; * p<.05.

Thus, hypotheses H1, H3, H4, H5, H6 and H9 are all supported in this alternative model. The standardized regression weights indicate the strength of the direct paths in the model and their impact on the dependent variable. Table 7-6 compares between the standardized total effect for both UK, final and alternative, models.

Table7-6: AMOS selected text output: Standardized total effect: UK final & alternative models

	With Exp-IB usage path					Without Exp-IB usage path				
	Exp	WQ	TEE	TPE	IB	Exp	WQ	TEE	TPE	IB
WQ	.327	.000	.000	.000	.000	.340	.000	.000	.000	.000
TEE	.636	.358	.000	.000	.000	.638	.356	.000	.000	.000
TPE	.460	.532	.550	.000	.000	.467	.529	.556	.000	.000
IB	.531	.488	.217	.394	.000	.330.	.536	.285	.513	.000

The table shows, in the absence of Exp-IB usage path, the highest impact on IB usage comes from website quality perceptions and performance expectancy, while in the presence of Exp-IB usage path, the highest impact comes from experience.

The results related to the impact of moderators on the alternative model are similar to the results of the final model: gender and age are not moderators for either model, while education and income are. Needless to say, the latent mean analysis is not affected by adding a new path since it is run using the mean covariance structure, where all variables are linked together in a manner similar to CFA measurement model. Hence the latent mean analyses results are the same for both, alternative and final, models.

Table 7-7 displays the measurement invariance output for the UK final and the alternative models.

Table7-7: AMOS selected text output: Measurement invariance for UK models.

Moderator	Statistics	With Exp-IB usage path		Without Exp-IB usage path	
		Measurement weights	Structural weight	Measurement weights	Structural weight
Gender	CMIN	16.220	8.348	15.859	9.729
	Df	13	8	13	7
	P	.237	.400	.257	.204
Education	CMIN	13.613	28.466	11.816	28.635
	Df	13	8	13	7
	P	.402	.000	.543	.000
Income	CMIN	20.099	26.360	20.277	22.487
	Df	13	8	13	7
	P	.093	.001	.089	.002
Age	CMIN	8.861	10.261	8.656	6.978
	Df	13	8	13	7
	P	.783	.247	.798	.431

7.6.2 Jordan Alternative Model

Running the model estimates after the addition of Exp-IB usage path, revealed an improvement in the model fit statistics.

Table 7-8: Model fit statistics – Jordan final and alternative

With Exp –IB usage path	Without Exp-IB usage path
$\chi^2 = 258.03$ df = 181 and $\chi^2 /df = 1.575$ GFI = .891 and SRMR = .0543 NFI = .883 and CFI = .953 RMSEA = .051 (.039 and .062) and PCLOSE = .443	$\chi^2 = 321.754$ df = 182 and $\chi^2 /df = 1.768$ GFI = .880 and SRMR = .067 NFI = .868 and CFI = .937 RMSEA = .059 (.048 and .069) and PCLOSE = .088

The alternative model with the added path Exp-IB usage, similar to UK alternative model, can be a nested model within Jordan final model; the added path reduced the degrees of freedom by one and $\Delta\chi^2$ is larger than 3.84 (63.724), thus the alternative model is a significantly better fit (Hair et al., 2006).

The values of the standardized estimates for both Jordanian models depicted in Figure 7-3 shows only minor differences for most paths except PE-IB usage, which has decreased remarkably after adding the Exp-IB usage path. The value descended from .41 to .16. The PE-IB path is the only path that links the dependent variable with the

rest of the model and the power of this apparently diminished by the existence of the additional path.

The squared multiple correlations (SMCs) values also showed minor differences, except for the dependent's value. The change is substantial with the addition of the extra path. R^2 is normally used as an indicator of the model's power in explaining the variance in the dependent variable. However, the weight of higher values (close to 1) is less important than statistics indicating the convergent validity of the hypothesized model. According to Hair et al. (2006), within the two steps of structural equation modelling, the main focal point is establishing validity of both the measurement model and the structural model, taking into consideration that assessment of validity requires more evidence than the model fit statistics. It requires examining parameter estimates and evaluating dependence relationship estimates in order to validate the theory behind the structural equation model. In other words, the objective is to show that the operationalization of the theory being examined is correlated and not disconfirmed by the data (Gefen et al., 2000)

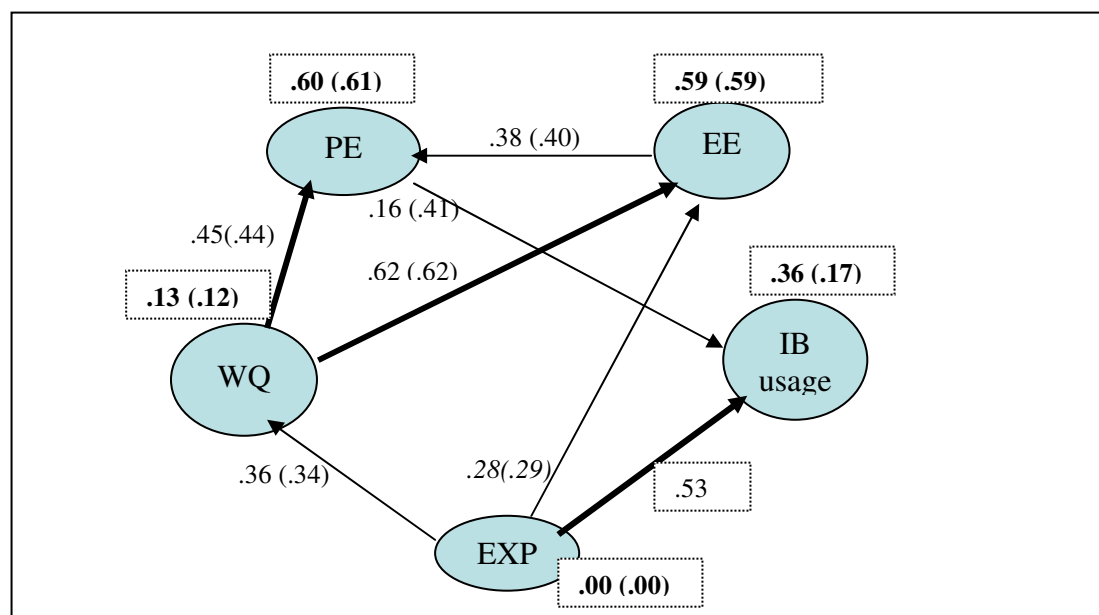


Figure 7-3: Statistics for Jordan final and alternative model.

Note: SMCs are depicted in bold for the alternative model & in brackets for the final model. Standardised regression estimates are depicted in italic for alternative model & in brackets for final model.

