Culture, Demography and Individuals' Technology Acceptance Behaviour: A PLS Based Structural Evaluation of an Extended Model of Technology Acceptance in South-Asian Country Context

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By

Muhammad Sharif Abbasi
BCS (Hons) Computer Sciences

Information Systems Evaluation and integration group (ISEing)

Brunel Business School,
Brunel University, London

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Abstract

The models that predict the factors of individuals' acceptance behaviour are predominantly based on a technology acceptance model (TAM) or the TAM's conceptualisation. Although the TAM has a parsimonious structure and good explanatory power across the time, population and context, it is still criticised by a number of researchers. Categorically, it is criticised due to: inherent 'cultural bias' that limits its generalisability across cultures (national to organisational level); its underlying conceptualisation of predicting acceptance behaviour solely based on an 'individual-based reactions' that limits its applicability over the group's effect (normative and social influence); and finally, due to its presupposition to examine the effect of 'external variables' through the only mediation effect of beliefs' perceived ease of use (PEOU) and perceived usefulness (PU) that limits its ability to be extended beyond its boundaries by adding further factors directly or indirectly affecting intention behaviour (BI).

To overcome mentioned limitations, an extended technology acceptance model to suit a developing country context is presented. The model attempted to delineate the direct relationship between behavioural beliefs, normative and control beliefs, management support beliefs, and task-specific beliefs towards acceptance intention and usage. In addition, the model examined the overlooked moderating impact of demographic and situational variables (age, gender, organisational type, academic position, educational level, experience usage and voluntariness) and cultural dimensions (masculinity-femininity, individualism-collectivism, power distance, and uncertainty avoidance) on indirect relations predicting acceptance behaviour.

This study used a quantitative methodology to investigate the correlational paths. Using a cross-sectional survey method, data was collected from 504 academics working in 25 public and private higher educational institutions in Pakistan. Overall response rate was 53.9% (i.e. 504 out of 935). After data-screening, the final model was tested with 380 subjects. Hypothetical relationships were examined using structural equation modelling (SEM) based on the partial least squares (PLS) at the first stage, and with analysis of moment structures (AMOS) at the second stage. The indirect exploratory effect of the moderators was examined using multi-group analysis (MGA) method.

The study findings indicate that the extended model achieved an acceptable fit with the data and most of the hypothetical paths were significant. Specifically, in the direct relationships, out of 20 paths representing 12 hypotheses, 11 were supported leaving 9 as unsupported. The highest variance explained by the independent variables towards dependent variables was quite similar in PU and BI (R^2=26% in both using PLS; R^2=34% in BI and 33% in PU using AMOS). The highest significant path was perception of usefulness, followed by academic tasks and resource facilitations towards intention; and perception of ease of use, subjective norms, and institute support towards perception of usefulness.

The findings of moderating factors i.e., demographics revealed that subjects younger in age, female in gender and bachelor degree in education were influenced by the perception of ease of use, and normative beliefs; control beliefs were influenced by the organisation being private; management support at institute level was more influential in private organisations with mandatory settings; and the effect of perception of usefulness and normative beliefs was decreased with the increased experience. From the cultural perspective, the highly sensitive path was between normative beliefs and the perception of usefulness, so that the effect was stronger for subjects who were feminine in nature, collectivist in society, and high on power distance. Demographic factor academic-position and cultural dimension uncertainty avoidance did not produce any moderation effect. Finally, based on the findings, limitations and implications for theory and practices are devised.

Dedication

This research which is accomplished with the only Grace of Al-Mighty Allah (swt), His (swt) Prophet Muhammad (P.B.U.H) and Family of Prophet (P.B.U.H) is dedicated to my parents, my grandmother, my three beloved brothers, three loving sisters, and a beautiful wife. Without their encouragement and support I would not be able to achieve anything today. Also, I dedicate my work to my dearly departed two uncles, two cousins and two friends whom I sadly lost during my Ph.D. studies. May Allah (swt) rest their soul in heaven (Amin).

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Author's Declaration

I, Muhammad Sharif Abbasi, declare that the ideas, research work, analyses and conclusions reported in my PhD thesis *Culture, Demography and Individuals' Technology Acceptance Behaviour: A PLS Based Structural Evaluation of an Extended Model of Technology Acceptance in South-Asian Country Context* are entirely my effort, except where otherwise acknowledged. Also, I certify that this thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work.

Publications associated with this thesis

1. **Abbasi, M. S**. (2009), *Acceptance of Information Technology in Under-Developing Countries: Empirical Evidence of Internet Usage within the Academics of Pakistan Higher Education Commission (HEC) System,* Brunel Business School Annual Symposium, Brunel University, 23-24 March.
2. **Abbasi, M. S.** (2010), *Determinants of Social and Institutional Beliefs about Internet Acceptance within Developing Country's Context: A Structural Evaluation of Higher Education System in Pakistan,* Brunel Business School Annual Symposium, Brunel University **(Best Overall Paper).**

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3. **Abbasi, M. S.,** Irani, Z. & Chandio, F.H. (2010), *Determinants of social and institutional beliefs about internet acceptance within developing country's context: A structural evaluation of higher education systems in Pakistan*", (Revised version of Brunel Business School Symposium), Proceedings of the European and Mediterranean Conference on Information Systems, Abu Dhabi, UAE, 12-13 April 2010 (**Best Overall Paper**). http://bura.brunel.ac.uk/handle/2438/4304
4. **Abbasi, M. S.,** Chandio F. H., Soomro A. F, Shah, F. (2011), *Social influence, voluntariness, experience and the internet acceptance: An extension of technology acceptance model within a south-Asian country context*, Journal of Enterprise Information Management, Vol. 24 Iss: 1, pp.30 - 52.
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7. **Abbasi, M. S.,** Irani, Z., (2011), *Culture and individual's acceptance behaviour: A PLS based multi-group evaluation of Power Distance and Individualism-Collectivism,* Information and Management (paper submitted).

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Chapter 1

Introduction

1.1. Precursors and rationales of the research

Over the past couple of decades there has been a growing demand for information technology (IT) and specifically Internet[1] services in small-medium and large multinational organisations. Organisations seem to be compelled to invest a significant amount of capital into IT and Internet services. In turn, IT and the Internet enable these organisations to remain connected with their global counterparts and perform daily operations ranging from the routine to the tactical (Applegate et al., 1996; Srite & Karahanna, 2006). Realising its importance, according to the U.S. Department of Commerce's census, 50% of new capital investment is now being allocated to IT research and implementation projects (Westland & Clark, 2000). As a result, IT and the Internet is becoming pervasive and is considered to be a key contributor to economic growth (e.g., Morris et al., 2005). For instance, Jorgenson & Motohashi (2005), in a comparative study between the U.S. and Japan from the years 1973 to 2003, found that investment in IT played an important role in both countries' economic growth. In Japan the growth in gross domestic product (GDP) increased to 2% in 1995 with a consistent rise of 0.2% annually. At an individual-level, the importance in particular of Internet usage can be seen from the recent survey conducted by the International Telecommunication Union (ITU) in 2009. According to this, currently one in four people is an Internet user around the world (ITU, 2009).

Despite significant investment in IT and its indisputable importance in organisations and everyday life, in efforts to apply new IT innovations, a number of projects are still being reported as failures. Landauer (1995) reported that in the U.S., about half of the IT systems implemented are either underused or have not been used at all. Out of many, one specific example is the Internal Revenue Service (IRS) project, which failed to keep safe thousands of significant documents electronically, and resulted in a loss of about $4 billion of

[1] The Internet is one of the services provided by information technology (IT). In the context of the study, it is further specified only in the educational context (i.e. academic use- teaching and research, and in non-academic use: administrative and socialization). Therefore literature and discussion on IT acceptance indirectly supports Internet acceptance at a general level, and in the educational context at specific level..

taxpayers' money (Johnston, 1997). Such drastic cases in IT project alarmed organisations to re-think and revise their policies to take decisions in IT investment. Researchers of information system structures and acceptance greatly emphasised the need to understand individuals' inherent perceptual behaviour, which might appear differently across the cultures (ranging from individuals to organisation, and organisations to national) (e.g., Srite & Karahanna, 2006; Karahanna et al., 2005; Straub et al., 1997) and/or across the personal and demographic characteristics (e.g., Agarwal & Prasad, 1999; Venkatesh & Morris, 2000). Morris et al. (2005, p.96) proposed that, for successful IT implementation, project managers must prioritise individuals' needs and expectations over and above the system designers.

Realising the impact of an individual's perceptual behaviour in successful IT implementation, several intention-based theoretical models have been proposed to predict cognitive acceptance behaviour. In this line of research, the technology acceptance model (TAM) (Davis, 1989; Davis et al., 1989), TAM2 (Venkatesh & Davis, 2000), theory of reasoned action (TRA) (Ajzen & Fishbein, 1980), the diffusion of innovation theory (DOI) (Rogers, 1995), theory of planned behaviour (TPB) (Ajzen, 1991) and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003) are noteworthy theoretical models that, in information system literature, predicted individuals' acceptance behaviour and persuaded them to adopt it. From this stream of theoretical models, the TAM has emerged as a robust theoretical model due to its parsimonious structure and acceptable explanatory fit (Venkatesh & Bala, 2008). The TAM posits that behavioural beliefs, i.e., perceived usefulness (PU) and perceived ease of use (PEOU) affect acceptance intention (BI) and usage behaviour (BU) (Davis, 1989; Davis et al., 1989).

However, through extensive replications of the original TAM and TAM's extensions, the literature suggests some limitations of both the TAM and the models based on its conceptualisations (e.g., Venkatesh, 2000; Taylor & Todd, 1995a; Venkatesh et al., 2007) with one of many being cultural bias (Straub et al., 1997; Abbasi et al., 2010; Rose & Straub, 1998; Bagozzi, 2007). For instance, Straub et al. (1997) examined the TAM in the context of three countries i.e., Japan, Switzerland and U.S, and found similar variance (R^2=10%) explained in behavioural usage in the U.S. and Swiss sample but very different variance in the Japanese sample context i.e., only 1%. The results of Straub et al. (1997) were expected because Davis et al. (1989), at the time of the TAM development, did not considered cultural bias within the model.

It is noted that, generally, studies based on the TAM or its conceptualisations are restricted to North America and Western countries and, more specifically, to a single country such as the U.S. (e.g., Venkatesh & Morris, 2000; Venkatesh et al., 2004), which limits their generalisablity and reliability across the different cultures. However, recognising the ongoing drive of globalisation, a few notable studies have been carried out outside the U.S on, for example: e-commerce and e-service (Pavlou & Chai, 2002; Choi & Geistfield, 2004; Jarvenpaa & Leidner, 1999), Internet banking (Shih & Fang, 2004; Alsajjan & Dennis, 2010), broadband Internet use and adoption (Oh et al., 2003; Choudrie & Lee, 2004; Khoumbati et al., 2007), healthcare (Wu et al., 2007), and academic and email use (Straub et al., 1997; Hu et al., 2003; McCoy et al., 2007). Previous studies outside the U.S. tended to generalise their results by discoursing similarities and differences between the native country's cultural indices proposed by Hofstede (1980) with the studies conducted in the U.S. Surprisingly, most of these studies did not directly incorporate and measure cultural dimensions (e.g., Straub et al., 1997), and hence, this leaves a gap in understanding country-level cultural differences[2] and, more importantly, individual-level cultural differences that, according to Srite & Karahanna (2006), are held differently even within same country.

Apart from the cross-cultural differences at a national-level, diversities within intra-culture (within the same nation, but in different organisations or groups) are also identified (Hofstede, 1994; Srite & Karahanna, 2006), however, these have rarely been investigated in IT acceptance literature (Honold, 1999). A reason behind the lack of research in this domain is consistent with the underlying conceptualisation of the TAM and its extensions. The TAM presupposes that decisions to accept and usage are initiated through the 'individual reactions' (Venkatesh et al., 2003, p.427), and hence apparently overlooks the importance of the group, cultural and social aspects when making acceptance decisions. It may be argued that, in a later extension of TAM normative beliefs 'social pressure' was introduced to overcome these limitations and enhance the acceptance with reference to the group influence (e.g., Moore & Banbast, 1991; Venkatesh & Davis, 2000). However, in reality, examining this limited impact of social group on individuals' interpersonal intentions was not enough to predict the effect of the groups itself (Bagozzi, 2007). This is the reason that most of the studies applying/relaying on the TAM showed mixed results

[2] It is assumed that, with respect to the time elapsed (30 years), Hofstede's dimensions score is not stable enough to generalise the results to the present time (see McCoy et al., 2005; McSweeney 2002).

when normative beliefs were examined to predict the acceptance intentions (e.g., Venkatesh & Davis, 2000; Mathieson, 1991).

Partly because of the above limitation, the rationale behind incorporating the significance of the group-level cultural influence[3] in the present study is consistent with human behaviour that cannot be best characterised by an individual's isolated actions (Bagozzi, 2007). It is commonly accepted that individuals more often perform some act in response to social pressure that might appear separately/jointly from friends, family members, colleagues or agents of organisations (Bagozzi, 2007a; Kelman, 1958). In summary, decisions to accept any technology need an equal consideration of the individual's prerequisites as well as the groups of which one is member. In this research, beside the normative influence (widely recognised in previous literature), emphasis is specifically given to the influence of organisational factors (management support at different levels). The importance of these factors is imperative (e.g., Lewis et al., 2003). For instance, Robey (1979) warned that management information systems (MIS) can and do fail in situations where organisational factors are ignored by the system designer. In a similar line of research, Tan & Toe (1998) found that organisational constructs (technology policies and top management support), technological constructs (relative advantages and compatibility), and environmental constructs (information intensity, competitive pressure and government support) produced a significant impact on individuals' Internet adoption behaviour.

Finally, consistent with the argument at the start of the section which advocates that successful IT implementation decisions need a user-centred approach (individuals' or end-users expectation-based), it is argued that models predicting individuals' acceptance behaviour (specifically the TAM and its extensions) remain futile to examine the effect of external factors in establishing intention. Rationally, the TAM, to keep its parsimony intact, postulates that an effect of external variable(s) on intentions is only possible with the mediated impact of PU and PEOU (Davis et al., 1989), and thus overlooks the direct link (predictor) or indirect link (moderator/mediator) between essential external beliefs and intention to establish acceptance behaviour. Despite the fact that parsimony (favouring a simple model), to some extent, is considered to be desirable if the model fails to predict expected substance (Venkatesh et al., 2003; Taylor & Todd, 1995b), seemingly it attracted a number of researchers (e.g. Venkatesh & Davis, 2000; Venkatesh & Bala, 2008; Lewis et

[3] In the present study group-level cultural influence refers to the influence of organisational context which might emanate at local institute-level or top-government level

al., 2003; Parboteeah et al., 2005) and models (e.g., TAM2, TAM3, TRA, TPB) to turn a blind eye to examining valuable insights into individuals' user acceptance that may be manipulated or fostered by the inspection of external beliefs. Since the inception of the TAM by introducing output quality as the first external factor, a wide range of external factors are introduced in the technology acceptance models in an attempt to predict the intention either through PEOU or PU (see meta-analysis, Sun & Zhang, 2006; Lee et al., 2003). Sun & Zhang (2006) broadly categorised these variables into three groups as: organisational factors, technological/system factors and individual factors. Overcoming the limitations of previous models, in the present study only the effect of organisational and individual factors is coherently incorporated with the indirect (moderator) link between beliefs and intention to examine acceptance behaviour.

Thus, the discussion can conclude that development in IT and the Internet enhanced the growth/interest in usage but equally presented (persistently inherent) challenges to understanding the extent to which an individual accepts a specific technology. Given that, in the line of research that suggests that behavioural models of technology acceptance failed to serve equally across the cultures (national), within cultures (within groups), across the individual's personal and external factors (demographic and institutional factors), this study positions the research question as follows in the next section.

1.2. Aim of the research

Based on the rationales presented in section (1.1), this study intended to present the conceptual model that delineated the barriers and drivers of an individual's acceptance behaviour towards Internet usage within an academic context. Primarily, drawing upon social cognitive theory (SCT) and the technology acceptance models (TAM), the study integrated the predictors of acceptance belief from the theory of reasoned action (TRA), TAM2, the decomposed theory of planned behaviour (DTPB) and the unified theory of acceptance and usage technology (UTAUT). In addition, the model also incorporated the theories of task technology fit (TTF), Bem's Sex Role Inventory (BSRI), and Hofsted's theory of national culture. In doing so, the coherent model answered the research question of the present study.

How do predictors of perceived behavioural beliefs, social and control beliefs, management support at institutional and governmental level, and task characteristics influence individuals' behaviour towards acceptance of Internet technology? In addition, how are basic beliefs of an individual's acceptance behaviour influenced by the *moderating impact of demographic characteristics (age, gender, organisational type, academic position, educational level, experience usage and voluntariness) and by native cultural dimensions (masculinity-femininity, individualism-collectivism, power distance, and uncertainty avoidance)?*

Before explaining the objectives of the study, it is worth to clarify the constraints/boundaries of the study from the perspective of culture and type of technology. From the culture stance, this study aims to examine the impact of culture on an individual-level and intra-organisational-level rather than cross-national level. Therefore, despite of fact that results and discussion of the present study are logically incomparable with the studies conducted in Western and North-American countries' context[4]. However, for comprehending whatever insights (e.g. differences and similarities) in terms of extending current literature in the specific developing country context (i.e. Pakistan and specifically educational institutes), the findings of the present study are supported with the established literature in the developing country context. Given that, generalisability of the results with the cautious interpretations is still applicable in the context (i.e. country and organization) sharing similar to the current study's context.

From the specific technology perspective, the aim of this study is to examine individual's acceptance behaviour towards Internet applications within the educational context. Broadly, these applications are categorized into two groups[5]. First, use of the Internet in applications supporting teaching and research tasks (i.e. academic tasks), and second use of the Internet in the applications supporting administrative tasks and socialization (i.e. non-academic tasks). More specifically, within the academic tasks, individuals' acceptance behaviour alike other 'world wide web' applications (e.g. internet-banking, e-commerce, etc.) were examined based on their Internet usage for- preparing teaching material (e.g. power point presentations, lectures, tests, tutorial, etc.) through downloading, to contact with students (e.g. use of e-mail service), and to enhance their own research skills (e.g. use of digital library, web-portal Google-scholar, e-learning, etc.). On other side, in non-academic use of Internet applications, individuals acceptance behaviour was examined based on their Internet usage for- the interaction with friends and family members using, e-mail, messaging, and social networking sites (e.g. facebook, twitter, etc); and to perform administrative tasks (e.g. attendance updates, time-tabling, assignments schedules, etc.).

[4] This is the limitation of the present study and reported in detail in chapter 7, section 7.2.2

[5] The use of the Internet applications into the two different categories in education sector is based on the characteristics of the tasks. Details tasks characteristics are given in chapter 3, section 3.2.4.

1.3. Objectives of the research

Pertaining to the aim of the research presented in section (1.2), the following research questions/objectives are formulated with expected solutions.

1. How are an individual's intentions formed towards the acceptance of the technology and to what extent are they related to future usage? To answer this objective, a detailed review of the prominent theories and models in the technology acceptance domain are inspected. In doing so, it developed the background knowledge to the beliefs in the present study, their formation and factors that facilitate/impede persistent usage.

2. Consistent with the first objective, the second objective is to select an appropriate single/multiple theoretical model/constructs(s) to achieve the aim of the present research. To answer this objective, a detailed comparison based on path significance (β value) within the model, and explanatory power (R^2) across the models is inspected. In doing so, it helped to delineate the weakness and strengths of each model/construct(s), which in turn lead to the development of the conceptual model for the present study.

3. Based on the first two objectives, an extended model is formulated to predict/examine the individuals' acceptance behaviour.

4. The next step was to select an appropriate methodology, relevant constructs with their measuring items, and operationlisation of instruments and demonstration of their reliability and validity. This leads to the examination of the direct hypothetical path relations proposed in the conceptual framework.

5. Based on the first three objectives, it is explored whether there is any perception of difference between the segments of users (academics) towards acceptance of the technology (the Internet) on the basis of their demographic characteristics. The importance of the demographic variables, both direct (predictor) and indirect (moderators), is reviewed in the technology acceptance literature. Based on the substance of the review, exploratory relationships are proposed and, at a later stage, the effect is examined using the multiple-group analysis (MGA) method.

6. Based on the first three objectives, it is explored whether there is any perception of difference between segments of the users (academics) towards acceptance of the technology (the Internet) on the basis of their individual cultural characteristics.

The importance of Hofstede's cultural dimensions (masculinity-femininity, individualism-collectivism, power distance, uncertainty avoidance), both direct (predictor) and in-direct (moderators), is inspected in technology acceptance literature. Based on the literature, exploratory relationships are established and, at a later stage, are examined using PLS multiple-group analysis (MGA) method.

7. Finally, based on empirically validated results, implications for practices and managerial policies are devised, so they may encourage users to accept the technology. In addition, the potential limitations of the study are being highlighted, which may be helpful for future researchers to extend or replicate the present study in a different context.

1.4. Research methodology

In order to achieve the aims of the study, the selection of methodology is based on the nature of the research question and previous literature that addresses similar problems. From the philosophical perspective, this research applied the positivism approach with quantitative strategy of analysis. The method for data collection is the survey. Rationally, it is consistent with the argument that suggests selecting a research approach based on the role of the researchers involved as part of the research being studied (Gilbert, 2001). Therefore, within the current context of the study, which requires examining technology acceptance behaviour of a large number of individuals working in higher educational institutes, it is illogical for the researcher to be part of the research and conduct qualitative interviews. From the perspective of overall research design, the purpose of this study is to test the hypothetical relations, the type of investigation is correlational, the extent of the researcher is minimal, the setting of study is non-contrived, the unit of analysis are individuals, and finally, the time of examination is cross-sectional.

Based on quantitative methodology, the initial survey instrument is developed from the pool of items widely accepted in the previous technology acceptance literature. Based on the pilot study findings, the instrument is revised based on content validity and reliability of the measures. After finalising the instrument, using a probability sampling approach, data is collected through self-administrative and mail (postal and email) survey methods. The targeted sample frame is 14,434 academics working in 57 public and private higher educational institutes of Pakistan.

The completed questionnaires are screened using descriptive statistical techniques with SPSS 16.0. The analysis with SPSS includes: coding, editing, checking missing data, assumptions of normality, linearity, multi-collinearity, outliers, non-response bias and factor analysis. In the next stage, using structural equation modelling (SEM), inferential statistics is examined to validate the model-fitting and test the hypothetical relationships suggested in the present study. The primary analysis technique within SEM is partial least squares (PLS); however, to confirm the robustness of the model at a later stage, the results are being re-examined with the analysis of moment structures (AMOS).

1.5. Context of the study

The present study intends to examine individuals' technology (the Internet) acceptance behaviour within higher educational institutes in Pakistan. From a country perspective, there are two reasons to select Pakistan as a context for the study.

1. *Pakistan is socially and culturally different from North American and Western countries*, and hence can serve well in understanding the unbiased validity and reliability of the predictors of individuals' acceptance behaviour, specifically within the unexplored south Asian country context. According to Hofstede & Hofstede (2005), unlike Western countries, Pakistani culture is moderate on power distance and masculinity, low on individualism, and higher on uncertainty avoidance (see table 1.1).

Country	**Cultural dimensions score**			
	Power distance PD	**Individualism/ collectivism (IC)**	**Masculinity/femininity (MF)**	**Uncertainty avoidance (UA)**
Pakistan	**55**	**14**	**50**	**70**
Arab countries	80	38	53	68
India	77	48	56	40
United States	40	91	62	46
Canada	39	80	52	60
Great Britain	35	89	66	35

Table 1. 1: Cultural position of Pakistan (values adopted from Hofstede & Hofstede, 2005).

2. Despite the *amount invested by the government of Pakistan in the IT industry*, growth in IT acceptance is observed to be lower than expected. Despite the fact that, to increase Internet usage, the government reduced the cost of Internet bandwidth by almost 95% (from US$30,000 in the year 2000 to US$3,950 in 2004) (MOIT.PAK, 2004), the Internet penetration rate is still poor compared with the neighbouring countries which share an almost similar culture. For instance, against the 10.6% Internet penetration rate in Pakistan, Iran has 32%, Saudi Arabia has 29.21%, Malaysia has 62%, UAE has 86%, and Indonesia has 12.5% (ITU 2009). According to the International Telecommunication Union (ITU), the number of

Internet users per 100 people in Pakistan reached only 11.4 in the year 2008 (ITU, 2009). The low Internet penetration rate raises the alarm that investing a significant amount of capital is not enough to boost the IT and Internet industry, but it requires a further exploration of factors that may help to encourage individuals to accept IT and Internet technology.

The reason behind selecting higher educational institutes is consistent with the previous literature in IT acceptance in the educational context (e.g., Lewis et al., 2003; Ma et al., 2005; Lazinger et al., 1997). According to Lewis et al. (2003), in educational institutions decisions regarding the introduction of technologies are often determined by top management (head of institutes and/or higher government officials). Individuals (academics within institutes) who are the real users of technologies are rarely considered and communicated with about such decisions. In this way, individuals' requirements, willingness and causes of resistance are over-looked by higher management, a process that often results in an unrealistic outcome regarding technology usage. Another reason (specific to Pakistan) for selecting higher educational institutes is related to the influence of government policies. For instance, compared with other organisations, the direct influence of explicit government policies to promote research productivity is apparent in the education sector. One example is the recent projects (Pakistan Education and Research Network (PERN), Digital Library, Pakistan Research Repository (PRR), and Campus Management Solution (CMS)) by the government of Pakistan to improve the usage of IT and Internet within higher educational institutes (HEC PAK, 2009). Finally, with the assumption that IT acceptance behaviour is related to educational qualifications (Agarwal & Prasad, 1999), selecting the context of the study as higher educational institutes is the most relevant choice rather than any other such as banks, SMEs, etc.

1.6. Organisation of the thesis

This study comprises seven chapters. A brief description of each chapter is given as follows:

Chapter1 presents the introduction and background of the research. Specifically, it presents the concise precursors, aims, objectives, expected research methodology.

Chapter 2 highlights gaps in the field relating to the aims and objectives of this research. Based on the research question, this chapter is in three sections. The first section provides a multidisciplinary analytical review of the prominent theories and approaches within the technology acceptance domain, followed by a critical comparison between these models.

The substance of the review and comparisons of previous models enables the selection of an appropriate model/construct(s) to develop the conceptual framework related to the research question in the next chapter. The second section provides a review of culture, the cultural theory of Hofstede, and its importance in IT acceptance domain. The outcome of this section enables the integration of environmental and cultural factors in the conceptual framework. Finally, section three presents the background review of the context of the study, including issues of Internet usage and government initiatives.

Chapter 3 is the outcome of the gaps and theoretical underpinnings established in chapter 2. Specifically, this chapter, in the form of the conceptual framework, presents the testable hypothetical relationships between the predictors of individuals' acceptance behaviour. In a broad perspective, chapter 3 presents rationales for the direct relationships between the core predictors of acceptance behaviour, and rationales for the indirect moderating effect of demographic and cultural variables on core predictors. The outcome of this chapter leads to the selection of appropriate methodological approaches, discussed in the next chapter.

Chapter 4 justifies the methodological approaches and data analytical techniques carried out to examine the framework established in chapter 3. This chapter is based on epistemological and ontological considerations and discusses the methodological strategies (qualitative and quantitative) and design approaches (survey). It also discusses the data collection procedures, data analysis tools and criterions, sample selection, and development of the questionnaire. This then leads on to the results section in chapter 5.

Chapter 5 presents the in-depth analysis of the empirical assessment of the research model proposed in chapter 3. Starting with the pilot study findings, it discusses the results of the descriptive findings using SPSS statistical analytical tool. Afterwards, it delineates the criterion for the structural equation modelling (SEM) and, based on these criteria, it calculates inferential analysis with the help of partial least squares (PLS) analytical method. Finally, chapter 5 ends with the post-hoc analysis based on AMOS analytical method.

Chapter 6 presents the detailed synthesis and discussion about the findings obtained in chapter 5. In doing so, the findings are rigorously complemented with the previous literature to rationalise the aims and objectives proposed in the present study.

Chapter 7 summarises the study's main findings in terms of contributions and limitations. Specifically, it represents the theoretical, methodological, managerial implications, and finally, offers future research recommendations based on the limitations of the present study.

Chapter 2

Multitude theories of technology acceptance models and national culture

Introduction

This chapter dissects the aim of the research presented in first chapter into three essential parts to explore the background perspective and importance of the relevant literature, which builds foundations for developing the conceptual framework in the next chapter. In doing so, this chapter contributes a threefold perspective.

First, the chapter presents a review of the prominent theories and models in the domain of information system research, which are widely accepted as predicting and explaining human behaviour towards acceptance of technological innovations. Consequently, an examination of the previous theories and models helps to select (an) appropriate single/multiple theoretical models/constructs based on their strength(s) and weaknesses in terms of explanatory power (i.e., R^2) and path significance (i.e., β value). Generally, most of the models and theories of technology acceptance are derived from two fundamental theories: Diffusion of Innovation theory (DOI) and Social Cognitive Theory (SCT). Based on DOI and SCT, section (2.1 to 2.10) presents a discussion of the widely accepted models including DOI, SCT, and the Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), Decomposed Theory of Planned Behaviour (DTPB), Technology Acceptance Model (TAM), Revised Technology Acceptance Model (TAM2), Augmented Technology Acceptance Model (A-TAM), and Unified Theory of Acceptance and Use of Technology (UTAUT). Section (2.11) continues the discussion by comparing strengths between the models: TAM x TPB, TPB x DTPB, TAM x TPB x DTPB, TPB x TRA, TAM x TRA, TAM x TRA x TPB, and TAM2 x UTAUT x other models.

The second contribution of the present chapter is an exploration of the importance of the various cultural theories that have a direct and indirect effect on an individual's cognitive behaviour. Specifically, section (2.12) presents introduction of culture, and section (2.13) reviewed Hofstede's cultural theory, which includes dimensions of power distance (PD), individualism-collectivism (IC), masculinity-femininity (MF), and uncertainty avoidance

(UA). Section (2.14 to 2.16) presents the influence of the Hofstede's theory in the technology acceptance studies across cultures, with substantial criticism.

Finally, section (2.17) evaluates the importance of IT and the Internet in an educational context. The discussion continues to examine the present Internet usage within the context of the study (i.e., the developing country of Pakistan); specifically, the initiative introduced by the government to promote IT and Internet usage in the educational sector are discussed. Building on these sections, the gaps and needs in the current research are identified to establish the conceptual framework and validate the formulated research question and objectives presented in chapter 1.

2.1. Theories and models of technology acceptance behaviour: A historical perspective

Even though research on the acceptance/adoption and usage of information technology (IT) is considered to be one of the most mature areas within modern information system literature (Hu et al., 1999; Benbasat & Zmud, 1999), still the selection of an appropriate model or constructs from a number of multitude models is a persistent problem for researchers in making decision to introduce new technologies in organisations (Venkatesh et al., 2003). Rationally, over the years a variety of theoretical models have been applied, modified and integrated from diverse disciplines such as social psychology, sociology and marketing in order to provide an understanding and predict the validated determinants of IT acceptance/adoption and usage (e.g., Benbasat & Zmud, 1999; Venkatesh et al., 2003). Consequently, a large number of theories and models posed difficulties for researchers when selecting an appropriate model for their objectives was required. For instance, if a single model is selected for a specific objective/context then it seems to be ignorant of the other models' contribution and also it is not necessary for the constructs within the selected model to perform equally as they were applicable in previous studies. Consequently, selecting a specific model may produce overflow and underflow conditions within the analysis process. Overflow conditions, which is opposite to parsimonious conditions (Bagozzi, 1992), might occur when a model with all its constructs is applied and only a few of them produce significant results leaving the others as useless; this also results in difficulties of understanding path relationships within the model. On the contrary, underflow conditions might occur when constructs within a single model are unable to produce the desired significant outcome. One possible solution for this problem can be the selection of various constructs from multitude models and integration of them into an extended model. However, selecting a number of theories and constructs of interest with warranted theoretical underpinnings is considered to be a challenging task (e.g., Venkatesh et al., 2003). For establishing an extended model in the present study, the researcher has deliberately reviewed a number of models and their constructs in the following sub-sections and has adopted an approach to select a number of constructs that produced significant results in previous literature.

2.2. Diffusion of Innovation theory

One of the earliest theories used to explain human acceptance behaviour and taken as background for the recent technology acceptance models is the Diffusion of Innovation theory (DOI), also known as the Innovation Theory of Diffusion (IDT) (Rogers, 1995). The original concept of DOI is based on the work of the French sociologist Gabriel Trade and the German sociologist George Simmel in 1903 (Rogers, 2003). Rogers (1995) defined DOI with Gabriel Tarde's (1903) Sigmoidal or S-shaped diffusion curve theory, which is used to measure the rate of adoption in innovations. Furthermore, Rogers defined diffusion as the process through which innovations are communicated by means of a communication medium over the specific time period among members of social systems. Furthermore, she defined 'innovations' (used as a synonym for new technologies) as ideas, practices or objects that are perceived to be new by the individuals or groups adopting them; and 'communication' as the process through which participants produce and share information with each other in order to benefit from mutual understanding (ibid). According to Fichman (1992), DOI provides well-developed concepts and tools (both qualitative and quantitative) to identify and assess the factors which facilitate/hinder the likely rate of diffusion of technology evaluation/adoption/implementation. Broadly, factors involved in the diffusion process can be categorised into three groups as: innovation decision process, attributes of innovations, and attributes of innovators.

Rogers (1983; 1995) categorised the adoption process in five stages on the basis of the distribution of adopters for an innovation approximated with the normal distribution of time to adopt; whereas adoption or rejection of any innovation was based on the decision process by individuals or groups. The stages are as follows:

Knowledge of innovation: an awareness process of an individual or other group (involved in the decision-making process) towards the existence of the innovation. Furthermore, knowledge can be viewed as: awareness-knowledge, which is seeking information that an innovation really exists; how-to-knowledge, which is seeking information necessary to use the innovation; and principles-knowledge, which is seeking information about the underlying process as to how an innovation works. Out of these three, Rogers emphasised the need for awareness-knowledge, which is also required at the persuasion and decision stages and can easily be achieved through mass media.

Forming attitude/persuasion toward the innovation: this mobilises individual(s) or other group unit's positive interest towards innovation. At this stage the decision-maker becomes psychologically involved and seeks credible information from their surroundings and peers to reduce uncertainty levels and develop a general perception to adopt the innovation. According to Rogers, developing a favourable or unfavourable attitude at this stage towards innovations does not necessarily lead to directly adopting or rejecting the innovation.

Decision to adopt or reject: the process of evaluation through which an individual(s) or other group unit secures commitment to adopt or reject an innovation. According to Rogers, the decision to reject can occur at any stage of the innovation decision process. For instance, it can occur after adoption (i.e., active rejection) by considering trial adoption (using how-to-knowledge); or it can occur prior to adoption (i.e., passive rejection) in which new innovations are never considered based on personal knowledge (using awareness-knowledge) or the confident opinions of peers/leaders, which drives individual(s) to make a rejection decision.

Implementation of the new idea: an operationalisation process on a trial basis in which individual(s) or group units start to use the innovation practically. Before this stage, individuals were involved in the decision process based on mental thinking. According to Rogers, at the implementation stage the original idea of innovation is re-invented based on its complexity/difficulty to learn, and the inadequate presence of the change agent to support technical assistance; alternatively, it is based on the simplification of the application and facilitation of local conditions.

Confirmation of the decision: a process in which the positive response after usage of an innovation by individual(s) or group units is taken to be final. It also reinforces the process of diffusion from the start of the knowledge creation or at any stage during the process of decision-making to adopt or reject innovation. According to Rogers, individual(s) might discontinue the adoption process due to: replacement discontinuation, in which individuals adopt a better innovation that supersedes the innovation in use; or disenchantment discontinuation, in which individuals completely reject the innovation due to dissatisfaction with its performance.

The second group of factors within the diffusion process is related to the attributes of the innovations. According to Rogers (2003), the usage behaviour and diffusion of an innovation is solely dependent upon attitude/persuasion to use, which is further based on the differences of the innovations. Furthermore, she warned of the dangers of oversimplifying the innovations, which regards all the innovations as an equivalent unit from the viewpoint of analysis. Nevertheless, she classified perceived attributes of innovations into five groups which were later widely replicated in theories of technology acceptance; Rogers also recommended caution regarding context when generalising the analysis (see figure 2.1).

Relative advantages (RA): is defined as the 'degree to which an innovation is perceived as being better than its precursor' (Moore & Benbasat 1991, p.195). It has also been taken as a variable of perceived usefulness (PU) in literature towards the effective and convenient use of innovations (Taylor & Todd, 1995a; Davis, 1989). In the persuasion process RA enables understanding of the effectiveness, efficiency, and satisfaction towards problem-solving (Rogers, 1995).

Compatibility (COMP): is defined as 'the degree to which an innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters' (Moore & Benbasat 1991, p.195). COMP is based on individual(s) and unit groups' beliefs, requirements, cultural and structural needs and patterns that may change their intention to adopt innovations over the traditional patterns of work. It is perceived that individuals may vary in their choice and preferences as to whether to accept or reject the innovations. Therefore it can be argued that COMP is related to the satisfaction/dissatisfactions of one's perception regarding the needs of the innovations.

Complexity (COLX): is defined as 'the degree to which an innovation is perceived as relatively difficult to understand and use' (Thompson et al., 1991, p.128). In innovations COLX is found to be an inherent factor because every innovation is based on a learning/understanding process. COLX and adoptions are observed to be reciprocal to each other. When a system is easy to understand, learn and use, it is adopted quickly and vice versa. Generally, within innovations, COLX is considered to be part of the usability factor (Sonnenwald et al., 2001) and has a negative impact on the perceived ease of use (PEOU) (Davis, 1989).

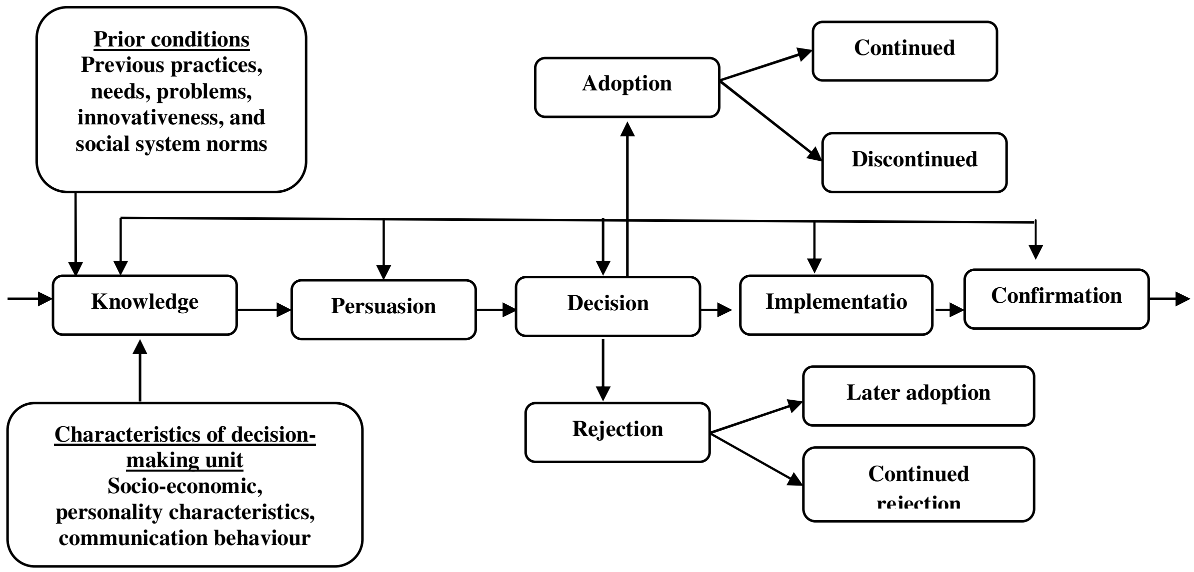


Figure 2. 1: Innovation Diffusion Process, Source: Rogers (1995)

Trialability (TRI): is related to the ease of experimenting with an innovation in the technology or system (Rogers, 2003). TRI is also taken as a usability factor in most of the innovation research because it is related to understanding the efforts and risks involved in usage of the system. It also facilitates a cost-effective recovery mechanism. Easy recovery and cost is found be a positive determinant on the adoption technology or system (Sonnenwald et al., 2001)

Observability (OBS): is closely related to the concept of visibility in which one can see others using the system in an organisation (Moore & Benbasat, 1991). According to Rogers (2003), OBS is considered and measured as an individual's perception learned from his/her partners or system. Thus, in other words, it can be defined as the degree to which innovations are easily perceived and understood (e.g., Sonnewald et al., 2001).

In addition to the described characteristics of innovations, Rogers (2003) also emphasised the need for some conditional variables that might expedite the rate of diffusion, such as: type of innovation (e.g., optional, collective, or authoritative), type of communication channel (e.g., mass media or interpersonal), nature of social system (e.g., norms, degree of network interconnectedness, etc.) and extent of change agents' supportive efforts.

The third category of factors involved in the diffusion process is related to the attributes of the innovators. Rogers (2003) classified innovators based on the degree to which an individual or group unit adoption is relatively earlier than other members of the system to adopt the new ideas. Based on time-series Roger categorised five groups of innovators as:

1) Innovators: are known as 'system gatekeepers' i.e., those who have the capability to understand and apply complex technical knowledge. Furthermore, they have the ability to cope with a high degree of uncertainty about innovations at the time of the diffusion process.

2) Early adopters: are known as 'change agents' because they are mostly leaders in the adoption process. They are the role model for the potential adopters who are seeking information and advice about innovations within a local social system.

3) Early majority: are known by their characteristic of 'deliberation' and they adopt an innovation earlier than the average members of the system. Nevertheless, they usually adopt the innovation with deliberate willingness but seldom lead; instead they work as a mediator between the two categories of adopters, i.e., early adopters and the late majority.

4) Late majority: are highly influenced by social pressure (e.g., peer pressure, economic necessity), and they adopt an innovation just after the average members of the system. In the late majority individuals are mostly sceptical and are highly uncertain about innovations, therefore they only adopt the innovation when the system has already been used and adopted by most of the individuals within the system.

5) Laggards: are the last to adopt the innovations. They rely on their own experience and are known as 'traditional users'. They are highly suspicious of change agents and usually resist due to limited resources and information shared by traditional people like themselves.

The DOI has remained as a focal point for many studies specifically in the area of the decision-making process towards technological innovations (Venkatesh et al., 2003; Tornatzky & Klein, 1982). In doing so, DOI has been refined and extended by many researchers, including Rogers herself (1983; 1995), with sets of external constructs. Specifically, in the acceptance of innovations, the work of Moore & Benbasat (1991) and Agrawal & Prasad (1998) is noteworthy. Moore & Benbasat's work is considered to be pioneering with its extension of the theory by introducing two new variables, voluntariness (VOL) and image (IMG) in the context of IT adoption. Additionally, they developed parsimonious 34-item instruments to measure the seven dimensions of DOI including: COMP, RA (used PU later on), result demonstrability (RD), visibility (VIS), PEOU (opposite of COLX in DOI), TRI, and IMG. The author found that COMP, RA and PEOU were the most influential constructs for actual usage and the decision to accept IT innovations. In the same stream of research that extended and refined DOI theory, Agarwal & Prasad (1998) extended the concept of moderation by adding constructs of personal innovations of information technology (PIIT), which differentiated global innovation and domain-specific innovation. The purpose was to reduce the risk-taking propensity introduced by Rogers (1995) in respect to the early adopters who were more open to uncertain conditions of innovations. Nevertheless, conceptualisation and extension of moderators within DOI theory was marvellous work by the authors, but the moderator only exhibited partial and shown significant effect on the relation between COMP and the intention to use innovation. Last but not least, Karahanna et al.'s (1999) work is also considered to be a great contribution to the domain of information system research, combining DOI theory with attitudinal theories in a single framework that assesses the pre and post-adoption beliefs and attitudes. The authors examined the constructs of Roger's (1995) DOI theory, i.e., RA and COLX with the replacement of PU and PEOU, and Moore & Benbasat's (1991) constructs, IMG and RD. Karahanna et al.'s (1999) findings revealed that that individual's intention to adopt an innovation is based on personal interest and social influence. Personal interest refers to the attitude required to perform specific behaviour that may be formed by reflecting information concerning past behaviour, affective information, and cognitive information; while social influence refers to the social pressure (i.e., subjective norms), which is similar to Roger's DOI theory's concept of 'type of communication network'. Furthermore, the authors classified social influence into two categories: 1) information influence, when an individual accepts information as evidence of reality, and 2) normative influence, the result of individuals confirming expectations of others through either identification, internalisation and/or the compliance process. The findings of Karahanna et al., (1999) are encouraging, that in the pre-adoption process instrumentality (i.e., relative advantages) and non-instrumentality beliefs influence attitude; however, in post-adoption (after gaining experience), only instrumentality beliefs and perceived IMG influence attitude. Finally, despite the fact that one of the most cited models i.e., the technology acceptance model (TAM) is driven from a different perspective to DOI, to some extent it shares similar conceptualisations in its core constructs. For instance, as reported earlier, the relative advantage in DOI is often considered to be PU and COLX to be opposite to PEOU in the determinants of the TAM. Therefore, it can be argued that the TAM to some extent confirms/compliments the theoretical foundations of DOI (Chen et al., 2002).

Regardless of the wide application and extendibility of DOI theory in information system research, it is limited in its provision of sound justifications about the process of ascertaining particular attitudes, which in turn lead to the acceptance or rejection decision process. Additionally, DOI remained unsuccessful in providing a process through which innovation characteristics (described earlier) fit into the process of establishing the attitude (Karahanna et al., 1999; Chen et al., 2002). Overcoming the limitations of DOI, theories related to the individual's cognitive process which defined process as developing attitude were established; one of them is Social Cognitive Theory (SCT). The next section discusses SCT, followed by its relationship with DOI.

2.3. Social Cognitive Theory

Social Cognitive Theory (SCT), proposed by Bandura (1986), is based on a view of 'human agency' in which individuals are agents proactively engaged in their own development and can make things happen by their actions. SCT differs from DOI by overcoming its limitations (discussed in the last paragraph of section 2.2). By referring to DOI theory as the 'social diffusion of innovation', Bandura (2006, p.119) posits the difference between the two as: 'Social cognitive theory distinguishes among three separable components in the social diffusion of innovation. The 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 network by which innovations are promulgated and supported'.

Originally, the conceptualisation of SCT was extracted from Miller & Dollard's (1941) Social Learning Theory (SLT), which asserts basic three principles: feedback (e.g., reward/punishment) which influences behaviour; vicarious learning (i.e., learning by observation) which leads to an act; and identification, in which the model behaviour of influential persons is likely to be adopted. Numerous researchers adopted and extended SLT in their relevant context, but in the present study only the extension of Bandura (1986) is discussed due to its contribution to current concepts of reciprocal determinants, self-efficacy, and temporal variation (variation in the long term due to experience and other social circumstances) between causal relationships.

From the perspective of reciprocal determinants, Bandura (1986) explained SCT with three sets of factors: environmental factors, people/personal factors, and behaviours that are constantly influencing each other. Bandura explained this triadic relationship as people interpreting the results of their own behaviour through personal expectation, beliefs, and self-perception; which are developed and modified by environmental factors (social and physical influence); in turn, both personal factors and the environment alters the subsequent behaviour (see figure 2.2.). In other words, behaviour determines which of the possible environmental factors come into play in what shape; in turn, the environment determines how the shape of individual's behaviour is developed and activated (Bandura, 1989). It is important to state that SCT contrasts with human functioning theory, which has overemphasised the role of environmental factors in human learning and behavioural change.

Human learning and behaviour are observed to be positive determinants on the adoption and acceptance of innovations (Compeau & Higgins, 1995a). Emphasising the relation of learning and behaviour, SCT aims to explain how people acquire and maintain certain behavioural patterns, while also providing the basis for intervention strategies (Bandura, 1997). Here it is needed to clarify that behaviour is not simply the consequence of the environment and the person, just as the environment is not simply the result of the person and the behaviour (ibid). Bandura (1986, p.25) defined behaviour as 'what people think, believe, and feel affects how they behave'. Whereas LaRose & Eastin (2004, p.360) defined behaviour as 'an observable act and the performance of behaviour is determined, in large part, by the expected outcomes of behaviour, expectations formed by our own direct experience or mediated by vicarious reinforcement observed through others'.

Here, vicarious reinforcement refers to the observational learning which an individual develops through the process of attention, retention, motor reproduction and motivational process. Individuals are not required to perform particular behaviours prior to the adoption decision (e.g., Bandura, 1989). From the experience point of view, social factors such as economic conditions, socioeconomic status, and educational and familial structures do not affect human behaviour directly but they affect it to the degree that they influence people's aspirations, self-efficacy beliefs, personal standards, emotional states, and other self-regulatory influences (Pajares, 2002).

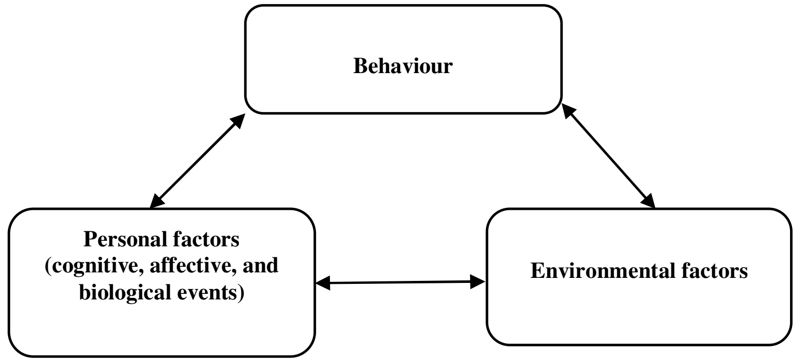


Figure 2. 2: Social Cognitive Theory: Source**:** Pajares (2002)

The second most important contribution of SCT is introducing the concept of self-efficacy (SE) and temporal variation (i.e., variation due to experience gained). Bandura described this contribution as individuals' self-regulatory capability which describes the sense of experience by human cognition to explore their own beliefs. In other words, individuals sense the possible control over their own thoughts, feelings, motivations and actions. According to Bandura (1986, p.391), SE can be defined as 'peoples' judgement of their capabilities to organise and execute courses of action required to attain designated types of performance. It is concerned not with the skills one has but with the judgement of what one can do with whatever skills one possess'.

Later on Bandura (1997) re-examined the concept of SE and explained it as the level of human motivation, effective states, and actions that are more based on their own beliefs in comparison to what is objectively true. In his work Bandura states that SE is altered by the individual's self-reflective capability (i.e., experience), which is characterised by analysing the experience and scrutinising thoughts to modify behaviour accordingly. Further he state that individuals with time and experience develop skills to deal with problems, and once they feel they are capable (habitual), SE no longer remains as a factor of interest to develop additional skills until significant change is observed in the tasks performed. This point highlights the important argument that SE varies across activities and situations, and thus cannot be generalised for all tasks. This assumption was also supported by Marakas et al., (1998) who found that SE influence is stronger and more accurate when it is determined through domain-specific measures rather than general measures.

Like DOI, the applicability of SCT in information system research is mostly as a focal point for extending other theories and models to measure the behaviour of acceptance and the adoption process. Usually these theories and models were focused on the concept of self-efficacy. For instance, Compeau & Higgins (1995a) developed and examined measures of SE through magnitude, strength and generalisability. The authors developed the model based on determinants of SE with its facilitators, encouragement by others and actual use by others; outcome expectations; affective response based on enjoyment and anxiety; and finally, usage of computing technology. The authors' findings were very supportive of the applicability of SCT, and showed that SE was an important construct towards shaping individuals' behaviour. For example, individuals with high SE had higher computer usage and experienced less anxiety compared with individuals with low SE. Additionally, the mediating impact of SE between outcome expectations (e.g., job performance) and social factors (i.e., encouragement by others and actual usage) was a ground-breaking finding by the authors. Later on, by removing SE's facilitators (i.e., encouragement by others and usage of others), Compeau et al., (1999) re-examined their model (Compeau & Higgins, 1995a) using a longitudinal study for a year. Yet again SE was found to be a strong determinant of computer usage, anxiety and enjoyment. Apart from the determinant SE, Compeau & Higgins (1995b) also investigated the role of training programmes in developing skills and their impact on SE. They found that training programmes and prior experience exhibited a significant effect on SE.

In examining the importance of SE the meta-analysis of Marakas et al., (1998) and Agarwal et al., (2000) are remarkable pieces of work. Marakas et al., (1998) reviewed 40 papers published during 1987-1996 to differentiate between the concept of general purpose SE and task-specific SE. The authors came up with the argument that both types of SE showed distinct results in the reviewed literature, and hence, cannot be treated interchangeably with the measurement perspective. Furthermore, the authors found a reciprocal relationship between SE and outcome performance i.e., if one increased, the other decreased and so on. The concept proposed by Markes et al., (1998) was employed by Johnson & Marakas (2000) and confirmed the findings of previous conceptualisations. The authors found that SE played an important role in outcome (i.e., acquisition of computer skills) and needs to be considered as a critical variable when multiple training methods are employed for measuring any change in developed skills. In the same line of research, Agarwal et al., (2000) reviewed papers published during 1986-1996 and established a model that examined the concept of SE within the software training environment with a longitudinal study. The authors developed a framework with the determinants of SE as: social influence, demographic variables (i.e., computer experience and prior performance), and beliefs related to self-perception. The outcome impact of SE on: outcomes (i.e., actual performance, satisfaction and learning), outcome beliefs (i.e., anxiety, outcome expectation, ease of use, perceived behaviour control); and finally, impact on behaviour such as system usage and adoption. The findins revealed that prior experience played an important role in general purpose SE but not in task-specific SE beliefs, which was unexpected and contrary to the previous studies.

Within the widely accepted model of technology acceptance (TAM), Igbaria & Iivari (1995) incorporated SE and its determinants i.e., experience and organisational support as external variables affecting computer anxiety. The study supported the importance of SCT within the TAM and confirmed that SE can play a vital role in shaping individuals' beliefs and behaviour. The authors found that experience along with organisational support affected SE, which in turn, showed a significant effect on computer anxiety and PEOU. In an attempt to add SE to the TAM, similar findings were found by Chau (2001), who examined the possible effect of attitude and SE on beliefs of the TAM. Nevertheless, the author didn't found an impact of attitude on behaviour intention and little negative significant impact of SE on PU, but study contributed in overall variance explained in dependent variable i.e., behaviour intentions.

In spite of that, SCT provided ground-breaking concepts of SE, experience, time to study, training, and social influence (later on used as subjective norms), but the theory itself cannot be generalised easily. SCT can be used as an umbrella to extend its concepts and constructs into a specific model and purpose but applying the theory itself is a very difficult task (e.g., Agarwal et al., 2000). As described earlier, SCT is not a theory specifically designed for observing human behaviour in specific areas but it is general and broad in context so it can be widely applied in many diverse areas, such as computer utilisation (e.g., Compeau et al., 1999), Internet usage and gratification (e.g., LaRose & Eastin, 2004), etc.

2.4. Theory of Reasoned Action

The third fundamental theory, which has remained a focal point for other theories and models to extend, is the theory of reasoned action (TRA). Originally TRA was introduced by Fishbein & Ajzen (1975) and Ajzen & Fishbein (1980). According to Bagozzi (1992), TRA from a theoretical perspective is the most intuitive and parsimonious theory capable of explaining insights into behaviour. Similar to DOI and SCT, TRA is also derived from social psychological settings, however, contrary to the previous two theories where attitude was the main predictor of the behaviour, TRA assumes intention to be the most important determinant of individuals' behaviour. In TRA beliefs influence attitude to shape intention, which in turn guides or dictates behaviour to perform i.e., action (Chau & Hu, 2001). According to Ajzen & Fishbein (1980, p.5), TRA is based on the assumption that individuals are usually rational and make systematic consideration of their actions' implications 'before they decide to engage or not engage in a given behaviour'. Whereas the process of behaviour establishment based on intention's significance is defined as: 'most behaviours of social relevance are under volitional control and are thus predictable from intention' (ibid, p.41). TRA is based on three major constructs and their relation to each other as follows:

Behavioural intention (BI): is an immediate antecedent of behaviour (Ajzen, 2002). It is a cognitive process of an individual's readiness to perform a specific behaviour. Whereas behaviour is an observable action performed by an individual on his/her experience or mediated by some vicarious observations to a given target (LaRose & Eastin, 2004). This implies that BI is the extent to which an individual formulates a conscious plan to perform or not perform some specified future behaviour towards a target (Warshaw & Davis, 1985). According to TRA, BI, which is an individual's relative strength to perform a task, is dependent upon a person's attitude towards the behaviour and/or the subjective norms (Ajzen & Fishbein, 1980; Fishben & Ajzen, 1975).

Attitude (A): this explains human actions (Ajzen & Fishbein, 1980, p.13) and is defined as, 'individual's positive or negative evaluation of performing the behaviour' (Fishbein & Azjen, 1975, p.216). It is determined by a person's evaluated beliefs about the performed behavioural consequences. Therefore, if past experience about targeted behaviour is positive then A will also have a positive impact on BI or else it will have a negative effect. Attitude is the product of important behavioural beliefs and the individual's outcome evaluation (Fishbein & Azjen, 1975); whereas behavioural beliefs are a subjective probability that behaviour leads to a particular outcome. In an extension of TRA known as the TAM, Davis et al., (1989) defined these behavioural beliefs with the perception of usefulness (PU) and perception of ease of use (PEOU) by which one evaluates differently (explained in detail in section 2.7).

Subjective norms (SN): defined as 'the person's perception that most people who are important to him or her think he should or should not perform the behaviour in question' (Azjen & Fishbein, 1975, p.302). In SCT it is considered with the concept of social influence (Agarwal & Prasad, 1998), which is examined by the opinion of friends, family, colleagues, peers and social groups (Miller, 2005). Consequently, these opinions become an individual's normative beliefs with which he/she complies (Scheper & Wetzels, 2007). Ajzen & Madden (1986, p.455) defined normative beliefs as the 'likelihood that important referent individuals or groups would approve or disapprove of performing the behaviour'. According to TRA, the strength of SN is based on an individual's normative beliefs multiplied by the motivation to comply with the opinion of important referents (ibid).

TRA can be understood by the notation of BI=A+SN, which means beliefs (i.e., underlying individual's attitude) affect intentions and behavioural consequences either through A or SN (Madden et al., 1992) (see figure 2.3). In other words, TRA explains an individual's volitional BI (i.e., likely to do it) is dependent on the individual's A towards BI and SN.

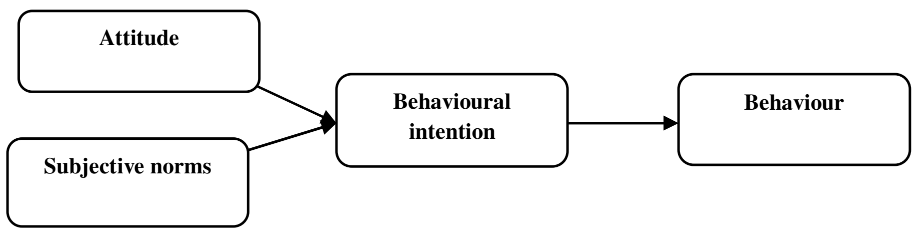


Figure 2. 3:Theory of Reasoned Action (Ajzen & Fishbein, 1980)
Source: Madden et al. (1992, p.4)

TRA is a general theory that has received considerable attention in various fields of information system research as well as in social, health and business studies. For instance, Sheppard et al., (1988) applied TRA in the field of consumer behaviour; Green et al., (1997) examined it in condom usage behaviour, and Spark et al., (1995) applied it in the agricultural and food context. Specifically, within information system research TRA has been revised by many researchers and various external variables were added to examine the effect of attitude and/or subjective norms over behavioural intention for use in specific contexts. Likewise, inclusion of personal norms was added by Fishbein (1967) during the time of TRA creation (cf. Ajzen, 1985), perceived control over behavioural achievement was added by Ajzen in (1985), competing attitudes was added by Davidson & Morrison (1983), and the extent of past behaviour with regard to innovation was examined by Bagozzi (1981). In a similar line of research Davis et al., (1989) extended the theory with a theoretical framework of individuals' acceptance of technology known as the TAM. Davis found that the variance explained by the TAM was largely consistent with the studies that had employed TRA in behavioural research (see the discussion of the TAM in section 2.7).

Despite its wide applicability and extendibility, including its conceptualisation of the TAM, TRA possesses many limitations. Out of many, one major limitation is its assumption of measuring the behaviour under volitional control. That is, beliefs depend upon the will of the individual to perform the behaviour (Ajzen, 1985). Thus, in situations when volitional control is low (i.e., individual's will is difficult to know), TRA was unsuccessful at predicting the expected significant relationship between BI and BU. Apart from volitional control limitation, Foxall (1997) highlighted three more perspectives where TRA failed to explain the expected behaviour. Firstly, TRA limits from the perspective of beliefs that establish the A. For instance, TRA was too general a model and does not specify the beliefs that are in operation for any specific behaviour. In other words, the model fails to include the non-attitudinal personal and situational beliefs that are likely to influence the strength of A→BI relation or increase the prediction of usage behaviour. This limitation suggests that, prior to applying TRA, it is essential to examine the individuals' salient beliefs about the behaviour under investigation (Davis et al., 1989), which in some situations seems impractical or expensive due to time and cost constraints. Secondly, TRA limits from the perspective of predicting future usage behaviour (Foxall, 1997). For instance, TRA was developed to examine the predicted BI rather than the outcome of the behaviour itself (ibid). According to Davis et al., (1989) in order to examine TRA, actual usage behaviour should be measured objectively and unobtrusively, so there should be a clear distinction between prior and present BI towards the usage behaviour. Contrary to Davis' caution, originally in TRA conceptualisation, behaviour is a direct determinant of BI and both (BI and behaviour (B)) are measured at the same time. That is, the outcome of the behaviour itself or predicting models' power to measure future usage is not true, rather than the model is predicting only the power for the current usage behaviour (i.e., similar to intention). Put simply, TRA limits its predictability in situations when BI and behaviour are highly correlated or measured at the same interval of time. This limitation was also reported by Ajzen & Fishbein (1980) who acknowledged that explaining future usage behaviour was difficult to achieve, due to the time interval which might invite unforeseen events. This in turn may affect the factors and disturb the relationship proposed. Thirdly, TRA limits from the perspective of BI (Foxall, 1997). That is, BI completely mediate the effect of the A on behaviour (ibid). According to Bagozzi & Yi (1989), the degree to which intentions are well-formed affects the way in which attitude influences the behaviour. Thus, the conceptualisation of TRA (i.e., A→BI→B) is ill-equipped to predict situations when intentions are ill-formed (i.e., partial or no mediation effect). Consequently, attitude produces a direct effect on behaviour (i.e., A→B).

2.5. Theory of Planned Behaviour

Overcoming the limitations of TRA to predict behaviour under condition where individuals have a low level of violation control, Ajzen (1988, 1991) proposed a revised succession of TRA known as the Theory of Planned Behaviour (TPB). Ajzen (1991) incorporated an additional exogenous construct, namely perceived behaviour control (PBC), in previous TRA's constructs (i.e., A to BI and SN) to predicate planned and deliberate behaviour. This inclusion was made to account for certain conditions when individuals intend to carry out some behaviour but the original behaviour was not satisfied because of a lack of confidence or control over behaviour (Miller, 2005 p.127). The affect of PBC in TPB was added by Ajzen (1985) as a direct determinant of behaviour and indirect through BI to behaviour. Ajzen (1991, p.188) defined the additional variable PBC as the 'perceived ease or difficulty of performing the behaviour'. Later on, specifically in the context of information system research, Taylor & Todd (1995a, p.149) defined PBC as the 'perception of internal and external constraints on behaviour'. Behavioural control is defined as beliefs about the presence of some factors that may facilitate/impede the performance of behaviour. It is different from SN, which is perceived social pressure or normative expectations from others and also has an impact on BI to use.

Ajzen (1988, 1991) incorporated the additional construct in TRA because of the assumption that most human social behaviour is under volitional control that can be predicated from intentions alone. However, argument was not effective in many cases and has been challenged by many researchers (e.g., Eagly & Chaiken, 1993; Taylor & Todd, 1995a), even by Ajzen himself (2002). It is a general observation that in some situations even people wish to deal with some favourable behaviour but fails due to lack volitional control e.g., the intention to visit a doctor to get positive results about disease symptoms is not completely under an individual's control but is based on others' actions and produces a lack of control over their own actual behaviour. This argument was also highlighted by Sheppard et al., (1988) who accepted TRA but differed on volitional control, which he defined as: 'behavioural intention will predict the performance of any voluntary act, unless intent changes prior to performance or unless the intention measure does not correspond to the behavioural criterion in terms of action, target, context, time-frame and/or specificity' (p.325).

As with TRA, in TPB an individual's behaviour is examined by his or her BI, which is affected by A toward BI, SN and additional construct of PBC. Furthermore these constructs are influenced by a human's individual beliefs, namely as behavioural beliefs (i.e., likely consequences or others' attributes of behaviour), normative beliefs (i.e., normative expectations of other people's beliefs) and control beliefs (i.e., presence of factors that may support or hinder behaviour) respectively (Ajzen, 2002) (see figure 2.4). Ajzen (1991) predicted that if A→BI and SN→BI have a favourable effect, then the PBC will be greater and an individual's BI to perform the behaviour will be higher/stronger.

Like TRA, TPB is a general theoretical model that has been adopted in many diverse fields and produced significant results. For example, Chau & Hu (2001) and Conner & Sparks (1996) used it in healthcare settings, Nguyen et al., (1997) used it in exercise purpose, and Conner et al., (2003) used it in diet control settings. Within information system research, a number of studies examined TPB and emphasised the importance of the construct PBC in determining BI and usage (e.g., Chau & Hu, 2001; Mathieson, 1991; Taylor & Todd, 1995a; Foxall, 1997; Madden et al., 1992).

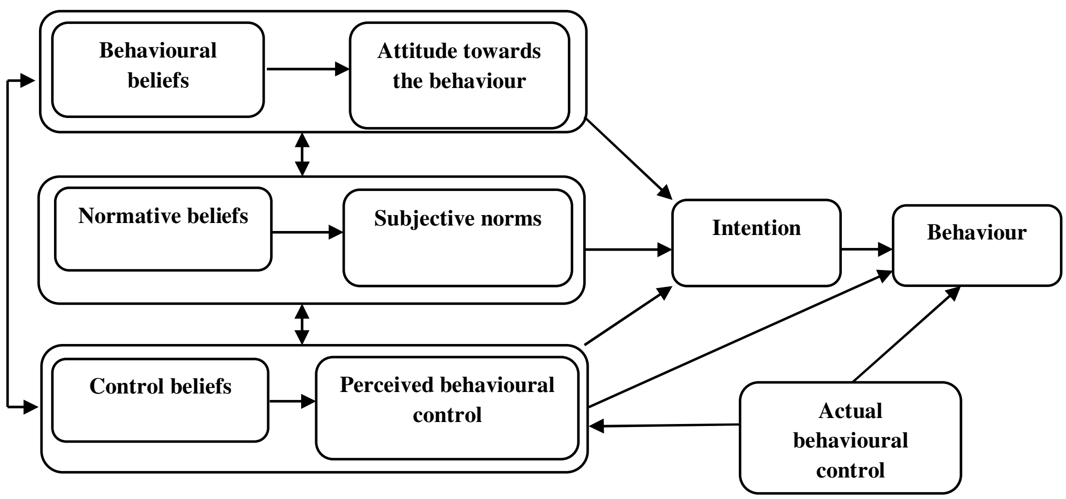


Figure 2. 4: Theory of Planned Behaviour: Source: Ajzen (1991)

Besides widespread replication and generalisibility, TPB has been refined by a number of research studies. Specifically, there has been work on the modification of the additional construct PBC. For instance, instead of PBC, Warshaw & Davis (1985) suggested that behavioural expectations can be a potential predictor of behaviour; Conner & Armitage (1998) and Elliott et al., (2003) suggested that in the case of routinised behaviour, instead of BI, habit may be the most important driver of behaviour. In addition to that, a number of other constructs have also been suggested to refine the predictions outlined in TPB, such as desire (Perugini & Bagozzi, 2001), implementation intention (Orbell et al., 1997), goal-directed behaviour (Leone et al., 2004), and self-identity (Sparks, 2000).

Nevertheless, TPB fills the gap of TRA for volitional control but still holds acceptable criticism. For instance, Eagly & Chaiken (1993) identified some factors that may exhibit an impact on BI and behaviour (e.g., habit, moral obligation and self-identity) within TRA, but had not yet been addressed in TPB. Secondly, as an extension of TRA, TPB holds an inherent assumption of proximity between BI and behaviour, which still requires specific situational conditions to predict the actual behaviour (Foxall, 1997). In other words, it can be stated that beliefs are still context-specific and cannot be generalised, therefore, it is necessary every time to modify the measurement items according to the specific context and population (Ajzen, 1991). According to Eagly & Chaiken (1993), the relationship between PBC and BI presumes that individuals decide to carry out behaviour because they feel they can achieve it. However, TPB fails to explain how an individual will presume and what mechanism would be needed to engage in specific behaviour (Taylor & Todd, 1995a). In addition, TPB is criticised due to the operationalisation of its additional construct PBC. It is assumed that the single construct PBC is enough to answer all the non-controllable factors predicting behaviour. More specifically, measurements of PBC are directly aggregated from the beliefs recording the control and predicted behaviour, which might overlook the presence of additional salient factors that predict BI and behaviour (Taylor & Todd, 1995c).

Contrary to the aggregation of control beliefs into the single construct PBC, Manstead & Parker (1995) examined TPB and pointed out that personal norms and affective evaluation of behaviour were additional factors that accounted for significant variance in BI. This finding suggests that there is continuing evidence that, apart than PBC, there might be additional factors that may account for additional variance in predicting BI and behaviour. Observing the expected limitations of the model, Ajzen (1991, p.199), at the time of TPB development, emphasised the need for further research to include additional predictors if they can capture a significant proportion of variance in BI or behaviour in addition to the part of the current variables.

2.6. Decomposed Theory of Planned Behaviour

To overcome the limitations of the operationalisation of PBC noted in TPB, Taylor & Todd (1995a) proposed a decomposition of the beliefs structures, which resulted in an improvement in model prediction. In addition, decomposition was advantageous in eliciting the underlying dimensions of belief structures which were presented by TPB with a single uni-dimensional construct, and makes the model difficult to generalise across various settings. Taylor & Todd (1995a) named this alternative model of TPB as the Decomposed Theory of Planned Behaviour (DTPB). DTPB decomposes the attitudinal, normative, and control beliefs derived from TPB into multidimensional belief constructs that were generalisable across the situations and not specialised to each context (see figure 2.5). A brief overview of each decomposition is given as follows:

Decomposing attitudinal beliefs structures: attitudinal beliefs (e.g., advantages/disadvantages or perceived usefulness, ease of use and facilitation conditions) are an individual's favourable/unfavourable feelings about a particular behaviour (Fishbein & Ajzen, 1975) (for more details see TRA in section 2.4). Attitudinal belief in previously explained models TRA and TPB was found to be a problematic construct due to its associated hidden sub-beliefs and their relationship to each other (Berger, 1993). Indeed, this is the reason that the TAM did not explain the intended usage intentions as expected (Taylor & Todd, 1995a). Taylor & Todd (1995a) decomposed attitudinal beliefs from the literature of Diffusion of Innovation theory (DOI). According to this, RA, COLX and COMP were incorporated due to their prevalence in IT usage and adoption literature (e.g., Moore & Banbasat, 1991). Whereas RA, analogous to PU in the TAM model (Chau and Hu, 2001), is evaluated as perception of innovations improvement and performance to its precursors, which might be moderated by economic benefits, convince and satisfaction factors (e.g., Moore & Banbasat, 1991; Roger, 1983; Taylor & Todd, 1995); COLX, reciprocal to the adoption process, is the measurement of perceived hardship and difficulties in order to understand and use new innovations (Roger, 1983; Thompson et al., 1991). COLX is also taken as inverse-analogous to PEOU in the TAM, (Chau & Hu, 2001); and finally, COMP is the measurement of satisfaction/dissatisfaction perception through which innovations are adopted with current needs and past experience (Moore & Benbasat, 1991; Roger, 1983).

In technology acceptance literature, an increase in perceived RA and use of information technology with decrease COLX factor has generally been found to be a positive construct on attitudinal belief (e.g., Taylor & Todd, 1995a; Moore & Benbasat, 1996, Davis, 1989). Recently, Hsu & Chiu (2004), building upon Fishbein & Ajzen's (1975) conceptualisation of attitudinal beliefs as PU, perceived risk (PR) and perceived playfulness (PP), examined DTPB in e-service satisfaction process. The strength of this model was similar to research conducted by Moore & Benbasat (1991) and supported the argument that an increase in PU and PP with a relative decrease in PR had a positive impact on satisfaction outcome.

Decomposing normative beliefs structures: normative beliefs are an individual's perceptions about a particular behaviour influenced by the judgment of others (Fishben & Ajzen, 1975). Taylor & Todd (1995a) decomposed normative beliefs into relevant referent groups that would likely exhibit a divergence of opinion and have a significant impact on an individual's decision to use/accept information systems. Three groups of referents, peers, superiors, and subordinates, were categorised by the authors but only two were examined, i.e., peers (other students) and superiors (professors) due to the sample of students case study. More specifically, the authors hypothesised that if the difference in opinion between referents is monolithic then it has no significant influence over SN. Making a slight difference in referent groups but using similar concepts, Bhattacherjee (2000) in a case study of the Internet and e-services adoption, examined the decomposition of SN into two groups, interpersonal and external beliefs. According to the author, external beliefs are the influence of non-personal people e.g., technology reports, expert opinions etc; and interpersonal beliefs are the influence of friends, family, peers, superiors and known adopters of services. Later on, the conceptualisation of SN proposed by Bhattacherjee was examined by Hsu & Chiu (2004). The authors found a weak significant impact of external factors within the e-service satisfaction context.

Decomposing perceived behavioural control structure: control beliefs are the measurement of perceived factors that may support or impede the performance of particular behaviours (Ajzen, 1985, 1991). Taylor & Todd (1995a) explained the decomposition of control beliefs in two groups as: self-efficacy (SE), an individual's internal control beliefs; and facilitating conditions (FC), an individual's external control beliefs. The construct SE originated in Social Cognitive Theory (SCT) (Bandura, 1977), which helps to determine the individual's judgment process through which he/she becomes capable of managing courses of action and achieving a targeted performance. Taylor & Todd (1995a) categorised FC into two groups as: related control belief of resource factors (e.g., time, money), and related technologies' compatibility issues and usage. Compeaue & Higgins (1991) posited that the higher level of SE has a positive impact on BI and behaviour usage, while Taylor & Todd (1995a) hypothesised that the facilitation resources may or may not have an impact on usage behaviour.

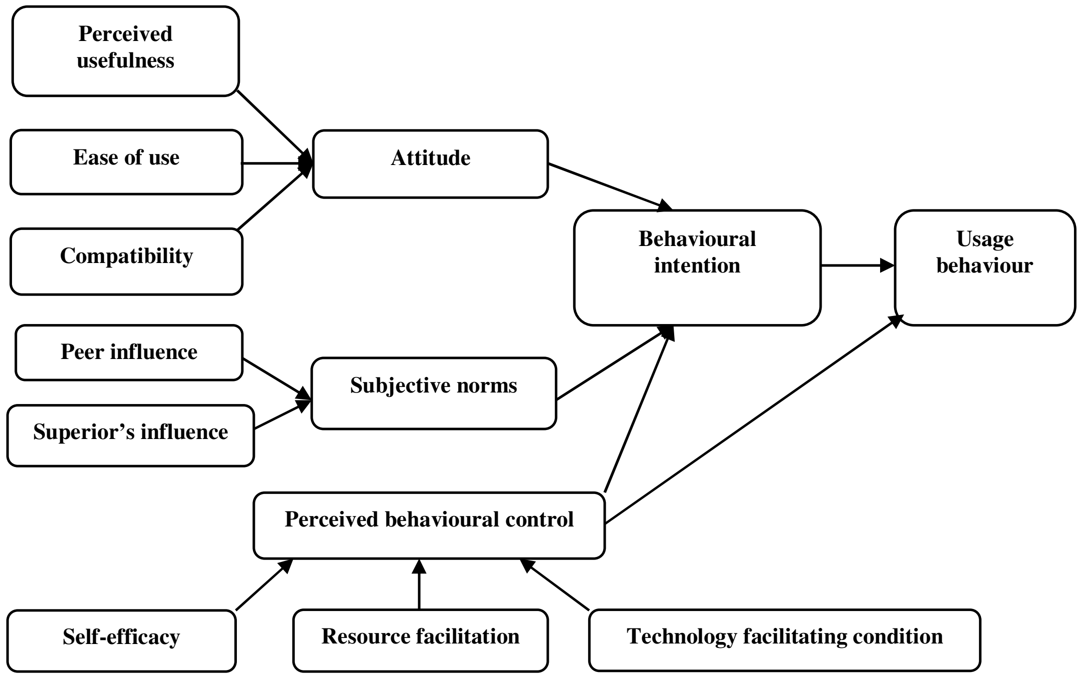


Figure 2. 5: Decomposed Theory of Planned Behaviour
Source**:** Taylor & Todd (1995, p.162)

The decomposition of factors in DTPB is not persistent and has been manipulated according to the design and implementation strategies in literature. For example, Chau & Hu (2001) showed the direct impact of COMP over PU and PEOU by excluding A from the original model. In exploring the cross-over effect, Taylor & Todd (1995c) combined COMP and RA based on the previous literature (e.g., Moore & Benbasat, 1991) and found that COMP and RA showed an effect on PBC, a SN influenced on A, and FC influenced on SN.

Nevertheless, due to the uni-dimensional belief constructs, DTPB provides increased explanatory power for BI, greater diagnostic value, greater insight into the factors that influence IT usage, and suggests beliefs that can be targeted by managers interested in information system research. However, it is considerably less parsimonious and more complex than the models from which it originated i.e., TRA and TPB.

2.7. Technology Acceptance Model

In search of a parsimonious model which presents an equally good explanatory power, Davis (1989) proposed a theory to be specifically modelled for the domain of IT in the form of the now widely accepted conceptualisation of IT acceptance: the Technology

Acceptance Model (TAM). Originally the TAM was an adoption of TRA where attitude (A) predicts intention (BI), and intention predicts behaviour (BU). However, unlike TRA, the TAM does not include subjective norms (SN) as a determinant of BI because of the uncertain theoretical and psychometric properties (Davis et al., 1989). The use of SN in TRA was also cautioned by Fishbein & Ajzen (1975) who posit that SN can create theoretical and empirical problems due to the difficulty of differentiating the direct effect of SN on BI from indirect effect via A. Another point of the TAM, which distinguishes it from TRA is that, unlike expectancy formulation of beliefs within TRA, the TAM suggests only two beliefs, perceived usefulness (PU) and perceived ease of use (PEOU), to predict an individual's A towards using technology. In addition to their indirect effect on BI via A, PU is also expected to exhibit a direct effect on BI (see figure 2.6). A brief description of the TAM predictors is given below:

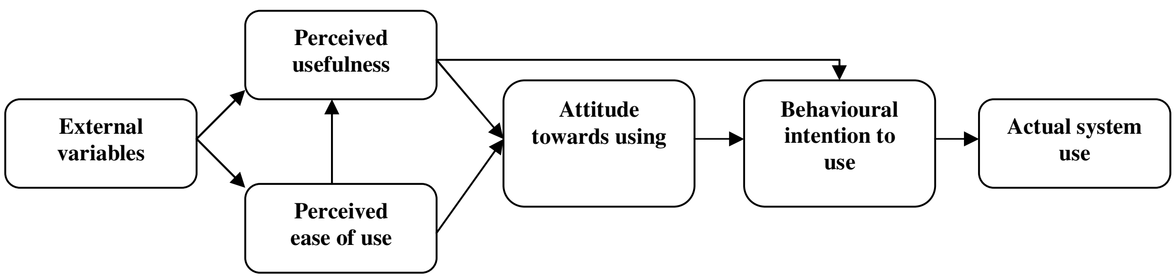


Figure 2. 6: Technology Acceptance Model (Davis et al., 1989, p.985)

Attitude (A): is defined as an individual's positive or negative feelings (evaluated effect) towards performing the targeted behaviour (Fishbein & Ajzen, 1975, p.216) (for more details see TRA in section 2.4).

Behavioural intention (BI): is defined as the measure of the strength of one's intention to perform a specified behaviour (Fishbein & Ajzen, 1975, p.288) (for more details see TRA in section 2.4).

Perceived usefulness (PU): is defined as the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organisational context (Davis et al., 1989, p.985). Taylor & Todd (1995a) during the development of DTPB considered PU as analogous to RA within DOI, which is an evaluation of the perception of innovations' performance with comparison to its precursors. Venkatesh et al., (2003) considered PU to the similar concept of extrinsic motivation in motivational model (MM) and outcome expectation in SCT, and performance expectancy in UTAUT.

Perceived ease of use (PEOU): is defined as the degree to which the prospective user expects the target system to be free of effort (Davis et al., 1989, p.985). Taylor & Todd (1995a) considered PEOU as an inverse of the construct COLX in DOI, which defines the measurement of difficulties in order to understand and use new innovations. Venkatesh et al., (2003) in UTAUT studied PEOU as similar to the effort expectancy.

External variables: are defined as the explicitly included factors in the model that have an expected impact on BI and BU through the meditation of PU and PEOU (Davis et al., 1989, p.987). According to the authors, external variables might include: system design characteristics, training, documentation and support, and decision-making characteristics (ibid). However, with the continued evaluation of the TAM, some more external variables in the TAM were introduced, such as system quality, compatibility, computer anxiety, self-efficacy, enjoyment, computing support, experience, and so on (e.g., Koufaris 2002; Moon & Kim 2001; Agarwal & Karahanna 2000; Lee et al., 2003; I-F Lui et al., 2010).

According to the TAM, individuals adopt applications primarily because of their functionality and performance, and secondarily due to the ease or difficulty involved in making the system perform (Davis et al., 1989). In addition, the TAM also assumes that individuals engage in behaviour because they evaluated the benefits of that behaviour and/or expect a certain outcome performance (Dishawa & Strong, 1999). According to Davis et al., (1989), PU is influenced by PEOU and suggests that, all things being equal, the easier a technology is to use, the more useful it can be. The argument was supported by Taylor & Todd (1995a), who posited that the easier the technology is to use has a positive impact on belief i.e., PU that results in an increase in A and BI on towards technology usage. Whereas, ease of technology is theorised to be determined by external variables, for instance, system features e.g., menus, icons, touch screen, etc. may enhance usability (Davis et al., 1989).

In the initial version of the TAM, like TRA, Davis et al., (1989) considered a two-step process for the formulation of BI (also known as expectancy formulation of beliefs). At a first step, important beliefs (PU and PEOU) were elicited from the target users for the specific context; next, the strength of each belief was assessed and multiplicatively weighted by the value assigned by users to the attributed behaviour. The expectancy was criticised by numerous researchers (e.g., Bagozzi, 1984a; Schmidt, 1973), for instance, in situations when beliefs were generally desirable (i.e., opposite to TRA and expectancy formulation) it was unnecessary to evaluate the weight of the beliefs in multiplicative measure. In simple words, it merits measuring the attitude and beliefs regarding use of the technology rather than attitudes and beliefs directed towards the technology itself, e.g., individuals might hold a positive intention about technology without being favourably disposed towards its use. This disaggregating of beliefs facilitates the researcher to specifically separate the effect of each belief on attitude and examine the effect of other external variables on the formation of beliefs.

Davis et al., (1989) noticed the inherent limitation of TRA in the TAM and modified the model by un-weighting its core constructs PU and PEOU instead of eliciting PU and PEOU for each specific technology and context. Nevertheless, omitting the multiplicative evaluation of beliefs invites possible misleading results (e.g., in a single study some people give a positive evaluation whereas other hold a negative evaluation of the same outcome), but it facilitated the TAM to differentiate between A, BI, the two beliefs PU and PEOU with the impact of external stimuli across different settings. After evaluating the TAM in voluntary settings, Davis et al., (1989) found that the model predicted well expected explanatory power in intention (i.e., 45% at the start and 57% after 14 weeks), except for the partial mediation effect of construct A (i.e., weak relation between PU→A, and strong at PU→BI). Hence, in revision, the authors removed the A construct and established a direct link of beliefs over BI (ibid), which is also supported in social psychology research and suggests that attitude can be omitted if the desired impact of beliefs on behaviour is warranted (e.g., Ajzen, 1991).

In general, the TAM was specifically developed for predicating and explaining an individual's acceptance of computer technology in voluntary settings (Davis et al., 1989), but since its creation it has evolved (replicated and extended) and proved to be parsimonious beyond its originality, organisational context, computing technologies, and user population (Agrawal & Prasad, 1999). For instance, it has measured intention in email, voice mail, graphics (e.g., Adams et al., 1992; Karahanna & Straub, 1999), e-service (e.g., Shish & Fang, 2004), personal computer usage (e.g., Igbaria et al., 1995), DBMS (e.g., Szajna, 1994), manufacturing services (e.g., Lin & Wu, 2004), spreadsheets (e.g., Mathieson, 1991; Venkatesh & Davis, 1996) and outside the technology adoption domain, like marketing (e.g., Dabholkar & Bagozzi, 2002; Gentry & Calantone, 2002), and advertising (e.g., Rodgers & Chen, 2002), to name only a few.

From the voluntary use perspective, where the choice of technology is dependent upon an individual's beliefs, the TAM presented significant results even in non-voluntary (mandatory) settings where individuals are influenced by the pressure of the organisation and superiors (see Agrawal & Prasad, 1997; Moore & Benbasat, 1996). The mandatory usage of the TAM is also referred to as compliance impact in some studies (e.g., Schepers & Wertzels, 2007). According to recent figures, two journal articles on the TAM (Davis, 1989; Davis et al., 1989) are cited over 1,700 times in the social sciences citation index (SSCI) and over 5,000 times in Google Scholar (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). There may be many reasons for such extensive popularity of the TAM, but the most prevalent could be its parsimonious structure, which provides an adequate explanation and prediction within a diverse sample, technologies, contexts and expertise level; theoretical framework supported by highly validated psychometric measurement scales; and finally, contribution in strong empirical results to provide well-accepted explanatory power (i.e., 40% since its creation) (Hu et al., 1999; Mathieson, 1991; Szajna, 1996; Venkatesh & Bala, 2008).

The evaluation of the TAM over the years can be easily understood by the two meta-analytical studies of Han (2003) and Lee et al., (2003). According to Han (2003), the TAM evolved in three stages, adoption, validation and extension. Within the adoption process, the TAM was examined and adopted across the applications (e.g., spreadsheet, Word, Excel), across the communication technologies (e.g., email, voice mail, Internet, online service), across the tools (e.g., DBMS, microcomputers), and across the organisational and cultural context (e.g., countries, financial institutes, universities, hospitals). Within validation stage, the TAM was examined either by testing its core constructs' psychometric properties (i.e., PU and PEOU) or by testing the casual link between the determinants proposed by Davis et al., (1989). Finally, within the extension stage, the possibility of other relevant factors important to the TAM's core construct (i.e., PU and PEOU) was explored.

The meta-analysis of Lee et al., (2003) is comprehensive regarding understanding the evaluation of the TAM. The author reviewed 101 articles published during 1986 to 2003 in 32 information system leading journals. According to this, the TAM evolved in four periods: introduction, validation, extension, and elaboration. In the introduction period (1986 to 1995) research on the TAM was either focused on examining its parsimonious structure by replicating it with a diverse set of applications and technologies, or comparing the TAM's result with its predecessor TRA. In that era, two important studies were best at this: Adams et al.'s (1992) study examined the TAM within five different applications; second, Taylor & Todd's (1995a) study, which compared results of the TAM study with two other models rooted from TRA i.e., TPB and DTPB. According to Lee et al., (2003), the second period (1992 to 1996) of validation research within the TAM was focused on testing its core constructs measurement items under different technologies. In this era, Segar & Grover's study is noteworthy; it criticised the measurement proposed by Davis et al., (1989) and was examined by Adam et al., (1992) in different settings. Later on, Chin & Todd (1995) answered their criticism and empirically supported the validity and reliability of the TAM's core constructs (i.e., PU and PEOU). During the extension period (1994 to 2003), the research around the TAM was focused on the introduction of new variables (direct and moderators) to increase its predictability. In doing so, Agrawal & Prasad (1999) extended the TAM by adding the mediating effect of individual differences, such as, role towards technology, tenure of workforce, level of education, prior experience. The importance of moderators within the TAM was highly prevalent and was highlighted by many researchers (see Venkatesh et al., 2003). Finally, within the elaboration period (2000 to 2003), studies were focused around developing newer versions of the TAM that encompassed the external variables affecting PU and PEOU. For instance, Venkatesh & Davis (2000) found additional constructs that predict BI with the mediation effect of PU. Venkatesh & Davis (2000) named this new model as TAM2. Three years later Venkatesh et al., (2003) examined eight theoretical models and proposed a new model called the Unified Theory of Acceptance and Use of Technology (UTAUT).

Despite the widespread acceptability of the TAM within information system research, it is not without its limitations. The most common limitation reported within TAM studies is its self-reported usage (Lee et al., 2003, Davis, 1993). According to this, self-reported usage is known to be subject to the common method bias, which either distorts or overstates the casual relationship between independent and dependent variables (Agrwal & Karahanna, 2000). The second limitation of the TAM is that it has not been tested with actual measures of usage behaviour but only various parts have been examined separately using measurement of beliefs, attitude and intentions collected coincidently with linear-regression, and hence, shown reasonable variance in BI and BU when examined in different settings (Taylor & Todd, 1995a; Mathieson, 1991). For instance, Taylor & Todd (1995a) examined the TAM and found that the model has reasonable explanatory power but the tests between the relationships of the model did not produce consistent results in all cases for validating its generalisibility. The third limitation within the TAM studies is related to its explanatory power. Although the model has consistently produced a 40% variance in BI, it fails to explain the reasons for the remaining unexplained 60% variance. Finally, the TAM since creation has remained successful in predicting system acceptance but has remained weak at explaining the design process which fosters the acceptance behaviour (Venkatesh & Davis, 1996; 2000). The model offers feedback on PU and PEOU but does not provide feedback about aspects of improvement, such as flexibility, integration, completeness and currency of information (Taylor & Todd, 1995a; Venkatesh et al., 2003).

2.8. Revised Technology Acceptance Model 2

Considering the consistent limitations of the TAM in terms of explanatory power, an extension of the TAM was developed by Venkatesh & Davis (2000) and called the TAM2 (p.186). The aspiration for the TAM2 was to keep the original TAM constructs intact and 'include additional key determinants of TAM's perceived usefulness and usage intention constructs, and to understand how the effect of these determinants changes with increasing user experience over time with the target system' (Venkatesh & Davis, 2000, p.187). The inclusion of additional constructs, specifically external variables on BI mediated by PU and PEOU, was also theorised by Davis et al., (1989). Similar to its predecessor the TAM, the TAM2 is also derived from the TRA with additional constructs of SN that were omitted by Davis et al., (1989) from the TAM due to weak psychometric properties with caution that 'further research is needed to address the generalisability of SN, to better understand the nature of social influence, and to investigate conditions and mechanism governing the impact of social influence on usage behaviour' (ibid, p.999). Additionally, further constructs are included in the TAM2 from Rogers' DOI (1983).

Venkatesh & Davis (2000) described the new additions as: social influence processing factors and 2) cognitive instrumental processing factors. They defined social influence process as forces affecting an individual to adopt or reject innovations, which includes factors such as SN, voluntariness (VOL), experience (EXP), and image (IMG); and cognitive process is defined as judgement of the individuals in part by comparing what a system is capable of doing with what they need to get done in their job, and includes factors of job relevance (JR), output quality (OQ), result demonstrability (RD) and PEOU. The graphical representation of the model is portrayed in figure 2.7, and a brief overview of additional factors is given below:

Subjective Norms (SN): perception of others that impacts on an individual's behaviour is consistent with TRA (Fishbein and Ajzen, 1975) and is explained in detail in section 2.4.

Image (IMG): originally introduced by Moore & Banbasat (1991) in an extension of DOI (see section 2.2). According to the authors, image is defined as 'the degree to which use of an innovation is perceived to enhance one's … status in one's social system'(p.195). Venkatesh & Davis (2000, p.189) posits that SN positively influences IMG because if members of a person's social group at a workplace believe that he/she should perform a behaviour then performing it will tend to elevate his/her standing within the group.

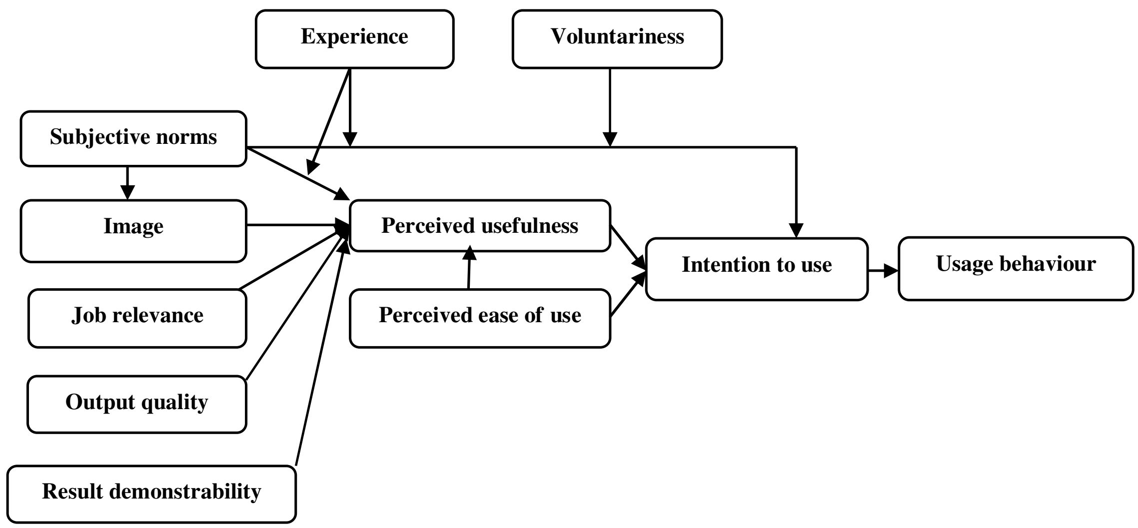


Figure 2. 7: Technology Acceptance Model2:
Source: Venkatesh & Davis (2000, p.188)

Voluntariness (VOL): included as a moderating factor on SN is defined as 'extent to which potential adopters perceive the adoption decision to be non-mandatory' (Venkatesh & Davis, 2000, p.188). Initially the concept of VOL was introduced by Moore & Benbasat (1991) during the extension of Rogers' DOI theory. According to the literature (e.g., Harwick & Barki, 1994; Moore & Benbasat, 1991; Agarwal & Prasad, 1997), SN had a significant effect in mandatory settings but not in VOL settings.

Experience (EXP): related to the level of knowledge that an individual has of a new type of systems (Venkatesh & Davis, 2000). According to the literature, an increase in EXP subsides the impact of SN over PU and BI (e.g., Harwick & Barki, 1994; Agrawal & Prasad, 1997). For instance, an increase in usage experience results in an increase in an individual's ability to use the system, which in turn increases his/her ability and confidence skill. Consequently individuals feel a lower dissonance with the direct benefits of technology and rely on their own skills rather than others' opinions.

Job relevance (JR): 'an individual's perception regarding the degree to which the target system is applicable to his or her job (Venkatesh & Davis, 2000, p.191). According to the author it is similar to the COMP concept in DOI, which is a function of importance within one's beliefs regarding the needs of innovation (ibid).

Output quality (OQ): the perception of the system's performance output. More specifically, it is a further consideration when examining a specific system how well that system achieves the objective(s) that it is aiming for (Venkatesh & Davis, 2000). According to this, a higher demonstrability of OQ will positively lead to a higher impact on the PU (ibid).

Result demonstrability (RD): originally introduced by Moore & Banbasat (1991, p.203) in extension of DOI, it is defined as 'tangibility of the results of using innovations'. According to Venkatesh & Davis (2000), individuals can be supposed to establish a positive perception of usefulness of a system if the covariation between usage and targeted result is readily distinguishable. Agarwal & Prasad (1997) in examining DOI found a significant correlation between BU and RD.

Venkatesh & Davis (2000) examined the validity and reliability of the model within four longitudinal studies conducted in voluntary and mandatory settings in diverse organisational contexts. As expected, the model explained 60% of variance, which was considerably higher than the traditional TAM (i.e., 35% to 40%). Moreover, a significant effect of SN (i.e., omitted in the TAM) on BI over and above PU and PEOU in mandatory settings was observed. Like the TAM, TAM2 provided a parsimonious structure that has been adopted in a variety of areas, for instance, examining Internet usage within healthcare (e.g., Chismar & Wiley-Patton, 2003), public library staff (e.g., Spacey et al., 2004) and in online Internet banking systems (Pikkarainen et al., 2004), etc.

Adding new constructs in the TAM2 presented a more detailed evaluation and clear view of the issues hidden in the TAM, but it didn't overcome the inherent limitations of the TAM. For instance, as with the TAM, self-reported usage was measured which might present the common method bias in the results. Additionally, like the TAM, the TAM2 assumes that intention to act implies limitless freedom, whereas in practice factors such as limited ability, time, environmental or organisational limits, and unconscious habits limit this freedom (Wilkins et al., 2009). Furthermore, it does not explain how performance beliefs often disagree with objective reality. Finally, the TAM2 examined the effect of additional constructs only on PU, instead of incorporating them into the nomological framework of the TAM, which might present a direct impact on BI, like the impact of SN on BI in TRA and DTPB. Observing the acceptable limitations of the TAM2, Venkatesh has gone one step further and developed another framework (UTAUT) that used several constructs outlined in the TAM2.

2.9. Augmented version of the TAM

The augmented version of the TAM (A-TAM) was introduced by Taylor & Todd (1995b) with the research paper 'Assessing IT usage: the role of prior experience'. The goal of augmented A-TAM was to fill the usage gap of the TAM i.e., the TAM was mostly used either by systems already in use or systems with which users were already familiar such as word processing and spreadsheets (Taylor & Todd, 1995b).

The A-TAM in a real sense is a combination of the TAM and TPB, which were rooted in social psychological theory, TRA. This helps to examine individuals' A towards BI with intention beliefs PU and PEOU, and with SN in the presence of external and internal constraints (PBC) over BI and BU (see figure 2.8). The description of each construct is already given in previous sections, in the TAM (section 2.7), TPB (section 2.5), and TRA (section 2.4).

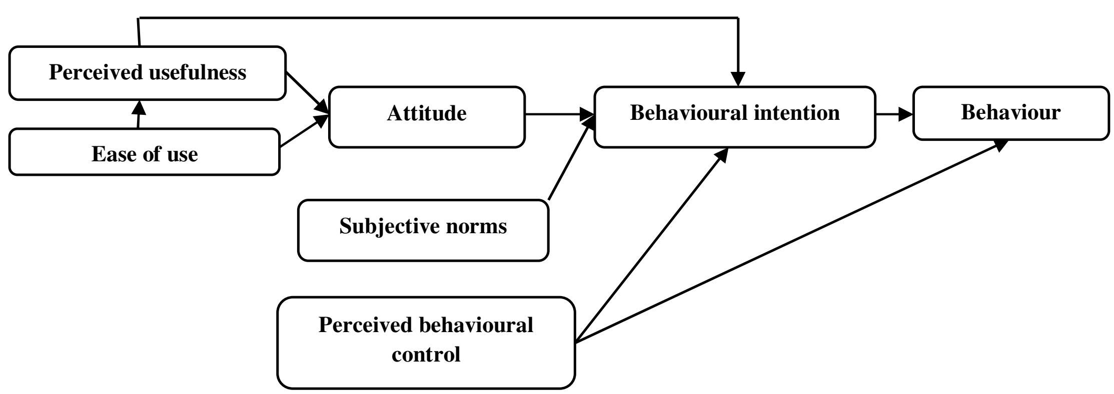


Figure 2. 8: Augmented version of the TAM: Source: Taylor & Todd (1995, p. 562)

According to Taylor & Todd (1995b), the A-TAM is capable of being used and examined in the field of system design and implementation process. Taylor & Todd (1995b) combined the TAM and TPB because of the lack of social influence factor (i.e. SN) and PCB in the TAM that are significant factors in IT usage (e.g., Compeau & Higgins, 1991; Mathieson, 1991; Moore & Benbasat, 1991; Taylor & Todd, 1995a, Thompson et al., 1991). Other reasons for developing a hybrid model was to examine the impact of models on experienced and inexperienced potential IT users, which was missing in both the TAM and TPB. After conducting a survey of 430 experienced and 356 inexperienced students in a business school separately, the authors found comparative results between experienced and inexperienced users as given in table 2.1. The authors found reasonable variance in all determinants of BI except A on behaviour of IT usage for both experienced and inexperienced users. This suggests that the model can be used to predict subsequent usage behaviour prior to users having experience (Taylor & Todd, 1995b).

Constraints	Experienced	Inexperienced
BI to B	Significant	Less significant
A to BI	Not significant	Not significant
PU to BI	Less significant	Significant
PU to A	Not significant	Not significant
SN to BI	Not significant	Not significant
PBC to BI	Significant	Less significant
PEOU to A	Less significant	Significant
PEOU to PU	Not significant	Not significant

Table 2-1: Comparative results of A-TAM. Source: Adopted from Taylor & Todd (1995b)

Despite examining the effect of EXP as an unexplored factor, the A-TAM also possessed some limitations. For instance, the sample selected for the study were students, therefore, social factors such as SN and PBC might produce different results if examined in real workplaces. Second, confiding variables which might influence experience e.g., age, gender, were not examined in this model. Third, the model was examined with homogenous technology and an organisational context which limits its generalisibility. Finally, the impact of EXP was examined on a dichotomous scale (i.e., high and low experience) which fails to generalise the results in situations where users evolve from novice to expert in technology usage.

