Determinants of Social and Institutional Beliefs about Internet Acceptance within Developing Country's Context: A Structural Evaluation of Higher Education Systems in Pakistan.

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Abstract

This study aims to extend a model of technology acceptance to suit in developing country's context. The model attempts to identify relationship between social and institutional factors over behavioural intention and usage. Recently, 'acceptance and adoption of information technology (IT) in multicultural setting' is becoming topic of interest for IS researchers. In this line, numerous theories and models are proposed to contribute in examining factors of IT acceptance and reluctance. It is argued that the models in published literature are found culturally biased, which successfully present results in only American and European context, however, their validity became questionable when they were tested in south Asian countries context. Additionally, lack of research is observed to predict individual's cognitive behaviour of acceptance, which are influenced by social factors (i.e. peer influence and superior influence, voluntariness, experience) and institutional factors (i.e. local institutional management influence and top-level governmental policies influence). This study used Structural Equation Modelling (SEM) based on Partial Least Square (PLS) method to analyse the data. The results reveal that the proposed conceptual model achieves acceptable fit and the hypothesised paths are valid.

Keywords: Culture, Behaviour and Intention, Technology acceptance, Social factors, Institutional factors

1 Introduction and context of study

In current era, the usage of information technology (IT), specifically, the Internet is been growing steadily. According to the International Telecommunication Union (ITU), currently one in four people are an Internet user around the world (ITU, 2009). This can be justified due to the high competition among numerous companies in providing cost-effective services and better telecommunication infrastructures (Guillén & Suárez, 2001). Another reason is that infrastructure of organisations is getting changed from traditional fixed-place location to the multi-clustered one. As such that, organisations are becoming more IT dependent, to use the Internet, remaining connected to each other and performing various daily operations (Applegate et al., 1996).

Due to such importance of the Internet, much of the research in IS implementation is getting interested to investigate and develop intention-based theories and models to predict the acceptance level of individuals' towards particular technology use. In this line, theory of reasoned action (TRA) (Ajzen & Fishbein, 1980) innovation diffusion theory (IDT) (Rogers, 1995), theory of planned behaviour (TPB) (Ajzen, 1991) technology acceptance model (TAM) (Davis 1989; Davis et al., 1989) and unified theory of acceptance and use technology (UTUAT) (Venkatesh et al., 2003) are most dominant in the IS implementation area. Among these models and theories TAM, since its creation, is

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widely regarded due to its parsimonious structure and acceptable explanatory power (Venkatesh & Bala, 2008). The TAM conceptualises individuals' perception are based on usefulness and ease of particular technology, which in turn, influence users' intention and their actual usage behaviour. Number of studies, repeatedly, examined the TAM and found satisfactory reliabilities across technologies, context and time of evaluation. However, in cross-cultural context, TAM and models based over its' conceptualisation produced shortcomings of biasness (e.g. Straub et al., 1997; Rose & Straub, 1998; McCoy et al., 2005). For example, Straub et al., (1997) examined TAM across Japan, Switzerland and the United States and found that TAM produced similar variance (R^2) in explanatory power of behavioural usage in both the U.S and Switzerland i.e. 10%, but very different in Japan i.e. only 1%. Such results are justified because when Davis developed the TAM (Davis, 1989) he didn't considered its un-biased reliability in cross-cultural settings.

Authors in this study claims that, since individuals are conditioned by their native culture, therefore, it is necessary to know, whether culture at national, organisational and individual level has impact on the models of technology acceptance or not? Such cultural diversity makes it unrealistic for theory developers to rely on their personal experiences. Reasonably, numerous researchers, from various disciplines investigated cultural issues. However, limited numbers of studies are conducted outside the North-American and European context. For example, e-commerce and e-service (Jarvenpaa & Leidner, 1999; Pavlou & Chai, 2002; Seyal et al., 2004; Choi & Geistfeld, 2004; Hsu & Chiu, 2004), Internet banking (Shih & Fang, 2004;), broadband Internet use and adoption (Oh et al., 2003; Choudrie & Lee, 2004; Khoumbati et al., 2007; Seyal & Rahman, 2003; Seyal et al., 2002), healthcare(Wu et al., 2007) and e-mail and academic use (Straub et al., 1997; Hu et al., 2003; McCoy et al., 2007). However, the studies exemplified rarely investigated cultural factors, and most of them emphasised on exploring the cultural difference which may exists between countries and may affect individuals' ability to accept particular IT system. Furthermore, apart from the cross-culture at national level, diversity within intra-culture (within same nation and organisation) are also rarely investigated (Honold, 1999). To that end, many researchers tried to identify the impact of organisational and environmental factors within same country context. For example, Tan and Toe (1998) investigated the impact of organisational constructs (i.e. technology policies, top management support), technological factors (i.e. relative advantages, compatibility), and environmental factors (i.e. information intensity, competitive pressure and government support) on the Internet adoption. The authors found that organisational and technological constructs were significant in the Internet adoption process. Similarly, Tan and Toe (2000) asserted that self-efficacy and governmental support played significant impact on Internet adoption.

In this study authors noticed that within the educational institutes' settings, decisions to introduce new technologies are carried out by top-management (i.e. head of institutes or higher government authorities), however, individuals' (i.e. academics within institutes) are rarely communicated to such technological decisions (Lewis et al., 2003). Thus, individuals' requirements, willingness and causes of resistance are over sighted by higher management, a process which often results in an unrealistic outcome regarding the use of the technology. The differences of culture at intra nation or organisation level were also suggested by Hofstede (1994), who proposed the theory of culture and rated different scale for different countries of world. He, established instrument to measure the cultural differences and also confirmed that the measures should also be suitable for the comparison of sub-groups within single country.

Hence, overcoming the shortcomings of cultural biasness and issues of social and institutional beliefs within the models of technology acceptance, this study aims to present an integrated framework, specifically, for the context of developing country. Authors proposed that keeping native culture in observation proposing technology acceptance model can enhance the number of users to accept IT and the Internet usage. The rest of our paper is organised as: A review of context of study, followed by research method, analysis and results, discussion and implications, and finally conclusion and limitations.

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1.1 Context of study: Pakistan

In order to gather data and address the gap above context of study is selected Pakistan, which is located in south Asia and is also part of greater Middle East. The country with 132.35 million populations (Gov. Pak, 2009) has 168.28 billion U.S dollars GDP (in year 2008) with growth rate 5.95% annually (World Bank, 2009). Pakistan is sixth most populous country in the world and third in Muslim countries. There are mainly three reasons for selecting context of study as Pakistan:

- Social and cultural characteristics of Pakistan are different from the Western and developed countries.
- Leverage amount of investment is invested by the government to promote IT and specifically the Internet use in education sector.
- Lower acceptance rate of Internet is observed in comparison to the other countries specifically in Muslim world.