The regression weight estimates, shown in Table 7-9, indicate that all paths are significant as in the model, without the Exp-IB usage path, except that TPE-IB usage

path is barely significant (.052). Thus, hypotheses H1, H3, H4, H6 and H9 are all supported by the alternative model.

Table7-9: Selected AMOS text output for Jordan alternative model estimates

Paths				Estimates	S.E	C.R	P
H9	Exp	→	WQ	.260	.056	4.661	***
H6	Exp	→	TEE	.188	.049	3.822	***
H4	WQ	→	TEE	.561	.082	6.797	***
H4	WQ	→	TPE	.534	.127	4.223	***
H1	TEE	→	TPE	.499	.151	3.303	***
H3	TPE	→	IB usage	.159	.082	1.942	.052
	Exp	→	IB usage	.448	.073	6.161	***

Note: *** p<.001; ** p<.01; * p<.05.

The standardized regression weights indicate the strength of the direct paths in the model and their impact on the dependent variable. Table 7-10 shows the comparison between the standard total effects for both, final and alternative, models.

Table7-10: AMOS selected text output: Standardized total effect: Jordan original & alternative models

	With Exp-IB usage path					Without Exp-IB usage path				
	Exp	WQ	TEE	TPE	IB	Exp	WQ	TEE	TPE	IB
WQ	.355	.000	.000	.000	.000	.344	.000	.000	.000	.000
TEE	.503	.619	.000	.000	.000	.501	.621	.000	.000	.000
TPE	.352	.687	.382	.000	.000	.351	.691	.396	.000	.000
IB	.584	.111	.062	.162	.000	.145	.285	.164	.412	.000

As noted in Table 7-10, in the absence of the Exp-IB usage path, performance expectancy has the highest impact on IB usage, whereas, in the presence of Exp-IB usage, experience has the highest impact on IB usage.

The impact of the additional path on the measurement invariance is similar to the results in the final model: none of the demographics has a moderating effect on the relationships in the model.

In conclusion, the alternative models produced a better fit for both countries. Nevertheless, fit in itself is insufficient to justify acceptance of alternative models, given that many alternative models may provide an equivalent or better fit. Additionally, although empirical results provide some evidence of validity, theoretical foundation is also important in validating the model. Hence, researchers are required

to add only paths that are justified by theory and not to attempt model retrofitting (Hair et al., 2006). In this study, it is acceptable that experience has an impact on the system usage whether that impact is direct or indirect. The addition of the direct path in the current models would be only an opportunistic means of improving R square and model fit. The R square statistics refers to how much of the variance in the dependent variable is explained by the independent variables in the model. Nevertheless, the importance of R square value is secondary to the emphasis on having a model that is correctly specified, using well-measured variables, and relationships hypothesized from theory, as is the case in the final model.

Furthermore, the alternative models provide a different emphasis to the proposed research model, and more importantly, appear to limit the importance of performance expectancy impact on usage (to a greater extent in the Jordanian model than in the UK model). Although some might argue for adding the extra path for the Jordanian model, the researcher considers, on balance, that such an attempt would compromise the theoretical framework by diminishing the proposed models' ability to explain determinants of IB usage. The approach would rely on experience as a key determinant of IB usage (.53) with WQ, EE and PE only presenting a minor impact through PE-IB usage path (.16). Consistent with the underlying theory, UTAUT, and prior empirical evidence, the experience impact in the original model should be lessened to its impact on the other variables as an antecedent only. Nevertheless, both models are included here in order to stimulate and facilitate future research on the mechanisms of the relative effect of experience and the other variables.

7.7 The Role of Moderators in Improving R squared Value

Technology acceptance research has been criticized for limited explanatory power. Sun and Zhang (2006) acknowledged the low explanatory power limitation associated with technology acceptance research and suggested that adding moderators to the model frame would improve the explanation power. Venkatesh et al. (2003) argued that the extension (moderators) to the various models identified in previous research mostly enhanced the predictive validity of the various models beyond the original specifications. The current study reports some supporting findings for the effect of moderators in improving the explanation power as shown in Tables 7-11 and 7-12.

Table7-11 Jordan final and alternative models SMC's

	Final model				Alternative model with Exp-IB usage path			
	WQ	EE	WQ	IB usage	WQ	EE	WQ	IB usage
Model	.118	.591	.609	.170	.126	.587	.596	.364
Males	.142	.544	.609	.249	.153	.540	.591	.388
Females	.083	.700	.684	.082	.086	.683	.660	.381
Income1	.121	.570	.624	.101	.141	.563	.617	.310
Income2	.058	.455	.520	.159	.068	.451	.505	.324
Younger	.095	.568	.586	.149	.103	.562	.574	.351
Older	.177	.611	.675	.190	.177	.609	.655	.372
Education1	.196	.650	.706	.218	.155	.577	.670	.296
Education2	.059	.545	.501	.084	.100	.448	.560	.303

The first line shows the squared multiple correlations (SMCs) for the Jordanian, final and alternative, models without the moderating effects. Although none of the demographics showed a moderating effect, the model explanation power increased in the alternative model.

Table 7-12 UK final and alternative SMCs

	Final model SMCs				Alternative model SMCs			
	WQ	EE	PE	IB use	WQ	EE	PE	IB use
Model	.116	.519	.614	.504	.107	.519	.610	.577
Males	.141	.581	.674	.554	.136	.582	.666	.580
Females	.043	.456	.524	.435	.037	.453	.523	.538
Income1	.169	.534	.716	.471	.153	.536	.713	.592
Income2	.022	.504	.397	.414	.022	.504	.396	.432
Younger	.022	.441	.644	.631	.018	.446	.636	.754
Older	.155	.571	.504	.443	.154	.571	.504	.444
Education1	.392	.515	.830	.692	.031	.591	.612	.816
Education2	.058	.583	.606	.678	.354	.518	.828	.689

In the UK models, despite gender and age's non-moderating effect, in the final UK model, they generated better explanation in the alternative model. Moreover, education and income, moderators for the UK sample, exhibited an improvement in explanatory power in the alternative model.

It is worth pointing out at this stage that the explanation power generated by the original UTAUT was produced using a different statistical approach. Venkatesh et al. (2003) used the PLS approach (the authors acknowledge using variance explained from PLS and comparing it to variance explained generated from using regression analysis produced in SPSS, both R^2 and adjusted R^2). The current study is using the SEM approach. There are differences between the two approaches. PLS aims to maximum variance explained (achieving high R^2). It produces parameters estimates

that maximize explained variance; therefore, the focus is more on prediction. SEM, on the other hand, tries to produce the observed covariances among measures, which enables an assessment of fit based on how well they are produced. Thus, SEM focuses more on how well a given theory is presented through how the structural model fits the observations. In other words, SEM is more focused on explanation (Gefen et al., 2000; Hair et al., 2006).