2.10. Unified Theory of Acceptance and Use of Technology

In a stream of research that intends to investigate the unexplored explanatory power in the TAM, keeping its parsimonious structure stable, Ventakesh & Davis (2000) proposed TAM2. The results of TAM2 were encouraging but it didn't affect the limitations of the TAM, which invited further research in this area. In doing so, Venkatesh and his team (Morris, Davis G. & Davis F) in 2003 went one step further and developed a unified model called the Unified Theory of Acceptance and Use of Technology (UTAUT). Based on the rationale that opting a single model among a multitude of models disregards the contribution from alternative models, the authors empirically compared eight models including, TRA, TAM, TPB, DOI, SCT, Motivational Model (MM), Combined TAM and TPB (C-TAM-TPB), and Model of PC utilisation (MPCU). Upon the review, test and comparisons of prior models, Venkatesh et al., (2003) identified five major limitations as:

1) The technologies studied were relatively simple and individual-oriented as opposed to more complex and sophisticated technologies.
2) Participants in these studies were mainly students.
3) Largely, the timing of measurement was general in nature. That is, most tests in prior studies were conducted well after the participant's acceptance or rejection decisions rather than during the decision-making process.
4) Largely the nature of measurement in prior studies was cross-sectional.
5) Finally, most of the studies were conducted in voluntary settings, which makes them difficult to generalise in mandatory settings.

Based on previously compared results, Venkatesh et al., (2003) incorporated four key determinants in model: performance expectancy, effort expectancy, social influence and facilitation conditions; and four key moderators: gender, age, voluntariness and experience (see figure 2.9). Furthermore, the authors examined factors of A, SE and anxiety but didn't incorporate a direct determinant in the model due to less or having no significant effect on BI and BU. For generalisablity and reliability purposes, the author examined results in six different organisations for a six month longitudinal time period in voluntary and mandatory conditions. The results were outperformed and the model showed a variance of 70% that is comparatively better than the previously tested all eight models (17% to 53%). The core constructs included in the model are briefly explained below:

Performance expectancy (PE): the degree to which an individual believes that using a system will result in increased job performance (Venkatesh et al., 2003). The PE is similar to PU in TAM/TAM2 and C-TAM-TPB, extrinsic motivation in MM, job-fit in MPCU, RA in DOI and outcome expectation in SCT. According to the authors, PE is the strongest predictor of intention among all other constructs. The effect of PE on intention was moderated by gender and age, so it was stronger for younger men.

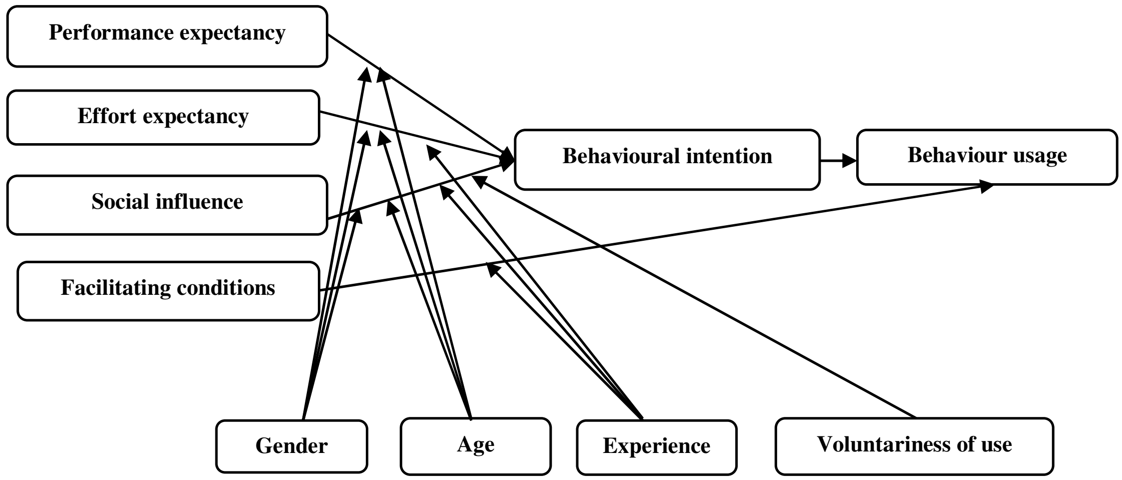


Figure 2. 9: Unified Theory of Acceptance and Use of Technology (UTAUT)
Source: Venkatesh et al., (2003, p.447)

Effort expectancy (EE): the degree to which an individual perceives that a system will be easy to use and is similar to PEOU in TAM/TAM2 and COLX in MPCU (Venkatesh et al., 2003). The authors found that gender, age and experience were the moderating factors over relationship of EE and BI, so that the effect was stronger for younger women with early experience.

Social influence (SI): defined as the degree to which an individual perceives who are important to him/her and who had influence on his/her work. The SI is studied as similar to SN in TRA, TAM/TAM2, TPB/DTPB and C-TAM-TPB, social factors in MPCU, and IMG in DOI (Venkatesh et al., 2003). The author found that gender, age, VOL and EXP were moderating factors on the relationship of SI and BI, so that the effect was stronger for older women with limited experience in mandatory settings of technology use.

Facilitating conditions (FC): defined as the degree to which an individual believes that organisational and technical resources are present to facilitate the use of the system. The FC is studied similar to PBC in TPB/DTPB, C-TAM-TPB, facilitating conditions in MPCU and COMP in DOI. In UTAUT, Venkatesh et al., (2003) did not find a direct impact of FC on BI, however, with the moderating impact of age and EXP they found a significance of FC on BU. Specifically, the effect was only visible within older age and increasing experience individuals.

Although published studies adopting or extending UTAUT are still scarce, this does not undervalue the importance of this model compared with other models of technology acceptance. Evidently, the model performed well in recent literature across the organisational context and culture. For instance, Koivimaki et al., (2008) using UTAUT examined the perception of individuals in northern Finland towards mobile service; Eckhardt et al., (2009) examined the social influence of workplace referent groups (superiors and colleagues) in German companies; Curtis et al., (2010) examined the adoption of social media in non-profit US organisations; and Verhoeven et al., (2010) examined computer usage in Belgian universities. The results in the exemplified studies showed that the model explained more than 60% variance in predicting intentions and ascertaining the power of the model. Apart from the diverse context and applications applicability, UTAUT has also been extended and modified by a number of researchers. For instance, Wang et al., (2009) extended UTAUT with additional constructs of perceived playfulness and self-management of learning within mobile learning in Taiwanese context. The results show that both constructs were significant towards BI and BU. In another study, Wang & Wang (2010) extended UTAUT with constructs of perceived playfulness, perceived value, and computer SE, and omitted BU from the model. By examining in a voluntary context, the authors found that perceived value and SE had a significant effect on adoption, leaving no effect of perceived playfulness on BI. The results of both studies and many others alike confirm the robustness of the model by extending it with additional constructs.

Despite the argument that UTAUT is a powerful model due to its parsimonious structure and higher explanatory power, it is also criticised due to its claims. For instance, regarding its parsimony, Bagozzi (2007, p. 245) critiqued the model by stating that ‘the exposition of UTAUT is a well-meaning and thoughtful presentation. But in the end we are left with a model with 41 independent variables for predicting intention and at least eight independent variables for predicting behaviour’. Furthermore, the model didn’t examine direct effects which might reveal new relationships. According to Bagozzi (2007), UTAUT’s important factors from the study were left out by subsuming under the existing predictors. Besides the parsimonious structure, Raaij & Schepers (2008) critiqued the model by its explanatory power. For instance, the authors argued that higher R^2 (coefficient of determination) within UTAUT was only achievable when moderating key variables (age, gender, EXP and VOL) were included in the model, and hence, it makes the model less parsimonious than its predecessors, the TAM and TAM2. Additionally, they critiqued the model due to its vague grouping of items to measure the constructs. For instance, FC were measured by integrated items from PBC, facilitations conditions, and COMP, and thus, invites complications to comprehend how such a wide variety of items replicates one single construct of psychometric properties.

2.11. Comparison of models in the literature

In the previous sections (2.1 to 2.10), the review of the multitude models revealed that the inception of various theoretical models within technology acceptance has lasted more than 20 years, and researchers have attempted to constitute new models or derivatives from already existing models (e.g., the TAM, TRA, and TPB). Also, it was earlier alluded to that model development was mostly concentrated to increase the explanatory and predictive power with a parsimonious structure. Nevertheless, at the beginning, each of the multitude models was doing well in providing diverse perspectives on approaching the problem with a specific theoretical stance; however, they were criticised at a later stage with some common threads and limitations. Therefore, selecting an appropriate model that can guide management to take action has always remained a critical task for information system researchers. Venkatesh et al., (2003, p.426) sketched this problem as: 'researchers are confronted with a choice among a multitude of models and find that they *must pick* and choose constructs across the models, or choose a *favoured model* and largely ignore the contributions from alternative models'. Echoing Venkatesh et al.'s (2003) argument, the following section presents an empirical comparison among the widely accepted models already discussed in the previous section. The discussion enables the researcher to find two unanswered questions that merits the establishment of foundations for the conceptual framework in the next chapter. The questions posed are: what is the set of beliefs that is consistently related to different operationalisations of technology acceptance models; and, what are the causal paths that might exist among these beliefs within various technology acceptance models.

There is general agreement in the existing information system research that an individual's behaviour is best measured by his/her attitudinal usage beliefs towards behaviour rather than his/her attitudinal beliefs towards objects (i.e., characteristics of innovations) involved in setting up the behaviour (Fishbein & Ajzen, 1975; Mathieson, 1991). Hence, there can be two distinct streams of research in the information system acceptance domain. According to Agarwal & Prasad (1999), one stream of the research within IT acceptance is grounded in social psychological theory whereby individual differences are posited to influence attitude, intentions and behaviour only through the mediating effect of the beliefs. Predominantly models in this stream (e.g., TRA, TPB, and the TAM) are based on

Social Cognitive Theory (SCT), which asserts that user intentions are based on the individual's usage behaviour (e.g., Bandura, 1986; LaRose & Eastin, 2004; Ajzen & Fishbein, 1980; Venkatesh & Davis, 2000; Chau & Hu, 2001; Taylor & Todd, 1995a).

In contrast, Agarwal & Prasad (1999) defined another stream of research that is grounded in the Diffusion of Innovation Theory (DOI). According to DOI, there is systematic disparity between early and late adopters of an innovation in three major areas of socioeconomic status, personality traits, and communication behaviour (Rogers, 1995). Additionally, a user's intentions in DOI are influenced by the characteristics of innovation itself (ibid). Unlike SCT, within information system research, no theory is directly/purely extended DOI. However, a number of theories incorporated predictors or adopted its conceptualisations within their nomological frameworks, e.g., UTAUT, TAM, TPB, DTPB (e.g., Teo et al., 1995; Wu & Wang, 2005; Wu et al., 2007; Yi et al., 2006; Rogers, 1995; Moore & Benbasat, 1991; Agarwal & Prasad, 1998). Keeping this divergence in perspective and a review of the nine models discussed with contingencies in the prior section, the research in this section presents a comparison of these models.

Unlike meta-analysis, where the results of various studies are gathered and analysed again, the objective of the present section is to only synthesise and validate the constructs in the past key citations. In doing so, comparison of the models is carried out using three common criteria suggested by Mathieson (1991). First, models are compared by observing their predictive power (i.e., R^2 coefficient of determinant), which suggests that a model higher in predictive power provides a more accurate picture of the issues required for acceptability. Second, by examining the path significance (i.e., β value nomological framework), which suggests how important information is gained from the model. And finally, by examining the parsimonious structure, which suggests that the simpler the path, the easier the model will be to understand. The comparisons and common criticism in the literature provides key strengths for presenting the conceptual framework in the next chapter and also facilitates the elaboration of the results of the current study with limitations and future directions. Table 2.2 summarises the major predictors and key citations in technology acceptance research.

2.11.1. TAM vs. TPB

Both the TAM and TPB are grounded in SCT and are immediate successors to the TRA. The review of the previous relevant sections (sections 2.5 and 2.7) advocate that two models share points of similarity due to a causal uni-dimensional view of relationships among the constructs. Specifically, both models suggest that environmental beliefs influence cognitive beliefs, which in turn influence attitude and targeted behaviour. Conversely, two models differ in the perspective of beliefs, for example, the TAM believes that A towards BI is the result of beliefs- PEOU and PU (Davis et al., 1989; Davis, 1989); whereas TPB believes that BI is the result of the beliefs defined in the TAM as well as explicit situational beliefs (i.e., SN) and control beliefs (i.e., PBC) (Ajzen, 1991; Methieson, 1991).

This difference can be understood by the categorisation of beliefs factors as: external control beliefs, which deal with the time, opportunity and cooperation constructs; and internal control variables, which incorporate one's skills and motivational strengths (Ajzen, 1985). Davis et al., (1989), within the TAM, did not explicitly examine both external and internal beliefs; however, they considered them as part of the situational beliefs which were measured by the PEOU. After examining the model in mandatory situations, Davis found that the TAM produced significant explanatory variance in internal situational beliefs (i.e., self-beliefs and skills) but remained less satisfactory in explaining variance within external controlled beliefs. This suggests that the TAM, like its predecessor TRA, is based on the assumption of volitional control, and performs less effectively in situations where volitional control is perceived as low.

Contrary to this, TPB gains advantage over the TAM by including factor PBC which explains a person's perception of control over performing behaviour. Due to volitional control TPB is empirically favoured in published literature. For instance the literature suggests that, within mandatory settings, TPB, compared with the TAM, added about 4% to 5% variance in explaining BI and 1% in explaining BU (e.g., Taylor & Todd, 1995a, Mathieson, 1991). However, from generality perspective, TPB compared with TAM is less applicable. The TAM assumes that beliefs about behaviour are measured in a similar way in all situations, whereas TPB assumes that beliefs are context specific (Taylor & Todd, 1995a). Therefore, TPB requires an extra step (i.e., usually piloting) to identify those situations specific to the particular organisational context, individuals' needs, and hence becomes more complex if different groups of individuals or situations exists within a single context of the study.

Nevertheless, from the explanatory perspective (i.e., R^2), both models remain successful at their par. However, within voluntary settings the TAM had a slight advantage over TPB. An illustration of this can be inferred from the studies of Mathieson (1991), Taylor & Todd

(1995a) and Chau & Hu (2002). Mathieson (1991) compared two models with the objective of predicting the user's intention to accept spreadsheet programmes within a sample of students. The authors found that the TAM performed slightly better than the TPB. For instance, the TAM explained 69% variance, whereas TPB explained 60% variance. In addition, within TPB, the authors didn't find a significant impact of SN over BI (ibid). This supports the TAM's framework which excludes SN and asserts that social pressure is an inherent part of behavioural beliefs and its explicit inclusion in a model only increases the model's complexity rather than the explanatory power to predict the intention (Davis et al., 1989). However, contrary to the TAM's assumptions, as theoretically supported in psychology literature, Mathieson (1991) found a significant impact of PBC on BI. Mathieson's results were echoed by Chau & Hu (2002) during the study of the physicians to predict the acceptance of telemedicine technologies. The authors found the TAM to be slightly better than the TPB at explaining BI, i.e., TAM=40% and TPB=32%. Also, similar to Mathieson's study, they found a significant impact of PBC and insignificant impact of SN on BI (ibid). One major difference between the two studies was the effect of beliefs of PEOU on A. Mathieson found a significant effect of PEOU and PU on A in the TAM, whereas Chau & Hu found an insignificant effect of PEOU on A. This result is contrary to the generality perception of the TAM and suggests that the TAM, identical to TPB, produced differences in results when context/situations were different.

Contrary to these two studies, during the development of DTPB Taylor & Todd (1995a) compared two models in the sample of students and found TPB to be better than the TAM. The authors found that the TAM explained 52% variance in acceptance intention whereas TPB explained 57% variance. Also, as theorised with TPB and contrary to the TAM, both social beliefs (i.e., SN) and control beliefs (i.e., PBC) produced significant impact on BI. Observing mixed results favouring two models, Taylor & Todd (1995b) combined two models and presented an integrated model known as the augmented TAM. The authors examined A-TAM within the context of both experienced and inexperienced users' context and found that the model produced 43% variance within BI for experienced users and 60% variance for inexperienced users. Similar to the TAM, A-TAM produced an insignificant impact of SN within the context of both experienced and inexperienced users. The merger of two models within A-TAM suggests that either the TAM or TPB was not enough to obtain the required objectives and leaves a gap for further exploration and extensions of theoretical conceptualisations.

Observing studies and the discussion above, it is concluded that the TAM is easier to use and is useful for predicting user intentions in situations where contextual information is not needed. Additionally, due to its parsimonious structure and explanatory power it gained in advantage over TPB. However, TPB remained advantageous over the TAM when designing and predicating specific user behaviour was required in diverse situations. However, context specification also undermines the TPB due to its complexity when approaching comparative reference points between all individuals/organisational needs during the implementation process.

2.11.2. TPB vs. DTPB

The two models share the point of similarity that both are derived from the TRA and aims to predict an individual's planned and deliberated behaviour. On the contrary, the two models are different in the way that TPB is a direct successor of TRA with the assertion that BU is a direct function of BI and PBC, and that BI is formed by one's A, SN and PBC; whereas, with DTPB, the direct successor to TPB decomposes the beliefs presented in TPB from the literature of DOI theory that are generalisable across situations and not specialised to a specific context. In addition to the context generality, another purpose of decomposing the beliefs within TPB was its lack of explanatory power in BI during the applications' design and implementation process (Taylor & Todd, 1995a). The decomposition of beliefs was also supported by Shimp & Kavas (1984) who suggested that cognitive components of beliefs could not be organised into a single conceptual or cognitive unit, therefore needs to be fragmented according to the context of the study.

According to the published literature, within a specific context TPB is more advantageous over DTPB in explanatory power (Taylor & Todd, 1995a). In addition, due to its parsimonious structure TPB is easier to implement compared with DTPB; however, the reverse is not true (ibid). Usually a parsimonious model becomes desirable when the explanatory power of one's intention is required (Venkatesh et al., 2003). Therefore, within a general context and situations that explore in-depth knowledge, DPTB is more advantageous over TPB.

For taking decisions to select an appropriate model, there is a scarce amount of empirical studies, out of which a few are discussed to clarify differences. The first pioneering study was Taylor & Todd (1995a), which compared three models, the TAM, TPB and DTPB, within a sample of business students. From the explanatory power perspective, the authors found that DTPB was slightly better than TPB, in that DTPB explained 60% variance in BI and 76% variance in A; whereas TPB explained 57% variance in BI and 58% within A. In addition, the author concluded that DTPB provided greater diagnostic values, greater insights into the factors that influence IT usage, and suggested beliefs that can be targeted by designers or managers interested in implementation of information system (ibid).

Later on, similar results have been found by a few more studies recently. For instance, Shish & Fang (2004), in the context of Internet banking in Taiwan, found that DTPB explained 66% variance in BI and TPB explained 54%; Lin (2007), examining online shopping acceptance within the context of Taiwanese customers, found that DTPB explained 57% variance in BI and TPB explained 46%; finally, Huh et al., (2009), examining information system acceptance within South Korean hotels, found that DTPB explained 63% variance in BI and TPB explained 59%. Despite the higher explanatory power within BI in all exemplified studies, it was noticed that the path between SN and BI in all results pertaining to the DTPB was insignificant, which suggests that inclusion of SN only increased model complexity rather than explanatory power. After observing the examples above, it is inferred overall that, with the exception of the parsimonious structure condition, DTPB, compared to the TPB, is more favoured and advantageous to explain and identify the salient beliefs of the individual establishing acceptance behaviour towards new technologies.

2.11.3. TAM vs. TPB vs. DTPB

In the previous two sections (2.13.1 & 2.13.2) three models theoretically rooted in social psychological theory SCT, and derivatives of TRA were compared i.e., (i.e., TAM vs. TPB and TPB vs. DTPB). From the parsimonious perspective it was noticed that the TAM compared to TPB, and TPB compared to DTPB were better; however, from the perspective of explaining BI, the TAM compared with TPB was still better, but TPB was less effective than DTPB. Therefore, in line with the discussion in previous sections it can be inferred that at some extent both the TAM and DTPB were more advantageous than the TPB. In addition to the previous discussion, this section further examines the various issues which are thought to be making a distinction among these models and helps to favour one over another.

As discussed, the three models share points of similarity in that they all are derived from TRA and postulate that individual differences are based on influence of A, BI and BU only via the mediating construct of beliefs. However, later on, A was excluded from TAM but is still part of TPB and DTPB. On the contrary, three models differ from each other in that

TAM does not include SN and PBC as determinants of BI. Exclusion of the SN within the TAM at some extent is rational due to weak psychometric properties (e.g., Davis et al., 1989) and mixed results in literature i.e., significant and insignificant (e.g., Taylor & Todd, 1995a; Lin, 2007). However, omission of PBC is considered to be a major limitation (e.g., Mathieson, 1991; Venkatesh et al., 2003). Despite the fact that on one side omission of control beliefs within the TAM constrains its applicability to examine BI in situation when individuals have low level of volitional control (e.g., mandatory situations), on the other hand this is considered to be the favoured point because of its context-free generalisibility and parsimony in structure. On the other side, inclusion of the SN and PBC within TPB and DTPB makes them more favoured compared with the TAM to some extent due to applicability within mandatory situations and explaining greater insights into factors of individuals' behaviour acceptance. At the same time this inclusion leads to them becoming more context-specific and less in parsimonious structure (see discussion of TAM vs. TPB). Specifically, inclusion of SN due to unstable results remains a topic of debate and confusion in IT acceptance and favours TAM conceptualisation. For example, specifically looking at the DTPB, which is favoured over the TAM due to its higher explanatory power (Taylor & Todd, 1995a), some researchers found a significant effect of SN over BI (e.g., Taylor & Todd, 1995a; Huh et al., 2009) while others found no effect (e.g., Chau & Hu, 2002; Shish & Fang, 2004; Lin, 2007).

Another point which favours the TAM over TPB and DTPB is exclusions of A which showed partial mediated effect at the time of creation (e.g., Davis et al., 1989). This exclusion made the TAM more parsimonious, and avoided the possibility of a mediating impact between behavioural beliefs and behaviour itself. However, on the other hand, TPB and DTPB still examine behaviour through the mediating effect of BI between A and BU; this might invite the risk of distorted results in situations where intentions are ill-formed (i.e., partial or no mediation effect) (e.g., Bagozzi & Yi, 1989). In favour of omission of A, Chau & Hu (2001) recently excluded A from DTPB and found a significant impact of COMP on PU and PEOU. This result favours our argument that inclusion of A is a limitation rather than an advantage of TPB and DTPB models.

Apart from the above rationales, the limitations of the TAM, which favours TPB and specifically DTPB, include: its self-reported usage instrument (e.g., Davis, 1993); construct BU not being examined with actual measures of usage behaviour (e.g., Matheision, 1991); inability to explain the explanatory variance more than 30% to 40% (Venkatesh et al., 2003; Taylor & Todd, 1995a); and finally, lack of external variables examination (e.g., Igbaria and Iivari, 1995). From the explanatory perspective, Taylor & Todd (1995a) compared all three models and found that DTPB provided an increased explanatory power for BI i.e., 60%; this compared with 57% of TPB and 52% of the TAM. Similar results were also found for explaining intention by Lin (2007) i.e., TAM=0.41%, TPB=0.46%, DTPB=0.57; and by Huh et al., (2009) i.e., TAM=0.61%; TPB=0.59%; DTPB=0.63%.

In summary, the importance of all three models, specifically the TAM and DTPB, is clear and indisputable. What is not clear, however, is the extent to which models need to be parsimonious as well as capable of explaining individuals' differences that matters in establishing acceptance behaviour. Up to this point in the discussion, it is concluded that TAM is the most favoured model over others if it is extended with situational and volitional factors similar to TPB and external factors similar to DTPB. This argument can be read in the literature that extended the TAM. For instance, Yi et al., (2006) developed an integrated model based on the TAM, TPB and IDT to assess the acceptance and design of hand-held devices in the health-care sector; it found a significant increase in explaining BI (i.e., 57%) as compared to pure TAM-based studies' variance (i.e., 30% to 40%).

2.11.4. TPB vs. DTPB vs. TRA

Up until this point in the discussion, the models compared were rooted in the social psychological theory SCT and directly derived from TRA. Nevertheless, models and theories are derived with the aim of overcoming the limitations of preceding one, but this does not mean that they would be better in all aspects from their earlier versions. In accordance with that assumption, the next few sections compare the models derived from TRA (e.g., the TAM, TPB) and TRA itself. The comparison helps to comprehend the real needs that were required at to be complete successive models.

The first extension of TRA was TPB. The two models were similar in that dependent variable of interest was an overt and observable manifestation of the focal behaviour. Specifically, both theories posit that such BU is influenced by an individual's BI, which in turn is determined by the individual's A and SN towards BI (Ajzen, 1985). However, unlike the TRA, TPB introduces an additional construct of PBC as a predictor of BI as well as BU. The inclusion of this additional construct within TPB was to overcome the limitation of TRA when predicting behaviour under conditions where individuals were having low or no volitional control (e.g., Ajzen, 1991; Taylor & Todd, 1995a). According to TPB, volitional control of individuals is unpredictable towards behaviour which needs to be observed with external variable PBC (Ajzen 1985; Madden et al., 1992). Examining the effect of newly added construct PBC within TRA, Madden et al., (1992) compared two models within the student sample to examine the 10 behavioural activities. The authors found that PBC presented a significant increase in the prediction of BI, on average, from R^2=48% to 59%, and within BU, R^2=28% to 38% (ibid). These results suggest that inclusion of PBC significantly enhances the prediction of BI as well as target behaviour.

Although TPB provided a solution for the TRA's volitional control assumption, but it still lacks a solution for the inherent assumption of the proximity between BI and BU, which requires specific situations to predict the actual behaviour. In other words, beliefs to measure were still context specific (Foxall, 1997). This limitation was acknowledged by Taylor & Todd (1995a) in the model comparison study. The author decomposed beliefs of TPB that were generalisable across the situations and named the model as DTPB. When comparing the three models, the TAM, TPB and DTPB, Taylor & Todd found that DTPB provide increased explanatory power compared with others, however, it had a less parsimonious structure. Recently, Shish & Fang (2004) compared TRA with its two extensions TPB and DTPB when examining the acceptance of Internet banking in Taiwan. As expected, the author found that DTPB was the most successful model followed by TPB and TRA respectively. Specifically, explaining BI and BU, the authors found that DTPB explained 66% and 23% variance, TPB explained 54% and 24% variance, and TRA explained 46% and 20% variance respectively. In summary, it is observed that DTPB was more favoured over others from the perspective of the context generalisability as well as explanatory power. Therefore, it can be argued that extending the model to understand the in-depth knowledge is an essential requirement rather than just desirable.

2.11.5. TAM vs. TPB vs. TRA

In line with the discussion on comparing the extensions of TRA with its original conceptualisation and empirical findings, this section aims to examine another extension i.e., the TAM with TRA and its extension, TPB. Before commencing the discussion, it is worth noting that a comparison of the TAM and TPB has already been discussed in section (2.13.3), and a comparison of TRA and TPB is presented in section (2.13.4). Here, the researcher only highlights the main differences between TRA and the TAM with some empirical evidence.

TAM is an immediate succession of TRA. Two models, TRA and the TAM, share the point of similarity that BI is the major determinant of BU. Both models share the limitation of volitional control, where it is assumed that individuals are usually rational when making the decision to engage in a specific behaviour (e.g., Fishbein & Ajzen, 1975; Davis et al., 1989). The two models differ from each other due to two main reasons. First, unlike TRA, the TAM does not include SN as a predictor of BI due to its uncertain theoretical and psychometric properties (e.g., Davis et al., 1989). Second, unlike expectancy formulation of beliefs examined in TRA, the TAM posits only two beliefs: PU and PEOU to predict an individual's A (however in the final TAM, A was removed due to partial mediaion effect) and BI. The two differences elicited makes the TAM more advantageous compared with TRA. For instance, it was noticed previously that SN remained an unstable predictor to explain BI (e.g., Chau & Hu, 2002; Shish & Fang, 2004; Lin, 2007) therefore its inclusion in a model only increases the complexity rather than explanatory power. The second difference, the addition of normative beliefs (e.g., system design characteristics, individuals' characteristics, task characteristics, nature of development process, political factors, and organisational factors) and their expectancy formulation with A is also considered to be a limitation of TRA, because for each new context new beliefs need to be elicited that are idiosyncratic in nature and cannot be generalised for other systems (Davis et al., 1989).

Overall, the importance of the two models remains unarguable. Davis et al., (1989) in a paper entitled 'User acceptance of computer technology: a comparison of two theoretical models' compared two models in a longitudinal study with a sample of 107 MBA students. Upon comparing the results of two models in voluntary settings the authors found the TAM to be better than TRA in explaining BI. Specifically, at two time intervals TRA explained 32% and 26% variance, whereas the TAM explained 47% and 51% variance. Additionally, as theorised in TRA, Davis did not find a significant impact of SN on BI, and hence supports the TAM's conceptualisation.

Very little research is found in published literature on comparing the three models, TRA and its two extensions, the TAM and TPB. One reason could be their dichotomous differences in conceptualisation. For example, there are studies that compare the conceptualisation of the TAM vs. TRA (e.g., Davis et al., 1989), TAM vs. TPB (e.g., Mathieson, 1991), or TRA vs. TPB (Madden et al., 1992), but studies that compare all the models together are very scarce. Gentry & Calantone (2002) compared three models to examine the buyer intention on the web and found that the TAM explained higher variance in BI i.e., 91% followed by TPB with 85% and TRA with 57%. In another study Venkatesh et al., (2003), during the development of UTAUT, compared the results of eight prominent models including TRA, TAM, TPB and DTPB as well. The authors found that within voluntary settings the TAM was better than the other two models. For instance, explaining BI, the TAM explained 38% variance, whereas TRA explained 30% and TPB/DTPB explained 37% variance. Also, in mandatory settings unexpectedly the TAM was better than the other two. For example, TAM explained 39% variance, TRA explained 26% variance, and TPB/DTPB explained 34% variance (ibid).

In conclusion, all three models have clear strengths over each other. However, the TAM precedes the other two due to its simple structure and consistent explanatory power, while in the design and implementation process, the other two models are considered to be better than the TAM. Considering the advantages, Venkatesh & Davis (2000) integrated all three models together and named it the TAM2. The authors' integration approach was successful and the model explained a 60% variance in BI within four different organisational contexts (ibid). The lesson learned from Venkatesh & Davis' (2000) findings suggest that selecting constructs from the multitude models is the favoured approach to overcome the limitations of earlier models and equally contributes to extending the present theoretical frameworks.

2.11.6. TAM2 vs. UTAUT and other models

Finally, in accordance to the previous section's summary of that integrating approach (e.g., TRA, TAM, and TPB within the TAM2) and the more detailed view of the unexplored issues in technology acceptance research, this section presents a comparison between two widely accepted integrated models, the TAM2 and UTAUT, developed by Venkatesh & Davis (2000) and Venkatesh et al., (2003) respectively. The two models share points of similarity in that both are based on the integrating approach and the paths are examined based on the cross-over effect (e.g., Venkatesh & Bala, 2008). Both models address acceptance as well as usage by excluding the concept of A and assume that perceived technological characteristics will directly influence the individuals' BI to accept the technology under consideration. Social norms (i.e., subjective norms in the TAM2 and social influence in UTAUT) and voluntariness of use were re-entered in the models that were previously omitted or were considered to be a limitation of the TAM. Finally, the moderating impact of usage experience over social norms was also highlighted in both models.

Contrary to the similarities, the two models differ in that the TAM2 applies the integrating approach based on a stream of research which intends to examine the key determinants of user acceptance due to the PU (e.g., Davis et al., 1989), rather than incorporating them into the nomological framework; whereas UTAUT examines the additional constructs directly as part of the framework. Second, unlike UTAUT, the TAM2 does not incorporate the effect of the demographic variables (i.e., age and gender) that remain powerful moderators in information system acceptance research (e.g., Venkatesh & Morris, 2000). And finally, the TAM2 includes uni-dimensional constructs (i.e., singular in nature and cannot be broken into further dimensions), whereas UTAUT incorporates multidimensional constructs (i.e., constructs are developed by summing up more than one uni-dimensional construct).

From the perspective of effectiveness, both models remain strong in explanatory power in comparison with the earlier version, except providing a less parsimonious structure. However, parsimony is not the only factor for the acceptance of a model. According to Taylor & Todd (1995b), models need to be evaluated in terms of their explanatory power as well as parsimony. Whereas Venkatesh et al. (2003), supporting Taylor & Todd, argued that parsimony is desirable to the extent that it facilitates understanding. By looking at the overall criticism of both models, the TAM2 and UTAUT, in sections (2.8 & 2.10) respectively, it is argued that the TAM2 is better than UTAUT. Despite the fact that UTAUT explained a higher variance in explaining BI (see Venkatesh et al.'s (2003) comparison of eight models where UTAUT was better than the rest) but it was only accounted due to moderating factors (Raaj & Schepers, 2006). Also, UTAUT's approach to integrate multidimensional constructs from the pool of uni-dimensional constructs is not a valid approach to examining the effect of all the 41 independent variables for predicting intention (Bagozzi, 2007). Therefore, apart from its approach to integrating the constructs of interest to predict intended behaviour, the TAM2 is considered to be better than UTAUT. The comparative results from the explanatory power perspective are not presented in this section because, as far as the researcher is aware, there is no study that compares the results of these models simultaneously in one single study, except for Venkatesh et al., (2003). He found that TAM2 produced 38% variance in voluntary settings and 39% in mandatory settings, whereas UTAUT explained 52% to 77% variance in predicting behaviour intention. The findings of just Venkatesh et al., (2003) cannot be taken as evidence of generalisation to explain the higher explanatory power due to the chance of the researchers' bias to support their own results compared with others.

Author	Purpose of Study	Context/Sample/ methodology	Moderators	Variable	Model	Variance/ Explanatory power (R^2)	Significant Findings	Non-Significant findings
Mathieson (1991)	Comparative study between TAM and TPB	Spread Sheet word processing program Students (262) Longitudinal Study	NA	PEOU, PU, A, BI, SN,PBC	TAM	A = 0.727 PU=0.442 BI=0.69	EOU→PU, EOU+PU→A A+PU→BI	
					TPB	A= 0.388 BI= 0.60	PBC+A→BI	SN→BI
Chau and Hu, (2002)	Comparative study between TAM, TPB, DTPB	Healthcare-Telemedicine technology- Hong Kong Physicians(400) Cross-sectional Study	NA	PEOU, PU, A, BI, SN, PBC, COMP	TAM	BI= 0.42 A= 0.36 PU=0.01	A→BI, PU→BI PU→A	PEOU→PU PEOU→A
					TPB	BI =0.32	A→BI, PBC→BI	SN→BI(-ve)
					DTPB	BI=0.42 A=0.37 PU=0.53 PEOU=0.01	A→BI, PBC→BI, PU→BI, PU→A, COMP→PU	SN→BI (-ve) PEOU→PU PEOU→A COMP→PEOU
Taylor and Todd (1995b)	Combined TAM and TPB and examination based on experience	Computing resources project Student (430 and 356) Longitudinal Study	EXP	PU, PEOU, A, SN, PBC, BI, B	A-TAM	Experience B = 0.21 BI= 0.43	Experience BI→B, PBC→BI	Experience A→BI, PU→A SN→BI
						Inexperience B = 0.17 BI= 0.60	Inexperience PU→BI, PBC→B, PEOU→A	Inexperience A→BI, PU→A SN→BI
Taylor and Todd (1995a)	Comparative study between three models TAM, TPB, DTPB	Computing resource project- Student(786) Longitudinal Study	NA	PEOU, PU, A, BI, SN, PBC, COMP,BU,PI,SI,SE,RF,TF	TAM	B=0.34 BI= 0.52 A= 0.73	PU→BI, PU→A PEOU→PU, PEOU→A BI→BU	A→BI (-ve)
					TPB	B=0.34 BI =0.57 A=0.58 SN=0.50 PBC=0.84	A→BI, BI→BU PBC→BI, PBC→BU SN→BI	
					DTPB	B=0.36 BI =0.60 A=0.76 SN=0.57	PU→A, A→BI PI→SN, SI→SN SN→BI, SE→PBC RF→PBC, PBC→BI	PEOU→A COMP→A TF→PBC(-ve)

						PBC=0.69	PBC→BU	
Shih and Fang (2004)	Comparison of TPB and DTPB with TRA	Internet Banking in Taiwan- Individuals (425) Cross-sectional Study	NA	BI, BU, A, SN, PBC, RA, COMP, COLX, NI, PBC, FC	TRA	BI= 0.46 BU=0.20 A=0.59 SN=0.78	A→BI BI→BU	SN→BI
					TPB	BI= 0.54 BU=0.24 A=0.63 SN=0.90 PBC=0.41	A→BI BI→BU	SN→BI PBC→BI
					DTPB	BI= 0.66 BU=0.23 A=0.82 SN=0.99 PBC=0.39	A→BI, PBC→BI BI→BU, NI→SN RA→A, COLX→A(-ve) SE→PBC	SN→BI (-ve) COMP→A (-ve) RF→PBC(-ve)
Lin (2007)	Comparison between TAM, TPB and DTPB	Online shopping of book stores in Taiwan Customers(297) Cross-sectional Study	NA	A,BI,BU,SN, PBC, PEOU, PU, COMP, INI, EIN, SE, FC	TAM	A=0.58 BI=0.41 BU=0.30	PEOU→PU, PEOU→A PU→A, PU→BI A→BI, BI→BU	
					TPB	BI=0.46 BU=0.31	A→BI, PBC→BI PBC→BU, BI→BU	SN→BI
					DTPB	A=0.63 SN=0.43 PBC=0.52 BI=0.57 BU=0.33	PU→A, PEOU→A COMP→A, INI→SN EIN→SN, SE→PBC A→BI, PBC→BI PBC→BU, BI→BU	FC→PBC SN→BI
Huh et al., (2009)	Comparison between TAM, TPB and DTPB	IT acceptance in Hotel industry in South Korea Employees(319) Cross-sectional Study	NA	PU,PEOU,A,BI,SN,PBC, COMP,PI,SI,SE,TS	TAM	PU=0.34 A=0.58 BI=0.61	PEOU→PU, PEOU→A PU→A, PU→BI A→BI	
					TPB	BI=0.59	A→BI, SN→BI, PBC→BI	
					DTPB	A=0.69 SN=0.38 PBC=0.50	PU→A, COMP→A PI→SN, SI→SN SE→PBC, TS→PBC	PEOU→A

						BI=0.63	A→BI, SN→BI, PBC→BI	
Yi et al. (2006)	Integrated view of technology acceptance models	Health-care- use of PDA- Physician(222) Cross-sectional Study	NA	BI, PU, PEOU, PBC, SN, RD, IMG, PII	TPB, TAM, IDT,	PEOU= 0.70 PU=0.49 SN=0.07 PBC=0.29 BI=0.57 RD=0.31 IMG=0.24	PII→RD, PI→PBC PII→SN, PII→PEOU RD→PU, RD→PEOU IMG→PU, PBC→BI PBC→PEOU, PEOU→PU PEOU→BI, PU→BI SN→BI, SN→IMG SN→PU	PII→IMG
Wu et al. (2007)	Revision of technology acceptance models (TAM and IDT)	Health-care use of mobile devices- Taiwan Physician(310) Cross-sectional Study	NA	BI, PU, PEOU, SE, COMP, TST	TAM, IDT	BI=0.70 SE= 0.56 PU=0.70 PEOU=0.65	COMP→BI, COMP→PU COMP→PEOU, COMP→SE SE→PU, SE→PEOU TST→SE, PU→BI PEOU→PU, PEOU→BI	TST→PU TST→PEOU
Lewis et al. (2003)	Individual beliefs about IT use- integration of theoretical perspectives	Education- use of web technology- Academics (161) Cross-sectional Study	NA	PU, PEOU, SE, PI, ITMS,ILMS, SF,	TAM, IDT, SCT, SIP	PU=0.50 PEOU=0.40	ILMS→PEOU, ITMS→PU SE→PEOU, PI→PEOU PI→PU	PEOU→PU ITMS→PU SF→PU SE→PU
Teo et al. (1995)	Accessing the ability of IDT theory for adoption of financial EDI system	EDI system- Singapore Stock-exchange Employees (105) Cross-sectional Study	NA	RA, COLX, OBS, COMP, TRI, RSK	IDT	AI= 0.38	Present intension RA, COLX, OBS, RSK,, Future intention COLX, OBS, TRI,RSK	Present intention COMP, TRI Future intention RA, COMP, RSK
Wu and Wang (2005)	Extension of TAM and testing in mobile commerce	use of internet for online-banking, shopping, investing , services- Taiwan Customer (310) Cross-sectional Study	NA	RSK, CO, COMP, PU, PEOU, BI, BU	TAM, TAM2, IDT	RSK, CO, PU, PEOU, BI, BU > 0.5	BI→BU, CO→ BI (-ve) COMP→ BI, COMP→PU PEOU→PU, PU→BI	RSK→BI PEOU→BI

Venkatesh and Davis (2000)	Extension of TAM called TAM2 by integrating models TAM, TRA,TPB	Four different organisational systems. Employees (156) Longitudinal Study	EXP VOL	SN, IMG, JR, OQ,RD, PU, PEOU, BI, BU	TAM2	BI= 0.60	SN x EXP→BI SN x VOL→BI SN x EXP→PU (-ve) SN→IMG, IMG→PU JR x OQ→PU RD→PU, PEOU→PU PEOU→BI, PU→BI BI→BU	
Venkatesh et al.(2003)	Unified view of acceptance of information technology: integrated view based on TRA, TAM, MM,TPB, C-TAM-TPB,MPUCU, IDT.SCT	Four different organisational systems. Employees (215) Longitudinal Study	G,AG, EXP, VOL	PE, EE, SI, FC, SE, CA, A, BI, BU	UTAUT	BI= 0.70	PE x AG→BI PE x G→BI EE x AG→BI EE x G→BI EE x EXP→BI FC x AG→BI FC x EXP→BI	FC→BI SE→BI CA→BI A→BI, BI→BU
Venkatesh and Morris (2000)	Examination of Gender and social influence over TAM	Five different organisational context Employees (342) Longitudinal Study	G, Time	PU, BI, PEOU, SN,	TAM	Short-term effect BI=0.41	PU→BI (M>W) PEOU→BI(W>M) SN→BI(W>M)	PEOU→PU(M>W)
						Long-term effect BI=0.41	PU→BI (M>W) PEOU→BI(W>M) SN→BI(W)	PEOU→PU(M>W) SN→BI(M)
Venkatesh (2000)	Determinants of PEOU	Three different organisational context Employees (246) Longitudinal Study	Time	PEOU, PU, BI, CA, SE, CPL, PEC, PEN, OBU	TAM	Time1 PEOU=0.40 BI=0.35	SE→PEOU, PEC→PEOU CA→PEOU(-ve) CPL→PEOU, PEOU→PU PEOU→BI, PU→BI	PEN→PEOU OBU→PEOU
						Time2 PEOU=0.54 BI=0.34	SE→PEOU, PEC→PEOU CA→PEOU(-ve) CPL→PEOU, PEN→PEOU	

							OBU→PEOU, PEOU→PU PEOU→BI, PU→BI	
						Time3 PEOU=0.60 BI=0.35	SE→PEOU, PEC→PEOU CA→PEOU(-ve) CPL→PEOU, PEN→PEOU OBU→PEOU, PEOU→PU PEOU→BI, PU→BI	
Venkatesh et al, (2000)	Gender differences in technology adoption decision making process	Four software companies Employees(355) Longitudinal Study	G, Time	A, BI, SN, PBC	TPB	Men BI=0.35	A→BI	SN→BI PBC→BI
						Women BI=0.36	A→BI, SN→BI PBC→BI	
Morris and Venkatesh (2000)	Age difference in technology adoption decision making process	Data retrieval software system Employees (118) Longitudinal Study	AG, Time	A, BU, SN, PBC	TPB	Short-term usage BU=0.52	AG X A→BU(-ve) AG X SN→BU AG X PC→BU	
						Long-term usage BU=0.48	AG X A→BU(-ve) AG X PC→BU	AG X SN→BU
Venkatesh et al. (2004)	Examination of Gender as psychological construct in technology acceptance	Examination of computer based system in organisation Employees (552) Longitudinal Study	G, Time	A, BU, SN, PBC, MAS, FEM, AND	TPB	Men and women BU=0.36	A→BU (M, W) SN→BU(W) PBC→BU(W)	SN→BU(M) PBC→BU(M)
						Masculine BU=0.36	A→BU	SN→BU PBC→BU
						Feminine BU=0.34	SN→BU PBC→BU	A→BU
						Androgynous BU=0.34	A→BU , SN→BU PBC→BU	
Hsu and Chiu (2004a)	Predicting of Electronic Services with revised DTPB	E-Services, of 100 companies in Taiwan Employees(149) Cross-sectional Study	NA	II, EI, PU, RSK, PP, SE, PC,ES	DTPB	I= 0.75	II→ES, PU→ES PP→ES, SE→I	ES→ES RSK→ES (-ve) SE→ES, PC→I

Gupta et al. (2008)	Examining ICT adoption using UTAUT	E-Government within internet government organizations. Employees (102) Cross-sectional Study	G	PE, EE, SI, FC, BI, G,BU	UTAUT	NA	PE→BI, EE→BI SI→BI, FC→BU	BI→BU PE x G→BI EE x G→BI SE x G→BI
Ma et al. (2005)	Examining acceptance of technology in Education System	Computer technology- students and academics(84) Cross-Sectional Study	NA	SN, PU, PEOU, BI	TAM, TRA	BI=0.43 PU=0.11	PU→BI, PEOU→PU	SN→PU, SN→BI PEOU→BI
Hsu and Chiu (2004b)	Internet self-efficacy acceptance	e-services- Taiwan students(239) Cross-sectional Study	NA	IN, SCN, WSE, PBC, PU, PEOU, RSK, ISE, BI, BU,A	TAM, TRA TPB DTPB	BI=0.50 BU=0.30	PU→A, PEOU→A RSK→A (-ve) ISE→A, ISE→WSE A→BI, WSE→BI WSE→BU	IN→BI, SCN→BI PBC→BI, PBC→BU
Seyal et al. (2002)	Use of internet in academics	Internet in teaching- Brunei Darussalam Academics(166) Cross-sectional Study	NA	EXP, OWN, PU, PEOU, TSK	TAM	PU=0.38	PU→BU, PEOU→BU EXP→BU	OWN→BU, TSK→BU
Hu et al. (2003)	Examination of technology acceptance in teaching	Micro soft word program- Academics(130) Longitudinal Study	Training	PEOU, PU, SN, JR, COM, SE, BI	TAM, TRA, IDT	Prior-training BI=0.47	Prior-training JR→PU, COM→PEOU SE→PEOU, SE→BI SN→BI, SN→PU (-ve) PU→BI, PEOU→PU	Prior-training PEOU→BI COM→PU
						Post-training BI=0.72	Post-training JR→PU, COM→PEOU COM→PU (-ve) SE→PEOU, SE→BI SN→BI, SN→PU (-ve) PU→BI, PEOU→PU	Post-training PEOU→BI SN→BI

Igbaria et al. (1997)	Revised TAM model	Use of computing technology in SME Employee (358) Cross-sectional study	NA	PU, PEOU,SU, ICS, ICT, MS, ECS, ECT	TAM, TRA	PEOU=0.4 PU=0.30 SU=0.25	MS→PEOU, ECS→PEOU ECT→PEOU, ICT→PU MS→PU, ECS→PU ECT→PU, PEOU→PU MS→SU, ECS→SU ECT→SU, PEOU→SU PU→SU	ICS→PEOU ICT→PEOU ICS→PU, ICS→SU ICT→SU
Igbaria et al., (1995)	Revised TAM	Micro computer usage Student(212) Cross-section Study	NA	UT, EXP, EUCS, MS, SQ, PEOU, PU, PRU,VRU	TAM TPB	PEOU=0.26 PU= 0.48 PRU=0.27 VRU=0.26	UT→PEOU, UT→PU UT→PRU, UT→VRU EXP→PEOU EXP→PU(-ve) EXP→PRU, EXP→VRU EUCS→PEOU, EUCS→PU EUCS→PRU, EUCS→VRU MS→PEOU, MS→PU MS→PRU, MS→VRU SQ→PEOU, SQ→PU SQ→VRU, PEOU→PU PEOU→PRU, PEOU→VRU PU→PRU, PU→VRU	SQ→PRU

Igbaria and Iivari (1995)	Revised TAM	Self-efficacy on computer usage Employee (450) Cross-sectional study	NA	EXP,SE, CA, ORG, PEOU, PU, U	TRA, TPB, TAM	SE=0.12 CA=0.07 PEOU=0.26 PU=0.30 U=0.26	EXP$\rightarrow$SE, EXP$\rightarrow$CA(-ve) ORG$\rightarrow$SE, SE$\rightarrow$CA(-ve) EXP$\rightarrow$PEOU, ORG$\rightarrow$PEOU SE$\rightarrow$PEOU, CA$\rightarrow$PEOU(-ve) EXP$\rightarrow$PU, ORG$\rightarrow$PU PEOU$\rightarrow$PU, EXP$\rightarrow$U PU$\rightarrow$U	ORG$\rightarrow$CA(-ve) SE$\rightarrow$PU CA$\rightarrow$PU(-ve) ORG$\rightarrow$U, SE$\rightarrow$U CA$\rightarrow$U(-ve) PEOU$\rightarrow$U
Igbaria (1991)	Revised TAM	User acceptance of microcomputer technology Student(187) Cross-sectional study	NA	AGE, GENDER, EDU, CA, UT, EXP, MS,PU, A, BI	TAM	CA=0.28 PU=0.48 A=0.36 BI=0.24 U=0.70	AGE$\rightarrow$CA, GENDER$\rightarrow$CA EDU$\rightarrow$CA(-ve) UT$\rightarrow$CA(-ve), EXP$\rightarrow$CA(-ve) MS$\rightarrow$CA(-ve) AGE$\rightarrow$PU(-ve) GENDER$\rightarrow$PU(-ve) EDU$\rightarrow$PU, UT$\rightarrow$PU EXP$\rightarrow$PU, MS$\rightarrow$PU CA$\rightarrow$PU(-ve) GENDER$\rightarrow$A(-ve) EXP$\rightarrow$A, MS$\rightarrow$A PU$\rightarrow$A, AGE$\rightarrow$BI(-ve) GENDER$\rightarrow$BI(-ve) EDU$\rightarrow$BI, UT$\rightarrow$BI EXP$\rightarrow$BI, MS$\rightarrow$BI CA$\rightarrow$BI(-ve) PU$\rightarrow$BI, A$\rightarrow$BI AGE$\rightarrow$U, EDU$\rightarrow$U UT$\rightarrow$U, EXP$\rightarrow$U MS$\rightarrow$U, PU$\rightarrow$U A$\rightarrow$U, BI$\rightarrow$U	AGE$\rightarrow$A EDU$\rightarrow$A UT$\rightarrow$A(-ve) CA$\rightarrow$A(-ve) GENDER$\rightarrow$U CA$\rightarrow$U

Davis et al., (1989)	Development of TAM and comparison with TRA	Word processing Student(107) Longitudinal Study	NA	PEOU, PU, A, BI, SN	TRA	BI=0.26 A=0.30	A→BI	SN→BI
					TAM	BI=0.51 A=0.36 PU=0.05	PU→BI, PU→A PEOU→A, PEOU→PU	A→BI

Table 2.2: Comparison of various technology acceptance models based on constructs significance and explanatory power (R2)

PEOU=perceived ease of use, A=attitude=, BI= behavioural intention= B(U)= Behaviour (usage), PBC= perceived behavioural control, SN= subjective norms, EXP= experience, VOL= voluntariness, IMG= image, JR= job relevance, RD= result demonstrability, OQ= output quality, G= gender, AG= age, PE= performance expectancy, EE= effort expectancy, SI= social influence, FC= facilitation conditions, SE= self efficacy, CA= computer anxiety, COMP= compatibility, PI= peer influence, SI= superior influence, RF= resource facilitation, TF= technology facilitation, TS= technical support, PII= personal innovativeness in IT, RA= relative advantages, CPL= computer playfulness, PEN= perceived enjoyment, OBU= objective usability, PEC= perception of external control, COLX= complexity, NI= normative influence, INI= interpersonal influence, EIN= external influence, MAS= masculinity, FAM= femininity, AND= androgynous, M=Men, W=Women, EDU=educational level, ORG=, organisational support, UT= user training, ECUS= end user computing support, SQ= system quality, PRU= perceived usage, VRU= variety of use, MS= management support, ICS= internal computing support, ICT= internal computing training, SU= system usage, ECS= external computing support, ECT= external computing training, PWN= PC owner ship, TSK= task characteristics, IN= interpersonal norm, SCN= social norms, WSE= web self-efficacy, ISE= internet self-efficacy, TST= Technical support and training, SF= Social Factors, ITMS= Institutional factors top-management support, ILMS= institutional factors local-management support, OBS= observability, TRI= trialability, RSK= Risk, AI= Adoption intention, CO= Cost, II= interpersonal influence, EI= External influence, PP= Perceived playfulness, PC= Perceived controllability , ES= e-service satisfaction.

2.12. Cultural issues and IT acceptance

In an attempt to answer the second research question, that is, 'Is there any perception of difference between segments of users (i.e., academics) towards acceptance of technology (the Internet) due to their individual cultural differences', this section discusses a number of issues related to culture and its impact on theories to predict an individual's acceptance behaviour. In doing so, a review of culture enables more information about its role in the theories of behavioural acceptance and answers questions such as why the theories and models developed in one country have met with limited success when applied in another context or rather, why theories and models are not found to be uniformly effective across the cultures when the aim is to predict an individual's acceptance of newer technologies. To answer these questions, the discussion strives to define culture, cultural models and dimensions, and their impact on the theories of IT acceptance in the literature.

2.12.1. Defining culture

A number of researchers have attempted to provide an acceptable definition of culture but there has been very little agreement with respect to an appropriate definition. In an effort to establish a consensus-based definition, Kroeber & Clyde Kluckhohn (1952) in their book *Culture: A critical review of concepts and definitions* examined 164 definitions. Despite these efforts, due to different levels and perspectives of understanding, there is little agreement except on a few prominent definitions of culture within sociology, social psychology and anthropology literature. From the anthropological perspective, where most of the cultural studies are established, some definitions related to the purpose of the current study are presented as follows.

According to Crane (1994), the term 'culture' can be defined as something that is an observable or recordable act; whereas, according to Mead (1953), it is a shared pattern of behaviour. These two definitions imply the single idea that culture is a group-level construct that is situated between the personality of the individual and human nature. In addition, it also implies that studying culture requires little more than observing and describing behaviour. Consistent with and in support of the themes of these two definitions, Hoecklin (1995, pp.24-25) defined culture as a "shared system of meanings; relative, learned; (and) about groups". A similar but more parsimonious definition was proposed by Hofstede & Hofstede (2005, p.4) as "culture is the collective programming of mind that distinguishes the members of one group or category of people from another". In addition, he named culture as “mental programming, software of the mind”. Hence, without contentions, it is argued that culture is a learned way of life that shares and shapes individuals’/groups’ attitudes, values and practices, and gives them a separate identity to differentiate themselves from other member groups.

2.12.2. Layers of culture

According to Hofstede (1980), several layers of cultural programming exist which encompass the range of cultures operative on an individual’s behaviour. Indeed, establishing a precise definition of culture remains contentious due to lack of its understandibility at different levels, ranging from individual to the national level (Karahanna et al., 2005). The importance of different layers within cultures can be understood from two famous definitions presented by Kroeber & Kluckholn (1952) and Triandis (1972).

According to Kroeber and Kluckholn (1952, p.86), culture is defined as “patterned ways of thinking, feeling and reacting, acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values”.

Whereas according to Triandis (1972, p.4): “[subjective] culture is defined as individual’s characteristic way of perceiving the man-mad part of one’s environment. It involves the perception of rules, norms, roles, and values, is influenced by various levels of culture such as language, gender, care, religion, place of residence, and occupation, and it influences interpersonal behaviour”.

Based on the above two core assumptions, Hofstede & Hofstede (2005) described culture as an onion that can be peeled, layer by layer, to reach the core. According to Hofstede, the outer layer represents symbols such as words, colours and the behaviour of others that may have special meaning; the second layer represents heroes who are example of admiration and can be representative of model behaviour; the third layer represents rituals; and finally, the fourth layer represents social values such as respect and greetings between people. According to the author, symbols, heroes and rituals can be measured just by observations; however, values are more difficult to understand due to higher invisibility/inconsistency within society/groups (ibid). In a similar vein, specifically within information system research, Karahanna et al. (2005) imparted five levels of culture as: supranational, national, professional, organisational and group-level cultures (see Table 2.3). According to the author, understanding and recognising individual-level workplace behaviour can function on all different levels of the cultures simultaneously (ibid).

Level	Definition
Supranational	Any cultural differences that cross national boundaries or can be seen to exist in more than one nation. Can consist of: • Regional: a group of people living in the same geographic area • Ethnic: a group of people sharing common and distinctive characteristics • Linguistic: group of people speaking the same tongue
National	Collective properties that are ascribed to the citizens of countries (Hofstede, 1984).
Professional	Focus on the distinction between loyalty to the employer organisation versus loyalty to the industry (Gouldner, 1957).
Organisational	The social and normative glue that holds organisations together (Siehl & Martin, 1990).
Group	Cultural different that are contained within a single group, workgroup, or other collection of individuals at a level less than that of the organisation.

Table 2. 3: Levels of culture: Source: Karahanna et al. (2005, p.5)

Apart from Karahanna's et al., (2005) cultural levels, a number of studies have recently started to realise the growing importance of cultural issues and have examined them on different levels. Mostly, within information system research, cultural issues are highlighted either at organisational or national level. For instance, though it is not exhaustive, Table 2.4 displays some of the multi-level cultural studies conducted in the information system domain. Additionally, observing the importance of cultural issues, *IEE Transaction on Engineering Management* recently published a special issue on cultural issues. Of the eight articles featured, three (Ford et al., 2003; Loch et al., 2003; Rose et al., 2003) specifically focused on national culture, and two (Doherty & Doig, 2003; Huang et al., 2003) focused on organisational culture. The remaining two articles (Tan et al., 2003; Weisinger & Trauth, 2003) highlighted issues related to the different levels of culture, for instance national-level cultural issues (e.g., individualist and collectivist) and industry professional-level cultural issues respectively.

Level	Author	year
National level	Ford et al.	2003
	Hasan & Dista	1999
	Hill et al.	1998
	Jarvenpaa & Leidner	1998
	Keil et al.	2000
	Leidner & Carlsson	1999
	Loch et al.	2003
	Mejias et al.	1996
	Png et al.	2001
	Rose et al.	2003
	Straub	1994

	Tan et al.	1995
	Tan et al.	1998
	Watson et al.	1994
	Straub et al.	1997
	Rose & Straub	1998
	Van der Heijden	2004
	Parboteeah et al.	2005
	McCoy et al.	2005
	McCoy et al.	2007
	Pavlou & Chai	2002
Organisational level	Delong & Fahey	2000
	Dohery & Doig	2003
	Gold et al.	2001
	Grover et al.	1998
	Huang et al.	2003
	Jarvenpaa & Staples	2001
	Ngwenyama & Nielsen	2003
Organisational and national level	Tan et al.	2003
	Weisinger & Trauth	2003

Table 2. 4: Levels of cultural studies in IS research

2.13. Cultural dimensions and Hofstede's model

Similar to the definitions and layers of culture, a number of leading anthropologists have strived to develop cultural models and frameworks that compare similarities and differences between two or more cultures/sub-cultures. Among these some well-cited and widely accepted models in cross-cultural studies include: Hofstede (1980), Schwartz (1994), Trompenaars & Hampden-Turner (1998), Hall (1989), and Kluckhohn & Strodetbeck (1961). Selecting an appropriate model based on the comparison seems to be illogical. Rationally each cultural model uses its own scope and variables to identify cultural characteristics and organise data accordingly. However, observing the research questions and aims of the study in terms of the cultural model's objective (e.g., examining it at an individual, organisational or national level), one can make a decision to pick an appropriate model of interest. In the present study, Hofstede's (1980) cultural model is selected due to two reasons.

1) Aim of the study: this study aims to examine the impact of culture on an individual level and intra-organisational level rather than cross-national level. Therefore, despite the fact that Hofstede's (1980) cultural model only represents differences at a national level, it is still best suited and more relevant compared with the others. As Hofstede & Hofstede(2005) argued, the dimensions of national culture proposed by him can still be examined at different levels ranging from national level through the professional and organisational levels to the group level. Moderation and

justification within Hofstede's theory for examining differences at an individual level are presented in section (2.16).

2) Wide acceptance of Hofstede's dimensions: in the last two decades, Hofstede's (1980) cross-cultural research and dimensions gained an extensive and wide-ranging audience across the diverse research context. For instance, a review of his citation work published after 1994 reports that 274 citations used his dimensions as a framework, 61 citations replicated his work, and more than 1,000 citations cited his work (Sondergaard, 1994). According to Ford et al. (2003), Hofstede's original work (1980) 'Cultures and Consequences' has been cited more than 1,700 times in the social sciences citation index (SSCI). Academic disciplines citing his work range from international management to accounting, IT acceptance to information system evaluation, organisational behaviour to marketing, education to health, and economics to law (Baskerville, 2003). Therefore, the results obtained using Hofstede's cultural dimensions for the present study will be easier and more reliable to generalise compared with other cultural theories and models.

Originally, Hofstede's (1980) cultural work was based on the conceptualisation of 'national culture' which, according to Clark (1990), is the representation of patterns and personality characteristics observed among people of the same nation. Hofstede (1980) mentioned that culture is at the centre of human nature and personality. He argued that human nature is different from culture because it is innate to oneself from its gene which is the same universally. Additionally, Hofstede said that personality is different from culture because it is a combination of characteristics innate in oneself and inherited from his/her ancestors as well as those one has learned from the social environment that are related to the single individual. In other words, Hofstede explained culture as a shared process among a group of people learned from the social environment that is neither fully innate from family, nor is specifically learned from society.

To develop the cultural theory, Hofstede (1980), from 1967 to 1973, while working for IBM, conducted a very large-scale survey called the 'value survey module' (VSM). The questionnaires were prepared in English and then translated into other languages as needed. There were a total of 66 questions measuring the psychological characteristics of people from different cultural groups working in IBM. Specifically, 44 questions were related to personal goals and beliefs, 14 questions were related to awareness of the work environment, one to satisfaction, and the rest related to demographic characteristics. He distributed 116,000 questionnaires in 50 countries around the world and received 60,000 responses. From the data collected and analysed, Hofstede found that 32 questions were loaded into four dimensions of factor analysis with representation of 40 countries' mean scores. Based on the results, Hofstede argued that differentiation between cultures should be based on four dimensions: Power Distance (PD), Individualism/Collectivism (IC), Uncertainty Avoidance (UA), and Masculinity/Femininity (MAS). A brief overview of each dimension is given below, whereas some of the Western developed countries and Asian developing countries' comparative index scores are given in Table 2.5.

Country	Cultural dimensions score			
	Power Distance (PD)	Individualism (IC)	Masculinity (MAS)	Uncertainty Avoidance (UA)
Pakistan	**55**	**14**	**50**	**70**
Arab countries	80	38	53	68
India	77	48	56	40
Japan	54	46	95	92
Taiwan	58	26	45	69
Malaysia	104	17	50	36
United States	40	91	62	46
Canada	39	80	52	60
Great Britain	35	89	66	35
Israel	13	54	47	81
Austria	11	55	79	70

Table 2 5: Hofstede's cultural dimensions score: Source: adopted from Hofstede & Hofstede (2005)

2.13.1. Power Distance

Power Distance (PD) is defined as "the extent to which the less powerful members of institutions and organisations within a country expect and accept that power [is] distributed unequally" (Hofstede & Hofstede, 2005 p.46). In essence, it is a way of evaluating a subordinate's perception of the power between him and his superior, or the perception of the preferences/experiences perceived by an individual of their work environment (e.g., fear of problems occurring and sharing with colleague or autocratic nature of supervisor). According to Hofstede (1980), in countries that scored low on PD, employees were less dependent on their boss and colleagues. Consequently, there is a greater sense of freedom and everyone is free to express and share in the decision-making process. The management hierarchies in low PD countries are flatter and more open to questioning. Additionally, privileges for the senior ranks are undesirable, and superiors are expected to be accessible to subordinates. According to Hofstede (1980), countries that score low on PD included Israel, Austria, Great Britain, USA, and Canada (13, 11, 35, 40, and 39 respectively).

On other hand, in countries that scored high on this dimension, employees were more afraid of expressing disagreement with their higher level manager or boss (Hofstede &

Hofstede, 2005). Consequently, a wide emotional distance is established between subordinate and boss, which in turn creates situations where either subordinates completely obey their boss' orders or, in the worst case, completely reject them. One of the reasons for this emotional disparity is that people in higher PD cultures are more comfortable with centralised power, and management and superiors are highly privileged and have the last say (Pavlou & Chai, 2002). According to Hofstede (1980), countries that score higher on PD include Malaysia, Arab countries, Guatemala, and Slovakia (104, 80, 95, and 104 respectively).

2.13.2. Individualism and Collectivism

Individualism and collectivism (IC) is defined as "Individualism pertains to societies in which the ties between individuals are loose: everyone is expected to look after himself or herself and his or her immediate family. Collectivism, as its opposite, pertains to the societies in which people from birth onward are integrated into strong, cohesive in-groups, which throughout people's lifetimes continues to protect them in exchange for unquestioning loyalty" (Hofstede & Hofstede, 2005 p.76). In simple words, individualism is the degree to which people feel responsible for themselves and/or their immediate family. In the context of working goals, individualism is associated with personal time, freedom, challenges; whereas collectivism is associated with training, physical conditions, and use of skills (Hofstede, 1980). Hofstede (1980) found that in countries that score high on individualism such as US, Britain, and Canada (91, 89, and 80 respectively), people were more disposed towards self-orientation, self-motivation and encouraged by their own perceptions. Additionally, people in these countries were working for their own interest and gave less/no importance to the organisation's interest (Hofstede, 1984). McCoy et al. (2007) reported that people with an individualist nature always make their decisions according to their own choice and are less or not affected by others' suggestions and considerations. On the other hand, in countries which scored lower on individualism such as Pakistan, Arab countries and Guatemala (14, 38 and 6 respectively), people gave a higher interest to groups or organisations compared to their own personal beliefs (Hofstede, 1984). In these societies decisions are not made on an individual basis but are likely to be considered with the sharing and helping of other colleagues (McCoy et al., 2007).

2.13.3. PD vs. IC

During the analysis, Hofstede & Hofstede (2005) noted an interesting point: the two dimensions, PD and IC, shared points of similarities between the indexes scores culturally allocated to each country. By plotting a graph, the x-axis represents the PD index from small to large and the y-axis represents the IC from low to high. Hofstede found that countries which scored high on the PD index were scored low on IC in the quadrant, e.g., Pakistan, India, Japan, and Bangladesh etc. On the contrary, countries with low PD were largely found to be high on individualism in the quadrant, e.g., US, Australia, Britain and Israel. Hofstede & Hofstede (2005, p.82) reported this relationship with caution in that two dimensions of culture, PD and IC, are negatively correlated with each others, so that large-PD countries are likely to be more collectivist, and small-PD countries are more likely to be individualist on cultural indices.

2.13.4. Masculinity\Femininity

Hofstede & Hofstede (2005) differentiated masculinity and femininity (MAS) as separate to the gender trait (male or female) on the basis of work goals and quality of life. For instance, masculine values reflect more assertiveness and material success as opposed to feminine values, which give more emphasis to quality of life goals, nurturing, and modesty (Hofstede, 1980). Hofstede (1980) defined working goals as: emphasis on earnings, recognition, advancement, challenge, greater work centrality, and achievements defined in terms of wealth. In contrast, he defined quality of life as: placing greater focus on cooperation, employment security, a friendly atmosphere, an environment where work is less central, and finally, achievements as defined in terms of human contacts. According to Hofstede (1980), the first set of values is related to masculine individuals, whereas the second is related to feminine individuals. Based on these social roles, Hofstede & Hofstede (2005, p.120) defined two groups of people forming two different cultures as:

> “a society is called masculine when emotional gender roles are clearly distinct: men are supposed to be assertive, tough, and focused on material success, whereas women are supposed to be more modest, tender, and concerned with the quality of life.” Whereas, “a society is called feminine when emotional gender roles overlap: both men and women are supposed to be modest, tender, and concerned with the quality of life.”

Hofstede (1980) found that countries like Japan, Austria and Mexico scored higher on the MAS index (95, 79, and 69 respectively) and men were mostly found to be more assertive, tough and materialistic at work, while women were found to be modest, tender and concerned with quality of life. Hofstede found that countries like Sweden, Norway, and the Netherlands scored lower on the MAS index (5, 8, and 14 respectively) and both men and women were modest, tender and concerned with quality of life. Interestingly, he found that most of the South Asian countries like Pakistan, India and Arab had a modest level of masculinity (50, 56, and 35 respectively) where people learn how to avoid aggression rather than how to defend against it. Hofstede (1984) argued that societies that scored high on masculinity were usually families who encouraged their children towards competition in society, while in feminine societies families train their younger generations in modesty and solidarity.

2.13.5. MAS vs. IC, PD, Gender and Age

Despite the fact that the dimensions of masculinity and femininity are independent of gender traits and both men and women can acquire a masculine/feminine nature (Hofstede, 1980), the literature suggests that men mostly have a masculine nature while women have a feminine nature (e.g., Bem, 1981; Hofstede & Hofstede, 2005; Venkatesh et al., 2004). For instance, Bem (1981) in the Sex Role Inventory (BSRI), during an examination of the psychological characteristics of men and women, found that men displayed more masculine traits (e.g., assertiveness) compared with women who exhibit more feminine traits (e.g., nurturing). Related to gender, age is also considered to be part of the masculine dimension (Venkatesh et al., 2004; Hofstede & Hofstede, 2005). For instance, Hofstede (1980), during an examination of cultural dimensions, noticed a higher ratio of men compared to women in countries which scored higher on the masculine index (e.g., Japan and Austria). Similarly, from the perspective of age, Hofstede found that in early age people were more focused on career development (a characteristic of masculinity) but as they grew older they tended to exhibit more social and less ego-oriented (i.e., characteristic of femininity) behaviour. Hofstede & Hofstede (2005) argued that, particularly in masculine societies, mostly men are dominant and are pushed by society to work, while in feminine societies both men and women are socialised to be ambitious.

To examine the interrelated effect of one dimension with another, Hofstede & Hofstede (2005) plotted a graph between the MAS and IC indices, and the MAS and PD indices. From the masculinity and individualism results, the author found that countries which scored higher on the MAS index (e.g., Australia, Britain and the US) were found in the quadrant with a higher value of IC. Similarly, within the masculine and power distance plot, countries which scored higher on the MAS index (e.g., Japan, Venezuela and Mexico) were found in the quadrant with a lower value of PD. Hence, from these two graphs it can be inferred that cultures which are mostly higher on MAS also tend to be higher on IC and PD. However, reporting results based on this assumption requires caution (Hofstede & Hofstede, 2005) because this case is not generalised for all the countries examined by Hofstede.

2.13.6. Uncertainty Avoidance

Uncertainty Avoidance (UA) is defined as "the extent to which the members of culture feel threatened by ambiguous or unknown situations" (Hofstede & Hofstede, 2005 p.167). In strong uncertainty avoidance cultures, individuals usually feel threatened by unknown or uncertain situations (Srite & Karahanna, 2006). Consequently, to reduce the level of uncertainty in these cultures, individuals tend to rely on certain rules and favour more stability at work and in their lives in general (Parboteeah et al., 2005). In cultures that are high on UA, employees working in organisations never consider breaking company rules even if they know that doing this would be in the firm's best interest (McCoy et al., 2007). Hofstede (1980) related UA with the tolerance effect and stated that within cultures that are high on UA, individuals possess less tolerance compared with cultures low on UA.

On the contrary, within cultures low on UA, individuals have higher levels of tolerance, experimentation and/or innovative behaviour; consequently, they are more open to taking risks. Additionally, he argued that feelings of uncertainty are not developed personally by individuals, however, they are also partially shared by the other members of society. In the workplace, job stress and anxiety (the state of being worried about what may happen) were the main reasons for the creation of a higher UA culture (ibid). Hofstede (1980) found that countries like Greece, Portugal and Japan scored high on UA (112, 104, and 92 respectively) and people in these cultures were mostly psychologically characterised by a higher tendency to stay with the same employer, display higher average seniority in jobs, and show higher loyalty to the organisation. On the contrary, in countries like Singapore, Sweden and China, which scored low on UA (8, 29, and 30 respectively), mostly people had less anxiety about future policies and outcomes, and less aggression and emotions were displayed. Finally, countries like Pakistan, Taiwan and Arab nations were found to have a medium to high level of UA (70, 69 and 68 respectively).

2.13.7. UA vs. MAS

During analysis, Hofstede & Hofstede (2005) also examined the interrelated effects of masculinity and UA dimensions. By plotting a graph where the x-axis represents MAS from low to high, and the y-axis represents UA from high to low, the author found that countries which scored higher on the MAS index were found in a quadrant with lower UA values (e.g., Sweden, Denmark, and Norway). On the other hand, countries which scored low on MAS were found in the quadrant with low UA (e.g., Japan, Greece, and Poland). Hence, with caution, it can be inferred that cultures representing high UA also present high on MAS.

2.13.8. Long-Term and Short-Term Orientation

Based on recent research on Chinese culture, Hofstede & Hofstede (2005) introduced a fifth dimension: long vs. short-term orientation (LTO). The new dimension has not been widely adopted in recent literature due to unreliable and validated measures (Spector et al., 2001). Therefore, this dimension is not added to the present study to evaluate the cultural consequences of the adoption behaviour. However, for the purposes of knowledge-sharing, a brief overview is presented. Hofstede & Hofstede (2005, p.210) defined long-term orientation (LTO) as the "fostering of virtues oriented toward future rewards – in particular, perseverance and thrift". Its opposite is short-term orientation which is defined as the "fostering of virtues related to the past and present- in particular, respect for tradition, preservation of 'face', and fulfilling social obligations".

According to Pavlou & Chai (2002), people in cultures with high LTO respect more and feel free to put off decision-taking until they are comfortable with the results. Furthermore, in LTO the future is represented by values, such as ordering a relationship by status and observing that order, whereas in short-term orientation, the future culture is represented by values such as personal steadiness and stability, saving face, respect for tradition, reciprocation of greetings, favours and gifts (ibid).

2.14. Critiques of Hofstede's cultural theory

As discussed in the previous section, Hofstede's work is adopted in the present study due to its acceptance by an extensive and wide-ranging audience across the diverse disciplines. Part of this popularity may be due to the simplicity of the dimensions and their link with management practices. In addition, Hofstede's model is based on a short and easily administrated questionnaire which provides scores for each of the dimensions he proposes.

Despite the fact that Hofstede's research in culture studies is one of the paramount works, it is criticised by a number of researchers (e.g., Spector et al., 2001; McCoy et al., 2005; McSweeny, 2002; Triandis, 1993). Three criticisms which are overtly observed of Hofstede's work are given as follows.

First, Hofstede's work has been criticised due to the lack of in-depth examination of culture. For instance, Walsham (2002, p.373) criticised Hofstede's approach as "rather crude and simplistic", which fails to examine or provide insights into the richness and depth of culture. According to Walsham (2002), Hofstede's model perceives culture as a static phenomenon, whereas in reality the nature of culture is reflexive and changes with the passage of time. This argument was levelled by Baskerville (2003), who proposed a more qualitative or active theory based on approaches to examine the depths of the culture. Relevant to the first criticism, Triandis (1993) criticised Hofstede's work on a limited number of dimensions and their tendency to generalise a whole culture. For instance, he argued that dimensions like masculine-feminine in terms of egalitarianism need to be avoided for the sake of gender neutrality and could be replaced with 'communal/agenetic' (ibid).

The second criticism observed of Hofstede's work is based on its methodology, which includes poor sample selection, single context of the study, and currency of findings to be generalised. For instance, McSweeny (2002) criticised Hofstede's work over its reliance on a single organisation (i.e., IBM) with a very selective population. Similar criticism was noted by Holden (2002) and Shanks et al. (2000), who argued that Hofstede's study only represents the culture of a single organisation, IBM, and can not necessarily be translated into other organisations or work patterns. From the results of the currency perspective, McCoy et al., (2005) argued that Hofstede's data is out-dated, as it was collected more than 30 years ago and the world has changed significantly over that period, therefore it is likely that values of national culture are stable no more.

Finally, Hofstede's work is heavily criticised due to its measurement items and their statistical validity. For instance, Walsham (2002) and McSweeny (2002) argued that despite Hofstede's claim that his work represents aggregated differences between social and national cultural values, in reality he did not provide links between cross-cultural contradictions and conflicts. Rationally, Hofstede's indices were only measuring central tendency (i.e., mean) in the sample (nation), which largely ignores divergence in individual answers within the same culture (ibid). Statistically, the weaknesses of Hofstede's scale when examining individual-level differences were also revealed by Spector & Cooper (2002) and McCoy et al. (2005). Both authors found that Hofstede's scale produced poor internal consistency and reliability when cultural differences were examined at individual level or even at organisational level. In reply to the measurement items' criticism, Hofstede & Hofstede (2005) admitted that his scale might produce poor reliability scores at an individual level because the scales were originally designed for comparing country-level scores.

Despite the criticism of Hofstede's work, it continues to be cited and replicated with alternative ways of conceptualising the culture (Brwon & Buys, 2005). In doing so, the alternative approach to overcoming the limitations of Hofstede's theory and its adoption in the present study is discussed in section (2.16).

2.15. Hofstede's cultural theory and IT acceptance

With the assumption that cultural diversity is pervasive and can exert an effect on the predictably of technology acceptance behaviour, a number of researchers within the information system field have started to investigate and address the cultural issues which might cause the failure of IT acceptance across the cultures (e.g., Straub et al., 1997; Rose & Straub, 1998; McCoy et al., 2005; Alsajjan & Dennis, 2010). In this line of research, the influence of Hofstede's proposed dimensions of national culture is very common and observable (Ford et al., 2003). Therefore, in order to assess the impact of Hofstede's cultural dimensions on the predictors of IT acceptance, this section categorises the discussion of the previous citations into three groups:

1. Citations which incorporated and examined the impact of Hofstede's dimensions within the same culture.
2. Citations which incorporated and examined the impact of Hofstede's dimensions across the cultures.
3. Citations which did not incorporate Hofstede's dimensions but examined their results across the cultures with the help of Hofstede's country-level cultural scores.

In the first group of citations, only a handful studies examined the impact of Hofstede's cultural dimensions on an individual's acceptance behaviour. In this group, researchers are specifically interested in examining an individual's gender-based differences of technology acceptance behaviour in relation to Hofstede's masculinity-femininity (MAS) dimension. Out of this few, one of the key studies is Venkestesh et al. (2004), who examined the impact of gender in terms of MAS on the construct of TPB. Using Bem's (1974) Sex Role Inventory (BSRI) scale to measure the individuals' differences, Venkatesh et al. (2004) found that masculine-type individuals exhibited the same patterns as men in previous research; however, feminine-type individuals were different from women in that they were influenced only by SN and PBC. Even though Venkatesh et al. (2004) did not use Hofstede's cultural dimensions directly due to their limited applicability at individual level, the results of the study were imperative in terms of highlighting cultural impact on acceptance behaviour.

The second group of citations which directly incorporated Hofstede's cultural dimensions and examined them across the countries also includes a very limited number of studies within the information system domain. Out of many, a discussion of a few noteworthy studies (Parboteeah et al., 2005; Srite & Karahanna, 2006; Hasan & Dista, 1999; Pavlou & Chai, 2002; McCoy et al., 2005) is presented due to their relevance to the present study. In this line of research, using an interpretive case study, Hasan & Dista (1999) examined four dimensions of Hofstede's cultural theory (PD, IC, MAS, UA) within ten organisations across the Middle East, Africa and Australia. Focusing on the technology transfer outcome, authors found that: adoption of IT was slower in risk-hesitant countries i.e., with high UA (e.g., Middle East and Africa); adoption was higher in cultures where IT staff and mangers were in continuous sharing i.e., with low PD (e.g., Australia); specifically, the adoption of group-oriented applications was favoured by collectivist cultures (e.g., Middle East and Africa), and finally, patterns of IT adoptions were varied according to the level of masculinity (technology focused) vs. femininity (people and end-user focused). Hasan & Dista's results were quantitatively echoed by Parboteeah et al. (2005), who examined the impact of the three cultural dimensions (IC, UA, MAS) on the perception of usefulness (PU) to accept the technology. Covering 24 nations with a sample of 26,999, Parboteeah et al. (2005) found that there was a negative relationship between IC and UA on PU and a positive relationship between MAS and PU.

Apart from the direct impact of culture on the individual's technology acceptance behaviour, fewer studies also examined the indirect impact (i.e., moderator). For instance, using the US and Uruguay sample, McCoy et al. (2005) examined the impact of the four cultural dimensions (IC, UA, MAS, PD) on the modified version of the TAM. The results revealed that culture played an inchoate moderating impact so that the impact of PBC on BI was strongly observed in the Uruguay sample as compared with the US sample. However, contrary to expectations, the author did not find any significant difference between the relationships of PU, PEOU, and SN on BI in both countries (ibid). In a similar line of research, Srite & Karahanna (2006) examined the moderating impact of the four cultural dimensions (IC, UA, MAS, PD) between the PU, PEOU and SN on BI. Using 30 countries and a sample of 223, the authors found a negative moderating impact of MAS and PD between SN and BI, and a positive moderating impact of UA between SN and BI. Similarly, Pavlou & Chai (2002) examined TPB in the US and China sample, and found that cultural dimensions (PD, IC, UA, and long-term orientation) played a significant moderating impact on the individual's perception to accept the e-commerce behaviour. Specifically, the model explained higher variance (77%) in Chinese culture (i.e., collectivist) compared with the US culture of 33% (i.e., individualist). Pavlou & Chai (2002) found that beliefs such as SN and SI were strongly observed in Chinese culture compared with the US, which in turn perceived higher importance of the PBC on behavioural intention. In comparison with Korean and US culture, Choe & Geistfeld (2004) examined the moderating impact of two cultural dimensions (IC and UA) on the individual's behaviour to adopt the e-commerce behaviour. The authors found that the cultural dimension UA played a significant moderating impact, so that the impact of perceived risk (PR) was strongly observed only in Korean culture, whereas SE was only significant in US culture. The authors did not find any significant difference between the two countries based on the moderating impact of IC (ibid).

The third group of the citations, which includes a very large number of the studies, aims to examine the robustness of technology acceptance models across the context of two or more countries. The core objective behind these studies is that studies predicating technology acceptance behaviour have largely been conducted within North America and specifically within a single country, that is, the US (e.g., Venkatesh & Morris, 2000; Venkatesh et al., 2004). Therefore, their validity and reliability is questionable when re-examined outside the US (Straub et al., 1997; Abbasi et al., 2010). In this stream of the research, the replication of technology acceptance models is widely observed in a diversified context. For instance, within e-commerce and e-service (e.g., Jarvenpaa et al., 1999; Seyal et al., 2004; Hsu & Chiu, 2004), in Internet-banking (e.g., Shish & Fang, 2004), in broadband Internet use and adoption (e.g., Oh et al., 2003; Choudrie & Lee, 2004; Khoumbati et al., 2007; Seyal et al., 2002, 2003), in healthcare (e.g., Wu et al., 2007), and in email and academic use (e.g., Struab et al., 1997; Hu et al., 2003). Predominantly, previous studies outside the US justified their results by discovering similarities and differences between the native country's cultural indices proposed by Hofstede (1980), with the studies conducted in a US context. Surprisingly, most of these studies did not directly measure cultural dimensions (e.g., Straub et al., 1997), which leaves a gap in understanding individual-level differences of acceptance behaviour. Despite the fact that most of these studies found a significant difference between the models evaluated in a US and non-US context, their discussion and importance is not relevant to the present context of the study. Reasonably, the present study not only aims to examine the inherent cultural biasness within models of technology acceptance behaviour but it also intends to examine the individual-based differences that lie within the same culture. Therefore, the present study only intends to focus on those studies which, directly or indirectly, incorporate Hofstede's dimensions.

The only study relevant to the discussion in the third group of citations is Straub et al. (1997). Arguably, Straub et al.'s (1997) study is one of the pioneering studies which explores inherent bias within the TAM and is one of the most widely cited studies within cross-cultural research (449 on Google Scholar to date). It is one of the most important studies that emphasises the need to incorporate Hofstede's dimensions so that individual-level cultural differences may be examined towards predicting technology acceptance behaviour. Straub et al. (1997) examined the TAM in Japan, Switzerland and the US and found that the TAM produced similar variance (R^2) in the explanatory power of behavioural usage in both the US and Switzerland (10%), but was very different in Japan (only 1%). Straub et al. (1997) justified these results with Hofstede's dimensions and argued that Japanese culture tends towards greater power distance, collectivist sentiments and higher uncertainty avoidance, which may limit their Internet usage and disassociate from the intention to accept. Such results are justified because Davis, at the time of the TAM development (Davis, 1989), did not consider its un-biased reliability in cross-cultural settings.

2.16. Modification and adoption of Hofstede's dimensions in the present study

In contrast with the previous studies based on Hofstede's conceptualisation (see previous section 2.15 presenting three groups of citations), this study intends to examine cultural differences at the individual-level using the Dorfman & Howell (1988) scale. It is argued that prior research based on Hofstede's conceptualisation and scores based on the value survey module (VSM) were inadequate in explaining individual-level cultural differences. The reasons are plausible. Hofstede defined culture as: "collective programming of mind that distinguishes the members of one group or category of people from others" (Hofstede, 1994 p.4), thus, Hofstede's theory is irreducible for representing individuals' perceptions. Also, the scores presented by Hofstede (1980) were based on the reflection of the mean response at a country-level rather than individuals' response. Hofstede himself warned that his scores represent a country-level analysis that cannot be interpreted at individual level (cf. McCoy et al., 2005). For example, when Hofstede examined the correlation between three items measuring power distance (PD), they were significant at the country level but at an individual level they were almost zero (Hofstede, 1984 p.76). In addition to the individual-level analysis criticism of Hofstede's scale (e.g., Dorfman & Howell, 1988) and its dimensions (McSweeney 2002), it is also criticised for its appropriateness (in terms of validity and reliability) with regard to the passage of time which elapsed, that is, more than three decades (McCoy et al., 2005). For instance, when McCoy et al. (2005) re-examined Hofstede's dimensions in the US and Uruguay, they found differences at country-level scores devised by Hofstede (1980) (see detailed critiques in section 2.14). Hence, incorporating Hofstede's measures direct into models of individual-level acceptance behaviour is impractical and requires strong rhetorical justification as well as a re-consideration of the measurement instrument.

2.17. Context of the study

Besides revisiting a variety of research models and theories within the IT acceptance domain (see 2.1 to 2.11 sections), and the impact of cultural dimensions on predictors of IT acceptance behaviour (see 2.12 to 2.16 sections), one of the objectives of this study is to explore the non-cultural bias of the extended model within the context of developing countries. Arguably, in the previous section, it was noticed that employing the original TAM or models based on the TAM's conceptualisation, proved to be reliable across the technologies, context and time of evaluation, however, these models presented a weakness of cultural bias and do not serve equally across the cultures (e.g., Straub et al., 1997; Rose & Straub, 1998; McCoy et al., 2005; Baker, Al-Gahtani & Hubona, 2010). Furthermore, these studies were largely constrained within the North American and Western cultural context or a few Asian-Pacific developing countries (e.g., South Korea, Taiwan, China), which limits their generalisability across the developing and IT-developing countries' context e.g., South Asia. Finally, apart from the cross-cultural differences at national level, it was noticed that few studies examined diversities at an intra-cultural level (within the same nation or even in organisations) (e.g., Honold, 1999). Taking these limitations into consideration in the present study, the diversity of an individual's acceptance behaviour is examined at an individual level within the context of a single South Asian developing country (i.e., Pakistan) in a single organisational context level (i.e., the higher education system). In doing so, a brief overview of the country profile with justifications for the selection is discussed in the next few sections.

2.17.1. Country profile

In order to gather data and address the gaps above, the context of the study is selected as Pakistan, which is located in South Asia and is also part of the greater Middle East (Gov. Pak, 2009). Pakistan is the sixth most populous country in the world and third out of the Muslim countries (World Bank, 2009). The country occupies 796,095sq.km with a population of 132.35 million (population census 1998) (Gov. Pak, 2009). According to the economic survey 2007-2008 published by the Ministry of Finance in Pakistan (Finance Pak, 2010), the estimated population at present is 160.9 million with a growth rate of 1.80%; GDP is US$168.28 billion with an annual growth rate of 5.95%. The male and female literacy rate is 67% and 42% respectively, and the life expectancy rate for men and women is 64% and 66% respectively.

The dramatic rise in population resulted in the rapid growth of large urban areas such as Karachi, Lahore and Islamabad. Overall, from an economic perspective, Pakistan is still considered to be a developing country and its economic growth is poor. For instance, Ministry of Finance statistics for the year 2007-2008 revealed that foreign investment in the country declined by 32.2% and stood at US$3.6 billion as against US$5.3 billion in the comparable period of last year. Domestic debt rose to RS. 2610.2 billion, inflation rate increased 10.3% compared with 7.9% in previous year; the budget deficit increased to US$11.6 billion (6.8% of GDP), and finally the Pakistan currency (rupee), after remaining stable for more than 4 years, lost significance and depreciated 6.4% against the US dollar (Finance Pak, 2010). There can be many reasons for poor economic growth, but one of the most viable is the history of military dictatorship and influential bureaucracy inherited from British colonial times, which resulted in higher corruption and nepotism in an organisational context (Galliers et al., 1998). The choice of Pakistan as the context of the study is due to two main reasons:

1. The social and cultural characteristics of Pakistan are different from North American and Western countries. Therefore, it is justifiable to generalise the un-biased validity and reliability of the predictors of individuals' acceptance behaviour

successfully applied in North American and Western countries to a South-Asian country context.

2. Despite leverage investment by the Pakistan government in IT and telecommunications industry, compared with neighbouring countries, a lower acceptance rate is observed. This lower acceptance indicates that just overcoming the problems of traditional IT acceptance barriers e.g., price, last-mile access, and lack of speed (e.g., Choudrie & Lee, 2004) are not enough, but there is still a need to explore the additional factors which may help to encourage and foster Internet acceptance in developing countries.

2.17.2. Social and cultural characteristics of Pakistan

From a cultural perspective, Pakistan differs from Western culture (see Table 1.1 chapter 1). Similar to other developing countries and Arab countries, Pakistan is moderate on PD because of its education system, social and government systems, and national wealth perspective. A higher education system is responsible for establishing middle-class society (Hofstede & Hofstede, 2005), which in turn gives freedom to individuals to quit social norms and participate in institutional, managerial and governmental systems. The literacy rate according to the Pakistan Social and Living Standards Measurement (PSLM) survey 2008-2009 shows that the overall literacy rate (age above 10 years) was 57% (69% male and 45% female)(Finance Pak, 2010). Therefore Pakistan's moderate score on PD was to be expected compared with the North American countries where the literacy rate is near to 100% (e.g., Canada). According to Hofstede & Hofstede (2005), in countries that score higher on PD, superiors have more power and want to maintain it forcefully. Also their autocratic nature allows them to implement policies in their interest without knowing the opinions or ethical values of their subordinates. From the wealth perspective, individuals in wealthy countries may have fewer dependencies on power to secure higher positions or have fewer tendencies towards creating powerful groups. According to Hofstede (1980), wealth is also considered to be a substitute for power satisfaction. In this case, a clear difference between North American countries and Pakistan is observed. For instance, the per capita income of Pakistan is only US$1085 of which 61% is paid into foreign debts (Finance Pak, 2010). In this case, where people are so poor, there are fewer chances to show reluctance for the unequal distribution of power at society level.

Based on IC, the cultural dimension of Pakistani society is considered to be collectivist compared with most North American and Western countries. One possible reason is that the country is highly influenced by the religion Islam (98% population) and most people are conservative in nature. Similar to PD, Hofstede & Hofstede (2005) argued that individualism and national wealth are correlated with each other. For instance, countries with a higher per capita (e.g., Denmark and USA) were higher on individualist society compared with Pakistan which, according to the author, was a poorer country (during 1968 to 1972) and tends to be a more collectivist society.

From the MAS dimension perspective, Pakistan is considered to be moderate on masculinity. According to Hofstede & Hofstede (2005), age and gender are factors associated with the nature of MAS culture. Generally, due to religion and lower literacy rates, Pakistan is a male dominant society but due to the higher female population, it is rated moderate on the masculine index. Due to this, people in Pakistan mostly resolve their conflicts by compromise and negotiations rather than strong win egoism, rewards are distributed on the basis of equality, and more leisure time is preferred over more money.

Finally, from the perspective of UA dimension, Pakistan is rated as middle to higher on the UA index. According to Hofstede (1980), UA is highly correlated with feelings of stress and anxiety. Compared to North American countries where a low unemployment ratio is observed, in Pakistan almost 35% people are reported as unemployed after receiving their higher level graduate degrees (ADB, 2007). The higher ratio of unemployment or employment with low wages results in high levels of uncertainty among individuals in society (Hofstede & Hofstede, 2005). Another reason for Pakistan to score higher on UA is the influence of religion. For instance, usually people do not plan for the long-term and avoid taking risks due to a belief in fortune, using the word 'inshallah' means 'if God wills'; whereas in North America or countries where individuals have less/no effect of religion, they are more used to plan for decades even though they are not certain that they will be alive at such a time.

Based on all four dimensions reported by Hofstede (1980), clearly Pakistan's culture is distinct from the culture of North American and Western countries. Therefore, within the perspective of technology acceptance behaviour, expecting similar behaviour from individuals in Pakistan and North American or Western countries seems to be uncertain, and requires further study within a real context.

2.17.3. Internet usage in Pakistan and lower penetration rate

According to the Internet world stats, there are 6,767,805,208 Internet users in the world, out of which 3,808,070,503 are in Asia i.e., 42.6%. Within the top ten Asian countries, Pakistan is ranked eigth, which covers about 18.5% of the total Internet user population. In 2000 there were 133,900 Internet users which reached 18,500,000 in 2009 and the Internet penetration rate was recorded at 10.6% (Internet World Stats, 2010). According to the International Telecommunication Union (ITU), the number of Internet users per 100 people in Pakistan reached 11.4 in the year 2008 (ITU, 2009).

Recently the Pakistan Telecommunication Authority (PTA), which is also in charge of licensing the private sector and foreign investors in the telecoms sector, published facts and figures regarding current Internet users in Pakistan (PTA, 2010). According to this, by the year 2007 there were about 3.5 million Internet subscribers, whereas total users crossed the 17 million mark, covering around 3,008 cities connected with base stand. Furthermore, the PTA statistics shows that at the end of January 2010, broadband subscribers in Pakistan reached 688,373 with a growth rate of 7% and net addition of 44,481. Compared to only 376,712 users in December 2008, the increase in growth rate is 141% which presents a remarkable success in this sector. From the broadband penetration perspective, the growth is also incredible. For instance, it steadily improved and stands at 0.42% from 0.16% in December 2008 (ibid). According to the statistics of the Pakistan finance division (Finance Pak, 2010), Pakistan has been ranked sixth in terms of quarterly growth and tenth in terms of annual growth in the global broadband penetration rate. Table 2.6 depicts the growth rate of broadband subscribers in Pakistan during 2006 to 2010. The Pakistan Telecommunication Corporation ltd. (PTCL) and Wateen are the two major broadband operators in Pakistan, while others like Worldcall, Link dot net, and Link direct are also catching up fast to provide Internet services to common users at home, software exporters, educational institutes, universities and corporate clients (Seyal et al., 2004; MOIT.PAK, 2004).

Technology	DSL	HFC	WiMax	FTTH	EvDO	Others	Total
2005-06	26,611						**26,611**
2006-07	44,669			484			**45,153**
2007-08	102,910	42,760	19,612	2,800			**168,082**
2008-09	262,661	36,201	88,477	3,967	22,503		**413,809**
2009-10	476,722	49,110	257,616	5,002	111,194	1,004	**900,648**
Jul-10	486,409	39,529	261,864	5,255	134,927	1,077	**950,594**
Aug-10	482,086	39,546	275,490	5,525	146,834	1,113	**950,594**
Sep-10	488,946	40,127	292,599	5,690	166,407	1,142	**950,594**

Table 2. 6: Broadband subscribers by technology

Source: Pakistan Telecommunication Authority (PTA, 2010)

To increase Internet usage, the government dramatically reduced the costs of bandwidth by almost 95% (from US$30,000 in the year 2000 to US$3,950 in 2004) specifically for software companies, educational institutions and call centres (Mujahid, 2002; MOIT.PAK, 2004). However, in comparison with neighbouring countries which share almost the same culture, the usage rate of the Internet is lower in Pakistan. For example, Iran has a 32% Internet penetration rate, Saudi Arabia has 29.21%, Malaysia has 62%, UAE has 86% and Indonesia has a 12.5% Internet penetration rate (ITU, 2009). Table 2.7 presents the PTA's comparative Internet and broadband indicators during 2003 between Pakistan and its neighbours. According to a report (MOIT.PAK, 2004) by the Pakistani Ministry of Information Technology, the major barriers inhibiting the widespread acceptance/diffusion of broadband are price, last mile access, and content. For instance, considering only price, despite the fact that the government reduced the larger costs, it is still higher than in neighbouring countries. The subscription price for broadband in Pakistan is 60 times higher than in Korea; if purchasing power is taken into consideration, it is 1,600 times higher in Pakistan (i.e., in 2004 the per capita GDP of Korea was US $ 17,700 as compared with $652 in Pakistan (Finance Pak, 2010; MOIT.PAK, 2004).

	Parameters	Korea	Malaysia	China	India	Pakistan
Access & infrastructure	No. of PCs per 100	78.6	15	2.8	0.8	1.85
	No. of cable TVs per 100 persons	43	0	9	6	4.28
	No. of fixed telephone lines per 100 persons	49	18.5	16.7	4.5	2.8
	No. of mobile phones per 100 persons	68	39.6	16.1	2.4	1.43
	Cost of PC (USD)	[500]	1,100		600	347
	Cost of cable/DSL modem (USD)	60			100	90
Internet usage	GDP (USD Per capita)	10,000	4,000	965	465	480
	No. of Internet connections per 100 persons	58	11	2	0.4	0.2
	No. of users per 100 persons	59.4	33	5	1	1.4
	Average revenue per user from an Internet customer per month (20 hrs, USD)	N/A	10		9	4.5
Broadband	No. of broadband connections per 100 persons	57.5	0.21	1	0.02	0.01
	Charges for broadband per month (USD)	30	29	16	20	-
	Charges per 100 Kbps per month (USD)	0.25	7.61	3.07	15.63	-

Table 2. 7: World Internet and broadband comparison: Source: PTA(2010)

2.17.4. Government IT policies and the higher educational system

After reviewing the country profile, its distinct position within Hofstede's cultural dimensions, and overall usage of the Internet, the present section is focused on reviewing the core context of the study i.e., higher educational institutes of Pakistan and initiatives introduced by the government of Pakistan to promote IT and the Internet within these institutions. In doing so, it enables an understanding of the adoption/acceptance of Internet technology within single organisational settings (i.e., intra-cultural settings that are different from cross-cultural settings) that is rarely investigated in the literature of the context of developing countries. The rationale behind selecting educational settings is consistent with the study of Lewis et al., (2003). According to this, in educational institutions, the decisions regarding the introduction of technologies and innovations are determined by top management (e.g., head of institutes and/or higher government officials). The individuals (i.e., academics within institutes) who utilise technologies in these institutions are rarely considered and communicated with about such decisions. In this way, individuals' requirements, willingness and causes of resistance are over-looked by higher management, a process which often results in an unrealistic outcome regarding the usage of technology (ibid). Apart from that, another reason for selecting higher educational institutes as the context for the study is related to the influence of government policies. For instance, compared with other organisations, the direct influence of explicit government policies to promote research productivity is apparent in the education sector. Finally, with the assumption that IT acceptance behaviour is related to educational qualifications (Agarwal & Prasad, 1999), selecting the context of the study as higher educational institutes is the most relevant choice rather than any other e.g., banks, SMEs, etc.

Given that, observing the overall growth of the Internet within the country (see section 2.17.3), it is obvious that the government of Pakistan started to realise that the Internet can play a vital role in providing capabilities for organisations to become more productive. Additionally, the government understands that investment in education and specifically support of IT and the Internet within education can be a major source of income generation and alleviation of poverty (MOIT.PAK 2004). However, even realising the importance of education and IT, unfortunately Pakistan's standing on investment in this sector is historically very poor. Spending on education as a percentage of GDP is very low compared with neighbouring countries, as can be seen in Table 2.8

Country	Public sector spending (As % GDP)	Literacy rate in (%)
Bangladesh	2.6	55.0
China	-	93.7
India	3.3	-
Indonesia	3.5	-
Iran	5.2	-
Malaysia	4.7	92.1
Nepal	3.2	57.9
Pakistan	2.1	57.0
Sri Lanka	…	90.6
Thailand	4.5	-
Vietnam	5.3	92.5

Table 2. 8: Comparison of public sector spending on education:

Source**:** World Bank, UNDP, UNESCO, FBS, Ministry of Education: Figures for latest available year (2008-2009)

Unlike other IT developing countries, such as the Middle East and Asian-Pacific countries, investing huge amounts of money in education and IT is a challenging task for the government of Pakistan. Arguably, apart from traditional problems of cultural diversity, political instability, sectarian violence, rapid growth in population and declining financial stability, the country is also facing a severe problem of terrorism. Ironically, at the inauguration of the US' 'global war on terror', Pakistan, under the leadership of General Musharraf, joined the coalition army but inevitability it suffered from local terrorism. As a result, a huge amount of Pakistan's budget is invested in the defence sector to fight against this terrorism. Despite these issues, the Pakistani government is striving to improve the higher educational system in the country and accorded it the highest priority in the government's Nine Point Plan 2008 (cf. Finance Pak, 2010). According to the national education policy (NEP) 2009, the government is planning to allocate 7% of GDP (i.e., 2.1% at the moment) to education by the year 2015 (c.f., ME.Pak, 2010).