1.1.1 Social and cultural characteristics

Starting with culture which is defined by Hofstede (2005, p.4) as '*collective programming of mind that distinguishes the members of one group or category of people from others*'. Cultural differences are based over individual's perceptions, which Hofstede categorised into four dimensions:

1. Power distance (PD): defined by Hofstede (2005, p.46) is "*the extent to which the less powerful member of institution and organization within country expect and accept that proper distributed equally*". PD is the way of evaluating subordinate's perception about the power between him and his superior (Hofstede & Hofstede, 2005).
2. Individualism/collectivism (IC): is defined as individuals' perception about himself/herself and the group of people one he is member. IC is the way to evaluate individuals' perception about prioritising self-interest over the concerns of group (Hofstede & Hofstede, 2005).
3. Uncertainty avoidance (UA): defined by Hofsted (2005, p.167) is " *the extent to which the members of culture feel threatened by ambiguous or unknown situations*". In organizational culture, UA is measured by evaluating employee's uncertainty about unclear procedures, strategies and rules.
4. Masculinity/femininity (MF): is differentiation of individuals' apart from gender trait and is based over working goals. It is the way to measure the masculine nature at work, which emphasizes on work goals, earnings, promotions and assertiveness (Hofstede & Hofstede, 2005).

Country	Cultural dimensions score			
	Power distance (PDI)	Individualism (IDV)	Masculinity (MAS)	Uncertainty avoidance (UAI)
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: Cultural differences between U.S and Pakistan on Hofstede's cultural dimensions (values adopted from Hofstede, 2005).

From the cultural perspective, Pakistan differs from Western countries culture (e.g. Table 1). Like other developing countries and Arab countries, Pakistan is higher in PD because of their educational system, social and governmental systems. A higher education system is responsible for establishing middle class society (Hofstede & Hofstede, 2005), which in turn gives freedom to individuals' to quite from social norms and participate in institutional, managerial and governmental systems. Country higher in PD, superior has more power and want to maintain it forcefully. Also their

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autocratic nature allows them to imply policies of their interest without knowing opinion or ethical values of subordinate. Due to conservative nature of people, Pakistan is rated higher in collectivist society, where decision are not made individually but are considered with sharing and helping of the colleagues (Hofstede & Hofstede, 2005). Hofstede (1980) posited that age and gender were associated factors with the masculine and feminine culture. Generally, Pakistan is male dominant society but due to higher number of female in population it is rated moderate in masculine index. Finally, in UA index, Pakistan is rated at higher level. Reason, can be that people feels stress and anxiety (state of being worried about what may happen) at the working environment.

1.1.2 Investment in Education sector through IT policies

For Pakistan IT, specifically, the Internet is playing vital role in providing capabilities for organisations to become more productive. The government believes that investment in IT can be a major source of generating income and alleviating the poverty. Unlike other IT developing countries, such as Middle East and Arabs, Pakistan considers investing a huge amount of money on IT and Internet as a challenging task. The country is facing lack of necessity projects such as, health, education and infrastructure. Also, due to collation in *War against Terror* Pakistan is the most affected country. As a result, a huge amount of Pakistan's budget is mainly invested in terrorist fight and to provide more security to the community. However, apart from these major challenges, recently in 2002 the government of Pakistan sets up dynamic policies to promote IT infrastructure, specifically in the education sector. The government launched mage projects under the title of e-Reforms for betterment of academics' research in universities, which includes- Pakistan Education and Research Network (PERN), Digital Library, Pakistan Research Repository (PRR), and Campus Management Solution (CMS) (HEC PAK, 2009). Also the government invited many foreign investors to invest in the IT infrastructure, up-gradation and Broadband facility. However, the current facts indicate that most of the educational institutes do not value skills associated with strategic use of the Internet in their academic and research work. One reason of such dead improvement can be the lack of the empirical evidences to explore the questions of resistance and advantages of the Internet use in their work.

1.1.3 Internet usage in Pakistan and lower penetration rate

According to the Internet world stats there are about 6,767,805,208 Internet users in all over the world, out of which 3,808,070,503 are in Asia i.e. 42.6%. Within top ten Asian countries Pakistan is ranked at eighth, which covers about 18.5% of total Internet user's population. In year 2000 there were 133,900 Internet users which reached at 18,500,000 in year 2009 and penetration rate recorded was 10.6% (Internet World Stats, 2010). According to the International Telecommunication Union (ITU), number of Internet users per 100 people in Pakistan reached to 11.4 in year 2008 (ITU, 2009). Pakistan telecommunication corporation ltd. (PTCL) is the major Internet connectivity and service provider to common users at home, software exporters, educational institutes, universities and corporate clients (Seyal et al., 2004). Government reduced dramatic costs in bandwidth specifically for software companies, educational institutions and call centres (Mujahid 2002) to increase the penetration rate. However, in comparison to neighbour countries which are sharing almost same culture, the usage rate of the Internet is noticed lower in Pakistan. For example, Iran has 32% penetration rate, Saudi Arabia has 29.21%, Malaysia has 62%, UAE has 86% and Indonesia has 12.5% penetration rate (ITU 2009).

2 Theoretical background

Figure 1 presents conceptual model which is consistent with the TAM (Davis, 1989; Davis et al., 1989), TPB (Ajzen, 1991), DTPB (Taylor & Todd, 1995b) and UTAUT (Venkatesh et al., 2003). Of these models, Davis' TAM which consistently produced 40% variance in explanation power (Venkatesh & Bala, 2008) is taken as a starting point for this study. TAM facilitates to examine

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attitudinal beliefs of individuals' comprising on perceived ease of use and perceived usefulness with their cognitive impact on individual's behavioural intention and behavioural usage. It is noticed from previous literature (Venkatesh & Davis, 2000; Taylor & Todd, 1995a) that TAM fails to predict the influence of volitional, situational and social conditions. Such conditions are expected in this study, because, it is common practice that individuals' in educational institutes are confronted with unpredictable organisational and social situations which results lower in acceptability of newer technologies. To overcome such limitations, organisational and social constructs are incorporated in this study from the theoretical models TPB, and DTPB. Additionally, for measuring the impact of moderators over behaviour, theoretical justifications are incorporated from UTAUT model.
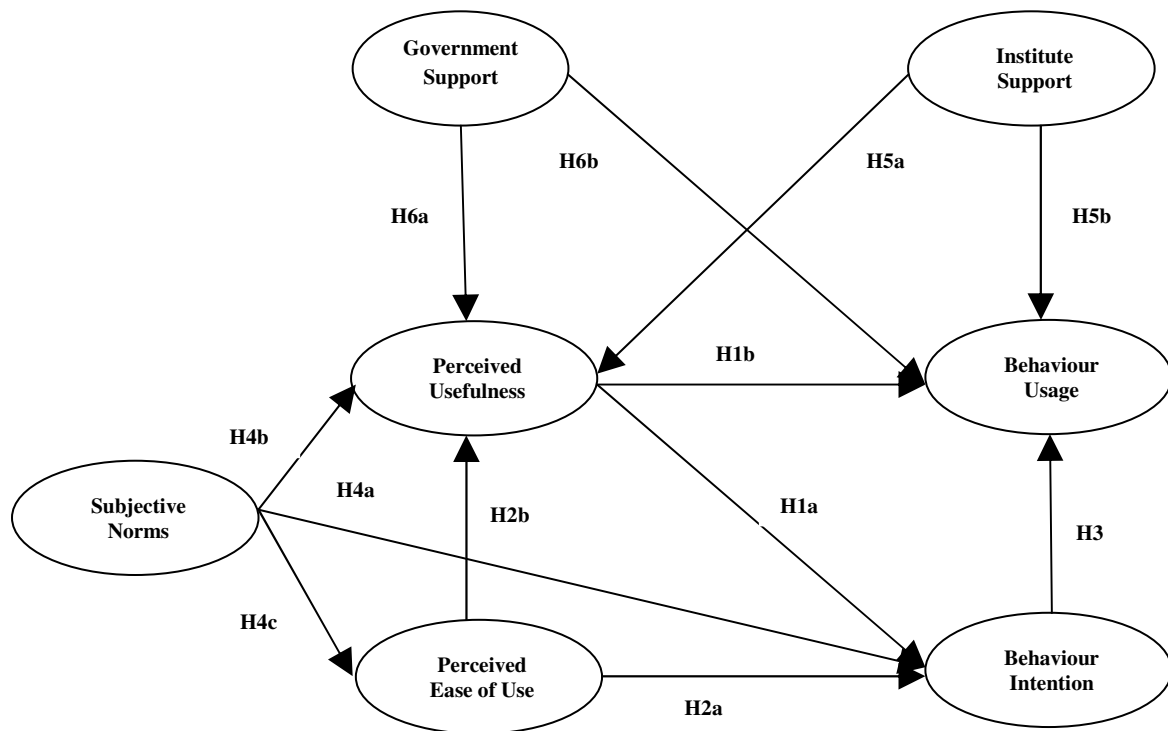
Figure 1: Theoretical Model