The original UTAUT model, established by Venkatesh et al. (2003), reported 70% (adjusted R^2) of variance explained by using the PLS (maximizing R^2) statistics. This study is using the SEM (maximizing the fit of covariances) statistical approach; thereby, the lower explanation power may arise partly from the difference between the two approaches.

7.8 Research Limitations

While this study has produced interesting findings, it does, however, have certain limitations. The study reports a limitation in respect of the findings, which may be limited to the populations, type of technology investigated or the context of online behaviour. The research was conducted within the specific domain of Internet banking. As a result, it is uncertain whether or not the findings can be applied more broadly to other forms of technology. Moreover, users in other countries may not resemble those of this study's populations. Another limitation is that the research was based on a cross-section survey, and the study contains the typical limitations associated with this kind of methodology (e.g., inability to uncover the exact nature of the theoretical linkages being investigated). Finally, this research included only factors specific to the UTAUT in addition to website design quality dimensions: technical, content, and appearance but did not test the universal set of antecedents or mediators such as those listed in section 7.9

7.9 Implications for Future Research

The results of this study have major implications. First, the extended UTAUT model is applicable to a non-western nation as to a western nation with varying degree of

explanatory power. The success of the incorporation of the website quality structure in the UTAUT model is evident from the results of the two countries' models. Nevertheless, there is still a need for more research, especially that the Jordanian model's power of explanation is not as high as the UK's, which indicates the need for examining other possible variables that might provide more power in explaining online behaviour in non-western countries. Second, the extended UTAUT model can be employed for explaining other online behaviour such as e-commerce or e-shopping. Third, the discussion revealed a need for further investigation into the role of experience in technology acceptance modelling, especially as an alternative model apparently produced better explanatory power when experience is linked directly to usage behaviour. Moreover, additional research designs might strengthen the understanding of the aggregated model. This study examined a cross-section of individuals within the Internet banking usage context. Other studies might study more controlled subsets of users and contexts in order to identify constraints and exceptions with respect to usage behaviour, website quality dimensions and the integrated model. It would also be beneficial to perform longitudinal studies that test the proposed relationships as they unfold over time. It would be advantageous to include other sets of antecedents or moderators such as system efficacy; and utilitarian versus hedonic aspects of website design quality.

Another area for future investigation is the impact of moderators such as gender, education, income, and age on usage behaviour. The current study results regarding the non-moderating effects of gender and age, suggest further investigation for situations where gender equality might be more prevalent. Prior research on technology acceptance behaviour has been focused on gender differences in the workplace. However, the prevalence of Internet usage on the personal level as well as the work level requires more research on gender as a determinant of usage behaviour in discretionary contexts. Likewise, further investigation is needed with respect to range of age that might be considered when examining technology acceptance behaviour, especially as the current generation of users are savvy, young and educated, whereas most research to date has focused on ranges within the work place (usually older). This suggests that more research with younger users and potential adopter is likely to be fruitful. Such demographic profiles would enable marketers to

appropriately target defined segments with respect to technology based products and services.

The UTAUT model is an aggregated form of eight dominant technology acceptance models. Considering it is a parsimonious model similar to Davis's TAM and acknowledging that researchers have worked diligently to extend TAM, the aggregated model deserves the same attentive work, especially since most current research is still focused on TAM compared to the UTAUT. The author encourages researchers to investigate the effects of the website quality aspects as antecedents to performance expectancy, effort expectancy and related usage behaviour. The current research models suggest ways in which this can be accomplished. Previous IS research examined the impact of system and information quality on system use and user satisfaction. Nevertheless, the dimensions of website quality examined in this current study are more broad and comprehensive than previously reported, opening up opportunities for future research.

Finally, in the light of observance of the current economic situation worldwide, at the time of writing, future research might well investigate "Trust" in more depth in studies within any financial context as this construct is expected to have gained in importance as a result of the financial market crisis.

7.10. Implications for Practice:

The advancement witnessed during the past few years in banking electronic services is by large the product of the shift into the e-services industry and the former retail boom. Consequently, the banking business is driven by one mantra: virtually all types and kinds of banking services to be made extendable across channels, including the Internet (Vat, n.d.). The current study focused on actual users of Internet banking in two countries. Customers hold the key to banks' survival and retaining current customers is less expensive than attracting new ones (Kotler & Armstrong, 2008). Through the findings of this research, decision makers within the financial sector can visualize the role of beliefs in forming actual usage behaviour. The findings showed that experienced users in both countries relied on their perceptions of performance expectancy and website design quality to make decisions about system usage. In

Jordan's model, the indirect impact of website quality perceptions was higher than the direct impact of performance expectancy; hence in this market, the implication for practitioners here is to highlight and improve expected benefits or gains of the online channel to induce more favourable attitude among current and potential users.

Likewise, in the UK's model, the benefits accumulated in perceptions of performance expectancy such as speed, time and efficiency are highly thought of by users, second only to their perceptions of web design quality. The implication here for practitioners is to build on these features and merits in attracting non-users and reinforcing the decision of actual users by maintaining and improving such characteristics of efficiency. Similarly, for the second determinant of usage, website quality perceptions, practitioners in both countries can benefit from the current findings and reinforce the users' decision by maintaining the quality features highly rated in each market and also communicate these features to induce potential users.

Web-designers can also make use of the current research focus; they can now assess website quality characteristics and reliably investigate their impact on banking online usage through the proposed connecting links. For example, the model helps designers understand which characteristics (e.g., technical, content, and appearance) have the most relative importance within the context of online banking e.g., navigation, access, and loading time from a technical view point; completeness, accuracy, preciseness from the content side; and readability, organization and attractiveness from the appearance facet. Accordingly, designers can look for changes in website layout and structure that can bring the most positive impact on usage. As users' perceptions evolve and change over time, so should systems and design too. The validation of the scale items of the website quality characteristics and their empirical linkage with usage behaviour (directly or indirectly through performance expectancy and effort expectancy) facilitates the examination of the effect of these characteristics on usage behaviour.

The current research has targeted actual users of Internet banking and reported the important features motivating their engagement in Internet banking option in both cultures. The same approach may also be applied to non-users in a quest for pointing out areas of design quality that need improvement or increased interactivity to overcome non-users' apprehension. By tailoring the banking options to cater for

users' features needs, banks can build on these results to exploit their contemporary virtual existence or improve it to effectively retain actual users, ensure their loyalty and attract potential ones.