Major reforms in Pakistan's higher education system were initiated in 2001 during the military dictatorship governed by General Musharraf. Under the reform process, the responsibility to improve higher education was assigned to a new independent division called 'HEC Pakistan' (Obaid, 2006). Atta-ur-Rehman, a privileged educationalist, was given responsibility as chairman to improve the quality standards of education. Since HEC's inception, funding by the government of Pakistan has increased immensely, even though it has faced financial constraints in recent years. According to the HEC, the recurring grant allocated during financial year 2008-2009 was similar to 2007-2008, however, for the current year 2009-2010 with the support of Rs.8.0 billion from World

Bank funding of HEC, it has increased to Rs.22.5 billion. Figure 2.10 shows how the ratio of funding in millions increased during 2005-2010.

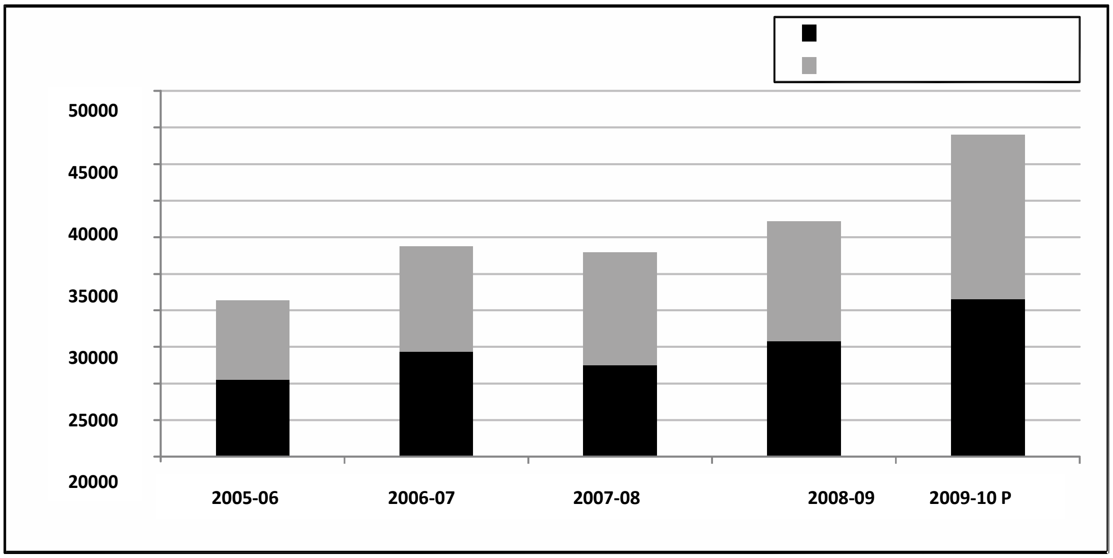


Figure 2. 10: Ratio of increase in higher education funding: Source: HEC (2009)
* Gray portion represents the recurring funds and black portion represents released development funds.

In order to transform Pakistan from an agricultural-based economy into a 'knowledge economy', the HEC in 2005 proposed a policy document for the next 5 years (i.e., 2010) with the title of 'medium term development framework 2005-2010'. There were a number of reforms and strategic plans to improve the education system, but only those that are relevant to the IT and Internet within the higher educational systems are being discussed here. According to this report, the government realised the importance of the use of ICT and the Internet within the higher education context and kept it as a key step for the strategic vision 2005-10. For instance, according to the report (MTDF, 2005 p.13): "Modern information and communications technologies (ICT) are key to enhancing efficiency, efficacy and impact of programmes of development in the higher education sector. Therefore, ICT must be effectively leveraged to deliver high quality teaching and research support in higher education both on-campus and using distance education, providing access to technical and scholarly information resources, and facilitating scholarly communication between researchers and teachers."

As part of the ICT strategy in higher educational institutes, HEC suggested four key objectives:

- To improve the IT infrastructure development inside institutions as well as linkages of institutions to each other and to the international teaching/research community.

- To improve research-related services.
- To improve teaching-related services acquisition for provision of quality education leveraged on technology.
- To improve the online library infrastructure development.

To accomplish these goals, HEC initiated a programme called the 'Pakistan Education and Research Network' (PERN) through which 56 public and private universities were connected with each other. PERN aims to provide an ideal platform to build an Internet compatible with a high-speed network that allows real-time transfer of audio and video, multimedia-enabled lectures, remote research partnerships, and many other applications hitherto unknown. To bring the PERN into reality, HEC also initiated a computer and networking programme called 'e-reform' for the public sector universities with funds to set up a high-speed network environment by installing Local and Wide Area Networking systems (LAN/WAN) (MTDF, 2005). With the help of PTCL, HEC planned to connect all the universities with fiber-optics and access to at least 34MB Internet connectivity.

Apart from that, HEC also initiated a 'digital library programme' which aims to empower the academics with technology to access high-quality peer-reviewed journals via online delivery. Finally, HEC recently started one more programme with the title of 'Pakistan Research Repository (PRR)' (HEC PAK, 2009). The PRR aims to promote the international visibility of the research originated within the institutes of Pakistan. In doing so PRR provides a facility to submit/download electronic theses published by Pakistani universities.

Despite these initiatives, the current facts indicate that most of the academics in educational institutes do not value skills associated with strategic use of the Internet in their academic and research work. One reason for such an unhealthy improvement could be the lack of empirical evidence to explore the questions of resistance and advantages of Internet use within a teaching and research context.

Conclusion

This chapter presented a detailed description and critical review of the theoretical background to this study. Specifically, in response to the research question posed in the first chapter, the present chapter sought three main objectives. Firstly, to develop a strong theoretical basis for the extended model, the most important theoretical models used in technology acceptance research were reviewed and compared, their limitations and advantages critically examined. The review revealed that predominantly models were favoured either due to their parsimonious structure with acceptable predictive power (e.g., TAM) or their explanatory power (e.g. TBP). A review of the empirical comparisons between these models showed that the TAM exhibited considerable advantages over others due to persistent predictive power (i.e., 40%) and its parsimonious structure. The parsimony of the TAM attracted a number of researchers to extend/replicate the TAM's conceptualisation in a diversified field of studies. However, this led to an inherent limitation in the ability of TAM to extend it beyond its core constructs (PU and PEOU) into specified fields of investigation. Considering these rationales, in the present study it was decided to extend TAM beyond its conceptualisation with a number of the constructs from various models that successfully produced significant results in published literature.

Secondly, this chapter scrutinised the importance of culture on the models predicting individuals' technology acceptance behaviour. In doing so, particular emphasis was placed on Hofstede's cultural theory (1980). Given that, the literature revealed that the predictors of technology acceptance behaviour were culturally biased and failed to predict individuals' acceptance behaviour outside the context of North American and Western countries. Surprisingly, it was noticed that most of these studies did not directly (i.e., predictor) or indirectly (i.e., moderator) measure the cultural dimensions of Hofstede, and thus, there is a gap to establish certain links between cultural dimensions and their impact on understanding individual-level differences of acceptance behaviour. To consider and overcome this gap in the present study, the impact of cultural dimensions on individuals' IT acceptance behaviour is examined at an individual-level within the context of a single developing country.

Finally, this chapter reviewed the specific context of the study i.e., higher educational institutes of Pakistan. Arguably, it was noted that Pakistan was culturally different from American and Western countries context. Besides that, it was noted that, despite huge investment by the government into IT to promote Internet usage, specifically within the context of higher educational institutes, a very low acceptance/adoption rate was observed compared with neighbouring countries. This shows that investing in the IT sector without knowing/measuring individuals' acceptance behaviour is a waste of resource. Therefore, to develop better policies to increase the acceptance rate, in the present study it is decided to examine the predictors of acceptance behaviour that are widely accepted in a US context and apply them to a developing country context. Based on the review, conceptual framework is presented in next chapter.

Chapter 4

Conceptual framework

Introduction

Achieving the aim of the study this chapter intends to develop the research hypotheses, which are conceptually related to each other. In order to do so, a detailed review of various models and the present research on individuals' acceptance behaviour was undertaken in the previous chapter. Some considerable differences and limitations were noticed between the constructs and/or the relations in these models, but a few recurrent themes were evident. Based on these themes, the theoretical background for the conceptual mode is devised in section (3.1). Section (3.2) depicts the proposed direct hypothetical relationships between the thirteen core constructs including: perceived ease of use, perceived usefulness, behaviour intention, behaviour usage, peer influence, superior influence, resource facilitation, technology facilitations, self-efficacy, academic tasks, non-academic tasks, government support, and finally, institute support. With the introduction of moderating factors in section (3.3), sections (3.4, 3.5, and 3.6) present the influence of seven demographic and situational moderators (age, gender, education level, organisation type, academic position, voluntariness and usage experience). Finally, section (3.7) presents the moderating influence of the four cultural dimensions (power distance, masculinity-femininity, individualism-collectivism, and uncertainty avoidance) on the predictors of individuals' acceptance behaviour.

3.1 Theoretical background

The conceptual framework developed for the present study (see figure 3.1) is drawn from the various theoretical models explained in chapter 2. From a broad perspective, it is primarily based on the conceptualisation of social cognitive theory (SCT) (Bandura, 1986). Applying SCT is relevant to the research question posed in the present study: according to SCT, there is a consistent reciprocal relationship between environmental factors, personal factors, and behaviour. Dividing the research question into three parts, conceptualisation of the first part of research question (examination of predictors that influence individuals' acceptance behaviour) is consistent with the behaviour in SCT; the second part (exploring the impact of the demographic characteristics on individuals' acceptance behaviour) is consistent with the personal factors in SCT; and finally, the third part (exploring the impact of situational and cultural factors on individuals' acceptance behaviour) is consistent with the environmental factors in SCT.

Based on SCT, the framework integrates the determinants from the models: TRA (Fishbein & Ajzen, 1975), DTPB (Taylor & Todd, 1995a), TAM2 (Venkatesh & Davis, 2000), task technology fit (Goodhue & Thompson, 1995), and UTAUT (Venkatesh et al., 2003) into an extended TAM. In addition, the model also incorporates the psychological theory of gender, Bem's Sex Role Inventory (BSRI) (Bem, 1981) and the cultural theory of Hofstede (1980), to explore the moderating effect of demographic and cultural factors on individuals' acceptance behaviour. Creating a model based on a number of prior dominant theoretical models is consistent with the rationales presented in the previous chapter. According to this, every model holds some limitations (in terms of parsimony, significance, and explanatory power), therefore, selecting a number of relevant constructs from the various models is the most favoured approach.

The rationale for selecting the TAM as the foundation model for the theoretical framework is based on the TAM's consistency in explainatory power since its creation, i.e., 40%, and its popularity as one of the most cited model in the social sciences citation index (SSCI) (e.g., Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). In doing so, perceived usefulness (PU), perceived ease of use (PEOU), behavioural intention (BI), and behavioural usage (BU) are incorporated with the conceptualisation of the TAM. Previous literature (e.g., Venkatesh & Davis, 1996; 2000; Taylor & Todd, 1995a; Mathieson, 1991) suggest that the TAM limits its ability to predict the influence of volitional, situational and social conditions. In order to overcome such limitations, volitional effect (voluntariness) and usage experience as moderators are incorporated with the conceptualisation of TAM2.

Both TAM and TAM2 theorise that the effect of external variables on intention can only be viewed in terms of the mediating effects of PEOU and PU, and hence, this limits their applicability to examine the direct effect of situational and social conditions on acceptance intention. Based on this limitation, the normative beliefs (peer-influence (PI) and superior-influence (SI)) are incorporated from TRA, and control beliefs (technology facilitation (TF), resource facilitations (RF), and self-efficacy (SE)) are incorporated from DTPB. None of these models explicitly conceptualised the importance of social influence (which can be exerted subject to culture and specific interpersonal agreements (Thompson et al., 1991)) on acceptance behaviour. Therefore, using a similar conceptualisation of UTAUT in terms of social influence effect on BI, the effect of management support (government support (GS) and institutional support (IS)) is incorporated in the extended model. Additionally, consistent with the UTAUT, the effect of moderators (age, gender, education level, organisation type, academic position) and cultural dimensions (PD, IC, MAS, UA) are also integrated. Finally, specific to the present study's context (educational institutes) and nature of job (teaching and research), external belief of technology utilisation i.e., task characteristics (academic tasks (AT) and non-academic task (NAT)) are incorporated with the theoretical justifications of task-technology-fit (TTF). The hypothetical relationships proposed can be seen in figure 3.1.

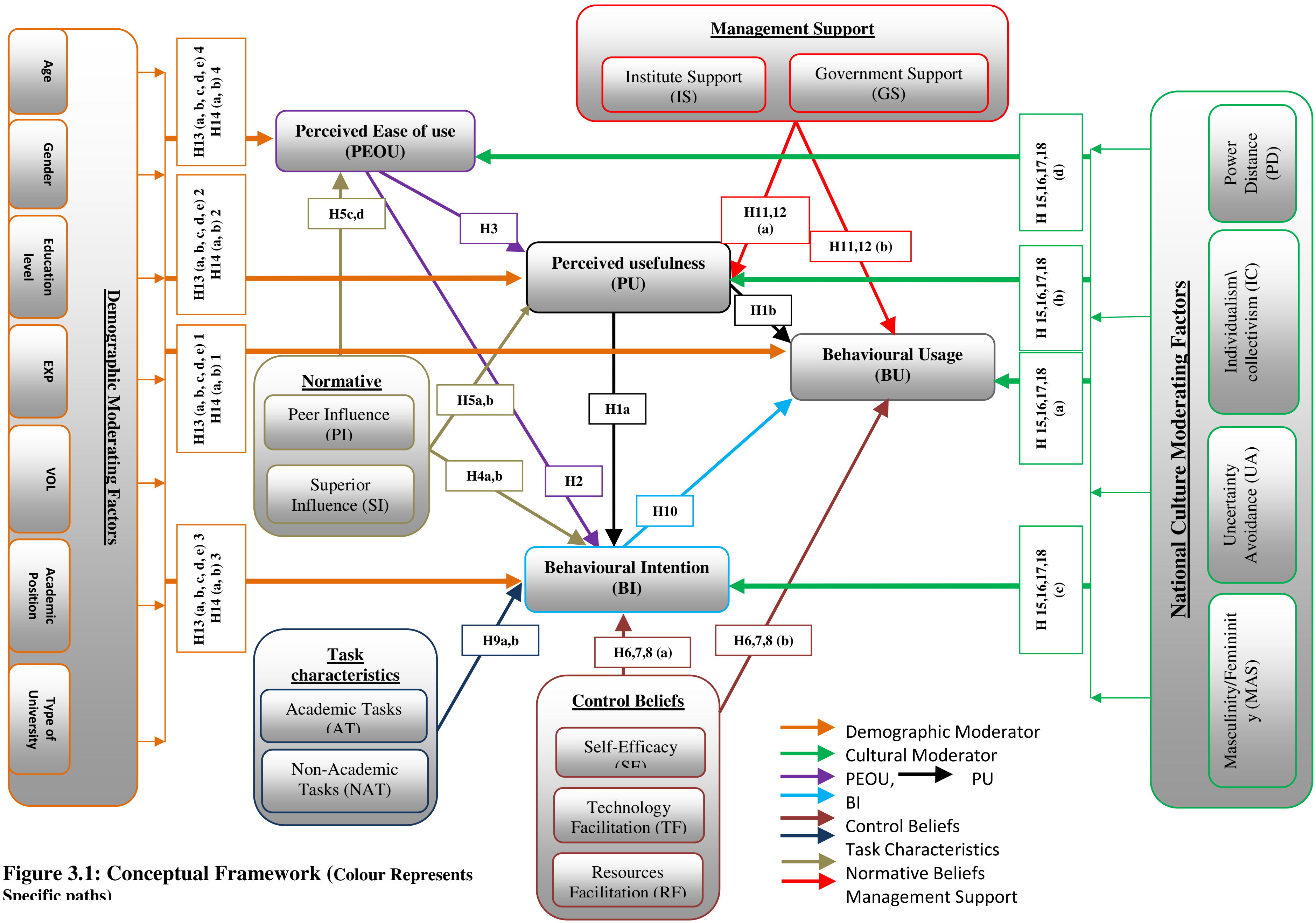


Figure 3.1: Conceptual Framework (Colour Represents Specific paths)

3.2 Direct relationships

3.2.1. Behavioural beliefs

Behaviour, which is defined as an observable act, is related to the individuals' persuasive or attitudinal feelings (LaRose & Eastin, 2004); whereas attitude/attitudinal feelings are defined as the 'degree to which a person has favourable or unfavourable evaluation or appraisal of the behaviour in question' (Ajzen, 1991 p.188). In simple words, behaviour can result in positive or negative feelings depending on the individual's observations or performance. Bandura (1977) is considered as a pioneer in introducing behavioural beliefs in SCT which were later used as outcome variable of attitude in the models TRA, TAM, A-TAM, TAM2, TPB, and DTPB.

In the original conceptualisation of the TAM, consistent with TRA, behavioural beliefs were hypothesised over behavioural intention (BI) with the mediation effect of attitude (A). However, in the subsequent study of the final TAM model, A was omitted due to partial mediation effect between beliefs and intention (Davis et al., 1989 p.955). Given that, in the present study, approaching the TAM's conceptualisation and keeping the parsimony of the model intact, A as a determinant of BI is also excluded. It is expected that two beliefs- PEOU and PU, which have remained direct determinants of behaviour (e.g., Taylor & Todd, 1995a) will determine individuals' BI to accept a specific technology.

Perceived usefulness (PU) is defined as the 'degree to which a person believes that using a particular system would enhance his/her job performance', whilst perceived ease of use (PEOU) is defined as 'the degree to which a person believes that using a particular system would be free of effort' (Davis et al., 1989 p.320). In literature, PU, which is a reflection of performance use (Venkatesh & Morris, 2000) has been closely studied as similar to *relative advantage* in the model DOI, *extrinsic motivation* in motivational model (MM), *outcome expectations* in SCT, and *performance expectancy* in UTAUT (see Venkatesh et al., 2003); whereas PEOU has been studied for its similarity to the *effort expectancy* in UTAUT and opposite to *complexity* in DOI (see also Venkatesh et al., 2003). Davis et al. (1989), within the TAM, established the direct relationship of PU and PEOU on BI, as well as the indirect (mediation) effect of PEOU through PU on BI. Subsequently, similar relationships were also suggested in various other models, such as: TAM2, A-TAM and DTPB (see the review of models in chapter 2). Persistently, relationships suggested in the TAM are empirically supported in a wide range of technology acceptance literature (see table 2.2, chapter 2). For instance, the literature supports the direct relationship of PEOU and PU on BI (e.g., Davis, 1989; Davis et al., 1989; Venkatesh & Davis, 2000; Taylor & Todd, 1995a; Taylor & Todd, 1995b; Mathieson, 1991; Subramanian, 1994; Szajna, 1996; Venkatesh & Morris, 2000; Venkatesh & Davis, 1996); PU on BU (e.g., Davis et al., 1989; Mathieson, 1991; Keil et al., 1995; Agarwal & Prasad, 1997; Agarwal & Prasad, 1999); and, PEOU as an indirect determinant of BI through PU (e.g., Wu et al., 2007; Taylor & Todd, 1995a; Mathieson, 1991; Chau & Hu, 2001).

Despite of the fact that the exemption of multiplicative effect of beliefs facilitates the examination of PU and PEOU across the different settings (e.g., Davis et al., 1989), in the present context of the study their relevance is rational. For instance, in the academic context, it is expected that behaviour among the individuals' acceptance does not largely vary from person to person. However, it is expected that individuals' professional and teaching practices will be influenced by their internal perception (through observing the relative advantages of the Internet). Keeping in view the relative advantages of the technology (i.e. the Internet) and, in line with the TAM, TRA, TPB studies, it is expected that if behavioural beliefs are positive towards the acceptance of the Internet then it is more likely to get positive effects on their behavioural intentions and use to accept the Internet technology. Therefore, it is hypothesised:

H1a: ***Perceptions of the PU of technology have a positive significant influence on the BI to accept the technology (PU→BI).***

H1b: ***Perceptions of the PU of technology have a positive significant influence on the BU of the technology (PU→BU).***

H2: ***Perceptions of the PEOU of technology have a positive significant influence on the BI to accept the technology (PEOU→BI).***

H3: ***Perceptions of the PEOU of technology have a positive significant influence on the perception of the PU of the technology (PEOU→PU).***

3.2.2. Normative beliefs

Normative beliefs, originally introduced in TRA, are defined as individuals' perceptions of particular behaviour as influenced by the judgment of others (Fishbein & Ajzen, 1975). Within TPB, it is a component of subjective norms (SN) which is defined as 'the perceived social pressure to perform or not to perform the behaviour' by the individual (Ajzen, 1991 p.188). Having been introduced into TRA, normative beliefs have been closely studied/employed as a construct of *social influence* in UTAUT, *image* in DOI, and as *subjective norms* in the TAM, TAM2, TPB, DTPB and A-TAM (see Venkatesh et al., 2003; also see the review of theoretical models in chapter 2).

The role of normative beliefs (SN in the present study) as a determinant of BI is documented as situational variable, which is influenced by the opinion of friends, family, colleagues, peers and social referents (e.g., Venkatesh & Davis, 2000). For instance, individuals working in one organisation may feel reluctant to accept conditions in another due to an unexpected and unfriendly environment or less support from superiors and peers. Keeping the impact of such divergence in perspective, Taylor & Todd (1995a) within DTPB decomposed normative beliefs into two groups: *peer influence* (PI) and *superior influence* (SI). Despite this fact, the opinions of these two groups might differ from each other, but they are still considered to be strong determinants of individuals' acceptance behaviour (e.g., Mathieson, 1991; Taylor & Todd, 1995a).

Mixed results presented in the literature show the direct impact of SN on BI and PU. For instance, previous scholars (e.g., Hu et al., 2003; Taylor & Todd, 1995a; Venkatesh & Davis, 2000; Yi & Yuandong, 2005) found a significant impact of SN on BI and PU in the presence of certain moderating factors such as *gender, training, experience and voluntariness*. On the contrary, other scholars (e.g., Mathieson, 1991; Taylor & Todd, 1995b; Chau & Hu, 2001; Lewis et al., 2003; Shih & Fang, 2004) did not find any significant impact of SN either on BI or on PU (see table 2.2, chapter 2). The ambiguous relation of SN can raise the question of its relevance within information system acceptance literature, and thus merits additional empirical evidence to examine the hidden relationships. Given that, the present study incorporates SN due to their importance towards establishing behavioural intention (e.g., Hartwick & Barki, 1994; Moore & Benbasat, 1996). In addition, rationales are assumed for those studies that did not find a significance of SN, either due to highly relative human behaviour (compulsory situations) towards technology (Davis et al., 1989) or due to an insufficient relevant sample (mostly students) (e.g., Venkatesh & Davis, 2000). Davis, who did not include SN in the TAM (1989), realised their importance and later in 2000, along with Venkatesh, demonstrated the significant impact of SN on BI as well as PU in TAM2.

Unlike behavioural beliefs (PU and PEOU), the impact of SN on BI is operationalised as a multiplicative construct in which the extent to which individuals believe that he/she should perform behaviour is weighted by the extent to which he/she wishes to comply with the source of the normative belief (Ajzen & Fishbein, 1980). In simple words, SN is a context and situation-specific construct and cannot be measured independently. In the present context of the study, the importance of the SN is highly relevant. Arguably, the present context of the study (Pakistan) is moderately evaluated on the masculinity-femininity cultural index as proposed by Hofstede (1980), which makes it difficult to explore the exact impact of SN. According to the literature, feminine culture compared with masculine culture shows a higher influenceablity due to intention towards agreeable desires, maintaining social relationships and interaction, concern with the well-being of others and greater interdependence (Srite & Karahanna, 2006; Gefen & Straub, 1997; Bem, 1981). Therefore, based on the discussion that highlights the importance of SN, its ambiguous relationship within information system research, and finally, relevance to the present context of the study, it is hypothesised:

H4a: Perceptions of the PI of technology have a positive significant influence on the BI to accept the technology (PI →BI).

H4b: Perceptions of the SI of technology have a positive significant influence on the BI to accept the technology (SI →BI).

H5a: Perceptions of the PI of technology have a positive significant influence on the perception of the PU of the technology (PI →PU).

H5b: Perceptions of the SI of technology have a positive significant influence on the perception of the PU of the technology (SI →PU).

H5c: Perceptions of the PI of technology have a positive significant influence on the perception of the PEOU of the technology (PI →PEOU).

H5d: Perceptions of the SI of technology have a positive significant influence on the perception of the PEOU of the technology (SI →PEOU).

3.2.3. Control beliefs

By extending the boundary conditions of violation control in TRA, TPB introduced control beliefs with the additional construct of perceived behavioural control (PBC). PBC is the reflection of an individual's perception regarding the possession of requisite resources and opportunities to perform a given behaviour (Ajzen, 1991). The possession of abundant resources and opportunities by an individual resulted in greater control over behaviour (Madden et al., 1992). According to Ajzen (1991), PBC reflects the perception of internal and external constraints on behaviour, which is defined as 'perceived ease or difficulty of performing behaviour' (p.188), and 'is assumed to reflect past experience as well as anticipated impediments and consequences' (p.122). In information system research, Moore & Benbasat (1991) conceptualised PBC as similar to the construct *compatibility* in DOI, whereas Venkatesh et al. (2003) regarded it as similar to the *facilitation conditions* in UTAUT. The effect of PBC in TPB was included as a direct determinant of BU as well as indirectly through BI (Ajzen, 1991). Similar to normative beliefs, the impact of PBC on BI is influenced by the personal (age, gender, experience) and situational (Voluntariness and Experience) characteristics (e.g., Mathieson, 1991). For example, researchers (e.g. Venkatesh et al., 2000; Venkatesh et al., 2004) found a significant impact of BPC on BI in women only, leaving men as insignificant. Additionally, similar to SN, they found a diminishing impact of PBC on BI with respect to the usage experience (ibid).

Within information system research PBC has remained an important construct of BI and BU. For instance, using TPB, DTPB, and A-TAM, researchers (e.g., Chau & Hu, 2001; Shish & Fang, 2004; Yi et al., 2006; Mathesion, 1991; Taylor & Todd, 1995a; Puschel et al., 2010) found a significant impact of PBC on BI, whereas using similar models, others (e.g., Taylor & Todd, 1995; Taylor & Todd, 1995a; Madden et al., 1992) found a significant impact of PBC on BU (see table 2.2, chapter 2). Apart from the IT acceptance research domain, the importance of the PBC on the decision-making process is appreciated in different contexts. For instance, within an academic context (the context of the present study), Manstead & Van Eekelen (1998), using TPB, found that perceived controllability (PBC) showed a significant impact on academics' intention to select one course out of three English courses.

For developing an in-depth understanding, the conceptualisation of construct PBC in the present study is consistent with the model DTPB (Taylor & Todd, 1995), in which to determine behaviour, PBC is treated in three partly separate beliefs i.e., self-efficacy (SE), resource facilitation (RF) and technology facilitation (TF). Originally, Taylor & Todd (1995a) followed the criteria of Ajzen (1985, 1991) to decompose the control beliefs. According to Ajzen (1985, 1991), control beliefs can be an individual's internal beliefs i.e., *self-efficacy* or can be external, similar to the Triandi's (1971) notion of *facilitation conditions*. This decomposition of PBC beliefs is also echoed by a number of subsequent studies (e.g., Chau & Hu, 2002; Lin, 2007; Huh et al., 2009) and is briefly described next.

Self-efficacy (SE), which emerged from social learning theory (SLT) and social cogitative theory (SCT), refers to an individual's self-evaluation beliefs about their ability to perform target behaviour (Bandura, 1977, 1986). Initially, within IT acceptance models, SE was considered to be part or similar to the perception of ease use (PEOU). For instance, Davis (1989) referred to PEOU as a similar concept of SE, whereas Malhotra (2002) defined PEOU as the intrinsic motivation which is based on self-control and tacit knowledge within context (i.e., SE). In the same line of research, Marakas et al. (1998) differentiated two types of the SE beliefs as: general computer SE, and task-specific SE. The author emphasised the need for caution before selecting any one of them (ibid). In the present study, only task-specific SE is relevant due to the intention to examine an individual's judgement of efficacy to perform specific task (teaching and research-related) using only the Internet.

The belief SE has been remain an important predictor of an individual's perceived ability towards task completion, intrinsic motivation in task, and task performance across the versatile domains (e.g., Ellen et al., 1991; Martocchio and Webster, 1992). Within the IT domain, studies reported the effect of SE as an important predictor of determining an individual's behaviour and performance using specific technology (e.g., Compeau & Higgins, 1991, 1995, 1999; Hartwick & Barki, 1994; Moore & Benbasat, 1996; Igbaria & Iivari, 1995). For instance, within PC adoption, the direct impact of SE on BI is reported by a number of researchers (e.g., Compeaue & Higgins, 1991; Wu et al., 2007). A similar effect within the context of Internet usage was found by other researchers (Hsu & Chiu, 2004; Eastin & LaRose, 2000; Eastin, 2002; Shih & Fang, 2004). The strong effect of SE on BU is also reported in IT literature (e.g., Agarwal et al., 2000; Thompson et al., 1991; Compeau & Higgins, 1995; Igbaria & Iivari, 1995). Finally, within studies consistent with TAM conceptualisation (external factors can only affect behaviour through the mediation effects of PEOU and PU), researchers (e.g., Compeau & Higgins, 1995; Lewis et al., 2003) found an impact of SE on PU and image, whereas researchers (e.g., Venkatesh & Davis, 1996; Agarwal et al., 2000; Lewis et al., 2003) found an impact of SE on PEOU.

As described earlier, within the deconstruction of control beliefs, the second group is related to *facilitations conditions* (FC) that is further divided into two sub-dimensions. First, r*esource facilitations* (RF) that are related to factors such as time and money; second, *technology facilitating* (TF) that is related to the technology compatibility issues that may restrain behavioural intention or usage (Taylor & Todd, 1995a). According to Taylor & Todd (1995a, p.153), BI and BU are expected to be less likely as less time and money are accessible and as technical compatibility decreases. RF and TF, as constructs of FC, were examined together by Venkatesh et al. (2003) during the development of UTAUT. Venkatesh et al. found that FC, neither in voluntary nor in mandatory settings, showed a significant effect on BI. Contrary to this, within the model of PC utilisation (MPCU), Thompson et al. (1991) found a significant impact of FC on BU. Similarly Venkatesh et al. (2003) found that FC produced a significant impact on BU in the presence of some moderating factors including age and experience. Rationally, the different results for FC can be supported by the difference in importance in underlying constructs, i.e., RF and TF. According to Taylor & Todd (1995a, p.153), the absence of RF represents barriers to usage and may inhibit the formation of BI and BU; on the contrary, the presence of RF may not be considered to encourage usage. To validate the argument, Taylor & Todd (1995a), within DTPB, examined the direct impact of TF and RF without the mediation of PBC and found that RF produced a significant effect on both BI and BU but the TF effect was negative and insignificant.

In the present context of the study, consistent with the TAM conceptualisation of parsimony (attitude was excluded due to partial mediation), PBC is omitted. This omission is supported by the results of Taylor & Todd (1995a) where RF presented a direct effect on BI and BU. Consequently, it provides a more parsimonious structure without the uncertain results of FC. The relevance of these factors in the present study is consistent with the initiatives taken by the government of Pakistan to improve technology (i.e., Internet) acceptance specifically within the educational sector (see section 2.17.4). Hence, summing up the discussion, it is hypothesised as:

H6a: ***Perceptions of the SE of technology have a positive significant influence on the BI to accept the technology (SE→BI).***

H6b: ***Perceptions of the SE of technology have a positive significant influence on the BU of the technology (SE→BU).***

H7a: ***Perceptions of the TF of technology have a positive significant influence on the BI to accept the technology (TF→BI).***

H7b: ***Perceptions of the TF of technology have a positive significant influence on the BU of the technology (TF→BU).***

H8a: ***Perceptions of the RF of technology have a positive significant influence on the BI to accept the technology (RF→BI).***

H8b: ***Perceptions of the RF of technology have a positive significant influence on the BU of the technology (RF→BU).***

3.2.4. Task characteristics

In the literature of information systems, the utilisation (in terms of acceptance/adoption) of a technology is mostly studied in the theories of attitude, beliefs and behaviour (e.g., Bagozzi, 1982; Davis, 1989; Davis et al. 1989; Thompson et al., 1991) and characteristics of tasks (internal and external) are found to be the strongest construct of behavioural beliefs towards behaviour intention (i.e., utilisation effect) (e.g., Goodhue & Thompson, 1995; Venkatesh, 2000; Davis, 1989; Davis et al., 1989; Dishaw & Strong, 1999). Even though, theoretically, characteristics of tasks are found to be effective constructs of motivation, only a very few researchers took them apart to examine as independent determinants of usage behaviour (Goodhue & Thompson, 1995). In most situations, task characteristics are considered to be a sub-part or internal factor of the core constructs. For instance, Davis (1989) examined task characteristics as an implicit factor of PU, that is to say, usefulness means useful for something, and hence, overlooked the explicit effect of the task on BI. The importance of task characteristics as an external factor of technology utilisation was introduced by Goodhue (1988) in a model known as 'task-technology-fit' (TTF). In later studies it was confirmed that explicit inclusion of task characteristics provides a better IT utilisation and performance (e.g., Thompson & Higgin, 1994; Goodhue & Thompson, 1995; Dishaw & Strong, 1999; Igbaria, 1990; Seyal et al., 2002).

Goodhue & Thompson (1995) defined 'task' as an action performed by an individual to carry out output activity (i.e. behaviour according to LaRose & Eastin (2004)), whereas task characteristics are an individual's abilities that support both work and work- related experience using a particular IT system utilisation. In addition, the authors state that technology is only acceptable when it is consistent with the needs of an individual and termed it as 'fit of technology'. According to authors, fit of technology may be examined at various levels, for example complexity (simple to difficult) and structure (routine to non-routine).

Similar with the normative and control beliefs, the conceptualisation of task characteristics in the present study (an academic context) is also situation-based (vary according to the context). In part, based on the TTF structure (routine and non-routine), the characterisation of tasks is divided into two groups, i.e., academic tasks (AT) and non-academic tasks (NAT). This grouping is consistent with the conceptualisation in literature (Reynolds, 1992; Rosenfeld et al., 1992) and is supported by a number of studies within the literature of computing in higher education systems (e.g., Harris, 1997; 1999; Chiero, 1997; Gilbert, 1996). According to this, within teaching, tasks can be pre-active (comprehending, preparing, and adopting content, plans, and material), interactive (performed during instructions), and post-active (includes both teacher's action and student's response, interaction with colleagues, and professional development) (Raynolds, 1992). Similar tasks were divided into six groups by Rosenfeld et al., (1992) as: planning and preparing for instructions, managing the classroom, implementing instructions, evaluating student learning and instructional effectiveness, administrative responsibilities, and additional professional responsibilities. Due to the requirements of the teaching job, out of these six, the first four are mostly considered as routine tasks (AT), while the remaining two are considered to be non-routine tasks (NAT) (Kripanont, 2007). Assimilating the discussion above and realising the importance of task characteristics towards BI within a utilisation focus and the TTF research (e.g., Davis et al., 1989; Thompson, et al., 1991; Hartwick & Barki, 1994; Goodhue, 1988; Goodhue & Thompson, 1995; Dishaw & Strong, 1999; Igbaria, 1990; Igbaria & Iivary, 1995), it is hypothesised that:

H9a: ***Task characteristics related to the AT using technology has a positive significant influence on the BI to accept the technology (AT→BI).***

H9b: ***Task characteristics related to the NAT using technology has a positive significant influence on the BI to accept the technology (NAT→BI).***

3.2.5. Behavioural intention towards behaviour usage

Ajzen & Fishbein (1980) and Fishbein & Ajzen (1975) were the first to introduce behaviour as a part of the TRA model. TRA played a key role in the development of the TAM. According to TRA, beliefs influence attitudes, and attitude determines the nature of intentions that guide behavioural usage (Ajzen & Fishbein, 1980). In other words, intention is the cognitive process of individuals' readiness to perform specific behaviour and is an immediate antecedent of usage behaviour. In turn, behavioural usage is an observable act performed by an individual based on their experience or mediated by some vicarious observations on a given target/level (LaRose & Eastin, 2004). The impact of BI on BU received strong support in literature (e.g., Venkatesh et al., 2003; Shih & Fang, 2004; Davis, 1989; Venkatesh & Davis, 2000; Taylor & Todd, 1995a, Taylor & Todd, 1995b; Szajna, 1996; Venkatesh & Davis, 1996; Davis et al., 1989; Wu & Wang 2005), listed only few. Therefore, based on previous strong and undebateable findings, it is expected that:

H10: ***The BI to accept technology has a positive significant influence on the BU of the technology (BI→BU).***

3.2.6. Management support: institutional-level and governmental-level

For the innovation of IT systems within an organisational context, management support presumably influences which innovations are adopted and used by employees (Igbaria & Chakrabarti, 1990). Decisions to promote technological changes and improvements are mostly carried out by management. In turn, the employees of an organisation are expected to learn new technological skills and perform tasks effectively. However, innovations and required outcomes are only attainable when individuals within the organisation believe that innovative behaviour is valued sufficiently. Generally, it is observed that, whenever IT innovations are introduced in an organisation, changes in that organisation are inevitable. In some cases, change resulted in resistance (Yoon et al., 1995). For instance, employee resistance might be the result of the perception of learning and a lack of training support, resources and facilitations to use the system effectively (Trevino & Webster, 1992). Therefore, without prior knowledge of the individuals' behaviour, the perception of a management decision towards innovation might differentiate between the expected attitude and the perceived impact of technological usage. Reasonably, several studies reported the role of management support to be one of the key determinants in IT acceptance literature (e.g., Igbaria, 1990, 1994; Igbaria et al., 1995; Igbaria et al., 1997; Purvis et al., 2001; Lewis et al., 2003; Venkatesh & Balla, 2008; Rouibah et al., 2009).

In this study, it is believed that expected management influence on behaviour is based on the personal characteristics possessed by an individual and may vary according to organisational context and culture. To develop a proposition, researcher followed previous research in information systems (Lewis et al., 2003), which conceptualised the influence of management at top level (i.e. government-support (GS) in present study) and at a low level (i.e. institution-support (IS) in the present study) in terms of commitment (future vision and goals, instrumental rewards), general support (funding, cooperation and police discussions) and specific support (resource allocation, facilitation conditions, technology support) towards individuals' PU and BU beliefs. Observing management support at a hierarchal level is also supported by Leonard-Barton (1987) who warned that, without observing management support at an appropriate level in the organisation, it will not be effective in predicting technology acceptance behaviour. Management support may be demonstrated in different ways. Specifically, for the present study, it is conceptualised that the mechanism through which individuals are influenced by the management is perceived through *indirect message passing* between the superior and the individual, or through *direct physical support* from the superior to the individual.

In terms of the message or notification issued by the management authorities to adopt or accept a particular innovation, Peabody (1961) identified four types of influence: legitimacy, position, competence and person. Whereas Orlikowski (1992) categorised management influence on individuals' perception into three types: significance, legitimisation and domination. Between Peabody and Orlikowski's categorisations, the common mechanism of influence is legitimisation, which is a process where a message is passed from higher management to the subordinates in an organisation so they are reassured about the beliefs and actions directed by the authorities (Scott, 1995). Thus, the process of legitimisation is the intended attitude of top management in the form of a persuasive message that is likely to affect individuals' attitude and intention to accept a particular behaviour. This is also consistent with Triandis' (1971) term of 'social norms', which posits that an individual's behaviour is influenced by the message received from others and reflects what individuals think they should do.

Unlike the message passing and legitimisation process, the influence of management support can directly impact an individual's perceptions of attitude and behaviour if they are aware of that management commitment and support. A significant number of studies found a positive effect of management support in a vast variety of dimensions, such as innovation of products management (Chakrabarti, 1974) and change in innovation and management (Leonard-Barton & Deschamps, 1988; Kanter, 1983). However, evaluating this direct support from management is not as easy as evaluating the perception of the message passing (Leonard-Barton & Deschamps, 1988). The reason for this is obvious as an individual's behaviour is not always similar and may alter by their desire for support in innovations (Fishbein & Ajzen, 1975). In the context of IT and Internet acceptance, it might be predicted that the provision of computers, the Internet and training from management may be the types of facilitation conditions that can influence an individual's perception of system usefulness and acceptance intention.

In the current study, it is intended to observe top-level and low-level management influence in terms of commitment, general support and specific support. It is expected that individuals (academics working in higher educational institutes) will be equally influenced by the attitudes of top-level (GS) and low-level (IS) management. Indeed, their daily or short-term cognitive behaviour is expected to be influenced by the support from the IS management depending on the provision of computers, training, and Internet access, whilst their long-term sustained cognitive behaviour is expected to be influenced by the GS in terms of funding allocation, encouragement and motivation through normative and instrumental reward. Therefore, consistent with the assertion of Igbaria et al. (1997), that management support is relevant with the greater system success and a lack of it is considered to be a barrier, it is hypothesised:

H11a: ***Perceptions of low-level management i.e. IS, have a positive significant influence on the perception of the PU of the technology (IS →PU).***

H11b: ***Perceptions of low-level management i.e. IS, have a positive significant influence on the BU of the technology (IS →BU).***

H12a: ***Perceptions of top-level management i.e. GS, have a positive significant influence on the perception of the PU of the technology (GS →PU).***

H12b: ***Perceptions of top-level management i.e. GS, have a positive significant influence on the BU of the technology (GS →BU).***

3.3 Moderating impact

Baron and Kenny (1986, p.1174) defined a moderator as the 'variable that affects the direction and/or strength of the relation between independent or predictor variable and dependent criterion variable'. In this research, two groups of moderating variables are expected to show a significant impact on the direct relationships proposed in the previous section (3.2). The first group includes seven demographic and situational variables: *age, gender, organisational type, academic position, educational level, experience usage* and v*oluntariness*. The other group includes four moderators related to the cultural dimensions suggested by Hofstede (1980): *masculinity and femininity (MAS), individualism-collectivism(IC), power distance (PD)* and *uncertainty avoidance (UA).*

Before starting a brief discourse about the importance of each moderator, it is important to remember that all the moderators are being examined on the basis of an exploratory approach. In other words, their effect is examined using correlational investigation. According to this, paths are identified, established and associated with certain predictors (Sekaran, 2000). This approach is different from the paths proposed in previous section (3.2) where casual investigation was used to examine the best or most appropriate cause and effect between one variable directly or indirectly (mediation) over another[6]. The brief importance of each moderator with the support of the literature is established below.

3.4 Moderators: demographic variables

3.4.1. Age

Despite the fact that age has been proven to be an important demographic predictor of interest in organisational settings (Ford et al., 1996; Minton & Shneider, 1980), it has received very little attention in IT acceptance research (Morris & Venkatesh, 2000). As a result, a few studies recently started to examine its effect (direct and indirect) on individuals' acceptance and usage behaviour (e.g., Burton-Jones & Hubona, 2006; Morris et al., 2005; Venkatesh et al., 2003; Carveth & Kretchmer, 2002; Porter & Donthu, 2006; Wang et al., 2009; Chung et al., 2010).

The prior research on age difference reported that increasing age is correlated with higher computer anxiety (reciprocal to behavioural and control beliefs PEOU and SE respectively) (e.g., Raub, 1981), unfavourable to PU (e.g., Igbaria & Parasuraman, 1989), lower attitude towards usage (e.g., Igbaria & Nachman, 1990) and acceptance behaviour (e.g., Igbaria et al, 1989; Lee, 1986; Chung et al., 2010). The rationale for control beliefs could be that older people are less likely to have computer experience, be less open to change, and consequently, be more susceptible to computer anxiety (Igbaria, 1990). In

[6] However, over all approach is correlation for both direct and indirect (moderators) examination. The correlational results of direct relationships are presented with computation of 'direct-effect' but are not explicitly discussed (See table A-7 in appendix).

simple words, age is positively related to computer anxiety. Igbaria's (1990) argument was confirmed by Morris & Venkatesh (2000) who found that age reduced the impact of PBC over BI and BU due to lower level of SE and cognitive skills.

The rationale for the reciprocal relationship of age and PU (lower age had a positive effect on PU and vice versa) are consistent with the instrumentality effect and extrinsic motivations. According to this, the literature shows that younger people placed a greater importance of extrinsic motivational effects (job-related attitudes, opportunities for promotion) and hence perceived a higher importance of PU (Morris & Venkatesh, 2000). From the perspective of normative beliefs, age increased the positive effect of SN due to greater need of affiliation (e.g., Igbaria, 1993; Morris & Venkatesh, 2000; Burton-Jones & Hubona, 2006). For instance, Hall & Mansfield (1975) put that the importance of having a friendly supervisor and peers increases with age. Finally, the literature suggests that age is negatively related to the BI and BU due to an increased perception of habit (e.g., Burton-Jones & Hubona, 2005, 2006; Igbaria, 1993).

Recent literature suggests that age together with gender can exhibit a simultaneous effect on an individual's acceptance behaviour (e.g., Morris et al., 2005; Wang et al., 2009). Indeed, Levy (1988) cautioned that examining either gender or age without referencing each other might mislead the expected outcome. In doing so, Venkatesh et al. (2003) examined the combined moderating effect of age and gender in UTAUT. The author, in terms of predicting intention, found that the affect of performance expectancy (similar to PU) was stronger for younger men, and the effect of effort expectancy (similar to PEOU) and social influence (similar to SN) was stronger for older women with limited experience (ibid). In a similar line of research, Morris et al. (2005) recently examined the combined effect of both moderators in TPB. Supporting the Venkatesh results, the authors found a significant effect of attitude in younger men and PBC in older women towards predicting the intention. Hence, despite clear evidence of the moderating impact of age in IT acceptance literature, it is still hypothesised on an exploratory basis that:

H13a1: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by age, or (BI, PU, TF, RF, SE, IS, GS) X Age →BU

H13a2: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by age, or (SN, PEOU, IS, GS) X Age →PU

H13a3: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by age, or (PU, PEOU, TF, RF, SE, AT, NAT, SN)X Age →BI

H13a4: The influence of the predictor SN towards PEOU is moderated by age, or SN X Age →PEOU

3.4.2. Gender and Masculinity-Femininity

The significant body of literature across the domains revealed the differences between men and women regarding the decision-making process. For instance, in academia, Wilson et al. (1994) observed behavioural differences among male and female academics in the decision-making process when selecting a particular course was examined. Powell & Ansic (1997) explored differences on the level of risk perception among male and female workers in the financial decision-making process. However, within the domain of information systems research, surprisingly the role of gender as a direct or indirect (moderating) construct on an individual's behavioural acceptance has received very little consideration (e.g., Venkatesh & Morris, 2000; Gefen & Straub, 1997; Porter & Donthu, 2006). So far, researchers have examined gender as a biological, dichotomous construct (e.g., Venkatesh & Morris, 2000; Al-Jabri & Al-Khaldi, 1997; Venkatesh et al., 2003; Gefen & Straub, 1997; He & Freeman, 2009; Wang et al., 2009) which constrains the understanding of the real differences between men and women on the basis of cognitive perceptions (cf. Venkatesh & Morris, 2000; Bem, 1981). Furthermore, the studies that explored differences between the genders were based on the mean differences between men and women in terms of abilities and psychological traits (Venkatesh & Morris, 2000). In this section, the effect of gender is discussed on the basis of biological traits (male and female) as well as on psychological traits (masculinity and femininity). In doing so, parallel to gender, this section also covers the justification of the cultural dimension masculinity-femininity (MAS). The rationale for looking at both moderators together is based on Bem's (1981) Sex Role Inventory (BSRI), which suggests that men tend to display more masculine traits (e.g., assertiveness) and women more feminine traits (nurturing).

An exploration of gender-based differences on behavioural beliefs (PU and PEOU) requires understanding of their conceptualisation within the TAM. According to the TAM (Davis et al. , 1989 p.112), PU is considered to be an extrinsic motivational effect, based on outcome performance through instrumentality, and PEOU is considered to be an intrinsic motivational effect based on the process of outcome performance. Support for this argument is found in the literature, which echoes that PU towards behaviour is strongly related to the effect of instrumentality, performance outcome and extrinsic motivations (e.g., Davis, 1993; Venkatesh & Morris, 2000). In the context of gender, Taylor & Hall (1982) in meta-analysis put that masculine traits were highly correlated with instrumental behaviour. Rationally, their argument is consistent with recent literature in social psychology, which asserts that individuals with masculine traits compared with feminine traits possess instrumental behaviour because they place a greater emphasis on earnings, recognition of the job, advancement and tackling challenging tasks (Hofstede & Hofstede, 2005). The effect of instrumentality, which asserts that men and masculinity, as compared with women and femininity, are highly influenced by the PU to develop the intention is also supported by a number of studies in IT acceptance literature (e.g., Srite & Karahanna, 2006; Venkatesh & Morris, 2000; Venkatesh et al., 2000; Venkatesh et al., 2004).

Contrary to the effect of instrumentality, which favours men and masculine individuals, a number of reasons are positioned in literature, which suggests that women, compared with men, tend to perceive a lower importance of PU. Out of many, one reason is the presence of a higher level of computer anxiety and technophobia within women (e.g., Harrison & Rainer, 1992; Parasuraman & Igbaria, 1990). Research indicates that the lower the computer anxiety, the greater the experience, which indirectly increases self-efficacy (SE) and in turn improves performance (Bandura, 1977; Rosen & Maguire, 1990; Brosan, 1998). From the gender perspective, the literature (e.g., Igbaria & Chakrabarti, 1990; Brosnan & Lee, 1998; Schumacher & Morahan-Martin, 2001; Weil & Rosen, 1995) shows that women tend to score higher on computer anxiety and are more computer-phobic than men; consequently, women are more reluctant to interact with technology and perceive less on usefulness. For example, Cooper & Weaver (2003) identified the hindrance factors for women to acquire technological benefits and found computer anxiety to be one of the major barriers. In a similar line of research, Whitley (1997), in a meta-analysis, found that women possess higher anxiety and exhibit lower in sex-role stereotyping for computer and computer self-efficacy.

In terms of gender-based differences between the relationship of PEOU on PU and BI, the influence of women and feminine individuals is usually considered to be higher than men and masculine individuals. Rationally, the essence of the statement is based on the conceptualisation of PEOU. Davis (1989) referred to PEOU as a similar concept to computer self-efficacy, whereas Malhotra (2002) defined it as an intrinsic motivation which, in a later study by van der Heijden (2004), was examined as enjoyment effect. Combining all these effects, Venkatesh (2000) proposed that PEOU is built upon determinants of internal control (self-efficacy), external control (facilitation conditions), intrinsic motivation (computer playfulness) and emotions (anxiety). Recalling the discussion relevant to the PU, that feminine individuals and women were more technophobic and higher on computer anxiety as compared with men, it is presumed that women perceive a lower level of computer self-efficacy, which in turn results in a lower level for the perception of PEOU. This proposition is also consistent with SCT, which suggests that anxieties and expectancies (self-efficacy and ease of use) are reciprocal to each other (Bandura, 1986). The determinant of PEOU is typically measured on the scale of difficulties in user acceptance (Davis et al., 1989), therefore a lower evaluation of the effect of computer SE will increase the importance of PEOU (Venkatesh & Morris, 2000). Finally, from the perspective of external control (facilitation conditions (FC)), Hofstede & Hofstede (2005) in cultural theory found that individuals with feminine traits compared with masculine traits rated a higher importance of FC in terms of service aspects and working environments. Hence, summing up the discussion, it is proposed that the belief PU in terms of instrumentality and performance outcome will be strongly influenced by men and masculine individuals; whereas, in terms of computer anxiety and facilitation conditions belief, PEOU and SE will be strongly influenced by women and feminine individuals.

The explanation of gender differences between the relationships of normative beliefs (SN) on BI, PU and PEOU, is based on the degree of differences between an individual's understanding through which they comprehend the information and social pressure shared by others. Originally, the direct impact of SN (which is a reflection of social pressure) on BI was proposed in the TRA and TPB (Ajzen, 1991; Fishbein & Ajzen, 1975). This relationship suggests that individuals' behaviour is based on the opinions of the people in their surroundings, even though they do not have any prior knowledge or positive feelings about a particular behaviour. Literature in social psychology and information systems research suggests that feminine individuals tend to be more tentative, socially oriented and concerned about others' feelings, whereas masculine individuals are more categorical, independent in nature and concerned about their own feelings rather than others (Gefen & Straub, 1997; Bem, 1981). Additionally, differences in biological traits suggest that women compared with men are found to be more expressive in nature (Taylor & Hall, 1982) and easily motivated by social pressure and affiliation needs (cf. Venkatesh & Morris, 2000), whereas men are more oriented towards interpersonal goals, achievement needs, and have high independence characteristics; moreover, men compared with women rarely rely on others' opinions (Venkatesh & Morris, 2000; Hofstede & Hofstede, 2005; Bem, 1981). Hence, it is expected that the relationship between SN and BI will often be stronger for women and feminine individuals.

The indirect effect of SN on BI intention through PU was introduced in TAM2 by Venkatesh & Davis (2000). This relationship explains that when superior or working colleagues suggest that usage of a particular system will be useful, then individuals start to take it as evidence of fact, which in turn establishes the intention to use the system. Similar to the impact of SN on BI, it is expected that the relationship between SN and BI through PU will be stronger in women and feminine individuals compared with men and masculine individuals, due to the high dependency on the internalisation effect (similar to social influence), interaction needs and being easily influenced by social circumstances (Venkatesh et al., 2004). This argument can be supported by the study of Srite & Karahanna (2006), who examined the impact of national culture on IT acceptance and found that feminine individuals showed higher influenceablity because of the intention towards agreeable desires, maintaining social relationships and interaction, and concern with the well-being of others and greater interdependence. Further evidence of this argument can also be inferred from Hofstede & Hofstede's cultural theory (2005), which suggests that for feminine individuals, relationships and quality of life possess a higher importance in comparison with masculine individuals who place higher value on earnings, achievements and job recognition.

Finally, like PU, the impact of SN on PEOU is based on the opinions of people. For instance, if co-workers or superiors suggest that the system is easier to use and will be useful, individuals start to take it as an argument of belief. The concept of ease/difficulty is closely related to self-efficacy and is studied as a determinant of PEOU (e.g., Venkatesh & Davis, 1996). A substantial amount of literature suggests that resource facilitation, supportive staff and available training showed a positive effect on self-efficacy in the early stages of system usage (e.g., Bergeron & Rivard, 1990). In this study, based on the influence of interaction and dependency on service aspects, it is expected that the impact of SN will be stronger for women and feminine individuals compared with men and masculine individuals. The reason is obvious as women and feminine individuals rated lower on SE (as discussed earlier in relation PEOU→BI) and are more dependent on service aspects and the physical working environment (Hofstede & Hofstede, 2005); consequently, they are less confident and highly people-oriented and largely value the opinion of their peers regarding the ease of a particular system.

The discussions on understanding gender difference in the relationship of SN on BI through PU and PEOU, and SN on BI through PU, also helps to understand the gender differences in the importance of management support. The management influence pertaining to message passing to inform about intended innovations is expected to be higher in women and feminine individuals compared with men and masculine influence. This reasoning is based on a review of SN, which suggests that feminine individuals are more interdependent, expressive in nature, influenced by the internalisation/social norms and sensitive to the needs of others. Additionally, empirical evidence indicated that women and feminine individuals, as compared with men and masculine individuals, are flexible towards compliance with orders and are most likely to accept behaviour if it is confirmed by the majority of people (see also Gefen & Straub, 1997; Venkatesh & Morris, 2000, Bem, 1981). Recently, in a computer-mediated communication, Guiller & Durndell (2006) indicated that women, as compared with men, were more attenuated and express agreement, whereas men were more authoritative and showed disagreement. The lower reliance/compliance of men upon others' opinions is related to masculine traits, which shows them to be self-reliant and independent (Minton & Schneider, 1980). In fact, Venkatesh et al. (2004) found that masculinity is not a significant moderator between SN and BI.

The management influence pertaining to physical support is also expected to be higher in women and feminine individuals. The explanation for this is based on the criteria of personal characteristics and intrinsic motivations that an individual holds. Intrinsic motivation means individuals tend to try and welcome innovations in an organisation. As described earlier in the review of PEOU, intrinsic motivation is based on the concept of ease of use which is perceived to be higher in women and feminine individuals as compared with men and masculine individuals. It was also noticed that women and feminine individuals were higher on technophobia and computer anxiety, and lower on self-efficacy. Therefore, women may need stronger management support (e.g., training and skills development) to improve their performance. This argument is also consistent with Hofstede's cultural theory (Hofstede & Hofstede, 2005), which suggests that feminine individuals rated a higher importance towards facilitation conditions in terms of service aspects and the working environment, in comparison with masculine individuals. On the other hand, research in psychology suggests that men and masculine individuals endorse analytical and competitive approaches to solving problems (Venkatesh et al., 2004) which enables them to become highly skilled and score high on SE (e.g., Whitley, 1997; Gefen & Straub, 1997). Therefore, men and masculine individuals may not require as much management support as women and feminine individuals because they may formulate their own opinions based on personal knowledge and experience.

Despite the conclusion of the discussion that men's and masculine individuals' perception regarding acceptance behaviour is more strongly influenced by their behavioural belief (PU), while feminine individuals and women are strongly influenced by behavioural belief (PEOU), normative and control beliefs (SN, PBC, SE) and managerial beliefs (GS and IS), it is still hypothesised on an exploratory basis that:

H13b1: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by gender, or (BI, PU, TF, RF, SE, IS, GS) X Gender→BU

H13b2: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by gender, or (SN, PEOU, IS, GS) X Gender→PU

H13b3: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by gender, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X Gender→BI

H13b4: The influence of the predictor SN towards PEOU is moderated by gender, or SN X Gender→PEOU

3.5 Moderators: educational level, academic position and organisational type

Unlike age and gender, which are noted as the most fundamental moderators, educational level, academic position and organisation type had been given very little importance in information system literature. Mostly, these factors are examined on the basis of confounding variables (the effect is controlled) with age and gender (e.g., Morris & Venkatesh, 2000; Minton & Schneider, 1980). For instance, it is assumed that people who are older in age are overrepresented in higher occupational positions, higher educational level, and higher income (Kite, 1996; Prager, 1986). Thus, in the present study, it was important to either confound the impact of these variables or evaluate their distinct role as moderators on the perception of individual's acceptance behaviour. Given that, in contrast with the previous literature (e.g., Morris & Venkatesh, 2000) the effect of these moderators is examined on an independent basis. A brief conceptualisation of each is given as follows.

3.5.1. Organisational type

The relationship between organisational (ORG) structure and IT cannot be undervalued. The previous research suggests that the innovation of technologies within an organisation affects the organisational structure (e.g., Heintze & Bretschneider, 2000; Caudle et al., 1991; Pinsonneault & Kraemer, 1993), and in reverse, an individual's acceptance of IT innovations is influenced by the organisational structure (e.g., Orlikowski, 2000; Lewis et al., 2003). In other words, the effect is reciprocal. For instance, Heintze & Bretschneider (2000) argued that the introduction of IT facilitates change in organisational structure from a hierarchal to a flatter structure by reducing the number of managers and improving communication channels. On the other hand, Orlikowski (2000) suggested that individuals' usage behaviour is deeply influenced by the institutional context where that behaviour is enacted. Similarly, Lewis et al. (2003) argued that an individual's beliefs pertaining to the specific technology are formed by the influence emanating from the institutional and social context. Realising its importance, in the present study the effect of organisational type on an individual's acceptance behaviour is incorporated as a moderator.

Organisations are usually categorised into two groups, public and private. The difference between public and private organisations was begun by Rainey et al. (1976) in the context of organisational differences within US society. According to the author, the two sectors can be differentiated on the basis of: environmental factors, organisational transactions, and internal structures and processes. Following Rainey's classification, Nutt (2000) reported that private organisations value higher competition, readily available data, flexible autonomy, indirect political influence, clear organisational goals that are open for discussion, and clear and long-term policies are devised; whereas public organisations place greater value on cooperation, data is often limited, autonomy is limited/ mandate, political influence is direct, organisational goals are shifting/complex/ambiguous, and vague and inconstant polices are devised.

Information systems research literature largely examines IT structures and performances with relation only to private sector organisations, and hence, leaves a gap to examine the effect within public sector organisations (Heintze & Bretschneider, 2000). In addition, within a handful of studies, it is observed that acceptance of technology in the private sector is reported to be higher than in the public sector (e.g., Caudle et al., 1991; Pinsonneault & Kraemer, 1993). The possible explanation for such results can be understood with relation to the differences suggested by Rainey et al. (1976). For instance, structure within public organisations is reported to be more rigid compared with the private sector, which is more flexible (Rainey et al., 1976). Technology facilitates more organisational individuals to be involved in the decision-making process through improved communication, which is difficult for public organisations to accept. Thus, based on the likely differences between the two organisation's structures (public and private universities in the present study), it is hypothesised as:

H13c1: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by organisational type, or (BI, PU, TF, RF, SE, IS, GS) X ORG → BU

H13c2: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by organisational type, or (SN, PEOU, IS, GS) X ORG → PU

H13c3: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by the organisational type, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X ORG→BI

H13c4: The influence of the predictor SN towards PEOU is moderated by organisational type, or SN X ORG→PEOU

3.5.2. Academic position

Academic position (AC) in this study is examined differently from the perspective of 'support' in terms of facilitation conditions (top and low-level management support, see section 3.2.6). This section intends to examine an individual's acceptance behaviour on the basis of their job tenure. So far, the effect of job position or tenure in the literature is reported as a surrogate of age and experience (e.g., Agarwal & Prasad, 1999). From the age perspective, it is noticed that senior individuals who have greater job tenure (assumed to be higher on position) showed more resistance towards innovation compared with more junior colleagues (e.g., Agarwal & Prasad, 1999; Majchrzak & Cotton, 1988). For instance, Majchrzak & Cotton (1988), in the context of new production of technologies, found that individuals with higher work experience showed a higher reluctance towards change. Similar results were found by Igbaria (1990) who reported that older individuals, due to less computer exposure and knowledge, were less flexible and more resistant to change and, in turn, perceived a lower importance of behavioural beliefs and attitude.

Another possible explanation behind these results can be understood from the perspective of an individual's cognitive behaviour. For instance, it is noticed that individuals lower in age (possibly lower on job position) are reported to be more interested in learning new behaviour compared with older individuals, who may take extra time to perceive and render the cues and learn the system (Morris & Venkatesh, 2000; Taylor & Todd, 1995a; Kite, 1996; Porter & Donthu, 2006) (see section 3.4.1). Therefore, based on rationales related to age, it is expected that individuals (academics in the present context) lower on job position will be more open to accepting technology compared with senior individuals.

From the perspective of experience (higher experience means higher on job position), the effect of job position is reported as opposite to the conceptualisation of age. For instance, contrary to the previous discussion, the literature suggests that higher in experience has a positive effect on usage behaviour through beliefs (PU and PEOU) and a negative effect through normative beliefs (SN) (e.g., Igbaria et al., 1995; Venkatesh & Davis, 2000). Rationally, it is noticed that computer experience is likely to improve an individual's usage behaviour by increasing their confidence in mastering challenging tasks and erasing fear that may produce reluctance in acceptance behaviour (Gist et al., 1988, 1989; Igbaria & Iivari, 1995) (see section 3.6.1). However, not all experience is necessarily related to age (i.e., older in age will be higher on job position) and increased acceptance behaviour. Morris & Venkatesh (2000) reported that older individuals were less experienced compared with younger individuals. The authors argued that older individuals in their twenties and thirties were less familiar with technology compared with the current younger generation. The reason is obvious in that technology was less common, and individuals were more accustomed to applying traditional methods. Hence, this leads to the perception discussed previously, that individuals in higher job positions will be less open to accept newer technologies in the workplace.

Finally, from the gender perspective, it is assumed that generally higher job positions favour men and masculine individuals and hence, favour higher attitude and lower normative beliefs. A possible explanation is related to the discussion in the gender section (see section 3.4.2). According to this, men and masculine individuals compared with women tend to be assertive and place higher importance on behavioural belief PU, whereas women tend to be nurturing and place higher importance on normative, control, and management support beliefs. Assimilating the discussion, it is noticed that academic position is a situational variable that can provide mixed results according to the context. Therefore, it is hypothesised on an exploratory basis:

H13d1: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by academic position, or (BI, PU, TF, RF, SE, IS, GS) X AC→BU

H13d2: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by academic position, or (SN, PEOU, IS, GS) X AC→PU

H13d3: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by academic position, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X AC→BI

H13d4: The influence of the predictor SN towards PEOU is moderated by academic position, or SN X AC→PEOU.

3.5.3. Educational level

In DOI, Roger (1995) argued that innovators are most likely higher on education, income, and leadership characteristics, and possess more a favourable attitude towards risky decisions to accept new technologies. In addition, the author suggests that an innovation without principle-knowledge might produce a misuse of new technology and results in discontinuance. In relation, the literature shows that educational level (EL) is directly related to knowledge skills, and thus shows a positive effect on beliefs pertaining to behaviour (e.g., Agarwal & Prasad, 1999; Rogers, 2003; Igbaria & Parasuraman, 1989). For instance, Rogers (1995) reported that in the category of ‘early adopter’, one reason is their higher level of education, which reflects their ability to understand ‘how-to-knowledge’ more quickly and easily compared those with a lower level of education. In the same line of research, Agarwal & Prasad (1999) found a positive relationship between educational level and belief PEOU, but not with PU. The authors argued that less educated individuals tend to be more sensitive to effort expectancy, and hence this results in a barrier to the adoption process (ibid). Agarwal's findings are consistent with social psychology literature (e.g., Hilgard & Bower, 1975), which asserts that low education reflects less sophisticated cognitive structures that impede an individual's ability to learn in new environments. Contrary to Agarwal & Prasad's findings, Burton-Jones & Hubona (2006) recently found a positive effect of education on PU with the argument that education increased PEOU, which in turn reduced anxiety and improved overall attitude in terms of usefulness. In addition, based on the same argument, the authors also reported a diminishing effect of social influence on behaviour with increased experience and educational level. Similarly Lymperopoulos and Chaniotakis (2005) found that education combined with experience affects attitude of individuals indirectly through the belief PU. Despite mixed results, the importance of education on an individual's acceptance behaviour is indisputable (see meta-analysis of Mahmood et al., 2001 and Sun & Zhang, 2006). Therefore, based on previous research which suggests that education is negatively related to computer anxiety and positively related to the perception of usefulness and attitude towards behaviour intention and usage (e.g., Howard & Smith, 1986; Igbaria & Parasuraman, 1989; Igbaria, 1993; Porter & Donthu, 2006; Davis & Davis, 1990), it is hypothesised on an exploratory basis:

H13e1: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by educational level, or (BI, PU, TF, RF, SE, IS, GS) X EL→BU

H13e2: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by educational level, or (SN, PEOU, IS, GS) X EL→PU

H13e3: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by educational level, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X EL→BI

H13e4: The influence of the predictor SN towards PEOU is moderated by educational level, or SN X EL→PEOU

3.6 Moderators: Situational variables

3.6.1. Experience usage

Experience (EXP) was introduced as a moderator in TAM2 and is defined as an individuals' involvement or action in something over a period of time (Venkatesh & Davis, 2000). In the literature, the experience construct seems to have a direct and moderating impact to a significant level on behavioural, normative and control beliefs (e.g., Igbaria & Chakrabarti, 1990; Igbaria, 1992; Taylor & Todd, 1995b; Venkatesh & Davis, 2000; Venkatesh et al., 2003; Venkatesh & Morris, 2000; Venkatesh & Bala, 2008). It is observed that experience acquired by repeating tasks produced low probability towards individuals' decision to accept new technologies (e.g., Taylor & Todd, 1995a; Fishbein & Ajzen, 1975). The essence of this statement is based on the cognitive preposition, which asserts that when IT usage is extremely enjoyable (higher in usage experience) than behavioural belief, PU might not remain a construct of decision on the BI and BU (e.g., Davis, et al. 1989; Davis, 1989; Igbaria & Zinatelli, 1997; Chin et al., 2003; Burton-Jones & Hubona, 2006). Similar criteria can be applied in the case of PEOU towards BI (e.g., Venkatesh et al., 2003; Agarwal & Prasad, 1999). In terms of normative beliefs and control beliefs, experience (gained though time and training) also produced a negative effect. For instance, researchers (e.g., Taylor & Todd, 1995a, 1995b; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Venkatesh et al, 2000; Venkatesh et al., 2004; Hu et al., 2003) found a decreasing impact of SN on BI and BU, whereas researchers (e.g., Taylor & Todd, 1995b; Venkatesh et al., 2000; Venkatesh et al., 2004) found a decreasing impact of PBC on BU. Contrary to the negative effect, experience has shown a positive effect (i.e., increase in explanatory power) between BI and BU (e.g., Davis et al., 1989; Taylor & Todd, 1995b; Mathieson 1991; Venkatesh & Davis, 2000; Venkatesh et al., 2004; Hu et al., 2003). For instance, during an examination of A-TAM, Taylor & Todd (1995b) found that the effect of usage was significantly raised from 17% to 21%. Similar results were echoed by Venkatesh & Davis (2000) during the development of TAM2. Thus, despite the evidence in the discussion that experience decreases the impact on behavioural, normative, and control beliefs and will increase intention and usage, still it is hypothesised on an exploratory basis that:

H14a1: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by experience, or (BI, PU, TF, RF, SE, IS, GS) X EXP →BU

H14a2: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by experience, or (SN, PEOU, IS, GS) X EXP →PU.

H14a3: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by experience, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X EXP →BI

H14a4: The influence of the predictor SN towards PEOU is moderated by experience, or SN X EXP →PEOU

3.6.2. Voluntariness

Voluntariness (VOL) is defined as: 'an extent to which potential adopters perceive the adoption decision to be non-mandatory' (Venkatesh & Davis, 2000 p.188). In other words, this is considered to be an explicit condition that helps to understand individuals' perception when he/she uses a particular system. Voluntariness was initially introduced by Moore & Benbasat (1991) during the extension of Roger's DOI theory. At the time of the

TAM development, despite considering voluntariness as an explicit condition, Davis et al. (1989) did not include it as part of the model. However, realising its importance, in a later study (TAM2) Davis, along with Venkatesh (2000), included it as a key moderating factor. Since this, moderator VOL, both alone and combined with EXP, is examined by a number of studies in IT acceptance research (e.g., Venkatesh et al. 2003; Venkatesh & Davis, 2000; Sun & Zhang, 2006; Venkatesh & Bala, 2008).

In most of the research, the effect of VOL is observed on the relationships of SN and BI (e.g., Hartwick & Barki, 1994; Venkatesh et al., 2003). Rationally, it is noticed that normative beliefs can influence through two ways: directly through compliance or indirectly through recognising perception of usefulness due to an internalisation and identification process (Karahanna & Straub, 1999). The effect of compliance is closely studied as the level of voluntariness (e.g., Venkatesh & Davis, 2000) in which individuals are instructed to perform specific behaviour without prioritising their own intentions. In simple words, the compliance effect increases the normative beliefs. Initially, the significant effect of SN on BI in only mandatory settings was observed by Hartwick & Barki (1994) but later on, Venkatesh & Davis (2000) retested and confirmed it in TAM2.

In the previous section (3.6.1) it was noticed that the effect of SN on BI subsided over time with increased EXP; therefore, it may be argued that combined VOL and EXP can also exhibit a moderating impact on intention. The argument is well-cited in literature. For instance, Agarwal & Prasad (1997), in the extension of DOI, found that the system used in mandatory conditions enhanced the early system utilisation, but at the same time it also produced pressure on individuals to overcome the difficulties of first-time usage, which in turn produced a lower level in acceptance behaviour. Consistent with Agarwal & Prasad (1997), Venkatesh & Davis (2000) found a strong significant effect of SN on BI in early system utilisation but was weaker on time and increased experience.

In the same line of research, Venkatesh et al. (2003) during the development of UTAUT, re-evaluated the combined effect of VOL and EXP together in the models of TRA, TAM/TAM2, TPB/DTPB, and C-TAM-TPB. Venkatesh et al. found that the effect of belief PEOU, SN and PBC on PU and BI was only significant in mandatory settings and decreased with increased experience. In addition, the authors in their integrated model UTAUT, found that social influence (SI) showed a significant impact on BI in the mandatory setting with limited experience. Despite the fact that VOL and EXP are predominately related to the normative influence, it is still hypothesised on an exploratory basis that:

***H14b1:** The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by voluntariness, or (BI, PU, TF, RF, SE, IS, GS) X VOL→ BU*

***H14b2:** The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by voluntariness, or (SN, PEOU, IS, GS) X VOL→ PU*

***H14b3:** The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by voluntariness, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X VOL→BI*

***H14b4:** The influence of the predictor SN towards PEOU is moderated by voluntariness, or SN X VOL→PEOU.*

3.7 Moderators: cultural variables

The moderating impact of culture integrated in the framework (figure 3.1) is conceptualised with the help of four dimensions (MAS, IC, PD, and UA) suggested by Hofstede (1980). In doing so, it helps to answer the research objective: 'Is there any perception of difference between segments of users (academics) towards acceptance of technology (the Internet) due to their individual cultural differences?' The rationales for integrating cultural dimensions are two-fold: re-evaluating Hofstede's cultural dimensions, and incorporating them into the extended model to predict the difference on individual's acceptance behaviour. From the perspective of re-evaluation, it was noticed in the previous chapter (section 2.14) that Hofstede's dimensions are widely accepted in diverse fields of research, but are equally criticised due to the lack of in-depth examination, poor methodological foundations and measurement items, time elapsed since evaluation, and hence, they merit further research. Incorporating Hofstede's dimensions is also consistent with the literature in the previous chapter (section 2.15), which revealed that studies in IT acceptance largely applied Hofstede's dimensions to only support their results, but in reality a very few studies directly measured these dimensions, specifically within the same culture. Before developing the hypothesis, it is necessary to clarify that, similar to the demographic variables impact of cultural dimensions is examined on the basis of exploratory basis. In doing so, it enables not only the validation of the paths suggested in the previous literature but also helps to explore new relations within the categorical groups of culture within same country context.

3.7.1. Masculinity-Femininity

According to Hofstede (1980), individuals high in masculine (MAS) culture tend to be assertive and prioritise material accomplishments, while individuals in feminine culture tend to be nurturing and prioritise human relationships and quality of life. From the definition, it is obvious that the effect of masculinity will be highly relevant to the behavioural belief PU due to the instrumentality effect and extrinsic motivation (see conceptualisation of PU in TAM section 2.7) while, on the contrary, the effect will be negatively related to the behavioural belief PEOU, normative beliefs, control beliefs, and management support due to effect of intrinsic motivation (see conceptualisation of each belief) (e.g., Srite & Karahanna, 2006; Parboteeah, et al., 2005; Venkatesh et al., 2004).

Despite this fact, masculinity and femininity are not synonymous with male and female, but they are still highly correlated with each other (Hofstede, 1980). For instance, Bem (1981) in the Sex Role Inventory (BSRI) found that men displayed more masculine traits (e.g., assertiveness) compared with women, who exhibited more feminine traits (e.g., nurturing). Based on Bem's conceptualisation, Venkatesh et al. (2004) and Srite & Karahanna (2006) examined the effect of masculinity and femininity with relation to gender and found similar results with marginal differences. Consistent with Bem and follow-up studies, the conceptualisation of masculinity and femininity in the present study is also rationalised with the effect of gender (see section 3.4.2). The summary of the discussion suggests that men/masculinity perceived a higher importance of PU and AT, while women/femininity perceived a higher importance of PEOU, SN, SE, GS, IS, and NAT. Apart from the relation to gender, Hofstede & Hofstede (2005) reported that masculinity is also interrelated with gender (younger), culture power distance (lower), culture individualism-collectivism (individualist) and culture uncertainty avoidance (lower). After careful investigation within related dimensions, it is noticed that relations are more likely to be similar in all these dimensions. Given that, based on arguments and consistent with the discussion in section (3.4.2), it is hypothesised on an exploratory basis:

H15a: The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by the cultural dimension MAS, or (BI, PU, TF, RF, SE, IS, GS) X MAS →BU

H15b: The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by the cultural dimension MAS, or (SN, PEOU, IS, GS) X MAS →PU

H15c: The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by the cultural dimension MAS, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) XMAS →BI

H15d: The influence of the predictor SN towards PEOU is moderated by cultural dimension MAS, or SN X MAS → PEOU

3.7.2. Individualism-Collectivism

Individualism-collectivism (IC) refers to the extent to which one perceives the relationship between one's self and the group of which one is a member (Hofstede, 1980). In individualist culture, people tend to be more self-conceived and prioritise their own interest above others (i.e., members in the same group or the organisation's interest). Conversely, an individual in a collectivist culture believes that one's self-identity is dependent upon the group's identity. In other words, they are profoundly influenced by the group, and continue to prove their unquestioning loyalty by complying with all acceptable or/and non-acceptable norms and values (e.g., Srite & Karahanna, 2006; Hofstede & Hofstede, 2005).

As in individualist cultures, personal goals are more important than the collective, therefore individuals in these cultures are expected to be influenced by the attitude and behavioural beliefs. In contrast, in collectivist cultures where individuals' decisions to accept something is based on the group's decision, it is expected that individuals in these cultures will be influenced by the normative beliefs. The position of this argument is also consistent with the literature in information system. For instance, Bontempo & Rivero (1990) in meta-analysis, reported that an individualist's behaviour is more closely related to the attitude and collectivists towards norms.

Further exploration can also be understood from the basic conceptualisation of the beliefs. For instance, in terms of PU which is one's subjective probability to view the usefulness of technology for self-interest can only be favoured to the individualistic. Rationally, within a collectivist society, subjective probability is related to groups (McCoy, 2002) which can favour the normative and control belief but not the belief PU (see also Parboteeah et al., 2005). From the perspective of PEOU and SE, which are mostly complementary concepts (e.g., Davis, 1989) and can be improved with the facilitation conditions (RF, TF), it will be more relevant to the collectivist culture. This rationale is consistent with Hofstede's (1980) argument which posits that within the working environment, collectivism is associated with training, physical conditions and use of skills. Finally, from the perspective of normative beliefs and management support that are the perceptions of one's decision based on others' will be expected to be higher in collectivist culture, as one is highly compliant with priorities of group values. The rationales presented to conceptualise the individualism-collectivism are also supported in information system literature (e.g., McCoy et al., 2005; McCoy et al., 2007; Srite & Karahanna, 2006; Pavlou & Chai, 2002; Choe & Geistfeld, 2004; Parboteeah et al., 2005; Alsajjan & Dennis, 2010).

Apart from the direct conceptualisation, the interrelated effect of individualism-collectivism can also be understood with the argument of Hofstede & Hofstede (2005). Hofstede argued that cultures high in individualism are also correlated with the culture low on power distance, low on uncertainty avoidance, high on masculinity, men in gender, and finally, younger in age. Observing the discussion in relevant sections, specifically within gender and masculinity (see section 3.4.2), it is noticed that relations proposed in the present section are highly relevant within all groups. Thus, despite the clear rationale that behavioural beliefs PU and AT will be highly relevant to the individualist, and normative and control beliefs PEOU, SE, TF, RF, GS, IS, SN, and NAT will be relevant to collectivist cultures, still it is hypothesised on an exploratory basis that:

H16a: ***The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by the cultural dimension IC, or (BI, PU, TF, RF, SE, IS, GS) X IC→BU***

H16b: ***The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by the cultural dimension IC, or (SN, PEOU, IS, GS) X IC→PU***

H16c: ***The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by the cultural dimension IC, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X IC→BI.***

H16d: ***The influence of the predictor SN towards PEOU is moderated by cultural dimension IC, or SN X IC→PEOU.***

3.7.3. Power Distance

Power distance (PD) is the extent to which an inequality is accepted as normal in a given culture (Hofstede, 1980). In low PD cultures, individuals tend to be more egalitarian, and feel less dependent on their superiors or working colleagues. Consequently, freedom of equality diffuses the hierarchical structure within organisations and encourages individuals to take part in the decision-making process (Leidner & Kayworth, 2006). In contrast, within a culture high on PD, superiors and subordinates consider themselves unequal, and thus, the traditional centralised hierarchal system is observed (Hofstede & Hofstede, 2005). In high PD cultures, superiors are expected to tell and direct, and in turn, the subordinate completes the tasks without measuring its merit or ethical values with the assumption that the 'superior is always right' (ibid). In simple words, both groups of PD (high and low) are distinct from each other on the basis of the compliance effect.

As in high PD, the compliance effect is higher, therefore individuals in these cultures are expected to be influenced by the normative, control and management support belief. In contrast, individuals in low PD are expected to be influenced by the behavioural beliefs, specifically with the PU. The argument is consistent with the concept of 'social influence' (also known normative beliefs (see Venkatesh et al., 2003)) which can be manifest through compliance, identification, and internationalisation effect (Kelman, 1958). According to Srite & Karahanna (2006), within compliance an individual tends to accept influence from another person/group with the aim of gaining a favourable advantage. In addition, from the perspective of hierarchy, the effect of compliance is noticed to be higher as it is directed by the more superior authority (ibid). Complementing Srite & Karahanna's argument with concept of high on PD (individuals are more concerned about complying with a superior's requirements and will fear disagreement), it is obvious that the effect of normative belief towards acceptance intention will be more relevant in cultures with higher PD.

From the perspective of attitude and behavioural belief, specifically in terms of PU, the effect is expected to be weaker within higher PD cultures. The rationale is consistent with the previous literature (e.g., Harris, 1997; Gunton, 1988; Panko, 1988) which suggests that technology is effective in conditions when it empowers the individuals to use it and decide for themselves how to use it. Obviously, when individuals are empowered to think on their own, they might start to depend upon their own skills (i.e. SE) and directly adopt the technologies by perceiving its likely importance in job performance (i.e. PU). In some cases, based on experience and familiarity with the technology, individuals start to suspect their superior's skills and regret accepting their decisions directly (Leonard-Barton & Deschamps, 1988). Such instrumental values are contradictory within a high PD culture where individuals are supposed to comply with their superior.

The rationales suggested above are also cited and validated within information systems acceptance literature. For instance, researchers (e.g., Srite & Karahanna, 2006; Pavlou & Chai, 2002; Hasan & Dista, 1999) found that the impact of normative beliefs on BI were highly relevant within higher PD cultures only. Finally, from the perspective of the interrelated effect of higher PD with other dimensions – higher on collectivism, higher on feminine, women in gender, and older in age (Hofstede & Hofstede, 2005) – it is noticed that the relationships presented in this section are also consistent with the relevant dimensions (for more details, see the relevant sections). Therefore, despite the clear rationales that high PD positively affects normative beliefs and negatively affects behavioural belief, it is still hypothesised on an exploratory basis that:

H17a: ***The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by the cultural dimension PD, or (BI, PU, TF, RF, SE, IS, GS) X PD→BU***

H17b: ***The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by the cultural dimension PD, or (SN, PEOU, IS, GS) X PD→PU***

H17c: ***The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by the cultural dimension PD, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X PD→BI***

H17d: ***The influence of the predictor SN towards PEOU is moderated by cultural dimension PD, or SN X PD→PEOU.***

3.7.4. Uncertainty Avoidance

Uncertainty Avoidance (UA) is the extent to which a member of the culture feels uncomfortable with uncertain situations (Hofstede, 1980). According to Dorfman & Howell (1988), it is the degree to which an individual favours structured over un-structured situations. In high UA cultures, individuals often feel threatened by uncertain conditions

(Ford et al., 2003; Parboteeah et al., 2005). To avoid such feelings and achieve stability at work, members in these societies are heavily pushed to rely upon formal rules and pre-defined structures (Hofstede, 1980). By contrast, in low UA cultures, people feel autonomous, and methods and procedures are volatile as individuals find new ways to accomplish given tasks (Hofstede, 1980; Gunton, 1988). According to Dorfman & Howell (1980), in low UA cultures, people tend to be more tolerant and feel less anxiety when confronted with challenging or unpredictable problems.

The effect of UA in the technology acceptance domain is most clearly discernible on behavioural beliefs and normative beliefs towards behaviour intention. For instance, from the perspective of normative beliefs, the effect is expected to be stronger in situations with a higher level of uncertainty. The rationale is consistent with the study of Srite & Karahanna (2006). According to this, the social environment can be an important source of information to reduce the level of uncertainty by determining the rules and their acceptability. More specifically, if peers or superiors in an environment share their own experience and perceptions, then individuals start to take them as evidence of reality (i.e., rule), which is socially desirable and acceptable (Karahanna, et al., 2005), and as a result, the effect of uncertainty is reduced.

Similar to normative beliefs, the effect of belief PEOU, control beliefs and management support beliefs are also expected to be stronger with respect to situations with a higher level of uncertainty. This argument is consistent with the level of anxiety and stress that is noted to be higher in highly uncertain situations (e.g., Dorfman & Howell, 1988; Hofstede & Hofstede, 2005). According to social cogitative theory (SCT), anxieties and expectancies (self-efficacy and ease of use) are reciprocal to each other (Bandura, 1986). Therefore, higher anxieties indirectly decrease the self-efficacy (one's self-evaluation/confidence to complete targeted task) and decrease overall performance (Bandura, 1977; Rosen & Maguire, 1990; Brosan, 1998). To overcome such conditions and increase self-control, an individual tends to rely on facilitation conditions (resource and technology facilitations, and management support) and support from the social environment (e.g., Srite & Karahanna, 2006; Venkatesh & Morris, 2000; Hwang, 2005). Thus, normative and control beliefs will be more important predictors of BI for individuals within high uncertainty avoidance cultures.

In contrast, the effect of belief PU is noticed to be weaker with respect to higher UA cultures (e.g., Parboteeah et al., 2005; Harris, 1997; Alsajjan & Dennis, 2010). The reason is obvious in that IT innovations inherently involve change and uncertainty in organisations (Yoon et al., 1995). Literature suggests that individuals in higher UA culture are more bound or habitual with pre-defined rules and standardised procedure (e.g., McCoy, 2002; Veiga et al., 2001). Consequently they are more likely to view change as negative and fail to perceive the usefulness of information technology in their work (Parboteeah et al., 2005; Ford et al., 2003).

In fact, previous research suggests that the usefulness of technology is associated with the freedom through which an individual is able to decide when and how the technology will be useful to accomplish targeted tasks (e.g., Cotterman & Kumar, 1989; Goodhue & Thompson, 1995). According to Harrison & Rainer (1992) and Harris (1997), an individual who is less conformist to rules (low UA), social norms, and accepted work patterns is less likely to have feelings of anxiety towards technology, and therefore will be more likely to accept the information technology on their own through perceived advantages (PU). Apart from the given argument, the previous research reviewed by Ford et al. (2003), and literature (e.g., Parboteeah et al., 2005; Hasan & Dista, 1999; McCoy et al., 2007; Hwang, 2005) reported that countries that were higher on UA typically showed higher resistance towards new technological applications and relied more on traditions. Finally, from the perspective of the interrelated effect of higher UA with other dimensions – higher on collectivism, higher on feminine, women in gender, and older in age (Hofstede & Hofstede, 2005) – it is noticed that the relationships presented in this section are also consistent with the relevant dimensions (for more details, see the relevant sections). Hence, despite the clear rationale that higher UA positively affects the relationship between normative and control beliefs, and negatively on perception of usefulness, still it is hypothesised on exploratory basis that:

H18a: ***The influence of the predictors BI, PU, TF, RF, SE, IS, and GS towards BU is moderated by the cultural dimension UA, or (BI, PU, TF, RF, SE, IS, GS) X UA → BU***

H18b: ***The influence of the predictors SN, PEOU, IS, and GS towards PU is moderated by the cultural dimension UA, or (SN, PEOU, IS, GS) X UA → PU***

H18c: ***The influence of the predictors PU, PEOU, TF, RF, SE, AT, NAT, and SN towards BI is moderated by the cultural dimension UA, or (PU, PEOU, TF, RF, SE, AT, NAT, SN) X UA → BI***

H18d: ***The influence of the predictor SN towards PEOU is moderated by cultural dimension UA, or SN X UA → PEOU***

Conclusion

This chapter has provided a theoretical framework based on the previous prominent theories and models in the technology acceptance research domain i.e., SCT, TAM, TAM2, TRA, DTPB, TTF and UTAUT. In addition, Bem's BSRI and Hofstede's cultural theory were also integrated to examine the moderating effect on direct relationships. Based on 13 direct determinants, a total of 12 hypotheses with 23 paths were proposed in the model. Specifically, for the direct relationship of behavioural beliefs (PEOU and PU) three hypotheses with four paths, for normative beliefs (PI and SI) two hypotheses with six paths, for control beliefs (TF, RF, and SE) two hypotheses with six paths, for task characteristics (AT and NAT) two hypotheses with two paths, for behavioural intention (BI) one hypothesis with one path, and finally, for management support (GS and IS) two hypotheses with four paths were presented.

After direct relationships, based on seven demographic and four cultural factors 6 hypotheses with 44 paths were proposed on an exploratory basis. Specifically, for the demographic variables (age, gender, education-level, organisation-type, academic position, voluntariness, and usage experience) two hypotheses with twenty-eight paths, and for cultural variables (PD, IC, MAS, and UA) four hypotheses with sixteen paths were presented. Dissecting the number of moderating relationships into a large number of paths only intends to examine the possible effect, not the causal effect at each level. In the next chapter, the proposed methodology and data analytical tools are being discussed to validate the paths presented in this chapter.

Chapter 5

Research methodology

Introduction

The purpose of this chapter is to elucidate and justify the methodology and approach to collecting and analysing the data. Choosing a certain methodology, as well as methods for data collection and analysis, is tantamount to deciding an overall viewpoint that determines what the researcher will come to find. In this chapter, section (4.1) discusses why this research is positioned from the perspective of positivist epistemology and ontology. Sections (4.2 and 4.3) discuss the two major paradigms in social science research, i.e., qualitative and quantitative research, with a justification of the selection of the quantitative research method of surveys for this study. Section (4.3) explains the overall research design, including the purpose of the study, type of investigation, extent of researcher interference, study settings, unit of analysis, and time horizon. Section (4.4) discusses the survey questionnaire development process, content, wording and layout criteria. Section (4.5) discusses the selection of the population and sample for the present research with the support of strong rationales and justifications. Sections (4.6 and 4.7) discuss the instrument development and scale adoption respectively. Finally, sections (4.8, 4.9, and 4.10) discuss the data collection techniques, pilot study, and data analysis technique with structural equation modelling (SEM) using PLS. Finally, section (4.11) considers the ethical issues with a summary in end.

4.1. Understanding epistemological and ontological considerations

According to the *Oxford English Dictionary,* the word ‘philosophy’ means the study of the fundamental nature of knowledge, reality and existence (Oxford, 2005). It is a viewpoint or a perspective that enables a researcher to perceive reality in the way in which it is described, and its relationship with knowledge that explains how the reality has been observed. Denzin & Lincolan (2000) observed philosophical assumptions as a set of paradigms that are based on beliefs that guide a researcher’s actions to know how the world works, and what characteristics of human nature are necessary.

Guba & Lincoln (1994) categorised the complexities of the various research philosophies into three basic groups: ontology, epistemology and methodology. Whereas ontology refers to questions about the nature of the reality to be known or examined, epistemology refers to questions concerning the relationship of the researcher to the problem being researched, whereas methodology refers to questions and techniques of the research process of collecting and validating empirical evidence. An identical explanation was also postulated by Creswell (2003) and Myers (1997). Furthermore, Guba & Lincoln (1994) and Lincoln & Guba (2000) classified three philosophical paradigms into four schools of thoughts as: positivism, post-positivism, critical theory and constructivism. The major classification of each philosophical assumption and its corresponding philosophical thought are presented in table 4.1, and discussed as follows:

- Positivism: the school of thought that predominantly advocates value-free (i.e., objective) natural sciences methods to study social reality and beyond (Bryman & Bell, 2007). Based on rigorously applicable procedures, it is regarded as a one-way mirror of inquiry in which researcher and researched object are presumed to be independent entities without influencing each other (Guba & Lincoln, 1994).
- Post-positivism: a school of thought established in the early 19^{th} century that suggests that, within the context of research on human behaviour and actions, a researcher cannot be 'positive' about claimed knowledge (Creswell, 2003). Identical to positivism, the background philosophy is objectivism (i.e., social phenomenon are independent from social actors (Bryman & Bell, 2007)), with only the contradiction of inquiry method, which not only aims to verify the cause-law effect but is also used to falsify the theoretical assumptions or hypotheses.
- Critical theory: the school of thought based on the principle of realism/subjectivism in which social phenomenon is dependent upon a social actor's conceptualisation and the way he/she knows about reality (Bryman & Bell, 2007). In this, researcher perception is influenced by the research objective(s) due to how they are inter-linked with each other (Guba & Lincoln, 1994). The method of inquiry within critical theory is mostly observation and the interview process, in which a problem (i.e., realism) based on theoretical concepts is examined to finally present a hypothesis that can be tested (Guba & Lincoln, 1994; Bryman & Bell, 2007).
- Constructivism: the school of thought that advocates that social phenomenon and their meanings are continually being achieved by social actors (Bryman & Bell, 2007). Identical to critical theory, the background principle is based on subjectivism, with one main exception: realities are produced through social

interaction that is often shared or categorised by many individuals together. The methods of inquiry for examining the objective(s) in constructivism (also referred to as ‘postmodernism’) are mostly interview and hermeneutics (Guba & Lincoln, 1994; Klein & Myers, 1999; Walsham, 1995).

Philosophical assumption	Positivism	Post-positivism	Critical theory	Constructivism
Ontology	Native realism: real reality exists but is apprehendable. It is conventionally summed up in time and context-free generalisations, and is based on cause-effect laws.	Critical realism: real reality but only imperfectly and probabilistically apprehendable.	Historical realism: virtual reality shaped by social, political, cultural, economic, ethnic, and gender values; crystallised over time.	Relativism: local and specific constructed realities
Epistemology	Dualist/objectivist; finding true	Modified dualist/ objectivist; critical tradition/ community; findings probably true.	Transactional/ subjectivist; value-mediated findings.	Transactional/ subjectivist; created findings.
Methodology	Experimental/manipulative; verification of hypotheses; chiefly quantitative methods.	Modified experimental/manipulative; critical multiplism; falsification of hypotheses; may include qualitative methods.	Dialogic/dialectical	Hermeneutical/dialectical

Table 4. 1: Underlying research philosophical paradigms: Source: Guba & Lincoln, 1994

Positivism and post-positivism are the opposing schools of thought to constructivism/interpretivism (Denzin & Lincoln, 2000), and are sometimes called the ‘scientific deductive method’, to conduct empirical and quantitative research (Creswell, 2003). Both perspectives reflect the deterministic-reductionist approach in which ideas are dissected into a small set of the items/variables with their effects and outcomes. Variables in positivist and post-positivist approaches are used to constitute hypotheses which are numerically measured by experiments (Creswell, 2003).

On other hand, social critical theory and social constructivism are based on the principle of subjectivism and interpretivism (see Mertens, 1998). Both perspectives are ‘naturalistic inductive methods’ of inquiry in which individuals seek to understand the world through establishing subjective meanings of their experiences towards certain objects (Creswell, 2003). Contrary to objectivism, the method of inquiry within interpretivism is known as ‘qualitative’, in which ideas are not categorised into small chunks of variables, but are further elaborated into theories with a specific context (Crotty, 1998).

4.1.1. Selection of positivism research approach

In order to guide the research in one particular direction, the selection of a positivist approach is based on the nature of the problem addressed and previous literature in a similar domain. Methodologically the positivist approach endeavours to examine reasoning using a deductive process (Hirschheim & Klein, 1992) which in brief is mostly depicted through: 1) the formulation of hypotheses, models, or causal relationship within constructs, 2) the probable use of quantitative methods to test relationships, and 3) the researcher's value-free interpretation objective (Chen & Hirschheim, 2004). Within a meta-analysis of methodological paradigms Orlikowski & Baroudi (1991, p.5) classified studies as positivist if they were based on prior fixed relationships, quantifiable measures of variables, hypothesis testing, and drew inferences about phenomenona from the sample to a stated population. The literature suggests that possible methods of inquiry within the positivist approach could be: observations, measurements, surveys, questionnaire instruments, laboratory and field experiments, statistical analysis, simulations, and case studies (Mingers, 2003; Choudrie & Dwivedi, 2005).

The primary objective of this research is to investigate the predictors of an individual's (academics) acceptance beliefs that are established through the influence of perceived behavioural beliefs, social and control beliefs, tasks characteristics, and management support. Exploring the moderating impact of culture and demographic variables was also of interest to the investigation. Therefore, from an ontological perspective, the positivist approach suits the present study. As Orlikowski & Baroudi (1991, p.9) state, within positivist ontology, "the role of [the] researcher is to discover the objective physical and social reality by crafting precise measures that will detect and gauge those dimensions of reality that interests the researcher." This study is also justified from the perspective of a positivist epistemological approach which, according to Chua (1986), regards beliefs about knowledge as verified or shown to be false through empirical testable theories and a hypothetical-deductive approach. In the present study, Chua's (1986) criteria for adopting a positivist approach can be viewed by observing the ultimate goal of the study, which, as described earlier, is to examine the constructs of behaviour intention for the acceptance of new technologies. Consequently the goal requires a conceptual framework with a clearly defined number of constructs and their relationships (i.e., independent, dependent, or moderating). In doing so, the literature review in chapter 2 reveals that a considerable number of theories and models are present within the domain of technology acceptance for examining the various objectives of technology acceptance (see literature review table 2.2). As a result, developing a conceptual model with rationales (e.g., Venkatesh et al., 2003) to achieve the objective of this study is achievable.

Selecting positivist research does not suggest that other philosophical thoughts for the present study are inappropriate. However, some rationales can be argued in favour of the positivist approach. For instance, applying a post-positivist approach would require an extra step of interviews to explore the cause and effect relationship (initially assumed to be false) (Guba & Lincoln, 1994), which is far removed from the pertinence of the present study. As discussed earlier, there is broad and up-to-date literature present within the domain of information systems acceptance to explore the constructs and their relationship(s). Therefore, adopting a post-positivist approach would only result in wastage of time, money and effort. Additionally, unlike the post-positivist approach, which aims to explore differences between the contexts of the phenomenon to establish the cause and effect between the constructs (Guba & Lincoln, 1994), this research aims to explore the effect of the widely accepted constructs (established within North American and Western countries) on a single phenomenon (academics within higher educational institutes) and the context of a single developing country (Pakistan). To avoid bias or the impact of a researcher on a researched object, critical and constructivism theories are completely over-looked. Also, the aim of this research is purely based on objectivism and there is little or no interference required by the researcher on the researched problem, therefore adopting a critical and constructivist research approach is unjustifiable because both of these are based on a relativist (also called subjectivist) approach with an interlocking relationship between the researcher and the researched object (Guba & Lincoln, 1994; Mertens, 1998).

4.2. Research strategy: quantitative and qualitative

According to Creswell (2003), quantitative methodology is based on objectivism ontology, positivism epistemology, voluntarism/unbiased axiology, and deductive methodology. Whereas Bryman & Bell (2007) explained the quantitative research strategy as a deductive approach that typically uses scientific procedures and numerical analysis to illustrate the relationship(s) among the factors in the phenomena of studies. Contrary to this, the qualitative strategy uses methods to derive the theories and hypotheses by emphasising description and understanding the situations behind the factors (Creswell, 2003; Klein & Myers, 1999). Advantageously, qualitative research enables the researcher to see how individuals perceive and interpret a social reality that is not static and changes over time (Bryman & Bell, 2007).

The motivation for adopting a quantitative research strategy was applicable to this study because it is one of the most useful methods in natural sciences as well as in social sciences research. It helps the researcher to test and establish the reliability and validity of previously researched theoretical propositions and hypotheses that are solely dependent on experimentation and measurement techniques (Patton, 1990; Blumberg, Cooper & Schindler, 2005). In contrast, not selecting qualitative research methods does not suggest that they are an unreliable method for the present study or cannot be used in future research. Predominantly, a qualitative research strategy is best suited when research aspires to explore society in a subjective manner by describing and interpreting human changing phenomena in a natural context. Moreover, it is the most reliable method of research when there is little previous research literature present to delineate constructs and their relationship(s) (Cohen, Manion & Morrison, 2000; Gilbert, 2001). However, this research, which aims to see the world in an objective manner without researcher impact on the researched object or problem domain, requires the testing of hypothetical observations emerging in human behaviour towards the acceptance of information technology (IT). Additionally this study, which is formulated using appropriate literature and poses a clear relationship(s) between constructs needed to uncover the relevant data with the help of statistical tests (Collis & Hussey, 2003), cannot be achieved through qualitative methods.

Perhaps formulating theoretical propositions or producing hypothetical observations in the current context of the study is possible with a qualitative method, but their constructs validations and relations still requires a positivist approach based on the quantification method that is only possible with quantitative methodology. As Creswell (2003) stated, that validation of theoretical generalisations and propositions in scientific endeavour, especially in social and business studies, requires a quantitative method that can be tested and interpreted numerically. Undoubtedly, qualitative methodology is a reliable method for both group and individual studies, allowing the researcher to explore within a natural setting, generate theories, and answer the questions that lead to an understanding of them and the complex procedures to tackle them. It allows the researcher to study problems that have been previously little studied (Creswell, 2003; Cassell & Symon, 2004; Yin, 1994), but as justified earlier, this is not relevant to the current research.

