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Age factor and Technology acceptance Behaviour of Academics in Pakistan

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Abstract: To identify the factors that determine academics intention towards internet technology an extension of technology acceptance model (TAM) is presented. In addition to the TAM's predictors (i.e. perceived ease of use(PEOU), perceived usefulness(PU) and behavioural intention(BI)) extended model integrated the direct impact of control beliefs (i.e. technology facilitation (TF), resource facilitation (RF) and self-efficacy (SE)) as determinants of individuals' acceptance behaviour. Moreover, model attempted to investigate overlooked moderating impact age over the beliefs of acceptance. Using a cross-sectional survey method, data was collected from 504 academics working in 25 public and private higher educational institutions (HEI's) in Pakistan. The final model was tested with 380 subjects. Hypothetical relationships were examined using structural equation modelling (SEM) based on the partial least squares (PLS). 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 (i.e., GoF=0.45). Overall model explained 26% variance, and specifically within sample younger in age explained 33% in academics intention towards internet technology. The significant predictors that affected academic's intention towards internet were PU, TF, and RF s; and towards perceived usefulness of internet was PEOU. Age as moderator only showed significant impact on PEOU→PU and RF→BI, such that paths were only significant within sample younger in age.

Keywords: Culture, Partial Least Squares (PLS), Structural Equation Modelling (SEM), technology acceptance model (TAM).

1. INTRODUCTION

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 (Srite and Karahanna, 2006).

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), is a noteworthy theoretical model due to its parsimonious structure and acceptable explanatory fit (Venkatesh and Bala, 2008). 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 (Venkatesh, 2000; Taylor and Todd, 1995a; Venkatesh *et al.,* 2007) with one of many being cultural bias (Straub *et al.,* 1997). 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 i.e. 1% in the Japanese sample.

Apart from inherent 'cultural bias' and its presupposition, examining the effect of 'external variables' through the only mediation effect of beliefs' perceived ease of use (PEOU) and usefulness (PU) also remain topic of debate and further research. An example of this can be impact of age, which has been proven to be an important demographic predictor of interest in the organisational settings (Ford *et al.,* 1996; Minton and Shneider, 1980), but has received a very little attention in the IT acceptance research (Morris and Venkatesh, 2000). Considering the limitations stated above, the purpose of the present study is to provide an extended model of technology acceptance to suit a developing country's context and delineate the impact of the age as a predictor of individual's differences towards acceptance behaviour vis-à-vis the Internet technology.

Conceptual Framework

The rationale for selecting the TAM as the foundation model for the theoretical framework is based on the TAM's consistency in explanatory power i.e.,

[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.

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40% since its creation, and its popularity as one of the most cited models in the social sciences citation index (SSCI) (Venkatesh and Bala, 2008; Venkatesh and Davis, 2000). In doing so, perceived usefulness (PU), perceived ease of use (PEOU), and behavioural intention (BI) are incorporated with the conceptualisation of the TAM.

Basic Relationships in TAM

Behaviour, which is defined as an observable act, is related to the individuals' persuasive or attitudinal feelings (LaRose and Eastin, 2004); whereas attitudinal feelings are defined as the 'degree to which a person has favourable evaluation of the behaviour in question' (Ajzen, 1991). In line with the TAM's conceptualisation it is expected that two beliefs i.e. PEOU and PU, which have remained direct determinants of behaviour (Taylor and Todd, 1995a) will determine individuals' BI to accept a specific technology.

PU is defined as the 'degree to which a person believes that using a particular system would enhance his/her job performance', whilst 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).

(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. Persistently, relationships suggested in the TAM are empirically supported in a wide range of technology acceptance literature. For instance, the literature supports the direct relationship of PEOU and PU on BI (Davis, 1989; Davis *et al.*, 1989; Venkatesh and Davis, 2000; Taylor and Todd, 1995a; Taylor and Todd, 1995b; Mathieson, 1991; Szajna, 1996; Venkatesh and Morris, 2000) and PEOU as an indirect determinant of BI through PU (Wu *et al.*, 2007; Taylor and Todd, 1995a; Mathieson, 1991; Chau and Hu, 2001).

In the context of present study, PU and PEOU 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), 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 to accept the Internet technology. Therefore, it is hypothesised:

H1: PU of technology has a positive significant influence on the BI to accept the technology (PU→BI).