Another benefit is gained through the reported findings with respect to demographics, in particular education and income, which demonstrated a moderating effect for the UK market. Such results can also be employed to tailor services and features of the online channel to match users' needs from different income levels.

7.11. Research Contribution

The contribution of this work lies in several areas of implementation and empirical analysis. First, in implementation, the study examined the viability of the UTAUT model, which was established in a western culture, in explaining a similar behaviour in a non-western culture. Second, the research implemented the model, which was established in an organizational context and applied it to a voluntary type of usage behaviour. Third, the research extended the UTAUT model to account for the online behaviour. The extension comprised decomposing the technical sources dimension of the facilitating condition construct of the UTAUT and replacing it with the website design quality structure variable. Fourth, the current work validated the UTAUT measures as developed by its authors, in addition to supporting the interrelationships among the key constructs in technology acceptance research.

The empirical analysis of this research contributed to knowledge in this area of research. First, the current work introduced the website quality construct as a higher-order structure. The higher-order structure has not been often employed in the technology acceptance literature. Most work published in respect to utilizing higher-order structures in the structural equation modelling techniques context comes from the Psychology discipline. Second, the current research introduced and validated the website quality structure for the two countries' samples. Third, the research utilized a structural equation analytical technique that permits a concurrent assessment of the adequacy of the measurement model and the conceptual model used to assess the target behaviour. Specifically, the research employed confirmatory factor analysis to validate the measurement model with the higher-order structure incorporated in the proposed research model. Fourth, studies only recently began examining invariance

using the mean and covariance structure analysis, which is an important advanced technique in answering questions related to group comparison or differences among culture and demographics such as gender. The current research utilized two types of group analysis using SEM technique: measurement and structural weights invariance using the covariance structure analysis, and the mean and covariance structure analysis, to examine the impact of moderators on the research model for both countries' models.

In general, the current research demonstrated that the proposed extension to the UTAUT model can be applicable to western and non-western cultures and demonstrated that the aggregated model of technology acceptance (UTAUT) is transferable and can be utilized to examine usage behaviour in diverse cultures such as Jordan's. Previous research has reported varying results in respect to TAM's transferability into other cultures. This research shows evidence that the aggregated technology model can be as effective in accounting for usage behaviour especially within the online context and the proposed model extension. The research also provided a theoretical understanding of how perceptions of the website quality (e.g., ease of navigation, access, clarity, accuracy, attractiveness, organization and readability) are considered important features of a bank's web design among users in both cultures. Additionally, the research exemplified the role website quality perceptions play and its impact on the beliefs structure in the UTAUT model, on one hand, and the ultimate system usage behaviour on the other hand.

While previous research has focused on TAM's transferability and although the aggregated model succeeded TAM, little research has utilized the UTAUT model or attempted testing its viability in different contexts than where it was established or for which it was tested. As a consequence, the current research contributes to theory by providing a new perspective to the UTAUT by exhibiting that previously established relationships among TAMs' constructs are also valid between the key constructs in the UTAUT and for both countries' models. This is considered a new addition to our understanding with respect to the unified theory of acceptance and use of technology. Finally, the current research expands knowledge in the area of IT adoption and usage

within developing nations' culture, specifically that of Jordan, while utilizing the parsimonious version of the UTAUT and its proposed extension.

7.12 Research Conclusions

In conclusion, the author presents here how the current research objectives have been realized in light of the previous elaborated discussion of results and the nature of the non-western location of the study.

The research proposed an extension to the UTAUT model that accounts for the utilization of the unified model within the online behaviour contexts. The proposed extension, website quality perceptions, multidimensional and interrelated nature as a concept has resulted in its introduction as a higher-order structure, which was successfully integrated into both countries' models with a small degree of variation in the UK model. The results showed that the website quality structure has an impact (directly and indirectly) on the online usage behaviour and that its total impact is greater than any other construct in both models. These results demonstrate the success of the proposed extension in achieving the objectives of this current work (research objectives two and three).

The primary focus of this research was to address the applicability of the UTAUT, which was established in a western culture or developed nations, to other non-western cultures or developing nations. The general perception is that most technologies that are designed and produced in developed countries are culturally-biased in favour of those developed countries' social and cultural systems (Hill et al., 1998). This bias may apprehend the applicability of these technologies when transferred to other culturally different societies. However, technologies advancements in the past fifteen years, since the commercialization of the Internet and the materialized benefits of the revolutionary communication technologies, made it practically impossible for businesses globally to disregard these advantages or eschew the Internet channel. Two points can be raised in favour of Jordan as a modern society. First, Jordan boasts a free market orientation with a dynamic and growing ICT environment following the telecommunication deregulation in the year 2000 and the full liberalization in 2004. The second point is the availability of modern reliable infrastructures recognized as

well-developed in the Middle East and North Africa region (MOICT Jordan, 2005) that enables the wide coverage of the market and initiates even more intense competition given the market size (e.g., currently there are five cell phone companies and more than ten ISP providers catering for less than six million people). The competitive pricing climate and the state initiative project, making ICT available for all, resulted in facilitating a countrywide embrace of communication technology.

Perhaps the advancement in the communication technology was the more readily transferable. If the world is becoming smaller because of the Internet and the telecommunications revolution, it is natural that information flowing freely changes Jordanians' perceptions and expectations. Therefore, where the digital divide is minimizing based on ICT distribution; it is acceptable that the UTAUT model be used for predicting technology acceptance in a non-western nation such as Jordan. This fulfils the first research objective.

As such, this work has added to the understanding of technology adoption within theories of technology acceptance research and in discretionary online behaviour contexts. The extended model provides an avenue to conceptualize how various web design quality choices might influence the overall website quality perceptions through the attributes of the four quality dimensions. This provides an approach for linking website quality perceptions to their ultimate effects on systems' effort and performance expectancy, and usage in the context of the Internet banking environment.

In summary, this work supports the application of the UTAUT in both a western and non-western culture, albeit subject to some reservations concerning the generalizability of the measurement weights and moderators' impact.