2.1 Attitudinal Beliefs (PU and PEOU) and Behaviour

Behaviour is often defined as an observable act which is related to the individuals' persuasive or attitudinal feelings (LaRose, Eastin 2004). Behaviour can results in positive or negative feelings based on the observations or performance. For example, Bandura (1977) introduced behavioural beliefs into the social cognitive theory (SCT) which were introduced afterward as attitudinal belief in various theories and models such as, TRA, , TAM2 (Venkatesh & Davis, 2000), A-TAM (Taylor & Todd, 1995a), TAM, TPB, and DTPB. In literature, for increasing explanatory power and to enhancing the in-depth understanding of the acceptance, behavioural beliefs were decomposed into sub components such as *relative advantages*, *compatibility, complexity, triability,* and *observability* in IDT (Rogers, 1995) ; *PU*, *PEOU* and *compatibility* in DTPB (Taylor & Todd, 1995b); and *PU* and *PEOU* in TAM, TAM2 and A-TAM.

In this study, authors expect two determinants of PU and PEOU to provide significant influence of attitudinal beliefs on behavioural intention. Perceived usefulness also studied as analogous construct of *relative advantage* in model IDT, *extrinsic motivation* in motivational model (MM), *outcome expectations* in SCT, and *performance expectancy* in UTAUT is defined by Davis (1989, *p.320*) as *'degree to which a person believes that using a particular system would enhance his/her job*

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performance'. Whilst, perceived ease of use is been studied as opposite of construct *complexity* in IDT and similar to the *effort expectancy* in UTAUT is defined by Davis (1989, p.320) as *'the degree to which a person believes that using a particular system would be free of effort'*. Researchers in technology acceptance and adoption area observed strong impact of PU and PEOU as direct determinant of BI in various models TAM, TAM2, A-TAM and DTPB (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), and BU (Davis et al., 1989; Mathieson, 1991; Keil et al., 1995; Agarwal & Prasad, 1997; Agarwal & Prasad, 1999). Also Davis (1989) found that PEOU and PU were significantly inter-correlated with each other, afterwards it was examined by many researchers (e.g. Wu et al., 2007; Taylor & Todd, 1995; Mathieson, 1991; Chau & Hu, 2001).

In the academics context, behaviour among the individuals' acceptance is not expected to vary from person to person. However, it is expected that individuals' internal perception (through observing relative advantages of the Internet) will impact on their professional and teaching practices. The Internet provides a number of advantages in the educational institutes' context. For example it often enhances the research and teaching skills by searching up-dated material. Also it usually gives academics an opportunity to increase their social contacts with peer fellows, friends and family members without limitations of distance and time. Considering the relative advantages of the Internet and in line with the TAM, TRA, TPB studies (where attitudinal beliefs were significant over individuals' behaviour to adopt innovations) it is expected that if attitudinal beliefs are positive towards acceptance of the Internet (within academics) then most likely it will positively affect their behavioural intention to use the Internet. Based on the above, it is hypothesis:

H1a: *Perceived usefulness (PU) will positively influence academics' behavioural intention (BI) to use the Internet technology.*

H1b: *Perceived usefulness (PU) will positively influence academics' behavioural usage (BU) to use the Internet technology.*

H2a: *Perceived ease of use (PEOU) will positively influence academics' behavioural intention (BI) to use the Internet technology.*

H2b: *Perceived ease of use (PEOU) will positively influence academics' perception of the usefulness (PU) of the Internet technology.*

2.2   Behavioural Beliefs (BI and BU)

Originally, behavioural beliefs were introduced by Ajzen and Fishbein (1980) and Fishbein and Ajzen (1975) as a part of TRA model. TRA was a key theoretical underpinning for the development of TAM. According to TRA beliefs influence attitudes, which in turn shapes intentions, and resultant intentions guides/dictates the behavioural usage (Ajzen & Fishbein, 1980). In other words, intention is 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 individuals based on their experience or mediated by some vicarious observations to a given target (LaRose & Eastin, 2004). The impact of BI over 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), hence, it is expected that:

H3:   *Behavioural intention (BI) of the Internet usage in academics will positively influence on behavioural usage (BU) of the Internet technology*

2.3   Normative Beliefs

Normative beliefs were originally introduced into the TRA and been used as a construct of *social influence* in UTAUT, *image* in IDT, and as *subjective norms(SN)* in TRA, TAM, TAM2, TPB, DTPB

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and A-TAM. Normative beliefs are defined as individuals' perceptions about particular behaviour influenced by the judgment of others (Fishbein & Ajzen, 1975). Mixed results are present in literature which shows the direct impact of SN over BI. For example, many scholars (e.g. Mathieson, 1991; Taylor & Todd, 1995b; Chau & Hu, 2001; Lewis et al., 2003; Shih & Fang, 2004) didn't find any significant impact. In contrary other scholars (e.g. Taylor & Todd 1995a; Venkatesh & Davis, 2000; Hu et al., 2003; Yi et al., 2005) found a significant impact of SN over BI as well as on PU in the presence of certain moderating factors such as *gender, training, experience, voluntariness*. In this study authors tap, normative beliefs as situational variable (Venkatesh & Davis, 2000) which may be influenced by the opinion of friends, family, colleagues, peers and social group. For example, academics' working in one institute may not accept the condition in any other institute due to unexpected unfriendly environment or less support from superiors. Keeping impact of such divergence in perspective, Taylor and Todd (1995a) decomposed normative beliefs into two groups-*peer influence* (PI) and *superior influence* (SI) towards BI. In this study, it is expected that, in situations where the conditions are imposed (compliance or mandatory) and systems is already developed to accept, interpersonal influence can well be observed from the perspective of superiors (top management and seniors members), whilst in voluntary conditions where adoption choice is based over academics wishes, may well be observed form of the perspective of peers influence (academics, researchers, and friends). For the clarification of ambiguous and un-revealed relationship between SN, BI and attitudinal beliefs, authors expect that stronger social influence will results more likely to accept the Internet within educational institutes setting. Therefore, it is hypothesis:

H4a: *Subjective Norms (SN) will positively influence academics' behavioural intention (BI) to use the Internet technology.*

H4b: *Subjective Norms (SN) will positively influence academics' perception of usefulness (PU) to use the Internet technology.*

H4c: *Subjective Norms (SN) will positively influence academics' perception about the ease of use (PEOU) towards the Internet technology.*

2.4   External Institutional/Management Beliefs

The institutional and managerial beliefs are considered to be important constructs in answering questions such as whom and how the resources will be facilitated? They are related to the perceived level of general support in work environment (in the form of cooperativeness and policies discussion) as well as with specific support (in the form of funding and resource allocation) by head of organisations and government supporting bodies. It is observed that whenever new IT systems are introduced in the work environment, changes in work places are also observed. In some cases these changes resulted in resistance against newer systems (Yoon et al., 1995). Numerous literature is present in the IS research, which posits that influence of external and internal psychological constructs on technology acceptance are mediated by individuals' attitudinal beliefs i.e. PU and PEOU over behavioural intention to use (Lewis et al., 2003; Igbaria, 1994; Igbaria & Zinatelli, 1997).

Consistent with Orlikowski's (1992) three ways (signification, legitimating, and domination) by which individuals' cognitive behaviour is mediated, authors in this study intend to examine the impact of management support at institutional level and governmental level, depending on the form of resource allocation and funding (Lewis et al., 2003), change and resistance to adopt newer systems(Yoon et al., 1995; Igbaria et al., 1997), and encouragement and motivation through normative and instrumental reward (Purvis et al., 2001) towards the Internet acceptance. Thus it is hypotheses

H5a: *Perceived local management support (i.e. institute/university) (IS) for the use of the Internet has significant positive influence on individuals' beliefs of perceived usefulness (PU)*

H5b: *Perceived local management support (i.e. institute/university) (IS) for the use of the Internet has significant positive influence on individuals' beliefs about usage behaviour (BU)*

H6a: *Perceived top management support (i.e. Government) (GS) for the use of the Internet has significant positive influence on individuals' beliefs of perceived usefulness (PU)*

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H6b: *Perceived top management support (i.e. Government) (GS) for the use of the Internet has significantly positive influence on individuals' beliefs about usage behaviour (BU)*

2.5 The Moderator Impact of Experience and Voluntariness

Baron and Kenny (1986, *p.1174*) defined moderator variables as *'variable that affects the direction and/of strength of the relation between independent or predictor variable and dependent criterion variable'*. In this research two moderating variables are expected to show significant impact i.e. *Experience* and *Voluntariness*.

Experience introduced as moderator in TAM2 and is defined as individual's involvement/action in something over interval of time. In the literature direct and moderating impact of the experience construct over attitudinal and behaviour beliefs is found significant (e.g. Igbaria & Chakrabarti, 1990; Igbaria & Wormley, 1992; Igbaria, 1992; Taylor & Todd, 1995b; Wilkins, 1996; Al-Jabri & Al-Khaldi, 1997; Clarke & Chambers, 1989; Dupagne & Krendl, 1992; Venkatesh & Davis, 2000; Venkatesh et al., 2003; Harrison & Rainer, 1992). It is observed that experience acquired by individuals' in repeating tasks produced low probability towards individuals' decision to accept new technologies (Ajzen & Fishbein 1980; Taylor & Todd, 1995b). 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 attitudinal belief PU might not become a construct of decision over the BI and BU. Same criteria can be applied in the case of PEOU towards BI (Venkatesh et al., 2003) and normative belief i.e. SN where an individual never cares about ease or the judgement of others once he/she is an expert in usage of particular technology. Hence, highly experienced individuals will enhance the enjoyable effect, which in turn, minimizes perceived usefulness towards acceptance. Therefore, it is hypotheses

H7: *Moderating factor Experience will negatively influence academics' attitudinal beliefs (i.e. PU and PEOU) and normative beliefs (i.e. SN) towards behavioural beliefs (i.e. BI and BU).*

Voluntariness or compliance effect was introduced by (Venkatesh et al., 2003) in UTAUT model, which is an explicit condition towards individuals' perception to use particular system. Initially at the time of TAM creation Davis (1989) didn't include voluntariness as an explicit factor. This is the reason that TAM since creation is criticised by many researchers (e.g., Lee et al., 2003). Afterwards, observing voluntariness importance and significant impact over individuals' intention, many researchers included it as moderator factor over social norms and perceptions (e.g. Venkatesh et al. 2003; Venkatesh & Davis, 2000; Agarwal & Prasad, 1997; Venkatesh & Morris, 2000; Hartwick & Barki, 1994). For example, Agrwal and Parsad (1997) found that when IT system was used in a mandatory conditions it enhanced the early system utilisation, but at the same time it also produced pressure over individuals' to overcome the difficulties of first-time-usage which might produces a lower level in the acceptance. Additionally, Agrwal and Parsad (1997) asserted that after the passage of time and experience gained, the problems of mandatory systems usage became diminishing. Similar results were observed by Venkatesh et al., (2003) during the examination of TRA and TPB. They found, SN was positively significant over BI when they were moderated by mandatory conditions. In the educational institutes' context, specifically in the developing countries, such as, Pakistan, mostly technologies to use are considered as mandatory conditions, which might result a lower acceptance of the technology due to over-sighting individuals' perceptions about voluntary use. Thus, it is hypothesis:

H8: *Moderating factor of Voluntariness (high in mandatory conditions) will positively influence academics' attitudinal beliefs (i.e. PU and PEOU) and normative beliefs (i.e. SN) towards behavioural beliefs (i.e. BI and BU).*

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3 Research method

3.1 Sample and procedure

Using survey instrument, a cross-sectional method of study was selected to test hypothetical model presented in Figure 1. In the interest of cultural differences validity at organizational level (Hofstede et al., 1993; Gefen & Straub, 1997) sample were collected from the full-time public and private universities' academics in Pakistan. The minimum requirement of response rate is based over the criterion of Krejcie and Morgan (Krejcie & Morgan, 1970). The participates were voluntary asked to complete the questionnaire based on their perception of the Internet usage within institutional/departmental context, not on the perception of personal usage, such as at home or Internet café, etc. During 2009, total 935 questionnaires were randomly distributed into 11434 academics working into 15 public and 10 private universities in Pakistan.

3.2 Measures

Measurement items used in this study were operationalized using validated items from prior research in IT acceptance and adoption with appropriate moderation according to context (see Table 2). Individual measurement items' validity and reliability were tested using exploratory factor analysis (EFA) and Cronbach's alpha. The instrument also captured demographic information of respondents. All items were measured on seven-point Likert scale anchored by strongly disagree to strongly agree, except for demographics and experience of usage, which were measured on a nominal scale.