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

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

Inclusion of control beliefs

By extending the boundary conditions of violation control, Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) introduced control beliefs with the additional construct of perceived behavioural control (PBC). (Ajzen, 1991). 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 systems research, PBC has remained an important construct of BI, and (Venkatesh *et al.* 2003) considered it similar to the *facilitation conditions* in the unified theory of acceptance and usage technology UTAUT. For instance, using TPB, Decomposed-TPB (DTPB), and Augmented-TAM (A-TAM), researchers (Chau and Hu, 2001; Shish and Fang, 2004; Yi *et al.*, 2006; Mathesion, 1991; Taylor and Todd, 1995a; Puschel *et al.*, 2010) found a significant impact of PBC on BI. In the academic context (the context of the present study), (Manstead and 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 PBC construct in the present study is consistent with the model DTPB (Taylor and 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).

Self-efficacy (SE), which emerged from the 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). Within the IT domain, studies reported the effect of SE as an important predictor of determining an

individual's behaviour (i.e. BI) and performance using specific technology (Compeaue and Higgins, 1991; Wu *et al.,* 2007).

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 and Todd, 1995a). According to Taylor and Todd (1995a), BI is expected to be less likely as less time and money are available and as technical compatibility decreases. Similarly (Venkatesh *et al.,* 2003) found that FC produced a significant impact on behaviour in the presence of some moderating factors including age and experience. According to (Taylor and Todd 1995a), the absence of RF represents barriers to usage and may inhibit the formation of BI; on the contrary, the presence of RF may not be considered to encourage usage. Therefore, following hypotheses are developed.

H4: SE of technology have a positive significant influence on the BI to accept the technology (SE→BI).

H5: TF of technology have a positive significant influence on the BI to accept the technology (TF→BI).

H6: RF of technology have a positive significant influence on the BI to accept the technology (RF→BI).

Inclusion of moderator Age

The prior research on age difference reported that increasing age is correlated with higher computer anxiety (reciprocal to behavioural and control beliefs of PEOU and SE respectively) (Raub, 1981) and unfavourable to PU (Igbaria and Parasuraman, 1989) and acceptance behaviour (e.g., Igbaria *et al.,* 1989; 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, Igbaria's 1990) argument was confirmed by (Morris and Venkatesh 2000) who found that age reduced the impact of PBC over BI due to lower level of SE and cognitive skills.

The rationale for the reciprocal relationship of age and PU 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 and opportunities for promotion) and hence perceived a higher importance of PU (Morris and Venkatesh, 2000). The literature also suggests that age is negatively related to the BI due to an increased perception of habit (Burton-Jones and Hubona, 2005, 2006). Hence, additional hypotheses are developed as under:

H7: PEOU towards PU is moderated by age, such that impact is negatively related with higher age or (PEOU) X (-)Age→PU

H8: PU, PEOU, TF, RF, SE towards BI is moderated by age, such that impact is negatively related with higher in age or (PU, PEOU, TF, RF, SE) X (-)Age→BI

2. METHODOLOGY

Method of data collection

The context of this study was 'a developing country context i.e. Pakistan' and participants were academics working in higher educational institutes (HEIs) in Pakistan. Using a cross-sectional questionnaire survey was used for testing above mentioned hypothetical relationships. Out of the 935 questionnaires distributed using by hand and email in 15 public and 10 private universities in Pakistan, 405 (i.e. 43%) surveys were returned. Using SPSS v.15.0, missing values and extreme outliers were screened-out to normalise the data, consequently 25 responses were discarded, and remaining 380 responses (i.e. 40.6%) were used for the inferential analysis. The measurement items were adopted from reliable and most cited studies, i.e. five items of PU and four items of PEOU from study of Venkatesh *et al.,* (2000), four items of BI from study of Venkatesh and Bala (2008), and six items of SE, four items of TF, five items of RF were adopted from study of Taylor and Todd (1995a).

Data Analysis

Partial Least Squares (PLS), a component-based Structural Equation Modelling (SEM) technique, was used to examine the hypothesised paths in the model. Data were analysed using the MPLS Smart Software Version 2.0.3 (Ringle *et al.,* 2005).