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Appendices

Appendix A: UK sample SPSS descriptive analysis

Computer knowledge

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid low	3	1.5	1.5	1.5
moderate	42	20.4	20.4	21.8
good	88	42.7	42.7	64.6
very good	73	35.4	35.4	100.0
Total	206	100.0	100.0	

Internet Knowledge

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid low	2	1.0	1.0	1.0
moderate	39	18.9	18.9	19.9
good	89	43.2	43.2	63.1
very good	76	36.9	36.9	100.0
Total	206	100.0	100.0	

Internet usage

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid less than 1 yr	12	5.8	5.8	5.8
1-2 yrs	28	13.6	13.6	19.4
more than 3 yrs	166	80.6	80.6	100.0
Total	206	100.0	100.0	

Daily usage

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid non	14	6.8	6.8	6.8
1-2 hrs	52	25.2	25.2	32.0
3-4 hrs	45	21.8	21.8	53.9
more than 4 hrs	95	46.1	46.1	100.0
Total	206	100.0	100.0	

Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid male	131	63.6	63.6	63.6
female	75	36.4	36.4	100.0
Total	206	100.0	100.0	

Marital Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid single	103	50.0	50.0	50.0
married	84	40.8	40.8	90.8
divorced	8	3.9	3.9	94.7
others	11	5.3	5.3	100.0
Total	206	100.0	100.0	

Age

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 31-40 yrs	63	30.6	30.6	30.6
20 & LESS	17	8.3	8.3	38.8
21-30	73	35.4	35.4	74.3
41-50	46	22.3	22.3	96.6
51-60	7	3.4	3.4	100.0
Total	206	100.0	100.0	

Education

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid high school	24	11.7	11.7	11.7
diploma	36	17.5	17.5	29.1
Bachelor	62	30.1	30.1	59.2
higher education	77	37.4	37.4	96.6
OTHERS	7	3.4	3.4	100.0
Total	206	100.0	100.0	

Occupation type

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid public sector	72	35.0	35.0	35.0
private sector	99	48.1	48.1	83.0
free lacing	4	1.9	1.9	85.0
Don't work	22	10.7	10.7	95.6
own business	9	4.4	4.4	100.0
Total	206	100.0	100.0	

Income

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid less 15 thousand	25	12.1	12.1	12.1
15- 24 thousand	46	22.3	22.3	34.5
25- 34 thousand	47	22.8	22.8	57.3
35 - 44 thousand	38	18.4	18.4	75.7
more 45 thousand	37	18.0	18.0	93.7
dont wish to give	13	6.3	6.3	100.0
Total	206	100.0	100.0	

Location

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Wembley	63	30.6	30.6	30.6
Centre London	65	31.6	31.6	62.1
Uxbridge.	78	37.9	37.9	100.0
Total	206	100.0	100.0	

Transactions & Balance Enquiries

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	12	5.8	5.8	5.8
sometimes	61	29.6	29.6	35.4
constantly	133	64.6	64.6	100.0
Total	206	100.0	100.0	

Statements

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	22	10.7	10.7	10.7
sometimes	73	35.4	35.4	46.1
constantly	111	53.9	53.9	100.0
Total	206	100.0	100.0	

Money transfer

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	44	21.4	21.4	21.4
sometimes	86	41.7	41.7	63.1
constantly	76	36.9	36.9	100.0
Total	206	100.0	100.0	

Bills

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	58	28.2	28.2	28.2
	sometimes	80	38.8	38.8	67.0
	constantly	68	33.0	33.0	100.0
	Total	206	100.0	100.0	

Credit cards

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	145	70.4	70.4	70.4
	sometimes	43	20.9	20.9	91.3
	constantly	18	8.7	8.7	100.0
	Total	206	100.0	100.0	

Cheque

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	134	65.0	65.0	65.0
	sometimes	57	27.7	27.7	92.7
	constantly	15	7.3	7.3	100.0
	Total	206	100.0	100.0	

Loans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	154	74.8	74.8	74.8
	sometimes	41	19.9	19.9	94.7
	constantly	11	5.3	5.3	100.0
	Total	206	100.0	100.0	

Travel & Insurance

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	156	75.7	75.7	75.7
	sometimes	43	20.9	20.9	96.6
	constantly	7	3.4	3.4	100.0
	Total	206	100.0	100.0	

Stock trade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	142	68.9	68.9	68.9
	sometimes	51	24.8	24.8	93.7
	constantly	13	6.3	6.3	100.0
	Total	206	100.0	100.0	

Appendix B: Jordan sample SPSS descriptive analysis

Computer knowledge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low	4	1.8	1.8	1.8
	low	28	12.5	12.5	14.3
	moderate	52	23.2	23.2	37.5
	good	86	38.4	38.4	75.9
	very good	54	24.1	24.1	100.0
	Total	224	100.0	100.0	

Internet Knowledge

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very low	3	1.3	1.3	1.3
	low	17	7.6	7.6	8.9
	moderate	56	25.0	25.0	33.9
	good	93	41.5	41.5	75.4
	very good	55	24.6	24.6	100.0
	Total	224	100.0	100.0	

Internet usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't use	3	1.3	1.3	1.3
	less than 1 yr	56	25.0	25.0	26.3
	1-2 yrs	53	23.7	23.7	50.0
	more than 3 yrs	112	50.0	50.0	100.0
	Total	224	100.0	100.0	

Daily usage

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	non	81	36.2	36.2	36.2
	1-2 hrs	84	37.5	37.5	73.7
	3-4 hrs	36	16.1	16.1	89.7
	more than 4 hrs	23	10.3	10.3	100.0
	Total	224	100.0	100.0	

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	135	60.3	60.3	60.3
	female	89	39.7	39.7	100.0
	Total	224	100.0	100.0	

Education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	high school diploma	26	11.6	11.6	11.6
	Bachelor	72	32.1	32.1	43.8
	higher education	100	44.6	44.6	88.4
	Total	26	11.6	11.6	100.0
	Total	224	100.0	100.0	

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	single	102	45.5	45.9	45.9
	married	93	41.5	41.9	87.8
	divorced	23	10.3	10.4	98.2
	others	4	1.8	1.8	100.0
	Total	222	99.1	100.0	
Missing	0	2	.9		
Total		224	100.0		

Occupation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	public sector	42	18.8	19.1	19.1
	private sector	126	56.3	57.3	76.4
	free license	37	16.5	16.8	93.2
	Don't work	15	6.7	6.8	100.0
	Total	220	98.2	100.0	
Missing	0	4	1.8		
Total		224	100.0		

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 and less	62	27.7	27.7	27.7
	26-30 yrs	87	38.8	38.8	66.5
	31-40 yrs	54	24.1	24.1	90.6
	41 yrs and more	21	9.4	9.4	100.0
	Total	224	100.0	100.0	

Income

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	300 JD and less	60	26.8	26.8	26.8
	301-500 JD	85	37.9	37.9	64.7
	501-800 JD	48	21.4	21.4	86.2
	801 JD and more	30	13.4	13.4	99.6
	dont wish to give	1	.4	.4	100.0
	Total	224	100.0	100.0	

Location

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid zarka	58	25.9	25.9	25.9
Amman	72	32.1	32.1	58.0
Irbid	5	2.2	2.2	60.3
Salt	87	38.8	38.8	99.1
other	2	.9	.9	100.0
Total	224	100.0	100.0	