4.3. Selection of survey research strategy

Selecting an appropriate method or strategy is considered to be a critical issue within any research to avoid decisions that could be contentious. A number of research approaches and methodologies have been devised in the field of social sciences and information technology, such as laboratory experimental research, field experiments research, survey methods, case studies, action research, grounded theory, ethnography, phenomenology, numerical methods such as mathematical modelling etc. (Creswell, 2003; Myers, 1997; Crotty, 1998; Chen & Hirschheim, 2004). Amongst these research approaches, the survey research approach is most appropriate for the present context of the study. The rationales behind opting for survey research are twofold. First, it is the most similar research strategy to that used in past literature in order to achieve similar objectives in the present study, and second, it is most relevant to the present context of the study. Both rationales are described briefly in the following sub-sections.

4.3.1. Review of methods previously applied in information system research

According to Zikmund (2003), survey research facilitates the collection of primary data as a source of information from a sample of people by using questionnaires or interviews. Chiefly, the objectives of survey research are to identify the characteristics of the particular research problem, such as the need to know what is happening (e.g., increasing prices or slower acceptance of new technology by academics etc.), why it is happening (e.g., some idea about why people do or not do something), how it is happening (e.g., process before some action, like decision-making, time period etc.), and who is involved (e.g., the persons, groups, organisations, characteristics etc.) (Zikmund, 2003; McDaniel & Gates, 2006).

Within information systems research paradigms, most studies are dependent on the methods and strategies that empirically answer their research questions with hypotheses testing (Chen and Hirschheim, 2004). Consequently, the survey is considered to be the most appropriate research method of enabling the researcher to examine the phenomena in their natural setting while covering a large population (Pinsonneault & Kraemer, 1993). The significance of the survey research within the information systems domain can be observed with the meta-analysis literature.

For instance, Orlikowski & Baroudi (1991) in the meta-analysis of 155 articles in information system published literature between 1985 to 1989 in leading journals ((*Management Information Systems Quarterly* (*MISQ*), *Communication of the ACM*

(*CACM*), *Management Sciences* and *Proceedings of the International Conferences on Information Systems* (*ICIS*)) found that overall, 96.8% of the articles applied a positivist approach leaving 3.2% offering an interpretivist approach. Within the positivist approach, the survey research strategy was the most dominant method with 49% of the studies choosing this, and 13.5% and 27.1% of the studies using case-study and experiments respectively. Similarly, Farhoomand & Drury (1999) scrutinised 2,098 articles based on empirical and non-empirical studies published between 1985 to 1996 in *MISQ*, *CACM*, *Journal of Management Information Systems* (*JMIS*), *European Journal of Information Systems* (*EJIS*), *Information and Management* (*I&M*), *Management Sciences* (*MS*), *Information System Research* (*ISR*), and the *Journal of Strategic Information Systems* (*JSIS*). The author found that 61% of the studies were based on empirical findings and the remaining 39% were based on non-empirical findings. Of the 61% empirical studies, the survey method was dominant, covering 32% of those studies followed by case studies and laboratory experiments, which covered 17% and 2% respectively (ibid).

In alignment with the literature of meta-analysis, evidence of survey research as the predominant strategy within the information system domain can be observed from the studies of the past decade. For instance, Chen & Hirschheim (2004) examined 1,983 studies published during 1991 to 2001 in four U.S. journals and four European journals including: *MISQ*, *ISR*, *JMIS*, *ICIS*, *Accounting, Management and Information Technology* (*AMIT*), the *Journal of Information Technology* (*JIT*), and *EJIS*. The findings indicate that the positivist approach remained dominant in the information system domain with a contribution of 81% of the studies followed by just 19% using the interpretivist approach. In addition, the authors found that within the positivist approach, the survey method was widely adopted i.e., by 41% of the studies surveyed, followed by case studies and laboratory experiments i.e., 36% and 20% respectively (ibid). Specifically, within the context of technology acceptance and adoption, which is the objective of the present study, Choudrie & Dwivedi (2005) reviewed 48 articles published during 2001 to 2003 in *MISQ*, *ISR*, *EJIS*, and *ISJ*. The authors found that 74% of the studies employed the survey method and the remaining 26% applied a case study research method (ibid).

After the review of the previous meta-analysis papers in the context of information system and IT acceptance and adoption literature, it is clearly apparent that the survey is the most widely accepted method. The case study and experimental methods appeared in second and third place. Hence, the findings of the past relevant literature suggest that employing a survey research method likely enables the achievement of the objective of this study.

4.3.2. Rationales for selecting surveys as the preferred research approach

Apart from the past literature, survey research is also an appropriate method of research because it provides a quick, inexpensive, efficient and accurate means of assessing information about a target population (Zikmund, 2003). Pinsonneault & Kraemer (1993) defined three main objectives for conducting survey research. First, when a study requires a quantitative method of inquiry with standardised information (e.g., hypothesis and relationship between variables) about a subject (i.e., individuals, groups, organisations, or communities, projects, applications, systems etc.); second, when a study requires the collection of data by asking questions with a pre-defined structured instrument; and third, when a study requires the ability to generalise information about a whole population's attitude, behaviour or characteristic of individuals and groups through a fraction of the sample.

In line with Pinsonneault & Kraemer's (1993) criteria, the aims and objectives of this study are purely based on the positivist approach (see section 4.1.1) with a quantitative method of inquiry (see section 4.2). In addition, the research clearly defined hypotheses and relationships (i.e., independent, dependent and moderating) between constructs with the help of rational justification from well-cited previously conducted studies (see chapter 3). In terms of subjects or unit of analysis as groups within an organisational context, the literature favours a case study strategy (Creswell, 2003; Yin, 1994). However, in the present study the unit of analysis are individuals (academics) working full-time in higher educational institutes in Pakistan. Therefore, the survey approach is preferred in the present context of the study due to its ability to enable the approach of large number of individuals distributed geographically in an inexpensive and time-saving manner (Gilbert, 2001; Hussey & Hussey, 1997).

The second and third criteria of Pinsonneault & Kraemer (1993) are related to the extent to which a researcher can be part of the context being studied. Within the present context of this study, i.e., an exploration of the factors of the Internet's intended acceptance by large numbers of individuals, it is impractical to become part of the context and identify the results using interviews, ethnography, observation and similar methods within an interpretivist epistemology. Also, one of the objectives of this research is to use the invariance analysis (i.e., multiple group analysis) to examine the moderation impact of culture and demographic variables, which require at least 100 observations in each group (Hair et al., 2006). Therefore, when taking random samples of the whole population in order to generalise the acceptance of behavioural beliefs, the survey method is more feasible in comparison with others.

Finally, usage of the survey method in this research is a result of the type of theories and models employed for the acceptance of information technology in past literature (see chapter 2, model compression table 2.2). The conceptual model presented in chapter 3 is consistent with the theoretical frameworks of the TRA, TAM, TAM2, DTPB and UTAUT (Venkatesh et al., 2003; Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Taylor & Todd, 1995a; Fishbein & Ajzen, 1975), which are employed by a number of researchers across cultures using a quantitative-positivist approach with the survey method (e.g., Choudrie & Lee, 2004; Straub, Keil & Brenner, 1997; Jarvenpaa & Leidner, 1999; Harrisburg, Hasan & Ditsa, 1999; Pavlou & Chai, 2002; Oh, Ahn & Kim, 2003; Hu, Clark & Ma, 2003; Seyal et al., 2004; Hsu & Chiu, 2004; McCoy, Everard & Jones, 2005; Wu, Wang & Lin, 2007; Gupta, Dasgupta & Gupta, 2008). Therefore, following the tradition of the relevant domain, it is assumed that the survey method is the preferred tool for answering the objectives of the present study.

4.4. Research design

According to Creswell (2003), research design is an overall procedure for formulating research problems, explaining the site chosen for data collection, ethical requirements when entering into the field, procedures for collection and analysis of the data, and the role of the researcher during the data collection process. Hussey & Hussey (1997) postulated that the success of the research only depends upon the selection of the right research process/steps within research design. In fact, research design is the process by which the success of each step depends upon successful completion of the earlier step. The key steps within the research design to carry out the research process within the present study are illustrated in the form of a flow chart in figure 4.1.

Overall, the research design process is categorised into three major steps. The first step is listed as research design and aims to establish and generate research hypotheses based on constructs relationships (presented as the conceptual framework in chapter 3). The generation of a hypothetical framework requires a review of published literature (chapter 2) related to the objective of the research question (chapter 1). After achieving a clearly stated research question, in the second step a series of rational decisions is decided and termed as the methodology (presented in the current chapter) to validate/test the relationships (hypotheses or conjectures) between the constructs established. Finally, the third step concentrates on the data collection process (presented within the current chapter), empirical analysis (chapter 5), discussion (chapter 6), and conclusion and future recommendations (chapter7).

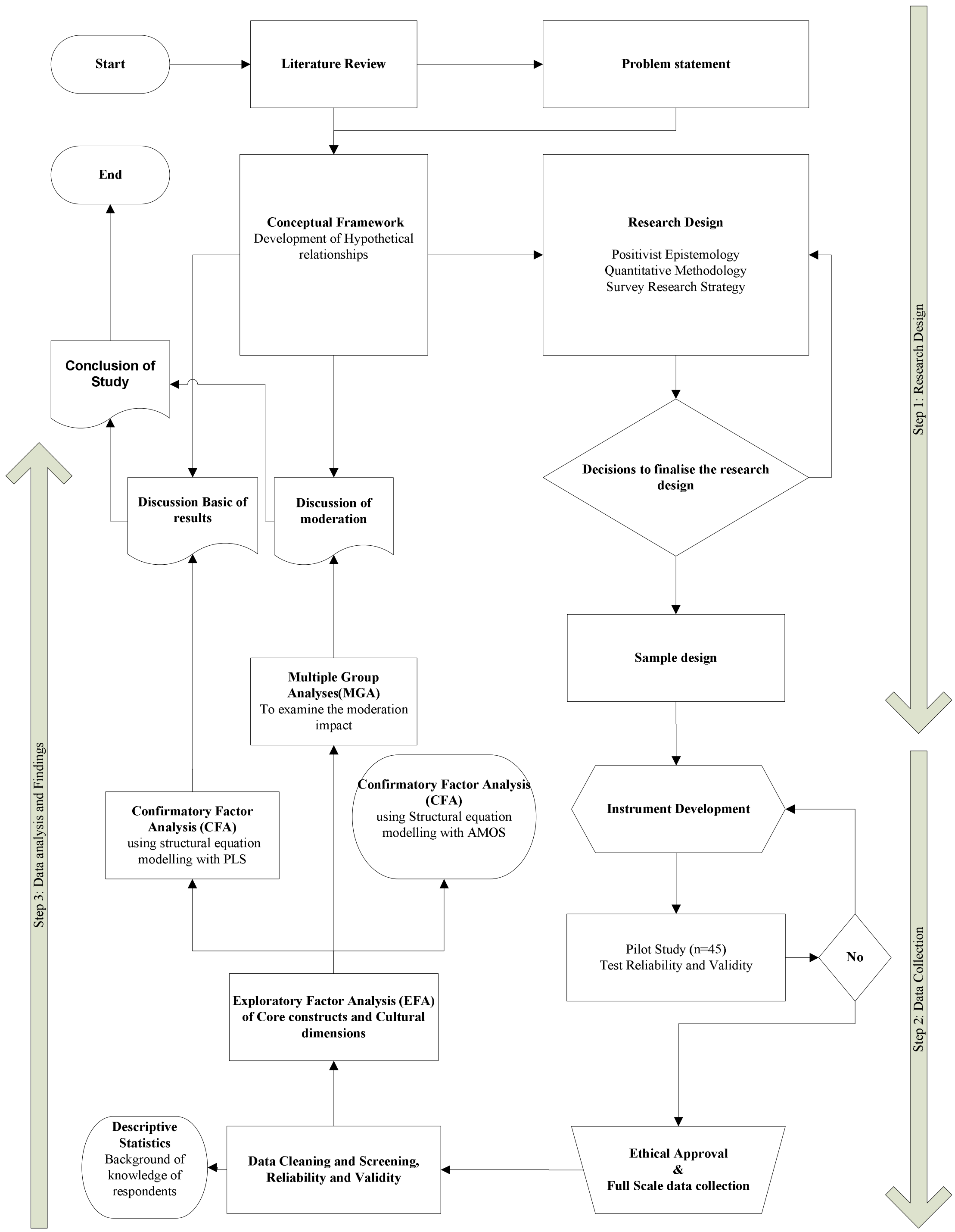


Figure 4. 1: Research Design

4.4.1. Decisions to finalise research design

In the previous three chapters and at the start of this chapter, the first four primary objectives within the research design (figure 4.1) were already accomplished i.e., to explore the predictors of technology acceptance behaviour and establish a conceptual model with a set of hypotheses. These in turn guided the researcher to select a positivist philosophy with quantitative survey method for the data collection process. In this section, the fifth step of the research design is to finalise the process and stages for accomplishing the overall purpose of the study. In doing so, six steps or guidelines suggested by Sekaran (2000) are taken to decide the purpose of the study, location or setting of the study, the type of study, researcher extent within study, the time horizon, and unit of analysis of the study. The rationale for each decision is given below with a summary of the decisions in table 4.2.

4.4.2. Purpose of the study: Hypothesis testing

Based on the nature of the research, Sekaran (2000) categorised the purpose of the studies as: exploratory, descriptive, and hypothesis testing. The purpose of the study reveals the knowledge required for achieving the particular object. For instance, the exploratory stage is preferred when new dimensions are required for exploration; descriptive is preferred in situations when certain characteristics of the research need to be described; and hypothesis testing is best suited to the stage when the nature of the problem has already been explored and described using hypotheses (Sekaran, 2000). As described earlier, this study is based on a positivist approach in which data is collected through the survey method to examine the variance between independent and dependent variables conceptually related to each other. Therefore, hypothesis testing, as suggested by Sekaran (2000), would be best suited to achieve the objective of the research.

4.4.3. Type of investigation: Correlational study

Studies to test hypothetical relationships from the perspective of investigation are usually categorised into two groups i.e., causal and correlational (Sekaran, 2000). Whereas the purpose of causal investigation is to examine the best or most appropriate cause and effect relationship or the impact of one variable directly or indirectly over another, the purpose of correlational investigation is to identify or establish the important constructs/relations associated with certain problems of domain (Sekaran, 2000; Bordens & Abbott, 2007). Contrary to causal investigations, which examine exact relationships or delineate the cause of one construct over another, this study aims to examine the salient relationships between the constructs of an individual's technology acceptance behaviour accompanied by demographic and cultural characteristics. In addition, this study aims to determine whether constructs presented in a conceptual framework are covary (i.e., there is a relationship between constructs, so that change in one tends to be accompanied by change in the other (Bordens and Abbott, 2007)), and if so, then determine the direction, variance and form of the observed relationship. According to Hair et al., (Hair et al., 2006), analysis of research based on covary relationships requires the simultaneous analysis of the paths together (i.e., multivariate-analysis with structural equation modelling) so the strength of most salient paths would be exploratory. Therefore, due to the nature of the present study, correlational type of investigation is favoured over the causal type of investigation.

4.4.4. Extent of researcher interference with study: minimal extent

The extent to which a researcher can be a part of the context being researched also plays an important role in determining the proper research approach (e.g. case study, survey approach etc.) (Choudrie & Dwivedi, 2005). It also has an impact on the type of investigation selected, either causal or correlational (Sekaran, 2000). According to Sekaran (2000), if the research is conducted in a natural setting, which is possible in correlational studies, than the researcher has minimal interference. On the contrary, when the research aims to establish a cause-and-effect relationship by some manipulation of variables, in causal studies the role of researcher is considered to be higher. In the present study, the positivist approach over critical and constructivism theories was adopted to avoid researcher bias over research object (section 4.1.1). Covering a large number of population face-to-face was impractical, therefore, the data collected in this study is based on little or no intervention by the researcher with respondents directly.

4.4.5. Study settings: Non-contrived

Sekaran (2000) postulated that generally all studies that use a correlational type of investigation (i.e., field studies) are conducted in non-contrived settings, whereas causal studies (i.e., lab experiments) are conducted in contrived settings. As justified earlier, the type of investigation in this study is correlational, therefore the nature of this study would be non-contrived.

4.4.6. Unit of analysis: Individuals

Sekaran (2000) defined the unit of analysis as the level of aggregation of data collection during the subsequent data analysis stage. The selection of the unit is an important aspect which must be considered at the time of formulating the problem statement or posing the research question (Creswell, 2003). For this study, it is vital to recall the research objective which aims to examine the predictor of perceived behavioural beliefs, social and control beliefs, management support, and task characteristics of an individual's (i.e., in this study academics working in higher educational institutes in Pakistan) acceptance behaviour with moderation of demographic and cultural factors. Therefore, evidently the research question invites the individuals to be the unit of analysis.

4.4.7. Time horizon: Cross-sectional

Sekaran (2000) defined cross-sectional (one-shot study) as a type of research that needs to be conducted just once to collect data, and might last for weeks or months. He defined longitudinal studies as research conducted at more than one point in time to see the change in dependent variables. For the present study, a cross-sectional design is selected. The reason is obvious from one of the aims of the study, which is exploration of the salient predictors of acceptance behaviour using multivariate analysis techniques. According to Hair (Hair et al., 2006), a minimum sample of 200 is required to obtain the best results in multivariate studies using structural equation modelling techniques. Therefore, a cross-sectional study is selected because it facilitates application to a large sample within a short time span and the researcher has not had to wait for a number of years in order to examine the change in dependent variables (Bordens & Abbott, 2007).

Research process steps suggested by Sekaran (2000)	**Research process selected for this research**
1. Purpose of the study: Exploratory, Descriptive, Hypothesis testing, Case study analysis	Hypothesis testing
2. Type of investigation: Causal, Correlational	Correlational
3. Extent of researcher interference in the study	Minimal interference of researcher
4. Study settings: Contrived, Non-contrived	Non-contrived
5. Unit of analysis: Individuals, Dyads, Groups, Organisation, Culture	Individuals
6. Time horizon: Cross-sectional, Longitudinal studies	Cross-sectional

Table 4. 2: Research design steps

4.5. Population and sampling

After selecting the most appropriate process for the research, the next step in research design (figure 4.1) is to design a targeted sample. Generally, the word 'sample' within research is defined as a selected segment of the population, which is carefully chosen to draw conclusions that are generalisable to the overall targeted population (Bryman & Bell, 2007; Sekaran, 2000; Schindler & Cooper, 2003)). In the present study, designing the sample is based on some main issues highlighted by Fowler (2002) as follows:

- Choice of sample: Either probability or non-probability sampling
- Sample frame: Specific unit of population required to be sampled
- Size of sample: Number of subjects required to be included
- Response rate: Ratio in percentage of sampled actually collected

4.5.1. Choice of sample

Before starting to collect the data it is essential to recognise the importance of respondents and their information, so that all the relevant data for the targeted objective can be achieved. There are two main types of sampling method, probability and non-probability sampling method (Bryman & Bell, 2007). In the former, subjects within the population have equal known chances of being selected, while in the latter, the elements do not have a predominant chance of being selected (Bryman & Bell, 2007; Sekaran, 2000).

In the present context of the study, a probability sampling method is chosen to collect the data. The reason is plausible in that the targeted population in the present study are individual academics working in higher educational institutes which are categorised demographically (age, gender, educational level, organisation type, academic position, technology usage experience and conditions for using), and the response of all the groups is required on an equal basis. It would be possible to select the non-probability sampling in conditions when the study aims to generalise the findings of the present study for a specific group of the individuals, for example, only male or female individuals within a specific institute, etc. According to Sekaran (2000), when there are time or other factors rather than generalisability concerns, then non-probability sampling is favoured over probability sampling. Therefore, in alignment with the research objective to cover a large sample within a short span of time (i.e., cross-sectional study), the probability sampling method is chosen for the present context of the study.

4.5.2. Target population

The selection of a target population or research settings/context is a central part of any research success (Baker, 1994). Realistically, the decision to select specific settings sets the boundaries for the generalisability of the research, which in turn are considered as potential limitations on hypotheses generated within the conceptual framework. Hence, selecting the appropriate settings can assist the researcher in finding the most effective way to examine the proposed theories and hypothesis with confidence by drawing conclusion about empirical findings (Eisenhardt, 1989). Within any setting, the choice of selecting an appropriate unit of analysis is based on the overall population. According to Bryman & Bell (2007, p.182), the term 'population' defines 'the universe of units from which the sample is to be selected'. In other words, population is the totality of all the samples or elements that conform to some targeted specifications, such as group of people, companies, communities, hospitals, stores, college students, state, nations, or similar that share some characteristics (Zikmund, 2003; Baker, 1994; Baker, 2002).

The target population selected for this research are the individual academics working in higher education institutes within the south Asian developing country of Pakistan. Pakistan is culturally identical to its Asian neighbours and clearly different from Western and North American countries (Hofstede, 1980) where most IT acceptance studies have been carried out. Looking at the targeted population, according to the statistics of the Higher Education Commission of Pakistan (HEC, 2003-2004), there are a total of 57 public and private universities in the country. The total number of academics working full-time and part-time is 37,428, which includes 17,802 academics working within the distance learning education system (HEC PAK, 2009). It would be too expensive and impractical to use all of the population in this study; therefore, a selected sampling frame is chosen and described in the next section.

4.5.3. Sampling frame

A sampling frame, also known as 'working population', is the listing of all the units in the target population from which the sample is being selected (Bryman & Bell, 2007; Zikmund, 2003; Sekaran, 2000). In the present study, the choice of an appropriate sampling frame is based on the criteria suggested by Rice (1997) as follows:

- Completeness of frame: also referred to as accuracy, ensures that all the subjects within the sample extracted from the targeted population are relevant and addressed properly.
- Adequacy of frame: identical to completeness, and ensures that the frame is covering the whole population.
- Up-to-date frame: ensures that the sampling frame is recently updated according to the recent changes in the overall targeted population.
- Convenience: ensures that subjects within the sampling frame are easily accessible and reachable.

- Non-duplication: an important criterion that ensures that subjects within the sample are carefully selected without duplication.

In the present study, the sample frame is based on statistics provided by HEC (2003-2004) which delineates the current number of universities and degree-awarding institutes (DAI) with an exact number of academics working full-time, part-time and on a distance-learning basis (see table 4.3).

Sector	Full-time	Part-time	Total
Distance learning	182	17,620	**17,802**
Public	10.471	2975	**13,446**
Private	3963	2217	**6180**
Overall	**14,616**	**22,812**	**37,428**

Table 4. 3: Number of full and part-time faculty members within public and private sector universities/DAIs in 2003-04. Source: HEC (2003-04) (HEC PAK, 2009)

The statistics provided by HEC also help to examine the different levels of sampling frames based on educational level, which range from the lowest level (bachelor degree) to the highest level (PhD) (see table 4.5). Selecting the sample frame from HEC is advantageous because of legal accessibility throughout time and world using its website www.hec.gov.pk. In addition, statistics presented on the HEC website have almost achieved all the criteria suggested by Rice (1997) with the exception of the up-to-date frame, which represents a three year gap between the time of conducting this research and the data updated on the website.

Surveying the whole population for a single study is very difficult and too expensive (Sproull, 1995). Therefore, in the present study, the sample frame only includes those individual academics who are working in the public and private sector with the omission of distance learning sector individuals. Excluding individuals from within the distance learning sector is reasonable due to the data collection method applied in the present study (i.e., predominantly face-to-face survey). It is impracticable to locate individuals working in the farthest territories and even abroad. Identically, the sample frame within the present study only includes full-time individuals (academics) and excludes those individuals working part time, which might increase the likelihood of data duplication (academics working full-time in public sector institutes may also choose to work part-time within private institutes), as warranted by Rice (1997). In addition, the reason for omitting part-time academics from the sample frame is the non-availability of their educational level data as officially published by the HEC (2003-2004), which can be observed from tables 4.3 and 4.4 (i.e., only presents the sample of full-time academics). It is worth explaining that the present study aims to examine the validity and reliability of the conceptual model with the moderation effect of demographic variables (age, gender, educational level, organisation type, academic position, usage experience and working conditions) and cultural dimensions (IC, MAS, PD and UA). The moderation effect is examined using multiple group analysis process (MGA). Therefore, the sample frame that at the moment only covers full-time working individuals (i.e., 14,434 academics) is split into the desired number of groups during MGA.

Sector	Bachelors	Masters	Masters (H)	M.Phil.	PhD	Total
Distance learning	9	110	0	22	41	**182**
Public	1,059	4,525	1,319	1,019	2,549	**10,471**
Private	1,151	1,480	508	284	540	**3,963**
Overall	**2,219**	**6,115**	**1,827**	**1,325**	**3,130**	**14,616**

Table 4. 4: Full-time faculty members classified by their highest qualification in2003-04. Source: HEC (2003-04) (HEC PAK, 2009)

4.5.4. Sample unit

According to Baker (1994, p.483) the unit of analysis is the social object or entity whose properties or characteristics are the focus of the study. In general, the unit of analysis can be either a single unit, as is common in case studies and survey research; or it may be multiple units as is normally found in research using hierarchical data analysis (Baker, 1994; Bernard, 2000). In the present study, at the initial level of analysis, the sample unit is individual academics working full time within higher educational institutes in Pakistan. However, at a later stage of analysis to examine the moderation effect, the sample unit is split into groups based on demographic and cultural characteristics. Arguably, selecting individual academics at a low-level compared to groups or institutional heads is consistent with the suggestions of Bernard (2000). Bernard (2000, p.46) suggested collecting the data at the lowest level unit of analysis as possible because data collected at an individual level can be aggregated into data at a higher level (e.g., groups, networks, companies etc.) whereas the disaggregating (reverse) may not be possible. Consistently, the aim of the present study is to explore the factors of intention behaviour which result in higher acceptance behaviour, therefore it would be not viable to only observe the perception of groups (i.e., group of academics in a department, or only males or females etc.) at a higher level (e.g., heads of department, chairs, or governmental officials proposing IT policies). It is important to clarify that data collection for the present study only focuses on the perception of academics using technology (the Internet) within their working practices (teaching and research within institutes) and does not consider their perception of experience using the Internet at a personal level (at home or at an Internet café).

4.5.5. Sample size

Specifying the exact number of a sample size is a tricky and complex task. For instance, if the sample size is lower than the estimated size it results in a greater chance of failure convergence, improper solution (e.g., negative error variance estimated for measured variable), and lower accuracy of parameter (Hair et al., 2006; Comrey & Lee, 1992). On the contrary, a larger sample size than what is required will result in a waste of time, expenses and process to obtain the respondents' responses (Bryman & Bell, 2007; Zikmund, 2003; Hair et al., 2006). Therefore, it is a critical question to know how large a sample size should be so it can be generalised for all the targeted population with reliable and trustworthy results. For the present study, the sample is selected by observing the most cited rules of thumb within multivariate analysis and the requirements of data analysis technique i.e., structured equation modelling (SEM) using CBSEM (e.g. AMOS, LISREL), component-based or variance-based (e.g., PLS) techniques, and general approaches to evaluating models using SEM.

Before applying the general approach of sample size selection, recall that the targeted population for the present study is n=14,434 academics working full time within public and private universities in Pakistan. There are two possibilities for estimating a sample size that represents the overall population: 1) the sample selected would represent a random number of individuals from the total population covering both public and private universities (n=14,434), or 2) the sample size selected would represent separately selected academics from public universities (n=10,471) and private universities (n=3,963) (see table 4.5). Following the generalised scientific criteria of sample selection suggested by Krejcie and Morgan (1970) (c.f. Sekaran, 2000, p.295), the estimated sample size for the present study is calculated as below:

Sector	**Full-time**	**Part-time**	**Total**
Public	10,471	2,975	**13,446**
Private	39,63	2,217	**6,180**
Overall	**14,434**	**5,192**	**19,626**

Table 4. 5: Number of full and part-time faculty members by public and private universities/DAIs in 2003-04. Source: Adopted from HEC (2003-04) and modified for this research.

Krejcie & Morgan (1970), using rigorous statistical techniques, came up with a generalised table of population to sample ratio (c.f. Sekaran, 2000, p.295). The total population needed to be covered in the present study (n=14,434) is not given in Krejcie & Morgan's (1970) table, therefore, the average/mean for the two nearest population sizes given by Krejcie & Morgan (10,000 and 15,000) is calculated in order to know the exact sample size as follows:

According to Krejcie & Morgan (1970):

If the given population (N)=15,000 then sample (S) is required to be=375,

AND, if N=10,000 then S= 370,

Therefore, for the present study N=14,434, S is ((375+370)/2)=**373.**

Similarly, specifically for public sector universities, it is needed:

If the given population (N)=15,000 then sample (S) is required to be=375,

AND, if N=10,000 than S=370,

Therefore, for the present study N=10,471, S is ((375+370)/2)=**373.**

And, specifically for private sector universities it is needed :

If the given population (N)=4,000 then sample (S) is required to be=351,

AND, if N=3,500 then S=346,

Therefore, for the present study N=3,963, S is ((351+346)/2)=**348.**

Another technique to decide the sample size depends upon data analysis methods and techniques (Fowler, 2002). Prior to discussion of the 'rules of thumb' to inspect the sample size, it is necessary to recall that the data analysis method in the present study is based on structural equation modelling (SEM). This is closely related to multiple regression (multivariate analysis) and includes statistical techniques such as: confirmatory factor analysis (CFA), structural path analysis (β), total variance extracted (R^2), causal modelling with latent variables, analysis of variance and multiple regression. The literature on data analysis techniques presents a number of rules of thumb for achieving robust and authenticated results using SEM, from which a few are considered for the present study and explained as follows:

Roscoe (1975) proposed four rules for deciding and establishing a sample size:

1) Sample size (n), n>30 and n<500 are appropriate for most research.

2) In situations when the sample needs to be split into sub-samples (e.g., male/female, junior/senior, etc.), a minimum sample size of 30 for each category is appropriate.

3) In multivariate analysis the sample size is required to be several times (preferably 10 times or more) larger than the number of variables in the framework.

4) For simple experimental research with full control over respondents' behaviour a sample size of 10 to 20 respondents is sufficient.

Similarly, Stevens (1996) postulates that 15 cases per construct are sufficient when a test of least square multiple regression analysis is needed. Furthermore, a rigorous statistical analysis data sample should be more than 300 respondents (ibid). Bentler & Chou (1987) recommend at least five cases per parameter when the data is perfectly normalised, distributed and without any missing or outlying cases, etc. It is worth noting that Bentler & Chou's recommendation concerns parameters (i.e., also considered regression path between construct-to-construct and items-to-construct) which are always more than the variables in any framework. Finally, Loehlin (1992) used confirmatory factor analysis (CFA) and suggested that models with 2 or 4 factors need at least 100 cases and 200 would be a better approach. Comrey & Lee (1992) give a guide of a sample size of 50 as very poor, 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1,000 as excellent.

In addition to considering the above rules of thumb, this study primarily considered the criteria suggested by Tabachnick & Fidell (2007) and Hair et al., (2006). According to Tabachnick & Fidell (2007, p.682 and p.613), covariances like the correlation are less stable when estimated from a small sample size, therefore, it is important that that sample size is large enough. The author suggested that as a general rule of thumb, it is comfortable to have at least 300 cases for factor analysis; if factor loading is >0.80 then a sample of about 150 cases is sufficient (ibid). Hair et al., (2006) emphasised a few considerations for selecting proper sample size when data analysis is being achieved through SEM as:

- Multivariate distribution of data, which refers to the assumption that if data deviates from more than the presumed normality then the ratio of respondent must be greater than the number of parameters, i.e., usually consider 15 respondents for each parameter estimated in the model.

- Estimation technique: maximum likelihood estimation (MLE) is the most common estimation procedure in SEM and is an iterative process. It is recommended that small sample size should be 100 to 150 for stable MLE results, and a sample of 150 to 400 is best.

- Model complexity: a model with a large number of constructs/variables requires a large number of parameters to estimate the model. A model containing five or fewer constructs can be estimated with a sample of 100 to150 and a model with a larger number of factors, such as six or more with three measured items in each, will require a sample size of more than 500.
- Average error variance of indicator: this refers to the process of communalities i.e., average amount of variation among measured variables. It is observed that a larger sample size has shown a smaller number of communalities and vice versa. For instance, for communalities of 0.6, an adequate sample is needed of 100-150; a communality of 0.45-0.55 needs a sample size of 200.

Following the criteria of variable to number of cases ratio (e.g., Hair et al., 2006; Roscoe, 1975; Tabachnick & Fidell, 2007), the present study aims to examine 13 constructs with 58 items within the basic model; therefore, the minimum required sample size needed is 290 (i.e., 58x5=290). However, based on the calculation performed using Krejcie & Morgan's (1970) formula and others' rules of thumb (Comrey & Lee, 1992; Bentler & Chou, 1987; Loehlin, 1992), the present study intends to achieve at least **373** workable sample sizes (after treating missing data) to examine the paths proposed in the model with reliable estimates.

4.6. Instrument development

After designing the sample and selecting the specific sample size, the next step in research design (figure 4.1) is to establish the instrument for collecting the data. Survey research for achieving research goals and objectives, designing and selecting the correct instrument with relevancy and accuracy is considered to be an essential and complex process (Zikmund, 2003). In particular, the instrument should be capable of answering the research question(s) about what is to be measured (construct validity) and how it is to be measured (construct reliability) (Zikmund, 2003; Sekaran, 2000). The present study followed Frazer & Lawley's (2000) and Sekaran's (2000) procedures to develop a suitable instrument, which chiefly emphasise three stages: 1) instrument content development by solving issues of item selection, categorisation, scales and coding (before analysis), 2) item wording, and 3) general appearance or layout of instrument.

In the present study, theories related to technology acceptance behaviour including the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), TAM2 (Venkatesh & Davis, 2000), DTPB (Taylor & Todd, 1995a), and UTAUT (Venkatesh et al., 2003), are incorporated within the extended model to develop the survey instrument. In addition, measuring the cultural dimension items from Hofstede's (1980) and Dorfman & Howell's (1988) studies are included, with the impact of management support suggested by Lewis, Agarwal & Sambamurthy (2003). Finally, observing the moderating impact of demographical characteristics from Agarwal & Prasad's (1999) and Venkatesh & Morris' (2000) studies are incorporated. The full description of all the constructs used in the present study with the number of measuring items, scale, support to hypothesis and their source of adoption are presented in table 4.6.

4.6.1. Questionnaire content development and operational items

The content development is based on the research question, which aims to determine the factors of perceived behaviour beliefs, social and control beliefs, management support at institutional and governmental level, and task characteristics that lead towards an individual's acceptance behaviour. Specifically, the context of the present study is higher educational institutes within the developing country of Pakistan. The sample is individual academics, therefore, the content of the questions within the instrument are modified according to the teaching context. In addition, the content of the instrument intends to collect the demographic and cultural data that are expected to produce a moderating impact on the constructs of an individual's acceptance behaviour. Generally, content designed within an instrument for the present study can be categorised into three sections. These are described briefly as follows:

4.6.2. Section A: Moderating demographic variables

This section is based on three sub-sections, which include key determinants with the specific role of moderators, i.e., age, gender, educational level, experience, voluntariness, academic position, type of university or institute, and region or province. The impact of these moderating variables can be viewed from the previous literature, but is not limited to it (e.g., Venkatesh et al., 2003; Agarwal & Prasad, 1999; Venkatesh & Morris, 2000; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008; Morris, Venkatesh & Ackerman, 2005; Minton & Schneider, 1980). The items used in the first section intend to validate the hypotheses H13 and H14, which include 28 path relationships.

In the demographic section, part I comprises seven questions (1 to 7) measured on a nominal scale to gather the background information of the respondents, such as gender, age, academic position, academic experience, educational level, type of university and provinces. Section A, part II is related to individuals' experience regarding Internet usage when searching for material, sending and receiving emails, downloading multimedia content and e-commerce activities. This part is based on two questions (8 and 9) and is measured on a nominal scale. Section A, part III is based on four questions (10 to 13) that gather information about the conditions of using the Internet, which might be the individuals' choice or institutional requirements (i.e., voluntariness). Given that, four questions are adopted from the study of Venkatesh et al. (2003) and are measured on a seven-point Likert scare anchored as 1=strongly disagree to 7=strongly agree.

4.6.3. Section B: Direct determinants of behaviour intention (BI) and behaviour usage (BU)

Section B of the instrument is based on questions for measuring the information of nine independent constructs i.e., perceived usefulness (PU), perceived ease of use (PEOU), peer influence (PI), superior influence (SI), self-efficacy (SE), technology facilitation (TF), resource facilitation (RF), academic tasks (AT), non-academic tasks (NAT), one mediating, as well as a dependent construct, behavioural intention (BI), and one dependent construct, behavioural usage (BU). All the questions in section B are measured on a seven-point Likert scale anchored as 1=strongly disagree to 7=strongly agree. However, construct BU, which is also measured on a seven-point Likert scale but with slightly different options, is anchored as 1=don't use at all, 2=use about once each month, 3=use a few times a month, 4=use once a week, 5=use a few times in a week, 6=use once a day, 7=use several times a day. For simplification and grouping purposes, this section is sub-divided into six parts.

Part I includes nine questions adopted from the study of Venkatesh, Morris & Ackerman (2000) to measure the individual's persuasive feelings/beliefs towards acceptance intention of Internet technology. The first five questions (14 to 18) are related to the perception of usefulness (PU) and intend to explore whether academics believe that using the Internet would increase his/her job performance; whereas the remaining four questions (19 to 22) are related to the perception of ease of use (PEOU) and intend to explore whether academics believe that using the Internet is effort-free and easy to understand. Both constructs PU and PEOU are the core construct of the TAM model (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) and have been widely practiced in literature to replicate TAM studies or extending studies based on TAM (e.g., Venkatesh & Morris, 2000; Venkatesh & Davis, 2000; Moore & Benbasat, 1991). Constructs PU and PEOU and their measuring questions are included in the instrument to examine the path relationships presented in hypotheses H1a, H1b, H2 and H3.

Section B, part II includes six questions related to the normative beliefs adopted from the study of Lewis et al. (2003). The questions intend to examine the perception of the academics' particular behaviour as influenced by the judgment of others. The first four questions (23 to 26) are related to peer influence (PI) and aim to explore whether academics' intention to accept Internet technology is due to the importance of the perception of his/her colleagues, friends and family members; whereas, the remaining two questions (27 and 28) are related to superior influence (SI) and aim to explore the importance of superiors (i.e., heads of department and chairs) in academics' perceptions of accepting Internet technology. Both constructs PI and SI, combined in previous literature, are also studied as a single construct of subjective norms (SN) (e.g., Taylor & Todd, 1995a; Mathieson, 1991; Venkatesh et al., 2004; Morris & Venkatesh, 2000) which were initially introduced in TRA by Ajzen & Fishbein (1980) and Fishbein & Ajzen (1975). Measuring constructs PI and SI helps to examine the path relationships presented in hypotheses H4, H5a and H5b.

Section B, part III includes 15 questions related to the control beliefs adopted from the study of Taylor & Todd (1995a). The questions aim to examine the conditions that affect the form of facilitation or impedances on academics' behaviour when using the Internet. In doing so, the first six questions (29 to 34) are related to the concept of self-efficacy (SE) and focus on measuring the academics' self-evaluation beliefs towards Internet usage in their tasks; the second four questions (35 to 38) are related to the concept of technology facilitations (TF) and measure academics' external beliefs as influenced by technology availability and control over its usage. Finally, the last five questions (39 to 43) are related to the concept of resource facilitations (RF) and measure the academics' external beliefs influenced by resource availability in terms of money, time, instructions and personal support of their Internet usage. Combined together, SE, TF and RF are termed as perceived behaviour control (PBC) and were originally introduced in TPB (Ajzen, 1991). The TPB, and SE, TF, and RF are widely used as core constructs in theories to examine intention behaviour of individuals (e.g., Taylor & Todd, 1995a; Wu, Wang & Lin, 2007; Taylor & Todd, 1995b; Agarwal & Prasad, 1998; Compeau, Higgins & Huff, 1999; Compeau & Higgins, 1995b; Compeau & Higgins, 1995a; Venkatesh, 2000). Measuring constructs SE, TF and RF helps to examine the path relationships presented in hypotheses H6a, H6b, H7a, H7b, H8a, and H8b.

Section B, part IV includes ten questions related to the task characteristics that are facilitated by the use of the Internet. The questions are developed by the researcher through applying the theory of task technology fit (TTF) (Goodhue & Thompson, 1995) over the questions of BI construct proposed in the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989). In addition, studies by Reynolds (1992) and Rosenfeld et al., (1992) were used to classify the tasks based on their characteristics. In doing so, it is observed that within the context of higher educational institutes, acceptance of the Internet is mostly based on its importance in academic (AT) and non-academic tasks (NAT). The first six questions (44 to 49) within the instrument are related to the measure of the intention to use the Internet in academic tasks. Specifically, the questions focus on examining the intention to use the Internet in preparing teaching materials, self-skills development (research) and communicating with students. The remaining four questions (50 to 53) are related to the measure of intention to use the Internet for non-academic tasks, specifically, questions focus on observing the intention to use the Internet in administrative, socialisation and enjoyment tasks. Constructs AT and NAT and their measuring question are included in the instrument to examine the path relationships presented in hypotheses H9a and H9b.

Parts V and VI in section B are related to the academics' cognitive processes (e.g., what they think, feel and behave, etc.) in forming intention to accept and use the Internet. Both parts include a total of eight questions adopted from the study of Venkatesh & Bala (2008). Specifically, part V includes four questions (54 to 57) to observe the behaviour intention (BI) of the academics to accept the Internet. The questions on BI are measured on a seven-point Likert scale anchored as 1=strongly disagree to 7=strongly agree. Part VI includes four similar questions to BI (58 to 61) and observes the behaviour usage (BU) with only a difference in scale. This is an eight-point Likert scale to measure the usage frequency anchored as: 1=don't use at all, 2=use about once a month, 3=use a few times a month, 4=use once a week, 5=use a few times a week, 6=use once a day, 7=use several times a day. BI is the most important construct of the present study and is chiefly the dependent variable for most of the paths in the conceptual framework. Both BI and BU also remained as major constructs in a number of theories within technology acceptance domain e.g., TRA, TAM, TAM2, TBP, DTPB, and UTUAT (see Venkatesh et al., 2003; Taylor &Todd, 1995a; Venkatesh & Morris, 2000; Venkatesh & Davis, 2000). In the present study constructs BI and BU and their measuring questions are included in the instrument to examine the path relationships presented in hypothesis H10.

4.6.4. Section C: Moderating cultural factors and direct determinant management support

This section includes the questions for measuring the important constructs to answer one of main objectives of the study, i.e., is there any perception of difference between segments of users (academics) towards acceptance of Internet technology on the basis of their individual cultural characteristics (masculinity-femininity, individualism-collectivism, power distance, uncertainty avoidance)? Recall the discussion in chapter 3, where it was proposed that models and theories within technology acceptance domain are mostly culturally biased, and need to be generalised within the specific context of culture. In addition, it was discussed that, within developing countries, most decisions to introduce new technologies are made by higher authorities without considering the concerns of end-users. Therefore, overcoming both problems of cultural bias and the influence of management support, four dimensions of culture suggested by Hofstede (1980) i.e., power distance (PD), individualism/collectivism (IC), uncertainty avoidance (UA), and masculinity/femininity (MF); and two constructs of management influence at a higher and lower level i.e., government support (GS) and institute support (IS) suggested by Lewis et al., (2003), are examined in the present study. Section C is divided into three sub-parts, in which two are measured on seven-point Likert scales anchored as 1=strongly disagree to 7=strongly agree. The third part, which consists of information related to the e-Reforms, is measured on a nominal scale.

Section C, part I includes 21 questions related to four cultural dimensions i.e., PD, IC, UA and MF. All the questions measuring cultural dimensions are proposed by Hofstede (1980) and are measured on Dorfman & Howell's (1988) scale. The reasoning behind this is plausible in that the scale proposed by Hofstede (1980) would be applicable when the study aims to examine the cultural differences at a country level (i.e., cross-cultural), whereas the present study only requires the exploration of the differences on an individual level. Additionally, the adoption of the Dorfman & Howell (1988) scale is based on the suggestion of McCoy, Everard & Jones (2005), who postulated that when cultural dimensions are to be explored at an individual level, then the Dorman & Howell scale is the best option. In doing so, the first six questions (62 to 67) are related to the construct PD to measure academics' experience of freedom to talk in the work environment (e.g., sharing problems, decision-making, etc. with the heads and chairs of organisations). The next six questions (68 to 73) are related to the construct IC to measure academics' perceptions about him/her and the group of people in the working environment. The next four questions (74 to 77) are related to the construct UA that measures academics' perceptions about their certainty in the job when observing rules and regulations. Finally, the last five questions (78 to 82) are related to the construct MF that measures academics' perceptions about job goals, earning, recognition at work, advancement in work position, and accepting challenging tasks, and establishing working relationships with colleagues and supervisors to promote the family environment. A number of researchers in previous literature has also examined the impact of culture (McCoy, Everard & Jones, 2005; McCoy, Galletta & King, 2007; Robertson & Hoffman, 2000; Robertson, 2000; Srite, 2006; Srite & Karahanna, 2006; Hwang, 2005; Choi & Geistfeld, 2004; Parboteeah, Bronson & Cullen, 2005; Alsajjan & Dennis, 2010). However, most were limited to measuring differences at a country level score. In the present study, measuring constructs PD, IC, UA and MAS helps to examine the moderating path relations presented in hypotheses H15 (a,b,c,d), H16 (a,b,c,d), H17 (a,b,c,d) and H18 (a,b,c,d).

Section C, part II includes ten questions related to management support for promoting Internet usage within academics working in higher educational institutes. All the questions are adopted from the study of Lewis et al., (2003) with little moderation according to the context of the study. The first five questions (83 to 87) are related to the construct government support (GS) to measure the academic perception of government policies, encouragement and their importance for Internet usage within universities. The next five questions (88 to 92) are related to the construct institute support (IS). The questions measuring GS are similar to IS except for difference of context, to see the influence of management at a high and low level. The importance of management support is also highlighted in previous studies e.g., Igbaria & Chakrabarti (1990) and Yoon, Guimaraes & O'Neal (1995). Measuring GS and IS helps to examine the path relations in hypotheses H11a, H11b, H12a, and H12b.

Finally, section C, part III includes five questions (93 to 98) that explore general information about the awareness of academics regarding the programmes initiated by the government to promote teaching and research skills. All the questions are measured on a nominal scale to observe the awareness of programmes launched by the Pakistan Higher Education Commission (HEC) under the umbrella of ‘e-Reforms’. These include: Pakistan Education and Resource Network (PERN), digital library, Pakistan Research Repository (PRR), e-learning, Enterprise Resource Planning (ERP), Campus Management Solution (CMS), IT infrastructure upgrade, and broadband facility (HEC PAK, 2009). Within the conceptual framework questions in section C, part III do not represent any path relationship; however, the information collected from the question enables the evaluation of the current infrastructure and its usage within academics’ work practices.

Factors	Source	No. of items	Scale	Hypothesis
Demographic				
Age	(Venkatesh et al., 2003)	Four	Nominal	**H13a1:**(BI, PU, TF, RF, SE, IS, GS)→BU **H13a2:** (SN, PEOU, IS, GS)→PU **H13a3**: (PU, PEOU, TF, RF, SE, AT, NAT,SN)→BI **H13a4:** SN→PEOU
Gender	(Venkatesh & Morris, 2000)	Two	Nominal	**H13b1:** (BI, PU, TF, RF, SE, IS, GS)→BU **H13b2:** (SN, PEOU, IS, GS)→PU **H13b3:** (PU, PEOU, TF, RF, SE, AT, NAT,SN)→BI **H13b4:** SN→PEOU
Educational level	(Agarwal and Prasad, 1999)	Four	Nominal	**H13e1:** (BI, PU, TF, RF, SE, IS, GS)→BU **H13e2:** (SN, PEOU, IS, GS)→PU **H13e3:** (PU, PEOU, TF, RF, SE, AT, NAT, SN)→BI **H13e4:** SN→PEOU
Experience	(Venkatesh et al., 2003)	Two	Nominal	**H14a1:** (BI, PU, TF, RF, SE, IS, GS)→BU **H14a2:** (SN, PEOU, IS, GS)→PU **H14a3:** (PU, PEOU, TF, RF, SE, AT, NAT,SN)→BI **H14a4:** SN→PEOU
Voluntariness	(Venkatesh et al., 2003)	Four	7-point Likert scale	**H14b1:** (BI, PU, TF, RF, SE, IS, GS)→BU **H14b2:** (SN, PEOU, IS, GS)→PU **H14b3:** (PU, PEOU, TF, RF, SE, AT, NAT,SN)→BI **H14b4:** SN→PEOU
Academic position	(Minton & Schneider, 1980)	Six	Nominal	**H13d1:** (BI, PU, TF, RF, SE, IS, GS)→BU **H13d2:** (SN, PEOU, IS, GS)→PU **H13d3:** (PU, PEOU, TF, RF, SE, AT, NAT,SN)→BI **H13d4:** SN→PEOU
Type of university	Researcher	Four	Nominal	**H13c1:** (BI, PU, TF, RF, SE, IS, GS)→BU **H13c2:** (SN, PEOU, IS, GS)→PU **H13c3:** (PU, PEOU, TF, RF, SE, AT, NAT, SN)→BI **H13c4:** SN→PEOU
Province	Researcher	Four	Nominal	Geographical information
Behavioural beliefs				
Perceived usefulness (PU)	(Venkatesh, Morris & Ackerman, 2000)	Five	7-point Likert scale	**H1a:** PU→BI and **H1b:** PU→BU
Perceived ease of use (PEOU)	(Venkatesh, Morris & Ackerman, 2000)	Four	7-point Likert scale	**H2:** PEOU→BI and **H3:** PEOU→PU
Normative beliefs				
Peer influence(PI)	(Lewis, Agarwal & Sambamurthy, 2003)	Four	7-point Likert scale	**H4:** SN→BI and **H5a:** SN→PU
Superior influence (SI)	(Lewis, Agarwal & Sambamurthy, 2003)	Two	7-point Likert scale	**H4:** SN→BI & **H5b:** SN→PEOU
Control beliefs				
Self-efficacy (SE)	(Taylor & Todd, 1995a)	Six	7-point Likert scale	**H6a:** SE→BI & **H6b:** SE→BU
Technology	(Taylor & Todd,	Four	7-point	**H7a:** TF→BI & **H7b:** TF→BU

facilitation (TF)	1995a)		Likert scale	
Resource facilitation (RF)	(Taylor & Todd, 1995a)	Five	7-point Likert scale	**H8a:** RF→BI & **H8b:** RF→BU
Task characteristics				
Academic(AT)	Researcher	Six	7-point Likert scale	**H9a:** AT→BI
Non-academic (NAT)	Researcher	Four	7-point Likert scale	**H9b:** NAT→BI
Cultural factors				
Power distance (PD)	(Dorfman & Howell, 1988)	Six	7-point Likert scale	**H17a**: (BI, PU, TF, RF, SE, IS, GS)→BU **H17b:** (SN, PEOU, IS, GS)→PU **H17c:** (PU, PEOU, TF, RF, SE, AT, NAT, SN)→BI **H17d:** SN→PEOU
Individualism /Collectivism(IC)	(Dorfman & Howell, 1988)	Six	7-point Likert scale	**H16a:** (BI, PU, TF, RF, SE, IS, GS)→BU **H16b:** (SN, PEOU, IS, GS)→PU H16c: (PU, PEOU, TF, RF, SE, AT, NAT, SN)→BI **H16d:** SN→PEOU
Uncertainty avoidance (UA)	(Dorfman & Howell, 1988)	Four	7-point Likert scale	**H18a:** (BI, PU, TF, RF, SE, IS, GS)→BU **H18b:** (SN, PEOU, IS, GS)→PU **H18c:** (PU, PEOU, TF, RF, SE, AT, NAT, SN)→BI **H18d:** SN→PEOU
Masculinity/ Femininity (MAS)	(Dorfman & Howell, 1988)	Five	7-point Likert scale	**H15a:** (BI, PU, TF, RF, SE, IS, GS)→BU **H15b:** (SN, PEOU, IS, GS)→PU **H15c:** (PU, PEOU, TF, RF, SE, AT, NAT, SN)→BI **H15d:** SN→PEOU
Environmental factors				
Government support (GS)	(Lewis, Agarwal & Sambamurthy, 2003)	Five	7-point Likert scale	**H12a:** GS→PU & **H12b:** GS→BU
Top management support (IS)	(Lewis, Agarwal & Sambamurthy, 2003)	Five	7-point Likert scale	**H11a:** IS→PU & **H11b:** IS→BU
Behavioural factors				
Behaviour intention (BI)	(Venkatesh & Bala, 2008)	Four	7-point Likert scale	**H10:** BI→BU
Behaviour usage (BU)	(Venkatesh & Bala, 2008)	Four	8-point Likert scale	**H10:** BI→BU
E-Reforms by HEC				
Internet access method	Researcher	One	Nominal	General information
HEC provided the Internet access	Researcher	One	Nominal	General information
Use of digital library	Researcher	One	Nominal	General information
Use of PRR	Researcher	Two	Nominal	General information
Participation in e-learning	Researcher	One	Nominal	General information

Table 4. 6: Operationalisation of research variables

4.6.5. Questionnaire wording and layout

The wording and layout of a questionnaire plays an important role in enhancing a respondent's interest up until the end of the questionnaire. Sekaran (2000) suggested five principles of wording in questionnaire design: 1) appropriateness of content, 2) question wording and level of language sophistication, 3) type and form of question, 4) sequencing of questions, and 5) personal data sought from the respondents.

The content of the questions in the present study mostly intend to explore the objective feelings of academics which is measured using Nominal and Likert scale techniques. Questions are asked in simple and easy language without using phrases or technical terms related to information technology. In addition, all the questions are worded into positive sentences of short length, so that respondents feel able to complete them without concentrating on the form of the question.

The type and form of the questionnaire, which is also referred to as the 'phrasing' of the question, is mostly categorised as either open-ended or closed-ended questions/fixed-alternative (Zikmund, 2003). Open-ended questions fit well when the research is exploratory so that respondents can freely describe their opinions; closed-ended questions are best suited for explanatory or causal studies. Keeping in mind the nature of the present study, the close-ended questionnaire phrasing is selected, which gives the advantage of taking less time to complete and is easier for the respondent to answer. In addition, applying closed-ended questions enables the researcher to code and tabulate them easily for quantitative data analysis purposes (Zikmund, 2003; Sekaran, 2000). Apart from the wording of questions, the researcher has also carefully examined the impact of bias from questions through avoiding ambiguity or leading responses.

From the layout or appearance point of view, a number of researchers have proposed mixed suggestions. Sekaran (2000) suggested that personal information either be kept at the start or the end of the instrument depending upon the aim of the research. Dillman (2000) suggested that personal information questions should not be at the start of the instrument because they are easy to answer and lead respondents to believe that the instrument is boring. In the present study, personal and demographic information is of equal importance to the main constructs of the research (examining moderation effect), therefore, in designing the layout the researcher has kept demographic information at the start of the instrument. One potential threat in the present layout of the instrument (see appendix B) could be its length (98 items). It might be possible that information at the end of the instrument may be left incomplete or be less interesting to the respondents. Overcoming this problem and ensuring that there is no difference between respondents' initial answers and later responses, a Mann-Whitney-U-test will be computed during the pilot study. In the case that a difference is observed, then three layouts of the instrument would be developed. In the first layout sections A, B and C will be similar to the present layout, as given in the appendix, while in the second layout the sequence will be A, C, B; finally in the third layout the sequence will be C, A, B. The final decision will be made after piloting the initial version of the instrument.

4.7. Scale used

In order to measure human attitude, Sekaran (2000) categorised two main groups of scales i.e., rating and ranking scales. Within the rating scale she defined ten further scaling methods. Among the types defined by Sekaran, the items selected for various constructs in this study are mostly based on the Likert scale (i.e., seven-point) established by Rensis Likert in 1932 (Likert, 1932). The reason for selecting the Likert scale is twofold: it is the most common and easiest method for gathering information from respondents using survey method (Sekaran, 2000; Viswanathan, Sudman & Johnson, 2004). It has been used widely (either five or seven points) in the published literature relevant to the current study (e.g., Venkatesh et al., 2003; Taylor & Todd, 1995a; Dorfman & Howell, 1988; Venkatesh & Morris, 2000; Venkatesh & Davis, 2000; Venkatesh & Bala, 2008). The full description of the constructs and their measurement items with the relevant scale is given in section (4.6).

4.8. Data collection procedure

The method of data collection is an integral part of any research design (Sekaran, 2000). It is the process by which the opinions of the respondents from the targeted population on a specific topic are collected (Zikmund, 2003). A number of methods and techniques are available for collecting the data according to the nature of the research problem. Methods such as interview can be conducted via face-to face, telephone, or computer-assisted. The questionnaire method includes self-administrated surveys, mail survey, electronic or internet survey etc. (Zikmund, 2003; Sekaran, 2000; Fowler, 2002). The selection of the data collection method requires an understanding of the sample size needed, type of the research question posed, content and number of questions in the instrument, cost in terms of accessibility to respondent and time (Fowler, 2002).

In the present study, the survey questionnaire method for data collection is selected, which is defined as a predefined set of written closed structure or open-ended items filled by the respondents (Sekaran, 2000). Specifically, the self-administrated questionnaire is adopted as the primary source of data collection with some supporting posted/mail and e-mailed surveys. Zikmund (2003) explained the self-administrated questionnaire as an instrument that is normally printed on paper or attached to mail/e-mail and is filled in by the respondent. The rationales behind selecting the self-administrated method for data collection process are as follows:

- Covering a large area and population: the targeted population for the present study are academics in higher educational institutes in Pakistan, which are spread geographically across four provinces. Therefore, accessing/contacting each individual personally for interview seems to be impractical. For simultaneous distribution while keeping the researcher isolated, the self-administrated mail and email method is preferred over the others (Zikmund, 2003).
- Inexpensive and time-saving: through simultaneous distribution, much time and money can be saved compared with the interview method, because the researcher does not need to sit with the respondent and fill the data in him/herself, as with the interview method (Zikmund, 2003; Sekaran, 2000). In the present study, in order to save additional time due to the delay in the postal service, and the expensive costs of printing and travelling, an electronic format of the questionnaire is also included for distribution.
- Respondent's convenience: unlike the interview method, with the self-administrated survey method (i.e., mail or e-mail) the respondent is free to think about their replies and complete it whenever a convenient time is available to them (Zikmund, 2003). Respondents in this method are not biased by the researcher's opinion, or by time hassle requirements.

Many disadvantages of the self-administrated method are observed which result in a slow and low response to completing the data. These include the absence of the researcher when filling in sensitive data or social data in the questionnaire that perhaps needs clarification at the time of completing survey, or instructions which might be difficult to understand and hence need the presence and guidance of the researcher (Zikmund, 2003; Sekaran, 2000). In this research, the problem of revealing personal, social and sensitive data is solved by attaching a cover letter with each questionnaire that clearly states how confidentiality of information is secured through a coding system rather than the names of respondents; the consent of each respondent is required before revealing his/her identity. The disadvantage of the self-administrated questionnaire i.e., the difficulty of instruction at the time of filling it in can be overcome by time-management. The researcher will use the follow-up technique (Zikmund, 2003) to inquire about a slow response rate, and if it is because of instruction then a revised version of the questions will be re-distributed for the data collection method.

4.9. Pilot study

After designing the initial version of the survey instrument in the research design (figure 4.1) the next stage is purification of the questions within the instrument. A pilot or feasibility study is usually carried out before the main data collection process in order to check its feasibility in terms of reliability and validity to improve the design of the instrument (Zikmund, 2003). Ticehurst and Veal, (2000, p.151) stress the importance of piloting in order to eliminate possible weaknesses and flaws in the survey instrument. These can be identified by testing question wording, sequence, layout, familiarity with respondents, response rate, questionnaire completion time, and analysis process. The recommended sample for the piloting study is usually 10 to 30 (Luck and Rubin, 1987) members of the relevant population. The results of the pilot study conducted in the present study are presented in detail in the next chapter (chapter 5, section 5.1).

4.10. Data analysis process

Having established the research design and data collection requirements, the next step in the research design (figure 4.1) is data analysis and findings. For this purpose, the analysis of the present study is divided into two stages: preliminary data analysis and evaluation of structural model.

The first part of the analysis is related to the preliminary data analysis and presents the descriptive statistics. The results of this part provide the general picture of the respondents' information and their response to the survey instrument. In doing so, SPSS 16.0 version, which has been accredited by many scholars (e.g., Tabachnick & Fidell, 2007; Field, 2006), was used for the tasks commenced from the pilot study to the main study e.g., coding, editing, checking missing data, assumptions of normality, linearity, multicollinearity, outliers and factor analysis. The tests required to perform these sorts of the tasks are briefly presented in table 4.7 and a detailed description and the purpose of each task is given in the next chapter (sections 5.1 to 5.5.).

Pilot Study					
Required analysis	**Purpose**	**Analytical technique**	**Tool**	**Reference**	**Required value**
Coding and editing of data	To define the labels each variable and assign numbers to each of the possible responses	Variable coding	SPSS	Pallant, 2007	NA
Reliability	To ensures that measures are free from the error and therefore yields consistent results	Cronbach's α	SPSS	Cronbach, 1951	α> 0.6
		Item-to-total correlation	SPSS	Churchill, 1979	Value>0.3
Factor analysis (EFA)	To confirm that scale selected for the present study is supported by the data	Kaiser-Mayer-Olkin (KMO)	SPSS	Kaiser, 1974	Value> 0.60
		Bartlett's test of sphericity	SPSS	Bartlett, 1954	Value> 0.3
		Communality	SPSS	Hair et al., 2006	Value> 0.5
		Variance/loading	SPSS	Churchill, 1979	Value>0.4
Questionnaire length bias	To ensure that length of instrument will have no effect on respondents interest to pay less concentration to the questions in the end	Mann-Whitney-U-test	SPSS	Pallent, 2007	p>0.05 indicates no difference
Main Study					
Missing data examination	Examination of missing data and its possible treatment.	Expectation maximisation (EM) with Little's MCAR test	SPSS	Tabachnick & Fidell, 2007	p>0.05 missing patterns are completely at random
Univariate outliers	To identify a case of an extreme value on single variable	Standardised score (z-scores)	SPSS	Hair et al., 2006	Value <± 3.0
Multivariate outliers	To identify case of odd combination of extreme values in two or more than two variables	Mahalanobis D^2	SPSS	Hair et al., 2006; Tabachnick & Fidell, 2007	D^2/df< 3, or p<0.05
		Box Plot	SPSS	Hair et al., 2006;	IQR < 3.0
Univariate normality	To ensure that the data distribution of scores at an item-level is linear and normally distributed	Q-Q plot	SPSS	Field, 2009	straight line
		Kolmogorov-Smirnov and Shapiro-Wilk (K-S) test,	SPSS	Shapiro and Wilk, 1965	P>0.05

		Skewness and kurtosis	SPSS	Hair et al., 2006	Value < $\pm$ 2.58
Multivariate normality	To ensure that the data distribution of scores within combination of two or more than two items is linear and normally distributed	P-P plot,	SPSS	Pallant, 2007	straight line
		Mardia's coefficient	AMOS	Mardia, 1970	p<0.05
Homoscedasticity	To ensure the assumption of normality that the dependent variable(s) display an equal variance across the number of independent variable(s)	Levene's test	SPSS	Pallant, 2007	P<0.05
Multicollinearity	To ensure that correlation matrix of three of more independent variables should be weakly related to each (<0.90)	Pearson's correlation,	SPSS	Tabachnick & Fidell, 2007	<0.8
		VIF and Tolerance effect using linear regression	SPSS	Myer, 1997; Menard, 1995	VIF<10, and tolerance >0.1
Non-response bias	To ensure that sample represent whole data without early and late respondents inequality	Mann-Whitney-U-test	SPSS	Armstrong & Overton, 1977; Pallant, 2007	p>0.05 indicates no difference
Demographics	To examine the Background information of respondents	Mean, standard deviation, frequency, cross-tabulations	SPSS	Na	Na
Reliability and validity	Same purpose as pilot study	==	==	==	==
Factor analysis	Same purpose as pilot study	==	==	==	==
Measurement model evaluation	See: table 5.21	See: table 5.21	PLS	See: table 5.21	See: table 5.21
Structural model evaluation	See: table 5.24	See: table 5.24	PLS	See: table 5.24	See: table 5.24
Post-hoc Analysis	To ensure the validity of results obtained using component-based SEM with covariance-based SEM	See: table 5:61	AMOS	See: table 5:61	See: table 5:61

Table 4. 7: Data analysis techniques and purposes

The second part of the analysis is related to the evaluation of the structural model to examine the interrelationship between multiple independent and dependent variables related to the individual's acceptance behaviour towards the new technology (i.e., the Internet). In addition, the impact of demographic and cultural characteristics is also part of the analysis in this section. For this purpose, structural equation modelling (SEM), also known as path analysis with latent variables (Bagozzi, 1984; Bagozzi & Yi, 1988), has been employed to test the theoretical model. According to Tabachnick & Fidell (2007, p.676) SEM itself is a set of statistical techniques that facilitates the establishment/evaluation of the relationships between more than one construct simultaneously. The statistical techniques within SEM can be broadly categorised into two families: covariance-based modelling (e.g., LISREL, AMOS) and variance-based or component-based modelling (e.g., PLS) (Gefen, Straub & Boudreau, 2000). In the present study, Partial Least Squares (PLS), a component-based SEM technique, is primarily adopted to examine the paths in the structural model. Specifically, MPLS Smart Version 2.0.3 (Ringle et al., 2005) is used to analyse the data. Rationally, due to its relevance to the current study and popularity in recent research, adoption of PLS is justified. For instance, PLS in recent years is getting more interest due to its capacity for modelling latent variables under non-normalised and small number samples, for examining the measurement path and explaining the regression estimation of structural paths (Janice et al., 1996; Henseler et al., 2009).

The structural model in the present study is evaluated using a two-step approach on the hierarchal basis (Henseler et al., 2009; Chin W. Wynne., 2002). First, the measurement model is assessed by examining psychometric reliability and validity tests. Second, multiple regression technique is used to assess the structural paths (i.e., hypothetical relationships based on sign, magnitude and significance levels). The moderating impact of demographic and cultural characteristics on the proposed relationships is assessed using a multiple group analysis (MGA) technique, which is similar to the hierarchical multiple regression developed by Cohen & Cohen (1983). This study employed bootstrap method for 200 times to obtain the t-value (i.e., used for path significance between hypothetical relationships) and standard error. A detailed description of the basic concepts of SEM, types of analytical techniques using SEM, practical considerations for adopting SEM, criteria to evaluate the measurement model and structural model based on a two-step approach, and use of MGA to examine the moderation effect, are presented in chapter 5 (section 5.6). In addition, overcoming the analysis approach bias threat, post-hoc analysis using a covariance-based SEM approach with analysis of moment structure (AMOS) is also carried out in section (5.6.5).

4.11. Ethical considerations

In social and business science research, when a study aims to examine human behaviour, ethical issues are considered to be a major issue. The lack of ethical consideration prior to or during the data collection process might result in a lack of cooperation (compliance) by the respondents and prevent collection of the desired amount of data (Zikmund, 2003; Sekaran, 2000). In other words, informed consent by fulfilling ethical values is a prerequisite for all research involving identifiable subjects, except in conditions where an ethical committee judges that such consent is not possible or is not valuable to the benefit/harm of the research (Christians, 2000). According to Sekaran (2000, pp.260-261), the researcher should protect human rights by considering ethical considerations: 1) to assure respondents that their information is kept strictly confident; 2) to assure respondents that their personal information will not be solicited; 3) to assure respondents that their information will not be misrepresented or distorted during the study; 4) the researcher should clearly define the purpose of the study without any misrepresentation of the goals; 5) the researcher should never violate the self-esteem and self-respect of the respondents; and finally 6) the researcher should get consent prior to collecting the data and should not force respondents to become part of the survey.

In the present study, in addition to Sekaran's (2000) recommendations, the guidelines of the Brunel Business School ethics committee are followed when collecting the data. According to the ethical considerations provided by the Brunel Business School ethics committee, the researcher needs to create a consent form which ensures the participants that their participation in the research is voluntary and they can withdraw at any time if they feel it is necessary. In addition, through the consent form, participants were informed that they were free to decline to answer any question. Finally, participants were also ensured that their confidentiality and data privacy would be the highest priority of the researcher and secured data will be not shared/used with any other person/research. After completing all the requirements of the Brunel Business School ethics committee and creating a consent form, approval to collect the data was obtained by the researcher’s supervisor and the school ethics committee.

During the data collection process, the cover letter (which included the title of the research and requirements of the ethical consideration) was attached with each instrument. Participants were informed that completing the survey instrument and sending it back to the researcher was assumed to be their consent of participation. A copy of the cover letter is presented with the questionnaire in the appendix-B.

Conclusion

This chapter presented the perspective, approach, and particular methods taken for the present study. In this regard, the positivist perspective of information systems research is justified with a critical overview of other choices. From a methodological perspective this research is positioned in a quantitative paradigm with a survey research strategy for collecting the data. Based on six elementary steps defined by Sekaran (2000), the research process of this study includes: the purpose of the study as hypothesis testing, type of investigation as correlational, extent of the researcher within the research is minimal, setting of study is non-contrived, unit of study is individual, and time of study is cross-sectional. The target population for the present study is academics working in the higher educational institutes of Pakistan. The size of the sample has been carefully selected keeping population-to-sample rules and data analysis techniques-to-sample rules. The minimum sample size using probability random sampling method is estimated to be 373. A survey questionnaire is developed in this study following the steps of content and operational-items relevancy to the objective of the research, along with proper wording and layout management. The data collection process is based on two techniques i.e., self-administrative and e-mail questionnaire survey method. Finally, for purposes of data analysis, a brief introduction about the preliminary statistical techniques to examine the descriptive statics results, and structural equation modelling SEM with PLS to examine the structural paths is presented.

Chapter 5

Data Analysis

Introduction

The previous chapter identified the justified an appropriate research methodology. In the interest of the assessment and testing the proposed research model, this chapter deals with the group of issues that are required to be resolved after data collection process. This chapter is alienated majorly in six sections. After, introduction section (5.1) presents the pilot study results to verify the reliability and validity of the survey instrument. Based on the reliable survey instrument, section (5.2) presents the screening of the data with essential statistical techniques and their output, such as- missing data treatment, outlier examination, normality, homoscedasticity, and non-response biasness. Using screened data, section (5.3) presents the descriptive statistics of the respondents' demographic characteristics and the Internet usage conditions with experience. Section (5.4) crafts the ground for inferential analysis through partial least squares (PLS) and presents the reliability and validity of the instrument. For confirming the items relations with underlying constructs section (5.5) presents the exploratory factor analysis (EFA) for the main constructs into framework as well as moderating construct of the culture. Section (5.6) is the important section of the chapter, which is further classified into four sections. Section (5.6.1) delineates the introduction of the structural equation modelling (SEM) techniques, practical considerations and justifications to use the PLS in this study. Followed, section (5.6.2) presents the two-step process to analysis the proposed model. In first step, measurement model is validated through confirmatory factor analysis (CFA). Having established unidimensionality, validity and reliability in first step, second step presents the evaluation of the structural equation model with substantive relations in framework. To this end, the plausibility of the hypothetical relations between the constructs is set-up to examine the moderating effects. Next, section (5.6.3) starts with the brief overview of the multiple group analysis (MGA) process and steps involved to analysis the moderation effect. Given that, five demographic moderating variables, two conditional variables, and four cultural variables moderating impact is examined. For checking the goodness-of-fit of the model and reliability, section (5.6.5) presents the post-hoc or post analysis of the basic model using AMOS. Finally, summary of the chapter is presented in end.

5.1. Pilot Study

Recall, in previous chapter importance of pilot study was highlighted as an indispensable process for developing reliable instrument, which in turn achieves the intended objectives of study. In doing so, prior to collecting full scale data, a pilot study was conducted for the present study during the month of January 2009. The pilot study aimed to evaluate the important requirements during instrument purification e.g. testing questions wording, sequence, layout, familiarity with respondents, response rate, questionnaire completion time and analysis process (Ticehurst and Veal, 2005). Additionally, it aimed to evaluate the level of content validity and reliability to ensure that the instructions, questions and scale of questions were clear to understand (Sekaran, 2000; Zikmud, 2000). Before, distribution of the instrument, questions wording, sequence and layout which all together establish 'face validity' criterion were tested by sending few survey instruments (via email) to the faculty members working in higher educational institutes of the Pakistan. As the questions within instrument were widely used in IT acceptance literature, therefore very little corrections were suggested by respondents, and ensured the accuracy of face validity.

The pilot test of the instrument was conducted by distributing 45 instruments via-email attachment to the randomly selected academics within higher educational institutes of the Pakistan. The respondents included into pilot study were not invited to participate in the final study. This is because it may influence the later behaviour of the respondents if they have already been involved in the pilot study (Haralambos and Holborn, 2000). For the piloting, selecting small sample size is in accordance to the guidelines in literature which suggested the pilot study sample size to be generally small i.e. up to 100 respondents (Diamantopoulos & Siguaw, 2000) or between 10 to 30 (Luck and Rubin, 1987). By the cut off date, 39 survey instruments were collected, out of which 3 were excluded due to large number of missing data. As result, response rate of the pilot study was 80%. The pilot test revealed that on average, respondents took about 15 to 20 minutes to complete the survey instrument.

In purification process of the instrument, next stage after content validity is reliability (i.e. Cronbach's α) of the instrument which ensures that 'measures are free from the error and therefore yields consistent results' (Peter, 1979, p.6.). In addition, exploratory factor analysis (EFA) was run to confirm that scale selected for the present study is supported by the data. The detailed discussion (literature, justification to use in present study, and criterion values) about the reliability and validity, and EFA is presented in section (5.4 and 5.5) respectively. The overall reliability of the instrument within piloting was α=0.800 or 80% which is above than the recommended threshold 0.7 (Nunnally and Bernstein, 1994). The individual construct reliability ranges from 0.626 to 0.875 (see table 5.1). The only construct which produced lower reliability than the cut off value was self-efficacy (i.e. 0.57). However, after examining each question in construct SE it was noticed that question SE6 'I could complete my tasks using the Internet if I had enough time provided to use it' produced lower item-to-total correlation (i.e. 0.12) than cut off value 0.30 (Churchill, 1979). After deleting SE6 the reliability α for the remaining five questions combined together in SE was 0.62 which was in acceptable range (Cronbach, 1951). The results of EFA revealed that Kaiser-Mayer-Olkin (KMO) statistics which is measurement of sampling adequacy was higher than minimum recommended value of 0.60(Kaiser, 1974) for most of the constructs. In addition, significance of Bartlett's test of sphericity in all the constructs indicates that the correlation among the measurement items was higher than 0.3 and were suitable for EFA (Hair et al., 2006). The total variance extracted by the questions within construct were higher than 0.60 (Hair et al., 2006) expect PU, PEOU, BI and IS. However, factor loading revealed that all the items in these constructs were loaded above 0.5, therefore they were retained (Hair et al., 2006) for more analysis (i.e. after full-scale data collection process) (see details in table 5.1).

Factor	No. of Items	Cronbanch α	EFA No. of factor	KMO	Bartlett's test Sphericity	Variance Explained
Perceived Usefulness (PU)	5	0.811	1	0.717	0.000	58.833%
Perceived Ease of Use (PEOU)	4	0.709	1	0.646	0.000	56.681%
Peer Influence (PI)	4	0.805	1	0.761	0.000	63.282%
Superior Influence (SI)	2	0.601	1	0.589	0.015	63.73%
Self Efficacy (SE)	6	0.576	2	0.530	0.000	83.186%
Self Efficacy (SE)*	5	0.626	2	0.521	0.000	76.654%
Technology Facilitation (TF)	4	0.829	1	0.756	0.000	66.710%
Resource Facilitation (RF)	5	0.601	1	0.610	0.000	63.020%
Academic Tasks (AT)	6	0.794	1	0.661	0.000	72.115%
Non-Academic Tasks (NAT)	4	0.875	1	0.793	0.000	73.116%
Behavioural Intention	4	0.662	1	0.636	0.000	51.371%

(BI)						
Behaviour Usage (BU)	4	0.793	1	0.729	0.000	62.764%
Power Distance (PD)	6	0.719	1	0.691	0.000	80.676
Individualism/Collectivism (IC)	6	0.753	1	0.581	0.000	64.49%
Uncertainty Avoidance (UA)	4	0.771	1	0.551	0.000	69.024%
Masculinity/femininity (MF)	5	0.655	1	0.602	0.000	70.406%
Government support (GS)	5	0.723	1	0.637	0.000	69.269%
Institute Support (IS)	5	0.743	1	0.696	0.000	52.153%

Table 5.1: Measurement of sampling adequacy and total variance

* SE: after deleting one item SE6

Recall, within instrument design (section 4.6) it was discussed that length of instrument might decrease respondents interest to pay equal concentration to the questions in the start of the instrument compared to the question in the end of instrument. It was suggested to examine the difference during pilot study and if difference is observed than different versions of instrument would be used for full-scale data collection process. In this regard, the chances of potential differences were computed by using Mann-Whitney-U-test between first-five questions (i.e. PU1 to PU5) and last-five questions (i.e. IS1 to IS5) with categorical variable gender (male/female). The results presented in table 5.2 revealed that significant value in all ten variables were higher than 0.5 probability value and suggest no difference between male and female respondents in all these questions (Pallent, 2007). Closely comparing Z score of PU with IS questions it is noticed that none of construct is totally higher than other (e.g. PU1>IS1, PU2>IS2 and so on), therefore, it can be infer that respondents didn't felt difficulty with respect to the length of the instrument. Based on piloting study result the normal layout of the instrument (Appendix-B) was retained for collecting full scale data.

	PU1_1	**PU2_1**	**PU3_1**	**PU4_1**	**PU5_1**
Mann-Whitney U	136.000	150.000	128.000	146.000	132.500
Wilcoxon W	346.000	286.000	338.000	282.000	342.500
Z	-.852	-.343	-1.177	-.483	-.941
Asymp. Sig. (2-tailed)	.394	.731	.239	.629	.347
	IS1_1	**IS2_1**	**IS3_1**	**IS4_1**	**IS5_1**
Mann-Whitney U	142.000	138.000	108.500	131.500	154.500
Wilcoxon W	278.000	274.000	244.500	267.500	290.500
Z	-.648	-.745	-1.709	-.983	-.190
Asymp. Sig. (2-tailed)	.517	.456	.087	.325	.850

Grouping Variable: D1 (Male/Female)

Table 5. 2: Mann-Whitney-U-test to observe difference between first-five and last-five questions within instrument.

5.2. Main Survey Study

5.2.1. Missing Data and Treatment

Most of the studies in social science and marketing research are based on survey questionnaire (Sekaran, 2000). Additionally, it is very rare to obtain the complete data when survey is administrated manually (Zikumnd, 2003). According to the Tabachnick & Fidell (2007) missing data is one of the most common problems in data analysis process. Specifically, within survey research problem of missing data (incomplete data) arises due to the conditions when respondents in targeted sample fail to answer one and/or more items in instrument. Missing data causes many problems in statistical analysis procedures. For instance, reducing sample size because of missing data reduces statistical power, which implies that, estimations calculated can be biased to generalise (Corderio et al., 2010). Similar problems of missing data within multivariate analysis are also warned by Hair et al., (2006) who state that- from the practical perspective: if solutions of missing data are not applied properly than the observations having missing values are excluded, consequently, reduction in sample produces inadequate sample for complete analysis; from the substantive perspective: empirical results obtained through data containing non-random missing data could be biased and leads to erroneous results.

Overcoming the above sever problems of missing data, Hair et al., (2006) prescribed four steps to follow- 1) examine the type of missing data, 2) examine the extent of missing data, 3) examine the randomness of missing data, and finally 4) apply the remedies e.g. imputation method. Whereas, type of the missing data are classified into two groups as- ‘ignorable and not-ignorable’. Furthermore, author (ibid) suggest that ignorable type of missing data can be part of research survey instrument and does not require any remedy to treat it. On other side, not-ignorable missing data is type of data which is result of either researcher’s procedural factors e.g. errors during data entry process or failure to enter all the entries, or even might be result of refusal by respondents to answer some items within survey instrument(ibid).

In the current study, researcher did not include any item in survey instrument which required to be un-answered by the respondents, hence, there was no chance of ignorable missing data occurrences. However, there were chances of the not-ignorable missing due to reasons described earlier. For the treatment of the not-ignorable missing data Hair et al.,

(2006) suggested to identify the patterns of missing data at first, and then the extent to which missing data is present in each individual variable(s), individual case(s), and even for overall dataset. From the importance of the patterns and extent of missing data occurrences Tabachnick and Fidell (2007) emphasised more over the patterns compared to the extent. There can be three patterns where missing data can be possible- missing completely at random (MCAR), missing at random also known ignorable (MAR), and missing not at random or not-ignorable (MNAR) (Tabachnick and Fidell, 2007; Hair et al., 2006). Tabachnick and Fidell (2007) pointed out that treating MNAR could yield biased results, whereas MCAR can be treated with any mechanism and results would be acceptable to generalise.

In the current study, for ascertaining the patterns and extent (frequency) of missing data within each item and variable (comprises more than one items to measure same concept) researcher used SPSS v. 16.0 missing value analysis (MVA) procedure. The results of expectation maximisation (EM) technique revealed that Little's MCAR test was insignificant at each item level (i.e. Chi-Square = 3301.523, DF = 2178, Sig. = .230) as well as at variable level (i.e., Chi-Square = 504.540, DF = 289, Sig. = .210). The statistically insignificant result of Little's MCAR result indicates that patterns of missing values were completely at random (cf. Tabachnick & Fidell, 2007).

The extent to which missing data was present in study was ranging from 0.3 to 1.1 in individual item-level, and was 0.3 to 1.6 at construct-level (see table A-1&2 in appendix-A). The extent to which missing data can be affordable in data set is remained debateable. For example, Hair et al., (2006) suggested that within random patterns missing data fewer than 10% level can be generally ignored but higher than 20% to 30% levels often requires to be remedied. Similar recommendation were second by Tabachnick and Fidell (2007) who posit that extent of missing data 5% or fewer in random patterns is considered mild and almost every remedy to treat yields similar results. Also, Cohen and Cohen (1983) suggested that missing data 5% or even 10% on specific item is not large enough. Therefore, based over the agreed point of the researchers (i.e. Hair et al., 2006; Tabachnick and Fidell, 2007; Cohen and Cohen, 1983) and lower presence of missing data percentage in current study it can be ignored/treated with any available imputation method. Out of several imputation methods defined by Hair et al., (2006) e.g. hot or cold deck imputation, case substitution, mean substitution and regression imputation, researcher in the current study applied mean substitution method. The rationales behind this approach were that it is most widely used/accepted method for both MCAR and normally distributed data (c.f.

Cordeiro et al. 2010), also, calculated mean through this method can be best single replacement for any missing value (Hair et al., 2006). The table A-1 in appendix-A presents the frequency and percentage of missing data replaced with mean imputation.

5.2.2. Outliers Examination

According to Tabachnick and Fidell (2006, p. 72) an outlier is defined as 'a case with such an extreme value on one variable (a univariate outlier) or such a strange combination of scores on two or more variable (multivariable outlier)'. It is observation(s) which is distinct from other observations due to high or low scores (Hair et al., 2006). Researchers agreed that outliers can result in non-normality of data and distorted statistical results (Kline, 2005; Hair et al., 2006; Tabachnick & Fidell, 2007). Tabachnick & Fidell (2007, p. 73) defined four reasons for outliers' presences within dataset, due to: 1) incorrect data entry, 2) failure of specifying codes for missing values which might be treated as real data, 3) entering observation which is not part of population from which sample is extracted, and 4) including observation from population but the distribution for the variable in the population has extreme values than the normal distribution. Kline (2005) categorised two types of outliers: univariate outliers- a case of an extreme value on single variable, and multivariate outlier- case of odd combination of extreme values in two or more than two variables. The issue of 'extreme values' and their tolerance are not explicitly characterised in literature. However, there are some widely accepted rules of thumb which suggest that within univariate outliers a case is outlier if: 1) standard score for small sample size (80 or fewer) is $\pm$ 2.5 or beyond, while for large sample size standard score can be considered up to 4, 2) value more than $\pm$ 3.0 standard deviations away from the mean is regarded as an outlier (Hair et al., 2006. p.75).

In the current study, for detecting the univariate outliers items were grouped together to represent single variable. Using SPSS function of descriptive statistics, the data values of each observation were converted to standardised score also known as z-scores (Hair et al., 2006; Tabachnick & Fidell, 2007). The results indicate that data set contains fewer univariate outliers (see table 5.3).

S.NO	Variable	Case of outlier	standardised values i.e. z-scores >$\pm$ 3.0
1	NAT	103	-3.64489
		57	-3.64489
		124	-3.64489
		115	-3.43909
		344	-3.23328
2	BI	No Case	---
3	BU	312	-3.55219
		430	-3.28631

		355	-3.02044
4	**GS**	No Case	---
5	**TS**	No Case	---
6	**VOL**	No Case	---
7	**PU**	449	-4.41476
8	**PEOU**	No Case	---
9	**SN**	No Case	---
10	**SE**	No Case	---
11	**TF**	58	-4.2893
		409	-3.50643
12	**RF**	No Case	---
13	**AT**	274	-3.41418
14	**PD**	No Case	---
15	**IC**	No Case	---
16	**UA**	No Case	---
17	**MF**	No Case	---

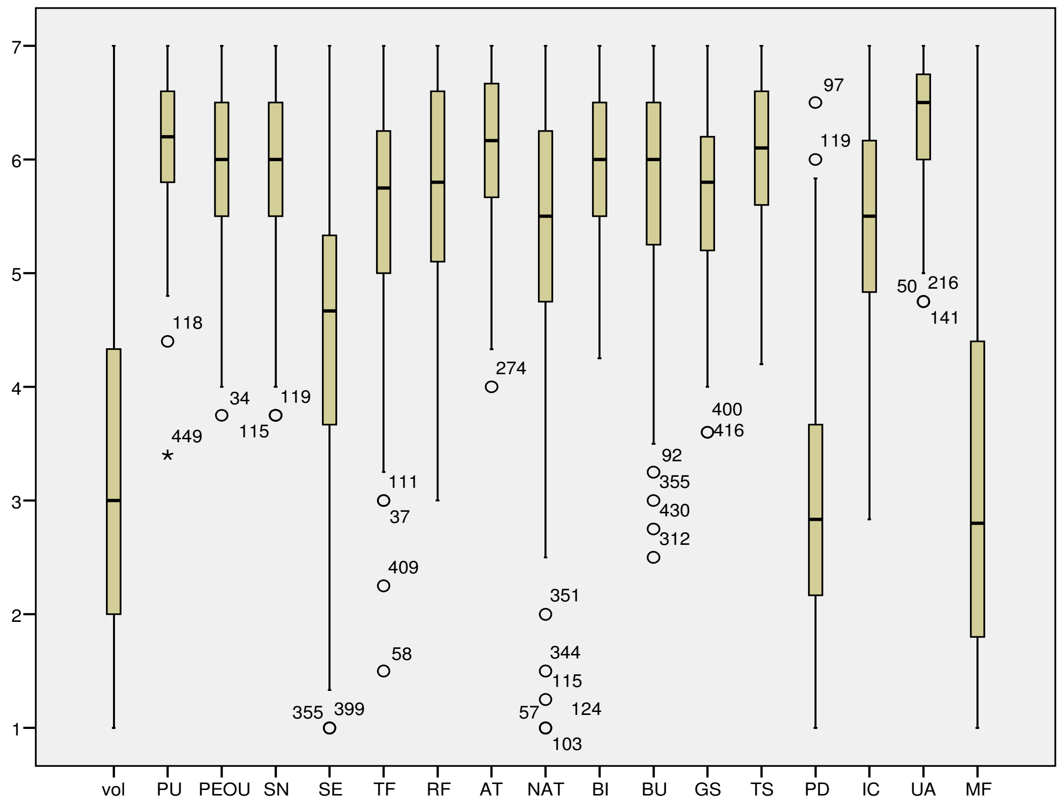
Table 5. 3: Univariate outliers

Multivariate outliers were detected by using Mahalanobis D^2 measure, also considered as multidimensional version of z-score (Hair et al., 2006; Tabachnick & Fidell, 2007). This method helped to measure each observations distance in multidimensional space from the mean of centre of all observations and provides a single value (Hair et al., 2006, p.75). According to Hair et al., (2006, p.75) if case D^2/df exceeds value 2.5 in small sample and 3 or 4 in large sample it is considered to be possible outliers. Additionally, a conservative statistical test of significance i.e. $p < 0.001$ or $p < 0.005$ is used with Mahalanobis distance measure, where larger the D^2 value for a case results smaller corresponding probability value, likely to be considered an outlier (Hair et al., 2006; Tabachnick & Fidell, 2007).

In the current study, liner regression method was applied to calculate the Mahalanobis D^2 value. For obtaining t-value of significance, function of SPSS V.16 "1-CDF.CHISQ(quant, df)" was applied, where quant = D^2 and df=13. The function returned, cumulative probability that a value from the chi-square distribution i.e. D^2 with degree of freedom less than the quant. Table 5.4 indicates that there were only seven observations of extreme outliers in sample of 380 (i.e. $p < 0.005$). Using Box Plot researcher also applied graphical method for detecting multivariate outliers. Figure 5.1 indicates that twenty eight observations were found as mild-outlier outlier (i.e. inter quartile range (IQR)> 1.5) and only one case was found extreme outlier (i.e. IQR > 3.0). According to Hair et al., (2006) outliers can be retained until and unless there is proof that outliers are truly deviated and are not signifying any observation in dataset. Even though, if outliers are found to be problematic they still can be accommodated in way that will not seriously distort the results (Tabachnick & Fidell, 2007). Therefore, observing outliers identified in table 5.3(univariate) and table 5.4 (multivariate) researcher decided to retained the observations having outliers for the next stage.

Count	Case of outlier	Mahalanobis D^2	D^2/df^a	p-value
1	45	39.55411	3.042624	0.001
2	58	39.18391	3.014147	0.001
3	119	37.77895	2.906073	0.002
4	103	36.9108	2.839292	0.002
5	124	36.60731	2.815947	0.002
6	449	35.17911	2.706085	0.004
7	121	31.01704	2.385926	0.013
$a_{df=13}$				

Table 5. 4: Multivariate Outlier detection



Circle= represents Mild-Outliers score which is more than 1.5IQR from the rest of the score
Star= represents Extreme-Outliers score which is more than 3IQR from the rest of the score

Figure 5. 1: Box-Plot representing multivariate outliers

5.2.3. Normality, Homoscedasticity and Non-Response Bias of data

5.2.3.1. Normality

The normality is considered to be fundamental assumption in multivariate analysis (Hair et al., 2006; Kline, 2005; Tabachnick & Fidell, 2007). Normality is characterised by the assumption that the data distribution in each item and in all linear combination of items is normally distributed (Hair et al., 2006; Tabachnick & Fidell, 2007). According to the Hair et al., (2006, p. 79) ‘if the variation from the normal distribution is sufficiently large, all resulting statistical test are invalid, because normality is required to use the F and t statistics’. Furthermore, author state that violation of normality within multivariate analysis can cause underestimation of fit indices and standardised residuals of estimations (ibid). The assumptions of normality can be examined at unvariate level (i.e. distribution of scores at an item-level) and at multivariate level (i.e. distribution of scores within combination of two or more than two items). According to Hair et al., (2006, p. 80) if the variable/items satisfies the multivariate normality than it also satisfy the univariate normality, while reverse is not necessarily true. In other words, existence of univariate normality does not guarantee the assumption of multivariate normality.

Assessing the severity of nonnormality is based on two assumptions- 1) the shape of offending distribution, and 2) the sample size (Hair et al., 2006, p.80). According to (Tabachnick & Fidell, 2007, p. 79) shape of normal distribution can be ascertained by either graphical or statistical methods. Within graphical method of examination, normality is checked by inspecting the histogram of variable, which requires being symmetrical, bell-shaped curve and has higher frequency of scores in middle and lower on peaks (Pallant, 2007, p. 124). Another graphical method for assessing normality, also considered to be an easier method compared to the others is Q-Q plot (also know normal probability plot) (Norusis, 1992). The Q-Q plot, displays graph between observed values and expected values. Within Q-Q plot if the points within graph are clustered around a straight line than it represents variable is normally distributed (Field, 2009).

Through visual inspection in figure A-1(appendix-A) the distribution of values in the current study shown that all variables were clustered around the straight line, therefore, observation within sample does not require any adjustment through transformation process. Furthermore, the normal probability plot (P-P plot of the regression standardised residual) employed to assess multivariate normality were also noticed normal (see figure 5.2). In addition, Kolmogorov-Smirnov and Shapiro-Wilk (K-S) statistics (Shapiro and Wilk, 1965) were calculated for each variable (see table 5.5) and results revealed that all the variables were significant, which violated the assumption of normality. The significance of K-S test was expected due to large sample size (Pallant, 2007, p. 62). According to the Field (2006, p.93) the significance of K-S test for large sample size cannot be considered as deviation of data from normal distribution.

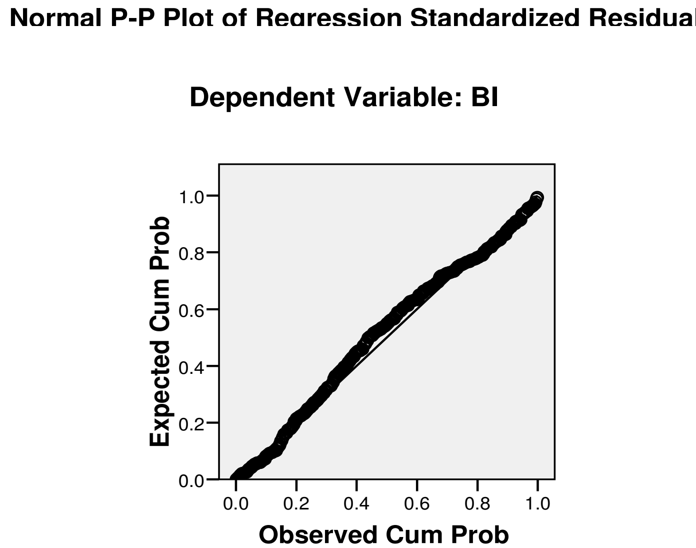


Figure 5. 2: Multivariate normal P-P plot of regression standardised residual

	Kolmogorov-Smirnov(a)			Shapiro-Wilk		
	Statistic	**df(b)**	**Sig.**	**Statistic**	**df**	**Sig.**
Vol	0.145	380	0.000	0.948	380	0.000
PU	0.100	380	0.000	0.947	380	0.000
PEOU	0.115	380	0.000	0.952	380	0.000
SN	0.128	380	0.000	0.959	380	0.000
SE	0.063	380	0.001	0.985	380	0.000
TF	0.132	380	0.000	0.945	380	0.000
RF	0.110	380	0.000	0.942	380	0.000
AT	0.113	380	0.000	0.954	380	0.000
NAT	0.105	380	0.000	0.927	380	0.000
BI	0.112	380	0.000	0.950	380	0.000
BU	0.162	380	0.000	0.925	380	0.000
GS	0.073	380	0.000	0.977	380	0.000
TS	0.111	380	0.000	0.953	380	0.000
PD	0.110	380	0.000	0.967	380	0.000
IC	0.081	380	0.000	0.973	380	0.000
UA	0.144	380	0.000	0.918	380	0.000

a. Lilliefors Significance Correction
b. Degree of freedom

Table 5. 5: K-S Test of Normality

The other method used to identify the shape of distribution is skewness and kurtosis (Pallant, 2007). Whereas, skewness portrays the symmetry of distribution and kurtosis refers to the 'peakedness' or the 'flatness' of distribution compared to the normal distribution (Field, 2006; Hair et al., 2006). According to the Hair et al., (2006, p.80) positive skewness denotes distribution shifted to the left and tails off to the right; whereas negative skewed distribution is reversed. For the normal distribution, the value of skewness is recommended to be zero which represents symmetric shape (Curran et al., 2006). The kurtosis, where the distribution is taller or more peaked than the normal is termed 'leptokurtic', and the distribution that is flat is termed 'platykurtick' (Hair et al., 2006, p. 80). Additionally, the negative kurtosis value indicates a flatter distribution, while a positive value indicates peaked distribution. The kurtosis values less than ± 1 are considered negligible, and values from ± 1 to ± 10 are indicated moderate non-normality, while greater than ± 10 are indication of severe non-normality (Holmes-Smith, Cunningham & Coote, 2006).

In this study, as presented in table 5.6 all the variables were within the normal range of skewness and kurtosis(i.e. < ± 2.58, c.f. Hair et al., 2006, p.82). However, the score presented in table 5.6 have both positive and negative skewness and kurtosis values. According to Pallant (2007, p. 56) negative or positive skewness and kurtosis does not represents any problem until and unless they are within normal range. Also, negative or positive values of skewness and kurtosis reflect the underlying nature of the construct being measured. For example, in this study, the negative skewed score of construct perceived usefulness represents that individuals within sample are agreed more than disagreed towards the acceptance due to usefulness.

The severity of normality is also based over the sample size (Hair et al., 2006). The larger sample size reduces the negative effects of non-normality (Hair et al., 2006; Pallant, 2007). Moreover, small sample size (fewer than 50 cases) represents serious effect on normality compared to the large sample size (more than 200 cases). In the current study, workable sample size is 380; therefore, presence of little non-normal univariate distribution may be avoidable.

For the test of multivariate normality, Mardia's coefficient was used (Brwon, 1982). Mardia's (1970) coefficient of multivariate normality was computed by AMOS (Arbuckle, 2006) (see table A-3 in appendix-A), which indicates that the assumption of multivariate normality was not tenable (Mardia's coefficient = 228.527, CR = 39.88). The table A-4 appendix-A, represents the observations farthest from the centroid (Mahalanobis distance) and displays potential multivariate outliers which resulted non-normality within sample.

	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**	**Skewness**		**Kurtosis**	
	Statistic	**Statistic**	**Statistic**	**Statistic**	**Statistic**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
vol	380	1.00	7.00	3.1897	1.51255	0.516	0.125	-0.628	0.250
PU	380	3.40	7.00	6.1463	0.62208	-0.433	0.125	0.022	0.250
PEOU	380	3.75	7.00	5.9480	0.73350	-0.319	0.125	-0.611	0.250
SN	380	3.75	7.00	5.9007	0.72609	-0.502	0.125	-0.234	0.250
SE	380	1.00	7.00	4.5561	1.24208	-0.141	0.125	-0.153	0.250

TF	380	1.50	7.00	5.6092	0.95801	-0.772	0.125	0.788	0.250
RF	380	3.00	7.00	5.7428	0.95392	-0.679	0.125	-0.179	0.250
AT	380	4.00	7.00	6.1321	0.62448	-0.448	0.125	-0.405	0.250
NAT	380	1.00	7.00	5.4276	1.21475	-0.975	0.125	1.124	0.250
BI	380	4.25	7.00	6.0132	0.69665	-0.396	0.125	-0.688	0.250
BU	380	2.50	7.00	5.8401	0.94030	-0.843	0.125	0.357	0.250
GS	380	3.60	7.00	5.7359	0.73117	-0.244	0.125	-0.219	0.250
TS	380	4.20	7.00	6.1163	0.62831	-0.419	0.125	-0.479	0.250
PD	380	1.00	6.50	2.9868	1.05344	0.568	0.125	-0.037	0.250
IC	380	2.83	7.00	5.4097	0.95252	-0.437	0.125	-0.177	0.250
UA	380	4.75	7.00	6.3513	0.54507	-0.546	0.125	-0.455	0.250
MF	380	1.00	7.00	3.1506	1.66060	0.532	0.125	-0.788	0.250
Valid N (listwise) 380									

Table 5. 6: The shape of data distribution based on Skewness and Kurtosis values

5.2.3.2. Homoscedasticity

According to Hair et al., (2006, p.83) homoscedasticity is the assumption of normality related with the supposition that dependent variable(s) display an equal variance across the number of independent variable(s). Whereas, Tabachnick and Fidell (2007, p.85) defined homoscedasticity as variability in scores for one variable roughly same to the values of all other variables. The assumption of equal variation between variables is pre-requisite in multiple regressions (Field, 2006). Within multivariate analysis, the failure of homoscedasticity is also known hetroscedasticity and can create serious problem (Hair et al., 2006). Hetroscedasticity is caused either by presence of nonnormality or higher error of measurement at some level in independent variable(s) (Hair et al., 2006; Tabachnick & Fidell, 2007). In analysis, where data are grouped, homoscedasticity is known as homogeneity of variance (Tabachnick & Fidell, 2007, p.86). The most common method for assessing the homoscedasticity is Levene's test of equal variance (Hair et al., 2006; Field, 2006; Pallant, 2007).

In this study, Levene's test for the metric variables was computed across non-metric variable (gender) as part of t-test. Most of the obtained scores (see table 5.7) except PU, PEOU, NAT, PD and MF, were higher than the minimum significant value i.e. $p<0.05$, which suggest that variance for all the variables was equal within groups of male and female and had not violated the assumption of homogeneity of variance. Similar to the Kolmogorov-Smirnov and Shapiro-Wilk test, Levene's test is also considered to be sensitive with respect to the sample size and can be significant for large sample (Field, 2006, p.98). Therefore, for the current study which has sample of 380, significance of few constructs in Levene's test does not represent the presence of substantial non-normality within sample.