Hypotheses were evaluated using a two-step approach on the hierarchal basis (Henseler *et al.,* 2009; Chin W. Wynne., 2002). First, the measurement model was assessed through examining psychometric reliability and validity tests. Second, the multiple regression technique was used to assess the structural equation paths. The moderating impact of age on the

proposed relationships were assessed using the hierarchical multiple regression developed by Cohen and Cohen (1983).

The psychometric properties of the all constructs with dataset (n=380) is presented in **(Table 1).** The absolute correlation (i.e. factor loading) was greater than 0.4 and were compatible with the psychometric test requirement i.e. $0.7(\cong \sqrt{0.5})$ (Henseler *et al.,* 2009). In addition, no cross-loadings were observed between the measured items and all cross-loadings were less than 0.30, which satisfied the condition of item-level discriminant validity suggested by Chin (1998).

Table 1: Outer/factor loading (item bold) and cross-loadings (item italic)

	BI	PEOU	PU	RF	SE	TF
BI1	**0.70**	0.15	0.28	0.24	0.10	0.04
BI2	**0.80**	0.15	0.34	0.19	0.10	0.11
BI3	**0.73**	0.13	0.27	0.11	0.05	0.08
BI4	**0.74**	0.24	0.31	0.20	0.12	0.14
PEOU1	0.20	**0.86**	0.34	0.11	0.06	0.15
PEOU2	0.19	**0.89**	0.30	0.10	0.10	0.16
PEOU3	0.18	**0.77**	0.30	0.11	0.18	0.15
PEOU4	0.17	**0.78**	0.33	0.06	0.18	0.13
PU1	0.34	0.28	**0.75**	0.10	0.14	0.11
PU2	0.36	0.25	**0.76**	0.08	0.05	0.17
PU3	0.30	0.29	**0.81**	0.11	0.09	0.10
PU4	0.24	0.30	**0.71**	0.14	0.11	0.11
PU5	0.24	0.31	**0.65**	0.08	0.14	0.13
RF2	0.20	0.16	0.09	**0.70**	-0.01	0.24
RF3	0.16	0.08	0.10	**0.74**	0.11	0.15
RF4	0.17	0.06	0.14	**0.73**	0.11	0.21
RF5	0.19	0.01	0.08	**0.76**	0.09	0.15
SE1	0.11	0.17	0.17	0.14	**0.95**	0.14
SE2	0.12	0.12	0.10	0.04	**0.94**	0.13
TF1	0.10	0.10	0.14	0.25	0.15	**0.82**
TF2	0.07	0.12	0.09	0.22	0.06	**0.69**
TF3	0.07	0.11	0.08	0.17	0.12	**0.81**
TF4	0.13	0.22	0.19	0.19	0.10	**0.81**

(Table 2) presents the average variance extracted (AVE) for each construct. The AVE for all constructs were higher than the required value of 0.5 and satisfied the criterion of convergent validity (Fornell and Larcker, 1981). Cronbach's α was higher than the required value of 0.6 (Cronbach, 1951), and finally, the internal consistency reliability (ICR), also known as composite reliability (CR), was higher than the recommended value of 0.7 (Nunnally and Bernstein, 1994) **(see Table 3).**

Table 2: Inter-construct correlation and AVE for basic model

			Inter-construct correlation					
	AVE	$\sqrt{AVE}$	**BI**	**PEOU**	**PU**	**RF**	**SE**	**TF**
BI	0.55	0.74	1.00					
P	0.68	0.82	0.23	1.00				
P	0.54	0.74	0.41	0.38	1.0			
R	0.54	0.73	0.25	0.12	0.1	1.0		
S	0.89	0.94	0.12	0.16	0.1	0.1	1.	
T	0.61	0.78	0.13	0.18	0.1	0.2	0.	1.

Having established a reliable and validated measurement/outer-model, the next step was to estimate the assumed causal and covariance linear relationship among the exogenous (independent) and endogenous (dependent) latent variables. The essential criteria used for the assessment of the structural equation model in this study were the coefficient of determination (R^2) for endogenous variable(s), estimation of path coefficients (β), effect size (f^2) and prediction relevance (q^2) (Chin 2010, Henseler *et al.,* 2009, Gotz *et al.,* 2010; Tenenhaus *et al.,* 2005).