Transactions and Balance Enquiry

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	50	22.3	22.3	22.3
sometimes	68	30.4	30.4	52.7
constantly	106	47.3	47.3	100.0
Total	224	100.0	100.0	

Statements

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	46	20.5	20.5	20.5
sometimes	88	39.3	39.3	59.8
constantly	90	40.2	40.2	100.0
Total	224	100.0	100.0	

Money transfer

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	81	36.2	36.3	36.3
sometimes	79	35.3	35.4	71.7
constantly	63	28.1	28.3	100.0
Total	223	99.6	100.0	
Missing 0	1	.4		
Total	224	100.0		

Billing

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid rarely	119	53.1	53.4	53.4
sometimes	62	27.7	27.8	81.2
constantly	42	18.8	18.8	100.0
Total	223	99.6	100.0	
Missing System	1	.4		
Total	224	100.0		

Credit Cards

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	150	67.0	67.0	67.0
	sometimes	51	22.8	22.8	89.7
	constantly	23	10.3	10.3	100.0
	Total	224	100.0	100.0	

Cheque

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	139	62.1	62.1	62.1
	sometimes	61	27.2	27.2	89.3
	constantly	24	10.7	10.7	100.0
	Total	224	100.0	100.0	

Loans

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	168	75.0	75.0	75.0
	sometimes	35	15.6	15.6	90.6
	constantly	21	9.4	9.4	100.0
	Total	224	100.0	100.0	

Assurance and travel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	166	74.1	74.1	74.1
	sometimes	36	16.1	16.1	90.2
	constantly	22	9.8	9.8	100.0
	Total	224	100.0	100.0	

Stock trade

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rarely	157	70.1	70.1	70.1
	sometimes	43	19.2	19.2	89.3
	constantly	24	10.7	10.7	100.0
	Total	224	100.0	100.0	

**Brunel University
Business and Management School**

I am a PhD research student at Brunel University-West London conducting a study to investigate consumers' behaviour with respect to online banking. The research title is:

Analyzing the Use of the Unified Theory of Acceptance and Use of Technology (UTAUT) Model in Explaining Internet Banking Adoption.

The questionnaire designed for this study consists of four parts. The first part assesses the respondent's computer and Internet experience while the second part collects data about the respondent's classifications. The third part assesses perceptions about Internet banking concepts and banks' website quality and their effect on actual usage of the service. The fourth part measures the actual usage of Internet banking services.

If you use Internet banking services, I would be very grateful if you fill out this questionnaire.

Your participation is voluntary. If you do not wish to participate, simply discard the questionnaire. Responses will be completely anonymous; your name will not appear anywhere on the survey. Completing and returning the questionnaire constitutes your consent to participate.

All of the information you kindly provide will be treated as completely confidential and it will not be possible for anyone to identify the information you supply.

The questionnaire will only take 10-15 minutes of your time to fill out. Your corporation is highly appreciated and will contribute to the success of this study. If you have any questions or concerns, please contact me k.al-qeisi@brunel.ac.uk or my supervisor Charles.Dennis@brunel.ac.uk

Thank you

Kholoud Al-Qeisi

Do you use the Internet for banking? Yes No

If your answer is **NO**, thank you for your time, you can stop now.

If your answer is **YES**, please proceed to the second question.

Part One: Computer and Knowledge and Experience (Please tick the box that matches your status)

1- How do you describe your general computer knowledge?

very poor poor moderate good very good

2- How would you describe your Internet knowledge?

very poor poor moderate good very good

3- How long have you been using the Internet?

Don't use less than 1yr 1- 2 yrs More than 2 yrs

4- How often do you use the Internet per day?

Don't use 1-2 hrs 3- 4 hrs More than 4 hrs

Part Two: Classification questions (Please tick the appropriate answer)

5-Gender: Female Male

6- Marital Status: Single Married Divorced / Separated other

7- Age: 20 or under 21- 30 31- 40 41 -50 51- 60 61 +

8- Highest level of education:

High school & below diploma bachelor higher education other Pls. state -----

9- Type of employment:

Not working Public sector Private Sector free lancing my own business

10- Occupation (Please specify, e.g. "University Lecturer in Chemical Engineering")

10a- your occupation -----

10b- Occupation of the main income earner in the home (if different from 10a)-----
--

11- Income bracket of your household:

Under £15,000 £15,000 – 24,000 £25,000 -34,000 £35,000 – 44,000 £45,000
+

12- The country that best describes your culture is -----

--Amplify if relevant, e.g. UK-AfroCaribbean, UK-Asia, UK-Jewish.

13- Which bank provides your Internet banking service? Please specify -----

--

Part Three:

14- Using a rating scale of 1 to 5, please circle the number that indicates your level of disagreement/agreement with the following statements:

No	Statements					
Performance Expectancy		Strongly disagree			Strongly agree	
1	I find Internet banking useful	1	2	3	4	5
2	Using Internet banking enables me to accomplish banking tasks more quickly	1	2	3	4	5
3	Using internet banking increases the effective use of my time in handling my banking tasks	1	2	3	4	5
4	Using internet banking increases the quality of my banking services output at minimal efforts.	1	2	3	4	5
Effort Expectancy		Strongly disagree			Strongly agree	
5	My interaction with Internet banking is clear and understandable	1	2	3	4	5
6	I am skilful at using banking Internet	1	2	3	4	5
7	Learning to use the Internet banking system is easy for me	1	2	3	4	5
8	I find it easy to get the Internet banking system to do what I want it to do	1	2	3	4	5
Social Influences		Strongly disagree			Strongly agree	
9	People who are important to me think that I should use Internet banking facilities	1	2	3	4	5
10	People who influence my behaviour think I should use the Internet banking.	1	2	3	4	5
11	The bank staff are helpful in the use of Internet banking system.	1	2	3	4	5
12	The branch encourages the use of Internet channel	1	2	3	4	5
Technical Quality						
The bank's website:		Strongly disagree			Strongly agree	
13	looks secure for carrying out transactions	1	2	3	4	5
14	looks easy to navigate	1	2	3	4	5
15	has adequate search facilities	1	2	3	4	5
16	has valid links (hyperlinks)	1	2	3	4	5
17	can be personalized or customized to meet my needs	1	2	3	4	5
18	has many interactive features (e.g. online application for bank services)	1	2	3	4	5
19	is easy to access	1	2	3	4	5
20	pages load quickly	1	2	3	4	5
General Content Quality		Strongly disagree			Strongly agree	
21	The content of the bank's website is useful	1	2	3	4	5
22	The content of the bank's website is complete	1	2	3	4	5