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
vol	0.581	1	378	0.447
PU	4.347	1	378	0.038
PEOU	4.117	1	378	0.043
SN	2.760	1	378	0.097
SE	0.857	1	378	0.355
TF	0.960	1	378	0.328
RF	3.228	1	378	0.073
AT	0.677	1	378	0.411
NAT	4.230	1	378	0.040
BI	2.404	1	378	0.122
GS	0.377	1	378	0.540
TS	0.513	1	378	0.474
PD	4.463	1	378	0.035
IC	3.306	1	378	0.070
UA	0.233	1	378	0.630
MF	7.041	1	378	0.008
BU	0.536	1	378	0.464

Table 5. 7: Leven's test of homogeneity of variances

5.2.3.3. Multicollinearity

Multicollinearity is the problem related to the correlation matrix in which three or more independent variables are highly correlated (say, .90 or above) to each other (Tabachnick & Fidell, 2007; Hair et al., 2006). The presences of higher level of multicollinearity results in lower of the unique variance explained by each independent variable (β-value) and increase the shared prediction percentage (Hair et al., 2006, p.186). In other words, the presence of multicollinearity limits the size of regression (R) value and makes it difficult to understand the contribution of each individual independent variable (Field, 2006). For increasing the prediction, it is suggested to inspect the highly correlated variables and delete one of them (Hair et al., 2006, Tabachnick & Fidell, 2007).

From the several method of detecting severity of multicollinearity, two are very common: inspecting the bivariate and multivariate correlation matrix, and calculating the variance inflation factors (VIF) and tolerance impact (Pallant, 2007; Tabachnick & Fidell, 2007; Temme et al., 2010). According to the Pallant (2007, p.156) the tolerance effect indicates the variability specified by independent variable is unique (not explained by any other independent variable), whereas VIF is the inverse of tolerance effect. The larger VIF (say, above 10) and lower tolerance (say, below 0.1) indicates the presence of mulitcollinearity (Myer, 1997; Menard, 1995; Pallant, 2007).

In the current study, bivariate correlation matrix was computed using Pearson's correlation. The results of correlation matrix presented in table 5.8 revealed that none of the bivariate correlation was above than 0.8 for independent variables. The VIF and tolerance effect were computed using multiple regression procedure with collinearity diagnostic option. The results presented in table 5.9 revealed that larges VIF vale was 0.961 which suggest absence of multicollieairty within independent variables; however, the tolerance effect in one independent variables was lower than the 0.1 and presents the possibility of mulitcollinearity. The strategy for dealing multicollieairity is to delete the redundant variable (Tabachnick & Fidell, 2007). However, instead of deleting the variable at this stage, variables were retained for the further examination of collinearities using factor analysis with principle component analysis method.

	Vol	PU	PEOU	SN	SE	TF	RF	AT	NAT	BI	BU	GS	TS	PD	IC	UA	MF
vol	1																
PU	0.036	1															
PEOU	0.065	.388(**)	1														
SN	0.067	.307(**)	.162(**)	1													
SE	0.045	-0.013	-.113(*)	.175(**)	1												
TF	0.033	.157(**)	.175(**)	.148(**)	-0.047	1											
RF	0.005	.149(**)	.125(*)	.155(**)	0.078	.272(**)	1										
AT	-0.024	0.068	.156(**)	.134(**)	-0.002	.192(**)	.177(**)	1									
NAT	0.054	.110(*)	.141(**)	.126(*)	-0.006	.219(**)	0.095	.244(**)	1								
BI	-0.075	.396(**)	.219(**)	.191(**)	0.069	.115(*)	.263(**)	.288(**)	.118(*)	1							
BU	-0.031	.168(**)	.118(*)	0.058	-0.002	.182(**)	.101(*)	0.073	0.094	.242(**)	1						
GS	-0.031	.250(**)	.192(**)	.228(**)	-0.001	.151(**)	.193(**)	.174(**)	.202(**)	.198(**)	0.084	1					
TS	-.192(**)	.287(**)	.189(**)	0.060	-0.085	.194(**)	.165(**)	.165(**)	.109(*)	.217(**)	.243(**)	.163(**)	1				
PD	.111(*)	-0.016	-0.066	-0.060	.215(**)	-0.029	.138(**)	0.000	-0.075	0.045	-0.026	0.082	-0.061	1			
IC	-0.021	.139(**)	0.084	0.097	.169(**)	0.064	-0.083	0.060	0.036	.101(*)	.132(*)	0.080	0.098	-0.037	1		
UA	-0.072	.139(**)	.127(*)	.263(**)	0.002	.191(**)	.213(**)	.216(**)	.120(*)	.233(**)	.151(**)	.183(**)	.199(**)	-0.086	.242(**)	1	
MF	-0.070	-0.054	-.116(*)	0.034	0.014	-0.100	-0.022	0.001	-0.062	0.049	0.025	.127(*)	-0.039	.165(**)	-0.059	-.122(*)	1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5. 8: Pearson correlation for observing multicollinearity

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta	Tolerance	VIF	B	Std. Error
(Constant)	.049	.572		.086	.931		
Vol	-.033	.021	-.071	-1.549	.122	.915	1.093
PU	.353	.058	.315	6.081	.000	.715	1.398
PEOU	.040	.047	.042	.853	.394	.788	1.270
SN	.002	.048	.002	.049	.961	.775	1.290
SE	.034	.027	.060	1.258	.209	.852	1.174
TF	-.042	.035	-.058	-1.201	.230	.824	1.213
RF	.105	.036	.144	2.955	.003	.810	1.235
AT	.231	.053	.207	4.375	.000	.860	1.163
NAT	.004	.027	.007	.153	.879	.871	1.148
BU	.105	.034	.142	3.065	.002	.895	1.118
GS	.009	.046	.010	.205	.838	.815	1.226
TS	.012	.055	.011	.217	.828	.788	1.269
PD	.019	.031	.028	.600	.549	.864	1.157
IC	.004	.035	.006	.118	.906	.858	1.166
UA	.123	.064	.096	1.933	.054	.777	1.286
MF	.028	.019	.066	1.421	.156	.899	1.113
a Dependent Variable: BI							

Table 5. 9: Regression for observing VIF and tolerance effect

5.2.3.4. Non- Response Biasness

One of the important aspects during the data collection procedure is to ensure that sample collected represents complete population. The unexpected refusal to respond or ineligibility to respond might reduces the sample size, which in turn distorts the validity of sample to represent the overall population. According to Saunders et al., (2007) when sample does not represent whole data than results obtained from the collected data are considered biased. The existence of effective response rate provides confidence that response bias is not a major problem (Weiss & Heide, 1993). The problem of non-response biasness is common in survey research, which occurs when respondents differ in meaningful way from non-respondents (Armstrong & Overton, 1977; Churchill, 1979).

In this study, the chances of any potential non-response biasness were computed by assessing the difference through Mann-Whitney-U-test between early and late respondents (see table 5.10) with respect to the means of all the variables (Armstrong & Overton, 1977; Lambert & Harrington, 1990; Weiss & Heide, 1993). According to proportion of approximated the actual way in which survey questionnaires were returned, first 50 observations were taken as early respondents and last 50 were taken as late respondents. The results presented in table 5.10 shows that significance value in any variable is not less than or equal to 0.5 probability value (i.e. insignificant), therefore, there is no statistically significant difference between early and late respondents. Thus, non-response bias is not a concern in the present study.

	PU	PEOU	SN	SE	TF	RF	AT	NAT
Mann-Whitney U	1,142.000	1,130.000	1,040.000	1,067.500	1,028.000	1,137.000	1,299.000	1,196.000
Wilcoxon W	2,417.000	2,321.000	2,315.000	2,342.500	2,303.000	2,599.000	2,582.000	2,471.000
Z	-0.749	-0.116	-1.459	-1.263	-1.542	-1.255	-0.237	-0.374
Asymp. Sig. (2-tailed)	0.454	0.434	0.145	0.207	0.123	0.224	0.811	0.708
	BI	**BU**	**GS**	**TS**	**PD**	**IC**	**UA**	**MF**
Mann-Whitney U	1,360.500	1,161.000	1,022.500	1,010.000	1,600.500	1,033.000	1,162.000	1,09.000
Wilcoxon W	2,669.500	2,436.000	2,297.500	2,285.000	2,336.500	2,308.000	2,437.000	2,351.000
Z	-0.123	-0.619	-1.575	-1.666	-0.188	-1.499	-0.615	-0.331
Asymp. Sig. (2-tailed)	0.634	0.536	0.115	0.096	0.401	0.134	0.539	0.680
Grouping variable: Respondent (1=early, 2=late)								

Table 5. 10: Mann-Whitney-U-test observing non-response biasness

5.3. Demographic details of the Respondents

5.3.1. Background Information

The full scale data was collected during February 2009 to May 2009. Total, 935 survey questionnaires were distributed into 25 public and private higher educational institutes of the Pakistan. The details of sample selection covering overall population are discussed into chapter 4 section 4.5. Table A-5 in appendix-A represents the details of the survey questionnaire distributed and returned from the selected universities. Out of 935 distributed questionnaires returned rate was 53.9% (n=504), from which 13.26% (n=124) questionnaires were discarded due to uncompleted sections and having large number of missing data. Finally, 40.6% (n=380) sample was selected for the final analysis. According to the study requirement (see chapter 4, section 4.5) which requires sample size at least 373 based on Krejcie and Morgan (1970) criterion and at least 300 based on the requirement of the analysis using structural equation modelling (SEM) (e.g. Hair et al., 2006; Tabachnick & Fidell, 2007; Roscoe, 1975; Bentler and Chou, 1987; Loehlin, 1992), this study has successfully achieved required number of the sample.

The demographic details of the respondents are presented in table 5.11. Researcher in this study was intended to overcome the problem of gender biasness, therefore, questionnaires were collected in way that equal number of male and female respondents can participate i.e., 50% (n=190). The largest age groups were between age 20-29 years (40%, n=152) followed by 30-39 years (36.1%, n=137), and lowest one was age 50 years and beyond (9.7%, n=37). From the academic position perspective, highest response rate was observed within lecturers (53.7%, n=204) and lowest was within professors (4.7%, n=18). The largest groups within the category of academic's experience were observed between experience 1-5 years (34.5%, n=131) followed by 6-10 years (27.9%, n=106). The lowest group in academic experience consisted those who were having experience of 20 years and above (8.4%, n=32). The category educational level revealed that most of the respondents were having masters degree (76.3%, n=290) and fewer were having bachelor degree (10.3%, n=39). The number of respondents within public and private universities was nearly same, i.e. 54.5% (n=207) and 45.5% (n=173) respectively. Despite the importance of province was not core objective in this study, researcher has collected data from all the regions of the country to cover the overall targeted population. The largest response rate was achieved from province Sindh (70.5%, n=268) and lowest was achieved from province Baluchistan (2.6%, n=10).

	Group	Frequency	Percent
Gender	1 Male	190	50.0
	2 Female	190	50.0
	Total	380	100.0
Age	1 20-29	152	40.0
	2 30-39	137	36.1
	3 40-49	54	14.2
	4 50 and above	37	9.7
	Total	380	100.0
Academic position	1 Lecturer	204	53.7
	2 Assistant professor	134	35.3
	3 Associate professor	24	6.3
	4 Professor	18	4.7
	Total	380	100.0
Academic Experience	1 < 1 year	54	14.2
	2 1-5 years	131	34.5
	3 6-10 years	106	27.9
	4 11-15 years	22	5.8
	5 16 -20 years	35	9.2
	6 21 and more	32	8.4
	Total	380	100.0
Educational level	1 Bachelor Degree	39	10.3
	2 Master Degree	290	76.3
	3 Doctoral Degree	51	13.4
	Total	380	100.0
Type of University	1 Public	207	54.5

	2 Private	173	45.5
	Total	380	100.0

Name of Province	1 Sindh	268	70.5
	2 Baluchistan	10	2.6
	3 Punjab	51	13.4
	4 North West Frontier Province (NWFP)	51	13.4
	Total	380	100.0

Table 5. 11:Demographic details of the respondents

5.3.2. Background of Internet usage experience

One of the objectives of this study is to observe the moderating impact of internet experience. Therefore, the patterns of the Internet experience were obtained by asking usage history in years and users self-assessment about usage (table 5.12). Results revealed that based on usage history, largest group of respondents were having 6-10 years (41.8%, n=159) experience followed by 1-5 years (26.6%, n=101) experience, and lowest one was having less than one year (2.9%, n=11) experience. Interestingly, it was observed that there were just few respondents who had never used Internet before (1.6%, n=6). Based on the self-assessment of the Internet usage experience question, most of the respondents evaluated themselves as moderate and highly experienced users i.e., 48.4% (n=184) and 46.3% (n=176) respectively. There were only 5.3% (n=20) respondents who evaluated themselves as low in the Internet experience usage. The overall patterns of usage experience revealed that within the higher educational institutes of the Pakistan academics were having good experience of the Internet usage.

	Group		Frequency	Percent
How long have you been using the Internet	Valid	1 Don’t use at al	6.0	1.6
		2 < 1 year	11.0	2.9
		3 1-5 year	101.0	26.6
		4 6-10 years	159.0	41.8
		5 > 10 year	103.0	27.1
		Total	380.0	100.0
How will you self-asses yourself about the Internet usage experience level	Valid			
		1 Low	20.0	5.3
		2 Moderate	184.0	48.4
		3 High	176.0	46.3
		Total	380.0	100.0

Table 5. 12: Descriptive of Interne experience usage

5.3.3. Impact of reforms initiated by Higher Education Commission of Pakistan

For examining the impact of reforms initiated by Higher Education Commission (HEC) Pakistan, questions were asked related to method of usage, availability of resources, access to the digital library, registration and access to the research repository, and finally participation in the e-learning programs. The table 5.13 indicates that widely used method of the Internet access within universities was broadband (86%, n=329) followed by wireless (10%, n=41). The response pertaining to the resources availability was partially observed. Near to half percent (52.11%, n=198) respondents answered that within their institutes there were enough resources to use the Internet, while other half (44.47%, n=169) denounced. The answers related to the awareness revealed that majority of respondents were either unaware or were irregular to use digital library i.e. one of the Internet based project. The response shown that 27% (n=105) respondents never used digital library, 20% (n=76) used fewer times in week, and 16% (n=64) used only fewer times in a month. The descriptive related to the use of Pakistan Research Repository (PRR) were more unfavourable than the access to digital library awareness. Results revealed that 90.53% (n=344) were not registered with PRR network and remaining only 9.47% (n=36) shown registration at the time of data collection process. Despite of very less number of academics registered with PRR, large number of respondents shown their willingness to upload their research work on PRR. The number of respondents who shown willingness were 80.79% (n=307).

	Groups	Frequency	Percent
Method of usage	1 Broadband	329.00	86.58
	2 Dial-up	6.00	1.58
	3 Wireless	41.00	10.79
	4 Other (specify)	4.00	1.05
	Total	380.00	100.00
Enough to use	1 Not enough	169.00	44.47
	2 Enough	198.00	52.11
	3 More than Enough	13.00	3.42
	Total	380.00	100.00
Digital Library	1 Don’t use at al	105.00	27.63
	2 Use about once in a month	52.00	13.68
	3 use about few times in a month	64.00	16.84
	4 Use about once in a week	45.00	11.84
	5 use about few times in a week	76.00	20.00
	6 use about once in a day	14.00	3.68
	7 use about few times in a day	24.00	6.32

	Total	380.00	100.00

Registered PRR	1 Yes	36.00	9.47
	2 No	344.00	90.53
	Total	380.00	100.00

Upload your work over PRR	1 Yes	307.00	80.79
	2 No	73.00	19.21
	Total	380.00	100.00

Participation in e-Learning	1 Never participate	320.00	84.21
	21-5 times	56.00	14.74
	46-10 years	4.00	1.05
	Total	380.00	100.00

Table 5. 13: Descriptive results of e-reforms initiated by Gov. of Pakistan

5.4. Reliability and Validity of the Instrument

After examining descriptive characteristics of respondents' demographic data, it was an essential step to examine the way respondents answered the survey questions/items related to the constructs presented in conceptual framework. The examination of the survey questionnaire is also known as examination of psychometric properties which requires an acceptable reliability and validity of the measures (Hair et al., 2006; Churchill, 1979).

The word reliability is most often used for two common purposes: it is an evaluation of consistency between number of measurement items measuring single variable, also called spilt-half method (Hair et al., 2006; Robinson et al., 1991); and it is correlation between the same respondent's score on same measurement item at two different points in time, also known as test-retest (Ticehurst & Veal, 2000). In generalisation, reliability of scale enables the accuracy, consistency of measures and avoids the biasness (error free) pertaining to the reproducibility of measurement instruments within different sample and time horizon.

Among the many statistical methods to measure reliability, such as spilt-half, Cronbach's coefficient α, and test-retest (McDaniel and Gates 2006; Bagozzi 1984), for the current study Cronbach's α coefficient method was selected. The reason behind selecting Cronbach's α (inter-item consistency reliability) was that it is easier to calculate and is well-accepted within the academic research (Cronbach, 1951; Nunnally, 1978; Tabachnick & Fidell, 2007). In general, lower acceptable limit of Cronbach's α coefficient is at 0.70 (70%), however, it may be accepted at 0.60 (60%) (Robinson et al., 1991; Sekaran, 2000). Regardless of the popularity and ease to calculate, Cronbach's α test is inflated by the number of items, and presumes that increase in the number of the items will result in increase of the overall reliability. According to Hair et al., (2006, p.137) reliability or internal consistency of scale can also be assessed by examining the item-to-total correlation (the correlation of the item to the summated scale score) and the inter-item correlation (the correlation among items). The suggested values of item-to-total correlation is 0.50 (50%) and above, and for inter-item correlation is 0.30 (30%) and above (Robinson et al., 1991; Hair et al., 2006).

Results in the table A-6 appendix-A, display that items in all the constructs were highly correlated to each other. Also, Cronbach's α was higher than the recommended value 0.6 (Cronbach's, 1951) except construct SE (i.e. 0.49). One suggested method to increase the α-value is by deleting the items having lower squared-multiple-correlations (SMC) or by deleting the item having lower corrected-item-total correlation (Pallant, 2007). Following the suggestions, items SE3 (corrected item-total correlation = 0.06) within SE construct was required to delete for increasing the α-value, however, it was retained to further examination using exploratory factor analysis method of convergent validity.

The validity of the measurement scale ensures that findings revealed through instrument were real representation of the concept of the interest (Hair et al., 2006; Collis & Hussey, 2003; Bryman & Bell, 2007). A test of validity should be capable of confirming the concepts already known (Bannister and Mair, 1968). Usually, within business and social science research two common methods of validity test are applied to measure the goodness of instrument: content validity and construct validity. Whereas, the content validity also known as face validity is qualitative assessment of relationship between items and the corresponding construct through rating by experts, judges, and pre-tests with multiple sub-population (Hair et al., 2006, p. 136). Content validity should be the first step during establishing the relationship between construct and its measuring items. According to the Graver & Mentzer (1999, p.35) if measurement scale does not possess content validity, it cannot possess construct validity no matter what the statistical analysis indicates.

In the current study for establishing the content validity, researcher extracted items from information system literature through rigorous analysis process (see literature review in chapter 2, and instrument development in chapter 4 section 4.6). Afterwards, researcher asked faculty members in department of information systems and computing (DISC) at Brunel university who were already familiar with the topic to evaluate the measurement items and point out whether the items appeared to be logical valid or not. As the items corresponding to the constructs were widely accepted in literature, therefore minor typographical suggestions were recommended by the experts and were incorporated in final questionnaire.

The second type of validity 'construct validity' is defined as degree to which a set of items measures what they intends to measure (Garver & Mentzer, 1999, p.34). It is also known as an external validity of instrument which is quantitatively calculated by observing the correlation between theoretically underpinned set of measurement items (Hair et al., 2006; Pallant, 2007). In generalisation, construct validity is the extent to which the set of measurement items are free from any systematic or non-random error. Krathwohl (1997, p.446) pointed out that construct validity provides evidence which forms the basis for intended score interpretation. Construct validity can be examined through convergent validity, discriminant validity and nomological validity (Campbell et al., 1959; Peter, 1981). At this stage, researcher was intended to examine the overall validity of survey instrument; therefore, only convergent validity was computed to assess the extent through which measuring items of same concept were correlated. The discriminant and nomological validities were computed and explained and in section 5.6.3.

The convergent validity, also known as criterion validity (Zikumnd, 2003), indicates that measuring items of specific construct should converge or share high proportion of variance in common (Hair et al., 2006, p.137). In other words, it is an assessment of higher correlation between items of same construct (Krathwohl, 1997). For higher convergent validity, it is suggested that item-to-total-correlation should be higher than 0.50 (50%) and the inter-item-correlation should be higher than 0.30 (Robinson et al., 1991). Besides, Cohen (1988, p.79-81) suggest that correlation (r) =0.10 to 0.29 is small, r = 0.30 to 0.49 is medium, and r = 0.50 to 1.00 is high correlation. In the current study, correlation was computed using SPSS reliability test. Table A-6 in appendix-A, display that except little exceptions, all the items were correlated medium to high with their relevant construct. The highest item-to-total correlation (i.e. 0.7 and beyond) was observed into the items of constructs PU and MF, while the lowest (i.e. 0.5 and below) was observed into items of construct SE. The inter-item-correlation for all the constructs was between medium to high level except SE. Until this stage of the study, items lower than the required correlations were still retained for the further exploration through the exploratory factor analysis (i.e., an additional method of convergent validity).

5.5. Factor Analysis

Factor analysis (FA) was undertaken in order to further examine the measurement items used in the present study. According to the Tabachnick and Fidell (2007, p.26) factor analysis is best way to understand the underlying structure about particular theory and its variables in analysis. The general purpose of the factor analysis is to reduce the information contained in a number of measuring items into a smaller set of new composite dimensions/factors (Gorsuch 1983; Rummel, 1970). Hair et al., (2006, p.107&111) defined two issues for which chiefly factor analysis can be used:

1. Helps to specify the unit of analysis: The FA is used to identify the structure of relationship (i.e. correlation) either between variables or respondents
2. Helps to achieve summarised data and reduced data: In data summarisation, FA is used to combine the individuals variables grouped together so they represent collectively the underlying dimensions. Whereas, in data reduction, FA empirically (by factor scores) represents specific variables from much large number of variables to be used in multivariate analysis, or creates entirely new set of variables which is much smaller than the original number, and partially or completely replaced original number of variable set.

Hence, factor analysis is way to examine the potential underlying dimensions that can be identified through the characteristics of variables which are grouped together in a meaningful way. This can be achieved by grouping variables which are highly correlated with each other (Tabachnick & Fidell, 2007). Usually two techniques of factor analysis are used to discover the variable of interest from the set of coherent subsets that are relatively independent from each other: exploratory factor analysis (EFA), and confirmatory factory analysis (CFA) (Hair et al., 2006; Tabachnick & Fidell, 2007).

The purpose of EFA is to explore the data and provide information to researcher about the number of possible factors that best represent the data (Hair et al., 2006). Whereas, purpose of the CFA is to validate/confirm the measurement factors that exists within set of variables involved in theoretical model (ibid). The CFA is often performed through structural equation modelling. Up to this stage of the study, objective was to check the validity of the survey instrument; therefore, EFA was applied to test the measurement items used in the present study. In next stage, CFA is applied to confirm theory about the latent variables.

5.5.1. Exploratory Factor Analysis (EFA)

In this study, exploratory factor analysis (EFA) was performed to examine the structure of the measurement items corresponding to the variables presented in conceptual framework. Among the various methods of extraction such as- principal component analysis (PCA), principle factors, maximum likelihood factoring, image factoring, alpha factoring and unweighted and generalised weighted lest squares factoring (Tabachnick & Fidell, 2007, p. 633), PCA was selected to generate the initial solutions for the EFA. The PCA helps to extract the maximum variance from the data set, in a way that first component extract highest variance and last component extract least variance (Tabachnick & Fidell, 2007, p. 635). Additionally, PCA helps to identify and reduces the large set of variables into smaller number of components by transforming interrelated variables into new unrelated linear composite variables (Hair et al., 2006; Tabachnick & Fidell, 2007).

The orthogonal varimax rotational method for the extraction was selected. The reason behind selecting orthogonal varimax method was that it is most commonly variance maximising procedure and has higher generalizabliity and replicability power compared to the oblique rotational method (Tabachnick & Fidell, 2007; Pallant, 2007). According to the Rennie (1997) results generated by the orthogonal rotations are best fitted with the past and future data, while within oblique rotation obtained results are best fitted with the data collected from the current survey research. In addition, due to uncorrelated factors the interpretations of the results obtained using orthogonal rotation are much easier compared to the oblique method (Pallant, 2007; Tabachnick & Fidell, 2007).

Among the several criterions to assess the adequacy of extracted factors, three were selected in this research, namely- latent root criterion, percentage of variance criterion, and Scree test criterion. The Eigenvalues greater than one satisfies the latent root criterion and solution that accounts 60% or above cumulative variance satisfies the criterion of variance percentage (variability in score) (Hair et al., 2006). The total variance of an original variable shared with other variables is also known as communality (Hair et al., 2006). According to the Field (2006, p.630) a variable that has no variance have a communality of 1, and a variable which shares nothing with other variables have communality of 0. The items that exhibits communality lower than 0.5 (50%) are considered to be weak items (Hair et al., 2006). In some cases, with respect to the sample size 0.3 cut-off value of communality is also accepted (Pallant, 2007).

In order to achieve appropriate factor analysis results, it is recommended to calculate the Kaiser-Meyer-Olkin (KMO) test to measure of sampling adequacy and Bartlett's test of Sphericity (Norusis, 1992). The value of KMO greater than 0.6 suggest that the relationship between items is statistically significant and is suitable for EFA to provide parsimonious set of factors (Tabachnick & Fidell, 2007). Whereas the significance of Bartlett's test of sphericity indicates that the correlation among the measurement items is higher than 0.3 and are suitable for EFA (Hair et al., 2006).

In this study, EFA was run separately for the items derived from the literature of technology acceptance behaviour and literature of cultural dimensions. Initially, 58 items related to the technology acceptance behaviour were examined using EFA to contribute in 13 theoretically established constructs. The results revealed that the KMO value was greater than 0.6 and Bartlett's test was significant ($p<0.005$) which satisfied the initial assumptions for the EFA (see table 5.14) (Kaiser, 1974; Bartlett, 1954). However, during eigenvalue's examination, unexpectedly 16 components were extracted whose eigenvalue was greater than 1. For identifying the problem, results within pattern matrix were examined. It was notice that 4 items AT4, RF1, SE6, and GS5 were loaded separately (i.e. cross-loading) in different components else than their relevant. Therefore, in second round of EFA, excluding 4 cross-loaded items, remaining 54 were run for the data reduction purpose.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.764
Bartlett's Test of Sphericity	Approx. Chi-Square	8,152.408
	df	1,431
	Sig.	0.000

Table 5. 14: Initial assumptions of EFA

The table 5.15 presents the information of communalities explained by each item. With few exceptions, most of the items shared above 0.5 communalities with their components. For instance, communalities were lower than 0.5 in construct PU item PU5 only, in construct PI items PI2 and PI3, in construct SI item SI2 only, in construct SE item SE3 only, in construct RF item RF2 only, in construct BI item BI1 only, and in construct AT item AT1 only. As described earlier lower communality indicates that item does not fit well with other items in same component, therefore, for improving or refining scale it is suggested to remove the items with low communality (Hair et al., 2006). Before removing the items due to low communality it is also suggested to observe the standardised outer loading also known as factor loading (Churchill, 1979; Pallant, 2007). The items having factor loading <0.40 or cross-loading >0.40 presents weak consistency within scale and are recommended to be removed (Hair et al., 2006). By observing the pattern matrix table 5.18 it was noticed that all the items having lower communality (PU5, PI2, PI3, SI2, SE3, RF2, BI1, and AT1) were highly loaded into their relevant component (i.e. factor loading >0.4 and no cross loading >0.4), therefore, items were retained for the next stage.

Items	Initial	Extraction	Items	Initial	Extraction
PU1	1.000	0.601	**AT1**	1.000	0.435
PU2	1.000	0.546	**AT2**	1.000	0.710
PU3	1.000	0.669	**AT3**	1.000	0.519
PU4	1.000	0.518	**AT5**	1.000	0.681
PU5	1.000	0.407	**AT6**	1.000	0.782
PEOU1	1.000	0.757	**NAT1**	1.000	0.676
PEOU2	1.000	0.821	**NTA2**	1.000	0.719
PEOU3	1.000	0.591	**NTA3**	1.000	0.708
PEOU4	1.000	0.600	**NTA4**	1.000	0.683
PI1	1.000	0.524	**BI1**	1.000	0.455
PI2	1.000	0.496	**BI2**	1.000	0.649
PI3	1.000	0.445	**BI3**	1.000	0.684
PI4	1.000	0.592	**BI4**	1.000	0.541
SI1	1.000	0.579	**BU1**	1.000	0.559
SI2	1.000	0.436	**BU2**	1.000	0.626
SE1	1.000	0.827	**BU3**	1.000	0.759
SE2	1.000	0.839	**BU4**	1.000	0.702
SE3	1.000	0.365	**GS1**	1.000	0.651
SE4	1.000	0.768	**GS2**	1.000	0.637
SE5	1.000	0.777	**GS3**	1.000	0.589
TF1	1.000	0.663	**GS4**	1.000	0.634
TF2	1.000	0.658	**IS1**	1.000	0.597
TF3	1.000	0.678	**IS2**	1.000	0.539
TF4	1.000	0.572	**IS3**	1.000	0.574
RF2	1.000	0.443	**IS4**	1.000	0.549
RF3	1.000	0.636	**IS5**	1.000	0.576
RF4	1.000	0.640			
RF5	1.000	0.650			
Extraction Method: Principal Component Analysis.					

Table 5. 15: Communalities shared by individual items

Table 5.16 presents the total variance explained by each component. The number of factors that contributed eigenvalue>1 were only significant and remaining were disregarded (cf. Hair et al., 2006; Tabachnick & Fidell, 2007). Table 5.16 display first 15 components results where 13 components were having eigenvalue>1. These 13 components explained total variance of 61.7% (see column cumulative %) which is higher than the recommendations. Literature evidences that factors extracted using Kaiser's criterion only (i.e. eigenvalue>1) tends to overestimate number of components extracted (Hubbard & Allen, 1987). Therefore, an additional statistical technique 'Horn's parallel analysis' (Horn, 1965) were applied to confirm the factors extracted using Kaiser's criterion. Using Monte Carlo PCA program, predicted 54 variables with 380 sample sizes were run to produce 100 additional sets of random data. Systematically, obtained eigenvalues using SPSS data reduction method were compared with the values obtained from the random data set using parallel analysis. Table 5.17 shows that within components from 1 to 13 eigenvalue extracted using PCA was higher than the criterion value obtained from parallel analysis (i.e. 1.234 >1.222), therefore only 13 components were retained and others were rejected (Pallant 2007, p. 191).

Total Variance Explained							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings(a)
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.412	13.727	13.727	7.412	13.727	13.727	3.713
2	3.462	6.410	20.137	3.462	6.410	20.137	3.271
3	3.164	5.860	25.997	3.164	5.860	25.997	3.560
4	2.558	4.738	30.734	2.558	4.738	30.734	3.708
5	2.420	4.481	35.215	2.420	4.481	35.215	3.294
6	2.290	4.241	39.456	2.290	4.241	39.456	3.254
7	2.196	4.066	43.522	2.196	4.066	43.522	2.615
8	2.030	3.760	47.281	2.030	3.760	47.281	3.447
9	1.883	3.486	50.768	1.883	3.486	50.768	3.004
10	1.678	3.108	53.875	1.678	3.108	53.875	2.639
11	1.592	2.948	56.824	1.592	2.948	56.824	3.096
12	1.414	2.618	59.442	1.414	2.618	59.442	1.858
13	1.234	2.285	61.727	1.234	2.285	61.727	3.281
14	1.082	2.003	63.730				
15	0.992	1.837	65.568				

Extraction Method: Principal Component Analysis.
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 5. 16: Eigenvalues and variance extracted by each component

Component	Actual Eigenvalue from PCA	Criterion Value from Parallel Analysis	Decision
1	7.412	1.8243	Accept
2	3.462	1.7404	Accept
3	3.164	1.6839	Accept
4	2.558	1.6344	Accept
5	2.420	1.5908	Accept
6	2.290	1.5452	Accept
7	2.196	1.5076	Accept
8	2.030	1.4704	Accept
9	1.883	1.4373	Accept
10	1.678	1.4027	Accept
11	1.592	1.3705	Accept
12	1.414	1.3425	Accept
13	1.234	1.222	Accept
14	1.082	1.148	Reject
15	0.992	1.0635	Reject

Table 5. 17: Parallel analysis for confirming the factors extracted using PCA

The third criterion applied for determining number of factors was Scree test. The Scree test plots the graph for the latent roots against the number of factors in their extraction order, and the shape of curve within plot is used to determine the cut-off point (Hair et al., 2006, p.120). The shape of plot decreases from first factor having highest eigenvalue towards lowest one until it reaches to the last factor having lowest eigenvalue (Tabachnick & Fidell, 2007, p.644). The change in the shape of plot (usually elbow shape) indicates the clear distinction between factors of interest having eigenvalue>1 and factors disregarded having eigenvalue<1 (Hair et al., 2006; Horn, 1965; Pallant, 2007). In this study, inspection of Scree plot (figure 5.3) confirms similar number of factors extracted using Kaiser's latent root criterion i.e. eigenvalue>1. Graph revealed quite clear breakdown between 13 and 15 components. Components 1 to 13 explained or captured much more of the variance than the remaining components.

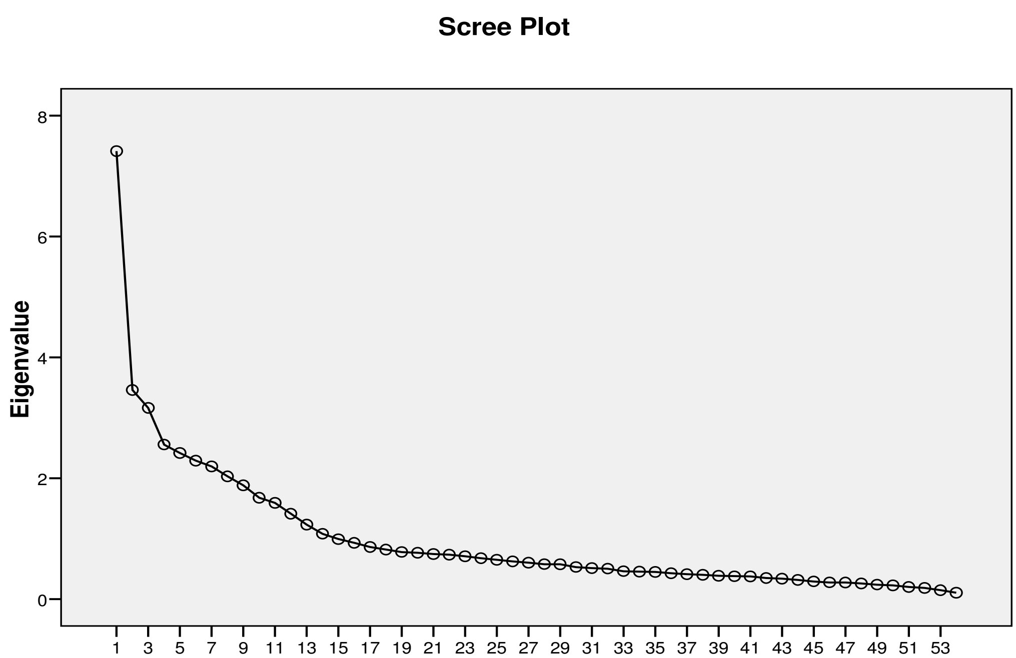


Figure 5. 3: Scree Plot of all the dimensions

Finally, the rotated pattern matrix (table 5.18) displayed 13 factor solutions. It is recommended that absolute correlation between construct and its measuring item (i.e. factor loading) should be higher than 0.7 ($\approx \sqrt{0.5}$) (Henseler et al., 2009, p. 299). Moreover, some psychometrists (e.g. Churchill, 1979) suggest deleting items having factor loading lower than 0.4. The results in pattern matrix table shows that items were loaded on

13 factors ranging from 0.420 to 0.903 and satisfied the minimum factor loadings criterions (Hair et al., 2006; Chruchill, 1979; Pallant, 2007).

Pattern Matrix(a)													
	Component												
	PU	AT	SN	PEOU	NAT	TF	RF	IS	GS	SE	BU	SE	BI
PU3	0.757												
PU1	0.666												
PU4	0.655												
PU2	0.586												
PU5	0.534												
AT6		0.836											
AT2		0.819											
AT5		0.799											
AT3		0.654											
AT1		0.420											
PI4			0.759										
PI1			0.678										
PI2			0.664										
SI1			0.660										
PI3			0.587										
SI2			0.587										
PEOU2				-0.892									
PEOU1				-0.842									
PEOU3				-0.728									
PEOU4				-0.710									
NTA4					0.818								
NTA2					0.818								
NAT1					0.805								
NTA3					0.774								
TF3						0.817							
TF2						0.802							
TF1						0.764							
TF4						0.683							
RF5							-0.783						
RF4							-0.767						
RF3							-0.754						
RF2							-0.477						
IS5								-0.737					
IS1								-0.707					
IS2								-0.705					
IS4								-0.700					
IS3								-0.696					
GS2									-0.779				
GS4									-0.757				
GS1									-0.750				
GS3									-0.720				
SE2										0.903			
SE1										0.879			
SE3										0.516			
BU3											0.855		
BU4											0.802		

BU1											0.727		
BU2											0.714		
SE4												0.864	
SE5												0.857	
BI3													-0.801
BI2													-0.734
BI4													-0.629
BI1													-0.555
Cronbach's α	**0.783**	**0.788**	**0.774**	**0.842**	**0.843**	**0.79**	**0.716**	**0.77**	**0.776**	**0.661**	**0.79**	**0.751**	**0.72**
Extraction Method: Principal Component Analysis.													
a. Rotation converged in 13 iterations.													

Table 5. 18: Pattern Matrix (factor loading)

Once factors have been extracted, it is required to know the extant at which items are loaded on their relevant component. The consistency of each component with their relevant items is identified using Cronbach's α measure (Cronbach, 1951; Nunnally, 1978). The details of each factor extracted are as follows:

Factor 1: Perceived Usefulness (PU): This factor extracted the information about the respondent's beliefs related to the usage of the Internet technology which resulted in improvement, performance and productivity at workplace. Five items adopted from Venkatesh et al., (2000) study were applied for the factor analysis and all were loaded above than the required value 0.5 (Field, 2006). The Cronbach's α for the items loaded in factor was 0.783. The highest loaded item was PU3 which revealed that individual's accepted Internet because it makes their task easier to complete.

Factor 2: Usage intention in Academic Tasks (AT): This factor extracted the information about the respondent's beliefs related to the acceptance of Internet which facilitate them to prepare teaching tasks, enhanced their teaching skills and knowledge, and to remain in contact with peer-fellows and students. Six items were developed by researcher based on Rosenfeld et al. (1992) tasks categorisation. One item AT4 was dropped due to lower loading 0.4 and remaining five were loaded in single component with α 0.788. The highest item loaded was AT6 which suggest that respondents accepted Internet in their tasks because of higher perception of relevance.

Factor 3: Subjective Norms (SN): This factor extracted the information about the respondent's perceptions related to the Internet technology which was influenced by the judgement of others (i.e. peer and superior). Four items of peer-influence and two items of superior-influence were adopted from Lewis et al., (2003). Unpredictably, all the items were loaded into single component, which was consistent with the previous study of

Thompson et al. (1991) with construct social factor. Cronbach's α for the items loaded into factor was 0.774. The highest item loaded was PI4 which revealed that respondents were more influenced by the opinion of non-academic group members (e.g. friends and family) compared to the academic colleagues and superiors.

Factor 4: Perceived Ease of Use (PEOU): This factor extracted items which provide information about the beliefs that the Internet is perceived to be easier and require fewer efforts to use and understand. Four-items were adopted from the study of Venkatesh et al., (2000) for the factor analysis. All the items were loaded into single factor and contributed 0.84 Cronbach's α value. The highest item loaded was PEOU2 which suggest that respondents were willing to accept the Internet if they found it easier to get material for their teaching purpose.

Factor 5: Usage intention in Non-Academic Tasks (NAT): This factor extracted the information about the respondent's beliefs about Internet acceptance which facilitate them to perform non-teaching task i.e. socialisation and administrative tasks. Similar to the AT, four items were developed by researcher based on Rosenfeld et al. (1992) tasks categorisation. All the items were loaded in single factor with α 0.84. The highest item loaded was NAT4 which suggest that respondents accepted the Internet because of its relevance in administrative tasks rather than the socialisation purposes.

Factor 6: Technology Facilitation (TF): This factor extracted the items which provide information related to the external beliefs, specifically about the technology availability and control over it. Originally four items were adopted from the study of Taylor & Todd (1995a), and all were loaded into single factor. The Cronbach's α for the factor was 0.79. TF3 was the highest item loaded in factor 6, which suggest that respondents accepted the Internet because of good and quick access to use at their workplace.

Factor 7: Resource Facilitation (RF): Similar to the TF this factor extracted the items which provided information related to the external beliefs in terms of resources like-money, time, instructions, personal support. Five items from the study of Taylor & Todd (1995a) were adopted for the factor analysis. In initial round of factor analysis RF1 was removed due to cross loading above than 0.4 with items of TF factor. In second round of factor loading remaining four items were loaded into single factor with α-value 0.716. The highest item loaded was RF5 which suggest that respondents were motivated to accept the Internet if resources, opportunities and knowledge about the Internet usage was available.

Factor 8: Institute Support (IS): This factor extracted the items which observed the respondents perceptions regarding to the policies, encouragement and importance suggested by the local institute or local level management towards the Internet usage and acceptance. Five items from the study of Lewis et al., (2003) were applied for the factor analysis. All items were loaded into single factor by contributing 0.77 Cronbach's α value. The highest item loaded was IS5 which suggest that respondents were well aware about their Internet usage and its relevancy for native department and institute.

Factor 9: Government Support (GS): Similar to the IS this factor observed the respondents perceptions regarding the policies, encouragement and importance suggested by the government or top level management. Initially five items were taken from the study of Lewis et al., (2003) for factor analysis, and item GS5 was dropped due to cross loading with the items of IS factor. The remaining four items contributed 0.776 Cronbach's α value. The highest item loaded was GS2 which revealed that respondents were well aware about government commitment policies and support efforts for the Internet usage in teaching tasks.

Factor 10 and 12: Self- Efficacy (SE): This factor extracted the items related to the individual's self-evaluation behaviour which is established by the experience of persistent supporting and non-supporting efforts during Internet usage. Six items adopted from the study of Taylor & Todd (1995a) were applied for the factor analysis. Notwithstanding to the literature (e.g. Taylor & Todd, 1995a) the factor analysis shown that items SE1, SE2, and SE3 were loaded separately in factor 10, and remaining items SE4 and SE5 were loaded in factor 12. The item SE6 was excluded in first run of factor analysis due to lower factor loading (<0.3) (Hair et al., 2006). The Cronbach's α for the factor 10 was 0.661 and for the factor 12 was .751. The first group of items in factor 10 revealed that individuals were more comfortable of using the Internet by their own, while the other group of items revealed the importance of help facility for the Internet usage. Due to requirement of items per factor (Hair et al., 2006) only factor 10 was retained for the further analysis.

Factor 11: Behavioural Usage (BU): This factor extracted the items related to the frequency of future Internet usage within academic and non-academic task. Four items were adopted from the study of Venkatesh and Bala (2008) to apply for factor analysis. All the items were loaded in single factor and contributed 0.79 Cronbach's α value. The highest item loaded was BU3 which suggest that if individuals had access to the Internet they were willing to use it fewer times in a week.

Factor 13: Behavioural Intention (BI): This factor extracted the items which observed that what individuals were thinking, feeling and behaving about the Internet acceptance in their academic and non-academic tasks. Four items were adopted from the study of Venkatesh and Bala (2008) similar like BU with only difference of measurement scale. Within BU purpose was to measure the usage intention with future usage frequency, whilst in BI purpose was to measure the willingness of acceptance on Likert scale (strongly-disagree to strongly-agree). All four items of BI were loaded into single factor and contributed 0.72 Cronbach's α. The highest item loaded was BI3 which shows that individuals were willing to accept the Internet based on accessibility.

5.5.2. Exploratory Factor Analysis (EFA) of Cultural Dimensions

After scanning and clarifying the items related to the respondents individual's acceptance behaviour, twenty-one items of cultural dimensions MF, IC, UA, and PD were examined using exploratory factor analysis (EFA). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was adequate at 0.745 and satisfied the recommended value (>0.6) (Kaiser, 1974). In addition, Bralett's test of Sphericity was also significant (chi-square = 3227.28, df =210, p<0.001) and satisfied the criterion of multivariate normality (Kaiser, 1974; Bartlett, 1954).

Based on Kaiser's criterion table 5.19 shows that all four components were extracted with eigenvalues>1. The individual variance explained by each component was 4.15, 3.396, 1.223, and 1.158, and total variance explained by four components was 54.35%. The Scree plot graph (figure 5.4) showed clear change in shape at fourth and fifth component, and verified the number of components extracted using Kaiser's criterion. Table 5.20 revealed that 21 items were loaded into 4 factors.

Total Variance Explained							
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings(a)
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.150	19.764	19.764	4.150	19.764	19.764	3.944
2	3.058	14.564	34.328	3.058	14.564	34.328	2.802
3	2.259	10.758	45.086	2.259	10.758	45.086	2.521
4	1.947	9.272	54.358	1.947	9.272	54.358	2.445
5	1.276	6.077	60.435				
6	1.158	5.514	65.949				
7	0.963	4.585	70.534				
8	0.783	3.727	74.261				
9	0.704	3.352	77.613				
10	0.654	3.114	80.727				

Extraction Method: Principal Component Analysis.
a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Table 5. 19: Eigenvalues and variance extracted by each component of cultural dimensions

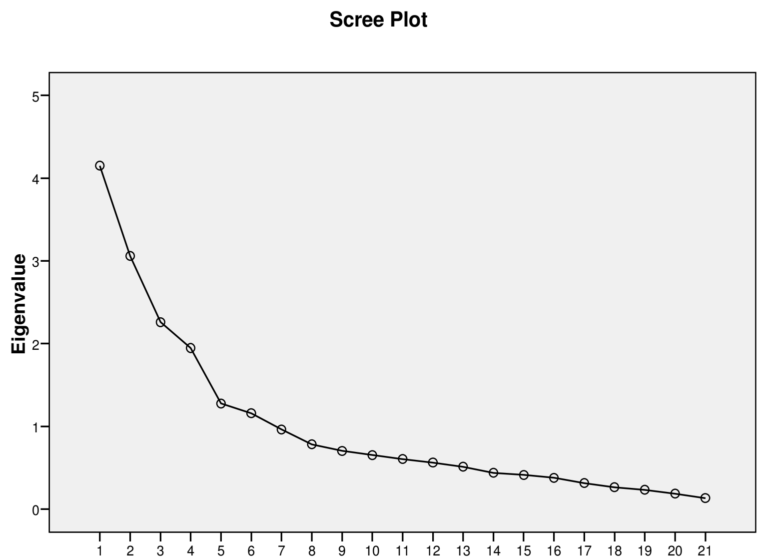


Figure 5. 4: Scree Plot (cultural dimensions)

Pattern Matrix(a)				
	Component			
	1	2	3	4
MF3	0.895			
MF4	0.888			
MF5	0.875			
MF2	0.869			
MF1	0.721			
IC2		0.785		
IC1		0.731		
IC4		0.709		
IC5		0.632		
IC3		0.523		
IC6		0.499		
PD2			0.776	
PD3			0.740	
PD5			0.685	
PD1			0.669	
PD6			0.443	
PD4				
UA3				0.800
UA1				0.774
UA4				0.762
UA2				0.562
Cronbach's Alpha	**0.91**	**0.73**	**0.714**	**0.74**
Extraction Method: Principal Component Analysis.				
a. Rotation converged in 6 iterations.				

Table 5. 20: Pattern Matrix (cultural factors)

Even though, it was not objective of the study to measure the constructs of cultural dimensions as direct determinants of the Internet acceptance behaviour, but still for the reliability of measurement items with their relevant constructs it was required to assess the factor analysis. For measuring the culture, all the items were adopted from the study of Dorfman and Howell (1988) with little moderation of context. The description of each factor with respect to reliability measure Cronbach's α value is given below:

Factor 1: Masculinity and Femininity (MF): This factor extracted the items which observed the masculine nature at work, which were based on working goals, earnings, and promotions at workplaces. Five items were applied for the factor analysis and all were loaded into single factor with 0.91 Cronbach's α value. The highest item loaded was MF3 which suggest that within masculine culture men usually solve problems with logical analysis, whilst women solve problems with intuition.

Factor 2: Individualism and Collectivism (IC): This factor extracted the information which was related to the individuals' perception about himself/herself and the group of people one is member. Items of this construct observed the extent at which respondents prioritised self-interest over the concerns of group. Six items applied for the factor analysis were loaded into single factor with 0.73 Cronbach's α value. The highest item loaded was IC2 which suggest that within collectivist society success of group was more important than then individual's success.

Factor 3: Power Distance (PD): This factor extracted items which were related to measure the subordinate's perception about the power between him and his superior. Out of six items applied for the factor analysis five were above the 0.4 recommended values (Hair et al., 2006). Item PD4 was removed due to lower factor loading. The Cronbach's α value for five items was 0.714. The highest item loaded was PD2 which suggest that in high PD culture respondents favoured to use authority and power when dealing with their subordinates.

Factor 4: Uncertainty Avoidance (UA): This factor extracted items which measured the extent to which employees were uncertain about unclear procedures, strategies and rules. Four items applied for the factor analysis were loaded into single factor and contributed 0.74 Cronbach's α value. The highest item loaded was UA3 which suggest that for respondent's rules and regulations were important because they informed them what the organisation is expecting from them.

5.6. Structural Evaluation of the Model

5.6.1. Basic concepts of Structural Equation Modelling (SEM)

5.6.1.1. Introduction

Structural equation modelling (SEM) refers to the collection of statistical techniques which facilitates to bring the data and underlying theory together (Tabachnik and Fidell, 2006). SEM is also known as causal modelling, causal analysis, simultaneous equation modelling, analysis of covariance structure, path analysis, or confirmatory factor analysis (Tabachnick & Fidell, 2007, p. 676). The analysing techniques of SEM such as covariance-based modelling (i.e. LISREL, AMOS) and variance-based or component-based modelling (i.e. Partial Least Squares (PLS)) are referred as second generation data analysing techniques (Bagozzi and Fornell, 1982). Contrary to the first generation statistical tools such as regression (e.g. linear regression, factor analysis, PCA, ANOVA, and MANOVA) which can analyse only one layer of relationship between independent and dependent variable at time, SEM enables researcher to model multiple layer relationship among the multiple independent and dependent variables simultaneously (Chin, 1998; Gerbing & Anderson, 1988; Gefen et al., 2000, Hair et al., 2006). Additionally, SEM supersedes first generation statistical tools by facilitating researcher to model complex relationships, deal with multicollinearity, perform confirmatory factor analysis, incorporate both unobserved (i.e. latent) and observed variables, and finally to estimate explicit measurement error variance (unreliability and random errors) to avoid the bias (Rigdon et al., 1998; Hair et al., 2006; Barbara, 2001). Because of these outstanding features, SEM tools are increasingly being used in behavioural research for the modelling complex relationships and multivariate datasets which requires researcher to gather multiple measures for the proposed constructs (Hair et al., 2006). According to the Gefen et al., (2000, p. 6) SEM is increasingly been considered in well known information systems Journals (e.g. MIS Quarterly, Information & Management and Information System Research) to validate the measurement items and testing casual relationship between constructs.

5.6.1.2. Types of models in SEM

SEM contains two interrelated models explicitly defined by the researcher, namely, measurement model and structural model (Gefen et al., 2000). Whereas measurement model also known as confirmatory factor analysis (CFA) defines the constructs (latent variables) that the model uses, and allocates observed variables to each, while structural model also known as regression or path analysis defines the hypothetical relationship among the latent variables (Hair et al., 2006; Gefen et al., 2000). It is important to clarify that latent variable is representation of the theoretical construct which cannot be observed directly and can have exogenous form (i.e. independent variable) or endogenous form (i.e. dependent variable) in model (Hair et al., 2006).

5.6.1.3. Practical consideration for SEM

Before adopting the SEM tools for the analysis it is important to consider some practical issues described as follows:

Sample Size: SEM is based on covariances which alike the correlations are less stable when estimations are made from the small samples (Tabachnick & Fidell, 2007). Therefore, sample size is a very important issue in the applications of SEM which determines that weather the sample collected is sufficient to assess the model with the given number of the parameters to be estimated (Baumgartner & Homburg, 1996). Although, SEM requires large sample size based on the number of measurement items in model, model misspecification, model complexity, and estimation procedure (Hair et al., 2006; Tabachnick & Fidell, 2007), however, there is no correct or absolute sample size limit established in literature. According to Hair et al., (2006, p. 742) model having five or fewer constructs with more than three items each and communality higher than 0.6 can well be estimated with small sample size (100-150). Furthermore, model with modest communality (0.45-0.55) needs sample more than 200, and finally for complex model having constructs more than six and having low communality (<0.45) requires samples above 500 (ibid).

Multivariate Normality: Most of the techniques used in the SEM require data closer to the assumptions of multivariate normality (Tabachnick & Fidell, 2007). The violation of the assumption of normality might produce potential distortion within results and leads bias outcome (Hair et al., 2006). Within SEM, assumption of multivariate normality is based on Maridia's coefficient (Mardia's, 1970), which requires to be tenable as p<0.005 (Arbuckle, 2006)

One-step or two-step approach: Usually in SEM domain, two-step approach is preferred over one-step approach (Hair et al., 2006, p. 848). Within two-step approach initially measurement model is assessed by observing unidimensionality, reliability, validity (convergent and discriminant) of the model. In second step, structural model is evaluated by verifying the causal relationships based on path significance between theoretically proposed latent constructs (Anderson & Gerbing, 1988; Garver & Mentzer, 1999). On other side, the one-step approach estimates both measurement model and structural model simultaneously (Hair et al., 2006). The one-step approach is recommended over two-steps when model is derived from strong theoretical justifications and measurement items are well established in prior research (Hair et al., 2006; Fornel & Yi, 1992), however, it is given less consideration due to difficulty in achieving good model fitting (Hulland et al., 1996). Therefore, this study adopted two-step approach which is also recommended by the majority of the researchers in SEM (Chin et al., 1998; Anderson & Gerbing, 1988).

5.6.2. Rational for selecting SEM with PLS approach compared to CBSEM approach

Prior to the evaluation of the conceptual model it is important to highlight the significance and rationales for adopting component-based or variance-based SEM technique PLS to analyse the data. For this purpose, it is needed to compare and contrast between two broad families of SEM analysis techniques i.e. covariance-based SEM (CBSEM) e.g. AMOS, LISREL, EQS, and variance-based or component-based SEM e.g. PLS, PLS Graph. The purpose of differentiating between two techniques is not to favour one technique over other, but it only intends to reveal their relevance within present study.

Some researchers postulated that both these techniques are complimentary to each other (e.g. Chin, 1998; Thompson et al., 1995). Chiefly, these two set of techniques differs based on estimation method. For instance, out of many (e.g. ULS, GLS, WLS, ML) CBSEM applies most commonly maximum likelihood (ML) estimation method to compare the observed and estimated covariance matrix (Hair et al., 2006). The primary objective of CBSEM is to present that measurement items extracted from the theory being examined and are supported by the data (Bollen, 1989; Joreskog and Sorbom, 2001). In other words, model examined using CBSEM produces an estimated covariance matrix which is within sampling variation of the observed matrix, additionally fits the data well and are generally accepted as fit-model (Hair et al., 2006). The data sample within CBSEM requires to be higher (at least 100 or 150) and assumed to be multivariate normal to achieve the goodness-of-fit indices, such as chi-square, CFI, REMSE, and GFA (Bollen, 1989; Hair et al., 2006; Tabachnick and Fidell, 2007). One of the disadvantages of CBSEM compared to component-based SEM techniques is that model does not always converges and produce un-interpretable outcome, consequently model requires to be modified or the theory needs to be reassessed(Chin, 1998; Henseler et al., 2009).

In contrast, component-based techniques, such as PLS applies ordinary least squares (OLS) as estimation method to explain the total variance (Gefen et al., 2000). Specifically, unlike CBSEM to estimate the variance of all the observed variables at time, PLS applies an iterative sequence of OLS (i.e. factor analysis combined with path difference) to analyse one construct at time in such way that it minimise the residual variance of all the dependent variables in structural model until the difference in the average R^2 of the construct becomes insignificant, consequently it is less susceptible of sample size and multivariate normal distribution requirement (Thompson et al., 1995; Chin, 1998; Gefen et al., 2000).

In the present study, rationales for adopting component-based SEM specifically PLS are twofold: first, it is widely accepted and used in recent diversified literature e.g. strategic management (e.g. Hulland, 1999), MIS (e.g.Dibbern et al., 2004), e-business (e.g. Pavlou and Chai, 2002) and so on (see review of Henseler et al., 2009). Second purpose of adopting PLS is based on the relevance of the present study. For instance, during screening process of data (section 5.2.3.1) one of the basic requirements for using CBSEM method i.e. multivariate distribution of data was not tenable (Mardia's coefficient = 228.527, CR = 39.88). Therefore, examining structural model using CBSEM is insensible due to potential threat that model might fails to converge as per requirement (Tabachinick and Fidell, 2007; Hair et al., 2006; Arbuckle, 2006). Another reason for not adopting CBSEM method is the sample size. Albeit, overall sample calculated for the present study (i.e. 380 workable sample) is enough to justify the use of CBSEM approach, but still is not enough to examine the moderation effect using invariance analysis (i.e. at least 100 per group (Hair et al., 2006)). Hence, applying PLS is best option for the present study, which not only facilitates to predict the path relations but also helps to build the theories and validate them with confirmatory factor analysis without prerequisite of sample size and multivariate distribution of data (Chin, 1998; Chin and Newsted, 1999; Gefen et al., 2000; Henseler et al., 2009; Tenenhaus et al., 2005). Supporting single approach (i.e. PLS) might be consider research approach biasness, therefore, this study also re-examines the results obtained through PLS with CBSEM (i.e. AMOS) which increases the robustness of the model and represents the possible chances of the errors between results of two approaches.

5.6.3. Basic Model Evaluation

The conceptual model developed in chapter three was evaluated using a two-step approach (i.e. inner-model or measurement model and outer-model or structural model) on the hierarchal basis (e.g., Chin, 2002; Henseler et al., 2009; Anderson & Gerbing, 1988). First, the inner-model was assessed through examining psychometric reliability and validity tests for the measurement items used. The evaluation of inner-model is also referred as confirmatory factor analysis (CFA), which is practically useful when one dependent construct becomes independent in subsequent dependence relationship (Tabachnick & Fidell, 2007). The next step was to assess the outer-model through multiple regression technique (i.e. hypothetical relationships based over sign, magnitude and significance level).

5.6.3.1. Step-one: Measurement Model Results

The first part in evaluating model is termed measurement model and employs CFA to assess the reliability (Cronbach's α and composite reliability) and validity (convergent and discriminant) of the model. The measurement or outer-model uses the factor analysis to assess the extent to which observed variables are loaded on their underlying construct (Chin, 1998). Even though, the theoretical model presented in chapter 3 was established from the well mature and acceptable theoretical research streams in information system, that does not require measurement re-assessment (Hair et al., 2006), still outer model/CFA is suggested to confirm the underlying relationship of the observed variables with the latent factors (Barbara, 2001). The criterions for the measurement model fitting are presented in table 5.21. Based on criterions stepwise analysis is given as follows:

Criterion	Description	Acceptable fit
Construct reliability Composite reliability	Is measure of internal consistency and is calculated by formula $\rho c = (\sum \lambda\iota)^{2} var\ F / (\sum \lambda\iota)^2\ var\ F + \sum \Theta\iota$, Where, $\lambda\iota$, F, and $\Theta\iota$ are the factor loadings, factor variance, and error variance respectively (Werts et al., 1974)	Value > 0.6 (Hair et al., 2006; Bagozzi & Yi, 1991)
Construct reliability Cronbach's α	Measures the indicators uni-dimensionality (inter-correlation) with their latent construct. It is calculated by $\alpha = \left(\frac{N}{N-1}\right) * \left(1 - \frac{\sum_{i=1}^{N} \sigma_i^2}{\sigma_t^2}\right)$ Where, N is number of indicators, σ_i^2 indicates variance of indicator i, and σ_t^2 represents the variance of the sum of all the indicators scores (Cronbach, 1951)	Value > 0.6 (Hair et al., 2006), and value > 0.8 or 0.9 is better (Nunnally & Bernsein, 1994)
Indicator reliability	Is absolute standardised outer loading. It indicates the variance explained by the observed variable towards underlying latent construct (Churchill, 1979)	Value > $0.7 (\cong \sqrt{0.5})$ is better (Henseler et al., 2009), and value> 0.4 is acceptable (Hulland, 1999; Churchill, 1979)
Convergent validity	Is the degree to whic two measures of the same concepts are correlated. It is demonstrated by the uni-dimensionality using average variance extracted (AVE)= $(\sum \lambda\iota^2)\ var\ F / (\sum \lambda\iota^2)\ var\ F + \sum \Theta\iota$, Where, $\lambda\iota$, F, and $\Theta\iota$ are the factor loadings, factor	Value > 0.5 (Fornell & Larcker, 1981)

	variance, and error variance respectively (Fornell & Larcker, 1981)	
Discriminant validity Construct-level	Is the degree to which two conceptually similar concepts are distinct (Hair et al., 2006). It ensures that each latent variable shares more variance with its own block of indicators that with another latent variable	$\sqrt{AVE}$>latent variable correlation (Fornell & Larcker, 1981)
Discriminant validity Item-level	Is the degree to which two conceptually similar concepts are distinct from each other (Hair et al., 2006)	Loading of each indicator > cross loadings (Chin, 1998; Gotz et al., 2010), and Cross loading <0.4 (Hair et al., 2006)

Table 5. 21: Criterion of assessment of the measurement model
Source: Developed by researcher

Measurement of the reliability (Item-level): In assessment of measurement model, first criterion was to assess the internal consistency of the measuring observed variables/items with each other. Specifically, item-reliability indicates that which part of item's variance can be explained by the underlying latent variable (Gotz et al., 2010, p.694). A common postulate is that absolute correlation (i.e. standardised outer loadings) should be more than half (i.e. 50%) explained by the latent construct (Chin, 1998). However, value above 0.7 i.e. ($\cong \sqrt{0.5}$) (Henseler et al., 2009) and value no less than 0.4 (Churchill, 1979) are recommended. Based on PLS measurement analysis, table 5.22 show that the absolute correlation between the construct and its measuring manifest items (i.e. factor loading) was above than the minimum threshold criterion 0.4. The factor loading was ranging from 0.58 to 0.95 and satisfied the requirements of the psychometric reliability test (Henseler et al., 2009; Churchill, 1979).

Measurement of the reliability (Construct-level): The construct-level reliability ensured that items assigned to the same constructs revealed higher relationship with each other. Even though, earlier calculated individual-level item reliability was adequate enough but it was still recommended to observe the constructs reliability measured jointly by the group of items within same construct (Bagozzi & Baumgartner, 1994). In this study, construct-level reliability was examined by using Cronbach's α and by composite reliability. Where, Cronbach's α measured the uni-dimensionality of multi-item scale's internal constancy (Cronhach, 1951), and composite reliability (similar to factor reliability) measured that how well construct were measured by its assigned items (Fornell & Larcker, 1981; Gotz et el., 2010). Table 5.26 shows that the Cronbach's α was higher than the required value of

0.6 (Cronbach, 1951) and composite reliability was higher than the recommended 0.7 value (Nunnally and Bernstein, 1994).

Measurement of validity (Convergent validity): The validity is the extent to which a set of measuring items correctly represents the underlying theoretical proposed concept (Hair et al., 2006). Specifically, convergent validity explains that the correlation between responses obtained through different methods represent same construct (Peter, 1981). In other words, it signify that set of items should represent one and same underlying construct that can be demonstrated through their uni-dimensionality (Henseler, 2009, p. 299). In this study, convergent validity was examined using widely accepted method 'average variance extracted (AVE)' (e.g. Hair et al., 2006; Tabachnick & Fidell, 2007; Henseler, 2009). An AVE was originally proposed by Fornell and Larcker (1981) that attempts to measure the amount of variance that a construct captures from its measuring items relative to the amount due to measurement error. Table 5.23 shows that AVE extracted for the each construct was higher than the required value 0.5 (50%) (Fornell & Larcker, 1981) and indicate that each construct has capability to explain more than half of the variance to its measuring items on average.

Measurement of validity (Discriminant validity): The discriminant validity is complementary concept of convergent validity which signifies that two conceptually different constructs should exhibit differently i.e. the set of measuring items are expected not to be un-dimensional (Henseler, 2009, p. 299). In this study, discriminant validity at construct-level was examined using Fornell and Larcker (1981) criterion, while at item level were examined using Chin (1998) criterions. Fornell and Larcker criterion suggest that square-root of AVE for each constructs should be greater than the other construct's correlation with any other (i.e. inter-construct correlation). Table 5.23 shows that none of the inter-construct correlation value was above the square-root of the AVE and satisfied the criterion of the discriminant validity. At item-level discriminant validity, Chin (1998) suggested to examine the cross-loading within factor loading. Table 5.22 ensures that each of measuring item within construct was higher than all of its cross-loadings in row and column. Infect, all cross-loading were lower than the 0.4 values recommended by Hair et al., (2006).

	AT	BI	BU	GS	IS	NAT	PEOU	PU	RF	SE	SN	TF
AT1	**0.81**	*0.34*	*0.22*	*0.19*	*0.24*	*0.13*	*0.28*	*0.30*	*0.13*	*0.20*	*0.17*	*0.20*
AT2	**0.73**	*0.18*	*0.03*	*0.08*	*0.11*	*0.18*	*0.02*	*-0.07*	*0.04*	*0.19*	*0.10*	*0.10*
AT5	**0.72**	*0.13*	*0.03*	*0.10*	*0.07*	*0.17*	*0.10*	*-0.08*	*0.14*	*0.17*	*0.06*	*0.11*
AT6	**0.70**	*0.10*	*-0.03*	*0.06*	*0.08*	*0.21*	*0.04*	*-0.17*	*0.08*	*0.14*	*0.07*	*0.10*
BI1	*0.22*	**0.70**	*0.18*	*0.08*	*0.20*	*0.03*	*0.15*	*0.28*	*0.24*	*0.10*	*0.07*	*0.04*
BI2	*0.23*	**0.80**	*0.20*	*0.17*	*0.12*	*0.07*	*0.15*	*0.34*	*0.19*	*0.10*	*0.17*	*0.11*
BI3	*0.25*	**0.73**	*0.20*	*0.21*	*0.15*	*0.14*	*0.13*	*0.27*	*0.11*	*0.05*	*0.17*	*0.08*

BI4	0.22	**0.74**	0.18	0.12	0.17	0.15	0.24	0.31	0.20	0.12	0.18	0.14
BU1	0.15	0.21	**0.76**	0.09	0.19	0.08	0.09	0.14	0.05	0.10	0.04	0.13
BU2	0.15	0.25	**0.80**	0.15	0.19	0.19	0.08	0.14	0.14	0.03	0.07	0.19
BU3	0.11	0.22	**0.87**	0.04	0.23	0.04	0.08	0.10	0.09	0.04	0.03	0.17
BU4	0.02	0.07	**0.72**	-0.02	0.18	-0.04	0.13	0.17	0.04	0.04	-0.03	0.13
GS1	0.10	0.19	0.14	**0.75**	0.04	0.21	0.19	0.18	0.13	0.06	0.15	0.18
GS2	0.07	0.08	0.04	**0.74**	0.10	0.18	0.09	0.20	0.12	0.02	0.13	0.06
GS3	0.14	0.19	0.05	**0.77**	0.14	0.11	0.09	0.22	0.15	0.10	0.18	0.10
GS4	0.15	0.08	0.04	**0.75**	0.06	0.14	0.15	0.18	0.11	0.03	0.20	0.04
GS5	0.16	0.16	0.08	**0.58**	0.26	0.11	0.17	0.16	0.18	0.07	0.19	0.19
NAT1	0.20	0.12	0.14	0.18	0.10	**0.83**	0.04	0.08	0.09	0.15	0.11	0.14
NTA2	0.17	0.08	0.10	0.18	0.07	**0.82**	0.11	0.08	0.05	0.16	0.06	0.22
NTA3	0.16	0.14	0.02	0.19	0.04	**0.86**	0.20	0.12	0.07	0.23	0.19	0.19
NTA4	0.16	0.06	0.11	0.12	0.11	**0.76**	0.11	0.09	0.06	0.13	0.09	0.20
PEOU1	0.16	0.20	0.11	0.18	0.16	0.06	**0.86**	0.34	0.11	0.06	0.11	0.15
PEOU2	0.15	0.19	0.03	0.15	0.05	0.11	**0.89**	0.30	0.10	0.10	0.17	0.16
PEOU3	0.21	0.18	0.13	0.13	0.20	0.16	**0.77**	0.30	0.11	0.18	0.15	0.15
PEOU4	0.17	0.17	0.11	0.15	0.21	0.15	**0.78**	0.33	0.06	0.18	0.18	0.13
PI1	0.09	0.16	0.08	0.17	0.13	0.09	0.17	0.23	0.15	0.20	**0.72**	0.13
PI2	0.09	0.09	0.05	0.18	0.00	0.17	0.10	0.18	0.09	0.17	**0.67**	0.13
PI3	0.18	0.20	0.04	0.17	0.12	0.12	0.15	0.26	0.15	0.21	**0.74**	0.12
PI4	0.13	0.10	-0.06	0.18	-0.01	0.14	0.08	0.18	0.05	0.13	**0.68**	0.06
PU1	0.09	0.34	0.14	0.22	0.23	0.14	0.28	**0.75**	0.10	0.14	0.23	0.11
PU2	0.07	0.36	0.17	0.24	0.26	0.09	0.25	**0.76**	0.08	0.05	0.24	0.17
PU3	0.09	0.30	0.11	0.24	0.22	0.07	0.29	**0.81**	0.11	0.09	0.24	0.10
PU4	0.07	0.24	0.10	0.14	0.19	0.04	0.30	**0.71**	0.14	0.11	0.21	0.11
PU5	0.09	0.24	0.09	0.10	0.16	0.08	0.31	**0.65**	0.08	0.14	0.23	0.13
RF2	0.12	0.20	0.13	0.18	0.17	0.00	0.16	0.09	**0.70**	-0.01	0.00	0.24
RF3	0.07	0.16	0.06	0.18	0.12	0.12	0.08	0.10	**0.74**	0.11	0.22	0.15
RF4	0.07	0.17	0.05	0.13	0.11	0.03	0.06	0.14	**0.73**	0.11	0.07	0.21
RF5	0.12	0.19	0.05	0.06	0.10	0.12	0.01	0.08	**0.76**	0.09	0.12	0.15
SE1	0.22	0.11	0.06	0.09	0.14	0.20	0.17	0.17	0.14	**0.95**	0.24	0.14
SE2	0.24	0.12	0.07	0.06	0.05	0.20	0.12	0.10	0.04	**0.94**	0.23	0.13
SI1	0.07	0.11	0.01	0.15	-0.07	0.05	0.14	0.24	0.00	0.16	**0.74**	0.08
TF1	0.18	0.10	0.19	0.13	0.18	0.19	0.10	0.14	0.25	0.15	0.13	**0.82**
TF2	0.15	0.07	0.06	0.08	0.12	0.11	0.12	0.09	0.22	0.06	0.00	**0.69**
TF3	0.10	0.07	0.15	0.10	0.13	0.17	0.11	0.08	0.17	0.12	0.11	**0.81**
TF4	0.18	0.13	0.19	0.16	0.18	0.18	0.22	0.19	0.19	0.10	0.15	**0.81**
IS1	0.16	0.14	0.27	0.18	**0.78**	0.07	0.14	0.22	0.13	0.09	0.08	0.18
IS2	0.04	0.10	0.17	0.14	**0.71**	0.02	0.12	0.20	0.14	0.05	0.00	0.12
IS3	0.17	0.17	0.13	0.07	**0.68**	0.18	0.18	0.19	0.08	0.05	0.06	0.20
IS4	0.21	0.19	0.17	0.09	**0.74**	0.03	0.12	0.26	0.19	0.11	0.07	0.11
IS5	0.20	0.20	0.15	0.09	**0.72**	0.06	0.14	0.19	0.10	0.05	0.01	0.13

Table 5. 22: Outer/factor loading with cross-loadings

	AVE	$\sqrt{AVE}$	AT	BI	BU	GS	IS	NAT	PEOU	PU	RF	SE	SN	TF
AT	0.55	0.74	1.00											
BI	0.55	0.74	0.31	1.00										
BU	0.62	0.79	0.15	0.25	1.00									
GS	0.52	0.72	0.17	0.19	0.10	1.00								
IS	0.53	0.73	0.21	0.21	0.25	0.16	1.00							
NAT	0.67	0.82	0.21	0.13	0.10	0.21	0.09	1.00						
PEOU	0.68	0.82	0.21	0.23	0.12	0.19	0.19	0.14	1.00					
PU	0.54	0.74	0.11	0.41	0.17	0.26	0.29	0.12	0.38	1.00				
RF	0.54	0.73	0.14	0.25	0.11	0.19	0.18	0.09	0.12	0.14	1.00			
SE	0.89	0.94	0.24	0.12	0.07	0.08	0.10	0.21	0.16	0.14	0.10	1.00		
SN	0.50	0.71	0.16	0.19	0.04	0.23	0.06	0.15	0.18	0.31	0.13	0.25	1.00	
TF	0.61	0.78	0.20	0.13	0.20	0.16	0.20	0.22	0.18	0.17	0.26	0.15	0.14	1.00

Table 5. 23: Inter-construct correlation and AVE for basic model

5.6.3.2. Step-Two: Structural Model Results

Having established reliable and validated measurement/outer-model, the next step is to estimates the assumed causal and covariance linear relationship among the exogenous (independent) and endogenous (dependent) latent variables. The structural model permits to evaluate the inner-model or path model i.e. established with the series of structural equations representing theoretical model (Chin, 2010). As discussed earlier, unlike covariance-based approaches PLS does not supports to statistically evaluate the overall goodness of fit of the model that is based on assumption of distribution-free variance (e.g. GFI, AGFI, CFI, REMSI), therefore, non-parametric statistical tests were applied to evaluate the overall model fitting. The essential criterions used for the assessment of the structural model in this study were- coefficient of determination (R^2) for endogenous variable, estimation of path coefficient (β), effect size (f^2) and prediction relevance (q^2) (e.g. Chin 2010, Henseler et al., 2009, Gotz et al., 2010; Tenenhaus et al., 2005). The description and threshold value for each criterion are presented in table 5.24 followed by stepwise examination of the structural model.

Criterion	Description	Acceptable fit
R^2 of endogenous (dependent) latent variable	Is coefficient of determination which is measures of how much variability in outcome is accounted by the exogenous (independent) observed variables (Tabachnick & Fidell, 2007; Hair et al., 2006). It is similar to squared multiple correlation (SMC) coefficient into covariance-based approach	Value 0.67, 0.33, 0.19 are substantial, moderate, and weak respectively (Chin 1998)
β coefficient	Is measure of multiple correlation coefficients between exogenous and endogenous variables (Tabachnick & Fidell, 2007). Value evaluated in terms of sign, magnitude and significance (t-test).	Value $t=2.58$ $p<0.01$, $t=1.96$ $p<0.05$, and $t=1.64$ $p<0.10$(Hair et al., 2006, p.390), and $t=2.326$ $p<0.01$ (Keil et al., 2000, p.312)

Effect size f^2	Is measure of representing the ratio of the improvement in prediction that results from the fitting the model (Tabachnick & Fidell, 2007). It is calculated by $f^2 = (R^2_{incl} - R^2_{excl})/(1- R^2_{incl})$ (Cohen, 1988)	Value 0.02,0.15, and 0.35 are weak, medium and large effect respectively (Cohen, 1988; Chin, 1998)
Prediction relevance q^2	Is an assessment of model's capability to predict R^2 through sample reuse/cross-validation (Henseler et al., 2009). It is calculated using $q^2 = (F^2_{incl} - F^2_{excl})/(1- F^2_{incl})$	Value 0.02,0.15, and 0.35 are weak, medium and large effect respectively (Chin, 1998)
Goodness of fit (GoF)	It is criterion of global goodness of fit, which is computed through the geometric mean of the average communality and average R^2. Formula is = $\sqrt{R^2 * average\ communality}$	Value closer to 1 is better (Tenenhaus et al., 2005)

Table 5. 24: Criterion of assessment of the Structural model (Developed by researcher)

Path estimation (β): The path estimation also known as nomological validity (i.e. hypothetical relations) was performed to examine the significance of the path relations in inner-model (e.g. Chin, 1998). In other words each path relationship presented in framework was examined though regression coefficient (β). The significance of regression coefficient β is based on t-value, which was obtained using PLS Bootstrap process. Table 5.25 shows that out of twenty path relations representing twelve hypotheses eleven were significant and remaining nine were insignificant. Graphical representation of paths is presented in figure A-2 and A-3 in appendix-A. Given that, results of paths towards dependent variable BU revealed that only TF, IS and BI were positively significant, while SE, RF, PU, and GS were insignificant. The highly significant path ($p<0.001$) was between BI and BU (β=0.19 or 19% and *t*= 3.42) while least significant ($p<0.05$) was between TF and BU (β=0.14 or 14% and t= 2.6). These results suggest that usage of the Internet within educational institutes context was mainly influenced by the individual respondent's (academics) personal intention to accept followed by the technological facilitations and institutional support. Thus, hypotheses **H7b, H10** and **H11b** were supported, and **H1b, H6b, H8b** and **H12b** were unsupported.

The result shows that more than half of the paths towards dependent variable BI were insignificant. Specifically, only AT, PU, and RF were significant and TF, NAT, PEOU, SE and SN were insignificant. The highest significant path was between PU and BI (β=0.34 or 34% and t= 7.5) followed by AT and BI (β=0.24 or 24% and t= 5.11). These results suggest that behavioural intention to accept the Internet in the academic institutions was predominantly influenced by the perception of usefulness of the Internet technology. Thus, hypothesis **H1a, H8a and H9a** were supported, and **H2, H4, H6a, H7a, H9b** were not supported.

All the paths SN, PEOU, GS and IS towards PU were significant and met the proposed theoretical suggestions. The highest significant relationship was between PEOU and PU (β=0.28 or 28% and t= 5.81) followed by SN on PU (β=0.22 or 22% and t= 3.99), and lowest was between GS and PU (β=0.12 or 12% and t= 2030). These results suggest that ease of use of the Internet and opinion of peer-fellows and social environment were the major antecedent to observe the usefulness of the Internet. Finally, the only path proposed for the relationship between PEOU and SN was also found to be significant (β=0.18 or 18% and t= 4.17) which suggest that like the PU peer-fellows and social environment had also impact on the ease of use of the Internet within academic institutions. Thus, hypothesis **H3, H5a, H5b, H11a, H12a** were all supported.

Determination of coefficient (R^2): The determination of coefficient (R^2) provides the percentage of variation in dependent variable(s) explained by independent variable(s) (Keil et al., 2000). According to the Bakhaus et al., (2003, p.63) R^2 represents the level of the latent construct's explained variance and therefore measures the regression function's 'goodness of fit' against the empirically obtained observed items. The value of R^2 varies according to the number of measuring independent variable(s) i.e. higher number of independent variable needs to produce higher value of R^2 and vice-verse (Chin, 1998). Furthermore, according to Chin (1998) model having R^2 as 0.67, 0.33, and 0.19 are considered as substantial, moderate, and weak respectively. Table 5.26 indicates that the PU shared highest variance (R^2= 0.269 ≅27%) followed by BI (i.e. R^2= 0.265 or 26%), BU (i.e. R^2=0.12 or 12%) and PEOU (i.e. R^2=0.03 or 3%). Following the criterion of Chin (1998) model is considered to be moderately fit. The results of R^2 were expected higher in BI compared to the others but due to having less significance of independent variables it was quite lower than the expectations. These results suggests that model mainly explained largest variation in perceived usefulness, which in turn contributed into variation explained by behaviour intention, and finally, a very little variation was explained by construct behaviour usage.

Effect size (f^2): Albers (2009) found that within inner-model path coefficient β declined with the increased number of indirect relationships, consequently, considerable direct relationships become insignificant. Additionally, effect was higher specifically when mediating variables have a suprious effect on the direct path (ibid). Therefore, for the goodness-of-fit model, it is required to keep the total effect (direct and indirect significant paths in inner-model) relatively constant, so that reasonable explanations for the proposed hypothesis may be justified (Henseler et al., 2009). In this study, within inner-model change in the relations with respect to the effect size is calculated by means of Cohen's (1988) function of f^2. The effect size function f^2 which is similar to traditional partial F-test (Gotz et al., 2010) helps to examine the increase in the R^2 relative to the proportion of variance of the dependent variable that remains unexplained. Contrary to the traditional F-test, f^2 does not refer to the sample size but to the basic population of the analysis, thus, no degree of freedom was needed to compute f^2 value. According to the Cohen (1988, p.413) values for f^2 of 0.02, 0.15, and 0.35 for the significant independent variables represents weak, moderate and substantial effect respectively.

In table 5.25 column f^2 revealed that most of the relations presented moderate effect size (i.e. $f^2 > 0.02$). The moderate impact of effect size suggests that inclusion of an additional path(s) or independent variable(s) have no observable effect on dependent variable's shared variance. Specifically, in terms of the substantive effect for the significant paths towards BU, f^2 for TF, BI and IS were 0.020, 0.033 and 0.029 respectively. These results suggest that path coefficient (β) has an approximately medium effect on BU above and beyond the contributions provided by TF, BI and IS. On other hand, all paths towards PU were found to be significant and f^2 for the paths SN, PEOU, GS, and IS towards PU ranges from 0.061 to 0.322. The paths towards dependent variable BI were partially significant and only AT, PU and RF contributed with effect size f^2 of 0.069, 0.12, and 0.36 respectively. Finally, f^2 for the significant β value SN on PEOU suggest that the relationship was moderately acceptable. It is worth to noticed that the effect size f^2 of some paths were negative or below the accepted range (e.g. PU→BU, SE→BU and alike). Reasonably, the negative or zero effect of these paths was based on their insignificant impact on the dependent variable.

Prediction relevance (q^2), cv-communality (H^2), cv-redundancy(F^2): Another assessment of structural model is q^2 statistics, which is predictive capability of the model by reproducing the observed values by the model itself and its estimating parameters. The q^2 is computed using Stone-Geisser (Stone, 1974; Geisser, 1975) criterion which suggests that model must be able to provide a prediction of the dependent variable's measuring items. The criterion of q^2 is also known as the sample reuse technique which facilitates to assess the cross-validation (CV) of the model (Chin, 1998; Wold, 1982). According the Fornell & Cha (1994, p. 73) if the q^2 is larger than zero the model is considered to have predictive relevance otherwise model lacks to have predictive relevance.

In PLS, two kinds of predictive relevances/validities are estimated for the measurement model i.e. cv-communality (H^2) and cv-redundancy (F^2). Whereas, cv-communality is calculated through the measurement model's capability to assess the path model, such that, block of measuring items are directly derived from their own latent variable (Tenenhaus et al., 2005). Additionally, prediction of the measuring items of dependent or endogenous block is measured using only the measuring items of that block (ibid). In other words, cv-communality is obtained if prediction of the omitted data points in the measuring variables block is made by an underlying construct or latent variable (Chin, 1998). On other hand, cv-redundancy measures the capability of the path model to predict the dependent or endogenous measuring items indirectly from the prediction of their own latent variable using the related structural relation, by cross-validation (Tenenhaus et al., 2005, p. 181-182). Contrary to the cv-communality, cv-redundancy measures the quality of the structural model only taking into account the measurement model (ibid).

In this study, predictive validities i.e. q^2, H^2, F^2 were computed using 'blindfolding' procedure. Gotz et al.,(2010, p.702) defined blindfolding procedure, as a parameter estimation method where systematically some data for the particular block (a block is set of measuring items for a construct) is removed from the sample and is treated as missing data. In the next step, a block of the missing data is treated as part of the estimation process by ignoring another part of the data, and the procedure is repeated until every data point is omitted and estimated. The omission and estimation of the data points in blindfolding procedure is dependent on the omission distance (G) (Chin, 1998). According to the Wold (1982), the omission distance should be integer between the number of indicators and cases, while Chin (1998) recommended omission distance is feasible between 5 and 10. In this study, considering the Chin (1998) recommendations, blindfolding has been carried out using omission distance G =7.

The indices for the q^2 are explained in table 5.25. As can be seen that the significant paths towards the dependent variable BU explained slightly above the common threshold of (i.e. $q^2>0$ and $q^2<0.02$) predictive relevance and presented lower impact. Within significant paths towards PU predictive relevance was higher than the 0.02 in most of the path (except GS→PU) and reflects medium impact. For the significant paths towards dependent variable BI predictive relevance was higher than the 0.02 and reflected, again, medium impact, except RF→BI. Finally, the predictive relevance for the significant path SN→ PEOU also reflected medium predictive relevance impact. The indices for the cv-communality (H^2) and cv-redundancy (F^2) obtained through the blindfolding method are given in table 5.26. It is worth to remind that cv-redundancy alike the R^2 is only computed for the path model to predict the endogenous or dependent variable. Results show that all the blocks presented an acceptable c-v redundancy index and cv-communality index. None of the index was negative which may imply that the corresponding latent variable(s) were been badly estimated (e.g. Tenenhaus et al., 2005).

Goodness-of-fit index (GoF): Finally, after examining the effect size of path estimation and predictive relevance capability, last criterion was remained to see the overall fit of the model. As discussed earlier, unlike CBSEM methods (e.g. LISREL, AMOS), PLS lacks to optimise global scalar function (e.g. chi-square X^2 in CBSEM) and, consequently, it lacks to calculate the index which measures the overall validity/fitting of the model globally (Chin, 2010; Tenenhaus et al., 2005). Overcoming this problem, Tenenhaus et al., (2005) and Amato et al., (2004) proposed a global criterion of goodness-of-fit (GoF) index, which is geometric mean of the average communality (i.e. outer-model or measurement model) and the average of R^2 (i.e. variance explained into dependent variable). The GoF is normed between 0 to 1, where the higher value represents better path model estimation (Heneseler et al., 2009, p.310). The GoF for the current study model was 0.322 (32%) (see table 5.26) and can be accepted at moderate level (Chin, 1998).

H. No.	Path Relations	Path (t-value)	Standard Error	f^2	q^2	Supported/Not-Supported
H1a.	**PU -> BI**	0.3421 (7.5819)***	0.0729	0.123	0.061	Supported
H1b.	**PU -> BU**	0.0139 (0.1968)Not Sig.	0.0705	-0.004	-0.008	Not-Supported
H2.	**PEOU -> BI**	0.0232 (0.4562)Not Sig.	0.0721	-0.001	0.011	Not-Supported
H3.	**PEOU -> PU**	0.281 (5.8124)***	0.0766	0.098	0.050	Supported
H4.	**SN -> BI**	0.0252 (0.5275)Not Sig.	0.0794	0.000	0.010	Not-Supported
H5a.	**SN -> PU**	0.2203 (3.9937)***	0.0919	0.061	0.033	Supported
H5b.	**SN -> PEOU**	0.1836 (4.1729)***	0.0664	0.035	0.024	Supported
H6a.	**SE -> BI**	-0.0124 (0.2125)Not Sig.	0.1024	0.000	-0.002	Not-Supported
H6b.	**SE -> BU**	0.0041 (0.0818)Not Sig.	0.0499	0.000	-0.004	Not-Supported
H7a.	**TF -> BI**	-0.0359 (0.6647)Not Sig.	0.0735	0.002	-0.001	Not-Supported
H7b.	**TF -> BU**	0.1435 (2.6076)**	0.055	0.020	0.004	Supported
H8a.	**RF -> BI**	0.1715 (3.5596)***	0.0844	0.036	0.017	Supported
H8b.	**RF -> BU**	-0.0141	0.0553	0.000	-0.008	Not-Supported

		(0.2555)Not Sig.				
H9a.	**AT -> BI**	0.2439 (5.1168)***	0.068	0.069	0.027	Supported
H9b.	**NAT -> BI**	0.0282 (0.6458)Not Sig.	0.0609	0.001	0.008	Not-Supported
H10.	**BI -> BU**	0.1941 (3.4228)***	0.0567	0.033	0.008	Supported
H11a.	**IS -> PU**	0.208 (4.6002)***	0.0764	0.322	0.024	Supported
H11b.	**IS -> BU**	0.1802 (3.2638)**	0.0552	0.029	0.006	Supported
H12a.	**GS -> PU**	0.1208 (2.3049)*	0.0673	0.322	0.008	Supported
H12b.	**GS -> BU**	0.0055 (0.0866)Not Sig.	0.0637	0.000	0.013	Not-Supported

Notes: *** p<0.001, ** p<0.001, * p<0.05; (based on $t_{(198)}$, two-tailed test)
$f^2 = (R^2_{incl} - R^2_{excl})/(1 - R^2_{incl})$
$q^2 = (F^2_{incl} - F^2_{excl})/(1 - F^2_{incl})$

Table 5. 25: Structural relations and path significance of basic model

Constructs	Comp Reliability	R^2	Communality	Cronbach's Alpha	H^2	Redundancy	F^2
AT	0.829		0.548	0.777	0.242		
BI	0.832	0.265	0.553	0.730	0.2612	0.051	0.1289
BU	0.865	0.126	0.617	0.795	0.3676	0.035	0.0589
GS	0.844		0.521	0.767	0.2842		
IS	0.849		0.530	0.779	0.297		
NAT	0.891		0.672	0.843	0.427		
PEOU	0.895	0.034	0.680	0.842	0.4603	0.026	0.0234
PU	0.855	0.269	0.542	0.788	0.3176	0.023	0.1406
RF	0.821		0.535	0.713	0.223		
SE	0.943		0.893	0.880	0.5551		
SN	0.835		0.504	0.758	0.234		
TF	0.862		0.610	0.796	0.353		
Average		**0.173425**	**0.6003667**			**0.033625**	
GoF		**0.322**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 26: Overall overview of results and GoF of basic model

5.6.4. Testing Moderating Impact

After examining the direct path relationships within core model, next step was to examine the moderating affect of the seven demographic variables: age, gender, educational level, academic position, organisational type, usage experience, and voluntariness; and four cultural variables: individualism-collectivism (IC), power distance (PD), masculinity and femininity (MF) and uncertainty avoidance (UA). According to Baron and Kenny (1986, p.1174) a moderator can be qualitative or quantitative variable that affects the direction and/or strength of a relation between an independent and dependent or criterion variable. There are several ways to examine the moderating effect within structural models but two are very common: examination using interaction effect (product term) and examination using multiple-group analysis (MGA). Before adopting any approach, brief overview of both methods is given as follows:

The first approach to examine the moderating effect is known as interaction-effect or product-term effect approach. In this, moderating effect within structural path model is always represented with new structural relationship (Henseler & Fasssott, 2010). Hence, proposed model needs to be examined with moderating effect not only comprise the main effect under consideration (a) and the moderator variable's main effect on criterion variable (b), but also an interaction variable's effect (c) (predictor x moderator) (ibid). Furthermore, if path c satisfy to differ significantly from zero (i.e. null hypothesis is rejected) than it represents an existence of moderation effect (Baron & Kenny, 1986). This approach to examine moderating effects is missing in CBSEM techniques (e.g. AMOS, LISERL, etc.) because of the assumption that the correlation between latent variable's needs to be zero (Ebrel, 2010). Apparently this approach has no drawbacks until and unless the predictors and moderator variables are modelled with the reflective indicators, however, if one of the two constructs is operationalised with the formative indicators than this approach is suboptimal to adopt (Chin et al., 2003, Eberl, 2010).

Overcoming the limitation of the interaction-effect approach, second approach is known as multiple-group analysis (MGA). This approach is widely suggested if either independent or moderator variable are categorical in nature (Henseler & Fassott, 2010). According to the Rigdon et al., (1998, p.1) 'if one or both of the interacting variable(s) is discrete or can be made so, researcher can apply a 'multisample' approach, with the interaction effect becoming apparent as differences in parameter estimates when the same model is applied to different but related set of data'. Usually this type of the group analysis is widely accepted into CBSEM methods to check moderating effect (Joreskog, 1971), and recently is also getting interest of the researchers within PLS environment (e.g. Chin, 2000; Keil et al., 2000; Eberl, 2010). Nevertheless, this approach does also have drawbacks, and one is its perquisite to test the t-value with assumption of the data normality. Overcoming this problem within PLS, recently Dibbern & Chin (2005) suggested an alternative, distribution free approach and provided random permutation method. In MGA, moderators are examined by dividing data-sample into subsamples (mostly dichotomous e.g. high and low) according to the moderating variable and same PLS model is run for both subsamples (Chin, 1998). The path differences between two groups are compared by examining the significance of parametric t-test (ibid).

From the explained two approaches above, in this study PLS based MGA was adopted to investigate the impact of moderators on the influence of independent variables towards the dependent variables. There were two reasons to select the PLS-MGA approach over the interaction approach- 1) as described MGA approach is also common in CBSEM methods, therefore, result obtained in this research using PLS will be helpful for the future researchers who might wish to re-examine and compare the moderating effect using CBSEM methods; 2) most of the moderators examined in this study were discrete/categorical in nature and all the predictors were measured on reflective indicators, therefore following the assumption of Rigdon et al., (1998) and Eberl (2010) MGA is most appropriate approach over the interaction effect.

It was also possible to perform the MGA using traditional MGA methods using ANOVA and MANOVA test, where intent is to assess the significant differences in terms of means scores on the dependent variable across the groups (Hair et al., 2006; Pallant, 2007). For that reason the variables measured in these tests needs to be observed and drawn from the data. In addition, the primary concerns for these tests were to see the difference in the dependent variable rather than the latent variables which might be unobservable in nature (Tabachnick & Fidell, 2007). According to the nature of current study where dependent or criterion variables were unobserved in nature and means of predictor or independent variable was indirectly supported on their indicators loadings, ANOVA and MANOVA were less preferred to use in comparison to the SEM techniques (see Allua, Stapleton and Beretvas, 2008)

5.6.4.1. Steps to examine the moderating impact using MGA

The objective of performing MGA was to confirm that whether the paths between groups were significantly different or not. The presence of significant difference among the groups (e.g. gender- male and female, culture- high and low on IC) suggests that moderator does have effect on the path strength and direction. The variables presented in framework were assessed with moderating variables in much similar stepwise approach of hierarchical multiple regressions developed by Cohen and Cohen (1983). The step-wise process is supported from the studies of Chin (1998; 2000) and Keil et al., (2000). In this approach, initially sample is split into desired groups (subsample) and the path-relationships of exogenous/independent variable(s) are regressed with endogenous/dependent variable(s) using one subsample at time. Each model considered to be acceptable in terms of goodness of fit i.e. validity (discriminant and convergent), reliability (Cronbach α and composite reliability) and explanatory power in dependent variable (R^2). In next step, bootstrap method is applied (in present study 200 times) to re-sample the data for obtaining the standard error of the structural paths in subsamples under consideration. In third step, differences between the path estimators are tested for the significance of t-test. If the obtained standard errors of path estimators are assumed to be equal the t-static is computed using Chin (2002) criterion as follows:

$$\mathrm{t} = \frac{b^{(1)} - b^{(2)}}{\sqrt{\frac{(n^{(1)}-1)^2}{n^{(1)}+n^{(2)}-2}\, se(b^{(1)})^2 \; + \frac{(n^{(2)}-1)^2}{n^{(1)}+n^{(2)}-2}\, se(b^{(2)})^2} \;\; x\sqrt{\frac{1}{n^{(1)}} + \frac{1}{n^{(2)}}}}$$

Where $b^{(1)}$= Path value in group one $\quad$ $b^{(2)}$= Path value in group two
$n^{(1)}$= Sample size in group one $\quad$ $n^{(2)}$= Sample size in group two
Se= Standard error

This would follow at t-distribution with m+n-2 degree of freedom. Where m= subsample1, and n=subsample2.

In conditions when assumption of standard errors' inequality is present, the differences between the paths estimators of two groups are tested using Smith-Satterthwait test (c.f. Chin, 2002) as follows:

$$t = \frac{path(sample1) - path(sample2)}{\sqrt{s.e.(sample1)^{(2)} + s.e.(sample2)^{(2)}}}$$

5.6.4.2. Results of MGA for Demographic moderating variables

5.6.4.2.1 Age

As described earlier, moderating effect is examined using MGA. The nature of moderating variable age was categorical in the survey question, therefore according to the Henseler & Fassott (2010, p.720) it does not required any refinement to divide the sample into groups. Due to lower number of respondents in some groups overall sample was split into two groups: younger-age group and older-age group. Within younger-age group there were total 289 respondents (academics) out of which 152 (52%) were in age between 20-29 and remaining 137(47%) were in age between 30-39; within older-age group there were 91 respondent (academics) out of which 54(59%) were in age between 40-49 and remaining 37(40%) were above age 50. F-test showed that age differed among the two split groups (F=1.096, p<0.05)

The results presented in table 5.27 revealed AVE for majority of the constructs in both models were higher than the 0.50 threshold and satisfied the criterion of the convergent validity (Fornell & Larcker, 1981). Only construct SN in younger-age group and GS in older-age group demonstrated slightly lower AVE's. Furthermore, the square-root of AVE for each construct was relatively high than the inter-construct correlation in both models and satisfied the criterion of discriminant validity (ibid).

Correlation among the construct (Younger-age Group)														
	AVE	$\sqrt{AVE}$	AT	BI	BU	GS	IS	NAT	PEOU	PU	RF	SE	SN	TF
AT	0.544	0.74	1.00											
BI	0.542	0.74	0.32	1.00										
BU	0.638	0.80	0.13	0.24	1.00									
GS	0.541	0.74	0.14	0.18	0.08	1.00								
IS	0.538	0.73	0.18	0.16	0.23	0.10	1.00							
NAT	0.619	0.79	0.19	0.19	0.14	0.24	0.06	1.00						
PEOU	0.671	0.82	0.23	0.22	0.06	0.16	0.13	0.18	1.00					
PU	0.535	0.73	0.14	0.41	0.15	0.26	0.27	0.22	0.40	1.00				
RF	0.544	0.74	0.21	0.27	0.17	0.24	0.19	0.11	0.11	0.21	1.00			
SE	0.911	0.95	0.22	0.12	0.06	0.05	0.06	0.24	0.17	0.12	0.19	1.00		
SN	0.489	0.70	0.15	0.22	0.04	0.26	0.07	0.16	0.15	0.31	0.15	0.25	1.00	
TF	0.593	0.77	0.17	0.12	0.20	0.15	0.16	0.20	0.20	0.20	0.27	0.17	0.15	1.00
Correlation among the construct (Older-age Group)														
AT	0.55	0.74	1.00											
BI	0.60	0.77	0.33	1.00										
BU	0.56	0.75	0.21	0.34	1.00									
GS	0.44	0.67	0.33	0.29	0.16	1.00								
IS	0.51	0.72	0.31	0.37	0.32	0.38	1.00							
NAT	0.73	0.86	0.30	0.11	0.10	0.16	0.21	1.00						
PEOU	0.71	0.84	0.17	0.23	0.31	0.31	0.38	0.18	1.00					
PU	0.58	0.76	0.08	0.39	0.25	0.30	0.41	-0.06	0.35	1.00				
RF	0.50	0.71	-0.04	0.24	-0.07	0.03	0.09	0.08	0.09	-0.07	1.00			
SE	0.75	0.87	0.36	0.24	0.13	0.20	0.25	0.23	0.18	0.28	-0.18	1.00		
SN	0.53	0.73	0.22	0.14	0.08	0.16	0.06	0.20	0.27	0.31	0.06	0.21	1.00	
TF	0.65	0.80	0.26	0.18	0.27	0.21	0.32	0.37	0.13	0.11	0.19	0.01	0.12	1.00

Table 5. 27: Inter-construct correlation and AVE for moderator age

Table 5.28 presents the overview of acceptable fit in both models. The Cronbach α and composite reliability were higher than 0.7 and 0.8 respectively and satisfied the internal consistency of measurement with underlying constructs in both models (Cronbach, 1951; Werts et al., 1974). The R^2 values for the main dependent variable BI was 26% and 34%, and for PU was 28% in each model, which indicates that models were moderately fit (see Chin, 1998). The communalities for both models were more than 0.50 thresholds (Hair et al., 2006) which suggest that variance extracted by the indicators/items towards underlying construct were more than half of the shared variance compared to the others. In addition goodness of fit index (GoF) (Tenenhaus et al., 2005) was computed for the both models and results suggest that younger-age model presented 32% and older-age model presented 36% GoF that was also in quite acceptable range. Finally, predictive relevance (Stone, 1974; Geiseer, 1975) to examine the cross-fitting and cross-validation, were computed using blindfolding (G=7 blocks). The results suggest that younger-age model fitted well (H^2 and F^2 >0), however, the older-age model's predictive relaveance of the cv-communality (H^2) and cv-redundancy (F^2) was not satisfied (H^2 and F^2 <0 or no negative).