Research variable	Purpose	Operationalization
Perceived usefulness	To observe beliefs that using Internet technology will results in improvement, performance and productivity,	Five-items (Venkatesh et al., 2000)
Perceived ease of use	To observe beliefs that Internet is perceived relatively easy/free of effort to use and understand	Four-items (Venkatesh et al., 2000)
Normative beliefs	To observe the academic's perceptions about particular behaviour influenced by the judgement of others (i.e. Peer and Superior)	Six-items (Lewis et al., 2003)
Management support a. Government support b. Local institute support	To observe the academic's perceptions regarding to the policies, encouragement and importance suggested by government and local institute.	Eight-items (Lewis et al., 2003)
Behavioural Intention	To observe that what individuals are thinking, feeling and behaving about Internet acceptance in their academic and non-academic task	Four-items (Venkatesh & Bala, 2008)
Behaviour usage	To observe that what individuals are thinking, feeling and behaving about Internet usage in their academic and non-academic task	Four-items (Venkatesh & Bala, 2008)
Experience and Voluntariness	To observe the experience of Internet usage in years and usage conditions (mandatory/voluntary)	Five-items (Venkatesh & Bala, 2008)

Table 2: Operationalization of research variables.

4 Analysis and results

For avoiding imbalance between individuals' cultural preponderance, equal numbers of male and female participants were taken for analysis purpose (see Table 3). Of the 953 questionnaires distributed, 504 i.e. 54% were returned. Using, SPSS v.15.0 missing values and extreme outliers were screened out and 120 responses i.e. 13% were discarded. Hence, finally 380 responses which yields 40.6% were taken for inferential analysis. It is important to mention that moderating factor experience shown mean of 3.90/7 which only represents sample of having experience 6-10 year on the Internet

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usage and moderating factor voluntariness shown mean 3.19/7 which represents that the usage of the Internet in institutions was in mandatory settings.

| | | | Type of University | | Total |
			Public	Private	
Gender	**Male**	Count	128	62	190
		% within Gender	67.4%	32.6%	100.0%
		% within Type of University	61.8%	35.8%	50.0%
		% of Total	33.7%	16.3%	50.0%
	Female	Count	79	111	190
		% within Gender	41.6%	58.4%	100.0%
		% within Type of University	38.2%	64.2%	50.0%
		% of Total	20.8%	29.2%	50.0%
Total		Count	207	173	380
		% within Gender	54.5%	45.5%	100.0%
		% within Type of University	100.0%	100.0%	100.0%
		% of Total	54.5%	45.5%	100.0%

Table3: Cross-tabulation between respondent's gender and type of working institute.

Authors used Partial Least Squares (PLS), a component-based Structural Equation Modelling (SEM) technique to examine the paths in the model. MPLS Smart Version 2.0.3 (Ringle et al., 2005) was used to analyse the data. PLS in recent years is getting interest due to capabilities to model latent variables (LV) under non-normalised and small number of sample, examining measurement path and as well as regression estimation of structural paths (Janice et al., 1996). Model presented in Figure 1 is evaluated using two-step approach (Jo¨rg et al., 2009) on the hieratical basis (Chin et al., 2003) by *with* and *without* moderating factors effect (see Figure 2 and 3). For measuring the standardised path coefficients i.e. sign, magnitude and significance level (p-value) authors employed a bootstrap method 200 times. PLS bootstrap provides t-value that is used for the measuring significance level of path model relationship.

4.1 Step-one: Assessment of Measurement Model

4.1.1 Examination of Reliability and Validity

The absolute correlation between construct and its measuring manifest variable ranges from 0.66 to 0.82 and are consistent with the required psychometric test i.e. $0.7(\cong \sqrt{0.5})$ (Jo¨rg et al., 2009) (see Table 4). Two items, PI2 and PI4 of construct *subjective norms* were eliminated due to lower standardised outer loading recommendation by (Churchill, 1979). Table 6 presents internal consistency reliabilities (ICR) which are grater then 0.80 for all the constructs, and Cronbach α higher than the 0.7 except for the *subjective norms* which is still in acceptable range. Both ICR and α values are higher than the recommended values (Nunnally & Bernstein, 1994).

Authors examined the convergent validity of the model using Fornell and Larcker criterion (Fornell & Larcker, 1981) which asserts that average variance extracted (AVE) of each construct should be equal or above than 0.5(see Table 5). It is found that AVE extracted of each construct in Table 5 is higher than the corresponding squared inter-construct correlation and confirms the discriminant validity at construct level (Fornell & Larcker, 1981). Also, no cross-loading between measurement items in Table 4 is observed which satisfies the condition of discriminant validity at item level (Chin, 1998).

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	Item	**BU**	**BI**	**GS**	**IS**	**PEOU**	**PU**	**SN**
Behaviour Intention (BI)	BI1_1	*0.2305*	**0.6661**	*0.1095*	*0.2249*	*0.197*	*0.263*	*0.1352*
	BI2_1	*0.3008*	**0.8137**	*0.1726*	*0.1152*	*0.2086*	*0.3463*	*0.2346*
	BI3_1	*0.3195*	**0.7514**	*0.2196*	*0.1656*	*0.1926*	*0.2676*	*0.2005*
	BI4_1	*0.2485*	**0.7367**	*0.1317*	*0.1784*	*0.2515*	*0.3195*	*0.2175*
Behaviour Usage(BU)	BU1_1	**0.6965**	*0.2145*	*0.1581*	*0.1703*	*0.1972*	*0.2737*	*0.0962*
	BU2_1	**0.7437**	*0.2604*	*0.145*	*0.2017*	*0.11*	*0.1304*	*0.1058*
	BU3_1	**0.7652**	*0.3634*	*0.081*	*0.2052*	*0.1151*	*0.1514*	*0.1094*
	BU4_1	**0.7053**	*0.2267*	*0.0836*	*0.1641*	*0.2749*	*0.33*	*0.0538*
Government Support (GS)	GS1_1	*0.1819*	*0.1906*	**0.7388**	*0.0862*	*0.2293*	*0.1809*	*0.1799*
	GS2_1	*0.0997*	*0.1317*	**0.765**	*0.1382*	*0.1852*	*0.234*	*0.1969*
	GS3_1	*0.1017*	*0.1923*	**0.7728**	*0.198*	*0.1428*	*0.2384*	*0.1914*
	GS4_1	*0.093*	*0.1367*	**0.7488**	*0.188*	*0.1959*	*0.2282*	*0.1561*
Perceived Ease of Use (PEOU)	PEOU1_1	*0.2562*	*0.3199*	*0.2081*	*0.1697*	**0.7732**	*0.3808*	*0.2446*
	PEOU2_1	*0.1273*	*0.1917*	*0.2014*	*0.2832*	**0.7921**	*0.402*	*0.1953*
	PEOU3_1	*0.1812*	*0.1792*	*0.1323*	*0.191*	**0.7266**	*0.274*	*0.1921*
	PEOU4_1	*0.1543*	*0.1625*	*0.209*	*0.2228*	**0.7817**	*0.3696*	*0.2214*
Subjective Norms (SN)	PI1_1	*0.1393*	*0.161*	*0.1857*	*0.2172*	*0.2685*	*0.2705*	**0.7438**
	PI3_1	*0.0258*	*0.1988*	*0.1849*	*0.1658*	*0.1732*	*0.2538*	**0.6821**
	SI1_1	*0.1151*	*0.2013*	*0.1632*	*0.241*	*0.1991*	*0.2944*	**0.7459**
	SI2_1	*0.0675*	*0.2069*	*0.1466*	*0.2373*	*0.1442*	*0.2339*	**0.6665**
Perceived Usefulness (PU)	PU1_1	*0.2374*	*0.3384*	*0.246*	*0.2458*	*0.3591*	**0.7877**	*0.2951*
	PU2_1	*0.2847*	*0.3565*	*0.2322*	*0.2936*	*0.3219*	**0.7695**	*0.2988*
	PU3_1	*0.2136*	*0.3003*	*0.2634*	*0.2719*	*0.417*	**0.825**	*0.3113*
	PU4_1	*0.1885*	*0.2439*	*0.1483*	*0.2165*	*0.3576*	**0.706**	*0.2377*
Institute Support (IS)	TS1_1	*0.2666*	*0.1392*	*0.1911*	**0.8063**	*0.2146*	*0.2338*	*0.2969*
	TS2_1	*0.1584*	*0.1765*	*0.2038*	**0.7829**	*0.2072*	*0.2816*	*0.2735*
	TS3_1	*0.1574*	*0.1839*	*0.1225*	**0.743**	*0.213*	*0.237*	*0.1774*
	TS4_1	*0.179*	*0.1828*	*0.0871*	**0.6878**	*0.2149*	*0.2594*	*0.1563*