23	The content of the bank's website is clear	1	2	3	4	5
24	The content of the bank's website is current	1	2	3	4	5
25	The content of the bank's website is concise	1	2	3	4	5
26	The content of the bank's website is accurate	1	2	3	4	5
Specific Content Quality		Strongly disagree		Strongly agree		
27	On the bank's website, I can find contact information (e.g. email addresses, phone numbers, etc.)	1	2	3	4	5
28	on the bank's website, I can find general bank information (e.g. goals, owners)	1	2	3	4	5
29	On the bank's website, I can find details about their products and services	1	2	3	4	5
30	On the bank's website, I can find information related to customer policies (e.g. privacy and dispute details)	1	2	3	4	5
31	On the bank's website, I can find information related to customer services	1	2	3	4	5
Appearance Quality		Strongly disagree		Strongly agree		
32	The bank website looks attractive	1	2	3	4	5
33	The bank website looks organized	1	2	3	4	5
34	The bank website is easy to read	1	2	3	4	5
35	The bank website uses appropriate colours	1	2	3	4	5
36	The bank website uses multimedia features properly	1	2	3	4	5

Part Four: Actual use of Internet Bank (please tick the box that matches your status)

13- How long have you been using the Internet banking facilities?

Under 1 year 1-2 years 3- 4 years more than 4 years

14- On weekly basis, how many times do you use Internet banking?

Not at all once a week 2-3 times more than 3 times

15- How frequently do you use your Internet banking for the following service:

Services	Frequency	Rarely	Occasionally	Constantly
Transactions & Balance enquiries				
Banking Statements				
Money Transfer				
Paying Bills				
Requesting Credit Card				
Requesting Cheque Book				
Applying for a Loan				
Travelling & Insurance Services				
Stock Market Trade				

Other (pls. specify)-----			
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Thank you for your time & help

بسم الله الرحمن الرحيم

عزيزي المستجيب :

انا طالبة في برنامج الدكتوراة في كلية ادارة الأعمال لدى جامعه برونييل – لندن ، و أعمل تحت اشراف الدكتور تشالز دينس. أود أن ادعوك مشكورا للمشاركة في بحثي من خلال تعبئة الاستبيان المرفق.

مشروع الدراسة بعنوان: استخدام النموذج الموحد لقبول و استخدام التقنية في تفسير تبني عملاء البنوك لخدمه البنك عبر الانترنت.

Utilizing the use of the Unified Theory of Acceptance and Use of Technology (UTAUT) to explain the adoption of Internet banking.

هذا النموذج تم تطويره في المجتمع الصناعي وأحد أهداف الدراسة هو البحث عن مدى انطباق النموذج على المجتمعات الغير صناعية مثل المجتمع الأردني. كذلك تهدف الدراسة الى تحديد العوامل الأكثر تأثيرا من حيث الأهمية في تفسير هذا السلوك (استخدام البنك عبر الانترنت) لدي عملاء البنوك الأردنية و مقارنة هذه العوامل مع تلك التي تؤثر في سلوك العملاء لدى البنوك في المملكة المتحدة.

إن تعبئة الاستبيان لن تستغرق من وقتك أكثر من 10-15 دقيقة و تعاونك هو موضع تقدير وامتنان ، علما بأن المعلومات التي سوف تزودنا بها سوف تعامل بسرية تامة و لن تستخدم سوى لأغراض البحث العلمي.

أن كانت لديك أية تحفظات أو استفسارات أرجو أن لا تتردد في الاتصال بي عبر البريد الالكتروني:

أو الاتصال بمشرفي عبر بريده الالكتروني k.al-qeisi@brunel.ac.uk

Charles.Dennis@brunel.ac.uk

الباحثة

خلود القيسي

جامعة برونييل - لندن

Internet Banking عبر الانترنت - هل أنت مستخدم حالي أو سابق لخدمات البنك الالكتروني

□ نعم □ لا
إذا كانت اجابتك لا . شكرا على وقتك و يمكنك الآن أن تتوقف عن ملأ الاستبيان

أما إذا كانت اجابتك نعم أرجو المتابعة في قراءة و ملأ الاستبيان
(أرجو وضع اشارة X على الإجابة الأقرب لك مع الأخذ بعين الاعتبار أن تقوم باختيار اجابة واحدة فقط لكل سؤال).

الجزء الاول: معلوماتك و معرفتك بالحاسب

1. كيف تقدر مستوى معرفتك بالحاسب (الكمبيوتر) بشكل عام؟

□ ضعيفة جدا □ ضعيفة □ متوسطة □ جيدة □ جيدة جدا

2. كيف تقدر معرفتك بالانترنت ؟

□ ضعيفة جدا □ ضعيفة □ متوسطة □ جيدة □ جيدة جدا

3. متى بدأت في استخدام الانترنت؟

□ لا استخدم □ أقل من سنة □ 1- 2 سنة □ أكثر من سنتان

4. كم من الوقت تقضي متصفحاً للانترنت يوميا؟

□ لا أستخدمة بشكل يومي □ 1-2 ساعة □ 3-4 ساعات □ أكثر من 4 ساعات

الجزء الثاني: المعلومات الديموغرافية

5. الجنس: □ ذكر □ أنثى

6. أعلى مؤهل علمي: □ توجيهي فأقل □ دبلوم □ بكالوريا □ تعليم عال

7. الحالة الإجتماعية: □ أعزب □ متزوج □ مطلق □ غير ذلك

8. الوظيفة الحالية: □ قطاع عام □ قطاع خاص □ أعمال □ لا أعمل حالياً

9. العمر: □ 25 سنه فأقل □ 26-30 سنة □ 31-40 سنة □ 41 سنة +

10. الدخل الشهري (د.ر.): □ 300 فأقل □ 301-500 □ 501-801 □ فأكثر

11. منطقة السكن: الزرقاء عمان اربد غيرها
اذكر

رجاءً -----

الجزء الثالث: باستخدام مقياس من 1- 5 أرجو وضع دائرة حول الرقم الذي يعبر عن مدى موافقتك أو عدم موافقتك على العبارات التالية:

(www) يشير مصطلح البنك عبر الانترنت إلى الخدمات البنكية المقدمة عبر موقع البنك على صفحة الويب