Reliability and goodness of fit of the model (Younger-age Group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.826		0.544	0.773	0.23		
BI	0.825	0.265	0.542	0.716	0.24	0.050	0.12
BU	0.875	0.119	0.638	0.813	0.40	0.031	0.06
GS	0.854		0.541	0.784	0.32		
IS	0.853		0.538	0.786	0.30		
NAT	0.866		0.619	0.811	0.37		
PEOU	0.891	0.023	0.671	0.835	0.45	0.015	0.01
PU	0.851	0.280	0.535	0.779	0.31	0.026	0.14
RF	0.826		0.544	0.718	0.24		
SE	0.954		0.911	0.909	0.59		
SN	0.826		0.489	0.745	0.22		
TF	0.852		0.593	0.790	0.33		
Average		**0.17163**	**0.59693**			**0.03015**	
GoF		**0.32008**					
Reliability and goodness of fit of the model (Older-age Group)							
AT	0.83		0.55	0.79	0.00		
BI	0.86	0.34	0.60	0.77	0.00	0.06	0.00
BU	0.83	0.22	0.56	0.75	0.00	0.06	0.00
GS	0.80		0.44	0.69	0.00		
IS	0.84		0.51	0.76	0.00		
NAT	0.92		0.73	0.89	0.00		
PEOU	0.91	0.07	0.71	0.86	0.00	0.05	0.00
PU	0.87	0.28	0.58	0.82	0.00	0.03	0.00
RF	0.80		0.50	0.71	0.00		
SE	0.85		0.75	0.77	0.00		
SN	0.85		0.53	0.78	0.00		
TF	0.88		0.65	0.82	0.00		
Average		**0.2291**	**0.593**			**0.050**	
GoF		**0.368**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 28: Overall overview of results and GoF of moderator age

Finally, table 5.29 presents the estimated values of the structural paths within original sample and subsamples with pair-wise parametric t-tests and non-parametric Smith-Satterthwait test of differences. It is found that model younger-age produced similar results like the overall sample model except TF→PU (β=0.13 or 13% and t=1.93). The highest significant path was between PU→BI (β=0.32 or 32% and t=5.84) and lowest significant path was between GS→PU (β=0.12 or 12% and t=2.30). The shared variance accounted by the independent variables was higher in PU (R^2 = 0.28 or 28%) followed by BI (R^2 = 0.26 or 26%). In model older-age results were slightly different from the overall sample model, such that paths were different in TF→BU (β=0.19 or 19% and t=1.43), IS→BU (β=0.16 or 16% and t=1.26), PEOU→PU (β=0.13 or 13% and t=1.3), and GS→PU (β=0.10 or 10% and t=0.92). The highest variance shared in dependent variable was in BI (R^2=0.33 or 33%) followed by PU (R^2=0.28 or 28%). The highest significant path was between PU→BI (β=0.38 or 38% and t=3.79) and lowest one was between SN→PU (β=0.24 or 24% and t=2.17).

After observing the values of parametric t-test and Smith-Satterthwait test, it is found that there were only two significant differences between two age groups i.e. RF→BU (t=2.03 and 1.79) and PEOU→PU (t=1.96 and t=1.88). Specifically, RF→BU was negatively insignificant in overall sample (β=-0.01 or -1% only and t=0.225) and older-age model (β=-0.19 or -19% and t= 1.54), but was positively insignificant in younger-age model (β=0.05 or 5% and t=0.92). For the PEOU→PU path was insignificant in older-age model (β=0.13 or 13% and t=1.37) and was significant in younger-age mode (β=0.31 or 31% and t=5.71). This result suggests that hypothesis **H13a** was partially supported, specifically **H13a2** and **H13a3** were supported leaving **H13a1** and **H13a4** unsupported.

Hypothesis	Combined Dataset(n=380)		Older in Age(n=91)		Younger in Age(n=289)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**		0.1984 (1.4307)Not Sig.		0.1375 (1.9349)Not Sig.		0.411	0.391
SE -> BU	0.0041 (0.0818)Not Sig.		-0.024 (0.1961)Not Sig.		-0.004 (0.0658)Not Sig.		0.155	0.146
RF -> BU	**-0.0141 (0.2555)Not Sig.**		**-0.192 (1.5494)Not Sig.**	0.222	**0.0504 (0.921)Not Sig.**		**2.031**	**1.790**
PU -> BU	0.0139 (0.1968)Not Sig.	0.126	0.0538 (0.3439)Not Sig.		-0.013 (0.1617)Not Sig.	0.119	0.399	0.380
BI -> BU	0.1941 (3.4228)***		0.286 (1.9886)*		0.1859 (2.9547)**		0.727	0.638
GS -> BU	0.0055 (0.0866)Not Sig.		-0.0377 (0.1706)Not Sig.		0.0034 (0.0557)Not Sig.		0.250	0.179
IS -> BU	0.1802 (3.2638)**		0.1663 (1.2658)Not Sig.		0.1747 (2.6619)**		0.061	0.057
SN -> PU	0.2203 (3.9937)***		0.2428 (2.1794)*		0.2202 (3.3578)**		0.171	0.175
PEOU -> PU	0.281 (5.8124)***		**0.1396 (1.3741)Not Sig.**	0.283	**0.3162 (5.7184)*** **	0.280	**1.96**	**1.88**
GS -> PU	0.1208 (2.3049)*	0.269	0.1031 (0.9265)Not Sig.		0.126 (2.3064)*		0.198	0.185
IS -> PU	0.208 (4.6002)***		0.3053 (2.8332)**		0.1975 (4.1871)***		1.044	0.916
TF -> BI	-0.0359 (0.6647)Not Sig.		0.0166 (0.1669)Not Sig.	0.338	-0.047 (0.7539)Not Sig.		0.513	0.542
AT -> BI	0.2439 (5.1168)***	0.265	0.2852 (2.4136)*		0.2292 (4.2973)***	0.265	0.485	0.432
NAT -> BI	0.0282 (0.6458)Not Sig.		0.0095 (0.0926)Not Sig.		0.0631 (0.9933)Not Sig.		0.423	0.443

PEOU -> BI	0.0232 (0.4562)Not Sig.		0.0229 (0.1868)Not Sig.		0.0135 (0.2202)Not Sig.		0.073	0.069
PU -> BI	0.3421 (7.5819)***		0.3815 (3.7983)***		0.322 (5.8457)***		0.527	0.520
RF -> BI	0.1715 (3.5596)***		0.2998 (2.3503)*		0.1533 (2.4883)*		1.121	1.034
SE -> BI	-0.0124 (0.2125)Not Sig.		0.0992 (0.7276)Not Sig.		-0.0244 (0.3871)Not Sig.		0.912	0.822
SN -> BI	0.0252 (0.5275)Not Sig.		-0.0899 (0.9998)Not Sig.		0.0582 (0.979)Not Sig.		1.264	1.374
SN -> PEOU	0.1836 (4.1729)***	0.034	0.2714 (3.1488)**	0.074	0.1509 (2.7892)**	0.023	1.120	1.184

Table 5. 29: Structural relations and path significance difference of moderator age

5.6.4.2.2 Gender

The nature of the moderating variable gender was categorical i.e. male and female, therefore it does not required any refinement. Also, no F-test was computed to examine the real difference between two groups. Out of 380 respondents half of were (n=190, 50%) were male and remaining half were (n=190, 50%) female. Table 5.30 indicates that AVE for most of the constructs in both models was higher than the common threshold 0.5 and satisfied the requirement of the convergent validity (Fornell & Larcker, 1981). Only construct GS, IS and RF in male group, and AT and SN's AVE in female group were slightly lower than then recommended value. The square-root of AVE computed for the each construct was higher than the inter-construct correlation, which indicates that the latent variable shared more variances with its assigned indicators compared to the others and satisfied the criterion of discriminant validity (ibid).

Correlation among the construct (Gender: Male Group)													
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.609	0.78	1.00											
BI	0.579	0.76	0.33	1.00										
BU	0.588	0.77	0.17	0.23	1.00									
GS	0.497	0.70	0.18	0.33	0.15	1.00								
IS	0.493	0.70	0.21	0.24	0.24	0.33	1.00							
NAT	0.707	0.84	0.28	0.15	0.04	0.22	0.14	1.00						
PEOU	0.635	0.80	0.13	0.22	0.08	0.15	0.16	0.23	1.00					
PU	0.504	0.71	0.03	0.37	0.14	0.29	0.22	0.16	0.32	1.00				
RF	0.481	0.69	0.13	0.29	0.15	0.18	0.15	0.10	0.14	0.07	1.00			
SE	0.867	0.93	0.34	0.09	0.19	0.13	0.18	0.33	0.18	0.11	0.15	1.00		
SN	0.505	0.71	0.14	0.18	0.14	0.27	0.10	0.23	0.20	0.38	0.17	0.22	1.00	
TF	0.505	0.71	0.23	0.19	0.19	0.22	0.28	0.28	0.27	0.15	0.24	0.21	0.20	1.00
Correlation among the construct (Gender: Female Group)													
AT	0.48	0.69	1.00											
BI	0.53	0.73	0.33	1.00										
BU	0.64	0.80	0.14	0.27	1.00									
GS	0.55	0.74	0.15	0.09	0.06	1.00								
IS	0.55	0.74	0.22	0.23	0.30	0.01	1.00							
NAT	0.60	0.78	0.17	0.16	0.16	0.18	0.02	1.00						

PEOU	0.72	0.85	0.30	0.23	0.16	0.22	0.23	0.06	1.00					
PU	0.58	0.76	0.21	0.44	0.20	0.25	0.38	0.09	0.44	1.00				
RF	0.58	0.76	0.15	0.23	0.09	0.22	0.20	0.07	0.11	0.20	1.00			
SE	0.91	0.95	0.17	0.17	-0.03	0.04	0.03	0.10	0.16	0.19	0.06	1.00		
SN	0.49	0.70	0.22	0.23	-0.04	0.19	0.05	0.10	0.18	0.30	0.10	0.30	1.00	
TF	0.61	0.78	0.19	0.09	0.23	0.11	0.13	0.14	0.13	0.19	0.28	0.08	0.12	1.00

Table 5. 30: Inter-construct correlation and AVE for moderator gender

Internal consistency metrics, presented in table 5.31 revealed that Cronbach α was higher than 0.7 and composite reliability was higher than 0.78 in both models and satisfied the measurement indicators criterion (Cronbach, 1951; Werts et al., 1974). The variance explained by independent variables in dependent variables R^2 in male group was higher in BI (0.30 or 30%) followed by PU (0.24 or 24%). For the female group, R^2 was higher in PU (0.33 or 33%) followed by the BI (0.28 or 28%). Based on Chin's criterion (Chin, 1998), R^2 suggests that both models were moderately acceptable. The shared variances extracted by the indicators in their underlying constructs presented by communalities were also higher than 0.5 thresholds in both models. Only, GS, IS and RF in male group, and AT and SN in female group shared slightly lower communalities than the recommended value. However, the average communality of all the constructs in individual model was still higher than the required threshold i.e. 0.58 (58%) and 0.60 (60%) in male and female group respectively. The goodness of fit index (GoF) for the male group was 0.32 or 32% and for female group was 0.35 or 35% which were in quite acceptable range. Finally the predictive relevance suggested by Stone and Geiseer (Stone, 1974; Geiseer, 1975) were computed using blindfolding method with omission distance G=7. The results of predictive relevance suggest that both models were acceptable at fit level (H^2 and F^2 >0).

Reliability and goodness of fit of the model (Gender: Male Group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.861		0.609	0.801	0.330		
BI	0.846	0.303	0.579	0.757	0.299	0.064	0.162
BU	0.850	0.118	0.588	0.768	0.316	0.027	0.048
GS	0.830		0.497	0.744	0.247		
IS	0.828		0.493	0.749	0.238		
NAT	0.906		0.707	0.866	0.500		
PEOU	0.874	0.041	0.635	0.806	0.388	0.025	0.026
PU	0.834	0.245	0.504	0.755	0.259	0.030	0.111
RF	0.787		0.481	0.662	0.144		
SE	0.929		0.867	0.855	0.496		
SN	0.836		0.505	0.756	0.246		
TF	0.860		0.609	0.793	0.355		
Average		**0.177**	**0.589**			**0.036**	
GoF		**0.323**					
Reliability and goodness of fit of the model (Gender: Female Group)							
AT	0.783		0.482	0.748	0.171		
BI	0.818	0.287	0.533	0.702	0.229	0.052	0.116

BU	0.875	0.180	0.637	0.818	0.400	0.040	0.084
GS	0.857		0.549	0.788	0.326		
IS	0.861		0.555	0.800	0.333		
NAT	0.858		0.604	0.813	0.326		
PEOU	0.911	0.033	0.720	0.869	0.523	0.024	0.025
PU	0.873	0.336	0.581	0.817	0.371	0.029	0.177
RF	0.848		0.584	0.761	0.311		
SE	0.952		0.909	0.903	0.586		
SN	0.826		0.490	0.761	0.221		
TF	0.862		0.609	0.800	0.338		
Average		**0.209**	**0.604**			**0.036**	
GoF		**0.355**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 31: Overall overview of results and GoF of moderator gender

Table 5.32 shows the estimated values of the structural relations within overall sample and subsamples. Total twenty paths with two groups (i.e. 20x2 = 40 comparisons) were compared using pair-wise parametric t-tests and non-parametric Smith-Satterthwait test of differences. Results revealed that male group sample produced slightly different results from the overall sample model, specifically TF→BU (β=0.07 or 7% and t=1.08), BI→BU (β=0.15 or 15% and t=1.46), GS→PU (β=0.13 or 13% and t=1.84) and IS→PU (β=0.11 or 11% and t=1.55) were different. The highest significant path in male group was between PU→BI (β=0.34 or 34% and t=5.27) and lowest significant path was between IS→BU (β=0.15 or 15% and t=2.15). In the model female group sample results were similar like the overall sample model. The highest significant path was between PU→BI (β=0.36 or 36% and t=5.34) and lowest one was between RF→BI (β=0.13 or 13% and t=2.21).

After observing the values of parametric t-test and Smith-Satterthwait non-parametric test, it was found that there was significant difference between male and female group at relations, SE→BU (t=2.04 and 2.04) and IS→PU (t=1.98 and t=1.97). For instance, even though SE→BU was insignificant in overall sample and in both subsamples, but it produced negative relationship in only female sample (β=-0.09 or -09% and t= 1.11). The second difference within subsamples was between IS→PU, such that relationship was significant in female group sample (β=0.29 or 29% and t=4.12) and was insignificant in male group sample (β=0.11 or 11% and t=1.55). Thus hypotheses **H13b** was partially supported. Specifically, **H13b1** and **H13b2** were supported and **H13b3** and **H13b4** were unsupported.

Hypothesis	Combined Dataset(n=380)		Gender Male(n=190)		Gender Female(n=190)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.0783 (1.0883)Not Sig.	0.118	0.2038 (2.8368)**	0.180	1.238	1.234
SE -> BU	0.0041 (0.0818)Not Sig.		**0.1203 (1.8912)Not Sig.**		**-0.0904 (1.1106)Not Sig**.		**2.045**	**2.040**
RF -> BU	-0.0141 (0.2555)Not Sig.		0.0393 (0.3554)Not Sig.		-0.0715 (1)Not Sig.		0.844	0.841
PU -> BU	0.0139 (0.1968)Not Sig.		0.0206 (0.1868)Not Sig.		-0.005 (0.0476)Not Sig.		0.169	0.168
BI -> BU	0.1941 (3.4228)***		0.1502 (1.4678)Not Sig.		0.2334 (3.2256)**		0.666	0.664
GS -> BU	0.0055 (0.0866)Not Sig.		0.0002 (0.002)Not Sig.		0.0377 (0.4384)Not Sig.		0.293	0.292
IS -> BU	0.1802 (3.2638)**		0.1533 (2.1545)*		0.2366 (2.8377)**		0.762	0.760
SN -> PU	0.2203 (3.9937)***	0.269	0.202 (2.753)**	0.245	0.288 (4.0531)***	0.336	0.844	0.842
PEOU -> PU	0.281 (5.8124)***		0.2225 (3.3595)**		0.3001 (4.3918)***		0.818	0.816
GS -> PU	0.1208 (2.3049)*		0.139 (1.8436)Not Sig.		0.1406 (2.1325)*		0.016	0.016
IS -> PU	0.208 (4.6002)***		**0.1102 (1.5537)Not Sig.**		**0.2926 (4.1295)*** **		**1.980**	**1.970**
TF -> BI	-0.0359 (0.6647)Not Sig.	0.265	0.0247 (0.3713)Not Sig.	0.303	-0.0793 (0.8626)Not Sig.	0.287	0.919	0.916
AT -> BI	0.2439 (5.1168)***		0.3185 (5.0721)***		0.225 (3.3545)**		1.020	1.017
NAT -> BI	0.0282 (0.6458)Not Sig.		0.005 (0.0986)Not Sig.		0.0822 (0.94)Not Sig.		0.767	0.765
PEOU -> BI	0.0232 (0.4562)Not Sig.		0.0459 (0.5974)Not Sig.		-0.025 (0.3652)Not Sig.		0.691	0.689
PU -> BI	0.3421 (7.5819)***		0.3415 (5.2706)***		0.3655 (5.3447)***		0.255	0.255
RF -> BI	0.1715 (3.5596)***		0.2346 (3.2509)**		0.1389 (2.212)*		1.003	1.000
SE -> BI	-0.0124 (0.2125)Not Sig.		-0.0997 (1.3156)Not Sig.		0.0472 (0.6524)Not Sig.		1.405	1.401
SN -> BI	0.0252 (0.5275)Not Sig.		-0.0232 (0.3932)Not Sig.		0.0451 (0.6406)Not Sig.		0.745	0.743
SN -> PEOU	0.1836 (4.1729)***	0.034	0.2012 (3.01)**	0.041	0.1819 (2.9999)**	0.033	0.214	0.214

Table 5. 32: Structural relations and path significance difference of moderator gender

5.6.4.2.3 Organisational type

The nature of the moderating variable organisation type was categorical, where one category was representing public universities (n=207, 54%) and other was representing private universities (n=173, 45%). Similar like gender, no refinement was made to create the groups therefore there was no need to compute the F-test for assessing the differences. Table 5.33 revealed that the AVE computed for most the construct in public universities' model was higher than 0.5 except GS and SN. Within private universities' sample AVE was also higher than the thresholds except AT, NAT and SN. The higher AVE satisfied the criterion of the convergent validity (Fornell and Larcker, 1981). For the discriminant validity at construct level, square-root of AVE was compared with the inter-construct correlation which was higher than the all relative correlations, and thus, satisfied criterion of discriminant validity (ibid).

Correlation among the construct (Organisation: Public universities)														
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.590	0.77	1.00											
BI	0.600	0.77	0.40	1.00										
BU	0.629	0.79	0.31	0.42	1.00									
GS	0.472	0.69	0.23	0.29	0.13	1.00								
IS	0.537	0.73	0.33	0.35	0.38	0.30	1.00							
NAT	0.679	0.82	0.34	0.29	0.15	0.26	0.19	1.00						
PEOU	0.673	0.82	0.24	0.30	0.22	0.15	0.28	0.24	1.00					
PU	0.567	0.75	0.15	0.49	0.29	0.28	0.39	0.24	0.46	1.00				
RF	0.514	0.72	0.19	0.28	0.20	0.22	0.16	0.16	0.13	0.22	1.00			
SE	0.912	0.95	0.29	0.23	0.21	0.13	0.20	0.25	0.19	0.23	0.17	1.00		
SN	0.480	0.69	0.17	0.25	0.07	0.36	0.10	0.17	0.24	0.39	0.15	0.36	1.00	
TF	0.630	0.79	0.26	0.19	0.16	0.16	0.22	0.18	0.25	0.21	0.27	0.22	0.14	1.00
Correlation among the construct (Organisation: Private universities)														
AT	0.465	0.68	1.00											
BI	0.510	0.71	0.21	1.00										
BU	0.601	0.78	-0.01	0.09	1.00									
GS	0.544	0.74	0.14	0.15	0.09	1.00								
IS	0.505	0.71	0.08	0.10	0.15	0.06	1.00							
NAT	0.412	0.64	-0.01	-0.25	0.07	0.05	0.04	1.00						
PEOU	0.685	0.83	0.19	0.13	0.00	0.24	0.07	-0.03	1.00					
PU	0.517	0.72	0.07	0.32	0.06	0.29	0.20	-0.06	0.30	1.00				
RF	0.557	0.75	0.09	0.24	0.02	0.16	0.17	0.04	0.11	0.04	1.00			
SE	0.859	0.93	0.18	-0.03	-0.09	0.03	-0.03	0.06	0.09	0.02	-0.02	1.00		
SN	0.495	0.70	0.12	0.10	0.01	0.13	0.08	-0.02	0.14	0.29	0.13	0.13	1.00	
TF	0.585	0.76	0.12	0.06	0.28	0.16	0.16	0.20	0.10	0.12	0.22	0.04	0.15	1.00

Table 5. 33: Inter-construct correlation and AVE for moderator organisational type

Table 5.34 present the overall view of the both models. It is found that reliability values Cronbach α and composite reliability were within the boundaries usually required for acceptance (>0.7) and satisfied the requirement of the internal consistency of the measurement items with their underlying latent variable (Cronbach, 1951; Werts et al., 1974). The shared variance explained by the independent variables into dependent variable for the public universities model was 36% (R^2= 0.36) in both BI and PU, whereas for the private universities it was 24% in BI (R^2= 0.24) followed by 21% in PU (R^2= 0.21). According the Chin (1998) criterions suggested for the R^2 values in both model were well fitted into moderate category. Some of the communalities which are the measure of the outer-model (measurement model) were below than the acceptable threshold (>0.5), for instance- GS and SN in public universities, and AT, NAT and SN in private universities. However, the average communality in both models was well above than the required values. The GoF for the public universities was moderately acceptable (0.39 or 39%) compared to the private universities (0.28 or 28%) which was slightly lower than public universities model fit value. The cv-communality (H^2) and cv-redundancy (F^2) for the predictive relevance of both models were computed using G=7 omission distance in blindfolding method. The results reveal that both models were well above the acceptable threshold value (H^2 and F^2 >0 or no negative).

Reliability and goodness of fit of the model (Organisation: Public Group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.852		0.590	0.802	0.298		
BI	0.857	0.366	0.600	0.778	0.332	0.086	0.203
BU	0.871	0.254	0.629	0.806	0.377	0.096	0.134
GS	0.817		0.472	0.732	0.197		
IS	0.852		0.537	0.782	0.308		
NAT	0.894		0.679	0.843	0.456		
PEOU	0.892	0.059	0.673	0.838	0.449	0.041	0.040
PU	0.867	0.364	0.567	0.808	0.349	0.018	0.200
RF	0.808		0.514	0.691	0.201		
SE	0.954		0.912	0.905	0.589		
SN	0.821		0.480	0.734	0.182		
TF	0.872		0.630	0.811	0.373		
Average		**0.261**	**0.607**			**0.060**	
GoF		**0.398**					
Reliability and goodness of fit of the model (Organisation: Private Group)							
AT	0.770		0.465	0.738	0.163		
BI	0.804	0.241	0.510	0.677	0.207	0.021	0.074
BU	0.856	0.110	0.601	0.786	0.338	0.003	0.033
GS	0.853		0.544	0.795	0.331		
IS	0.834		0.505	0.769	0.264		
NAT	0.713		0.412	0.845	0.039		
PEOU	0.896	0.019	0.685	0.847	0.477	0.012	0.012
PU	0.841	0.217	0.517	0.765	0.276	0.038	0.100
RF	0.834		0.557	0.748	0.263		
SE	0.924		0.859	0.851	0.435		
SN	0.829		0.495	0.758	0.233		
TF	0.848		0.585	0.779	0.317		
Average		**0.147**	**0.561**			**0.019**	
GoF		**0.287**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 34: Overall overview of results and GoF of moderator organisation type

Table 5.35 presents the standardised estimation path values of the relations in overall sample and two subsample models. Results reveal that, within public universities subsample, only two paths were different from the overall sample. For instance, TF→BU (β=0.14 or 14% and t=2.60) and GS→PU (β=0.06 or 6% and t=0.89) were different. The highest significant path in public universities was between PU→BI (β=0.38 or 38% and t=6.94) and lowest one was between RF→BI (β=0.13 or 13% and t=2.17). The path results for the private universities were also bit similar to the overall sample except few. For instance, BI→BU (β=0.08 or 8%

and t=0.81), IS→BU (β=0.11 or 11% and t=1.53), AT→BI (β=0.17 or 17% and t=1.5) and SN→PEOU (β=0.13 or 13% and t=1.76) were different. The highest significant path in private universities subsample was between PU→BI (β=0.29 or 29% and t=3.98) and lowest one was between GS→PU (β=0.19 or 19% and t=2.9).

Differences between the paths of public and private universities subsamples were computed using t-test and Smith-Satterwait test. It was found that paths were different in relations at TF→BU (t=2.05 and t=2.22), and BI→BU (t=1.99 and t=2.0). For instance TF→BU was insignificant (β=0.02 or 02% and t=0.3) in public universities subsample and was significant (β=0.27 or 27% and t=2.94) in private universities subsample similar to the overall sample. Contrary, BI→BU similar to the overall sample was the significant (β=0.30 or 30% and t=3.86) into public universities subsample but was insignificant (β=0.08 or 8% and t=0.81) into private universities subsample. Looking at the results, hypothesis **H13c** was partially supported. Specifically, **H13c1** was only supported and remaining three **H13c2**, **H13c3**, and **H13c4** were unsupported.

Hypothesis	Combined Dataset(n=380)		Organisation Public(n=207)		Organisation Private(n=173)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**		**0.0204 (0.3116)Not Sig.**		**0.2721 (2.9464)****		**2.050**	**2.224**
SE -> BU	0.0041 (0.0818)Not Sig.		0.0805 (1.2358)Not Sig.		-0.0946 (1.2216)Not Sig.		1.477	1.730
RF -> BU	-0.0141 (0.2555)Not Sig.		0.0574 (0.7228)Not Sig.	0.254	-0.0938 (1.0372)Not Sig.		1.052	1.256
PU -> BU	0.0139 (0.1968)Not Sig.	0.126	0.0335 (0.3882)Not Sig.		-0.037 (0.3314)Not Sig.	0.110	0.443	0.500
BI -> BU	0.1941 (3.4228)***		**0.3009 (3.8652)*****		**0.0884 (0.8132)Not Sig.**		**1.991**	**2.01**
GS -> BU	0.0055 (0.0866)Not Sig.		-0.0643 (0.7964)Not Sig.		0.0553 (0.563)Not Sig.		0.811	0.941
IS -> BU	0.1802 (3.2638)**		0.1166 (1.539)Not Sig.		0.2495 (4.1575)***		1.205	1.375
SN -> PU	0.2203 (3.9937)***		0.2624 (3.7911)***		0.2191 (2.9237)**		0.348	0.425
PEOU -> PU	0.281 (5.8124)***	0.269	0.3167 (4.8173)***	0.364	0.2153 (3.4582)***	0.217	0.871	1.120
GS -> PU	0.1208 (2.3049)*		0.0634 (0.8979)Not Sig		0.1991 (2.9545)**		1.084	1.390
IS -> PU	0.208 (4.6002)***		0.1585 (2.1035)*		0.2531 (3.9585)***		0.814	0.958
TF -> BI	-0.0359 (0.6647)Not Sig.		-0.0174 (0.2423)Not Sig.		0.0061 (0.0724)Not Sig.		0.180	0.212
AT -> BI	0.2439 (5.1168)***		0.2827 (4.9172)***		0.1762 (1.5015)Not Sig.		0.897	0.815
NAT -> BI	0.0282 (0.6458)Not Sig.		0.0709 (1.3024)Not Sig.	0.366	-0.2341 (1.0168)Not Sig.		1.867	1.289
PEOU -> BI	0.0232 (0.4562)Not Sig.	0.265	0.0158 (0.209)Not Sig.		-0.0143 (0.1888)Not Sig.	0.241	0.223	0.281
PU -> BI	0.3421 (7.5819)***		0.3825 (6.9149)***		0.2996 (3.9869)***		0.805	0.888
RF -> BI	0.1715 (3.5596)***		0.1328 (2.172)*		0.2265 (2.9814)**		0.835	0.960
SE -> BI	-0.0124 (0.2125)Not Sig.		0.0118 (0.1426)Not Sig.		-0.044 (0.4136)Not Sig.		0.366	0.414
SN -> BI	0.0252 (0.5275)Not Sig.		0.0212 (0.2948)Not Sig.		-0.0294 (0.3907)Not Sig.		0.393	0.486

SN -> PEOU	0.1836 (4.1729)***	0.034	0.2437 (3.6116)***	0.059	0.1373 (1.768)Not Sig.	0.019	0.870	1.034

Table 5. 35: Structural relations and path significance difference of moderator organisation type

5.6.4.2.4 Academic position

The nature of moderating construct academic position was categorical, comprising on five categories- lecturer (n=204, 53%), assistant professor (n=134, 35%), associate professor (n=24, 6%) and professor (n=18, 4%). Due to lower number of the respondents from assistant professor to professor categories the sample were split into two groups- lecturer (n=204, 53%) and higher position (n=176, 46%). The F-test showed that the two groups split were really different from each other (F= 3.42, p<0.005). Results in table 5.36 shows that AVE for majority of the constructs in both sub-models was higher than threshold acceptance value (>0.5) satisfied the requirement for the convergent validity (Fornell and Larcker, 1981). The assumption of the discriminant validity examined by comparing the square-root of the each constructs AVE's with the inter-construct's correlation was also satisfied (ibid).

Correlation among the construct (Academic Position: Lecturer Group)														
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.521	0.722	1.00											
BI	0.534	0.730	0.34	1.00										
BU	0.652	0.807	0.16	0.28	1.00									
GS	0.531	0.729	0.14	0.17	0.15	1.00								
IS	0.534	0.731	0.25	0.14	0.30	0.13	1.00							
NAT	0.622	0.789	0.18	0.23	0.25	0.23	0.12	1.00						
PEOU	0.667	0.817	0.22	0.23	0.16	0.22	0.25	0.12	1.00					
PU	0.530	0.728	0.11	0.42	0.27	0.25	0.36	0.24	0.49	1.00				
RF	0.543	0.737	0.24	0.27	0.16	0.30	0.22	0.17	0.09	0.26	1.00			
SE	0.910	0.954	0.20	0.17	0.08	0.06	0.15	0.23	0.14	0.17	0.20	1.00		
SN	0.494	0.702	0.15	0.22	0.02	0.21	0.09	0.17	0.22	0.26	0.22	0.26	1.00	
TF	0.601	0.775	0.12	0.09	0.25	0.16	0.16	0.17	0.17	0.21	0.22	0.16	0.13	1.00
Correlation among the construct (Academic Position: Higher position Group)														
AT	0.576	0.759	1.00											
BI	0.586	0.766	0.31	1.00										
BU	0.569	0.754	0.15	0.25	1.00									
GS	0.497	0.705	0.18	0.22	0.06	1.00								
IS	0.520	0.721	0.15	0.32	0.23	0.20	1.00							
NAT	0.719	0.848	0.26	0.06	-0.02	0.18	0.07	1.00						
PEOU	0.685	0.828	0.22	0.22	0.07	0.17	0.13	0.19	1.00					
PU	0.561	0.749	0.13	0.39	0.05	0.30	0.23	0.00	0.29	1.00				
RF	0.507	0.712	0.02	0.26	0.07	0.06	0.07	0.01	0.14	0.00	1.00			
SE	0.773	0.879	0.33	0.14	0.05	0.10	0.06	0.22	0.21	0.15	-0.02	1.00		
SN	0.507	0.712	0.18	0.21	0.06	0.27	0.01	0.11	0.20	0.40	0.03	0.23	1.00	
TF	0.614	0.783	0.29	0.20	0.19	0.13	0.25	0.28	0.20	0.14	0.31	0.13	0.14	1.00

Table 5. 36: Inter-construct correlation and AVE for moderator academic position

The overall model fitting and overview for the both sub-models is presented in table 5.37. Results suggest that both models were well fitted in terms of reliability and validity. For instance, internal consistency measures Cronbach α for the both models was higher than the 0.7 and composite reliability was higher than 0.8. The sub-model lecturer explained highest shared variance into dependent construct PU (R^2 = 0.33 or 33%) followed by BI (R^2 = 0.28 or 28%). The sub-model higher in position explained highest shared variance into dependent variable BI (R^2 = 0.28 or 28%) followed by PU (R^2 =0.26 or 26%). Based on Chin (1998) criterions both models were acceptable at moderate level. The relationship of the indicators with their underlying latent variable was observed with communalities, which were higher than the acceptable value (>0.5). Only, SN in sub-model lecturer, and GS in sub-model higher in position presented slightly lower communalities. However, average computed for both sub-models communalities indicated that indicators in both sub-models shared more than half of the variance in their underlying constructs. The GoF computed for the both sub-models was higher than the 0.30 or 30% and were moderately acceptable range. Finally, tests of the predictive relevance computed using blindfolding with omission distance G=7 shows that cv-communality (H^2) and cv-redundancy (F^2) were well above the acceptable range (H^2 and F^2 >0 or no negative).

Reliability and goodness of fit of the model (Academic Position: Lecturer Group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	***F^2***
AT	0.812		0.521	0.766	0.202		
BI	0.820	0.287	0.534	0.706	0.232	0.056	0.120
BU	0.882	0.189	0.652	0.822	0.413	0.045	0.092
GS	0.850		0.531	0.783	0.288		
IS	0.851		0.534	0.785	0.301		
NAT	0.868		0.622	0.815	0.365		
PEOU	0.889	0.047	0.667	0.834	0.438	0.030	0.029
PU	0.848	0.330	0.530	0.775	0.299	0.021	0.160
RF	0.824		0.543	0.713	0.253		
SE	0.953		0.910	0.908	0.580		
SN	0.827		0.494	0.762	0.236		
TF	0.857		0.601	0.804	0.332		
Average		**0.213**	**0.595**			**0.038**	
GoF		**0.356**					
Reliability and goodness of fit of the model (Academic Position: Higher position Group)							
AT	0.844		0.576	0.792	0.276		
BI	0.850	0.286	0.586	0.765	0.312	0.051	0.137
BU	0.838	0.109	0.569	0.767	0.304	0.030	0.030
GS	0.827		0.497	0.745	0.256		
IS	0.844		0.520	0.771	0.278		
NAT	0.911		0.719	0.872	0.373		
PEOU	0.896	0.040	0.685	0.848	0.473	0.027	0.026
PU	0.864	0.264	0.561	0.804	0.339	0.038	0.139
RF	0.802		0.507	0.719	0.176		

SE	0.870		0.773	0.836	0.273		
SN	0.837		0.507	0.756	0.242		
TF	0.864		0.614	0.792	0.341		
Average		**0.175**	**0.593**			**0.036**	
GoF		**0.322**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 37: Overall overview of results and GoF of moderator academic position

The estimated values for the structural relations within sub-models are presented in table 5.38. Within sub-model lecturer results revealed that only two paths were different from the overall sample model. For instance, GS→PU (β=0.10 or 10% and t=1.65) and RF→BI (β=0.10 or 10% and t=1.53) were different. The highest significant path in lecturer sub-model was between PEOU→PU (β=0.37 or 37% and t=6.05) and lowest one was between SN→PU (β=0.13 or 13% and t=2.17). Similar to the lecturer sub-model, except two paths remaining all were similar in sub-model higher in academic positions and overall sample model. For instance, only TF→BU (β=0.13 or 13% and t=1.24) and IS→BU (β=0.14 or 14% and t=1.76) were different. The highest significant path in sub-model higher in academic position was between PU→BI (β=0.34 or 34% and t=4.73) and lowest on was between GS→PU (β=0.15 or 15% and t=2.24).

The tests of differences i.e. t-test and Smith-Satterwait test revealed that there was no significant difference in both groups. However, after closely observing it was noticed that relationship PEOU→PU was near to significant (t=1.95 and t=1.933). It was noticed that PEOU→PU was highly important for the lecturers (β=0.37 or 37% and t=6.05) compared to the higher position academics (β=0.18 or 18% and t=2.38). Observing the results it is concluded that hypothesis **H13d** was completely rejected.

Hypothesis	Combined Dataset(n=380)		Academic Position High(n=176)		Academic Position Lecturer (n=204)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.1338 (1.2414)Not Sig.	0.109	0.1851 (2.7149)**	0.189	0.414	0.402
SE -> BU	0.0041 (0.0818)Not Sig.		0.0043 (0.0376)Not Sig.		-0.0247 (0.3465)Not Sig.		0.223	0.216
RF -> BU	-0.0141 (0.2555)Not Sig.		-0.0394 (0.4247)Not Sig.		-0.0063 (0.0815)Not Sig.		0.277	0.274
PU -> BU	0.0139 (0.1968)Not Sig.		-0.091 (0.8379)Not Sig.		0.0646 (0.7331)Not Sig.		1.127	1.113
BI -> BU	0.1941 (3.4228)***		0.2275 (2.4194)*		0.2055 (2.9654)**		0.192	0.188
GS -> BU	0.0055 (0.0866)Not Sig.		-0.0078 (0.0819)Not Sig.		0.0473 (0.702)Not Sig.		0.483	0.472
IS -> BU	0.1802 (3.2638)**		0.1455 (1.7689)Not Sig.		0.2135 (2.9452)**		0.624	0.620
SN -> PU	0.2203 (3.9937)***	0.269	0.3175 (3.4528)***	0.264	0.1319 (2.178)*	0.330	1.732	1.686
PEOU -> PU	0.281 (5.8124)***		**0.1829 (2.3871)***		**0.3729 (6.0533)*****		**1.959**	**1.933**

GS -> PU	0.1208 (2.3049)*		0.1512 (2.2454)*		0.1063 (1.6576)Not Sig.		0.483	0.483
IS -> PU	0.208 (4.6002)***		0.1694 (2.2175)*		0.245 (4.3813)***		0.815	0.799
TF -> BI	-0.0359 (0.6647)Not Sig.		0.0017 (0.0238)Not Sig.		-0.0597 (0.8144)Not Sig.		0.590	0.592
AT -> BI	0.2439 (5.1168)***		0.2498 (3.6755)***		0.2583 (4.0463)***		0.091	0.091
NAT -> BI	0.0282 (0.6458)Not Sig.		-0.013 (0.2142)Not Sig.	0.286	0.0791 (1.4028)Not Sig.		1.113	1.110
PEOU -> BI	0.0232 (0.4562)Not Sig.	0.265	0.0219 (0.3039)Not Sig.		-0.0207 (0.315)Not Sig.	0.287	0.439	0.437
PU -> BI	0.3421 (7.5819)***		0.3451 (4.7347)***		0.3504 (5.3245)***		0.054	0.054
RF -> BI	0.1715 (3.5596)***		0.2533 (2.9996)**		0.1045 (1.5311)Not Sig.		1.388	1.370
SE -> BI	-0.0124 (0.2125)Not Sig.		0.0055 (0.0534)Not Sig.		0.0116 (0.157)Not Sig.		0.049	0.048
SN -> BI	0.0252 (0.5275)Not Sig.		0.0145 (0.1829)Not Sig.		0.0642 (0.9603)Not Sig.		0.484	0.479
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1989 (2.9976)**	0.040	0.2157 (3.2595)**	0.047	0.179	0.179

Table 5. 38: Structural relations and path significance difference of moderator academic position.

5.6.4.2.5 Educational level

Like the other moderator the nature of educational level moderator was also categorical. The first category was respondents (academics) having bachelor degree (n=39, 10%), second was respondents having masters degree (n=290, 76%) and finally third one was the respondents having doctorate degree (n=51, 13%). There was visible difference between the respondents having master's degree and others. It was possible to combine the groups having bachelor degree and doctorate degree to see the difference with master's degree but it was illogical. Due to totally different level of the educational level between bachelors and doctorate respondents they were not combined together. Thus, the impact of moderator educational level was observed into three groups rather than two. No refinement was made into variable therefore there was no need to compute the F-test to see the differences.

Table 5.39 presents the convergent validity and discriminant validity for all the three models. Even though sample was very low in bachelor and doctorate sub-models but still AVE computed for all the three models was higher than the acceptable level (>0.5). Exceptionally, within sub-model bachelor AVE was bit lower in BI, GS and IS, and was extremely lower in construct NAT. Within sub-model masters except SN all others constructs AVE was well above the threshold value. Finally within sub-model doctorate IS was bit lower and GS was extremely lower than the required values. The overall AVE's average results suggest that all three models produced acceptable convergent validity between the measurement items and underlying latent variables. The discriminant validity was assessed by observing the square-root of the AVE with inter-construct correlations (Fornell & Larcker, 1981). In all three models overall discriminant validity for all the constructs was well satisfied, except for the one construct within sub-model bachelor model i.e. NAT<BI. This result suggests that items measuring NAT construct were not clearly different from the items measuring BI. One possible reason can be the lower sample size in bachelor group.

Correlation among the construct (Educational level: Bachelor Group)														
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.655	0.81	1											
BI	0.457	0.68	0.34	1.00										
BU	0.592	0.77	0.00	0.13	1.00									
GS	0.482	0.69	0.00	0.16	0.31	1.00								
IS	0.455	0.67	0.15	0.12	0.37	0.36	1.00							
NAT	0.210	**0.46**	0.25	**0.57**	0.23	0.14	0.26	1.00						
PEOU	0.504	0.71	-0.02	-0.32	-0.19	0.05	-0.23	-0.29	1.00					
PU	0.438	0.66	-0.38	0.13	0.07	0.36	0.34	0.18	0.00	1.00				
RF	0.582	0.76	0.34	0.38	0.29	0.15	0.27	0.48	-0.28	0.08	1.00			
SE	0.856	0.93	0.57	-0.12	0.07	0.12	0.31	0.12	-0.01	-0.03	0.24	1.00		
SN	0.559	0.75	0.14	-0.25	-0.10	0.00	-0.17	-0.40	0.17	-0.38	-0.36	-0.04	1.00	
TF	0.658	0.81	0.08	0.15	0.53	0.40	0.14	0.19	0.24	0.02	0.08	-0.05	0.03	1.00
Correlation among the construct (Educational level: Masters Group)														
AT	0.524	0.72	1.00											
BI	0.559	0.75	0.33	1.00										
BU	0.629	0.79	0.21	0.28	1.00									
GS	0.543	0.74	0.21	0.20	0.08	1.00								
IS	0.551	0.74	0.22	0.22	0.26	0.18	1.00							
NAT	0.699	0.84	0.23	0.18	0.10	0.23	0.08	1.00						
PEOU	0.689	0.83	0.28	0.25	0.11	0.19	0.21	0.16	1.00					
PU	0.541	0.74	0.19	0.41	0.15	0.30	0.31	0.16	0.43	1.00				
RF	0.520	0.72	0.10	0.23	0.13	0.23	0.18	0.09	0.16	0.18	1.00			
SE	0.890	0.94	0.18	0.12	0.06	0.09	0.05	0.23	0.16	0.15	0.07	1.00		
SN	0.479	0.69	0.15	0.21	0.07	0.29	0.11	0.22	0.18	0.39	0.15	0.30	1.00	
TF	0.602	0.78	0.25	0.18	0.22	0.15	0.19	0.24	0.21	0.19	0.30	0.19	0.16	1.00
Correlation among the construct (Educational level: Doctorate Group)														
AT	0.523	0.72	1.00											
BI	0.586	0.77	0.35	1.00										
BU	0.582	0.76	-0.01	0.26	1.00									
GS	0.159	**0.40**	0.13	0.18	-0.28	1.00								
IS	0.472	0.69	0.21	0.28	0.24	0.11	1.00							
NAT	0.590	0.77	0.15	-0.11	-0.10	0.31	0.10	1.00						
PEOU	0.746	0.86	-0.25	0.31	0.33	0.06	0.21	0.11	1.00					
PU	0.635	0.80	-0.01	0.48	0.34	0.40	0.17	-0.07	0.30	1.00				
RF	0.573	0.76	0.17	0.20	-0.16	0.17	0.18	-0.01	-0.02	-0.11	1.00			
SE	0.924	0.96	0.38	0.26	0.23	0.23	0.30	0.29	0.08	0.10	0.03	1.00		
SN	0.599	0.77	0.26	0.37	0.03	0.22	-0.05	-0.15	0.14	0.36	0.20	0.08	1.00	
TF	0.590	0.77	-0.03	-0.21	-0.04	0.18	0.21	-0.03	-0.11	0.09	0.23	0.04	0.00	1.00

Table 5. 39: Inter-construct correlation and AVE for moderator educational level

Table 5.40 presents the overall model fitting for all three sub-models. It is found that within sub-model bachelors reliability measure Cronbach α was well above the required 0.6 but the composite reliability for the construct NAT was extremely lower than the threshold value. In addition to the measurement fitting, overall communality average was higher than the required value (>0.5) but at individual construct level BI, GS, IS and PU were slightly lower, while NAT was extremely lower than the required value. The effect of lower reliability and communality was also observed in predictive relevance computed using cv-communality (H^2) and cv-redundancy (F^2) and result for NAT (-0.27) was unsatisfied (H^2 and F^2 >0 or no negative). The highest variance explained by independent variables in sub-model bachelor in dependent variable BI (R^2 = 0.60 or 60%) followed by BU (R^2 = 0.40 or 40%). The average R^2 for sub-model bachelor was 0.33 and GoF was 0.42 which satisfied that model was moderately fit (Chin, 1998; Tenanhaus, 2005).

The sub-model masters presented both reliability measures Cronbach α and composite well above the required value i.e. 0.6 and 0.7 respectively. The highest variance explained by independent variables was in PU (R^2 = 0.34 or 34%) followed by BI (R^2 =0.25 or 25%). The relationship of the indicators with underlying variable presented by communalities for all the constructs were more than 0.5 or more than half of the variance into relevant constructs. Only indicators measuring the SN presented slightly lower communality (0.47) than the required value. Predictive relevance measured through the cross validity and redundancy was also satisfied i.e. H^2 and F^2 >0 or no negative. Finally the GoF index was also found to be in acceptable range (0.34 or 34%). In sub-model doctorate, reliability measures Cronbach α and composite reliability were above the required values, except for the GS. The highest variance shared by independent variables was in BI (R^2 = 0.57 or 57%) followed by BU (R^2 = 0.42 or 42%). The communalities for the each construct were above than the 0.5 required value except for the GS. However, when average communalities were computed then the effect of lower communality for GS was masked and overall model presented 0.58 or 58% communality. Except GS, predictive relevance computed using cross validity and reliability were also satisfactory. Finally observing the average R^2 value (0.33 or 33%) and GoF value (0.44 or 44%) it was concluded that model was acceptable at moderate level.

Reliability and goodness of fit of the model (Educational level: Bachelor Group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.883		0.655	0.837	0.365		
BI	0.756	0.600	0.457	0.615	0.093	-0.018	0.083
BU	0.850	0.405	0.592	0.770	0.306	-0.011	0.114
GS	0.787		0.482	0.723	0.220		
IS	0.795		0.455	0.708	0.121		

NAT	0.105		0.210	0.800	-0.270		
PEOU	0.754	0.030	0.504	0.632	0.230	0.018	0.008
PU	0.786	0.310	0.438	0.689	0.111	0.053	0.051
RF	0.847		0.582	0.762	0.311		
SE	0.923		0.856	0.833	0.332		
SN	0.862		0.559	0.804	0.179		
TF	0.882		0.658	0.827	0.438		
Average		**0.336**	**0.537**			**0.010**	
GoF		**0.425**					
Reliability and goodness of fit of the model (Educational level: Masters Group)							
AT	0.813		0.524	0.768	0.214		
BI	0.835	0.254	0.559	0.736	0.271	0.054	0.126
BU	0.871	0.143	0.629	0.805	0.386	0.044	0.071
GS	0.855		0.543	0.790	0.316		
IS	0.859		0.551	0.796	0.328		
NAT	0.903		0.699	0.858	0.483		
PEOU	0.898	0.034	0.689	0.848	0.477	0.023	0.023
PU	0.854	0.342	0.541	0.786	0.313	0.030	0.170
RF	0.813		0.520	0.702	0.209		
SE	0.942		0.890	0.878	0.547		
SN	0.821		0.479	0.733	0.204		
TF	0.858		0.602	0.794	0.335		
Average		**0.193**	**0.602**			**0.038**	
GoF		**0.341**					
Reliability and goodness of fit of the model (Educational level: Doctorate Group)							
AT	0.813		0.523	0.735	0.148		
BI	0.850	0.577	0.586	0.765	0.300	0.067	0.198
BU	0.845	0.427	0.582	0.757	0.304	0.004	0.120
GS	0.145		0.159	0.612	-0.445		
IS	0.814		0.472	0.716	0.178		
NAT	0.846		0.590	0.801	0.198		
PEOU	0.921	0.020	0.746	0.888	0.564	0.012	0.005
PU	0.896	0.306	0.635	0.855	0.447	0.099	0.181
RF	0.841		0.573	0.750	0.299		
SE	0.961		0.924	0.918	0.637		
SN	0.881		0.599	0.838	0.322		
TF	0.847		0.590	0.797	0.340		
Average		**0.332**	**0.582**			**0.045**	
GoF		**0.440**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 40: Overall overview of results and GoF of moderator educational level

After observing the model fitting of the all three models, next step was to see the estimated path differences among three models. Table 5.41 shows that seven of the paths in sub-model bachelor were different from the overall sample model. For instance BI→BU (β=-0.06 or -6% and t=0.29), PEOU→PU (β=0.09 or 9% and t=0.43), IS→PU (β=0.19 or 19% and t=0.71), PU→BI (β=0.26 or 26% and t=1.19), RF→BI (β=0.007 or 00% and t=0.04), SE→BI (β=-0.53 or 53% and t=2.06), and SN→PEOU (β=0.17 or 17% and t=0.79) were different. The highest significant path was between AT→BI (β=0.66 or 66% and t=2.00) and lowest one was between IS→BU (β=0.27 or 27% and t=0.77). For sub-model masters group results were similar like the overall sample group. One possible reason for the similar significance of result can be large sample size in sub-model master derived from the overall sample model. The highest significant path was between PU→BI (β=0.31 or 31% and t=5.29) and lowest one was between RF→BI (β=0.13 or 13% and t=2.166). Finally due to small sample size sub-model doctorate was also bit different from the overall sample model. For example, TF→BU (β=-0.015 or 1% and t=0.10), PU→BU (β=0.49 or 49% and t=2.003), BI→BU (β=0.01 or 1% and t=0.06), IS→BU (β=0.15 or 15% and t=0.79), PEOU→PU (β=0.22 or 22% and t=1.40), IS→PU (β=0.09 or 9% and t=0.7), TF→BI (β=-0.27 or 27% and t=2.04), and GS→PEOU (β=0.14 or 14% and t=0.77) were different. The highest significant path was between GS→BU (β=-0.54 or -54% and t=3.13) and lowest one was between RF→BI (β=0.25 or 25% and t=2.02).

The significance of the path difference between three sub-models was computed using t-test and Smith-satterthwait test. There were total 20 paths and 3 groups therefore total 60 pair-wise comparisons were made to observe the differences. Looking at the results, first difference was between path SN→PU between sub-models bachelor and masters (t=3.57 and t=2.86) and between bachelor and doctors (t=2.42 and t=2.34). The path SN→PU was negatively significant (β=-0.36 or -36% and t=2.7) into sub-model bachelor but was positively related into other two sub-models. This result suggests that sample having bachelor degree had negative perception of the subjective norms (peer influence and superior influence) towards the perception of usefulness of technology. The second difference was at path SE→BI between bachelor and masters (t=2.56 and t=2.44) and bachelor and doctors (t=2.44 and t=2.26). The result reveal that path was negatively significant into sub-model bachelor (β=-0.53 or -53% and t=2.06) but was insignificant in other two sub-models. This result suggests that self-efficacy was negatively related with the perception of intention within sample having bachelor degree only. Thus, hypotheses **H13e** was partially supported. Specifically, **H13e2**, **H13e3** were supported and **H13e1**, **H13e4** were unsupported.

Hypothesis	Combined Dataset(n=380)		Education level Bachelor (n=39)		Educational level Masters(n=290)		Educational level Doctor(n=51)		Parametric test of difference			Smith-Satterthwait test		
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square	Bachelor vs. Masters	Bachelor vs. Doctorate	Masters vs. Doctorate	Bachelor vs. Masters	Bachelor vs. Doctorate	Masters vs. Doctorate
TF -> BU	0.1435 (2.6076)**		0.4727 (2.0302)*		0.1513 (2.678)**		-0.0151 (0.1089)Not Sig.		1.835	1.915	1.138	1.342	1.801	1.113
SE -> BU	0.0041 (0.0818)Not Sig.		-0.0539 (0.2809)Not Sig.		-0.0033 (0.0548)Not Sig.		0.252 (1.6591)Not Sig.		0.287	1.282	1.644	0.252	1.251	1.565
RF -> BU	-0.0141 (0.2555)Not Sig.		0.2171 (1.1914)Not Sig.	0.405	0.0033 (0.0483)Not Sig.		-0.0539 (0.3838)Not Sig.		1.086	1.211	0.332	1.099	1.177	0.366
PU -> BU	0.0139 (0.1968)Not Sig.	0.126	-0.0552 (0.1968)Not Sig.		-0.0273 (0.4009)Not Sig.	0.143	0.4981 (2.0039)*	0.427	0.132	1.491	1.737	0.097	1.476	1.039
BI -> BU	0.1941 (3.4228)***		-0.0636 (0.2962)Not Sig.		0.2243 (3.4651)***		0.0135 (0.0693)Not Sig.		1.496	0.268	1.213	1.284	0.266	1.028
GS -> BU	0.0055 (0.0866)Not Sig.		0.0203 (0.1257)Not Sig.		-0.0165 (0.2364)Not Sig.		-0.5429 (3.1328)**		0.185	1.004	1.035	0.209	1.114	1.087
IS -> BU	0.1802 (3.2638)**		0.2772 (2.7736)**		0.1967 (3.3036)**		0.153 (0.7944)Not Sig.		0.389	0.328	0.269	0.222	0.305	0.217
SN -> PU	0.2203 (3.9937)***		**-0.3689 (2.7001)****.		**0.2763 (4.6209)*****		**0.2609 (1.9816)***		**3.572**	**2.426**	0.098	**2.866**	**2.342**	0.091
PEOU -> PU	0.281 (5.8124)***	0.269	0.0917 (0.4319)Not Sig.	0.310	0.3196 (5.8617)***	0.342	0.22 (1.4061)Not Sig.	0.306	1.365	0.504	0.687	1.040	0.487	0.601
GS -> PU	0.1208 (2.3049)*		0.2886 (1.9958)*		0.119 (2.4319)*		0.3216 (2.0842)**		1.168	0.091	1.199	1.010	0.098	0.674
IS -> PU	0.208 (4.6002)***		0.1916 (0.7179)Not Sig.		0.1928 (3.7386)***		0.0988 (0.7012)Not Sig.		0.007	0.331	0.691	0.004	0.308	0.626
TF -> BI	-0.0359 (0.6647)Not Sig.		0.0642 (0.3672)Not Sig.	0.600	0.0042 (0.0582)Not Sig.		-0.2764 (2.0438)*		0.289	1.584	1.545	0.317	1.541	1.829
AT -> BI	0.2439 (5.1168)***		0.6695 (2.0086)*		0.2311 (4.6056)***		0.354 (1.996)**.		1.881	0.847	0.833	1.301	0.801	0.570
NAT -> BI	0.0282 (0.6458)Not Sig.	0.265	0.2983 (1.1566)Not Sig.		0.0547 (1.1278)Not Sig.	0.254	-0.2041 (1.1918)Not Sig.	0.577	1.510	1.703	1.911	0.928	1.623	1.454
PEOU -> BI	0.0232 (0.4562)Not Sig.		-0.2157 (1.0837)Not Sig.		0.015 (0.2789)Not Sig.		0.2509 (1.9624)Not Sig.		1.417	1.078	1.704	1.119	1.972	1.701
PU -> BI	0.3421		0.2684		0.319		0.4449		0.276	0.784	0.841	0.217	0.716	1.069

	(7.5819)***		(1.1933)Not Sig.		(5.2929)***		(4.3985)***							
RF -> BI	0.1715 (3.5596)***		0.0078 (0.0406)Not Sig.		0.1345 (2.1662)*		0.2586 (2.0282)*		0.693	1.142	0.790	0.628	1.089	0.875
SE -> BI	-0.0124 (0.2125)Not Sig.		**-0.5315 (2.0655)***		**0.0025 (0.0372)Not Sig**.		**0.124 (0.9271)Not Sig.**		**2.567**	**2.441**	0.743	**1.988**	**2.261**	0.844
SN -> BI	0.0252 (0.5275)Not Sig.		-0.1057 (0.5265)Not Sig.		0.0137 (0.2118)Not Sig.		-0.013 (0.0904)Not Sig.		0.626	0.390	0.161	0.566	0.376	0.169
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1717 (0.7954)Not Sig.	0.030	0.1848 (3.205)**	0.034	0.1401 (0.7781)Not Sig.	0.020	0.075	0.114	0.286	0.059	0.112	0.236

Table 5. 41: Structural relations and path significance difference of moderator educational level.

5.6.4.2.6 Experience usage

The moderator usage experience in this study was measured with self-ascribed three point scale anchored as low, moderate and high. Most of the respondents (academics) self-estimated themselves as moderate to high in Internet usage experience (mean= 2.41/3), consequently, very little sample was observed in category low usage experience. Due to lower number of respondents in low usage experience category, scale was refined by appending low usage experience with moderate usage experience category. In this way, two categories of respondents- low usage experience (n=204, 53%) and high usage experience (n=176, 46%) were established from earlier three categories. Within low usage experience category, sample n=20, 9% respondents self-assessed themselves as low experienced, while remaining n=184, 90% self-assessed themselves as moderate experienced users. The F-test of the differences showed that two groups established were really different from each other (F=9.58, p<0.05).

Table 5.42 presents that the AVE extracted for each construct within sub-model high usage experience was higher than the acceptable range (>0.5). Similarly, AVE in almost all the constructs within sub-model low usage experience was also higher than the acceptable range and satisfied the criterion of the convergent validity (Fornell & Larcker, 1981). The square-root of AVE was also higher than 0.7 in both sub-models and none of the inter-construct correlation value exceed the square-root of AVE's value. This result satisfied the requirement of the discriminant validity and suggests that the constructs theoretically and empirically were different from each other to measure similar concept (ibid).

Correlation among the construct (Usage Experience: High Group)														
	AVE	$\sqrt{AVE}$	AT	BI	BU	GS	IS	NAT	PEOU	PU	RF	SE	SN	TF
AT	0.529	0.73	1.00											
BI	0.527	0.73	0.32	1.00										
BU	0.604	0.78	0.06	0.17	1.00									
GS	0.551	0.74	0.09	0.14	-0.01	1.00								
IS	0.569	0.75	0.06	0.11	0.16	0.10	1.00							
NAT	0.659	0.81	0.20	0.18	0.08	0.13	0.06	1.00						
PEOU	0.688	0.83	0.24	0.15	-0.05	0.09	-0.01	-0.05	1.00					
PU	0.536	0.73	0.17	-0.35	-0.13	0.20	0.21	0.11	0.25	1.00				
RF	0.550	0.74	0.13	0.17	0.10	0.25	0.20	0.07	0.07	0.12	1.00			
SE	0.920	0.96	0.32	0.04	-0.06	0.04	0.08	0.21	0.12	0.11	0.06	1.00		
SN	0.515	0.72	0.16	0.13	0.05	0.23	0.00	0.02	0.13	0.33	0.02	0.21	1.00	
TF	0.554	0.74	0.26	0.19	0.13	0.15	0.24	0.19	0.15	0.25	0.24	0.17	0.17	1.00

Correlation among the construct (Usage Experience: Low Group)														
AT	0.57	0.75	1.00											
BI	0.57	0.75	0.30	1.00										
BU	0.61	0.78	0.18	0.32	1.00									
GS	0.49	0.70	0.23	0.24	0.20	1.00								
IS	0.49	0.70	0.32	0.28	0.34	0.22	1.00							
NAT	0.63	0.79	0.21	0.09	0.06	0.29	0.07	1.00						
PEOU	0.66	0.82	0.15	0.26	0.23	0.31	0.32	0.24	1.00					
PU	0.55	0.74	0.05	0.45	0.22	0.33	0.36	0.09	0.51	1.00				
RF	0.51	0.72	0.15	0.33	0.13	0.13	0.19	0.13	0.16	0.16	1.00			
SE	0.87	0.93	0.18	0.17	0.13	0.10	0.11	0.21	0.17	0.16	0.12	1.00		
SN	0.49	0.70	0.17	0.29	0.08	0.24	0.13	0.32	0.27	0.33	0.25	0.29	1.00	
TF	0.60	0.77	0.15	0.12	0.29	0.18	0.16	0.19	0.22	0.11	0.28	0.09	0.14	1.00

Table 5. 42: Inter-construct correlation and AVE for moderator usage experience

Table 5.43 shows that Cronbach α and composite reliability were respectively above than 0.6 and 0.8 and satisfied the reliability conditions. Average R^2 explained for the dependent constructs in sub-model high usage experience was lower than the sub-model low usage experience. Individually, within sub-model high in usage experience highest R^2 was explained into dependent variable BI (R^2=0.21 or 21%) followed by PU (R^2=0.20 or 20%), whereas within sub-model low on usage experience highest R^2 was explained into PU (R^2=0.35 or 35%) followed by BI (R^2=0.33 or 33%). The average R^2 for both the model was higher than 0.19, which suggest that both models were acceptable at moderate level (see Chin, 1998). The communalities for the both sub-models were higher than 0.5 and satisfied the criterion for the convergent validity (Fornell and Larcker, 1981). The predictive relevance assessed using blindfolding method with omission distance G=7, shows that cv-communality (H^2) and cv-redundancy (F^2) values were above than the required criterion (H^2 and F^2 >0 or no negative). Finally, the combined measurement items validity (average communality) and structural path's explanatory power (average R^2) were computed using GoF. Results shows that GoF for both sub-models both were in acceptable range, specifically, within sub-model high usage experience GoF was 0.27(27%) and for sub-model low usage experience GoF was 0.38(38%).

Reliability and goodness of fit of the model (Usage Experience: High group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.817		0.529	0.768	0.207		
BI	0.815	0.217	0.527	0.697	0.231	0.051	0.087
BU	0.857	0.068	0.604	0.803	0.297	0.011	0.005
GS	0.856		0.551	0.791	0.342		
IS	0.868		0.569	0.812	0.348		
NAT	0.885		0.659	0.839	0.435		
PEOU	0.896	0.016	0.688	0.850	0.500	0.010	0.012
PU	0.852	0.205	0.536	0.784	0.303	0.016	0.092
RF	0.829		0.550	0.753	0.253		

SE	0.959		0.920	0.915	0.373		
SN	0.841		0.515	0.767	0.251		
TF	0.826		0.554	0.817	0.305		
Average		**0.126**	**0.600**			**0.022**	
GoF		**0.275**					
Reliability and goodness of fit of the model (Usage Experience: Low group)							
AT	0.840		0.568	0.785	0.266		
BI	0.840	0.334	0.569	0.745	0.291	0.049	0.159
BU	0.860	0.225	0.606	0.784	0.338	0.053	0.113
GS	0.828		0.491	0.740	0.230		
IS	0.828		0.492	0.744	0.245		
NAT	0.870		0.629	0.839	0.366		
PEOU	0.888	0.072	0.665	0.834	0.432	0.045	0.045
PU	0.857	0.357	0.546	0.791	0.322	0.039	0.184
RF	0.806		0.512	0.680	0.195		
SE	0.928		0.867	0.851	0.494		
SN	0.829		0.493	0.747	0.224		
TF	0.855		0.595	0.777	0.319		
Average		**0.247**	**0.586**			**0.046**	
GoF		**0.380**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 43: Overall overview of results and GoF of moderator usage experience

Table 5.44 shows that estimated values for the structural relations within sub-model usage experience high were relatively different from the overall sample results. For instance, paths TF→BU (β=0.07 or 7% and t=0.49), BI→BU (β=0.13 or 13% and t=0.95), IS→BU (β=0.11 or 11% and t=1.88), GS→PU (β=0.10 or 10% and t=1.06), NAT→BI (β=0.10 or 10% and t=2.04), and RF→BI (β=0.09 or 9% and t=1.4) were different. The highest significant path was between PU→BI (β=-0.27 or -27% and t=3.53) and lowest one was between NAT→BI (β=0.10 or 10% and t=2.04). The paths within sub-model usage experience low were relatively similar to the overall sample, except, GS→PU (β=0.13 or 13% and t=1.92). The highest significant path was between PU→BI (β=0.38 or 38% and t=6.60) and lowest one was between SN→PU (β=0.17 or 17% and t=2.99).

The tests of differences i.e. t-test and Smith-Satterwait test revealed that the two sub-model shown significant difference at path PU→BI (t=2.20 and t=1.98). Specifically, path PU→BI was negatively significant in sub-model with high usage experience (β=-0.27 or 27% and t=3.53), contrary was positively significant in low usage experience (β=0.38 or 38% and t=6.60). The second difference was at path BI→BU (t=2.64 and t=2.616), specifically path was significant in high usage experience (β=0.22 or 22% and t=3.56) and was insignificant in low usage experience (β=0.13 or 13% and t=0.95). Finally, third difference was at path IS→BU (t=2.078 and t=2.10), specifically path was insignificant into high usage experience (β=0.117 or 11% and t=1.88) and was significant into low usage experience users (β=0.23 or 23% and t=2.81). Observing the results of differences it is found that hypothesis **H14a** was partially accepted, specifically, **H14a1** and **H14a3** were supported and **H14a2** and **H14a4** were unsupported.

Hypothesis	Combined Dataset(n=380)		Usage Experience High(n=176)		Usage Experience Low(n=204)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.0709 (0.4957)Not Sig.	0.068	0.2336 (3.4325)***	0.225	1.075	1.027
SE -> BU	0.0041 (0.0818)Not Sig.		-0.0891 (0.8318)Not Sig.		0.0491 (0.6799)Not Sig.		1.098	1.070
RF -> BU	0.0141 (0.2555)Not Sig.		-0.0489 (0.5372)Not Sig.		0.0634 (0.8383)Not Sig.		0.960	0.949
PU -> BU	0.0139 (0.1968)Not Sig.		-0.0573 (0.5476)Not Sig.		0.0091 (0.1052)Not Sig.		0.495	0.489
BI -> BU	0.1941 (3.4228)***		**0.2227 (3.5617)*****		**0.1305 (0.9592)Not Sig.**		**2.646**	**2.616**
GS -> BU	0.0055 (0.0866)Not Sig.		-0.0716 (0.7085)Not Sig.		0.0618 (0.7186)Not Sig.		1.015	1.006
IS -> BU	0.1802 (3.2638)**		**0.1177 (1.889)Not Sig.**		**0.2315 (2.8141)****		**2.078**	**2.102**
SN -> PU	0.2203 (3.9937)***	0.269	0.2782 (3.3781)**	0.205	0.1778 (2.9925)**	0.357	1.010	0.989
PEOU -> PU	0.281 (5.8124)***		0.2059 (2.9824)**		0.3568 (5.1143)***		1.532	1.537
GS -> PU	0.1208 (2.3049)*		0.1007 (1.0686)Not Sig.		0.1373 (1.9233)Not Sig.		0.315	0.310
IS -> PU	0.208 (4.6002)***		0.2006 (3.1724)**		0.195 (3.1011)**		0.063	0.063
TF -> BI	0.0359 (0.6647)Not Sig.	0.265	-0.0262 (0.2756)Not Sig.	0.217	0.0182 (0.287)Not Sig.	0.334	0.399	0.389
AT -> BI	0.2439 (5.1168)***		0.2557 (3.1894)**		0.2423 (4.1306)***		0.138	0.135
NAT -> BI	0.0282 (0.6458)Not Sig.		0.1076 (2.0405)*		-0.0484 (0.5391)Not Sig.		1.443	1.498
PEOU -> BI	0.0232 (0.4562)Not Sig.		0.0313 (0.3537)Not Sig.		-0.0194 (0.2594)Not Sig.		0.442	0.437
PU -> BI	0.3421 (7.5819)***		**-0.2745 (3.5325)*****		**0.3897 (6.6031)*****		**2.201**	**1.981**
RF -> BI	0.1715 (3.5596)***		0.0939 (1.4431)Not Sig.		0.2193 (3.6089)***		1.411	1.408
SE -> BI	-0.0124 (0.2125)Not Sig.		-0.102 (1.2025)Not Sig.		0.0258 (0.3447)Not Sig.		1.136	1.129
SN -> BI	0.0252 (0.5275)Not Sig.		0.0033 (0.0379)Not Sig.		0.0764 (1.0942)Not Sig.		0.662	0.653
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1261 (1.9886)*	0.016	0.2676 (3.8154)***	0.072	1.436	1.443

Table 5. 44: Structural relations and path significance difference of moderator usage experience

5.6.4.2.7 Voluntariness

The nature of moderating variable voluntariness in this study was metrically scaled. Three questions measured on seven-point Likert-scale ranging from strongly-disagrees to strongly-agree were asked from the respondents (academics) to know whether the nature of the Internet usage was mandatory or was voluntary in their institutions. The overall mean of the construct was 3.18/7.0, which suggests that the usage of the Internet in the perspective of the respondents was mandatory. For observing the moderating impact using MGA the metrically scaled construct voluntariness was transformed into categorical construct. Based on mean 3.18, scores were categorised into two groups- compliance group (n=226, 59%, mean<3.18) and voluntariness (n=154, 40%, mean>3.18). The F-test shows that two groups were significantly different from each other ($F=9.18$, $p<0.005$). The convergent validity and discriminant validity of the both sub-models were examined by observing the AVE of each latent construct form its measuring indicators/items. Table 5.45 revealed that AVE extracted for both sub-models were above than the required value (>0.5) and satisfied the criterion of convergent validity (Fornell and Larcker, 1981). Only slightly lower (near to acceptable) AVE was observed into IS and SN in sub-model voluntariness. The square-root of AVE compared with the inter-construct correlation reveals that none of the inter-construct correlation was higher than the square-root of AVE and satisfied the criterion of the discriminant validity (ibid).

Correlation among the construct (Voluntariness: Compliance group)														
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.555	0.745	1.00											
BI	0.551	0.742	0.31	1.00										
BU	0.616	0.785	0.08	0.23	1.00									
GS	0.560	0.748	0.11	0.19	0.08	1.00								
IS	0.516	0.718	0.18	0.22	0.27	0.08	1.00							
NAT	0.653	0.808	0.12	0.17	0.14	0.21	0.16	1.00						
PEOU	0.693	0.832	0.15	0.18	0.08	0.23	0.19	0.14	1.00					
PU	0.542	0.736	0.04	0.38	0.17	0.23	0.23	0.15	0.35	1.00				
RF	0.553	0.743	0.12	0.22	0.06	0.14	0.17	0.16	0.10	0.14	1.00			
SE	0.907	0.952	0.20	0.18	0.03	0.07	0.12	0.15	0.17	0.20	0.09	1.00		
SN	0.511	0.715	0.22	0.22	0.07	0.20	0.05	0.19	0.20	0.29	0.13	0.20	1.00	
TF	0.645	0.803	0.20	0.16	0.27	0.23	0.27	0.22	0.19	0.21	0.28	0.11	0.13	1.00
Correlation among the construct (Voluntariness: Voluntariness group)														
AT	0.53	0.73	1.00											
BI	0.56	0.75	0.33	1.00										
BU	0.62	0.78	0.27	0.31	1.00									
GS	0.46	0.68	0.27	0.24	0.16	1.00								
IS	0.54	0.73	0.26	0.23	0.24	0.30	1.00							
NAT	0.66	0.81	0.39	0.14	0.07	0.20	0.06	1.00						
PEOU	0.66	0.81	0.32	0.31	0.18	0.14	0.19	0.14	1.00					
PU	0.55	0.74	0.25	0.48	0.19	0.33	0.41	0.05	0.45	1.00				
RF	0.51	0.72	0.17	0.31	0.18	0.28	0.18	0.00	0.15	0.14	1.00			
SE	0.87	0.93	0.30	0.04	0.14	0.09	0.08	0.31	0.13	0.04	0.11	1.00		
SN	0.49	0.70	0.06	0.16	0.02	0.28	0.12	0.07	0.16	0.35	0.15	0.33	1.00	

TF	0.54	0.73	0.17	0.09	0.11	0.06	0.12	0.22	0.18	0.10	0.24	0.20	0.16	1.00

Table 5. 45: Inter-construct correlation and AVE for moderator voluntariness

The validity, reliability and overall model fitting is presented in table 5.46. Results indicates that Cronbach α and composite reliability for both sub-models were higher than the 0.6 and 0.7 and satisfied the criterion of the internal consistency reliability (Cronbach, 1951; Werts et al., 1974). The communalities for all the constructs in sub-model compliance were higher than the required value 0.5, while within sub-model voluntariness construct GS and SN shown slightly lower values than the acceptable range. However, overall average communality for both sub-models were satisfactory (>0.5). Within sub-model compliance, the variance explained by independent variables into dependent variable i.e. R^2 was highest in BI (R^2=0.25 or 25%) followed PU (R^2=0.21 or 21%), while within sub-model voluntariness R^2 was highest in PU (R^2=0.39 or 39%) followed by BI (R^2=0.33 or 33%). According to Chin (1998) criterion based on explanatory power R^2 both models presented moderate level of acceptable fit. Besides looking at the magnitude of the R^2 as a criterion for predictive relevance, the cv-communality (H^2) and cv-redundancy (F^2) results in both models were above than the zero positive value and satisfied model's predicative relevance (Tenenhaus et al., 2005). Finally, the global criterion of goodness of fit (GoF) index represented that sub-model compliance group shown 0.31 or 31%, and sub-model voluntariness 0.36 or 36% fit index which suggest that both models were moderately acceptable.

Reliability and goodness of fit of the model (Voluntariness: Compliance group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.832		0.555	0.792	0.235		
BI	0.829	0.252	0.551	0.725	0.262	0.052	0.112
BU	0.864	0.146	0.616	0.798	0.366	0.025	0.068
GS	0.863		0.560	0.804	0.338		
IS	0.842		0.516	0.766	0.271		
NAT	0.882		0.653	0.843	0.399		
PEOU	0.900	0.042	0.693	0.850	0.480	0.028	0.027
PU	0.855	0.216	0.542	0.787	0.313	0.022	0.108
RF	0.831		0.553	0.729	0.248		
SE	0.951		0.907	0.898	0.583		
SN	0.839		0.511	0.764	0.234		
TF	0.879		0.645	0.822	0.401		
Average		**0.164**	**0.608**			**0.032**	
GoF		**0.316**					
Reliability and goodness of fit of the model (Voluntariness: Voluntariness group)							
AT	0.819		0.532	0.760	0.359		
BI	0.835	0.332	0.559	0.737	0.302	0.047	0.081
BU	0.864	0.143	0.615	0.793	0.167	0.053	0.066
GS	0.808		0.460	0.704	0.265		
IS	0.853		0.539	0.786	0.314		

NAT	0.885		0.659	0.846	0.431		
PEOU	0.887	0.025	0.664	0.831	0.490	0.017	0.036
PU	0.857	0.393	0.546	0.791	0.327	0.038	0.076
RF	0.808		0.513	0.693	0.196		
SE	0.929		0.868	0.854	0.480		
SN	0.826		0.489	0.742	0.120		
TF	0.818		0.535	0.748	0.460		
Average		**0.223**	**0.582**			**0.039**	
GoF		**0.360**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 46: Overall overview of results and GoF of moderator voluntariness

Table 5.47 provides the detailed results of the standardised path estimations for the overall sample model and two sub-models. Within sub-model compliance most of the paths were similar to the overall sample model. The highest significant path in sub-model compliance was PU→BI (β=0.32 or 32% and t=5.31) and lowest one was RF→BI (β=0.12 or 12% and t=2.19). Within sub-model voluntariness paths were bit different from the overall sample model. For instance, path relations TF→BU (β=0.03 or 3% and t=0.21), IS→BU (β=0.03 or 3% and t=0.29), GS→PU (β=0.11 or 11% and t=1.92) and AT→BI (β=0.17 or 17% and t=1.87) were different. The highest significant path was between PU→BI (β=0.37 or 37% and t=4.68) and lowest one was between PEOU→SN (β=0.15 or 15% and t=2.05). Even though there were some paths different in the both sub-model, but the parametric t-test and non-parametric Smith-Satterthwait tests of significant differences reveal that there was no significant difference among two groups. Hence, hypothesis **H14b** was completely rejected.

Hypothesis	Combined Dataset(n=380)		Compliance (n=226)		Voluntariness (n=154)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.2141 (2.6985)**	0.146	0.0373 (0.2192)Not Sig.	0.143	1.043	0.942
SE -> BU	0.0041 (0.0818)Not Sig.		-0.0487 (0.7108)Not Sig.		0.1013 (1.1351)Not Sig.		1.355	1.333
RF -> BU	-0.0141 (0.2555)Not Sig.		-0.0713 (1.0476)Not Sig.		0.0496 (0.5325)Not Sig.		1.076	1.048
PU -> BU	0.0139 (0.1968)Not Sig.		0.038 (0.3854)Not Sig.		-0.0217 (0.2464)Not Sig.		0.428	0.451
BI -> BU	0.1941 (3.4228)***		0.166 (2.2617)*		0.2519 (2.8337)**		0.747	0.745
GS -> BU	0.0055 (0.0866)Not Sig.		-0.0114 (0.1278)Not Sig.		0.0305 (0.2936)Not Sig.		0.304	0.306
IS -> BU	0.1802 (3.2638)**		0.1844 (2.612)*		0.1596 (1.9055)Not Sig.		0.226	0.226
SN -> PU	0.2203 (3.9937)***	0.269	0.2096 (2.56)*	0.216	0.2206 (3.1854)**	0.393	0.096	0.103
PEOU -> PU	0.281 (5.8124)***		0.2508 (3.4469)***		0.3442 (4.9936)***		0.892	0.932
GS -> PU	0.1208 (2.3049)*		0.1347 (2.0207)*		0.1194 (1.9249)Not Sig.		0.165	0.168
IS -> PU	0.208 (4.6002)***		0.2825 (3.7604)***		0.1633 (2.7016)**		1.246	1.237
TF -> BI	-0.0359 (0.6647)Not Sig.	0.265	-0.0251 (0.3074)Not Sig.	0.252	-0.052 (0.5926)Not Sig.	0.332	0.220	0.225

AT -> BI	0.2439 (5.1168)***		0.2647 (4.2446)***		0.1776 (1.8729)Not Sig.		0.803	0.767
NAT -> BI	0.0282 (0.6458)Not Sig.		0.0655 (0.9584)Not Sig.		0.0789 (0.9059)Not Sig.		0.122	0.121
PEOU -> BI	0.0232 (0.4562)Not Sig.		-0.0034 (0.0543)Not Sig.		0.0509 (0.652)Not Sig.		0.546	0.542
PU -> BI	0.3421 (7.5819)***		0.3275 (5.311)***		0.3777 (4.6836)***		0.503	0.495
RF -> BI	0.1715 (3.5596)***		0.1269 (2.1914)*		0.2391 (3.0551)**		1.180	1.153
SE -> BI	-0.0124 (0.2125)Not Sig.		0.0357 (0.5614)Not Sig.		-0.0821 (0.7491)Not Sig.		0.994	0.930
SN -> BI	0.0252 (0.5275)Not Sig.		0.0316 (0.5429)Not Sig.		0.0051 (0.0639)Not Sig.		0.274	0.267
SN -> PEOU	0.1836 (4.1729)***	0.034	0.2047 (3.3863)**	0.042	0.1586 (2.0578)*	0.025	0.476	0.470

Table 5. 47: Structural relations and path significance difference of moderator voluntariness

5.6.4.3. Results of MGA for Cultural moderating variables

5.6.4.3.1. Masculinity and Femininity

The moderating construct MF was based on five items. Each item was measured on seven-point Likert-scale ranging from strongly-disagree to strongly-agree. The overall mean of the construct 3.15/7 suggest that the feminine culture was more dominant than the masculine culture in the present context of study. In order to test the moderating effect of MF using MGA, metrically scaled construct was transformed into categorical construct. Using median-split method, sample was categorised into two groups- femininity (n=199, 52%) and masculinity (n=182, 47%). The F-test (8.82, $p<0.05$) showed that two groups split were significantly different from each other. Table 5.48 indicates that AVE extracted for the sub-model feminine was well above the required value 0.5, however for sub-model masculine constructs AT, PU and SN exhibit slightly lower AVE than the acceptable range. The overall average AVE's for both sub-models satisfied that the models were well converged and indicators measuring underlying constructs were sharing more than half of the variance to their relevant construct. The square-root of the AVE extracted for each construct and compared with inter-construct correlation revealed that all the correlations were lower than the square-root of the AVE and satisfied the criterion of discriminant validity (see Fornell & Larcker, 1981).

Correlation among the construct (Culture: Feminine group)													
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.584	0.764	1.00											
BI	0.540	0.735	0.30	1.00										
BU	0.607	0.779	0.04	0.24	1.00									
GS	0.513	0.716	0.20	0.22	0.19	1.00								
IS	0.545	0.738	0.20	0.17	0.27	0.10	1.00							
NAT	0.720	0.849	0.24	0.16	0.13	0.17	0.12	1.00						
PEOU	0.694	0.833	0.18	0.24	0.07	0.20	0.17	0.13	1.00					

PU	0.589	0.767	0.01	0.42	0.23	0.24	0.26	0.07	0.37	1.00				
RF	0.517	0.719	0.10	0.17	0.07	0.12	0.14	0.01	0.12	0.09	1.00			
SE	0.905	0.951	0.26	0.13	-0.01	0.00	0.02	0.26	0.13	0.16	0.06	1.00		
SN	0.511	0.715	0.11	0.15	-0.02	0.27	0.01	0.18	0.20	0.40	0.15	0.23	1.00	
TF	0.615	0.784	0.17	0.18	0.17	0.16	0.19	0.29	0.19	0.22	0.24	0.15	0.31	1.00
Correlation among the construct (Culture: Masculine group)														
AT	0.47	0.69	1.00											
BI	0.57	0.75	0.35	1.00										
BU	0.63	0.79	0.26	0.26	1.00									
GS	0.52	0.72	0.18	0.16	-0.01	1.00								
IS	0.51	0.71	0.22	0.28	0.27	0.26	1.00							
NAT	0.58	0.76	0.12	0.11	0.06	0.29	0.07	1.00						
PEOU	0.66	0.81	0.28	0.22	0.21	0.21	0.20	0.16	1.00					
PU	0.49	0.70	0.26	0.43	0.11	0.32	0.35	0.19	0.41	1.00				
RF	0.55	0.74	0.17	0.37	0.14	0.30	0.23	0.15	0.11	0.20	1.00			
SE	0.86	0.93	0.21	0.11	0.18	0.20	0.25	0.12	0.21	0.14	0.13	1.00		
SN	0.49	0.70	0.20	0.25	0.08	0.15	0.14	0.13	0.19	0.23	0.10	0.25	1.00	
TF	0.60	0.78	0.19	0.08	0.28	0.20	0.21	0.12	0.18	0.11	0.28	0.19	-0.02	1.00

Table 5. 48: Inter-construct correlation and AVE for moderator MF

Table 5.49 presents the overview of the both sub-models. The reliability indicators, Cronbach α and composite reliability were satisfied above the range of 0.6 and 0.7 respectively. The measurement of outer-model observed through communalities revealed that within sub-model feminine all constructs were above than the acceptable range 0.5, however within sub-model masculine only AT, PU and SN were just below than the acceptable range. The overall average communality for the sub-model feminine was 0.612 and for masculine was 0.577 and both were above than the required value 0.5. The R^2 a criterion of the predictive relevance which is explained by the variance shared by independent variables into dependent was highest in PU (R^2=0.29 or 29%) followed by BI (R^2=0.28 or 28%) within sub-model feminine group. Whereas R^2 was highest in BI (R^2=0.33 or 33%) followed by PU (R^2=0.29 or 29%) within sub-model masculine group. Observing R^2, according to the Chin (1998) criterion both models were moderately acceptable fit, however, the average R^2 value for the sub-model feminine was bit lower than the acceptable range. Another criterion of predictive relevance suggested by Stone (1974) and Geisser (1975) was computed using blindfolding method with omission distance G=7. The results of the cv-communality (H^2) and cv-redundancy (F^2) for both sub-models were satisfactory (H^2 and F^2 >0 or no negative). The final measure of the model fitting GoF proposed by Tenenhaus et al. (2005) for both sub-models was 0.34 or 34% and it suggest that both sub-models were moderately acceptable.

Reliability and goodness of fit of the model (Culture: Feminine group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.848		0.584	0.782	0.282		
BI	0.824	0.285	0.540	0.716	0.239	0.050	0.120
BU	0.859	0.142	0.607	0.792	0.359	0.028	0.052
GS	0.839		0.513	0.759	0.274		
IS	0.856		0.545	0.792	0.321		
NAT	0.911		0.720	0.871	0.508		
PEOU	0.901	0.039	0.694	0.853	0.482	0.026	0.025
PU	0.877	0.294	0.589	0.825	0.378	0.020	0.156
RF	0.809		0.517	0.712	0.207		
SE	0.950		0.905	0.898	0.561		
SN	0.839		0.511	0.769	0.244		
TF	0.864		0.615	0.806	0.363		
Average		**0.190**	**0.612**			**0.031**	
GoF		**0.341**					
Reliability and goodness of fit of the model (Culture: Masculine group)							
AT	0.774		0.472	0.773	0.176		
BI	0.841	0.330	0.569	0.747	0.289	0.059	0.156
BU	0.869	0.189	0.625	0.800	0.374	0.041	0.099
GS	0.841		0.517	0.769	0.280		
IS	0.839		0.511	0.764	0.263		
NAT	0.845		0.581	0.816	0.313		
PEOU	0.886	0.035	0.661	0.827	0.433	0.023	0.019
PU	0.826	0.290	0.490	0.741	0.245	0.038	0.128
RF	0.829		0.550	0.721	0.246		
SE	0.925		0.860	0.839	0.483		
SN	0.828		0.491	0.744	0.213		
TF	0.858		0.602	0.784	0.336		
Average		**0.211**	**0.577**			**0.040**	
GoF		**0.349**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 49: Overall overview of results and GoF of moderator MF

The standardised estimated path relations for both sub-models are presented in table 5.50. Most of the path relations in sub-model feminine were similar to overall sample model. Exceptionally, paths TF→BU (β=0.08 or 8% and t=0.94), BI→BU (β=0.14 or 14% and t=1.64), GS→PU (β=0.08 or 8% and t=1.33), and RF→BI (β=0.10 or 10% and t=1.35) were different in between sub-model feminine and overall sample model. The highest significant path in sub-model feminine was between PU→BI (β=0.42 or 42% and t=6.79) and lowest on was between SN→PEOU (β=0.19 or 19% and t=3.01). Within masculine sub-model only path SN→PU (β=0.11 or 11% and t=1.72) was different from the overall sample model. The highest significant path was between PU→BI (β=0.30 or 30% and t=4.34) and lowest one was between GS→PU (β=0.17 or 17% and t=2.61).

The test of differences computed using parametric t-test and non-parametric test of Smith-Satterwait shows that path SN→PU were significantly different in two groups (t=2.20 and t=2.17). Specifically, path SN→PU was highly significant in feminine group (β=0.32 or 32% and t=4.93) but was insignificant in masculine group (β=0.11 or 11% and t=1.72). Based on this moderating difference hypothesis **H15b** was only partially supported, while **H15a**, **H15c** and **H15d** were rejected.

Hypothesis	Combined Dataset(n=380)		Feminine(n=199)		Masculine (n=181)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.0829 (0.9493)Not Sig.	0.142	0.2395 (3.9904)***	0.189	1.469	1.478
SE -> BU	0.0041 (0.0818)Not Sig.		-0.0531 (0.7198)Not Sig.		0.0969 (1.4568)Not Sig.		1.519	1.511
RF -> BU	-0.0141 (0.2555)Not Sig.		-0.0179 (0.1967)Not Sig.		-0.0191 (0.195)Not Sig.		0.009	0.009
PU -> BU	0.0139 (0.1968)Not Sig.		0.0874 (0.8776)Not Sig.		-0.0476 (0.507)Not Sig.		0.994	0.986
BI -> BU	0.1941 (3.4228)***		0.146 (1.6485)Not Sig.		0.2326 (2.5286)*		0.687	0.678
GS -> BU	0.0055 (0.0866)Not Sig.		0.1012 (1.0802)Not Sig.		-0.1443 (1.6055)Not Sig.		1.906	1.891
IS -> BU	0.1802 (3.2638)**		0.1998 (2.8992)**		0.1897 (2.3113)*		0.096	0.094
SN -> PU	0.2203 (3.9937)***	0.269	**0.3208 (4.9317)*** **	0.290	**0.1165 (1.7211)Not Sig.**	0.290	**2.202**	**2.175**
PEOU -> PU	0.281 (5.8124)***		0.2559 (4.0691)***		0.3055 (4.4445)***		0.540	0.532
GS -> PU	0.1208 (2.3049)*		0.0824 (1.3322)Not Sig.		0.1757 (2.617)*		1.036	1.022
IS -> PU	0.208 (4.6002)***		0.2304 (2.9073)**		0.2014 (3.3857)**		0.300	0.293
TF -> BI	-0.0359 (0.6647)Not Sig.	0.265	0.0203 (0.2903)Not Sig.	0.285	-0.0645 (0.847)Not Sig.	0.330	0.831	0.820
AT -> BI	0.2439 (5.1168)***		0.2774 (4.1048)***		0.2146 (3.2989)**		0.675	0.670
NAT -> BI	0.0282 (0.6458)Not Sig.		0.0718 (1.1065)Not Sig.		-0.0182 (0.1821)Not Sig.		0.779	0.756
PEOU -> BI	0.0232 (0.4562)Not Sig.		0.0307 (0.4723)Not Sig.		0.0084 (0.1099)Not Sig.		0.226	0.222
PU -> BI	0.3421 (7.5819)***		0.4209 (6.7961)***		0.3014 (4.3435)***		1.305	1.285
RF -> BI	0.1715 (3.5596)***		0.1096 (1.3537)Not Sig.		0.2862 (3.4618)***		1.543	1.526
SE -> BI	-0.0124 (0.2125)Not Sig.		-0.0228 (0.2575)Not Sig.		-0.0298 (0.4169)Not Sig.		0.062	0.062
SN -> BI	0.0252 (0.5275)Not Sig.		-0.0888 (1.3168)Not Sig.		0.1129 (1.6929)Not Sig.		1.146	1.125
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1967 (3.0127)**	0.039	0.1856 (3.1866)**	0.035	0.128	0.127

Table 5. 50: Structural relations and path significance difference of moderator MF

5.6.4.3.2. Individualism-Collectivism

There were six items in survey questionnaire to measure the level of the IC within the respondents (academics) working in the higher educational institutes. All the items like other cultural constructs were measured on seven-point Likert-scales. The total mean of the construct was 5.40/7 which showed that respondents were more inclined towards collectivist society. In the interest of the MGA metrically scaled construct was transformed into two-level categorical construct as- low collectivist (n=207, 54%), and high collectivist (n=173, 45%). The F-test of difference showed that both groups established were significantly different from each other (6.06, $p<0.05$). Convergent and discriminant validity of the measurement items were assessed using MPLS Smart Version 2.0.3. Results presented in table 5.51 revealed that AVE for all the constructs in both sub-models were above 0.5, except for the GS in sub-model low collectivist. Also, the square-root of AVE for all the constructs in both sub-models was above than the inter-construct correlations. The AVE higher than 0.5 and square-root higher than then correlation between constructs satisfied the criterion of the convergent and discriminant validity (Fornell and Larcker, 1981)

Correlation among the construct (Culture: Low collectivist group)														
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.507	0.712	1.00											
BI	0.547	0.739	0.27	1.00										
BU	0.649	0.806	0.07	0.30	1.00									
GS	0.483	0.695	0.26	0.20	0.03	1.00								
IS	0.535	0.731	0.26	0.26	0.25	0.15	1.00							
NAT	0.619	0.786	0.23	0.10	0.05	0.20	0.05	1.00						
PEOU	0.623	0.789	0.09	0.19	0.13	0.18	0.14	0.02	1.00					
PU	0.552	0.743	0.12	0.41	0.20	0.28	0.35	0.11	0.33	1.00				
RF	0.550	0.742	0.16	0.22	0.08	0.17	0.19	0.07	0.12	0.15	1.00			
SE	0.872	0.934	0.25	0.16	0.09	0.08	0.15	0.20	0.17	0.14	0.09	1.00		
SN	0.502	0.708	0.22	0.15	-0.02	0.22	0.04	0.11	0.17	0.27	0.13	0.26	1.00	
TF	0.617	0.786	0.23	0.09	0.24	0.20	0.29	0.23	0.16	0.22	0.35	0.18	0.16	1.00
Correlation among the construct (Culture: High collectivist group)														
AT	0.58	0.76	1.00											
BI	0.56	0.75	0.37	1.00										
BU	0.55	0.74	0.25	0.20	1.00									
GS	0.54	0.74	0.07	0.17	0.15	1.00								
IS	0.52	0.72	0.12	0.13	0.24	0.16	1.00							
NAT	0.71	0.84	0.18	0.19	0.17	0.19	0.11	1.00						
PEOU	0.75	0.86	0.31	0.27	0.07	0.18	0.21	0.21	1.00					
PU	0.52	0.72	0.10	0.42	0.10	0.25	0.21	0.10	0.43	1.00				
RF	0.51	0.71	0.12	0.30	0.22	0.22	0.16	0.11	0.11	0.15	1.00			
SE	0.92	0.96	0.24	0.08	0.02	0.08	0.04	0.21	0.14	0.15	0.09	1.00		
SN	0.51	0.71	0.08	0.28	0.12	0.27	0.07	0.18	0.18	0.39	0.11	0.22	1.00	
TF	0.59	0.77	0.15	0.16	0.14	0.08	0.05	0.15	0.18	0.08	0.17	0.12	0.13	1.00

Table 5. 51: Inter-construct correlation and AVE for moderator IC

Table 5.52 presents the overall model fitting results. The coefficient of internal consistency Cronbach α and composite reliability were higher than threshold values 0.6 and 0.7 respectively. The measures of outer loadings towards underlying constructs assessed through communalities were higher than 0.5 thresholds, except GS within sub-model low collectivist. Overall average communalities for the sub-model low collectivist were 0.58 or 58% and for the sub-model high collectivist was 0.60 or 60%. Within sub-model low collectivist, coefficient of determination R^2 of the dependent variables was highest in PU (R^2 = 0.27 or 27%) followed by BI (R^2 = 0.24 or 24%). Whereas, within sub-model high collectivist R^2 was highest in BI (R^2 = 0.34 or 34%) followed by PU (R^2 = 0.30 or 30%). Based on Chin's (1998) criterion on individual construct's R^2 values both sub-models were acceptable at moderate level, however, based on average of R^2 value sub-model low collectivist was acceptable at substantial level and sub-model high collectivist was acceptable at moderate level. Models capability to predict shows that cv-communality (H^2) and cv-redundancy (F^2) for the both sub-models were positive higher than the zero and satisfied the conditions of the predictive relevance (Stone, 1974; Geisser, 1975). Finally, the measure of the overall goodness of fit index (GoF) revealed that sub-model low collectivist presented 0.32 or 32% fit index, and sub-model high on collectivist presented 0.34 or 34% index. The GoF for both sub-models were in moderate acceptable range.

Reliability and goodness of fit of the model (Culture: Low collectivist group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.802		0.507	0.760	0.185		
BI	0.827	0.244	0.547	0.720	0.256	0.037	0.113
BU	0.881	0.160	0.649	0.819	0.413	0.057	0.080
GS	0.822		0.483	0.733	0.227		
IS	0.852		0.535	0.785	0.303		
NAT	0.866		0.619	0.802	0.290		
PEOU	0.868	0.028	0.623	0.796	0.367	0.018	0.016
PU	0.859	0.273	0.552	0.796	0.339	0.032	0.128
RF	0.830		0.550	0.729	0.257		
SE	0.931		0.872	0.854	0.490		
SN	0.834		0.502	0.758	0.244		
TF	0.866		0.617	0.803	0.346		
Average		**0.176**	**0.588**			**0.036**	
GoF		**0.322**					
Reliability and goodness of fit of the model (Culture: High collectivist group)							
AT	0.846		0.579	0.794	0.284		
BI	0.837	0.347	0.563	0.741	0.274	0.074	0.150
BU	0.825	0.118	0.548	0.751	0.265	0.015	0.031
GS	0.856		0.544	0.792	0.308		
IS	0.841		0.516	0.768	0.276		
NAT	0.906		0.709	0.879	0.487		
PEOU	0.922	0.034	0.747	0.886	0.570	0.026	0.027
PU	0.843	0.301	0.518	0.768	0.276	0.019	0.143
RF	0.806		0.510	0.696	0.177		
SE	0.958		0.919	0.916	0.572		
SN	0.837		0.508	0.759	0.231		
TF	0.852		0.593	0.779	0.311		
Average		**0.200**	**0.605**			**0.033**	

GoF		**0.348**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 52: Overall overview of results and GoF of moderator IC

After observing the reliable and valid outer and inner model estimations, individual path coefficients for both sub-models were computed and presented in table 5.53. For the sub-model with low collectivist paths were similar to the overall sample model except at IS→BU (β=0.13 or 13% and t=1.78) and IS→PU (β=0.10 or 10% and t=1.52). The highest significant path within low collectivist sub-model was PU→BI (β=0.36 or 36% and t=6.55) and lowest one was between GS→PU (β=0.14 or 14% and t=2.05). For the sub-model with high collectivist paths were different from overall sample model at TF→BU (β=0.08 or 8% and t=0.82), BI→BU (β=0.13 or 13% and t=0.93), and GS→PU (β=0.08 or 08% and t=1.22). The highest significant path was between PU→BI (β=0.33 or 33% and t=4.48) and lowest one was between SN→PEOU (β=0.18 or 18% and t=2.23).

The test of differences computed using parametric t-test and non-parametric Smith-Satterthwait shows that both sub-models were different at IS→PU (t=2.15 and t=2.13). Specifically path IS→PU was significant in high collectivist group (β=0.29 or 29% and t=5.18) but was insignificant in sub-model low collectivist (β=0.10 or 10% and t=1.53). Thus, only hypotheses **H16b** was partially supported and **H16a**, **H16c** and **H16d** were unsupported.

Hypothesis	Combined Dataset(n=380)		Low Collectivist (n=207)		High Collectivist (n=173)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.2071 (2.6634)**	0.160	0.0824 (0.8217)Not Sig.	0.118	1.000	0.983
SE -> BU	0.0041 (0.0818)Not Sig.		0.0003 (0.0052)Not Sig.		-0.0176 (0.1566)Not Sig.		0.147	0.140
RF -> BU	-0.0141 (0.2555)Not Sig.		-0.0623 (0.8548)Not Sig.		0.129 (1.0237)Not Sig.		1.369	1.314
PU -> BU	0.0139 (0.1968)Not Sig.		0.0283 (0.2915)Not Sig.		-0.0349 (0.2971)Not Sig.		0.420	0.415
BI -> BU	0.1941 (3.4228)***		0.2646 (3.537)***		0.1302 (0.9387)Not Sig.		0.893	0.853
GS -> BU	0.0055 (0.0866)Not Sig.		-0.0834 (0.8557)Not Sig.		0.0713 (0.9276)Not Sig.		1.215	1.247
IS -> BU	0.1802 (3.2638)**		0.1341 (1.7867)Not Sig.		0.1898 (2.7495)**		0.539	0.546
SN -> PU	0.2203 (3.9937)***	0.269	0.1867 (2.2332)*	0.273	0.2954 (3.6715)***	0.301	0.928	0.937
PEOU -> PU	0.281 (5.8124)***		0.2349 (3.0957)**		0.3352 (4.4897)***		0.935	0.942
GS -> PU	0.1208 (2.3049)*		0.1499 (2.0544)*		0.0895 (1.2211)Not Sig.		0.581	0.584
IS -> PU	0.208 (4.6002)***		**0.1029 (1.5233)Not Sig.**		**0.2901 (5.1896)*****		**2.159**	**2.134**
TF -> BI	-0.0359 (0.6647)Not Sig.	0.265	-0.1103 (1.6835)Not Sig.	0.244	0.0492 (0.6186)Not Sig.	0.347	1.567	1.548
AT -> BI	0.2439 (5.1168)***		0.2058 (3.7602)***		0.3115 (4.9357)***		1.275	1.266

NAT -> BI	0.0282 (0.6458)Not Sig.		0.0166 (0.2357)Not Sig.		0.0807 (0.9393)Not Sig.		0.585	0.577
PEOU -> BI	0.0232 (0.4562)Not Sig.		0.0364 (0.5312)Not Sig.		-0.024 (0.3025)Not Sig.		0.580	0.576
PU -> BI	0.3421 (7.5819)***		0.3667 (6.5572)***		0.3319 (4.4897)***		0.383	0.376
RF -> BI	0.1715 (3.5596)***		0.1632 (2.231)*		0.1893 (2.7666)**		0.258	0.261
SE -> BI	-0.0124 (0.2125)Not Sig.		0.0554 (0.6353)Not Sig.		-0.0997 (1.2765)Not Sig.		1.305	1.325
SN -> BI	0.0252 (0.5275)Not Sig.		-0.0192 (0.2616)Not Sig.		0.1048 (1.6178)Not Sig.		1.247	1.267
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1682 (2.7692)**	0.028	0.1847 (2.2341)*	0.034	0.164	0.161

Table 5. 53: Structural relations and path significance difference of moderator IC

5.6.4.3.3. Power Distance

There were initially six items in survey questionnaire measured on seven-point Likert-scales. The purpose was to measure the level of the PD within the respondents (academics) working in the higher educational institutes. Due to cross-loading and lower factor-loading in EFA, item PD4 was exempted from the analysis. The remaining five items shared total mean 2.82/7 which suggests that the culture in study context (higher educational institutes of the Pakistan) was more towards lower PD. Like the other cultural dimensions PD was also categorised into two groups using median-split method. The first group was low on PD (n=198, 52%, mean=1.93) and second group was high on PD (n=182, 47%, mean=3.80). The result of F-test computed showed that both groups were significantly different from each other ($F=8.05$, $p<0.05$). Results of convergent validity and discriminate validity presented in table 5.54 indicate that AVE for most of the constructs in both sub-models was higher than suggested value 0.5. Exceptionally, only constructs SN and TF in sub-model low PD, and GS in sub-model high PD presented slightly lower AVE. However, the square-root of the AVE computed for the both sub-model were clearly higher than the inter-construct correlations. The higher value of AVE from 0.5 and higher square-root of AVE from inter-construct correlation satisfied that outer model (measurement model) was validated in terms of convergent validity and discriminant validity (Fornell and Larcker, 1981).