*Table 4: Outer/factor loading(**item bold**) and cross-loadings(item italic)*

	BU	**BI**	**GS**	**IS**	**PEOU**	**PU**	**SN**
Behaviour Usage(BU)	**0.5303****						
Behavioural Intention(BI)	0.14 (0.3714)*	**0.5533**					
Government Support(GS)	0.02 (0.1569)	0.05 (0.2154)	**0.5722**				
Institute Support(IS)	0.07 (0.255)	0.05 (0.224)	0.04 (0.2023)	**0.572**			
Perceived Ease of Use(PEOU)	0.06 (0.2371)	0.08 (0.285)	0.06 (0.2481)	0.08 (0.2808)	**0.5911**		
Perceived Usefulness(PU)	0.09 (0.3011)	0.16 (0.404)	0.09 (0.2917)	0.11 (0.3343)	0.22 (0.4696)	**0.598**	
Subjective Norms(SN)	0.02 (0.1257)	0.07 (0.2684)	0.06 (0.2397)	0.09 (0.3029)	0.08 (0.2797)	0.14 (0.3717)	**0.5048**

Table 5: Inter-construct correlation table

*   values in braces presents the original correlation and values without braces presents the square of correlation.
* *   All the 1's in diagonal are replaced with AVE (values in bold font) for confirming construct level discriminant validity based on Fornell- Larcker criterion(Fornell, Larcker 1981).

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	AVE	Composite Reliability (ICR)	R Square(β)	Cronbachs Alpha(α)	Communality
Behaviour Usage	0.5303	0.8185	0.1846	0.7051	0.5303
Behavioural Intention	0.5533	0.8313	0.188	0.7296	0.5533
Government Support	0.5722	0.8425		0.7507	0.5722
Institute Support	0.572	0.8419		0.7492	0.572
Perceived Ease of Use	0.5911	0.8524	0.0782	0.7712	0.5911
Perceived Usefulness	0.598	0.8557	0.322	0.7752	0.598
Subjective Norms	0.5048	0.8026		0.6724	0.5048

Table 6: Summarized model-fitting table
Note: all the results in table are without moderating impact. The results with moderating impact are in Table 7 and represents higher significant difference in R-Square value.

4.2 Step-two: Assessment of Structural Model

Figure 2 and 3 presents the standardised path coefficients *without* and *with* moderating effect respectively. The nomological validity through path coefficient β and t-value produced by PLS are presented in Table 7. All the hypothetical relationships *without* moderating effects are positively significant at minimum acceptance level (i.e. $p<0.05$) except for the *government support* and *perceived usefulness* on *behavioural usage,* and *perceived ease of use* on *behavioural intentions.* The highly positive significant path ($p<0.001$) is between *perceived ease of use* and *perceived usefulness* (β=0.33 or 33%), while lower positive significance path ($p<0.05$) is between s*ubjective norms* and *behavioural intentions* (β=0.12 or 12%).

The standardised paths *with* moderating factors are much similar to the paths *without* moderating factors except for the relationship between *perceived usefulness* and *behaviour usage* (β=0.13, or 13% $p<0.05$) which was previously insignificant. One reason behind this significance is negatively significant moderating effect of *experience* along with *perceived usefulness* on *behavioural usage* (β= -0.1329 or -13%, $p< 0.05$). Similarly construct *experience* resulted negative effect with *perceived ease of use* on *perceived usefulness* and measured lower in path (-0.090 or -9%, $p<0.05$). The moderating factor v*oluntariness* produced negative effect in all the relationships except for *behavioural intentions* on *behavioural usage.* However, the effect of *voluntariness* was measured lower and didn't reach the minimum level of significance ($p<0.05$) (see Table 7). Specifically in results, it is important to notice that model *with* moderating factors shared higher explanatory power in comparison on to the model *without* moderating factors impact, such as, *perceived usefulness without* moderating effect explained 32% variance while *with* moderating effect slightly higher 34%.

5 Discussion and implication for research and practices

The empirical results supports almost all the hypothetical relationships presented in the model (see Table 8). Based on the Chin's criterion (Chin, 1998), the model is rated as moderate, which explained variance R^2 = 34% in perceived usefulness, and 25% in both intention and usage behaviour. The results revealed that determinants of traditional TAM proposed by Davis (Davis, 1989; Davis et al., 1989) appeared slightly different in the developing country's context. In accordance with the prior research (Davis, 1989; Davis, et al., 1989) authors in this study found total effect of perceived usefulness significant and greater than perceived ease of use on behavioural intention. Notwithstanding to the Davis (Davis, 1989; Davis et al., 1989) findings, model showed insignificant relationship between perceived ease of use and behavioural intention. This result is relevant to the context of study, which suggests that the academics in universities are driven to accept the Internet primarily on the basis of usefulness, which is established by perceiving the relative advantages. Additionally, it is possible that the Internet is still newer in educational institutes of Pakistan and academics are not much familiarised and experienced enough. Therefore, academics might be willing