Table 3: Overall overview of results and GoF of basic model

Constructs	**Comp Reliability**	**R^2**	**Communality**	**Alpha**
BI	0.832	0.265	0.553	0.730
PEOU	0.895		0.680	0.842
PU	0.855	0.269	0.542	0.788
RF	0.821		0.535	0.713
SE	0.943		0.893	0.880
TF	0.862		0.610	0.796
Average		**0.267**	**0.6355**	
GoF		**0.452**		

GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

The path estimation was performed to examine the significance of the path relations in the inner-model (Chin, 1998). The significance of regression coefficient (β) was based on t-value, which was obtained using the PLS Bootstrap process. **(Table 4)** shows that four out of six main path relations (without moderating impact of age) were statistically significant.

The highly significant path ($p<0.001$) was between PU and BI ($\beta=0.34$ or 34% and t= 7.58) while the least significant ($p<0.01$) was between TF and BI ($\beta=0.14$ or 14% and t= 2.6). These results suggested that usage of the Internet within HEI context was mainly influenced by the individual respondent's (academics) personal intention to accept the internet technology followed by the technological and resource facilitations. Thus, hypotheses H1, H3, H5 and H6 were supported and H2 and H4 were unsupported.

Table 4: Structural equation relations and path significance of the basic model

H. No.	Paths	Path (t-value)	f^2	q^2	Supported/Not-Supported
H1	**PU -> BI**	0.3421 (7.5819)***	0.123	0.061	Supported
H2	**PEOU -> BI**	0.0232 (0.4562)Not Sig.	-0.001	0.011	Not-Supported
H3	**PEOU -> PU**	0.281 (5.8124)***	0.098	0.050	Supported
H4	**SE -> BI**	-0.0124 (0.2125)Not Sig.	0.000	-0.002	Not-Supported
H5	**TF -> BI**	0.1435 (2.6076)**	0.020	0.004	Supported
H6	**RF -> BI**	0.1715 (3.5596)***	0.036	0.017	Supported

Notes: *** p<0.001, ** p<0.01, * p<0.05; (based on $t_{(198)}$, two-tailed test)
$f^2 = (R^2_{incl} - R^2_{excl})/(1- R^2_{incl})$
$q^2 = (F^2_{incl} - F^2_{excl})/(1- F^2_{incl})$

The result showed that more than half of the paths towards the dependent variable i.e. BI were insignificant. Specifically, only AT, PU, and RF were statistically significant and TF, NAT, PEOU, SE and SN were not significant. The highest significant path was between PU and BI (as mentioned above) followed by AT and BI ($\beta=0.24$ or 24% and t= 5.11). These results suggested 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.

The determination of coefficient (R^2) provided the percentage of variation in dependent variable(s) explained by independent variable(s) (Keil *et al.*, 2000). According to Chin (1998), a model having R^2 as 0.67, 0.33, and 0.19 are considered as substantial, moderate, and weak, respectively, fit with the data. **(Table 5)** indicates that PU shared the highest variance (R^2= 0.269 ≅27%) followed by BI (i.e. R^2= 0.265 or 26%). Following the criterion of Chin (1998), the basic model is moderately fit with the data in the present study.

Table 5: Overall overview of results and Goodness of fit (GoF)index of the basic model

Constructs	ICR	R^2	Communality	Cronbach's Alpha
BI	0.832	0.265	0.553	0.730
PEOU	0.895		0.680	0.842
PU	0.855	0.269	0.542	0.788
RF	0.821		0.535	0.713
SE	0.943		0.893	0.880
TF	0.862		0.610	0.796
Average		**0.267**	**0.6355**	
GoF		**0.452**		

GoF = Goodness of Fit index = $\sqrt{R^2 * average\ communality}$

Effect size (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 the variance of the dependent variable that remains unexplained. According to (Cohen 1988), f^2 values of 0.02, 0.15, and 0.35 for the significant independent variables present weak, moderate and substantial effect respectively. In table 4, column f^2 shows that most of the relations presented a moderate effect size (i.e. f^2 >0.02). The moderate impact of effect size suggested that inclusion of an additional path(s) or independent variable(s) have no observable effect on dependent variable's shared variance.