Correlation among the construct (Culture: Low PD group)													
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.539	0.734	1.00											
BI	0.507	0.712	0.19	1.00										
BU	0.611	0.781	0.07	0.17	1.00									
GS	0.542	0.736	0.11	0.18	0.14	1.00								
IS	0.526	0.725	0.10	0.08	0.19	0.17	1.00							
NAT	0.711	0.843	0.18	0.15	0.08	0.26	0.08	1.00						
PEOU	0.672	0.819	0.17	0.08	0.14	0.14	0.12	0.13	1.00					
PU	0.501	0.708	0.05	0.34	0.12	0.17	0.19	0.12	0.31	1.00				
RF	0.501	0.708	0.07	0.22	0.12	0.20	0.28	0.07	0.15	0.10	1.00			

SE	0.901	0.949	0.15	-0.03	-0.11	0.09	-0.02	0.11	0.17	0.21	0.06	1.00		
SN	0.492	0.702	0.10	0.10	0.07	0.20	0.08	0.11	0.15	0.27	0.06	0.29	1.00	
TF	0.490	0.700	0.19	0.02	0.19	0.09	0.20	0.20	0.18	0.11	0.22	0.13	0.21	1.00
Correlation among the construct (Culture: High PD group)														
AT	0.53	0.73	1.00											
BI	0.60	0.78	0.44	1.00										
BU	0.61	0.78	0.24	0.34	1.00									
GS	0.49	0.70	0.24	0.23	0.08	1.00								
IS	0.51	0.71	0.30	0.36	0.35	0.17	1.00							
NAT	0.63	0.79	0.25	0.13	0.14	0.18	0.11	1.00						
PEOU	0.68	0.83	0.26	0.35	0.08	0.25	0.26	0.15	1.00					
PU	0.58	0.76	0.20	0.47	0.22	0.39	0.42	0.12	0.45	1.00				
RF	0.54	0.73	0.28	0.33	0.16	0.24	0.09	0.13	0.08	0.17	1.00			
SE	0.87	0.93	0.32	0.26	0.22	0.05	0.18	0.31	0.13	0.05	0.12	1.00		
SN	0.52	0.72	0.24	0.30	0.00	0.24	0.10	0.22	0.25	0.38	0.20	0.20	1.00	
TF	0.62	0.78	0.22	0.24	0.29	0.22	0.20	0.22	0.24	0.25	0.30	0.13	0.14	1.00

Table 5. 54: Inter-construct correlation and AVE for moderator PD

Table 5.55 indicates that Cronbach α and composite reliability measures in both sub-models were clearly above than the threshold values of 0.6 and 0.7 respectively and satisfied the requirement of the internal-consistency measures (Nunnally & Bernstein, 1994). Additionally the measurement items/indicators shared variance towards underlying constructs represented by communalities were above than the 0.5 threshold value. Only SN and TF in sub-model low PD, and GS in high PD represented slightly lower communalities. However, overall average communalities for sub-model low PD was 0.58 or 58% and for high on PD was 0.59 or 59% which were well above the acceptable range. Within sub-model low PD coefficient of determination R^2 of the dependent variables was highest in BI (R^2 = 0.21 or 21%) followed by PU (R^2 = 0.17 or 17%). Whereas, within sub-model high PD highest value of R^2 was in PU (R^2 = 0.41 or 41%) followed by BI (R^2 = 0.39 or 39%). Based on Chin's (1998) criterion for R^2 values at individual construct sub-model high PD was acceptable at moderate level and sub-model low PD was acceptable at substantial level. However, on the average R^2 value sub-model low PD was accepted at substantial level and sub-model high PD was accepted at moderate level. The predictive relevance or model's capability to predict was computed using blindfolding method with omission distance G=7, and results showed that cv-communality (H^2) and cv-redundancy (F^2) for both sub-models were positive above than zero value, and satisfied that both sub-models were capable to predict with re-sample process(cf. Stone, 1974; Geisser, 1975). Finally, the coefficient of overall goodness of fit index GoF shows that sub-model low PD presented 0.27 or 27% of fit index, and sub-model high PD presented 0.40 or 40% of index. The GoF values for both sub-models were in moderate acceptable range.

Reliability and goodness of fit of the model (Culture: Low PD group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.821		0.539	0.802	0.251		
BI	0.804	0.215	0.507	0.674	0.190	0.018	0.086
BU	0.861	0.110	0.611	0.798	0.361	0.012	0.045
GS	0.853		0.542	0.793	0.330		
IS	0.845		0.526	0.791	0.306		
NAT	0.908		0.711	0.866	0.501		
PEOU	0.891	0.022	0.672	0.840	0.432	0.012	0.014
PU	0.833	0.172	0.501	0.751	0.252	0.009	0.075
RF	0.799		0.501	0.715	0.173		
SE	0.948		0.901	0.914	0.533		
SN	0.828		0.492	0.756	0.228		
TF	0.783		0.490	0.797	0.213		
Average		**0.130**	**0.583**			**0.013**	
GoF		**0.275**					
Reliability and goodness of fit of the model (Culture: High PD group)							
AT	0.817		0.528	0.752	0.103		
BI	0.858	0.397	0.603	0.779	0.175	0.095	0.040
BU	0.863	0.224	0.612	0.790	0.450	0.057	0.024
GS	0.824		0.485	0.733	0.378		
IS	0.839		0.510	0.761	0.277		
NAT	0.869		0.626	0.822	0.538		
PEOU	0.895	0.061	0.681	0.842	0.496	0.042	0.005
PU	0.874	0.414	0.584	0.819	0.243	0.069	0.083
RF	0.822		0.539	0.710	0.136		
SE	0.928		0.866	0.848	0.642		
SN	0.842		0.516	0.766	0.193		
TF	0.865		0.616	0.795	0.212		
Average		**0.274**	**0.597**			**0.066**	
GoF		**0.405**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 55: Overall overview of results and GoF of moderator PD

Table 5.56 presents the estimated path relations in both sub-models with the tests of the differences. Within sub-model low PD paths TF→BU (β=0.16 or 16% and t=1.18), BI→BU (β=0.11 or 11% and t=1.01), IS→BU (β=0.12 or 12% and t=1.48), GS→PU (β=0.07 or 7% and t=1.20), and IS→PU (β=0.120 or 12% and t=1.92) were different from the overall sample model. The highest significant path within sub-model low PD was between PU→BI (β=0.35 or 35% and t=4.75) and lowest one was between SN→PEOU (β=0.14 or 14% and t=2.36). Within sub-model high PD all the paths were similarly significant like the overall sample model with little change in the significance level. The highest significant path within sub-model high PD was PU→BI (β=0.31 or 31% and t=4.59) and lowest one was between RF→BI (β=0.17 or 17% and t=2.27).

In the interest of checking the differences between two sub-models parametric t-test and non-parametric Smith-Satterthwait were computed. Results indicates that groups were different at path IS→PU (t=2.01 and t=2.0). Specifically, IS→PU was insignificant in sub-model low PD (β=0.12 or 12% and t=1.92) but was highly significant in sub-model high PD (β=0.29 or 29% and t=4.67). Based on the results, hypotheses **H17b** was partially supported and **H17a, H17c** and **H17d** were completely rejected.

Hypothesis	Combined Dataset(n=380)		Low PD (n=198)		High PD(n=182)		Parametric test of difference	Smith-Satterthwait test
	Path (t-value)	R-Square	Path (t-value)	R-Square	Path (t-value)	R-Square		
TF -> BU	0.1435 (2.6076)**	0.126	0.1642 (1.1812)Not Sig.	0.110	0.1937 (2.6545)**	0.224	0.184	0.188
SE -> BU	0.0041 (0.0818)Not Sig.		-0.1502 (1.7963)Not Sig.		0.1012 (1.546)Not Sig.		1.347	1.369
RF -> BU	-0.0141 (0.2555)Not Sig.		0.0091 (0.0854)Not Sig.		0.0213 (0.28)Not Sig.		0.092	0.093
PU -> BU	0.0139 (0.1968)Not Sig.		0.0537 (0.6062)Not Sig.		-0.0074 (0.0765)Not Sig.		0.469	0.467
BI -> BU	0.1941 (3.4228)***		0.1126 (1.0174)Not Sig.		0.196 (2.2161)*		0.584	0.589
GS -> BU	0.0055 (0.0866)Not Sig.		0.0918 (0.9529)Not Sig.		-0.0563 (0.7349)Not Sig.		1.193	1.204
IS -> BU	0.1802 (3.2638)**		0.1204 (1.4849)Not Sig.		0.2311 (2.9912)**		0.987	0.988
SN -> PU	0.2203 (3.9937)***	0.269	0.2079 (2.8556)**	0.172	0.2302 (2.9721)**	0.414	0.211	0.210
PEOU -> PU	0.281 (5.8124)***		0.2565 (3.7198)***		0.2651 (3.6792)***		0.086	0.086
GS -> PU	0.1208 (2.3049)*		0.0722 (1.2051)Not Sig.		0.2148 (3.4078)***		1.945	1.940
IS -> PU	0.208 (4.6002)***		**0.125 (1.9268)Not Sig.**		**0.2936 (4.6771)*****		**2.016**	**2.007**
TF -> BI	-0.0359 (0.6647)Not Sig.	0.265	-0.0964 (1.088)Not Sig.	0.215	0.0142 (0.2215)Not Sig.	0.397	0.999	1.011
AT -> BI	0.2439 (5.1168)***		0.1853 (2.3275)*		0.2582 (3.2515)**		0.649	0.648
NAT -> BI	0.0282 (0.6458)Not Sig.		0.1 (1.6344)Not Sig.		-0.0676 (0.7711)Not Sig.		1.592	1.567
PEOU -> BI	0.0232 (0.4562)Not Sig.		-0.0683 (0.8631)Not Sig.		0.1025 (1.2895)Not Sig.		1.525	1.523
PU -> BI	0.3421 (7.5819)***		0.3519 (4.7576)***		0.3184 (4.5963)***		0.330	0.330
RF -> BI	0.1715 (3.5596)***		0.2062 (2.4278)*		0.173 (2.2724)*		0.290	0.291
SE -> BI	-0.0124 (0.2125)Not Sig.		-0.1454 (1.7083)Not Sig.		0.1308 (1.5644)Not Sig.		2.316	2.315
SN -> BI	0.0252 (0.5275)Not Sig.		0.035 (0.4436)Not Sig.		0.0493 (0.6976)Not Sig.		0.134	0.135
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1488 (2.3625)*	0.022	0.2472 (4.1777)***	0.061	1.136	1.138

Table 5. 56: Structural relations and path significance difference of moderator PD

5.6.4.3.4. Uncertainty Avoidance

The four items measuring cultural construct UA were based on seven-point Likert-scale ranging from strongly-disagree to strongly-agree. The overall mean of the construct was 6.35/7 which suggests that there was very high UA in respondents in the context of the study. Using median-split method, metrically scaled construct UA was transformed into two level dichotomous construct, where one was low on UA (n=237, 62%, mean=6.0) and second was high on UA (n=143, 37%, mean=6.9). The mean of both groups suggest that both groups were higher on UA with little difference of level. The F-test (6.42, $p<0.05$) showed that two groups split were significantly different from each other to conduct MGA.

Results presented in table 5.57 indicates that AVE for all the constructs in both sub-models were above than the acceptable range 0.5, except GS in sub-model low UA and SN in sub-model high UA. The higher value of AVE indicates that items measuring underlying construct were highly correlated with each other and satisfied the condition of the convergent validity (Fornell and Larcker, 1981). The contrary concept, discriminant validity was examined by comparing the square-root of the AVE with the inter-construct correlations. The results indicates, none of the inter-construct correlation value exceed square-root of AVE and suggested that items conceptually established to measure underlying construct were clearly different from the items of another construct (Fornell & Larcker, 1981).

Correlation among the construct (Culture: Low UA group)														
	AVE	$\sqrt{AVE}$	**AT**	**BI**	**BU**	**GS**	**IS**	**NAT**	**PEOU**	**PU**	**RF**	**SE**	**SN**	**TF**
AT	0.554	0.744	1.00											
BI	0.535	0.731	0.25	1.00										
BU	0.612	0.782	0.05	0.20	1.00									
GS	0.484	0.696	0.21	0.17	0.07	1.00								
IS	0.529	0.727	0.16	0.19	0.19	0.10	1.00							
NAT	0.626	0.791	0.21	0.10	0.10	0.26	0.06	1.00						
PEOU	0.653	0.808	0.13	0.17	0.01	0.16	0.08	0.07	1.00					
PU	0.518	0.720	0.12	0.36	0.08	0.22	0.26	0.08	0.33	1.00				
RF	0.534	0.731	0.18	0.25	0.06	0.17	0.15	0.10	0.14	0.08	1.00			
SE	0.909	0.953	0.31	0.10	0.02	0.13	0.05	0.17	0.14	0.08	0.11	1.00		
SN	0.509	0.713	0.13	0.12	-0.02	0.20	-0.02	0.12	0.17	0.25	0.14	0.27	1.00	
TF	0.561	0.749	0.20	0.07	0.18	0.20	0.22	0.31	0.20	0.21	0.24	0.17	0.24	1.00
Correlation among the construct (Culture: High UA group)														
AT	0.52	0.72	1.00											
BI	0.57	0.75	0.37	1.00										
BU	0.60	0.78	0.28	0.29	1.00									
GS	0.52	0.72	0.04	0.17	0.14	1.00								
IS	0.51	0.71	0.25	0.19	0.33	0.22	1.00							
NAT	0.67	0.82	0.19	0.20	0.12	0.12	0.15	1.00						
PEOU	0.71	0.84	0.30	0.28	0.28	0.28	0.34	0.20	1.00					
PU	0.58	0.76	0.09	0.45	0.31	0.37	0.33	0.19	0.47	1.00				
RF	0.51	0.72	0.02	0.22	0.19	0.15	0.21	0.04	0.07	0.24	1.00			
SE	0.85	0.92	0.05	0.11	0.11	0.06	0.17	0.22	0.17	0.25	0.05	1.00		
SN	0.48	0.69	0.16	0.27	0.09	0.27	0.16	0.16	0.19	0.39	0.07	0.17	1.00	
TF	0.66	0.81	0.13	0.15	0.22	0.08	0.11	0.09	0.16	0.09	0.28	0.08	-0.04	1.00

Table 5. 57: Inter-construct correlation and AVE for moderator UA

Table 5.58 presents the overview of the both sub-models low UA and high UA. The reliability indicators, Cronbach α and composite reliability were above the acceptable range 0.6 and 0.7 respectively and satisfied the criterion of internal consistency reliability (Cronbach, 1951; Werts et al., 1974). Additionally, communalities were also above than 0.5, which suggests that each construct explained more than half (50%) part of each item's variance. Only, construct GS in sub-model low UA and SN in sub-model high UA present slightly lower communalities than the required value. The overall average communalities extracted for sub-model low UA and high UA were 0.58(58%) and 0.59(59%) respectively. Within sub-model low UA the R^2 a criterion of the predictive relevance which explains the variance shared by independent variables into dependent was highest observed in BI (R^2=0.22 or 22%) followed by PU (R^2=0.21 or 21%). Whereas, within sub-model high UA the R^2 was highly observed in PU (R^2=0.36 or 36%) followed by BI (R^2=0.33 or 33%). Observing, individual dependent construct's R^2 value and average R^2 value for both sub-models, model low UA was acceptable at substantial level, while model high UA is acceptable at moderate level (see Chin, 1998). Beside R^2 criterion, Stone (1974) and Geisser (1975) criterion of predictive relevance computed using blindfolding method with omission distance G=7 revealed that cv-communality (H^2) and cv-redundancy (F^2) were within acceptable range (i.e. H^2 and F^2 >0 or no negative). Finally, results of overall model fit index (GoF) shows that sub-model low UA presented 0.28(28%) index and sub-model high UA presented 0.37(37%) index which were in quite acceptable in range.

Reliability and goodness of fit of the model (Culture: Low UA group)							
Constructs	**Comp: Reliability**	**R^2**	**Communality**	**Cronbach's Alpha**	**H^2**	**Redundancy**	**F^2**
AT	0.832		0.554	0.764	0.246		
BI	0.821	0.221	0.535	0.707	0.231	0.018	0.100
BU	0.862	0.090	0.612	0.793	0.362	0.012	0.030
GS	0.817		0.484	0.747	0.253		
IS	0.848		0.529	0.781	0.293		
NAT	0.868		0.626	0.832	0.332		
PEOU	0.882	0.030	0.653	0.823	0.417	0.012	0.018
PU	0.843	0.219	0.518	0.767	0.272	0.009	0.102
RF	0.820		0.534	0.718	0.234		
SE	0.952		0.909	0.899	0.556		
SN	0.837		0.509	0.768	0.241		
TF	0.835		0.561	0.750	0.274		
Average		**0.140**	**0.585**			**0.023**	
GoF		**0.286**					
Reliability and goodness of fit of the model (Culture: High UA group)							
AT	0.809		0.516	0.790	0.205		
BI	0.838	0.331	0.567	0.742	0.284	0.074	0.148
BU	0.859	0.205	0.605	0.784	0.351	0.036	0.094
GS	0.842		0.517	0.782	0.279		
IS	0.838		0.510	0.763	0.276		

NAT	0.892		0.674	0.856	0.442		
PEOU	0.907	0.036	0.711	0.863	0.510	0.025	0.025
PU	0.872	0.367	0.579	0.816	0.372	0.059	0.200
RF	0.807		0.512	0.699	0.183		
SE	0.921		0.854	0.832	0.464		
SN	0.822		0.483	0.733	0.192		
TF	0.884		0.657	0.844	0.419		
Average		**0.235**	**0.599**			**0.048**	
GoF		**0.375**					

Note: H^2 = Constructs cross-validate communality
F^2 = Construct cross-validate redundancy
GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Table 5. 58: Overall overview of results and GoF of moderator UA

The estimated path relations for sub-model low UA and high UA are presented in table 5.59. Results indicate that all the paths in terms of significance were similar in sub-model low UA and overall sample model. Within sub-model low UA paths IS→BU, GS→PU, and IS→PU (β=0.14 or 14% and t=1.82) were different. The highest significant path in sub-model low UA was PU→BI (β=0.33 or 33% and t=5.94) and lowest one was TF→BU (β=0.16 or 16% and t=2.03). Within sub-model high UA, paths TF→BU (β=0.15 or 15% and t=1.48), BI→BU (β=0.15 or 15% and t=1.66), and RF→BI (β=0.10 or 10% and t=1.20) were different from overall sample model. The highest significant path within sub-model high UA was PU→BI (β=0.36 or 36% and t=4.03) and lowest one was GS→PU (β=0.18 or 18% and t=2.53).

For checking the strength of moderators, differences between two sub-models were computed using parametric t-test and non-parametric test of Smith-Satterwait. Even though, few paths in both sub-models were different in terms of significance but the tests of differences were insignificant in all paths. Thus, no differences between two sub-models were observed and hypothesis **H18** was completely rejected.

Hypothesis	**Combined Dataset(n=380)**		**Low UA (n=237)**		**High UA (n=143)**		**Parametric test of difference**	**Smith-Satterthwait test**
	Path (t-value)	**R-Square**	**Path (t-value)**	**R-Square**	**Path (t-value)**	**R-Square**		
TF -> BU	0.1435 (2.6076)**		0.1631 (2.0324)*		0.15 (1.4874)Not Sig.		0.101	0.102
SE -> BU	0.0041 (0.0818)Not Sig.		-0.0239 (0.3612)Not Sig.		0.0016 (0.019)Not Sig.		0.239	0.239
RF -> BU	-0.0141 (0.2555)Not Sig.		-0.0477 (0.6647)Not Sig.		0.029 (0.1692)Not Sig.		0.475	0.413
PU -> BU	0.0139 (0.1968)Not Sig.	0.126	-0.064 (0.7549)Not Sig.	0.090	0.1461 (1.4396)Not Sig.	0.205	1.564	1.589
BI -> BU	0.1941 (3.4228)***		0.1959 (2.9297)**		0.1544 (1.6655)Not Sig.		0.371	0.363
GS -> BU	0.0055 (0.0866)Not Sig.		0.0173 (0.1696)Not Sig.		-0.0087 (0.0909)Not Sig.		0.173	0.186
IS -> BU	0.1802 (3.2638)**		0.1431 (1.8947)Not Sig.		0.2323 (2.7305)**		0.761	0.784
SN -> PU	0.2203 (3.9937)***	0.269	0.1906 (2.6216)*	0.219	0.2566 (3.4563)***	0.367	0.602	0.635

PEOU -> PU	0.281 (5.8124)***		0.2544 (5.0385)***		0.3195 (4.6662)***		0.777	0.765
GS -> PU	0.1208 (2.3049)*		0.1216 (1.8688)Not Sig.		0.1827 (2.5383)*		0.608	0.629
IS -> PU	0.208 (4.6002)***		0.1456 (1.8211)Not Sig.		0.233 (3.7897)***		0.871	0.866
TF -> BI	-0.0359 (0.6647)Not Sig.		-0.0996 (1.506)Not Sig.		0.0532 (0.5087)Not Sig.		1.302	1.235
AT -> BI	0.2439 (5.1168)***		0.1781 (2.8329)**		0.3093 (3.8487)***		1.286	1.285
NAT -> BI	0.0282 (0.6458)Not Sig.		0.0412 (0.4004)Not Sig.		0.0621 (0.915)Not Sig.		0.147	0.170
PEOU -> BI	0.0232 (0.4562)Not Sig.	0.265	0.022 (0.326)Not Sig.	0.221	-0.017 (0.2062)Not Sig.	0.331	0.362	0.366
PU -> BI	0.3421 (7.5819)***		0.3374 (5.9468)***		0.3664 (4.0312)***		0.286	0.271
RF -> BI	0.1715 (3.5596)***		0.2092 (3.1556)**		0.1032 (1.2034)Not Sig.		0.981	0.978
SE -> BI	-0.0124 (0.2125)Not Sig.		0.0084 (0.1226)Not Sig.		-0.0363 (0.4194)Not Sig.		0.405	0.406
SN -> BI	0.0252 (0.5275)Not Sig.		-0.0023 (0.0319)Not Sig.		0.0735 (0.9602)Not Sig.		0.693	0.723
SN -> PEOU	0.1836 (4.1729)***	0.034	0.1728 (3.0993)**	0.030	0.1903 (2.0571)*	0.036	0.173	0.162

Table 5. 59: Structural relations and path significance difference of moderator UA

5.6.5. Post-analysis using AMOS

Even though, at the initial stage of the data analysis CBSEM method of analysis (e.g. AMOS, LISERAL) were rejected due to violation of the multivariate normality i.e. Mardia's coefficient (see section 5.6.2), but at this stage of the study researcher adopted one of the CBSEM's widely accepted technique AMOS to re-run the model. Reason behind this re-examination is to enhance the reliability of the model by verifying the paths significance and goodness-of-fit with two different approaches in the paradigm of SEM. Also the re-examination of the model overcomes the limitation of the research approach biasness by using component-based SEM method PLS. As the model is already evaluated using CFA and SEM with PLS approach, therefore, recommended one-step approach (Hair et al., 2006; Fornell & Yi, 1992) is applied to re-assure the path significance. Standardised and unstandardised regression weights output of the AMOS model with similar construct run into PLS are presented in figure A-4 and A-5 appendix-A respectively. Only, construct SE was excluded from the AMOS model because of having lower standardised regression weight.

Table 5.60 presents the regression weights. Observing the results, it is clearly visible that path significant in PLS were also significant in AMOS. For example, paths significant in PLS model i.e. PU→BI, PEOU→PU, SN→PU, SN→PEOU, TF→BU, RF→BI, AT→BI, BI→BU, IS→PU, IS→BU, GS→PU were also significant in AMOS model. The path value represented by estimates in AMOS were slightly higher than the path values in PLS (β). For example, in AMOS PU→BI path value was 0.44(44%), while it was 0.34(34%) in PLS.

Contrary the critical ratio (C.R) similar to t-value in PLS was bit lower observed in AMOS. For instance PU→BI was 2.52 in AMOS and was 7.58 in PLS. Apart from these difference, the significance level (p-value) in both models was similar. The squared multiple correlation (SMC) analogous to the determination of coefficient (R^2) in PLS, revealed that highest variation was explained into construct BI (0.34 or 34%) followed by nearly same PU (0.33 or 33%), BU (0.14 or 14%) and PEOU (0.044 or 4%). Compared to the PLS (R^2) values, SMC values computed using AMOS were clearly higher.

H. No.	Path Relations	Estimate	Standard Error	*C.R.*	P	Supported/Not-Supported
H1a.	**PU -> BI**	.448	.081	5.520	***	Supported
H1b.	**PU -> BU**	-.047	.101	-.463	.644	Not-Supported
H2.	**PEOU -> BI**	.006	.038	.161	.872	Not-Supported
H3.	**PEOU -> PU**	.193	.040	4.841	***	Supported
H4.	**SN -> BI**	.001	.052	.023	.981	Not-Supported
H5a.	**SN -> PU**	.241	.055	4.388	***	Supported
H5b.	**SN -> PEOU**	.250	.076	3.297	***	Supported
H6a.	**SE -> BI**	Excluded	Excluded	Excluded	Excluded	Not-Supported
H6b.	**SE -> BU**	Excluded	Excluded	Excluded	Excluded	Not-Supported
H7a.	**TF -> BI**	-.007	.035	-.201	.840	Not-Supported
H7b.	**TF -> BU**	.119	.050	2.361	.018	Supported
H8a.	**RF -> BI**	.085	.031	2.728	.006	Supported
H8b.	**RF -> BU**	-.028	.044	-.654	.513	Not-Supported
H9a.	**AT -> BI**	.167	.048	3.456	***	Supported
H9b.	**NAT -> BI**	.002	.026	.077	.938	Not-Supported
H10.	**BI -> BU**	.354	.120	2.943	.003	Supported
H11a.	**IS -> PU**	.286	.061	4.672	***	Supported
H11b.	**IS -> BU**	.290	.086	3.372	***	Supported
H12a.	**GS -> PU**	.145	.047	3.060	.002	Supported
H12b.	**GS -> BU**	-.010	.063	-.160	.873	Not-Supported

Table 5. 60: Structural path relations using AMOS

Table 5.61 presents the overview of model fitting criterions. As, it was not objective to examine the data using AMOS, therefore details of each criterion are briefly summated into single table. Based on literature (Hair et al., 2006; Kline, 2005; Arbuckle, 2006), fit measures were grouped into majorly three groups i.e. absolute fit index, incremental fit index and parsimonious fit index. Using AMOS values obtained were presented in last column of the table. Against the assumption, it was found that $\chi2$ (chi-square) and normed chi-square ($\chi2/df$) were significant which indicate that model does not fit with the data. However, because the chi-square statistic is very sensitive to the sample size it was more appropriate to look at other fit measures (Hair et al., 2006). Fortunately, other fit measures indicated that model was well fitted with the data (CMIN/DF = 1.708, RMSEA = 0.043, CFI = 0.900) (see table 5.61).

Fit index	Description	Acceptable fit	Value obtained using AMOS
Absolute fit index			
Chi-square ($\chi 2$)	Is minimum value of discrepancy, used to test the null hypothesis that the estimated variance-covariance matrix deviate from the sample. It is sample sensitive. The more the implied and sample moments differ, the bigger the chi-square statistic, and the stronger the evidence against the null hypothesis.	Non-Significant at least p>0.005	1159.775, p<0.000
Normed Fit Chi-Square CMIN/DF ($\chi 2$ / *df*)	Is minimum discrepancy divided by its degree of freedom. Value close to 1 indicates good fit but less than 1 implies over fit	Close to 1 is good, but should not exceed to3	1159.775/679=1.708, p<0.000
Goodness-Of-Fit Index (GFI)	Represents the comparison of the square residual for the degree of freedom, obtained through ML (maximum likelihood) and ULS(unweighted least squares)	Value >0.95 good fit; value 0.90-0.95 adequate fit	.865
Adjusted Goodness-Of-Fit Index (AGFI)	Is based over the degree of freedom. Very often used due to lower predictability across the applications. Value is not bounded by 0 and 1	Value >0.95 good fit; value 0.90-0.95 adequate fit	.845
Root Means Square Error of Approximation Residual (RMSEA)	Is population discrepancy function which implies that how well the fitted model approximates per degree of freedom.	Value<0.05 good fit; value 0.08-0.05 adequate fit	.043
Incremental fit index			
Buntler-Bonett Normed Fit Index (NFI)	Represents a comparative index between the proposed and baseline model (not adjusted for df). The effect of sample size is strong	Value >0.95 good fit; value 0.90-0.95 adequate fit	.791
Comparative Fit Index (CFI)	Is improved version of NFI and identical to Relative non-centrality Index (RNI). Represents the comparative index between proposed and baseline model adjusted for df. It is highly recommended index for fitness of model	Value >0.95 good fit; value 0.90-0.95 adequate fit	.900
Tucker Lewis Index (TLI)	Is opposite of NFI and called as non-NFI or NNFI. Represents the comparative index between proposed and baseline model adjusted for df	Value >0.95 good fit; value 0.90-0.95 adequate fit	.891
Parsimonious fit index			
Parsimony Goodness-Fit Index (PGFI)	Degree of freedom is used to adjust the GFI value using parsimony ratio.	Higher value compared to the other model is better	.916
Parsimony Normed Fit	Degree of freedom is used to adjust the NFI	Higher value	.725

Index (PNFI)	value based on parsimony ratio	compared to the other model is better	

Table 5. 61: Overall overview of results and model fitting using AMOS

Conclusion

This chapter started with the preliminary results of the pilot study. The results of the pilot study were satisfactory and confirmed that the instrument was reliable and valid to collect the full scale data. The data was collected using self-administrated survey and e-mail survey method in the higher educational institutes of the Pakistan in 2009. In the first step of analysis, the returned data from main survey was screened-out through statistical techniques-missing data, outliers, normality, homoscedasticity and non-response biasness. The amount of missing data was very little (0.3 to 1.1) at item-level and (0.3 to 1.6) at construct-level; additionally Little's MCAR test revealed that patterns of missing data were completely at random, therefore remedies to overcome the missing data problem were ignored. The z-scores showed that there were only 12/380 univariate outliers. Mahalanobis D^2 score showed that only 7 multivariate outliers were present. Observing the nature of outliers from box plot it was found that all the outliers were mild in nature therefore they were retained to ascertain the generalisation. The P-P plot along with the results of skewness and kurtosis suggested that data was normal at univariate level. However, significance of K-S test at construct level, significance of Levene's test of homogeneity, and significance of Mardia's coefficient' (i.e. 228.527, CR=39.88) revealed that assumption of multivariate normality was violated. Consequently, rather than using CBSEM approach (e.g. AMOS) which best performs on multivariate normal data, PLS was selected as primary approach of analysis. The assumption of multicollinearity examined using bivariate Pearson correlation and multiple regression showed that r, VIF and tolerance effect were within acceptable range which suggested the absence of multicolinearity. Finally, data was checked for non-response error from respondents using Mann-Whitney-U test between early and late respondents. All the results were insignificant which suggest that there was no difference between the early and late respondents response.

In next step, descriptive statistics of screened demographic data was reported. The response rate was 40.6% (n=380). The largest number of respondents based on age was academics having age 20-29 years (n=152, 40%), based on academic position were lecturer (n=204, 53.7%), based on academic experience were academics having experience 1-5 years (n=131, 34.5%), based on educational level were having degree masters (n=290, 76.3%). The ratio of sample obtained from public universities was 54.5% (n=207) and from private universities was 45.5% (n=173). The descriptive of the Internet usage experience shows that most of the users were having experience of 6-10 years (n=159, 41.8%). The descriptive of the reforms initiated by higher education commission (HEC) of the Pakistan revealed that largest method of the Internet access within universities was broadband (n=329, 86%). The response pertaining to the resources availability to use the Internet was partially observed, as 52.11% (n=198) were agreed and remaining 44.47% (n=169) were not agreed about the availably of the resources. Regarding to the access of digital library project, large number of respondents (n=105, 27.63%) were unaware and remaining were very irregular to utilise the digital library resources. Similarly, response of registered Pakistan research repository (PRR) network was negligible (n=36, 9.4%). However, the willingness of respondents to upload their research work on PRR was very high (n=307, 80.7%). Finally the descriptive of participation into e-learning programs showed that large number of respondents (n=320, 84.2%) had never participated in such programs.

In the third step of analysis, reliability and validity of all the constructs were examined, followed by exploratory factor analysis (EFA) to group the multiple items that belongs to the same construct. Based on Kaiser's criterion of eigenvalue 13 components were extracted which explained total 61.7% variance. The highest variance was explained into construct PU (13.27%). During EFA items AT4, RF1, SE6, and GS5 were deleted due to cross-loading with other components. Factor extracted based on EFA were parallel examined using Scree plot and Monto Carlo method. Similar process of EFA was applied for the construct of cultural dimensions and all the items were loaded into underlying construct except PD5. Total variance explained by the cultural dimensions was 54.35%.

In fourth step of the analysis, assessment and testing of the proposed model was performed using structural equation modelling (SEM) with two-step approach. In first step, measurement model was evaluated to observe the items and constructs reliability, discriminant validity and convergent validity. Results revealed that constructs within model fitted well with underlying measuring items; therefore none of the item was deleted at that stage. In second step, structural model was evaluated to examine the hypothetical relations presented in framework. The criterion of model fitting R^2 and GoF suggested that model was fitted at moderate level with the data. The highest variance explained by the independent constructs to dependent was almost similar into PU and BI (R^2=26%). Out of total 20 paths representing 12 hypotheses, 11 were supported and 9 were unsupported. The predicative relevance of path significance sample-to-population based on Stone-Geisser criterion was also satisfied.

In fifth step of the analysis, impact of five demographic variables (age, gender, educational level, academic position, organisation type), two conditional variables (usage experience and voluntariness), and four cultural dimensions (IC, PD, MF, UA) were examined as moderator between the path relations presented in framework. The impact of moderators was examined using MGA method and difference between paths was computed using Chin's parametric t-test and Smith-Satterthwait non-parametric t-test (Chin, 1998). Results suggested that all the demographic moderators were supported except academic position; for conditional moderating variables only usage experience was supported and voluntariness was unaccepted; and finally for cultural dimensions all were supported except UA.

In the sixth step of the analysis, basic results computed using component based structural method PLS were re-examined with CBSEM based structural method AMOS to verify the significance of the paths and at some extent the model-fitting. Results suggest that all the paths significant in PLS were also significant into AMOS. The variance explained into dependent variable (R^2) was bit higher in AMOS compared to the PLS (i.e. BI=0.34 or 34%, PU=0.33 or 33%).

Chapter 6

Discussion and Synthesis

Introduction

The previous chapter presented a preliminary analysis of the pilot study and a rigorous analysis of the findings of the main study. The aim of the previous chapter was to empirically examine the potential predictors of behavioural intention to accept Internet technology in a higher educational institute's academic context. In doing so, the structural model was evaluated with and without the moderating effect of demographic and cultural dimensions. In alignment with the findings of the previous chapter, this chapter aims to discuss the possible justifications for the significance and insignificance of the relationships proposed in the conceptual model (see Figure 6.1). Specifically, followed by the introduction, section (6.1) presents a discussion of the findings of the basic extended model, which aims to answer the question of how do predictors of perceived behavioural beliefs, social and control beliefs, management support at institutional and governmental level, and task characteristics influence individuals' beliefs towards acceptance of Internet technology? Next, section (6.2) presents a discussion of the findings obtained by examining the moderating impact of demographic and cultural characteristics. This helps to understand how the moderating impact of demographic characteristics (age, gender, organisational type, academic position, educational level, experience usage and voluntariness) and cultural dimensions (MF, IC, PD, UA) influence the individuals' perceptions when accepting Internet technology. Finally, a summary of the chapter is presented.

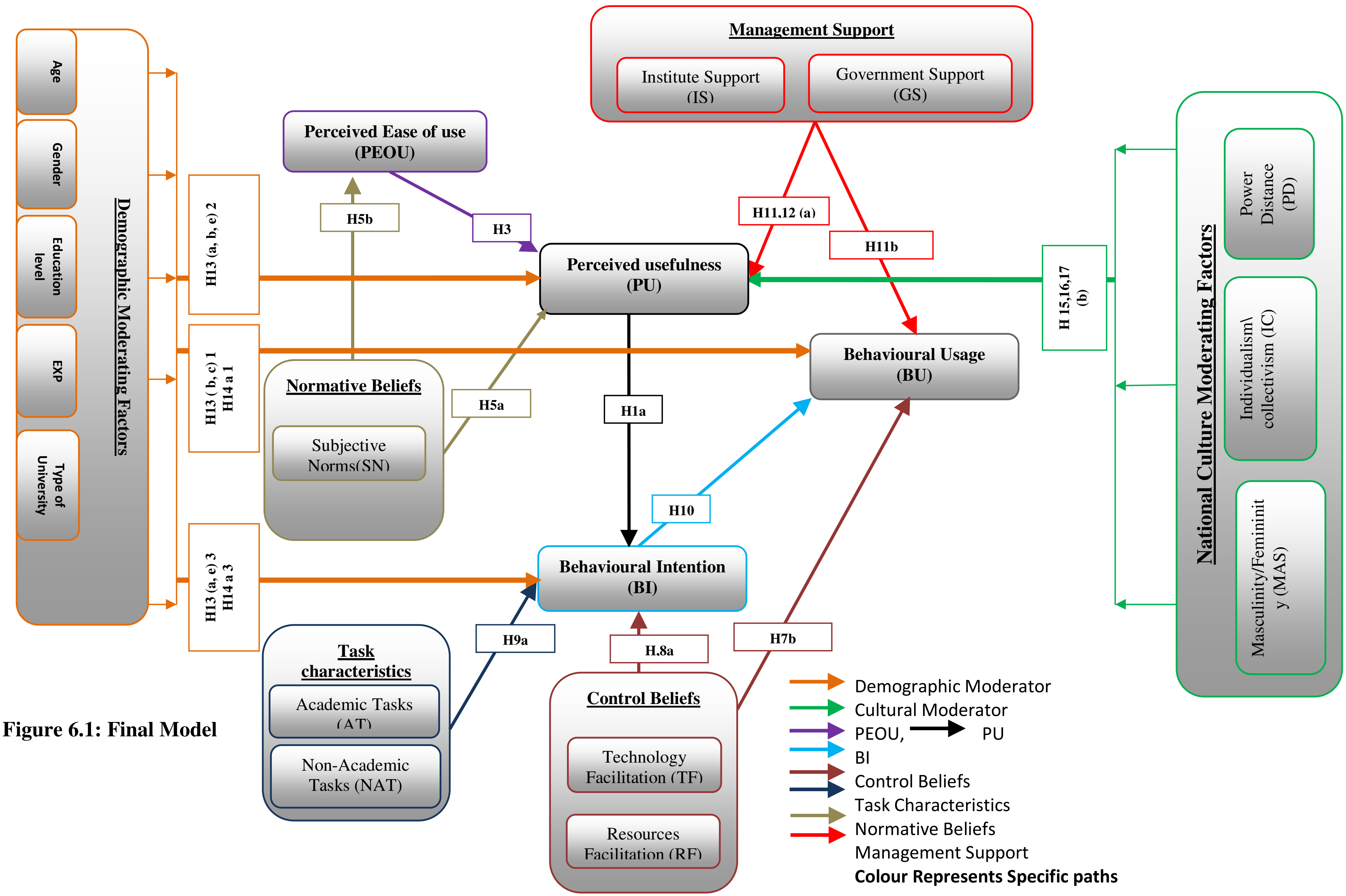


Figure 6.1: Final Model

6.1. Discussion of the results: Extended model

This research set out to meet the research objectives presented in chapter 1. In the extended model without moderation effect, initially total 12 hypotheses with 23 paths were proposed, but due to merger of two determinants (PI and SI in SN) same 12 general hypotheses were representing 20 path relations. The rationale behind segregating the hypotheses into a number of relations was in order to understand the in-depth exploratory impact of the each construct's relation as moderated by demographic and cultural dimensions on the acceptance of the individuals' behaviour. A summary of all the paths is presented in chapter 5, table 5.25. The results revealed that the partial relations were significant i.e., out of 20 paths 11 were supported and 9 were unsupported. By grounding the related constructs from the well-known accepted models TRA, TAM, TAM2, DTPB and UTAUT into the extended model and then applying them to a non-Western and non-North American context, it showed that an explanatory power of model within BI was accepted at a moderate level (R^2= 26% using PLS, and R^2=34% using AMOS), which is slightly lower than the TAM's persistence explanatory power (R^2=40%). The lower explanatory power is consistent with the inherent limitation of the cultural bias in the TAM and models based on the TAM's conceptualisation (e.g., Straub, Keil & Brenner, 1997; Srite & Karahanna, 2006; Teo et al., 2009; Alsajjan & Dennis, 2010). For example Straub, Keil & Brenner (1997) examined the TAM across three countries and found that the model shared similar variance within both a U.S. and Swiss context (R^2=10% in each) but was very low in a Japanese context (R^2=01% only). Closely observing the cultural characteristics measured by Hofstede (1980) for the Japanese context and current study context (i.e., Pakistan), it is observed that both countries tend towards greater power distance, collectivist sentiments and are higher on uncertainty avoidance which may limit their Internet usage and result in a disassociation from the intention to accept. Similar results were found by Teo et al (2009) who examined TAM within Singapore and Malaysian context. Teo et al., found clear difference in terms of beliefs explaining behavioural intention, such that effect was stronger in Malaysian context (i.e. 53%) compared to the Singapore context (i.e. 8% only). Supported by Straub et al. (1997), findings regarding the TAM's cultural bias and difference in explanatory power are further substantiated by reproducing the findings of the extended model in different cultural groups in chapter 5, section (5.6.4.3). In the following section an explanation of each group of hypotheses in the extended framework is presented.

6.1.1. Behavioural beliefs

For achieving the objective of observing how behavioural beliefs influence individuals' intentions beliefs towards acceptance of Internet technology, three path relations with two hypotheses were proposed:

H1a: *PU→BI;* ***H1b:*** *PU→BU;* ***H2:*** *PEOU→BI;* ***H3:*** *PEOU→PU.*

The SEM results in table 5.25 provided empirical evidence that hypothesis H1 was partially supported i.e., H1a was significant and H1b was insignificant; while H2 was completely insignificant and H3 was highly significant. In accordance with the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) and with previous literature (e.g., Venkatesh & Morris, 2000; Venkatesh, Morris & Ackerman, 2000; Venkatesh & Davis, 1996; Pai & Huang, 2011) it is found that the total effect of PU was significant and greater than PEOU on BI (H1a, H2). However, notwithstanding Davis' suggestions, an insignificant relation between PEOU and BI was observed (H2). This is not uncommon and has occurred in many other studies (e.g., McCoy, Everard & Jones, 2005; Abbasi, Irani & Chandio, 2010). The most significant relation between PEOU, PU and BI has always been between PU and BI (Alsajjan & Dennis, 2010). These findings are relevant to the context of the current study, which suggests that the respondents (academics) are driven to accept the Internet primarily on the basis of its usefulness, which is established by perceiving relative advantages. A possible explanation for the insignificant relation of PEOU on BI can be derived from the study of Davis (Davis, 1986) itself, who argued that the impact of PEOU may influence BI indirectly through PU. Table 5.25 indicates that PEOU has an indirect effect on BI via a strong direct significance on PU (H3). This result suggests that PEOU increased the perception of usefulness of the Internet technology. Similar result were also found by Venkatesh et al. (2003) in UTAUT with a direct effect of effort expectancy (i.e., PEOU) on performance expectancy (i.e., PU), and by Alsajjan and Dennis (2010) in Internet banking acceptance model with a effect of perceived manageability (similar to PEOU in this study) on PU. In addition, strong evidence in literature is present (e.g., Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Taylor & Todd, 1995a; Mathieson, 1991; Yi et al., 2006; Teo et al., 2009; Pai & Huang, 2011; Teo, 2010) supporting the relationship between PEOU on PU.

The insignificant relation of PEOU and BI (H2) is consistent with the prior research (e.g., Gefen & Straub, 2000; Abbasi, Irani & Chandio, 2010) which suggests that the perception of ease of use primarily influences the potential adopters' usage intention. For example

Gefen & Straub (2000) found that new technology was adopted due to extrinsic motivations (i.e., PU) rendering intrinsic motivations insignificant (i.e., PEOU). Therefore, it can be inferred that PEOU can only influence the intention and use when intrinsic characteristics of the technology contribute to the actual usage. Additionally, the impact of PEOU on BI and BU is found to be inconsistent in relation to the usage experience and complexity of the system, that is, the impact is stronger when the users have less experience and the technology is more complex to use (Igbaria et al., 1997; Kim, Choi & Han, 2009). In the sample of the current study most of the respondents (academics) self-estimated themselves as moderate (n=184) to higher (n=176) with regard to their Internet usage experience, therefore, as much as respondents were gaining experience with the Internet technology, more cognitive considerations emerged and insignificance in the intended behaviour was expected. An additional possible explanation could be that technological usage, specifically the Internet within the context of the study (i.e., higher educational institutes in Pakistan), is still new. Consequently, respondents might be willing to use the Internet but due to scarcity of resources they are discouraged. Nevertheless, the relation of PEOU on BI and BU is consistently found to be significant in information systems literature, but in some cases it was also found to be statistically insignificant (e.g., Hu, Clark & Ma, 2003; Wu & Wang, 2005). Reasonably in some of the recent literature effect of PEOU on BI is completely excluded (e.g. Alsajjan & Dennis, 2010; Ha & Stoel, 2009).

Finally, contrary to the TAM, the effect of PU on BU (H1b) was found to be insignificant. This insignificance is consistent with Straub, Keil & Brenner (1997) study which found cultural bias within the TAM. Authors, found an insignificant impact of PU on BU in the Japanese context (similar to the current study's context), while it was found to be significant in the context of the U.S. and Switzerland (ibid). An additional possible explanation could be given on the basis of usage experience, which suggests that higher usage experience creates an enjoyment effect, which in turn minimises the significance of PU (Chin, Marcolin & Newsted, 1996). This lower or even negative impact of PU moderated by perceived enjoyment (i.e., higher in usage experience) is also reported in previous literature (e.g. Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Igbaria et al., 1997; Igbaria, 1993; Abbasi, Irani & Chandio, 2010; Kim, Choi & Han, 2009). In the current study, as defined earlier, respondents had moderate to higher usage experience, which might have given rise to an enjoyment effect, and consequently the impact of PU became weaker. Further clarification of this impact is given in the discussion of section (6.2.1.6) where experience is examined as a core moderator.

6.1.2. Normative beliefs

Within the extended model the second objective was to observe how perceived normative beliefs will influence an individual's behavioural and intentional beliefs towards acceptance of Internet technology. Initially, based on Taylor and Todd's (1995a) study, conceptualisation of normative beliefs in the framework were incorporated as peer influence (PI) and superior influence (SI). Six paths represented the two hypotheses as follows:

H4a: *PI→BI;* ***H4a:*** *SI→BI;* ***H5a:*** *PI→PU;* ***H5b:*** *SI→PU;*

H5c: *PI→PEOU;* ***H5d:*** *SI→PEOU*

However, after EFA both constructs PI and SI were loaded into a single component with highest factor loading of PI followed by SI (see table 5.18). This suggests that respondents (academics) were more influenced by their peers and colleagues in comparison with their superiors. Based on the EFA results, both factors PI and SI were merged into one construct as subjective norms (SN). Thus, the previous six paths and two hypotheses were converted into three path relations representing two hypotheses as follows:

H4: *SN→BI;* ***H5a:*** *SN→PU;* ***H5b:*** *SN→PEOU*

In this study the grouped PI and SI construct in SN is also consistent with previous literature. For example, SN was studied in TRA (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), TAM2 (Venkatesh & Davis, 2000), TPB (Ajzen, 1991), DTPB (Taylor & Todd, 1995a), and A-TAM (Taylor & Todd, 1995b). SN were also studied as social influence in UTAUT (Venkatesh et al., 2003) which is defined as individuals' perception about particular behaviour influenced by the judgment of others. Similarly it was studied as image in IDT (Rogers, 1995).

The results in table 5.25 provide empirical evidence that hypothesis H4 was completely rejected; while H5 was fully accepted. These results are in accordance with TAM2 (Venkatesh & Davis, 2000) and recent literature (e.g. Baker, Al-Gahtani & Hubona, 2010; Teo, 2010) which suggest that the opinions of professional co-workers and superiors play a major role in developing the behavioural beliefs towards acceptance intention. The insignificant impact of SN on BI (H4) is not common and Davis (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) decided to remove SN from the original model for this very reason. However, in later studies SN was added with the caution of time and experience (Venkatesh & Morris, 2000; Venkatesh & Davis, 2000). For instance, Venkatesh & Davis (2000) found that the direct impact of SN on BI became weaker with the passage of time and experience usage. This implies that users in early/before technology implementation were less familiar with technology and its benefits, and thus for developing intention they rely more on other people's opinions. With the passage of time users acquires direct experience and knowledge about the system's strengths and weaknesses; this lessens the influence of others in shaping their own intentions. An identical effect was found in literature by Morris and Venkatesh (2000) which states that SN become weaker over time. Additionally Taylor & Todd (1995b) and Karahanna and Straub (1999) reported that the relative impact of SN on BI intention was higher for the respondents with less experience. In the current study, as stated earlier, most of the respondents (academics) had moderate to high usage experience which they gained with the passage of time, therefore their cognitive consideration towards intention to accept technology (i.e., the Internet) was based on self-reliance experience rather than the opinion of others.

The significance of the path SN on PU (H5a) is in accordance with the TAM2 (Venkatesh & Davis, 2000) and literature (e.g. Baker, Al-Gahtani & Hubona, 2010; Kim, Kim & Shin, 2009), which posits that SN can influence BI indirectly through PU by the process of internalisation effect. The literature also supports indirectly the effect of PEOU on BI via PU (Davis et al., 1992); therefore the indirect impact of SN on PU via PEOU (H5b) consistent with literature (e.g. Alsajjan & Dennis, 2010; Teo, 2010) was also expected in this study. The internalisation refers to the process by which individuals refine their own behavioural beliefs by incorporating the opinion of the important referents (Venkatesh & Davis, 2000). It is different from the normative beliefs where individuals form their intentions by taking others' opinions as evidence of reality (ibid). Additionally, it is noticed that the effect of SN on the BI to accept the technology through the indirect relation of PU tends to disappear with increased experience and voluntary usage conditions (e.g., Venkatesh et al., 2003; Hu, Clark & Ma, 2003; Venkatesh & Davis, 2000; Yi et al., 2006). In the context of the study (higher educational institutes in Pakistan), the overall mean of the usage conditions (i.e., voluntariness) was 3.18/7.0, which suggests that the usage of the technology (the Internet) was mandatory. Therefore, the significant impact of SN on behavioural beliefs (PU and PEOU) was expected and met the conditions of the literature discussed.

6.1.3. Control beliefs

The third objective within the extended model was to observe how perceived control beliefs will influence individuals' behavioural and intentional beliefs towards acceptance of Internet technology. Similar to the normative beliefs, perceived behavioural beliefs were adopted from the decomposed theory of the planned behaviour (Taylor & Todd, 1995a). Based on Ajzen (1991), the conceptualisation impact of PBC (i.e., beliefs regarding access to the resources and opportunities needed to perform behaviour) were examined in two groups of the constraints: internal constraints and external constraints. The internal constraints refer to the construct self-efficacy (Bandura, 1977), which reflects one's self-appraisal of his/her ability to perform specific tasks. To examine SE, two path relations representing one hypothesis were parsed as:

H6a: *SE→BI;* ***H6b:*** *SE→BU*

Whereas external constraints refers to the construct facilitation condition (Triandis, 1979), which reflects the availability of the resources (e.g., time, money and specialised resources) needed to engage in specific behaviour. For in-depth understanding, FC was examined with the help of two control beliefs, one related to the resource factors (time and money) and the other relating to technology compatibility issues that may constrain usage. Hence, four path relations representing two hypotheses were examined:

H7a: *TF→BI;* ***H7b:*** *TF→BU;* ***H8a:*** *RF→BI;* ***H8b:*** *RF→BU*

The results in chapter 5, table 5.25 revealed that hypothesis H6 was completely rejected, H7 and H8 were partially supported (i.e., H7b and H8a were accepted, and H7a and H8b were rejected). Contrary to the literature (e.g., Mathieson, 1991; Compeau and Higgins, 1995a; Mathieson, Peacock and Chin, 2001; Hasan & Ahmed, 2010; Wang & Wang, 2010), SE produced an insignificant effect on BI and BU (H6a and H6b). One possible explanation could be that SE showed uncertain properties within the model. For instance, during psychometric examinations of the survey, the overall reliability of the construct was lower than the required value (0.49); one item, SE3 ('I could complete my tasks using the Internet if there is no one around me to tell what to do as I go'), produced very low corrected item-to-total correlation (0.06). Contrary to the recommendations (Pallant, 2007), the item was retained up to EFA. Within the EFA item, SE6, ('I could complete my tasks using the Internet if I had enough time provided to use it') was excluded due to cross-loading. The remaining items of SE were loaded into two groups. The first group of items represented individuals who were more comfortable using the Internet on their own, while the other group represented individuals who were more comfortable getting help to use the Internet. Following the requirement of items per factor (Hair et al., 2006), only the first group was examined in the extended model, which produced an insignificant effect.

Apart from the lower construct fitting into the model, another justification could be given from the previous literature, which referred to SE as a similar concept to both PEOU (Davis, 1989; Alsajjan & Dennis, 2010) and internal control (Venkatesh & Morris, 2000). It was observed and discussed in H2 that there was an insignificant relation between PEOU and BI, therefore, due to similarities in the concept, a lower perception of PEOU resulted in a lower evaluation of self-efficacy. This insignificant effect of SE is also consistent with previous studies e.g., Lewis et al., (2003) found an insignificant effect of SE on PU, Venkatesh et al., (2003) found an insignificant effect on BI, and Hsu & Chiu (2004) found an insignificant effect on e-service satisfaction. Finally, the insignificance of SE can be explained with the awareness of technology in the current context of the study. It is possible and it was observed that technology awareness is getting easier in the educational institutes of Pakistan and academics increasingly socialised using technology. As a result it is becoming ubiquitous within and outside of work situations. Therefore, it might be possible that the relevance of SE as an important construct due to the awareness of technology in explaining acceptance intention is becoming eroded with the passage of time.

The results in table 5.25 revealed that the proposed paths related to external constraints, which is facilitation conditions (TF and RF), were partially supported. During EFA item, RF1 ('Use of the Internet in my university is free of cost') was excluded due to lower factor loading. The justification behind the partial support for the hypothetical relations related to the FC (it includes both TF and RF) could be given from the study of Taylor & Todd (1995a), who argued that lack of FC represents a barrier to use and may inhibit the shaping of intention. However the reverse may not be assumed as encouragement. In other words, the availability of TF and RF may or may not impact on usage and intention behaviour, but equally, usage and intention are less likely to be expected with reference to less time, money and decreased technical compatibility.

In literature, the impact of FC on BI and BU is examined through the perception of behaviour control (PBC) (Taylor & Todd, 1995a; Mathieson, 1991; Taylor & Todd, 1995b; Mathieson, Peacock & Chin, 2001; Puschel et al., 2010), which is moderated by experience (Taylor & Todd, 1995b). For example, within A-TAM it was observed that the relation between PBC with BI and BU decreased with increased experience (Taylor & Todd, 1995b). Similar results were found by Venkatesh et al. (2003) during the development of UTAUT. The author reproduced the results using TBP and DTPB and found that the impact of PBC on BI was moderated by experience, so that PBC decreased with increased experience. As mentioned earlier, the majority of the respondents (academics) in this study had moderate to high experience of the technology (the Internet) and therefore more chances of insignificance were expected. However, observing the clear impact of the experience, table 5.44 revealed that paths TF on BU (H7b) and RF on BI (8Ha) were only significant with individuals with less experience, and this supports the previous literature.

A possible explanation behind the insignificant relation of TF on BI (H7a) and RF on BU (H8b) could be the insignificant relation of facilitation conditions (i.e., combined TF and RF items) on intention in UTAUT (Venkatesh et al., 2003). Venkatesh et al. (2003) found that in the presence of construct effort expectancy (similar to PEOU in this study) and performance expectancy (similar to PU in this study), the effects of FC were insignificant on BI and BU. Therefore, the significance of PU on BI (H1a) could be a possible reason for the insignificance of FC. The mixed results (partially significant) for FC are also found in the previous literature. For example, in TPB and DTPB, the path was significant. However, in other cases MPCU and IDT paths were insignificant (for review see Venkatesh et al., 2003).

6.1.4. Task characteristics

The fourth objective within extended model was to examine the importance of task characteristics towards individuals' acceptance behaviour, with one hypothesis and two path relations:

H9a: *AT→BI;* ***H9b:*** *NAT→BI*

The SEM results in table 5.25 provide empirical evidence that hypothesis H9 was partially supported (i.e. H9a was accepted and H9b was rejected) and suggest that academics primarily adopted technology (Internet) due to relevance within academic task (AT). Recalling the conceptual framework (chapter 3, section 3.24) where AT were considered as routine-task and NAT as non-routine, results of the present hypothesis are contrary to the literature. For instance, Goodhue & Thompson (1995) within TTF found strongest effect of non-routine tasks compared to routine tasks. One of the possible rational for this result can be understood from the study of Dishaw and Strong (1999). By combining both TTF and TAM authors found that precursors of utilisation (i.e. behavioural beliefs and attitude) were reflected with situational conditions (i.e. voluntariness and mandatory) (ibid). Therefore, recalling the discussion (in section 6.2.1.7) and considering similarities with normative beliefs it was expected that effect of routine-task (i.e. mandatory most likely imposed by supervisors) would be higher than the non-routine task (i.e. voluntary for the purpose of self-interest). In addition to this, even in voluntary settings, effect of technology (Internet) was expected higher in AT due to relevance with job characteristics. This is consistent with the literature which utters that element of acceptance of any innovation is based on its need at work (Roger, 1983; Compeau and Higgins, 1995; Larsen et al., 2009). For instance, Laresen et al. (2009, p. 780) posit that if the technology meets the requirement of the specific work tasks, than there is higher probability that the technology will contribute to improve the job performance. In contrary to this, Leonard-Barton and Deschamps (1998, p-1255-56) posit that if task has less relevance, than individual's may have lower perceived importance and needs push from the higher management. Considering job requirements, which is similar to job-relevance and perception of usefulness (see conceptual framework Section 3.2.1) the effect of AT was highly expected. In addition, looking at direct and indirect effect in table A-7 appendix-A, it was noticed that identical to PU conceptualisation in TAM, path of AT was significant on both BI as well as on BU.

6.1.5. Behavioural intention towards behavioural usage

The fifth objective of the study was to examine the direct relationship between behaviour intention and behaviour usage. The hypothesis investigated was:

H10: *BI→BU*

Consistent with the TAM, TRA, and TPB (Davis, 1989; Davis, Bagozzi && Warshaw, 1989; Ajzen, 1991; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), the theoretical underpinnings of this study found usage behaviour to be a direct determinant of behaviour intention (table 5.25). This significance corroborates the possibility of placing the extended technology acceptance model in the context of non-Western academics' Internet acceptance. The pragmatic inclusion of behaviour intention as a mediator between key determinants of cognitive intention and usage was to increase the predictive power of the model (Taylor & Todd, 1995a). Albeit, a significant impact of intention dictating usage behaviour substantiates previous findings (e.g., Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Taylor & Todd, 1995a; Venkatesh & Morris, 2000; Venkatesh et al., 2004; Morris & Venkatesh, 2000; Ajzen & Fishbein, 1980; Taylor & Todd, 1995b; Igbaria & Chakrabarti, 1990; Igbaria & Iivari, 1995; Shih & Fang, 2004; Szajna, 1996; Szajna, 1994; Szajna & Scamell, 1993) but the paths of beliefs which shaped intention revealed an ineffective significance on usage behaviour. Arguably, there may be several possibilities but one is the operationalisation of measures to examine the behaviour. The measures used to examine the usage were similar to intention with a different scale i.e., intentions were observed using a scale of agree/disagree, and usage was observed by asking the frequency of future willingness. Due to the cross-sectional approach, usage frequency was not examined for understanding the differences over time. In other words, measures to examine the usage were self-assessed questions to measure the similar concept of intention. Therefore, the significance of the paths concerning usage also supported the higher intention regarding acceptance.

6.1.6. Management support: institutional and governmental level

Within the extended model the sixth objective was to present the empirical evidence that institutional and governmental forces in terms of management support exhibit a significant and differential impact on the key determinants of the behavioural beliefs and usage towards the acceptance of Internet technology. A total of four causal paths representing two hypotheses were investigated as:

H11a: *IS→PU;* ***H11b:*** *IS→BU;* ***H12a:*** *GS→PU;* ***H12b:*** *GS→BU*

The results in table 5.25 show that the relationship between low-level management i.e., institute support (IS), was positively significant with respondents' (academics) behavioural belief i.e., PU and usage or BU (H11a and H11b). However, the relationship was partly supported in the context of top-level management i.e., government support (GS) (H12a). The significance of management support (similar to organisational support) is in accordance with theoretical speculation which reported the influence of the external variables over the formation of the individuals' cognitive acceptance behaviour through behavioural beliefs i.e., PU and PEOU (Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Szajna, 1996; Szajna, 1994; Szajna & Scamell, 1993). This significance also highlights the importance of management support as a key predictor, and the lack of it as a critical barrier to acceptance and success (e.g., Yoon, Guimaraes & O'Neal, 1995; Igbaria et al., 1997). Pragmatically, the significance of the relationship is consistent with previous literature in the context of organisational support (e.g., Davis, Bagozzi & Warshaw, 1989; Igbaria & Chakrabarti, 1990; Thompson, Higgins & Howell, 1991; Igbaria, 1990; DeLone, 1988; Leonard-Barton & Deschamps, 1988; Monge, Cozzens & Contractor, 1992; Monge et al., 1998; Kim & Kim, 2008) and specifically within management support towards PU and system usage (e.g., Lewis, Agarwal & Sambamurthy, 2003; Igbaria et al., 1997; Igbaria, 1994; Igbaria & Tan, 1997; Abdul-Gader & Kozar, 1995; Rouibah et al., 2009).

In accordance with Lewis et al.'s (2003) term 'institutional factors', the findings of the current study suggest that when respondents (academics) were aware of their future visions, their efforts regarding support and recognition, encouragement and incentives, and finally their importance for the institute or government, they showed a positive response towards behavioural beliefs and usage. In other words, management, in terms of commitment and support, influenced academics' beliefs about the usefulness and usage of technology (the Internet). This relationship was inevitable in terms of the context of the study, as discussed earlier: the government of Pakistan recently initiated mega-projects for encouraging technological use in the higher educational system in order to enhance the research skills of academics. One of these projects is entitled e-Reforms and includes the Pakistan Education and Research Network (PERN), the Digital Library, the Pakistan Research Repository (PRR), and the Campus Management Solution (CMS) (HEC PAK, 2009). In addition, the government has invited many foreign investors to invest in upgrading the basic IT infrastructure and broadband facility. Promotions and upgradings which were previously given on the basis of seniority are now based on research efforts and skills. Consequently, technology and Internet usage in order to improve skills are becoming necessary for academics. Therefore, the support of management in terms of resource allocation and recognising individuals' efforts was likely to promote the perceived usefulness and usage of technology acceptance.

The higher impact of IS (fully supported) compared with GS (partly supported) can be understood through the analogy of Miller & Toulouse (1986) who reported a higher impact of the chief executive officer (CEO) in the context of small firms. Similarly, in the context of this study (higher educational institutes) academics were more likely be influenced by lower-level management i.e., management at the level of institutes (chairs, deans, vice-chancellors) compared with top management. Rationally, lower-level management have an enormous influence via their face-to-face contact, the immediate effect of their expressed goals, and preferences. Indeed, this differentiated impact is consistent with Lewis et al.'s (2003) findings that individuals were much influenced by their immediate supervisors due to their day-to-day communication compared with top-management. Further support of this difference is examined next with the moderating effect of the organisational context (section 6.3.1.3).

6.2. Discussion of the results: moderators

6.2.1. Demographic characteristics

Beside establishing and examining the extended model, the second goal of this research was to explore the difference evoked between segments of respondents (academics) towards acceptance of the technology (the Internet) on the basis of their demographic characteristics i.e., age, gender, organisational type, academic position, educational level, experience and voluntariness. In the findings chapter, the researcher examined seven moderating variables using the multiple-group analysis (MGA) method. Each examination required splitting the sample into the desired group; differences between the paths' parameters were scrutinised on the basis of parametric and non-parametric t-statistics. Before explaining the brief discussion on the results below, it is important to assert that all the relations in MGA were examined on the basis of exploratory approach. In other words, rather than not validating each causal path presented in the extended model, only the paths with significant difference were explored.

6.2.2.1.Age

Within demographic groups first moderator investigated was age, to know the influence of exogenous variables on endogenous variables with the help of following proposed hypotheses:

H13a1: (BI, PU, TF, RF, SE, IS, GS) X Age→BU

H13a2: (SN, PEOU, IS, GS) X Age→PU

H13a3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X Age→BI

H13a4: SN X Age→PEOU

The results in section (5.6.4.2.1) show that the model fitting for both the younger and older age group was satisfied except predictive relevance in the older group. One possible reason behind the unsatisfactory predictive relevance (i.e., cross-validity and redundancy of paths by re-sampling method) could be the lower number of respondents in the older age group. In this study, the age groups were split based on the research of Morris et al., (Morris, Venkatesh & Ackerman, 2005) which suggests that the age range <39 represents younger and ≥40 represents older groups. Therefore, in the older group the number of examined respondents was only 91 and the remaining 289 were in the younger group. Although, age became a potential moderator in this study and differences were observed but the generalised observations for the older group should be treated with caution.

The R^2 value (i.e., shared variance explained by predictors of criterion variable) was higher in terms of instrumentality factor PU (R^2=0.28 or 28% in both groups). However, in terms of establishing cognitive intention towards acceptance, the older group was more sensitive than the younger one i.e., R^2=0.33 or 33% and R^2 = 0.26 or 26% respectively. This finding is consistent with Venkatesh et al.'s (2003) study in which the author reported that the impact of performance expectancy (similar to PU) was higher in the younger age group. In the current context of the study, this finding suggests that perception development towards the acceptance of the Internet within higher educational institutes is primarily influenced by perceiving positive intention in older academics, and perceiving usefulness in younger academics.

Consistent with the TAMs (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), the highest significant path within both groups was PU→BI. However, the lowest significant path in the younger group was GS→PU, and in the older group it was SN→PU. These results suggest that both groups perceived the higher importance of technology (the Internet) usefulness in their tasks, which in turn established positive intentions towards acceptance behaviour. The impact of government support was also noticed in forming perceptions; however, it was hardly observed in the younger age group. Finally, both groups were significantly influenced by the normative factors (peer and superior influence) but older age group respondents (academics), compared with the younger age group, paid very little attention to the opinions of others when forming their own perceptions of technology usefulness.

Before examining the impact of moderation, it is worth mentioning that age only evoked a moderating impact when differences (variance) were computed based on parametric t-test. However in terms of non-parametric t-test there was no moderating impact found. The results show that age produced a moderating impact between two groups at path RF→BU and PEOU→PU. For instance, RF→BU was negatively insignificant in the overall sample and the older age group but it was positively insignificant in the younger age group. Contrary to DTPB, A-TAM and UTAUT (Venkatesh et al., 2003; Taylor & Todd, 1995a; Taylor & Todd, 1995b), which posits a positive relationship between PBC and facilitation conditions towards usage, the path of resource facilitation (i.e., component of PBC in DTPB) was insignificant in this study. Even though the path was insignificant in both groups, the negative insignificance in older groups reveals that RF was much less important for the older age group compared with the younger age group. This finding is partly consistent with the study of Morris et al., (2005) which found that a higher age reduced PBC due to lower SE and cognitive skills. Additionally, in recent study of Chung et al., (2010) echoed previous literature and found negative relationship between age and the Internet self-efficacy.

The second moderating impact PEOU→PU revealed that the path was significant in the younger age group and was insignificant in the older age group. This finding can be interpreted with the previous literature (Venkatesh et al., 2003; Wang et al., 2009) which found a higher impact of effort expectancy (similar to PEOU in this study) in younger age individuals only towards BI. Furthermore, it is also noticed that increased age shows an association with difficulty in processing complex stimuli and allocating attention to task-relevant knowledge (Plude, 1985). Consequently, older people are less likely to have technological experience, exposure and information, and therefore less perception of the importance of usefulness. These results suggest that hypothesis **H13a** was partially supported, specifically **H13a** and **H13b** were supported and **H13c** and **H13d** were unsupported.

6.2.2.2. Gender

The demographic variable gender was investigated to examine the following hypotheses:

H13b1: (BI, PU, TF, RF, SE, IS, GS) X Gender→BU

H13b2: (SN, PEOU, IS, GS) X Gender→PU

H13b3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X Gender→BI

H13b4: SN X Gender→PEOU

Section (5.6.4.2.2) presents the results obtained during the analysis of moderating variable gender. The shared variance (R^2) explained in dependent variable for the male group was higher in BI followed by PU i.e., $R^2 = 0.30$ or 30% and 0.24 or 24% respectively; whereas in the female group the variance noticed was higher in PU followed by BI i.e., $R^2= 0.33$ or 33% and 0.28 or 28% respectively. Theoretically and based on previous literature (e.g., Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Taylor & Todd, 1995a), a higher variance explained in BI was expected. However, in the female group a higher variance explained PU was surprising at the first instance. Vigilantly examining the results of path significance in table 5.32, it is found that within the female group, the overall sample data significant path ratio was higher in the dependent variable PU compared with the BI. Consequently PU shared the highest variance (i.e., the number of paths' significance is directly related to variance explained (Chin, 1998b)). This finding suggests that male respondents (academics) accepted the technology (the Internet) primarily by perceiving the direct impact of beliefs i.e., behavioural, social, control, support and task characteristics over BI, whereas female respondents established acceptance intention via indirect effects of perceived behavioural, social, control, support and task characteristics beliefs mediated through the PU. Consistent with the TAM results, the highest significant path in both groups was PU→BI. However, the lowest was IS→BU in the male and RF→BI in the female group. This result suggest that management support at an institute level and resource facilitation established behaviour intention of acceptance and usage behaviour but their importance was very low compared with the other constructs.

The test of moderation showed that gender produced a significant moderating impact at paths SE→BU and IS→PU. Regardless of the evidence that SE did not produce any significant relation in the model (possibly due to weak psychometric properties), it showed negative insignificant relation in the female group towards BU. One possible explanation is given by social cognitive theory (SCT) (Bandura, 1986), which suggests that anxieties and expectancies (i.e., SE and PEOU) are reciprocal with each other. Additionally, literature (e.g., Bandura, 1977; Rosen & Maguire, 1990; Brosan, 1998; He & Freeman, 2009) indicates that the lower the computer anxiety, the greater the experience, which indirectly increases SE and in turn improves performance. In the context of gender IT acceptance studies, literature (e.g., Igbaria & Chakrabarti, 1990; Brosnan & Lee, 1998; Schumacher & Morahan-Martin, 2001; Weil & Rosen, 1995; He & Freeman, 2009) shows that women, compared with men, had higher levels of computer anxiety and were more techno-phobic. Consequently they were more reluctant to interact with technology and had perceived lower ability of SE to perform tasks and established BU and BI.

The second path difference due to the moderating impact of gender IS→PU revealed that the path was significant in the female group and insignificant in the male group. This result suggests that female respondents (academics) gave a higher importance to the institute support towards the PU of technology (the Internet). One possible explanation could be inferred by recalling the discussion above which suggests that females were higher on anxiety and lower on SE. It is obvious that when one's self-appraisal of his/her ability to perform a task decreases then he/she will be more interdependent and sensitive to the needs of others. This argument is also supported in the literature (e.g., Venkatesh & Morris, 2000; Gefen & Straub, 1997; Bem, 1981; Wang et al., 2009; Hu et al., 2010) which reported that women, as compared with men, are flexible towards compliance with orders and most likely to accept behaviour if it is confirmed by a majority of people. These results suggests that hypothesis **H13b** was partially supported. Specifically, **H13b1** and **H13b2** were supported and **H13b3** and **H13b4** were unsupported.

6.2.2.3. Organisational type

The third moderator was to examine the impact of organizational type (public and private) over the relations of independent and dependent variables in the framework. Examination of organisation type will help to evaluate the following hypotheses:

H13c1: (BI, PU, TF, RF, SE, IS, GS) X Org→BU

H13c2: (SN, PEOU, IS, GS) X Org→PU

H13c3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X Org→BI

H13c4: SN X Org→ PEOU

Section (5.6.4.2.3) presents the results examined using MGA to observe the moderation impact due to organisational context. The two models were compared by splitting the main data into public organisations (n=207) and private organisations (n=173), which achieved a moderate acceptable fit. Consistent with the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), both models shared highest and similar variance into dependent variable BI i.e., R^2= 0.36 or 36%, followed by PU (i.e., R^2= 0.24 or 24% in public, R^2= 0.21 or 21% in private).

These results suggest that primarily the intention of acceptance within both organisations was based on the direct impact of beliefs: behavioural, social, control, support and task characteristics; and afterwards, via indirect effect, similar beliefs through the PU. Specifically within public organisations, respondents were more influenced by the PU compared with the private organisations. Consistent to the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), the highest significant path in both models was PU→BI, and the lowest path was RF→BI in the public and GS→PU in the private organisation. The possible explanation behind the weaker significance of the RF path in public organisations and the GS path in private organisations is related to the type of management support. For instance, in previous sections (6.2.1.2) it was noticed that respondents gave higher importance to the perception of the immediate head of the organisation compared with the top-level management. This impact is clearly visible in private organisations context where the impact of IS→PU was much higher than in public organisations. Additionally, GS→PU was totally insignificant in the context of public organisation and was weak significant in the context of private organisations. The reason is obvious that in private organisations the influence of low-level management (institute-level chairs and heads) is perceived to be higher due to most of the assets ownership in the organisation. Additionally, it is common for heads to be involved in most of the key decisions and perhaps are the only individuals who can harness the technology on the basis of compliance to achieve their objectives and goals. On the contrary, in public organisations the use of technology is on a voluntary basis and respondents grant a lower importance to both top- and low-level management. In these organisations individuals value their own autonomy and in rare cases view hierarchical relationships between themselves and the head of the organisations as an administrative necessity. Further authentication of this compliance and voluntary use and their impact is examined in section (6.2.1.7).

The MGA show that two paths i.e., TF→BU and BI→BU were significantly different in two organisational contexts. Specifically, TF in public and BI in private organisations (universities) was insignificant. Recall that the discussion on those individuals in both organisations, specifically in public, gave lower importance to top-level management support (government support). Therefore, the related advantages of top-level management in terms of encouragement (instrumental reward) and facilitation (money, time, and technology) are also less perceived by individuals. This is the reason that not only TF, but also RF were totally insignificant in the context of public organisations. This is contrary to private organisations where low-level management has a higher influence on an employee's attitude to the acceptable importance of the technology and resource facilitations of their acceptance behaviour. Observing the MGA result, hypothesis **H13c** was partially supported, specifically, only **H13c1** was supported and the remaining three **H13c2**, **H13c3**, and **H13c4** were unsupported.

6.2.2.4. Academic position

Moderating factor academic position was investigated to examine the following hypotheses:

H13d1: (BI, PU, TF, RF, SE, IS, GS) X AC→BU

H13d2: (SN, PEOU, IS, GS) X AC→PU

H13d3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X AC→BI

H13d4: SN X AC→PEOU.

Section (5.6.4.2.4) presents the results of the MGA when observing the moderating impact of academic position. Five groups based on hierarchical academic position were split into two groups: lecturer (n=204) and higher position (n=176). Both models achieved acceptable reliability, validity, explanatory power, predictive relevance and goodness of fit. Consistent with the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) based on higher academic positions explained highest shared variance into BI (R^2=0.28 or 28%) followed by PU (R^2=0.26 or 26%). However, the model based on the lecturer sample presented the highest shared variance of belief PU (R^2=0.33 or 33%) followed by BI (R^2=0.28 or 28%). The highest significant path in higher position academics was PU→BI and the lowest was GS→PU, whereas the highest significant path in the lecturer group was PEOU→PU and the lowest was SN→PU. This result suggests that the intentions of the academics who held a higher position to accept technology (the Internet) were solely based on the perception of instrumental outcome PU, while newer academics' acceptance intention was based on the PEOU. Both of these relations were consistent with Davis et al.'s (1989) findings which reported the direct impact of behavioural beliefs (PU and PEOU) over BI and an indirect of PEOU via PU over BI.

The results of the MGA show that there was no significant difference between the two groups. It was noticed that academic position nearly moderated the path PEOU→PU (i.e., parametric t-test=1.95 and non-parametric t-test=1.933). Regardless of which path was significant in both groups in the same direction, the results suggest that academics who held the position of lecturer compared with those who held a higher position, perceived a higher importance of PEOU toward BI via PU. In summary, the moderator of academic position failed to produce an acceptable difference, and thus hypothesis **H13d** was completely rejected.

6.2.2.5. Educational level

The final personal characteristic examined as a moderator was educational level, and represent following hypotheses:

H13e1: (BI, PU, TF, RF, SE, IS, GS) X EL→BU

H13e2: (SN, PEOU, IS, GS) X EL→PU

H13e3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X EL→BI

H13e4: SN X EL→PEOU

The number of respondents (academics) was highest in the category of masters degree (n=290) and so were lower in the categories of bachelor degree (n=39) and doctorate degree (n=51). Due to the lower sample size in the bachelor and doctorate group, the fitting of these models was slightly lower than an acceptable fit. In addition, out of twenty paths, seven in the bachelor group and the majority of the doctorate group were different. Therefore generalisation of the results of the moderating impact of educational level requires cautious interpretation.

Consistent with the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989), the highest shared variance (R^2) explained in the bachelor and doctorate groups was in dependent variable BI i.e., R^2=0.60 or 60% and R^2=0.57 or 57% respectively. However, in the masters group, the shared variance was observed to be higher in PU followed by BI i.e., R^2=0.34 or 34% and R^2=0.25 or 25% respectively. These results suggest that a large number of the respondents (academics in the masters group) established an intention to accept technology through beliefs - behavioural, social, control, support and task characteristics - mediated by the PU. Whereas respondents from the bachelor and doctorate groups accepted the technology primarily on the basis of their cognitive behaviour established directly through the behavioural, social, control, support and task characteristics beliefs. In the bachelor group the highest significant path was between AT→BI and the lowest was IS→BU; whereas consistent with TAM's findings, the highest significant path in the masters group was PU→BI and the lowest was RF→BI. Finally, in the doctorate group the highest path was between GS→BU and the lowest was RF→BI.

The test of significance of differences using MGA shows that the level of education shows a moderating effect at path SN→PU between the bachelor and the other two groups. Specifically, the path was negatively significant in the bachelor group compared with positively significant in the other two groups. The second difference was at path SE→BI between the bachelor and the other two groups. As with the previous difference, this path was negatively significant in the bachelor subgroup and was insignificant in the remaining two groups. These results suggest that the sample with the lower level of education perceived a negative impact of social norms and self-efficacy regarding the perception of usefulness and intention.

The negative impact of SE over BI in the bachelor degree groups is consistent with the previous literature that reported a negative impact of education with computer anxiety (negative perception of usefulness and learning) and a positive impact on PU, attitude, BI and BU (e.g., Igbaria, 1993; Igbaria, Pavri & Huff, 1989; Igbaria & Parasuraman, 1989; Lymperopoulos & Chaniotakis, 2005). These studies reported empirical evidence that less educated individuals possess insufficient knowledge, greater anxiety, and less sophisticated cognitive structures to learn new things; consequently they are one of the main barriers towards the acceptance of technology. Similarly Agarwal and Prasad (1999) and Calisir et al., (2009) found a positive significant impact of education (higher) on the PEOU (theoretically built on internal control also known as SE (Venkatesh & Morris, 2000)), as less educated people would find technology cumbersome and strenuous to learn.

The negative impact of SN in the bachelor group is also related to the lower education level. An increase in education empowers the users (e.g., high levels of knowledge, experience, income, and higher position) and reduces the effect of social norms on their behavioural beliefs. These negative relations can also be understood in terms of age and academic position. It seems rational that an individual with a bachelor degree would be in a lower academic position (lecturer) and would be younger (lower in age). This recalls the discussion in sections (6.2.1.4 and 6.2.1.1) and results in tables 5.38 and 5.29, which show similar results to those presented here. Specifically, regarding academic position, the impact of SN over PU in the lecturer group was clearly lower to the academics who held higher positions. Similarly, within the age group, the younger academics showed a negative impact of SE over BI. Thus, hypothesis **H13e** was partially supported. Specifically, **H13e2** and **H13e3** were supported and **H13e1** and **H13e4** were unsupported.

6.2.2.6. Experience usage

Apart from personal characteristics, in this study two moderating factors, experience and voluntariness, were included from the UTAUT (Venkatesh et al., 2003) which showed a significant impact in the literature of technology acceptance. In this regard, moderating variable usage experience is examined to test the following hypotheses:

H14a1: (BI, PU, TF, RF, SE, IS, GS) X EXP→BU

H14a2: (SN, PEOU, IS, GS) X EXP→PU.

H14a3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X EXP→BI

H14a4: SN X EXP→PEOU

Section (5.6.4.2.6) presents the results of the MGA with the moderating effect of experience. Before explaining the results of the moderation it is worth remembering that experience in the current study was measured with the self-assessment measure anchored as novice, moderate and highly experienced. A higher proportion of the sample assessed themselves as moderate (n=184) than high (n=176) usage experienced. The sample were split into two groups based on the median method to represent low (n=204) and high (n=176) usage experience, but overall the mean (2.41/3) revealed that all the users had good levels of technology (the Internet) usage experience. Furthermore, respondents were also examined on the basis of usage history (in years). The results revealed that the majority of the respondents had a usage experience of >6 years (mean=3.90/5). Finally the cross-tabulation between self-assessed and years of usage revealed that the highest number of users were moderate with six to ten years' experience (n=84, 22.1%). Therefore, generalising the results of the moderating factor experience requires cautious interpretation of both high and low usage experience.

The model fitting in both groups was moderately accepted. Consistent with the TAM and other studies in the context of North America, the highest shared variance within high usage experience was observed in BI (R^2=0.21 or 21%) followed by PU (R^2=0.20 or 20%), whereas in the low usage experience the group was explained by PU (R^2=0.35 or 35%), followed by BI (R^2=0.33 or 33%). These results suggest that respondents with a higher usage experience were directly influenced by the predictors of behavioural beliefs, social and control beliefs, support and task characteristics. By contrast, respondents with a lower usage experience established acceptance intentions by perceiving the impact of behavioural beliefs, social and control beliefs, support and task characteristics through the indirect effect of PU. Consistent with the TAM, the highest significant path in both groups was PU→BI. However, the lowest was NAT→BI in the higher experience and SN→PU in the lower experience group.

The test of moderation effect revealed that experience played a potential moderation effect between the predictors of behaviour intention towards acceptance. For instance, the first difference was found at path PU→BI which was negatively significant in high usage experience and positively significant in low usage experience. This result suggests that respondents (academics) with higher usage experience perceived a lower importance of PU towards BI. This result is consistent with the previous literature (e.g., Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Igbaria et al., 1997; Kim, Choi & Han, 2009) which posits that higher usage experience creates an enjoyment effect, which in turn minimised PU (see also Chin, Marcolin & Newsted, 2003; Abbasi, Irani & Chandio, 2010). The negative relation of higher experience and lower relation in lower usage experience groups were expected in this study. It was observed that the majority of respondents in the collected data rated themselves as moderate users i.e., with six to ten years' experience.

The second moderating impact of experience was observed at path BI→BU. Specifically, the path was highly significant within the high usage experience group and was insignificant in the low usage experience group. This result suggests that experience is vital for developing intention and the basic relationships proposed were not enough to accept and establish the cognitive behaviour. The result is consistent with the argument that experienced users employ their gained knowledge from prior experience to form intention towards usage behaviour (e.g., Fishbein & Ajzen, 1975). Also there is strong evidence present in the literature which reported that direct experience will result in a stronger and more stable relationship between BI and BU (e.g., Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Taylor & Todd, 1995b; Igbaria & Iivari, 1995; Igbaria, Guimaraes & Davis, 1995).

Finally, the third moderating difference due to experience was found at path IS→BU. Specifically the path was significant in low usage experience and was insignificant in high usage experience. As was expected, the low level or insignificance of management support at an institutional level (IS) was countered by gaining higher experience. It is commonly observed that experience and training are likely to improve an individual's perceptions and beliefs about technology use, which in turn increase their personal beliefs and their ability to master and reduce the fear and anxiety (e.g., Igbaria & Iivari, 1995; Gist, Rosen & Schwoerer, 1988; Gist, Schwoerer & Rosen, 1989). Consequently, experienced individuals compared with less experienced feel less susceptible or less likely to accept specific technology due to managerial influence or social influence (peer and superior). This argument is also well-supported in previous literature. For instance, Leonard-Barton & Deschamps (1988) reported that if individuals have enough experience of specific tasks then they may be less inclined to the suggestions of higher authority because they might doubt the technical competence of their superiors. Similarly, Venkatesh & Morris (2000) reported that the impact of normative beliefs (somehow similar to management support in terms of suggestions and advice) with the passage of time and experience were diminished towards intention (immediate construct of usage). Hence, experience played a vital moderating impact in the current study's context and hypothesis **H14**a was partially accepted, specifically, **H14a1** and **H14a3** were supported and **H14a2** and **H14a4** were unsupported.

6.2.2.7. Voluntariness

The second moderating factor derived from the unified theory of acceptance and usage technology (UTAUT) (Venkatesh et al., 2003) was voluntariness. The expected impact was proposed as on following hypotheses:

H14b1: (BI, PU, TF, RF, SE, IS, GS) X VOL→ BU

H14b2: (SN, PEOU, IS, GS) X VOL→ PU

H14b3: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X VOL→BI

H14b4: SN X VOL→PEOU.

Section (5.6.4.2.7) presents the results of the second moderating variable of voluntariness, adopted from the UTAUT (Venkatesh et al., 2003). It is worth mentioning that the construct measuring voluntariness presented a mean of 3.18/7.0 which suggests that usage of the technology (the Internet) in the current context of the study (higher educational institutes) was in mandatory settings. Therefore, generalisation of the results, as with the experience results, requires caution.

Based on the mean two groups were established to examine the significant difference: compliance (n=226) and voluntary (n=154). The model fitting for both groups was well above the acceptable range and both models were moderately fit. Within the compliance group the highest shared variance explained by the independent variables in the dependent variable (R^2) was noticed in BI (R^2=0.25 or 25%) followed by PU (R^2=0.21 or 21%). Within the voluntary group, it was noticed in PU (R^2=0.39 or 39%) followed by BI (R^2=0.33 or 33%). In accordance with the TAM study, the highest significant predictor for establishing intention in both groups was PU. However, the lowest was RF→BI in the compliance group and PEOU→SN in the voluntary group.

There were some paths different in both groups but parametric and non-parametric tests showed an insignificant effect, thus there was no moderating impact of voluntariness and hypothesis **H14b** was completely rejected. This finding is inconsistent with the previous literature which reported a higher significant impact of subjective norms, social influence, and increased system utilisation in early and mandatory settings (e.g., Venkatesh et al., 2003; Venkatesh & Davis, 2000; Agarwal & Prasad, 1997). One possible justification could be that there was an indistinguishable distribution of the respondents in the voluntary and compliance settings, thus the results of both groups were influenced by the mandatory settings only.

Looking closely at the results it was noticed that, contrary to Venkatesh et al. (2003), the impact of SN→PU was lower in the higher compliance group compared with the lower compliance group. The rationale for this result can be derived from the study of Venkatesh and Davis (2000) in the extended TAM. The author found the impact of SN to be significant in mandatory settings at the initial stage of implementation; however, with the passage of time and experience, its impact was diminished. It is worth remembering that the majority of the respondents in the current study were also moderate to highly experienced users, therefore a lower impact of SN was to be expected.

Earlier during the examination of organisational moderating impact, it was noticed that, within public organisations as compared to private, respondents perceived a lower importance of management support due to the voluntary use of technology. These findings can be clearly understood in the current section of analysis where the impact of GS→PU was less significant in mandatory settings (similar to that observed in private organisations) and was insignificant in voluntary settings (similar to that observed in public organisations). In addition, like the organisational moderating results, path IS→PU was higher in mandatory settings and was lower in voluntary settings. These results give support to the argument that technology acceptance within private institutes is the result of mandatory settings.

6.2.2. Discussion: Cultural moderating variables

In addition to the demographic characteristics this study also examined the impact of culture as a moderator on an individual's perception of acceptance within the extended model. Given that, four dimensions of culture suggested by Hofstede (1980) i.e., masculinity-femininity (MF), individualism-collectivism (IC), power distance (PD), and uncertainty avoidance (UA) were measured using the Dorfman & Howell (1988) scale to observe the perception of difference. Similar to the previous section (6.2.1) MGA was adopted to explore the difference based on parametric and non-parametric t-statics. The discussion of each analysis is presented below.

6.2.2.1.Masculinity-Femininity

The moderating impact of the first dimension masculinity and femininity (MF) was examined to explore the following relations:

H15a: (BI, PU, TF, RF, SE, IS, GS) X MAS→BU

H15b: (SN, PEOU, IS, GS) X MAS→PU

H15c: (PU, PEOU, TF, RF, SE, AT, NAT, SN) XMAS→BI

H15d: SN X MAS→ PEOU

Section (5.6.4.3.1) presents the result of moderating factor MF in cultural dimension. The overall mean of the construct was 3.15/7, which suggests that feminine culture was more dominant in the context of the study (higher educational institutes in Pakistan). In literature (Bem's (1981) Sex Role Inventory) it is reported that men tend to exhibit more masculine traits (e.g., assertiveness) and women tends to exhibit more feminine traits (e.g., tenderness). Therefore for observing relationships cross-tabulation was computed between gender and masculine-feminine index. Table 6.1 shows that out of the overall sample, 182 (47%) of the respondents were masculine and 199 (52%) were feminine. Specifically, within the masculine sample, 97 (53%) were men and 84 (46%) were women; whereas within the feminine sample, 93 (48%) were men and the remaining 106 (55%) were women. Thus, the argument that men tend to be more masculine and women tend to be more feminine is closer to acceptance. During the cross-tabulation within the context of the study (Pakistan), one important difference was found between the previous MAS index computed by Hofstede (1980) and the current study. Hofstede rated Pakistan as moderate on the masculinity-femininity index (50), but the researcher in this study found that culture in Pakistan is getting closer to the feminine index (52%).

Gender as psychological construct	Gender as biological construct	Sample (N) per gender ratio	% of gender as biological construct	% of gender as psychological construct	Total
Masculine	Men	97	97/190= 51.1%	97/181= 53.6%	(97+84)/380= 47.6%
	Women	84	84/190= 44.2%	84/181=46.4%	
Feminine	Men	93	93/190= 48.9%	93/199= 46.7%	(93+106)/380= 52.4%
	Women	106	106/190= 55.8%	106/199= 53.3%	

Table 6. 1: Number of men and women within psychological categorisation of gender.
Note: *The third and fourth column represents the number of men and women and their percentage as masculine-men, masculine-women, feminine-men and feminine-women. The fifth column represents the ratio of men and women in gender as psychological construct. Finally, the sixth column represents the overall sample distribution of masculine and feminine individuals.*

The overall model fitting for both models, masculine and feminine, was averagely accepted and moderately fit. Within the feminine group shared variance (R^2) explained by the independent variables in dependent variable was observed to be higher in PU (R^2=0.29 or 29%) followed by BI (R^2=0.28 or 28%). Within the masculine model it was higher in BI (R^2=0.33 or 33%) followed by PU (R^2=0.29 or 29%). Consistent with the TAM (Davis, 1989; Davis, Bagozzi and Warshaw, 1989), the highest significant path in both groups was PU→BI, while the lowest was SN→PEOU in the feminine group and GS→PU in the masculine group. These results are in accordance with those of the TAM which revealed that in both groups the intention to accept the technology (the Internet) was primarily based on outcome performance or perceived usefulness of the technology. On the other side the respondents attached very little importance to ease of use in the feminine group and government support in the masculine group.

The parametric and non-parametric t-test of moderation revealed that the two groups were different at path SN→PU. Specifically, the path was highly significant in the feminine group and was insignificant in the masculine group. This finding is consistent with the study of McCoy et al., (2005) which suggests that in the feminine group as compared with the masculine group, normative beliefs were more important to establish the BI through the PU. This result is supported by the previous literature which suggests that feminine individuals tend to show higher influenceablity because of the intention towards agreeable desires, maintaining social relationships and interaction, concern with the well-being of others and greater interdependence (e.g., Srite & Karahanna, 2006; Bem, 1981). Furthermore, justification for the support of the argument that feminine individuals tend to be sensitive towards normative beliefs can be understood from the perspective of gender. It was noticed that females possessed more feminine traits, therefore, looking closely at the same relationship SN→PU in gender moderation (section 6.2.1.2 and table 5.32), it was found that females, compared with males, perceived a higher importance of normative beliefs (peer and superior influence) towards the PU. Similar results were also reported by Venkatesh & Morris (2000) who found that the impact of SN was significant in both males and females at the initial stage. However, in the long run this impact only remained significant in the female group. The insignificant impact of normative beliefs in the masculine group can be justified by the literature which suggests that masculine individuals and men are more categorical, independent in nature and concerned more with their own feelings rather than others' (Venkatesh & Morris, 2000; Srite & Karahanna, 2006; Gefen & Straub, 1997; Bem, 1981; Hofstede & Hofstede, 2005; Hu et al., 2010). Consequently, they are less likely to establish intentions based on other people's opinions or judgement. Based on this moderating difference hypothesis **H15b** was only partially supported, while **H15a**, **H15c** and **H15d** were rejected.

6.2.2.2.Individualism-Collectivism

The second moderating construct within cultural group was individualism-collectivism(IC) to explore the following path relations:

H16a: (BI, PU, TF, RF, SE, IS, GS) X IC→ BU

H16b: (SN, PEOU, IS, GS) X IC→ PU

H16c: (PU, PEOU, TF, RF, SE, AT, NAT, SN) X IC→BI.

H16d: SN X IC→PEOU.

Section (5.6.4.3.2) presents the results of the moderating factor in the cultural dimension IC. The overall mean of the construct (5.40/7.0) shows that respondents in the context of the study (higher educational institutes of Pakistan) were highly inclined towards a collectivist society. The low level of individualism culture in Pakistan was also reported by Hofstede (1980) in which Pakistan scored just 14 on the individualism scale. Given the high level of collectivist society, the sample was split into two groups in order to observe the difference between high collectivist (n=173) and low collectivist (n=207) respondents. As with the MF, the generalisation of moderator IC requires caution due to missing segregation between the individualist and collectivist groups.

The overall model fitting for both groups, high and low collectivist, was averagely acceptable and moderately fit. The highest shared variance (R^2) explained by independent variables in dependent was noticed in PU (R^2=0.27 or 27%) followed by BI (R^2=0.24 or 24%) within the low collectivist group. Within the high collectivist group it was in BI (R^2=0.34 or 34%) followed by PU (R^2=0.30 or 30%). The rationale behind the difference in variance can be observed by the analogy of a collectivist society with the female gender. According to Hofstede (1980, p.80), individuals in a collectivist society give higher priority to obedience, respect, honour, support and cooperation. Likewise, females are more agreeable towards social relationships and the well-being of others (Taylor & Hall, 1982), therefore both the female gender and respondents who inclined towards the collectivist society shared similar attributes. Recalling the results in section (6.2.1.2) and table 5.32 of gender as a moderator, it was noticed that PU shared a higher variance compared with the BI in the female group. This result suggests that within the high collectivist group respondents (academics) established their intentions to accept technology (the Internet) by perceiving behavioural, social and control, management support, and task beliefs through the indirect effect of PU. Whereas in the low collectivist group the mediating effect of PU was lower than the direct effect of BI. In line with the TAM (Davis, 1989; Davis, Bagozzi & Warshaw, 1989) and its related findings, the highest significant path in both groups was PU→BI, while the lowest was GS→PU in the low collectivist respondents and SN→PEOU in the high collectivist respondents.

The test of moderation significance shows that the two groups were different at path IS→PU; specifically, the path was significant in the high collectivist group and insignificant in the low collectivist group. This finding is consistent with the results of McCoy et al., (2005) and suggests that the respondents (academics) within the high collectivist group compared to the low collectivist group were more influenced by the management at an institutional level. The explanation can be understood from the literature (e.g., Srite, 2006; Srite & Karahanna, 2006; Straub et al., 2002; Triandis, 1989), which suggests that in a collectivist society individuals are more concerned about the opinion and help of others in shaping their own behaviour. Furthermore, the higher importance of management support in a collectivist society can also be understood by recalling the discussion in previous sections. As noticed, a high collectivist shares similar characteristics with the female gender; therefore, vigilant examination of the path IS→PU, shows that the path was also higher in older age, compliance work settings, female gender, and feminine cultural dimension compared with younger age, voluntary work settings, male gender, and masculine cultural dimension respectively. The rationale for this relationship is similar to the rationale of the female group: higher levels of computer anxiety, more dependent on support, easily convinced by social pressure, less experience, higher importance given to other' opinions, and willingness to sacrifice personal interest for the sake of the group (e.g., Venkatesh & Morris, 2000; Srite & Karahanna, 2006; Gefen & Straub, 1997; Bem, 1981; Hofstede & Hofstede, 2005). McCoy et al., (2005) also reported that within a collectivist society individuals are more likely to adopt a new technology when the group (colleagues) decides that it is valuable. Straub et al., (1998) state that face-to-face interaction (i.e., rich media) more readily transmits social situations cues that are deemed to be important and desirable for collectivist cultures. Thus, only hypothesis **H16b** was partly supported and **H16a, H16c** and **H16d** were unsupported.

6.2.2.3.Power Distance

The third moderating construct within cultural group was power distance (PD). The impact of PD was examined to see moderating relations between the paths below:

H17a: ***(BI, PU, TF, RF, SE, IS, GS) X PD→BU***

H17b: ***(SN, PEOU, IS, GS) X PD→PU***

H17c: ***(PU, PEOU, TF, RF, SE, AT, NAT, SN) X PD→BI***

H17d: ***SN X PD→ PEOU.***

Section (5.6.4.3.3) presents the moderating results of the cultural dimension, PD. The mean of the construct 2.8/7.0 suggests that culture within the context of the study (higher education institutes in Pakistan) is moderately lower on the PD dimension. The mean calculated is consistent with Hofstede's (1980) study which rated Pakistan at 55 on the PD index. Similar to previous cultural dimensions i.e., MF and IC, interpretation of the PD dimension results requires caution due to the unclear difference between high and low PD individuals. Based on the mean two groups, low PD (n=198) and high PD (n=182), were established for the group analysis.

Both models were well above the acceptable range and moderately fit. Within the low PD group the shared variance (R^2) explained by independent variables in dependent variable was highly noticed in BI (R^2=0.21 or 21%) followed by PU (R^2=0.17 or 17%). Whereas in the high PD group the shared variance was noticed to be higher in PU (R^2=0.41 or 41%) followed by BI (R^2=0.39 or 39%). This result suggests that within the high PD group, respondents established their behavioural intentions though the indirect effect of behavioural, social and control, management support and task characteristics beliefs through the PU. The rationale behind the development of acceptance intention through PU in the high PD group can be understood by the similar analogy within the high collectivist group in the previous section. As Hofstede and Hofstede (2005, p.82) reported, PD and IC are negatively correlated: large-PD countries are likely to be more collectivist, and small-PD countries to be more individualist. Due to the relationship of PD with collectivist, shared variance was also noticed to be similar in groups similar to collectivist i.e., cultural dimension feminine and female gender (see section 6.3.2.1, table 5.50, and section 6.2.1.2, table 5.32 respectively).

The highest significant path in both models was PU→BI and the lowest was RF→BI in high PD and SN→PEOU in low PD. The test of moderation between high and low PD groups shows that groups were different at path IS→PU. Specifically the path was insignificant in the low PD group and was significant in the high PD group. Closely observing the results, a similar difference was also found in path GS→PU but the significance difference was only slightly lower than the acceptable range and therefore the moderation effect was ignored. These results suggest that management support at a government or institute level has no significant impact on intention behaviour by perceiving usefulness of technology within the respondents holding lower PD traits.

The significant impact of management support in high PD was expected and is consistent with Hofstede's (1980) cultural theory, which suggests that within a high PD workplace subordinates respond either by completely accepting or rejecting the decisions of higher management. In addition, Hofstede (1980) also stated that individuals in high PD are more concerned about complying with their superiors and would be afraid to disagree with them. Justification of this relationship and Hofstede's statement can also be observed within work settings that moderations affect i.e., voluntariness (section 6.2.1.7 and table 5.47). It was noticed that both paths of managerial support were highly significant in compliance settings compared with voluntary settings at work. Related to the compliance effect, it was also noticed that both paths were highly significant in private organisations as with public organisations, and thus confirms the researcher's argument that private organisations are more inclined to the compliance effect and higher on PD. The importance of others' opinions in forming intentions was also noticed by McCoy et al., (2005) who found a strong relationship of normative beliefs in cultures which score higher in PD. In accordance with McCoy, the results in the current study also revealed higher impact of SN→PU and IS→BU in the high PD group.

Finally, recalling the statement that high PD respondents were more inclined towards a high collectivist culture, it is noticed in section (6.3.2.2, table 5.53) that the paths were highly significant in the collectivist group only. The respondents who were higher on collectivism are also observed to be higher on feminine traits, which in turn are influenced by the female gender roles (e.g., modesty, cooperation, interdependence) (Bem, 1981; Hofstede & Hofstede, 2005). Therefore, the results in section (6.3.2.1, table 5.50) and section (6.2.1.2, table 5.32) show that the paths were highly significant in the feminine individuals and female groups as compared with the masculine individuals and male groups. Based on the results, hypothesis **H17b** was partially supported and **H17a, H17c** and **H17d** were completely rejected.