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to use the Internet but due to difficulties of usage they are discouraged to use it, consequently, they may not be able to observe perceived benefit of its usage. This emphasises the importance of the internal training program among academics which might enhance their self confidence perception about ease of Internet.
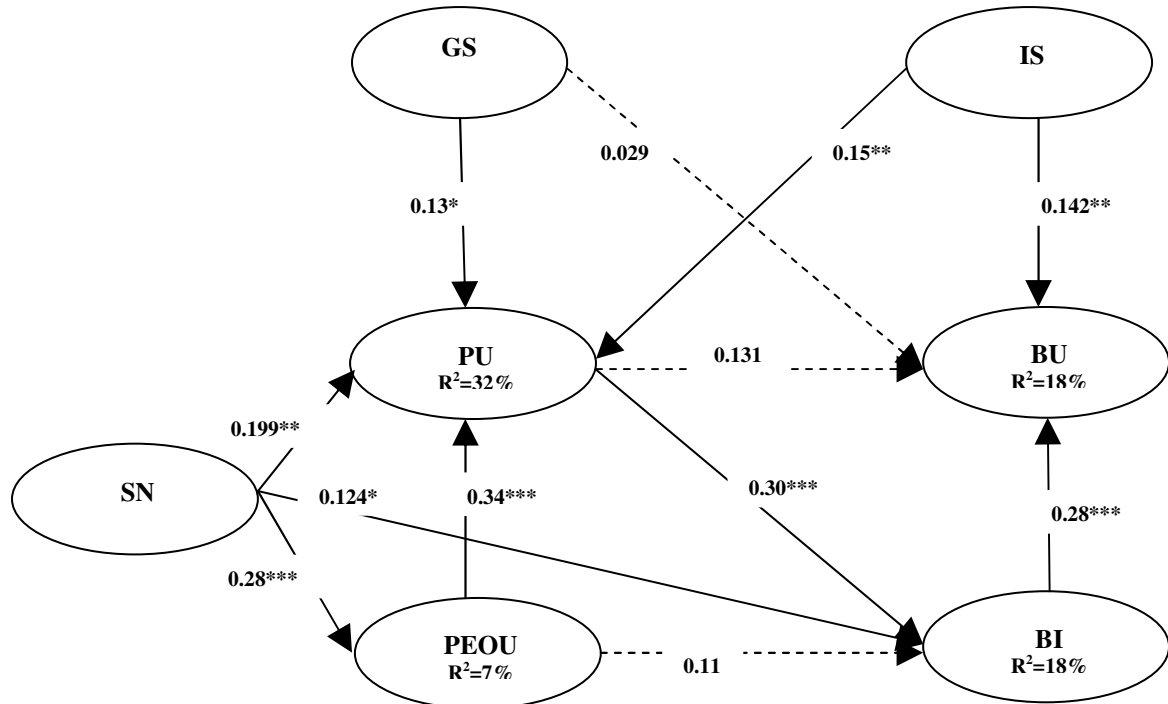

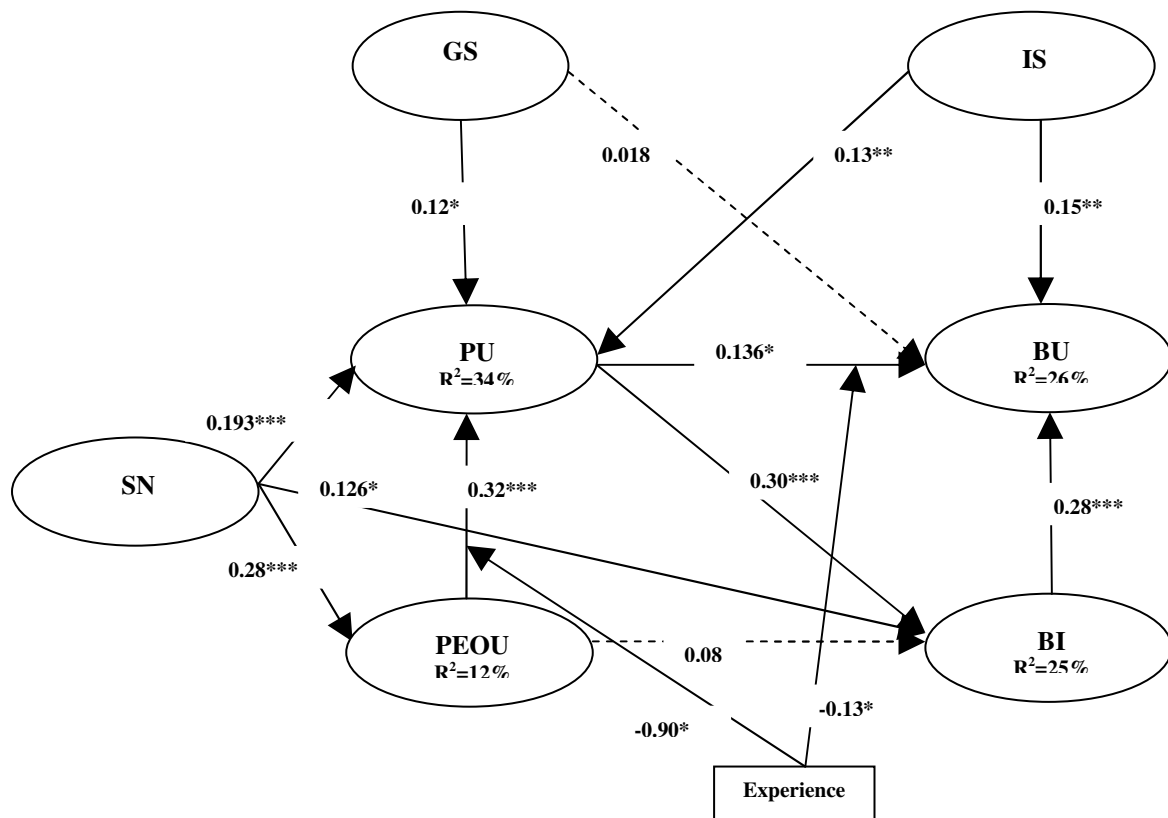*Figure 2: Path regression without moderating factors*

Figure 3: Path regression with moderating factors

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Hypothetical path	Without Moderators				With Moderators			
	Path coefficient (β)	t-value	Sig. Level	R-Square value	Path coefficient (β)	t-value	Sig. Level	R-Square value
BI -> BU	0.2799	4.2638	***	BU=0.1846	0.2743	4.8377	***	BU=0.2559
GS -> BU	0.0293	0.5097	not sig.		0.0184	0.346	not sig.	
IS -> BU	0.1423	3.0633	**		0.1526	3.2271	**	
PU -> BU	0.1319	1.5813	not sig.		0.1367	2.2221	*	
PEOU -> BI	0.1055	1.856	not sig.	BI=0.188	0.0825	1.4745	not sig.	BI=0.2513
PU -> BI	0.3082	5.5806	***		0.2957	5.7237	***	
SN -> BI	0.1243	2.2898	*		0.1267	2.5068	*	
SN -> PEOU	0.2797	6.659	***	PEOU=0.0782	0.2883	5.7608	***	PEOU=0.1291
IS -> PU	0.1525	2.9768	**	PU= 0.322	0.1319	2.7537	**	PU=0.3436
GS -> PU	0.1289	2.4171	*		0.118	2.5678	*	
PEOU -> PU	0.3389	6.5039	***		0.3182	6.5328	***	
SN -> PU	0.1998	3.6516	***		0.193	3.952	***	
PU * VOL -> BU					-0.123	0.8492	not sig.	
BI * VOL -> BU					0.129	0.856	not sig.	
BI * EXP -> BU					-0.1208	0.8013	not sig.	
PU * EXP -> BU					-0.1329	2.2694	*	
PEOU * VOL -> BI					-0.0324	0.3492	not sig.	
PU * VOL -> BI					-0.0051	0.0607	not sig.	
SN * VOL -> BI					-0.1525	1.1115	not sig.	
PU * EXP -> BI					-0.0878	0.8596	not sig.	
PEOU * EXP -> BI					-0.0545	1.0356	not sig.	
SN * EXP -> BI					-0.0569	0.8688	not sig.	
SN * EXP -> PEOU					-0.0548	0.8343	not sig.	
SN * VOL -> PEOU					-0.2092	0.9542	not sig.	
SN * EXP -> PU					0.0824	1.2563	not sig.	
PEOU * EXP -> PU					-0.0908	2.1027	*	
SN * VOL -> PU					-0.0223	0.2197	not sig.	
PEOU * VOL -> PU					0.0719	0.6835	not sig.	