الرقم	العبارات			
	<table border="1"> <thead> <tr> <th>أوافق بشدة</th> <th>لا أوافق بشدة</th> <th>الأداء المتوقع</th> </tr> </thead> </table>	أوافق بشدة	لا أوافق بشدة	الأداء المتوقع
أوافق بشدة	لا أوافق بشدة	الأداء المتوقع		
1.	أجد البنك عبر الانترنت مفيدا في حياتي			
2.	البنك عبر الانترنت يمكنني من اتمام المعاملات البنكية بشكل أسرع			
3.	البنك عبر الانترنت يمكنني من انجاز المعاملات البنكية بوقت أقصر			
4.	البنك عبر الانترنت يزيد من قدرتي على الاستفادة من الخدمات البنكية بشكل أفضل و بتكلفة أقل.			
	<table border="1"> <thead> <tr> <th>أوافق بشدة</th> <th>لا أوافق بشدة</th> <th>الجهد المتوقع</th> </tr> </thead> </table>	أوافق بشدة	لا أوافق بشدة	الجهد المتوقع
أوافق بشدة	لا أوافق بشدة	الجهد المتوقع		
5.	نظام البنك عبر الانترنت واضح و مفهوم تعاملي مع			
6.	تعاملي مع نظام البنك عبر الانترنت يتصف بالمهارة			
7.	القدرة على تعلم نظام البنك عبر الانترنت أمرا سهلا بالنسبة لي			
8.	من السهل تطبيق ما أريد من معاملات بنكية من خلال البنك عبر الانترنت.			
	<table border="1"> <thead> <tr> <th>أوافق بشدة</th> <th>لا أوافق بشدة</th> <th>التأثير الاجتماعي</th> </tr> </thead> </table>	أوافق بشدة	لا أوافق بشدة	التأثير الاجتماعي
أوافق بشدة	لا أوافق بشدة	التأثير الاجتماعي		
9.	الأفراد المهمين بالنسبة لي يعتقدون أنه يجب أن استخدم البنك عبر الانترنت			
10.	الأفراد الذين لهم تأثيراً على قراراتي يعتقدون أنه يجب أن أستعين بخدمات البنك عبر الانترنت.			
11.	موظفي البنك يقدمون المساعدة للعملاء في استخدام البنك عبر الانترنت			
12.	فرع البنك يشجع العملاء على استخدام البنك عبر الانترنت.			
	<table border="1"> <thead> <tr> <th>أوافق بشدة</th> <th>لا أوافق بشدة</th> <th>الجودة المرتبطة بالجانب التقني لموقع البنك على الانترنت</th> </tr> </thead> </table>	أوافق بشدة	لا أوافق بشدة	الجودة المرتبطة بالجانب التقني لموقع البنك على الانترنت
أوافق بشدة	لا أوافق بشدة	الجودة المرتبطة بالجانب التقني لموقع البنك على الانترنت		
	www: موقع البنك على شبكه الانترنت			
13.	يمتاز بالحماية و الأمان لاجراء المهام البنكية المرغوبة			
14.	يسهل تصفحه			
15.	يمتاز بتوفر خيار للبحث داخل الموقع			
16.	فعالة Hyper Links بمتاز بوجود وصلات انتقال			
17.	يمكنني من تحديد المواصفات على الصفحة بما يتناسب مع احتياجاتي			
18.	يتمتع بتوفر تطبيقات فاعلة (على سبيل المثال: ملأ طلبات الخدمات البنكية عبر الانترنت مثل بطاقه الائتمان أو دفتر الشيكات أو غيرها)			
19.	يسهل الوصول إليه			
20.	يمتاز بسرعه تحميل صفحاته.			
	<table border="1"> <thead> <tr> <th>أوافق بشدة</th> <th>لا أوافق بشدة</th> <th></th> </tr> </thead> </table>	أوافق بشدة	لا أوافق بشدة	
أوافق بشدة	لا أوافق بشدة			

					الجودة المرتبطة بالمحتوى العام لموقع البنك عبر الانترنت
5	4	3	2	1	21. محتوى موقع البنك عبر الانترنت مفيدا بشكل عام
5	4	3	2	1	22. محتوى موقع البنك عبر الانترنت متكامل
5	4	3	2	1	23. محتوى موقع البنك عبر الانترنت واضح
5	4	3	2	1	24. محتوى موقع البنك عبر الانترنت محدث (يمتاز بالتحديث المستمر)
5	4	3	2	1	25. محتوى موقع البنك عبر الانترنت يتمتع بالايجاز (يحقق الهدف منه)
5	4	3	2	1	26. محتوى موقع البنك عبر الانترنت يمتاز بالدقة في المعلومات
أوافق بشدة					لا أوافق بشدة
					الجودة المرتبطة بالمحتوى المتخصص لموقع البنك عبر الانترنت
5	4	3	2	1	27. أستطيع أن أجد على الموقع المعلومات المتعلقة بالاتصال مع البنك (على سبيل المثال: عنوان البريد الالكتروني و أرقام الهواتف)
5	4	3	2	1	28. أستطيع أن أجد على الموقع معلومات عامة حول البنك (على سبيل المثال: المالكون و أهداف البنك)
5	4	3	2	1	29. أستطيع أن أجد على الموقع تفاصيل حول المنتجات و الخدمات التي يقدمها البنك
5	4	3	2	1	30. أستطيع أن أجد على الموقع معلومات متعلقة بسياسة البنك فيما يتعلق بعملائه (على سبيل المثال: سرية المعلومات و فض المنازعات)
5	4	3	2	1	31. أستطيع أن أجد على الموقع معلومات خاصة بخدمات العملاء
أوافق بشدة					لا أوافق بشدة
					الجودة المرتبطة بالخصائص الشكلية لموقع البنك عبر الانترنت
5	4	3	2	1	32. موقع البنك عبر الانترنت يبدو جذابا
5	4	3	2	1	33. موقع البنك عبر الانترنت يبدو منظما
5	4	3	2	1	34. موقع البنك عبر الانترنت سهل القراءة
5	4	3	2	1	35. موقع البنك عبر الانترنت يستخدم ألوانا مناسبة
5	4	3	2	1	36. multi media موقع البنك عبر الانترنت يستخدم الوسائط المصورة بشكل ملائم

الاستخدام الفعلي للبنك عبر الانترنت:

13. كم مضي على استخدامك لخدمات البنك عبر الانترنت؟

أقل من سنة 1- 2 سنة 3- 4 سنوات أكثر من 4 سنوات

14. بشكل أسبوعي، كم مرة تستخدم البنك عبر الانترنت؟

لا أستخدم مرة واحدة 2- 3 مرات 4 مرات فأكثر

15. كيف يكون استخدامك للبنك عبر الانترنت للقيام بالمهام البنكية التالية:

التكرار الخدمات	نادرا	احيانا	باستمرار
الاستفسار حول الرصيد و الحركات على الحسابات			
مشاهدة كشوف الحسابات			
تحويل الأرصدة			
دفع الفواتير			
طلب بطاقات الائتمان			
طلب دفاتر الشيكات			
التقدم بطلبات القروض			
خدمات التأمين و السفر			
الاتجار في سوق الأسهم			
أخرى (ارجو ذكرها) -----			

تقبلوا فانق الشكر و الاحترام