6.2.2.4.Uncertainty Avoidance

The final moderating construct within cultural dimensions was uncertainty avoidance (UA) to observe the moderating effect on the following path relations:

H18a:* *(BI, PU, TF, RF, SE, IS, GS) X UA→BU

H18b:* *(SN, PEOU, IS, GS) X UA→ PU

H18c:* *(PU, PEOU, TF, RF, SE, AT, NAT, SN) X UA→BI

H18d:* *SN X UA→PEOU

The results of the fourth cultural dimension UA are presented in section (5.6.4.3.4). The overall mean of the construct was 6.35/7.0 which shows that respondents in the current study were very high on UA. These findings are aligned with the score of Hofstede (1980) who rated Pakistan as moderately higher on UA index (score=70). The higher score on UA shows higher levels of anxiety and nervousness during work through informal rules and structure within the context of study (higher educational institutes in Pakistan).

Based on the mean, two split groups models, high UA (n=143) and low UA (n=273), were well above the acceptable range and moderately fit. Within the low UA, the shared variance (R^2) explained by the independent variable in dependent was higher in BI (R^2=0.22 or 22%) followed by PU (R^2=0.21 or 21%). Within the high PD the shared variance was higher in PU (R^2=0.36 or 36%) followed by BI (R^2=0.33 or 33%). In spite of many visible path differences between the two groups, the test of moderation showed an insignificant effect. Thus, hypothesis **H18** was completely rejected due to no moderating effect of UA. However, closely observing the results, it was noticed that individuals within high UA showed similar results towards normative beliefs and management support in groups: high on PD, high on collectivist, more on feminine individuals and female, low on experience, older in age, compliance work environments and in private organisations. The reason for the similar relationship with previous moderating variables and higher scores on management and normative support is warranted. For instance, the acceptance of a new technology (the Internet in the context of the study) within an organisation requires sufficient knowledge about its usage and potential benefits. However, due to uncertain rules and bureaucratic organisational structure, the respondents were only compelled to look at the social environment which suggested and encouraged them to accept that particular technology by perceiving that its usefulness would be valuable within a personal and organisation context. Similar results, which suggest that the relationship between normative beliefs (SN) and intentions are moderated by high UA, were found by Srite & Karahanna in (2006). The results of UA differences are also interesting in terms of the TAM's reliability in different cultures. For instance, basic relations within the TAM based on PU, PEOU and BI reveals that paths were higher and significant in high UA only and reveal the cultural bias within the TAM.

Conclusion

This chapter presented a discussion of the findings of the structural model evaluated in the previous chapter. The findings are categorically described in two groups of hypotheses:

with and without the moderation effect. Specifically, without the moderation effect, independent factors of perceived behavioural beliefs, social and control beliefs, management support at institutional and governmental level, and task characteristics were discussed regarding the relationship with dependent variable behavioural intention and usage. With moderation, the effect of demographic and cultural characteristics was discussed. Consistent with Straub et al.'s (1997) reasoning, the extended model in the present study displays a lower variance in the explanatory power of behaviour intention of the developing countries' respondent context, which claims the presence of cultural bias within the predictors of technology acceptance models and theories.

The most significant path in the model is between perception of usefulness and intention, which suggests that the respondents in the developing country's context are driven to accept the technology mainly on the basis of its usefulness, established by perceiving relative advantages. The effect of normative influence was significant on intention via the perception of usefulness which suggests that the opinion of professional co-workers and superiors plays a major role in establishing behavioural beliefs towards acceptance intention. In addition, it was noticed that academics primarily accepts new technology based on their task relevance (academic teaching and research). Their perceptions were more influenced by the local institutional management support compared with higher-level governmental support and motivation.

The results with the moderation effect of demographic characteristics revealed that respondents who were younger in age, female in gender, and held a bachelor degree level of education were more influenced by the perception of ease of use, normative beliefs and management support at an institute level towards the perception of usefulness of the technology to establishing acceptance intention. The academic position does not have any effect on the predictors of intention; however, organisational context showed a higher importance of control belief over usage only in the context of private universities. The usage experience and voluntariness conditions of use as a moderator revealed that management support at an institutional level were more visible in mandatory settings, specifically within the context of private institutes. Whereas the perception of usefulness decreased with high usage experience; and intention towards usage was insignificant for respondents who had low usage experience.

Finally, the moderation effects of cultural dimensions revealed that respondents within the context of Pakistan are higher on collectivist nature, moderate on masculinity, moderately higher on power distance and higher on uncertainty avoidance. These scores are similar to the score obtained by Hofstede (1980). Results revealed that culture has mostly affected the relationship of normative beliefs on the perception of usefulness to establish the intention. Specifically, normative beliefs (opinions of co-workers and superior) were highly recognised in respondents who are feminine, collectivist and high on power distance cultural characteristics. Based on the findings of the previous chapter and the discussion in the current chapter, the next chapter discusses the contribution of the study and its potential limitations with future recommendations.

Chapter 7

Conclusions

Introduction

The primary objective of this research is to provide an extended model of technology acceptance that determines the predictors of academics' behavioural intention to accept the Internet technology on the one hand, and the impact of demographic and cultural characteristics on the predictors of intention on the other hand. To achieve these objectives, questions for this research were positioned as: *How do predictors of perceived behavioural beliefs, social and control beliefs, management support at institutional and governmental level, and task characteristics influence individuals' Internet technology acceptance behaviour? In addition, how are basic beliefs of an individual's acceptance behaviour influenced by the moderating impact of demographic characteristics (age, gender, organisational type, academic position, educational level, experience usage and voluntariness) and by native cultural dimensions (masculinity-femininity, individualism-collectivism, power distance and uncertainty avoidance)?*

Achieving aim of the study, a structured literature review was examined in chapter 2 followed by chapter 3, which represented important predictors of intention behaviour within the conceptual framework with the expected impact of demographic and cultural characteristics. Examining the real practicability of the model, research design was positioned with a positivism paradigm using the survey instrument to collect the data. Subsequently, chapter 5 presented an examination of the model with research findings, and chapter 6 presented a discussion in light of the research objectives and observed findings. Finally, summing up the research, this chapter presents the implications and contributions of the research based on theoretical, methodological and managerial perspective. At the same time, the chapter also presents the potential limitations of the research with suggested future research directions.

7.1. Implications and Contributions

There may be several perspectives on the implications and contributions but categorically they are judged from two perspectives: theoretical and methodological contributions, and managerial or practical implications.

7.1.1. Theoretical contributions

7.1.1.1. Critical analysis and synthesis of literature

The primary objective of this study is to develop a conceptual model that can predict the factors that determine an individual's intentions to accept Internet technology in the context of developing countries on the one hand, and how this relationship is moderated by individual and cultural differences on the other. To achieve the research objective and develop the theoretical background, a systematic literature review was conducted in chapter 2. The literature critically reviewed nine of the most influential theoretical models in information system acceptance literature. For the purpose of ascertaining the strengths and weaknesses of the reviewed models, all the models were critically compared by examining the paths specified, the paths' strengths (i.e., significance and insignificance), explanatory power of the model (in terms of dependent variables), parsimonious of model, and influence of external variables. In addition, culture as a dimension of the individual differences was also explored.

The synthesis of the literature suggests that the TAM was the most successful model, however, its fundamental constructs (perceived usefulness and ease of use) were not enough to completely reflect the technology (the Internet) acceptance and so there was a need for additional variables. *The comprehensive literature provides an incremental contribution of additional substance for the empirical studies in this area*. For instance, research for the design of future technology acceptance models can introduce/extend new concepts, variables, or even establish new relations between the current models (reviewed models in literature) by evaluating the relative importance and contributions found in this study.

7.1.1.2. Extension in the IT acceptance literature

The comprehensive, albeit less parsimonious model developed in the current study, thus makes an additional contribution to the literature by grounding key predictors of belief in technology acceptance model and then applying them to a new context (south Asian developing countries). Contrary to the TAM, which posits that individuals accept the technology only and if they believe it will have a positive outcome (i.e., perceived usefulness), the present study followed the assumption of SCT that is accentuated to understand both individuals' expectations of their capabilities and beliefs about outcome in examining acceptance behaviour. The extended model was formulated in an attempt to identify the number of fundamental variables suggested by the previous research dealing with the individuals' cognitive acceptance behaviour. In doing so, the TAM was extended by modelling theoretical relationships and integrating various disparate lines of the research: TRA, TAM2, DTPB, UTAT, Bem's Sex Role Inventory (BSRI) and cultural theory of Hofstede as theoretical backdrop. The extended model explained moderate shared variance in acceptance intention (R^2=26% using PLS, and R^2=34% using AMOS) which shows that only beliefs about outcome (identical to the TAM) may not be sufficient to affect acceptance behaviour (identical to SCT) if an individual's doubt about their capabilities (in terms of, social, situational and control beliefs, managerial support and relevance of tasks), personal characteristics (demographic characteristics) and cultural relevance (that one holds inherently) to successfully use the technology with interest. However, some beliefs may be generalised across the context with caveats; this study also confirms that, in general, beliefs are context specific: what is not necessarily applied in one context can give identical results in another context.

The key strength of the extended model is its comprehensiveness which is opposite to the assumption of parsimony. However, in terms of in-depth understanding parsimony in and of itself is not desirable, but to a certain extent it is enviable to facilitate the understanding (Venkatesh & Bala, 2008; Venkatesh, 2000). For instance, if the model does not provide information that can guide acceptance of development, it will not be useful to examine it, no matter how well it predicts intention at low cost (i.e., lower number of factors and path relations). Therefore, in order to add the richness and insight to our understanding and provide actionable guidance for individuals' acceptance behaviour, all the relevant factors are integrated in the present work, which was not viable considering the parsimony of the model. In spite of the parsimony limitation, the extended model contributed by delineating 20 path relations with 12 general hypotheses between 13 key predictors covering behavioural beliefs, normative beliefs, control beliefs, management support and task characteristics towards the understanding of acceptance intentions.

Besides, the extended model was examined to explore the relations with 7 moderating factors of personal characteristics and 4 moderating factors of cultural dimensions in order to see what causes individuals to accept new technologies. Consequently, the results of the present study will be a useful guide to understanding whether causes were inherent within personality and background (moderation effect) or were driven by the key determinants of information technology acceptance itself (without a indirect effect of moderation). Indeed, emphasising the integration of external factors to explore the individual's differences was suggested by Davis, Bagozzi & Warshaw (1989); however, little attention was paid (Chan et al., 2010), specifically over the factors relating to individual differences (e.g., Agarwal & Prasad, 1999; Agarwal & Prasad, 1997).

7.1.1.3. Extension in literature to understand the context of the study

A number of recent developments indicate that the factors influencing technology acceptance are one of the most important issues facing many organisations, specifically within the context of developing countries. However, the models developed to examine acceptance behaviour are predominantly established and examined within North America and specifically within one single country, the U.S. (e.g., Venkatesh & Morris, 2000; Venkatesh et al., 2004). Realising the ongoing drive towards globalisation, a handful of studies contributed literature to examine the cross-cultural validity of the models developed in the North American context. Surprisingly, these studies were limited to examining the difference at the mean difference of culture computed by Hofstede (1980) 30 years ago. Specifically, as far as the researcher is aware, factors influencing the decision to accept technology (the Internet) within higher educational institutes of the developing country (Pakistan) have not yet attracted the attention of the research community. Therefore, *this study breakes new ground within IT acceptance literature because it is one of the few studies which attempted to validate the constructs of the well-established IT acceptance theories outside the North American context*. Indeed, regardless of the extensive applicability and extensionality of the TAM and similar models, literature shows its limitations to serve equally across cultures, specifically beyond the boundaries of North America (e.g., Straub, Keil & Brenner, 1997; McCoy, Everard & Jones, 2005; McCoy, Galletta & King, 2007; Srite, 2006; Parboteeah, Bronson & Cullen, 2005; Rose & Straub, 1998; Alsajjan & Dennis, 2010; Baker, Al-Gahtani & Hubona, 2010; Yang, 2010).

Although this study has limitations when it comes to generalising its context independently, it represents a contribution to the examination of the extended model with primary data across two real organisations (public and private institutes) and with a non-student sample. Since the key predictors examined in the present study are influenced by the environmental and work-related activities, taking a student sample would be limiting due to having no/low level of work and/or technological experience/awareness. Evidently, most of the prior research examined technology acceptance theories and models based on a student sample (e.g., Taylor & Todd, 1995a; Srite & Karahanna, 2006; Venkatesh & Davis, 1996) and secondary data (e.g., Parboteeah, Bronson & Cullen, 2005). *Therefore, examining academics working in the context of universities contributes to the literature and the understanding of the perception of the autonomous knowledge workers*. The university environment facilitates the support of academics' autonomy, provides a decentralised environment, and the opportunity to examine the likelihood of influence exercised by a social circle.

7.1.1.4. Extension in literature to understand the cultural factors

One of the paramount contributions of the present study is the introduction of the culture itself as a dimension of the difference towards acceptance behaviour of technology. Evidently, in prior research, differences of beliefs towards acceptance are examined using Hofstede's (1980) national culture's mean differences without directly measuring the cultural dimension itself (e.g., Straub, Keil & Brenner, 1997; Karahanna, Evaristo & Srtie, 2005; Alsajjan & Dennis, 2010; Yang, 2010). *The present study contributes by examining the cultural dimensions itself at an individual level, which helps to understand more accurate empirical findings between the effects of the cultural dimensions on the IT acceptance behaviour*. Also the differences computed are not based on mean differences, but are based on β-value which is carefully computed using multiple-group analysis (MGA) identical to hierarchal regression method.

Additionally, unlike previous research (e.g., Straub, Keil & Brenner, 1997; Parboteeah, Bronson and Cullen, 2005), *the present study contributes to the examination of Hofstede's (1980) cultural dimensions (power distance, individualism and collectivism, uncertainty avoidance, and masculinity and femininity) at an individual level within the context of a single country (intra-culture)*. Exercising Hofstede's measures in the model of individual-level acceptance behaviour is impractical and requires strong rhetorical justification as well as a re-consideration of the measurement items. Overcoming this problem, this study contributes to an examination of Hofstede's cultural dimensions by introducing Dorfman & Howell's (1988) scale, which provides nearly similar results to those established by Hofstede (1980). Derived solely from the results of the present study, it is postulated that individuals are conditioned by their native/national culture (similar to Hofstede's cultural theory), whereas national culture is conditioned by the cultural values which one holds differently (i.e., found in this research). Therefore, the findings of the present study are beneficial in aggregating and understanding the exact salient impact of the particular behaviour, not only at an individual level but at an organisational level, regional level, as well as at a national level.

The comprehensive examination of the 20 path relations within four cultural dimensions, each split into two groups (low and high) produced a total of 160 comparisons (20x4x2=160). In addition, each difference computed for comparison using parametric and non-parametric t-statics is a principal contribution and can be used as actionable guidelines in the literature pertaining to explore cultural differences.

The achieved results with moderation effect revealed that some of the key predictors of acceptance beliefs, specifically subjective norms and management support at an institute level, were highly important within cultural groups: higher on femininity, higher on collectivist, higher on power distance and uncertainty avoidance. These results call for great caution when applying technology acceptance models and theories developed in one context and replicated in another context. In other words, the results support the researcher's argument that, due to differential cultural differences, large amounts of the research carried out in IT acceptance areas within North American culture may not be relevant for understanding individuals' acceptance behaviour within the context of a developing country.

7.1.1.5. Extension in literature to understand the demographic factors

This study contributes to the recognition of boundary conditions which are moderated by personal/demographic variables (age, gender, organisational type, academic position, educational level and experience) and working conditions (i.e., voluntariness and mandatory). The examination of boundary conditions associated with the role played by the key determinants within an extended model helps to refine, sharpen, and, quite possibly better apply the extended model to the study of behaviour acceptance in a wide range of workplaces. Indeed, assessing the impact of external or boundary variables is emphasised in the key literature of technology acceptance (e.g., Venkatesh et al., 2003; Davis, Bagozzi & Warshaw, 1989; Agarwal & Prasad, 1999; Venkatesh & Morris, 2000; Morris, Venkatesh & Ackerman, 2005; Porter & Donthu, 2006; I-F Lui et al., 2010).

Similar to the cultural dimensions, *six demographic variables were split into two groups (e.g., high and low, male and female etc.) and one (education qualification) was split into three groups, therefore a total of 300 comparisons (20x6x2=240 and 20x1x3=60)* were computed to explore (not validate) the in-depth differences between key determinants moderated by demographic variables.

The obtained results revealed that respondent who were younger in age perceived higher importance of the perception of usefulness; female in gender and academics in private institutes perceived a higher importance of management support at institute level; in the educational level normative and control beliefs were negatively related with the individuals holding a bachelor degree. In terms of usage experience a negative impact was observed between the perception of usefulness and intention. Finally, two moderators, academic position and working conditions (i.e. voluntariness) failed to produce any significant difference within the present context of the study. Apart from the contribution in terms of exploring the differences this study can also be used as a guide to examine the strength (β value) between paths of interest; eventually they will be able to identify the causes of obstruction or facilitations towards decisions of technology acceptance.

7.1.2. Methodological contributions

In terms of methodology, this study offers several major contributions. For instance, *the study contributes to the examination of the predictors of well-established models of technology acceptance in a country which is culturally different from the environments in which these constructs were developed (North American and European context)*. In doing so, the study verifies, adopts, and purifies the measurement items with rigorous statistical tests to check their validity and reliability. Although a few items were deleted from the conceptual model, the overall constructs displayed a high degree of convergent and discriminant validity, reliability, and finally satisfied the fit indices along with more than half of the relations being found to be significant. Thus this study contributes to the literature which examined certain constructs in the context of a developed country within the context of a developing country.

This study contributes in the methodology by examining the conceptual framework using structural equation modelling (SEM). Contrary to first generation analysis methods (e.g., regression, factor analysis, ANOVA and MANOVA), which can analyse one layer of a relationship at a time between independent and criterion variables, SEM enables the modelling of multiple layers simultaneously and answers the set of interrelated research questions in a single precise model with a systematic and comprehensive manner (Gefen, Straub & Boudreau, 2000; Chin, 1998b). *Due to the lack of multivariate normality, partial least squares (PLS) as a technique of SEM was exercised in the present study which is an additional contribution to the method analysis*. Using a two-step approach (measurement analysis and structural analysis) presents the study in a very thorough manner that explains each step of the analysis and can be used as a guideline for the future research. For instance, study stepwise examined construct reliability (composite and α), item reliability, convergent validity, discriminant validity (item and construct level), explanatory power of model (R^2), path significance (β value), effect size (f^2), predictive relevance (cv-communality and cv-redundancy), and goodness of fit indices (GoF).

This study provides a leading contribution to the methodology by illustrating the identification and quantification of the moderation effect using multiple-group analysis (MGA) technique. To date, a handful of methodology-oriented studies have assessed the detection of moderation effect using PLS path model, among them Chin et al., (2003), Eggert et al., (2005) and Henseler & Fassott (2010) are noteworthy. The future recommendations of the said researchers in addition to the dissuasion on the PLS official forum (www.smartpls.de) reveals that the process of inclusion and examination of moderation effect in PLS is still new and requires great work to be formalised. In order to provide actionable guidelines for future researchers, this study applied and explained the MGA approach in an identical manner to that applied by Cohen & Cohen (1983) using hierarchical multiple regression method. *The analysis is so detailed that it provides 460 exploratory comparisons between each path and their significance differences using both parametric (Chin, 1998b) and non-parametric t-tests (Chin, 2002).*

Finally, this study contributes to examinations of the robustness of the model by using parallel analysis. Primarily, the technique for using the SEM was based on the component-based model method PLS. However, for identifying the similarities and contrasts the model was re-examined using covariance-based SEM modelling technique AMOS. Despite the fact that covariance-based models require multivariate normal data, which was not tenable in the present study, AMOS provides similar structural results like the PLS with acceptable fit indices. Even though, interestingly, the path significance and explanatory power of the model generated using AMOS compared to the PLS was slightly higher. This parallel analysis contributes to the literature specifically related to examining the techniques of SEM. In addition, these results suggest that it is not perhaps necessarily that the data needs to be multivariate normal to exercise the covariance-based modelling techniques, such as AMOS.

7.1.3. Managerial and practical implications

This study provides several practical implications which can be understood by categorising them into two groups: first, general implications based on the core determinant findings which can be used as a guideline for any organisation; second, implications specific to the context of the study, which is higher educational institutes in the developing country Pakistan.

7.1.3.1. General practical implications

Regarding general implications, the primary question posed by this study was: what are the predictors that affect an individual's acceptance behaviour towards new technologies in organisations? The answer obtained from the findings was that it depends upon a number of factors (beliefs) that are important for individuals in establishing intention, such as behavioural beliefs, social and control beliefs, support beliefs, and task characteristics beliefs. Additionally, it is noticed that beliefs are also influenced by the individual's demographic and cultural traits. It is an accepted fact that within any organisation, a successful introduction of technology depends upon its acceptance by individuals who are also the targeted end-users. In addition to the core determinants of the technology acceptance model (ease of use and usefulness), the findings of the current study highlight the importance of social and environmental factors towards acceptance behaviour. Specifically, the importance of management support at a low-level (e.g., the CEO at local branch level) towards establishing intention through the perception of usefulness was noticed to be higher within respondents that were female, younger in age, in private organisations, and junior in working status. Contrary to this, individuals who were more skilled and had higher usage experience gave little importance to management support in establishing intention behaviour.

These findings are important for higher management in terms of providing facilitation conditions (e.g., provision of technology and training) at local management level. The management can reduce time and money constraints and enhance the technology acceptance behaviour if they recognise specific segments of the employees who are more susceptible to management support compared with the segment who do not perceive any need. Similarly, the findings of this result suggest that the perceived ease of use is not a direct crucial determinant of intention behaviour; however, through the perception of usefulness, those who are younger in age, female in gender, in a public organisation, lower in academic position, lower on usage experience and within a voluntary use environment, perceived higher importance. It may be advisable for the management to target this segment of users by attempting to build their confidence with training programmes and assistance facilitations. In order to introduce new technologies within organisations, management also needs to consider the impact of working conditions (voluntary or compliance) and usage experience. For instance, the path from intention to behaviour was more salient for experienced users, which suggests that experience can fill the expectation gap when introducing new technology; therefore, management faces challenges to find a way to close the expectation gap or to attract the inexperienced individuals only.

Additionally, findings revealed that the perception of usefulness towards intention produces a negative impact. These findings may suggest that information and training provided to skilled and experienced users to establish their positive intention towards technology acceptance is futile because they value their own skills and autonomy, no matter how important and useful the information provided to them by their supervisors or organisational management.

Regardless of demographic differences, management also needs to consider the importance of cultural dimensions which are not homogeneous across the nations and even across the individuals within the same nation. The findings of the current study highlighted that social influence does matter within distinct cultural groups, whether in the form of subjective norms or in management support. For example, individuals higher on power distance, feminine in nature, more on collectivist, gave a higher importance to subjective norms (peer and superior influence) and management support at an institute level to establish the acceptance intention through the perception of usefulness. Consistent with the moderation effect of femininity, collectivism, and power distance management can devise strategies to improve the acceptance behaviour with the help of colleagues and local management. This may include, but is not limited to, the provision of group training programmes, structured learning opportunities within groups, availability of resources at local organisational level, and sharing the future commitment and vision of technology through local management, colleagues and peers.

7.1.3.2. Specific practical implications within higher educational institutes

Perhaps the most significant implications discussed within the previous section are closely relevant to the context of higher educational institutes in Pakistan, where management is expecting advancements in research and teaching from academics by introducing new technologies and the Internet. Recently the government of Pakistan has introduced the e-Reforms project (HEC PAK, 2009) for the betterment of academic research in universities. This includes: Pakistan education and research network (PERN), Digital library, Pakistan research repository (PRR), and Campus management solutions (CMS). In addition, the government has set up a broadband infrastructure for use of the Internet in universities and to create awareness of its usefulness with academics. However, the government needs to understand that expecting usage and acceptance behaviour from academics based only on usefulness is not enough when introducing new technologies: as was noticed in the results of the present study, individuals' perception are formed through behavioural, social, control and institutional beliefs. Additionally, differences of perception are moderated by demographic and cultural traits. Therefore, the models proposed in Western culture or even within the same culture and applied within one segment cannot be taken for granted for the total population. Recognising the needs of a particular segment, their task relevance and targeting them with a specific strategy will be beneficial for both end-users (academics) and the implementing authority (government). For instance, the greater significance of Internet technology within academic tasks to establish intention in this study suggests that when academics perceived the higher importance of Internet technology in their teaching and research, they felt no reluctance in accepting it.

Similarly, recalling the discussion on general implications, it is noticed that social norms, management support, and the perception of behaviour beliefs are perceived differently by academics based on their demographic and cultural differences. Therefore, the management of the higher educational system, both at a governmental and local institute level, should identify the specific segments and design tailored information for different constituencies, thereby giving each segment the relevant information to solve its barriers (e.g., lack of training, resources etc.) and increase the level of acceptance. For example, management support at a governmental level can influence IT acceptance by initiating the educational and training programmes which increase the sense of efficacy and in turn the perception of ease of use. In addition, the government may provide a wider selection of different software tools that are potentially useful and relevant to an educational institutional context in order to increase the use of technology.

On the other hand, management at an institute level, which showed strong influence in some segments of academics in this study, can play a vital role by encouraging academics about the incentives of technology, showing interest in, and being aware of the problems encountered by not using the new technologies. In conclusion, establishing more favourable beliefs will eventually increase acceptance of the technology.

7.2. Limitations and directions for future research

Although this study has produced interesting findings in terms of presenting an extended model of an individual's acceptance behaviour, these findings carry important limitations which are relevant for future research, as detailed below.

7.2.1. Sample size

Due to the distribution of population geographically, organisationally, working positions, experience, age and gender, the sampling method chosen to collect the data was the probability method (Sekaran, 2000). The descriptive revealed that the response rate (n=380/935, 40.6%) was lower than the expected requirement (if it was 721, then two independent models of public and private universities would be examined). However, the obtained response rate still confirms the requirements of the data analysis techniques (SEM) and shows an insignificant difference in non-response bias checks (i.e., using the Mann-Whitney-U-test), but still random selections of the participants and the lower response rate requires caution when understanding or interpreting the findings. For instance, in a few groups (e.g., educational level) sample sizes were less than 50, which could result in a reduction in the power of the significant test. Additional research is essential to target a large sample as a means of increasing statistical power and more conclusively establishing the robustness of the findings explored in the current study.

7.2.2. Context and generalisation

The second limitation is related to the issues of the external validity of the current study. Even though the study gathered data from two different organisational contexts (public and private universities), still the context was unique (higher educational institutes in Pakistan), the working tasks were similar (teaching and research), the technology examined was homogenous (the Internet) and the sample exhibits similar task characteristics (teaching and research). Therefore, it is not certain that, other than the current context of the study, the findings would be similar. In other words, the findings reported here are subject to the usual caveats about the inadvisability of comprehensive generalisation. For instance, within the findings of the cultural dimension masculinity-femininity, it was noticed that the culture within higher educational institutes tends to be feminine which favoured a higher impact of normative beliefs over intention behaviour. This may not be true in other contexts dominated by masculine individuals, such as for example, the army, security services etc.

Apart from the intra-cultural context limitations, the study also contains limitations as to how it can be generalised at a cross-cultural level. The present study was based on data from one country, and Hofstede's (1980) analysis confirms that Pakistan is culturally relatively moderate on power distance and masculinity, higher on uncertainty avoidance, and lower on individualism than Western European (e.g., Great Britain) and North American (e.g., U.S., Canada) countries. Therefore, the interpretations of results, despite the similar context (educational institutes), cannot be generalised. This difference can be understood from the perspective of usage behaviour. For example, Igbaria and Iivari (1995) and Davis (1989) reported that individuals' abilities, experiences, perception of usefulness and organisational support are likely to play salient role in the perception of usage, and numerous studies confirmed this in the context of Western Europe and North America (e.g., Venkatesh et al., 2003; Taylor & Todd, 1995b; Venkatesh, 2000; Igbaria & Chakrabarti, 1990; Taylor & Todd, 1995c). However, in the present study (Pakistan), due to its high scores on feminine and collectivist societies, perception of usefulness was not a dominant factor of usage. Future research is necessary to collect data across multiple organisations, cultures and technologies in order to establish the generalisability of this research and deepen our understanding of the findings obtained.

Finally, the limitations of the perspective context may be due to the self-reported questionnaire. As the study used a single method (survey) and a single set of respondents (academics) at a single point in time (cross-sectional) the possibility of the common method variance may be due to inflated correlation for the obtained results (e.g., Igbaria, 1993). To some extent the researcher overcame this problem by using exploratory factor analysis (EFA) which substantiated that factors were loaded separately; however, the chances of there being a spurious effect were still inevitable. The alternative approach to a self-report data source and refining measures would certainly reduce the likelihood of obtaining spurious relationships and would increase the reliability and validity of the measurement model and more rigorous results using SEM.

7.2.3. Cross-sectional study

The third limitation of this study is related to the cross-sectional design that restrained the understanding of the extent to which causality can be inferred. In spite of the fact that cross-sectional design allowed the researcher to collect a large data sample in a short span of time (Bordens and Abbott, 2007), it remained futile to try to understand the impact of the key predictors with respect to time towards acceptance intentions and usage behaviour.

Realistically, the extended model in the current study is based on the TAM, which in turn is based on behavioural theories of cognition, i.e., TRA and SCT. These require continuous interaction/feedback with the factors under examination. Specifically, for the acceptance of newer IT systems where users evolve from being novices to experienced users, there is a clear need to examine the phenomena over several points of time (e.g., Davis, 1989; Davis, Bagozzi & Warshaw, 1989; Venkatesh & Davis, 2000; Kim, Choi & Han, 2009).

In support, the literature shows that initial adoption and sustained usage (i.e., novice to experienced) of technology produced differences in many of the TAM and models similar to its conceptualisation constructs on behavioural beliefs (e.g., Venkatesh et al., 2003; Morris & Venkatesh, 2000; Davis & Venkatesh, 2004). For example, during an examination of gender-based differences in technology acceptance behaviour, Venkatesh et al., (2000), based on the studies of Lu (1999) and Roosmalen & McDaniel (1992), reported that women, compared with men, were more likely to sustain the follow-up on expressed intentions. Similarly, linked to the normative beliefs, Venkatesh & Davis (2000) found that the direct impact of SN on BI became weaker with the passage of time and experienced gained. Therefore, future research particular to longitudinal studies is needed to replicate the current study and address the issues related to time and long-term usage.

7.2.4. Normality of data and construct reliability

An examination of the extended model using SEM provides strong support through the acceptable structure paths and measurement weights; however, to some extent the psychometric properties of the measurement items were weak. For instance, multivariate normality, which is one of the fundamental requirements for the multivariate analysis (Tabachnick & Fidell, 2007) specifically for the CBSEM method (Arbuckle, 2006), was not tenable in the current study. In addition, the study was also unable to determine the reliability score for items measuring one of the important exogenous constructs of self-efficacy. The exploratory factor analysis showed that the construct SE was split into two groups: one measured the perception of those individuals who were more comfortable using technology on their own; the other measured the perception of the individuals who were comfortable using technology with the appropriate help facility. In the present study only the first group of the respondents were retained due to the number of items and reliability requirements. Therefore, there is a chance that some of the important relationships with respect to the SE remain unexplored and require further investigation.

7.2.5. Predictive power of the model

One of the limitations needs to be considered in terms of predictive relevance i.e., the R^2 value. The basic model without moderation produced only a 26% variance using PLS, and 34% using AMOS. With the moderation effect, the highest variance was observed in the cultural dimension of high PD (39%) followed by public organisation (36%). Perhaps the interesting results from this study were obtained by adding the normative, control and management support beliefs with the moderation effect of personal characteristics and culture to the relatively simple TAM model; the ability of the model to predict intention behaviour was not increased substantially. This leads to the question of what does still account for the approximately 66% unexplained variance in intention behaviour. This may be due in part to the insignificant effect of half of the path relations (9/20) in the proposed model. Alternatively, it may postulate that variance explained in the present (26% to 39%) study is the best in the current study settings and additional factors were situation specific which doesn't account for any improvement. Nevertheless, further exploration replicating similar factors in the different context, or alternatively, distinct factors in the current context to establish intention behaviour are warranted.

7.2.6. Lack of mediation, indirect effect and new relations

This study potentially has limits when highlighting the mediation and indirect effect between key predictors and acceptance behaviour. Within the model proposed, it can be inferred that BI, PU and PEOU can possibly play the role of mediator between predictors and acceptance intention. In the appendix-A, the table A-7 presenting direct effects shows that the impact of AT→BI was also significant on BU. In addition, the impact of GS→PU and IS→PU was also significantly related to the BI, and SN→PEOU was also related to the PU. Interestingly, path PEOU→BI, which was insignificant in direct relations, was significant with the mediating effect of the PU perception. These results are so important and were missing in the present study.

Within IT acceptance the literature has emphasised the need to explore the mediating impact. For instance, Taylor & Todd (1995a) examined the importance of the construct BI as a mediator in TAM, TPB, and TRA, as suggested by Fishbein & Ajzen (1975); that research found that omitting the BI results led to a substantial decrease in BU. Analogous to this, in the present study it is observed that PEOU was only significant on BI when individuals perceived the importance of PU only. Thus, the PU played an important substantive role in predicting BI. In future research, a re-evaluation of the present model with the missing relationships could explore the new findings, specifically in terms of increasing the predictive relevance of the model and the importance of the mediators within the model.

Apart from the mediation effect, future research is also invited to explore the distinct role of the variables present in the extended model. For instance, SE, which has been studied purely as an exogenous variable, could also be studied as an endogenous variable. Compeau & Higgins (1995) reported that SE is positively related to the encouragement by others' use (known in the present study as management support) and support of the organisation in terms of help assistance (in the present study as resource facilitations). Similarly, Davis et al., (1989) highlighted the importance for exploring new relations with external factors and perceptions of ease of use and usefulness. Therefore, future research is invited to examine the relationships among the construct presented in the current study in order to see how well they can predict and explain the user acceptance.

7.2.7. Moderation effect

Finally, this study is limited to eliciting the underlying multiple-way interaction effect of the moderators. For example, observing the effect of gender within the demographic group of moderators, literature in sociology, social psychology and in information system acceptance (e.g., Venkatesh et al., 2003; Levy, 1988) asserts that gender is related to experience, age and voluntariness. Similarly, Minton & Schneider (1980) found that income, occupation and education can be confounding variables associated with age. Minton & Schneider's argument is justifiable, for instance, usually older individuals, as compared with younger individuals, are overrepresented in categories of higher income, higher occupational position and higher educational qualifications.

In the same line of research the literature shows that normative beliefs (SN) were significant only in mandatory settings for the female gender with higher age and lower experience (e.g., Venkatesh et al., 2003; Venkatesh & Davis, 2000; Szajna, 1996; Szajna, 1994). In the present study, during the MGA it was noticed that many paths were similar or contradictory to each other within different groups. For example, path IS→PU was highly significant in the female gender and organisations of private institutes, which might suggest a new relationship: female individuals, as compared with male, perceived a higher importance in management support at an institute level within private institutes as compared with public institutes. Despite this fact, a relationship can be validated from the results of the current study but cannot be generalised without calculating the interaction effect (i.e., gender x organisation type).

Standing in the same line and observing cultural dimensions, Hofstede & Hofstede (2005) postulates that individuals with high PD are more inclined towards a collectivist society. Evidence of this can be observed in the current study. Path SN→PU was highly significant in high PD and in the high collectivist group, which can present the proposition that: individuals high on PD compared to low on PD perceived a higher importance of the normative belief (SN) towards acceptance intention by perceiving the usefulness within collectivist society. Like the gender and organisation relationship, this relationship could also be justified by the current study but its generalisation needs caveats.

These patterns and many others likewise reflect the importance of the multiple-way interaction effect of moderating variables on individuals' personality and the perception of acceptance behaviour. Thus, future research is invited to underscore the moderating impacts of demographic variables as well as cultural variables presented in the current study with the multiple-interaction method.

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Appendix-A

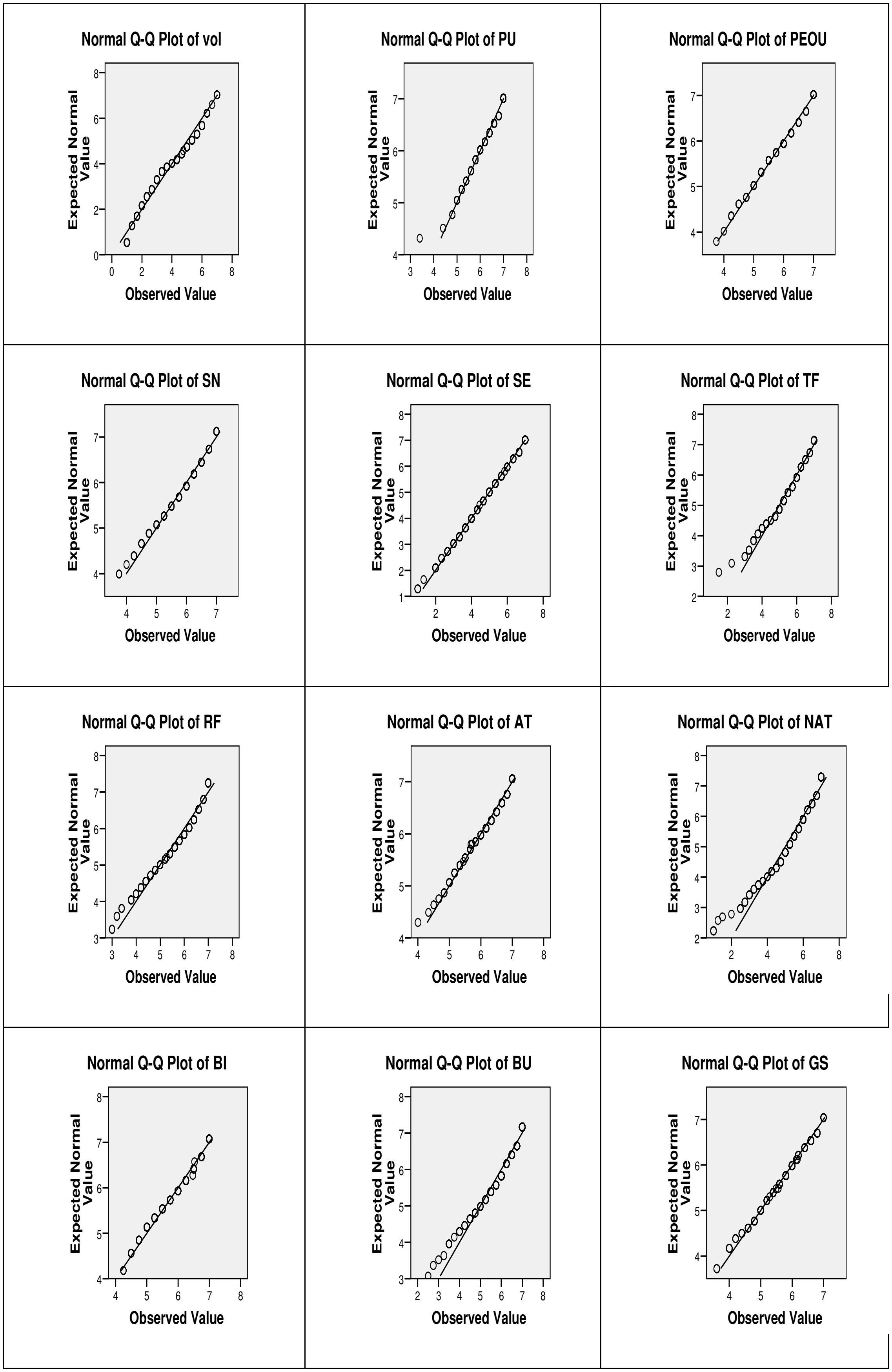
Univariate Statistics (item-level)							
				Missing		No. of Extremes(a)	
	N	Mean	Std. Deviation	High	Count %	Percent	Low
V1	380	5.29	1.531	0	0.0	0	0
V2	379	3.98	2.167	1	0.3	0	0
V3	380	2.41	1.726	0	0.0	0	37
V4	380	3.18	1.887	0	0.0	0	0
PU1	380	6.29	0.813	0	0.0	9	0
PU2	380	6.28	0.774	0	0.0	6	0
PU3	380	6.20	0.830	0	0.0	5	0
PU4	379	6.15	0.774	1	0.3	5	0
PU5	379	5.79	1.019	1	0.3	3	0
PEOU1	380	5.87	0.971	0	0.0	2	0
PEOU2	380	5.81	1.109	0	0.0	4	0
PEOU3	380	6.00	0.894	0	0.0	0	0
PEOU4	378	5.93	0.970	2	0.5	0	0
PI1	380	5.98	0.937	0	0.0	3	0
PI2	380	5.69	1.069	0	0.0	1	0
PI3	379	5.50	1.156	1	0.3	20	0
PI4	380	5.27	1.185	0	0.0	34	0
SI1	380	6.00	0.989	0	0.0	29	0
SI2	380	6.15	0.896	0	0.0	20	0
SE1	380	6.30	0.871	0	0.0	8	0
SE2	380	6.23	0.881	0	0.0	13	0
SE3	380	5.56	1.327	0	0.0	18	0
SE4	379	4.60	1.573	1	0.3	18	0
SE5	380	3.81	1.837	0	0.0	0	0
SE6	378	5.37	1.313	2	0.5	35	0
TF1	380	5.69	1.280	0	0.0	17	0
TF2	379	5.25	1.598	1	0.3	60	0
TF3	377	5.71	1.223	3	0.8	9	0
TF4	379	5.39	1.343	1	0.3	32	0
RF1	379	6.46	0.909	1	0.3	11	0
RF2	379	5.65	1.566	1	0.3	26	0
RF3	380	4.67	1.825	0	0.0	0	0
RF4	380	4.88	1.825	0	0.0	0	0
RF5	378	5.87	1.220	2	0.5	9	0
AT1	377	6.07	1.040	3	0.8	25	0
AT2	379	6.19	0.855	1	0.3	6	0
AT3	377	5.30	1.640	3	0.8	0	0
AT4	379	6.41	0.838	1	0.3	7	0
AT5	380	6.47	0.888	0	0.0	8	0
AT6	378	6.44	0.783	2	0.5	6	0
NAT1	379	5.68	1.369	1	0.3	17	0
NTA2	380	5.56	1.579	0	0.0	33	0
NTA3	380	5.26	1.650	0	0.0	31	0
NTA4	380	5.32	1.573	0	0.0	28	0
BI1	378	5.95	0.941	2	0.5	1	0
BI2	378	5.31	1.402	2	0.5	33	0

BI3	378	5.13	1.528	2	0.5	13	0
BI4	380	6.09	0.862	0	0.0	14	0
BU1	380	6.14	1.079	0	0.0	25	0
BU2	380	5.17	1.795	0	0.0	61	0
BU3	377	5.25	1.784	3	0.8	39	0
BU4	379	6.18	1.144	1	0.3	26	0
PD1	378	2.29	1.543	2	0.5	0	23
PD3	380	3.28	1.892	0	0.0	0	0
PD4	379	3.80	1.835	1	0.3	0	0
PD5	377	2.97	1.640	3	0.8	0	11
PD6	378	2.55	1.528	2	0.5	0	24
IC1	378	5.80	1.356	2	0.5	15	0
PD2	380	3.03	1.765	0	0.0	0	16
IC2	380	5.79	1.317	0	0.0	13	0
IC3	379	5.80	1.217	1	0.3	5	0
IC4	379	5.06	1.570	1	0.3	18	0
IC5	380	5.00	1.660	0	0.0	8	0
IC6	380	5.01	1.580	0	0.0	5	0
UA1	380	6.38	0.772	0	0.0	11	0
UA2	380	6.24	0.818	0	0.0	12	0
UA3	380	6.50	0.583	0	0.0	1	0
UA4	380	6.15	1.135	0	0.0	24	0
MF1	378	3.96	2.021	2	0.5	0	0
MF2	377	3.11	1.954	3	0.8	0	0
MF3	379	3.15	1.853	1	0.3	0	0
MF4	380	2.90	1.929	0	0.0	0	0
MF5	380	2.63	1.943	0	0.0	0	0
GS1	377	5.63	1.129	3	0.8	16	0
GS2	378	5.66	1.029	2	0.5	9	0
GS3	376	5.41	1.147	4	1.1	18	0
GS4	377	5.47	1.165	3	0.8	19	0
GS5	378	5.69	1.194	2	0.5	4	0
TS1	380	6.06	0.973	0	0.0	23	0
TS2	378	6.01	0.952	2	0.5	16	0
TS3	380	5.98	0.944	0	0.0	1	0
TS4	380	5.92	1.028	0	0.0	5	0
TS5	380	6.21	0.876	0	0.0	15	0
a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).							
Little's MCAR test: Chi-Square = 3301.523, DF = 2178, Sig. = .230							

Table A. 1: Missing data examination at item-level

Univariate Statistics							
	N	Mean	Std. Deviation	Missing		No. of Extremes(a)	
				High	Count	Percent	Low
M_VOL	379	3.1856	1.51240	1	0.3	0	0
M_PU	378	6.1476	0.66237	2	0.5	0	0
M_PEOU	378	5.9061	0.78980	2	0.5	0	0
M_SN	379	5.7647	0.72384	1	0.3	1	0
M_SE	377	4.5871	1.21390	3	0.8	3	0
M_TF	375	5.5093	1.04762	5	1.3	13	0
M_RF	377	5.5034	0.98759	3	0.8	0	0
M_AT	374	6.1448	0.64582	6	1.6	4	0
M_NAT	380	5.4276	1.21475	0	0.0	10	0
M_BI	378	5.6210	0.89190	2	0.5	0	0
M_BU	377	5.6857	1.08897	3	0.8	6	0
M_PD	375	2.9756	1.05377	5	1.3	0	2
M_IC	376	5.4189	0.95110	4	1.1	0	0
M_UA	380	6.3191	0.58988	0	0.0	7	0
M_MF	374	3.1214	1.65603	6	1.6	0	0
M_GS	374	5.5743	0.92309	6	1.6	5	0
M_TS	378	6.0397	0.76447	2	0.5	9	0
a. Number of cases outside the range (Q1 - 1.5*IQR, Q3 + 1.5*IQR).							
Little's MCAR test: Chi-Square = 504.540, DF = 289, Sig. = .210							

Table A. 2: Missing data examination at Construct-level


Normal Q-Q Plot of vol
Normal Q-Q Plot of PU
Normal Q-Q Plot of PEOU
Normal Q-Q Plot of SN
Normal Q-Q Plot of SE
Normal Q-Q Plot of TF
Normal Q-Q Plot of RF
Normal Q-Q Plot of AT
Normal Q-Q Plot of NAT
Normal Q-Q Plot of BI
Normal Q-Q Plot of BU
Normal Q-Q Plot of GS
Expected Normal Value
Observed Value

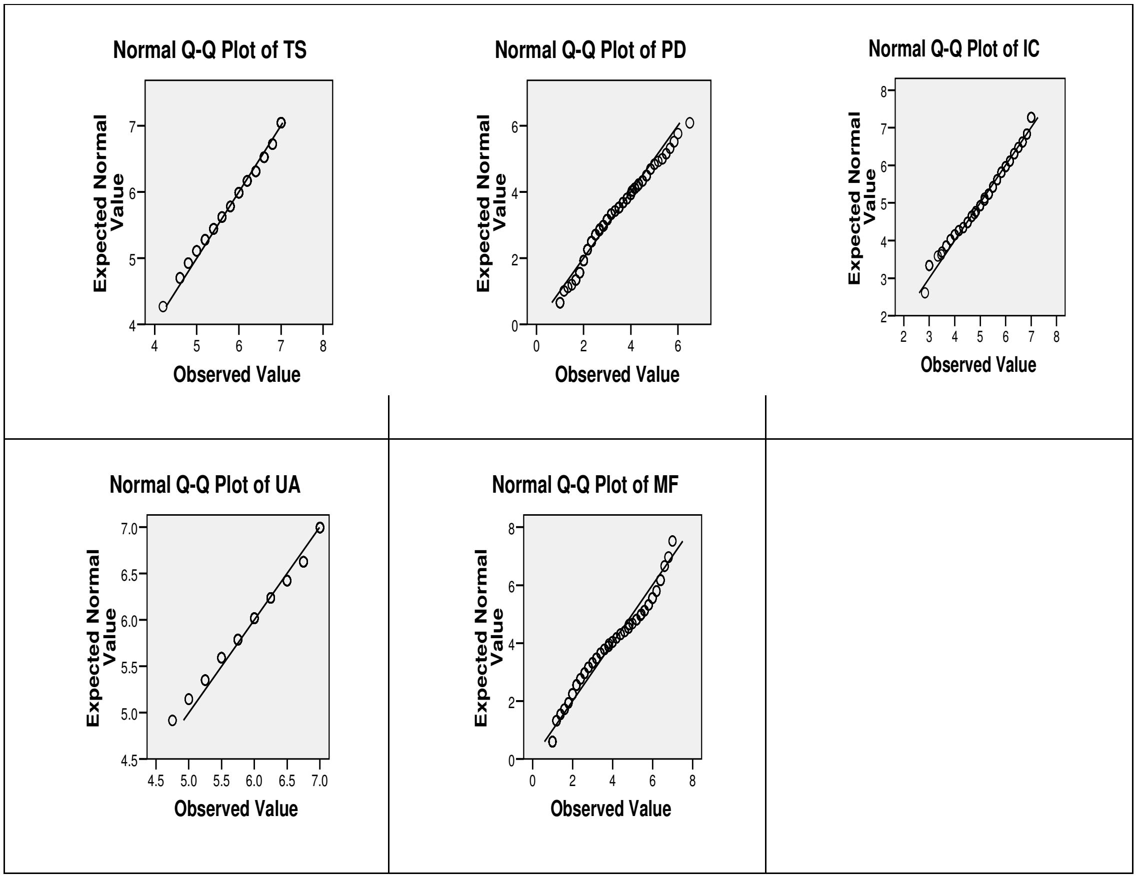


Figure A. 1: Normal probability Q-Q plot

Assessment of normality (Group number 1)						
Variable	**min**	**max**	**skew**	**c.r.**	**kurtosis**	**c.r.**
PEOU3_1	3	7	-0.601	-4.78	-0.075	-0.3
TS1_1	3	7	-0.772	-6.148	0.293	1.166
TS2_1	3	7	-0.528	-4.2	-0.251	-1
TS4_1	2	7	-0.922	-7.336	1.289	5.129
TS5_1	3	7	-0.83	-6.604	0.052	0.208
PU5_1	2	7	-0.774	-6.157	0.664	2.64
PU4_1	3	7	-0.67	-5.329	0.146	0.58
PU3_1	3	7	-0.622	-4.954	-0.404	-1.609
PU2_1	3	7	-0.781	-6.215	0.106	0.423
PU1_1	3	7	-0.92	-7.323	0.308	1.224
BI4_1	4	7	-0.564	-4.487	-0.505	-2.008
BI3_1	1	7	-1.234	-9.819	2.059	8.192
BI2_1	3	7	-0.462	-3.674	-0.548	-2.179
BI1_1	3	7	-0.666	-5.299	0.076	0.301
GS1_1	3	7	-0.539	-4.292	-0.175	-0.697
GS2_1	3	7	-0.295	-2.35	-0.415	-1.65
GS3_1	3	7	-0.413	-3.291	-0.407	-1.621
GS4_1	3	7	-0.467	-3.715	-0.409	-1.627
AT2_1	3	7	-0.712	-5.668	0.206	0.819
TF4_1	1	7	-0.968	-7.705	1.135	4.517
TF3_1	1	7	-0.994	-7.908	1.105	4.396
TF2_1	2	7	-1.017	-8.091	0.867	3.449
TF1_1	2	7	-0.983	-7.824	0.963	3.831
RF5_1	1	7	-1.142	-9.085	0.606	2.411
RF4_1	1	7	-1.171	-9.32	0.585	2.326
RF3_1	1	7	-0.976	-7.771	0.009	0.034
NAT1_1	1	7	-1.204	-9.585	1.487	5.916
NTA2_1	1	7	-1.209	-9.622	1.184	4.713
NTA4_1	1	7	-0.953	-7.588	0.506	2.015
AT6_1	3	7	-0.565	-4.5	-0.257	-1.024
AT5_1	2	7	-0.762	-6.062	0.623	2.48
SI1_1	2	7	-0.81	-6.446	0.33	1.313
PI2_1	3	7	-0.535	-4.26	-0.374	-1.49
PI1_1	2	7	-0.928	-7.384	1.172	4.663
PEOU1_1	3	7	-0.385	-3.064	-0.625	-2.489
PEOU2_1	3	7	-0.343	-2.728	-0.586	-2.332
BU3_1	1	7	-1.315	-10.468	1.7	6.765
BU2_1	2	7	-1.028	-8.18	0.664	2.641
BU1_1	1	7	-1.144	-9.108	1.291	5.139
Multivariate					**228.527**	**39.388**

Table A. 3: Assessment of normality

Observations farthest from the centroid (Mahalanobis distance) (Group number 1)							
Obs. No.	**Mahalanobis d-squared**	**p1**	**p2**	**Obs. No.**	**Mahalanobis d-squared**	**p1**	**p2**
250	122.804	0	0	**216**	59.618	0.018	0
5	114.382	0	0	**157**	59.443	0.019	0
266	99.68	0	0	**321**	59.363	0.019	0
319	99.51	0	0	**150**	59.321	0.02	0
10	97.717	0	0	**106**	59.236	0.02	0
365	87.339	0	0	**166**	59.196	0.02	0
215	84.206	0	0	**240**	59.081	0.021	0
159	82.263	0	0	**34**	58.859	0.021	0
260	81.85	0	0	**304**	57.787	0.027	0
234	79.695	0	0	**68**	57.63	0.028	0
288	79.234	0	0	**133**	57.54	0.028	0
267	76.93	0	0	**81**	57.454	0.029	0
214	76.726	0	0	**113**	57.437	0.029	0
268	75.566	0	0	**158**	57.375	0.029	0
19	74.674	0.001	0	**294**	57.182	0.03	0
41	74.624	0.001	0	**368**	56.863	0.032	0
99	74.438	0.001	0	**116**	56.137	0.037	0
43	74.339	0.001	0	**64**	56.035	0.038	0
367	74.23	0.001	0	**134**	55.049	0.046	0
221	72.792	0.001	0	**307**	54.473	0.051	0
160	71.971	0.001	0	**280**	54.23	0.053	0
230	71.707	0.001	0	**185**	54.207	0.054	0
44	71.196	0.001	0	**9**	53.905	0.057	0
263	70.935	0.001	0	**306**	53.85	0.057	0
28	70.665	0.001	0	**261**	53.744	0.058	0
249	70.266	0.002	0	**177**	53.399	0.062	0
298	70.166	0.002	0	**22**	53.299	0.063	0
303	69.178	0.002	0	**178**	52.633	0.071	0
320	68.075	0.003	0	**324**	51.437	0.088	0
264	67.899	0.003	0	**2**	51.299	0.09	0
11	67.891	0.003	0	**128**	51.221	0.091	0
308	66.901	0.004	0	**172**	51.032	0.094	0
123	65.093	0.005	0	**6**	50.73	0.099	0
181	64.655	0.006	0	**296**	50.384	0.105	0
302	64.545	0.006	0	**239**	50.254	0.107	0
38	63.137	0.009	0	**228**	49.799	0.115	0
121	62.843	0.009	0	**183**	49.744	0.116	0
251	62.53	0.01	0	**291**	49.366	0.124	0
220	62.048	0.011	0	**71**	49.251	0.126	0
301	60.806	0.014	0	**91**	49.137	0.128	0

151	60.116	0.017	0	**156**	48.883	0.133	0
55	48.473	0.142	0	**245**	46.756	0.184	0.004
186	48.337	0.145	0	**326**	46.686	0.186	0.004
193	48.317	0.146	0	**201**	46.653	0.187	0.003
20	47.56	0.163	0.001	**165**	46.459	0.192	0.005
32	47.434	0.167	0.001	**48**	46.345	0.195	0.005
327	47.281	0.17	0.001	**269**	46.318	0.196	0.004
49	47.261	0.171	0.001	**127**	46.286	0.197	0.003
26	46.873	0.181	0.004	**125**	45.884	0.208	0.012
169	45.738	0.213	0.015	**190**	45.727	0.213	0.011

Table A. 4: Multivariate normality

S.No.	Name of University	Sector (Public/Private)	Province	Questionnaire Distributed	Questionnaire Returned	Response Rate(%)
1	University of Sindh Jamshoro	Public	Sindh	180	59	32.78
2	Quaid-e-Awam University of Engineering Science and Technology, Nawabshah	Public	Sindh	55	22	40.00
3	Sukkur Institute of Business Administration	Public	Sindh	40	34	85.00
4	Mehran University of Engineering and Technology	Public	Sindh	40	33	82.50
5	University of Karachi	Public	Sindh	35	18	51.43
6	NED University of Engineering and Technology	Public	Sindh	35	17	48.57
7	Sindh Agriculture University, Tandojam	Public	Sindh	50	27	54.00
8	Shah Abdul Latif University	Public	Sindh	45	21	46.67
9	University of Sindh, Lar College, Badin	Public	Sindh	25	10	40.00
10	Liaqat University of Medical and Health Sciences	Public	Sindh	25	20	80.00
11	Hamdard University Karachi	Private	Sindh	40	34	85.00
12	Shaheed Zulifiqar Ali Bhutto Institute of Science and Technology (SZABIST)	Private	Sindh	20	15	75.00
13	Preston University Karachi	Private	Sindh	30	13	43.33
14	Sir Syed University of Engg. & Technology	Private	Sindh	30	11	36.67
15	KASB Institute of Technology Karachi	Private	Sindh	35	22	62.86
16	Isra University, Hyderabad	Private	Sindh	35	27	77.14
17	University of Peshawar	Public	NWFP	15	12	80.00
18	NWFP University of Engineering and Technology, Peshawar	Public	NWFP	5	5	100.00
19	Ghulam Ishaque Khand Institute of Engineering and Technology	Private	NWFP	50	36	72.00
20	Lahore University of Management Sciences	Private	Punjab	20	12	60.00
21	Institute of Management Sciences	Private	Punjab	20	10	50.00
22	University of Punjab	Public	Punjab	30	12	40.00

23	National College of Arts	Public	Punjab	45	24	53.33
24	Iqra University, Quetta	Private	Baluchistan	15	5	33.33
25	Baluchistan University of Information Technology and Management Sciences	Public	Baluchistan	15	5	33.33
	Total			**935**	504	53.90

Table A. 5: Details of questionnaires distributed and response rate

Construct	Item	Question	Mean	Std. Deviation	Corrected Item-Total Correlation
Voluntariness Items= 3 Cronbach's Alpha (0.68) Inter-Item Correlations 0.45-0.39	**VOL2**	My use of the Internet is voluntary	3.98	2.16	0.48
	VOL3	My chair does not require me to us the Internet	2.41	1.73	0.53
	VOL4	Although it might be helpful, using Internet is certainly not compulsory in my job	3.18	1.89	0.49
Perceived Usefulness Items= 5 Cronbach's Alpha (0.78) Inter-Item Correlations 0.56-0.29	**PU1**	Using Internet enables me to accomplish my teaching and research activities more quickly	6.28	0.81	0.56
	PU2	Using Internet improves the quality of my teaching and research job	6.21	0.83	0.57
	PU3	Using Internet makes teaching and research activities easier to me	6.20	0.81	0.65
	PU4	Using Internet enhance my teaching and research effectiveness	6.13	0.82	0.55
	PU5	Using Internet gives me greater control over my teaching and research job	5.91	0.97	0.48
Perceived Ease of Use Items= 4 Cronbach's Alpha (0.84) Inter-Item Correlations 0.82-0.473	**PEOU1**	Usage of Internet to support my teaching and research is clear and understandable	5.93	.896	.727
	PEOU2	When using Internet to support my teaching and research, I found it easy to get material that I use to do what I want them to do	5.90	.902	.783
	PEOU3	Overall, I believe that it is easy to use the Internet to support my teaching and research skills	6.02	.896	.608
	PEOU4	Learning Internet use to support my teaching and research skills is easy for me	5.94	.882	.595
Peer Influence Items= 4 Cronbach's Alpha (0.69) Inter-Item Correlations 0.28-0.45	**PI1**	My academic colleagues think that using the Internet is valuable for teaching and research	5.96	.957	.466
	PI2	The opinion of my academic colleagues is important to me	5.76	1.028	.452
	PI3	People in non-academic groups (e.g., friends and family) think that using Internet is valuable for me	5.73	1.140	.497
	PI4	The opinion of non-academic groups (e.g., friends and family) is important to me	5.59	1.137	.526
Social Influence Items=2 Cronbach's Alpha (0.59) Inter-Item Correlations 0.22-0.13	**SI1**	My departmental and organizational chair thinks that using Internet is valuable for teaching and research activities	5.94	1.02	0.42
	SI2	The opinion of my departmental and organizational chair is important to me	6.08	0.92	0.42
Self Efficacy Items=6 Cronbach's Alpha **(0.49)** Inter-Item Correlations **0.79-0.13**	**SE1**	I would feel comfortable using the Internet on my own	6.29	0.84	0.24
	SE2	For me, feeling comfortable using the Internet on my own is important	6.23	0.83	0.29
	SE3	I could complete my job using the Internet if there is no one around to tell me what to do as I go	5.59	1.33	0.06
	SE4	I could complete my job using the Internet if I had help-facility for assistant	4.55	1.60	0.40

	SE5	I could complete my job using the Internet if someone show me how to do it first	3.94	1.85	0.31
	SE6	I could complete my job using the Internet if I had enough time provided to use it.	5.17	1.39	0.27
Technology Facilitation Items= 4 Cronbach's Alpha (0.79) Inter-Item Correlations 0.55-0.41	**TF1**	The technology necessary (computers, cables, modems, etc) for the Internet use in my university are modern and updated.	5.65	1.177	.623
	TF2	There is enough number of computers available for everyone to use the Internet	5.59	1.246	.593
	TF3	I have good and quick access of the Internet facility at my university	5.59	1.228	.661
	TF4	I have control over using technologies for the Internet	5.61	1.216	.550
Resource Facilitation Items= 5 Cronbach's Alpha (0.70) Inter-Item Correlations 0.49-0.17	**RF1**	Use of the Internet in my university is free of cost	6.33	.865	.298
	RF2	I can use the Internet at any time I want	5.93	1.253	.387
	RF3	Specialised instructions and education concerning the Internet is available to me	5.37	1.664	.544
	RF4	A specific person (or group) is available for assistance with the Internet difficulties	5.42	1.636	.533
	RF5	Given the resources, opportunities and knowledge it takes to use the Internet, it would be easy for me to use it	5.66	1.450	.584
Usage Intention in Academic Tasks Items= 6 Cronbach's Alpha (0.78) Inter-Item Correlations 0.73-0.17	**AT1**	I intend to use the Internet for preparing teaching material (e.g., power point presentations, lectures, tests, tutorial, etc)	6.14	.829	.399
	AT2	I intend to use the Internet to enhancing my teaching knowledge	6.10	.874	.664
	AT3	I intend to use the Internet to contact with my students using e-mail	5.98	1.147	.489
	AT4	I intend to use the Internet for downloading research material for my own research knowledge development	6.38	.829	.370
	AT5	In my job (teaching and research) use of internet is important	6.12	.872	.655
	AT6	In my job (teaching and research) use of internet is relevant	6.07	.878	.683
Usage Intention in Non-Academic Tasks Items= 4 Cronbach's Alpha (0.84) Inter-Item Correlations 0.64-0.51	**NAT1**	I intend to use the Internet to interact with my friends, family and colleagues, and it creates sense of presence with them	5.62	1.365	.656
	NAT2	Messaging through the Internet (email, chat, etc.) enable me to quickly response my friends, family and colleagues	5.48	1.481	.709
	NAT3	When I send message (e.g., email, chat, etc.) through the Internet to my family, friends and colleagues they usually respond me quickly	5.36	1.523	.679
	NAT4	I intend to use the Internet for administrative tasks (e.g., attendance updates, time-tabling, assignments schedules etc.)	5.26	1.522	.668
Behaviour Intention Items=4 Cronbach's Alpha (0.72)	**BI1**	Assuming I had access to the Internet, I intend to use it in my academic tasks.	6.04	0.89	0.44
	BI2	Assuming I had access to the Internet, I intend to use it in my non-academic tasks.	5.93	0.93	0.61

Inter-Item Correlations 0.57-0.27	**BI3**	Given that I had access to the Internet, I predict that I would use it	5.93	1.11	0.52
	BI4	Whenever it will be possible to me, I plan to use the Internet in my teaching and research job	6.14	0.81	0.51
Behaviour Usage Items=4 Cronbach's Alpha (0.79) Inter-Item Correlations 0.58-0.39	**BU1**	Assuming I had access to the Internet, I intend to use it in my academic tasks.	5.99	1.085	.563
	BU2	Assuming I had access to the Internet, I intend to use it in my non-academic tasks.	5.81	1.180	.580
	BU3	Given that I had access to the Internet, I predict that I would use it	5.62	1.085	.716
	BU4	Whenever it will be possible to me, I plan to use the Internet in my teaching and research job	5.94	1.067	.587
Power Distance Items=6 Cronbach's Alpha (0.68) Inter-Item Correlations 0.53- 0.06	**PD1**	Head of universities and chairs should make most decisions without consulting their academic faculty members.	2.29	1.54	0.45
	PD2	It is frequently necessary for a head of universities and chairs to use authority and power when dealing with their academic faculty members.	3.03	1.76	0.55
	PD3	Head of universities and chairs should seldom ask for the opinions of their faculty members.	3.28	1.89	0.54
	PD4	Head of universities and chair should avoid off-the-job social contacts with their faculty members.	3.80	1.83	0.18
	PD5	Faculty members should not disagree with head of universities and chairs decisions.	2.97	1.63	0.47
	PD6	Head of universities and chairs should not delegate important tasks to faculty members.	2.55	1.52	0.29
Individualism and Collectivism Items= 6 Cronbach's Alpha (0.73) Inter-Item Correlations 0.76-0.03	**IC1**	The welfare of academics as group is more important to me than individual rewards.	5.80	1.35	.529
	IC2	The success of academics as group is more important to me than individual success.	5.79	1.32	.592
	IC3	Being accepted by the members of workgroup is very important.	5.80	1.22	.290
	IC4	To me, academic members should only pursue their goals after considering the welfare of their colleagues.	5.06	1.57	.492
	IC5	Head of universities and chairs should encourage faculty members' group loyalty even if individual academics goals suffer.	5.00	1.66	.487
	IC6	To me, individual academic member may be expected to give up his/her goals in order to benefit faculty members as group.	5.01	1.58	.351
Uncertainty Avoidance Items= 4 Cronbach's Alpha (0.74) Inter-Item Correlations 0.52-0.30	**UA1**	It is important to have job requirements and instructions spelled out in detail so that faculty members always know what they are expected to do.	6.39	0.74	0.55
	UA2	Head of universities and chairs expect faculty members to closely follow instructions and procedures.	6.26	0.76	0.45
	UA3	Rules and regulations are important because they inform faculty members what the organization/university expects of them.	6.50	0.58	0.62
	UA4	Standard operating procedures are helpful to faculty members on the job.	6.26	0.81	0.52
Masculinity and Femininity Items= 5	**MF1**	Academic and non-academic discussions are usually run more effectively when they are chaired by a man.	3.96	2.02	0.62

Cronbach's Alpha (0.91) Inter-Item Correlations 0.80-0.52	**MF2**	It is more important for men to have a professional career than it is for women to have a professional career.	3.11	1.95	0.80
	MF3	Men usually solve problems with logical analysis; women usually solve problems with intuition.	3.15	1.85	0.82
	MF4	Solving organizational/departmental problems usually requires an active forcible approach which is typical of men.	2.90	1.93	0.83
	MF5	It is preferable to have a man in a high level position rather than a woman.	2.63	1.94	.775
Government Support Items= 5 Cronbach's Alpha (0.76) Inter-Item Correlations 0.52-0.21	**GS1**	The government is committed to a vision of using the Internet in universities	5.75	0.99	0.52
	GS2	The government is committed to support academics efforts in using the Internet for teaching and research	5.73	0.98	0.54
	GS3	The government strongly encourages the use of the Internet for teaching and research purpose	5.70	1.01	0.58
	GS4	The government will recognize academics efforts in using the Internet for teaching and research purpose	5.78	1.01	0.56
	GS5	The use of the Internet for teaching and research purpose is important for government.	5.85	1.08	.451
Local level Support Items= 5 Cronbach's Alpha (0.77) Inter-Item Correlations 0.45-0.33	**TS1**	My University and department are committed to a vision of using the internet in teaching and research tasks	6.11	0.85	0.61
	TS2	My University and department are committed to support academics efforts in using the Internet for teaching and research purpose	6.14	0.79	0.57
	TS3	My University and department strongly encourages the use of the Internet for teaching and research purpose	6.05	0.90	0.56
	TS4	My University and department will recognize academics efforts in using the Internet for teaching and research purpose	6.06	0.91	0.49
	TS5	The use of the Internet for teaching and research purpose is important for my University and department.	6.20	0.85	0.51

Table A. 6: Reliability and Validity of the survey questionnaire

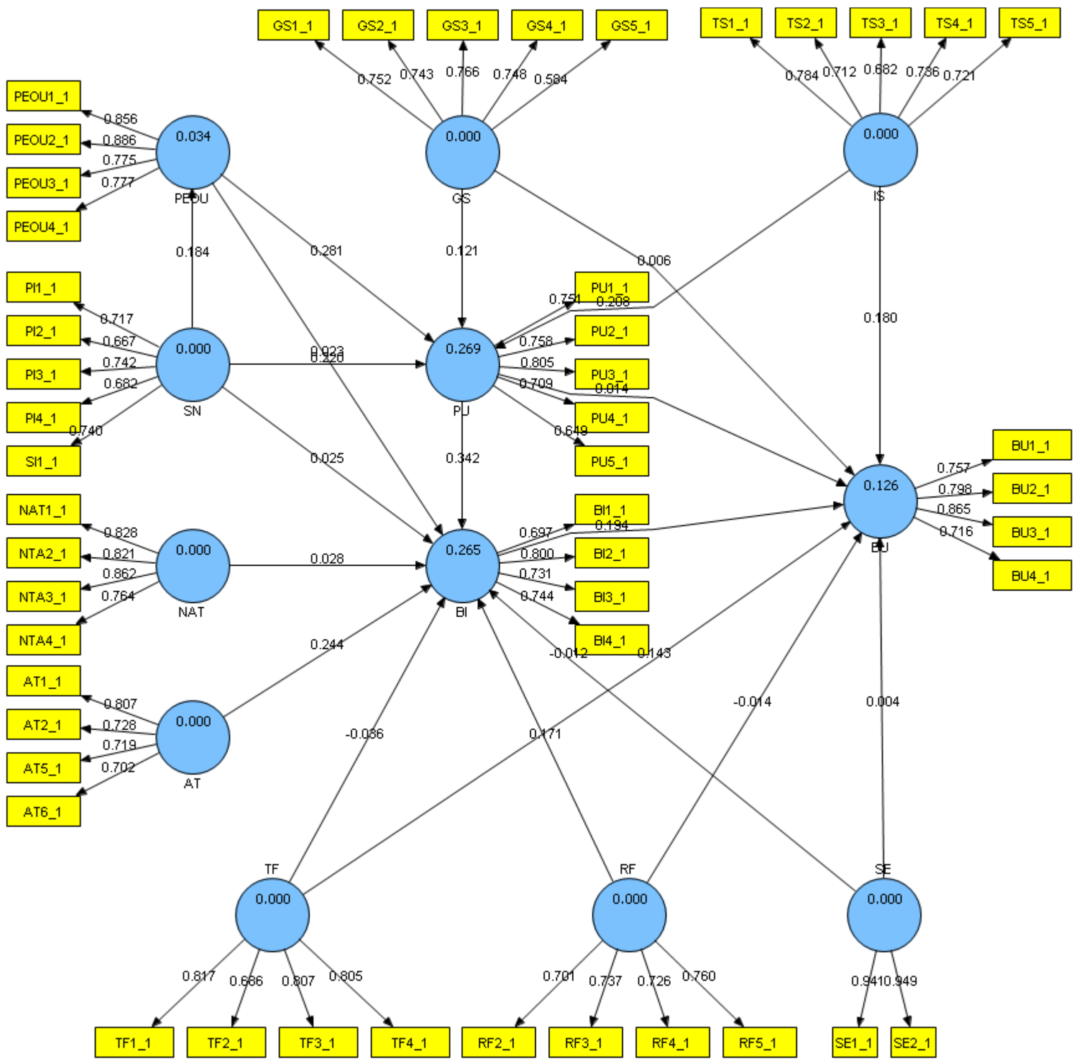


Figure A. 2: PLS based Path diagram

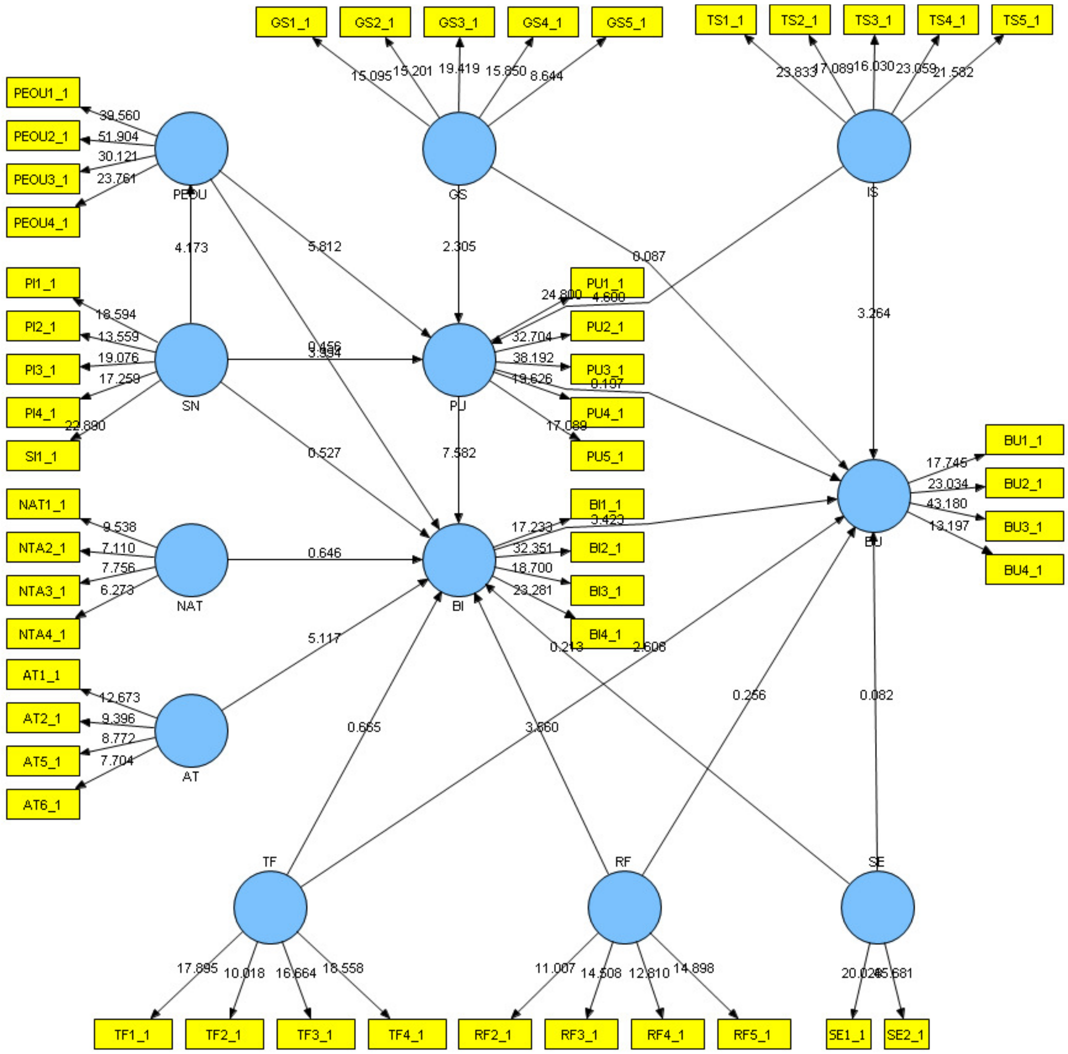


Figure A. 3: PLS based t-values

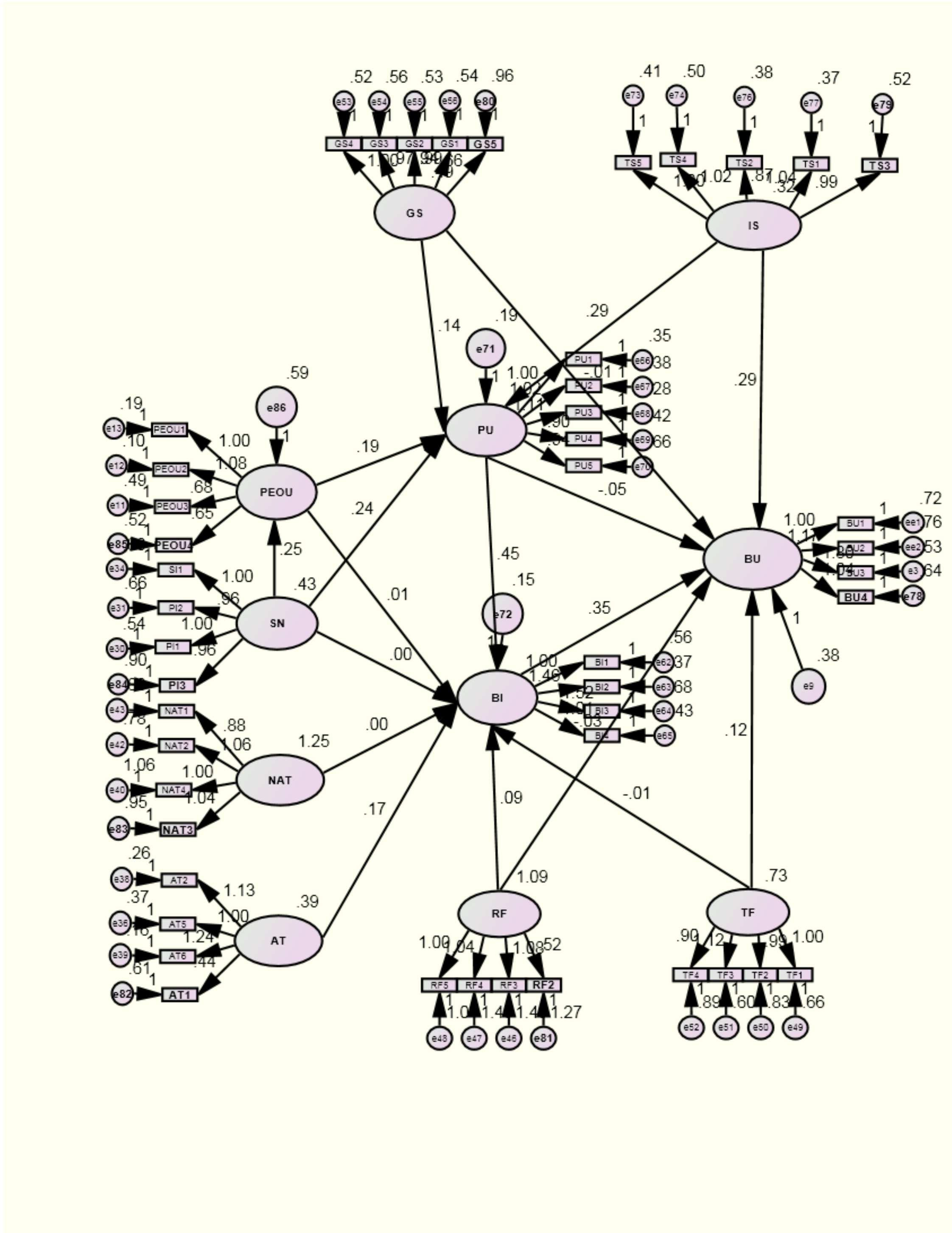


Figure A. 4: Unstandardised path estimations using AMOS

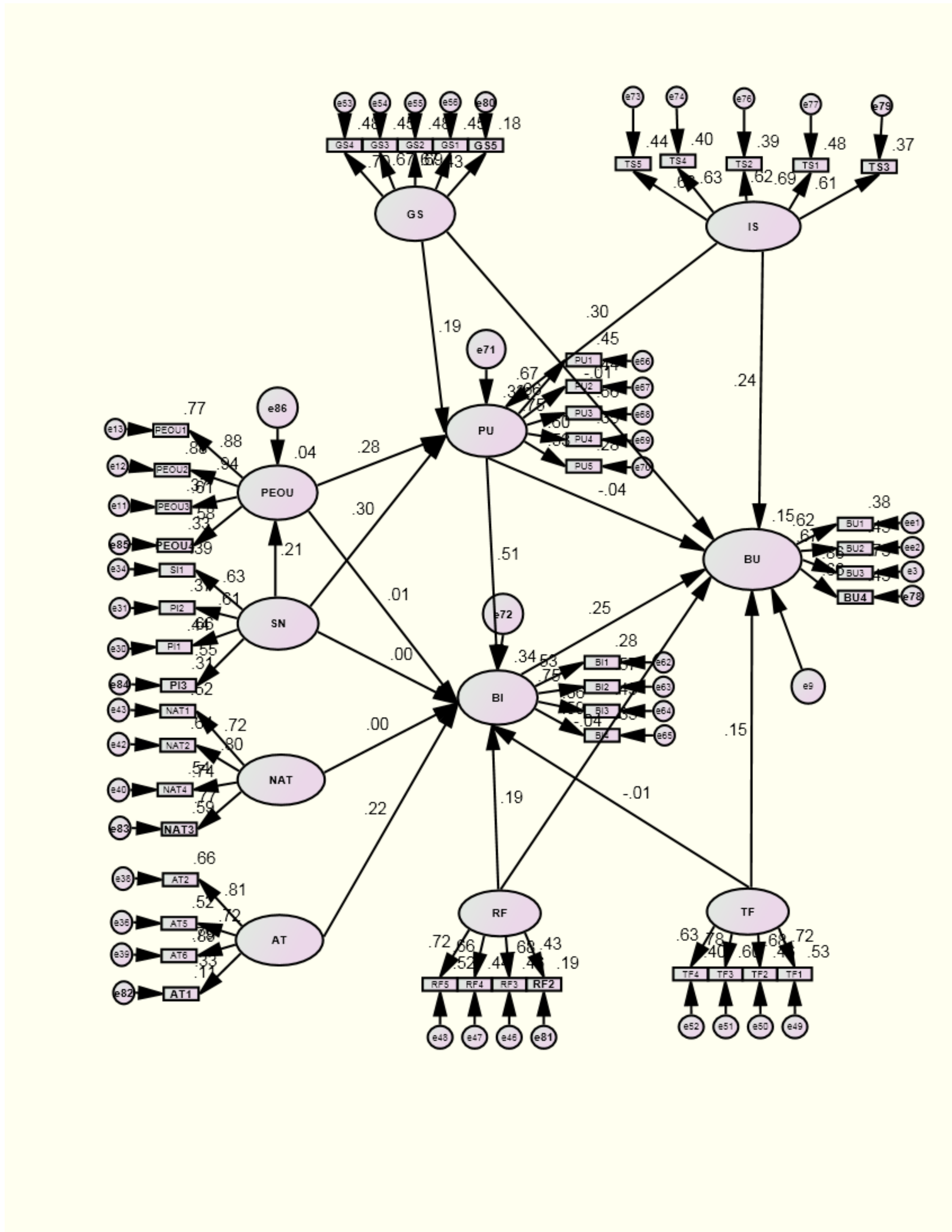


Figure A. 5: Standardised path estimations using AMOS

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	Standard Error (STERR)	T Statistics (|O/STERR|)	β(t-value)
GS -> BU	0.0152	0.0173	0.0617	0.0617	0.2467	0.0152 (0.2467)Not Sig.
AT -> BU	0.0473	0.0497	0.018	0.018	2.6354	0.0473 (2.6354)**
BI -> BU	0.1941	0.1974	0.0567	0.0567	3.4228	0.1941 (3.4228)***
IS -> BU	0.1969	0.1926	0.0545	0.0545	3.6145	0.1969 (3.6145)***
NAT -> BU	0.0055	0.0073	0.0089	0.0089	0.6174	0.0055 (0.6174)Not Sig.
PEOU -> BU	0.0271	0.0264	0.0206	0.0206	1.3139	0.0271 (1.3139)Not Sig.
PU -> BU	0.0803	0.0821	0.0636	0.0636	1.262	0.0803 (1.262)Not Sig.
RF -> BU	0.0191	0.0264	0.0541	0.0541	0.354	0.0191 (0.354)Not Sig.
SE -> BU	0.0017	-0.0003	0.0515	0.0515	0.0325	0.0017 (0.0325)Not Sig.
SN -> BU	0.0275	0.0279	0.0195	0.0195	1.4116	0.0275 (1.4116)Not Sig.
TF -> BU	0.1365	0.1507	0.0562	0.0562	2.4267	0.1365 (2.4267)*
GS -> BI	0.0413	0.0435	0.0186	0.0186	2.2172	0.0413 (2.2172)*
AT -> BI	0.2439	0.2506	0.0477	0.0477	5.1168	0.2439 (5.1168)***
IS -> BI	0.0712	0.0725	0.0172	0.0172	4.1336	0.0712 (4.1336)***
NAT -> BI	0.0282	0.0377	0.0437	0.0437	0.6458	0.0282 (0.6458)Not Sig.
PEOU -> BI	0.1193	0.1126	0.0507	0.0507	2.3554	0.1193 (2.3554)*
PU -> BI	0.3421	0.3408	0.0451	0.0451	7.5819	0.3421 (7.5819)***
RF -> BI	0.1715	0.1816	0.0482	0.0482	3.5596	0.1715 (3.5596)***
SE -> BI	-0.0124	-0.016	0.0584	0.0584	0.2125	-0.0124 (0.2125)Not Sig.
SN -> BI	0.1225	0.1245	0.0473	0.0473	2.5883	0.1225 (2.5883)*
TF -> BI	-0.0359	-0.0341	0.0541	0.0541	0.6647	-0.0359 (0.6647)Not Sig.
GS -> PU	0.1208	0.1281	0.0524	0.0524	2.3049	0.1208 (2.3049)*
IS -> PU	0.208	0.2133	0.0452	0.0452	4.6002	0.208 (4.6002)***
PEOU -> PU	0.281	0.2746	0.0483	0.0483	5.8124	0.281 (5.8124)***
SN -> PU	0.2719	0.2805	0.0539	0.0539	5.0489	0.2719 (5.0489)***
SN -> PEOU	0.1836	0.1906	0.044	0.044	4.1729	0.1836 (4.1729)***

Table A. 7: Direct and In-direct path relations

Appendix-B

Brunel
UNIVERSITY
WEST LONDON
Brunel Business School

A Covering Letter

Dear Respondent,

I am a PhD candidate at Brunel University West London, under the supervision of Professor. Zahir Irani, Head of Brunel Business School, Brunel University, London, UK. This research is entitled as:

Culture, Demography and Individuals' Technology Acceptance Behaviour: A PLS Based Structural Evaluation of an Extended Model of Technology Acceptance in South-Asian Country Context

The aim of study is twofold, i.e. to generate model to contribute the knowledge regarding the constructs which significantly determine the acceptance of information technology in developing countries context, and to provide useful information to the IT policy makers within the developing countries to improve the Internet usage within the academic's working and professional practices.

This study will require you to complete the survey questionnaire (attached) which takes approximately 20 to 30 minutes. Your participation is voluntary, and if you do not wish to participate please discards the questionnaire. Your name and any information you provide will be kept strictly confidential and will not be attributed to the individual or organisation. Completed questionnaire response will be stored in secure environment, and the results of research would be used for only academic purpose.

If you have any question or concern about this study, please contact the investigator: Mr. Muhammad Sharif Abbasi, PhD Student, Brunel Business School, Brunel University, West London, UB8, 3PH, email: sharif.abbasi@brunel.ac.uk or my supervisor email: zahir.irani@brunel.ac.uk.

Your help would be greatly appreciated, thank you very much for your time and cooperation.

Consent:

I wish to be identified in the report YES ☐ NO☐

I have read the above information and I agree to participate in this study (Please Tick) ☐

Researcher Signature

Date: Wednesday, 02 November 2011

Cordially,

Muhammad Sharif Abbasi.

Survey Questionnaire

Section A: Demography

PART : I Questions 1-to-7 are related with *Your Background information*: please mark [x] only one option					
1.	Gender	☐ Male	☐ Female		
2.	Age (years)	☐20-29	☐30-39	☐40-49	☐50 and above
3.	Academic position	☐ Lecturer ☐ Professor	☐Assistant professor ☐ Other	☐Associate professor	
4.	Academic Experience	☐< 1 year ☐11-15 years	☐ 1-5 years ☐16 -20 years	☐ 6-10 years ☐21 and more	
5.	Educational level	☐Bachelor Degree ☐Doctoral Degree		☐Master Degree ☐ Other	
6.	Type of University	☐Public ☐Other	☐Private	☐Semi-private	
7.	Province	☐Sindh ☐Punjab	☐ Baluchistan ☐North West Frontier Province (NWFP)		

PART: II Questions 8-to- 9 are related with *the Internet usage Experience*: please rate the extent to which you agree with each statement (mark [x] only one option)				
8.	How long have you been using the Internet	☐ Don't use at al ☐ 6-10 years	☐ < 1 year ☐ > 10 year	☐1-5 year
9.	How will you self-assess yourself about the Internet usage (Experience level)?	☐ Low	☐ Moderate	☐ High

PART:III Question 10-to-13 are related with the V*oluntariness* use of the Internet: please rate the extent to which you agree with each statement (mark [x] only one option) **1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree** **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
10.	My chair expects me to use the Internet	☐1	☐2	☐3	☐4	☐5	☐6	☐7
11.	My use of the Internet is voluntary	☐1	☐2	☐3	☐4	☐5	☐6	☐7
12.	My chair does not require me to us the Internet	☐1	☐2	☐3	☐4	☐5	☐6	☐7
13.	Although it might be helpful, using the Internet is certainly not compulsory in my job	☐1	☐2	☐3	☐4	☐5	☐6	☐7

SECTION: B- Behaviour Intention (BI) and Behaviour Usage (BU)

PART: I Questions 14 to 22 are related with individuals' *Behavioural Beliefs* about the Internet usage: please rate the extent to which you agree with each statement (mark [x] only one option) **1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree** **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
Perceived Usefulness (PU)								
14.	Using the Internet enables me to accomplish my teaching and research tasks more quickly	☐1	☐2	☐3	☐4	☐5	☐6	☐7
15.	Using the Internet improves the quality of my teaching and research job	☐1	☐2	☐3	☐4	☐5	☐6	☐7
16.	Using the Internet makes teaching and research tasks easier to me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
17.	Using the Internet enhance my teaching and research effectiveness	☐1	☐2	☐3	☐4	☐5	☐6	☐7
18.	Using the Internet gives me greater control over my teaching and research job	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Perceived Ease of Use (PEOU)								
19.	Usage of the Internet to support my teaching and research is clear and understandable	☐1	☐2	☐3	☐4	☐5	☐6	☐7
20.	When using the Internet to support my teaching and research, I found it easy to get material that I use to do what I want them to do	☐1	☐2	☐3	☐4	☐5	☐6	☐7

21.	Overall, I believe that it is easy to use the Internet to support my teaching and research skills	☐1	☐2	☐3	☐4	☐5	☐6	☐7
22.	Learning the Internet use to support my teaching and research skills is easy for me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
<u>PART: II</u> Questions 23 to 28 are related with individuals' *Normative Beliefs* about the Internet usage. please rate the extent to which you agree with each statement (mark [x] only one option) **1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree** **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
Peer influence (PI)								
23.	My academic colleagues think that using the Internet is valuable for teaching and research activities	☐1	☐2	☐3	☐4	☐5	☐6	☐7
24.	The opinion of my academic colleagues is important to me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
25.	People in non-academic groups (e.g. friends and family etc.) think that using the Internet is valuable for me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
26.	The opinion of non-academic groups (e.g. friends and family etc.) is important to me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Superior influence (SI)								
27.	My departmental and organizational chair think that using the Internet is valuable for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7
28.	The opinion of my departmental and organizational chair is important to me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
<u>PART: III</u> Questions 29-to-43 are related with individuals' *Control Beliefs* towards the Internet usage. please rate the extent to which you agree with each statement (mark [x] only one option) **1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree** **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
Self-efficacy (SE)								
29.	I would feel comfortable using the Internet on my own	☐1	☐2	☐3	☐4	☐5	☐6	☐7
30.	For me, feeling comfortable using the Internet on my own is important	☐1	☐2	☐3	☐4	☐5	☐6	☐7
31.	I could complete my tasks using the Internet if there is no one around to tell me what to do as I go	☐1	☐2	☐3	☐4	☐5	☐6	☐7
32.	I could complete my tasks using the Internet if I had help-facility for assistant	☐1	☐2	☐3	☐4	☐5	☐6	☐7
33.	I could complete my tasks using the Internet if someone show me how to do it first	☐1	☐2	☐3	☐4	☐5	☐6	☐7
34.	I could complete my tasks using the Internet if I had enough time provided to use it	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Technology facilitation (TF)								
35.	The technology necessary (e.g. computers, cables, modems, etc.) for the Internet use in my university are modern and updated	☐1	☐2	☐3	☐4	☐5	☐6	☐7
36.	There is enough number of computers available for everyone to use the Internet	☐1	☐2	☐3	☐4	☐5	☐6	☐7
37.	I have good and quick access of the Internet facility at my university	☐1	☐2	☐3	☐4	☐5	☐6	☐7
38.	I have control over using technologies for the Internet	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Resource facilitation(RF)								
39.	Use of the Internet in my university is free of cost	☐1	☐2	☐3	☐4	☐5	☐6	☐7
40.	I can use the Internet at any time I want	☐1	☐2	☐3	☐4	☐5	☐6	☐7
41.	Specialised instructions and education concerning the Internet use is available to me	☐1	☐2	☐3	☐4	☐5	☐6	☐7
42.	A specific person or group is available for assistance with the Internet difficulties	☐1	☐2	☐3	☐4	☐5	☐6	☐7
43.	Given the resources, opportunities and knowledge it takes to use the Internet, it would be easy for me to use it	☐1	☐2	☐3	☐4	☐5	☐6	☐7
<u>PART: IV</u> Questions 44-to-53 are related with individuals' *Academic and non-Academic tasks* performed using the Internet. please rate the extent to which you agree with each statement (mark [x] only one option) **1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree** **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
Academic Task (AT)								

44.	I intend to use the Internet for preparing teaching material (e.g. power point presentations, lectures, tests, tutorial, etc.)	☐1	☐2	☐3	☐4	☐5	☐6	☐7
45.	I intend to use the Internet to enhancing my teaching knowledge and skills	☐1	☐2	☐3	☐4	☐5	☐6	☐7
46.	I intend to use the Internet to contact with my students using e-mail	☐1	☐2	☐3	☐4	☐5	☐6	☐7
47.	I intend to use the Internet for downloading research material for my own research knowledge and skills development	☐1	☐2	☐3	☐4	☐5	☐6	☐7
48.	In my job (i.e. teaching and research) use of the Internet is important	☐1	☐2	☐3	☐4	☐5	☐6	☐7
49.	In my job (i.e. teaching and research) use of the Internet is relevant	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Non-Academic Task (NAT) e.g. social presence, immediacy, playfulness and enjoyment								
50.	I intend to use the Internet to interact with my friends, family and colleagues, and it creates sense of presence with them	☐1	☐2	☐3	☐4	☐5	☐6	☐7
51.	Messaging through the Internet (e.g. email, chat, etc.) enable me to quickly response my friends, family and colleagues	☐1	☐2	☐3	☐4	☐5	☐6	☐7
52.	When I send message (e.g. email, chat, etc.) through the Internet to my family, friends and colleagues they usually respond me quickly	☐1	☐2	☐3	☐4	☐5	☐6	☐7
53.	I intend to use the Internet for administrative tasks (e.g. attendance updates, time-tabling, assignments schedules etc.)	☐1	☐2	☐3	☐4	☐5	☐6	☐7
PART:V Questions 54-to-57 are related with individuals' *Behaviour Intention* to use. please rate the extent to which you agree with each statement (mark [x] only one option) **1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree** **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
Behaviour Intention to use (BI)								
54.	Assuming I had access to the Internet, I intend to use it in my academic tasks.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
55.	Assuming I had access to the Internet, I intend to use it in my non-academic tasks.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
56.	Given that I had access to the Internet, I predict that I would use it	☐1	☐2	☐3	☐4	☐5	☐6	☐7
57.	Whenever it will be possible to me, I plan to use the Internet in my teaching job	☐1	☐2	☐3	☐4	☐5	☐6	☐7
PART: VI Questions 58-to-61 are related with individual's B*ehaviour Usage* of the Internet. please rate the extent to which you agree with each statement (mark [x] only one option) **1= Don't use at all 2= Use about once each month 3= Use few times in month** **4= Use once in week 5= Use few times in week 6= Use once in day 7= Use several times in day**								
Behaviour usage (BU)								
58.	Assuming I had access to the Internet, I intend to use it in my academic tasks.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
59.	Assuming I had access to the Internet, I intend to use it in my non-academic tasks.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
60.	Given that I had access to the Internet, I predict that I would use it	☐1	☐2	☐3	☐4	☐5	☐6	☐7
61.	Whenever it will be possible to me, I plan to use the Internet in my teaching job	☐1	☐2	☐3	☐4	☐5	☐6	☐7

SECTION: C- Cultural Factors and Management support

PART: I Questions 62-to-82 to are related with your personality: please rate the extent to which you agree with each statement (mark [x] only one option) 1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree **4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree**								
Cultural factors: Power Distance (PD)								
62.	Head of universities and chairs should make most decisions without consulting their academic faculty members.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
63.	It is frequently necessary for a head of universities and chairs to use authority and power when dealing with their academic faculty members.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
64.	Head of universities and chairs should seldom ask for the opinions of their faculty members.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
65.	Head of universities and chair should avoid off-the-job social contacts with their faculty members.	☐1	☐2	☐3	☐4	☐5	☐6	☐7

66.	Faculty members should not disagree with head of universities and chairs decisions.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
67.	Head of universities and chairs should not delegate important tasks to faculty members.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Cultural factors: Individualism/Collectivism(IC)								
68.	The welfare of academics as group is more important to me than individual rewards.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
69.	The success of academics as group is more important to me than individual success.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
70.	Being accepted by the members of your workgroup is very important.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
71.	To me, academic members should only pursue their goals after considering the welfare of their colleagues.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
72.	Head of universities and chairs should encourage faculty members' group loyalty even if individual academics goals suffer.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
73.	To me, individual academic member may be expected to give up his/her goals in order to benefit faculty members as group.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Cultural factors: Uncertainty Avoidance (UA)								
74.	It is important to have job requirements and instructions spelled out in detail so that faculty members always know what they are expected to do.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
75.	Head of universities and chairs expect faculty members to closely follow instructions and procedures.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
76.	Rules and regulations are important because they inform faculty members what the organization/university expects of them.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
77.	Standard operating procedures are helpful to faculty members on the job.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Cultural factors: Masculinity/Femininity(MF)								
78.	Academic and non-academic discussions are usually run more effectively when they are chaired by a man.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
79.	It is more important for men to have a professional career than it is for women to have a professional career.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
80.	Men usually solve problems with logical analysis; women usually solve problems with intuition.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
81.	Solving organizational/departmental problems usually requires an active forcible approach which is typical of men.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
82.	It is preferable to have a man in a high level position rather than a woman.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
PART-II Questions 83-to-92 to are related with Government and Top-management support about the Internet use: please rate the extent to which you agree with each statement (mark [x] only one option) 1= Strongly Disagree 2= Quite Disagree 3= Slightly Disagree 4= Neutral 5= Slightly Agree 6= Quite Agree 7= Strongly Agree								
Government Support (GS)								
83.	The government is committed to a vision of using the Internet in universities	☐1	☐2	☐3	☐4	☐5	☐6	☐7
84.	The government is committed to support academics efforts in using the Internet for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7
85.	The government strongly encourages the use of the Internet for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7
86.	The government will recognize academics efforts in using the Internet for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7
87.	The use of the Internet for teaching and research purpose is important for government.	☐1	☐2	☐3	☐4	☐5	☐6	☐7
Top-management Support (TS)								
88.	My University and department are committed to a vision of using the Internet in teaching and research tasks	☐1	☐2	☐3	☐4	☐5	☐6	☐7
89.	My University and department are committed to support academics efforts in using the Internet for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7

90.	My University and department strongly encourages the use of the Internet for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7
91.	My University and department will recognize academics efforts in using the Internet for teaching and research purpose	☐1	☐2	☐3	☐4	☐5	☐6	☐7
92.	The use of the Internet for teaching and research purpose is important for my University and department.	☐1	☐2	☐3	☐4	☐5	☐6	☐7

PART: III

Questions 93-to- 98 are related with *E-Reforms launched by Higher Education Commission (HEC)of Pakistan to promote research culture*:

93.	What Internet access method is being used at your working institute?	☐Broadband ☐ Wireless	☐ Dial-up ☐Other (specify)
94.	Do you think so, currently Internet provided at your institute by HEC is enough to use	☐Not enough ☐Enough	☐More than Enough
95.	At present, overall how often do you use the Internet to visit Digital Library Program started by HEC.	☐Don't use at al ☐use about few times in a month ☐use about few times in a week ☐use about few times in a day	☐Use about once in a month ☐ Use about once in a week ☐ use about once in a day
96.	At present, have you registered yourself Pakistan Research Repository (PRR) program to digitalize M.Phil/Ph.D thesis, so it would be accessible through the Internet for research purpose.	☐ Yes	☐ No
97.	Are you willing to upload your M.Phil/Ph.D thesis over PRR	☐ Yes	☐ No
98.	Can you please indicate your participation in e-learning program started by HEC.	☐Never participate ☐6-10 years	☐ 1-5 times ☐ > 10 times