Table 7: Path regression with and without moderating factors

*** Correlation is significant at the 0.001 level (2-tailed)
**   Correlation is significant at the 0.01 level (2-tailed)
*   Correlation is significant at the 0.05 level (2-tailed)

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In support with TAM usage in Western studies, the effect of behavioural intention on behavioural usage and inter-related impact of perceived ease of use on usefulness are also significant in this study. Contrary, the effect of perceived usefulness over behavioural usage produced insignificant impact. This result is supported with Straub et al., (1997) argument about cultural biasness within TAM who found insignificant impact of PU into Japanese context while significant in US and Switzerland. However, interacting with moderating factor experience, perceived usefulness showed significant result. This significance is negative, which suggests, the academics higher in usage experience perceived lower importance of usefulness towards usage behaviour. This result is consistent with literature (e.g. Davis, et al. 1989; Davis, 1989; Igbaria & Zinatelli, 1997) which posits that higher usage experience creates enjoyment, which in turn, minimized perceived usefulness (Chin et al., 2003). This finding with respect to experience was expected in this study, because academics in collected data rated themselves as moderate users i.e. 6-10 years experience. Similar negative moderating impact of experience is observed on perceived ease of use on usefulness.

Hypothesis	Path Direction	Result	
		Without Moderators	With Moderators
H1a	PU-> BI	Supported	Supported
H1b	PU -> BU	Not Supported	Supported
H2a	PEOU -> BI	Not Supported	Not Supported
H2b	PEOU -> PU	Supported	Supported
H3	BI -> BU	Supported	Supported
H4a	SN -> BI	Supported	Supported
H4b	SN -> PU	Supported	Supported
H4c	SN -> PEOU	Supported	Supported
H5a	IS -> PU	Supported	Supported
H5b	IS -> Behaviour Usage	Supported	Supported
H6a	GS -> PU	Supported	Supported
H6b	GS -> BU	Not Supported	Not Supported
H7	(PU,PEOU, SN)x (EXP)→(BI, BU)	Na	PU*EXP→BU PEOU*EXP→PU Only Supported
H8	(PU,PEOU, SN)x (VOL)→(BI, BU)	Na	Not Supported

Table 8: Summary of Result

As theorised, all three relationships of subjective norms over ease of use, usefulness and behavioural intentions are significant. These results comes in accordance with TAM2 (Venkatesh & Davis, 2000) and suggests that co-worker and head of institutes can be important source of influence for the acceptance of the Internet. There are plausible explanations behind such social norms significance in this study, such as, in educational institutes of Pakistan, organizational structure is based on traditional hierarchal system and is rated on high power distance (Hofstede & Hofstede, 2005) . The governance structure is still based on bureaucratic mentality individuals. The message passed through superior (academic dean and head of institutes) is having higher importance on academics' beliefs about its obedience. This is the reason when academics were asked about the nature of the Internet usage they rated it as mandatory basis i.e. mean=3.19.

The impact of government support and local institutes support are both significant on academics' perceived usefulness as well as on usage beliefs. Both determinants taken for this study are similar to the institutional factors studied by Lewis et al., (2003). Results revealed, when academics were aware about their future visions, their efforts support and recognizations, encouragement and incentives, and finally their importance for institute or government they showed positive response towards usefulness and usage. For this relationship explanation can be observed from earlier discussion, where it is

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mentioned that government of Pakistan has announced many mega projects for promoting research skills among the academics of higher educational system and one of them is to provide the Internet facility and the Internet related research facilities (e.g. access to digital library, access to research repository network, etc.). The promotions and up gradations which were previously based on seniority basis are now based on the research efforts and skills, consequently the Internet usage to search online research resources and improve their own skills is becoming compulsion for academics. Therefore, the support of management in resource allocation and recognizing individuals' efforts likely promoted the usefulness and usage of the Internet acceptance.

Finally and unexpectedly, moderating factor voluntariness exhibited insignificant impact on any determinant of ease, usefulness, intention and usage. This result is contrary to the previous literature (e.g., Venkatesh et al., 2003; Venkatesh & Davis, 2000). The justification behind this can be considered major limitation for this study as well. As stated earlier, the sample collected for this study is based on voluntary conditions and data analysis is performed without categorization of sample (voluntary vs. mandatory). Therefore, overall mean only showed that the Internet usage in mandatory, which in turn, didn't observed the impact of voluntariness.

6   Conclusion and Limitations and Future Implication

The objective of this study was to contribute in extension of the technology acceptance model which would be applicable in the context of developing country. Authors investigated the factors of individuals' cognitive behaviour of acceptance which are influenced by social norms and institutional norms. Additionally, the impact of moderating factors experience and voluntariness were investigated by the mediators of attitudinal and normative beliefs towards intention and usage behaviour. The findings are encouraging and provide practical insights into individuals' Internet usage acceptance in the educational institutes. Perceived usefulness was found more important construct of the Internet acceptance (R^2=34%) than the behavioural intention and behavioural usage (R^2=25%) each. Results also support impact of management support as institutional and governmental basis.

Although results of the study are satisfactory and encouraging but it does have some limitations. Authors examined the impact of moderating factors experience and voluntariness based on their mean; consequently, the results only represent the sample with moderate Internet experienced users in compliance/mandatory environment. Due to neglecting the categorical representation of sample (high and low experience, voluntary and mandatory usage) and use of multiple group analysis (MGA) there are chances that observed heterogeneity (Ringle, 2006) may lie in results. However, there are several PLS-based approaches (e.g. finite mixture partial least squares FIMIX-PLS) to examine the MGA and are opened for the future researchers.
Another limitation of the this study is based over the criteria of Venkatesh et al., (2003) who found that moderated factors may produced multiple-way interaction effect over individuals' personality and perception about usage behaviour. For example, Venkatesh et al., (2003) found that the impact of experience (low) along with gender (only female) over subjective norms were significant on behavioural intentions. Therefore, it is expected that if multiple source of moderating factors e.g. age, gender, education will be examined in this study then results might produce more insights about the specific beliefs of specific technology acceptance.

The results has implications for the management of higher educational institutes who are expecting advancement in research and teaching from academic by introducing new technologies and the Internet. This study demonstrates that social and institutional factors are impacting individuals' academics behaviour differently from the culture of developing countries. Also, expecting usage behaviour from academics only on the basis of usefulness is not enough for introducing new IT technology, but individuals' perceptions are formed through attitudinal, institutional and social belief. Therefore, management of higher education system (at government level as well as institute level)

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should identify the barriers (e.g. training, resources, etc.) and find appropriate ways to increase acceptance level.

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