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). According the (Fornell and Cha 1994), if the q^2 is larger than zero the model is considered to have predictive relevance otherwise model lacks predictive relevance. In this study, predictive validity (q^2) was computed using the 'blindfolding' procedure (Gotz *et al.*, 2010). The indices for the q^2 are explained in table 4. None of the indices was negative (except SE→BI which was insignificant), which might imply that the corresponding latent variables were badly estimated (Tenenhaus *et al.*, 2005).

Finally, the goodness-of-fit (GoF) index which includes the 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) is examined and presented in (Table 5) (Amato *et al.,* 2004). The GoF is normed between 0 to 1, where the higher value presents better path model estimation (Heneseler *et al.,* 2009, p.310). The GoF for the current study model was 0.45 (45%) (see table 5) and can be accepted at a moderate level (Chin, 1998).

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

For examining the moderating effect, initially sample was split into desired groups (subsample) and the path-relationships of independent variables were regressed with dependent variable using one subsample at a time. Both sub-models were acceptable in terms of the goodness of fit i.e. validity (discriminant and convergent), reliability (Cronbach α and composite reliability) and explanatory power of the independent variables within the dependent variable (R^2).

In next step, bootstrapping method was applied (in present study 200 times) to re-sample the data for obtaining the standard error of the structural equation paths in the subsamples under consideration. In the third step, differences between the path estimators were tested for the significance of t-test. If the obtained standard errors of path estimators were assumed to be equal, the t-static was computed using the (Chin, 2002) criterion as follows:

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

Where $b^{(1)}$= Path value in group one
$b^{(2)}$= Path value in group two
$n^{(1)}$= Sample size in group one
$n^{(2)}$= 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 situation when assumption of standard errors' inequality was present, the differences between the paths estimators of two groups were tested using the Smith-Satterthwait test (c.f. Chin, 2002) as follows:

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

The R^2 values for the main dependent variable BI were between 26% and 34%, and for PU was 28% in younger and older model respectively, which indicates that models were moderately fit (Chin, 1998).

(Table 6) presents the estimated values of the structural equation paths within subsamples with pair-wise parametric t-tests and non-parametric Smith-Satterthwait test of differences. It was found that model with younger-age sample produced similar results like the overall sample model except TF→BI (β=0.016, t=1.66). The highest significant path was between PU→BI (β=0.32, t=5.84). In model with older-age sample, results were quite different from the overall sample model, such that only path PU→BI (β=0.38, t=3.7) was statistically significant and others were not significant.

After observing the values of parametric t-test and Smith-Satterthwait test, it was found that there were only two significant differences between two age groups i.e. RF→BI (t=2.03 and t=1.79) and PEOU→PU (t=1.96 and t=1.88). Specifically, RF→BI was positively related and statistically significant in the

overall sample and the younger-age, but was negatively related and statistically not significant in older-age model. The PEOU→PU path was statistically not significant in the older-age sample model but was statistically significant in the younger-age sample model. These result suggested that both moderating hypotheses H7 and H8 were supported.

Table 6: Structural equation relations and path significance difference of moderator age Note: *** p<0.001, ** p<0.01, * p<0.05; (based on $t_{(198)}$, two-tailed test)

Hypothesis	Older age sample (n=91)		Younger age sample (n=289)		P-test	S-test
	Path (t-value)	R-Square	Path (t-value)	R-Square		
PEOU -> PU	**0.139 (1.37)Not Sig.**	0.28	**0.31 (5.71)*** **	0.28	**1.96**	**1.88**
TF -> BI	-0.04 (0.75)Not Sig	0.26	0.01 (0.16)Not Sig.	0.33	0.51	0.54
PEOU -> BI	0.02 (0.18)Not Sig.		0.01 (0.22)Not Sig.		0.07	0.06
PU -> BI	0.38 (3.79)***		0.32 (5.84)***		0.52	0.52
RF -> BI	**-0.19 (1.54)Not Sig.**		**0.15 (2.48)***		**2.03**	**1.79**
SE -> BI	-0.02 (0.38)Not Sig.		0.09 (0.72)Not Sig.		0.91	0.82

3. DISCUSSION

Almost all the hypothetical relationships presented in the conceptual framework found support from the empirical results. In accordance with the TAM (Davis, 1989; Davis, Bagozzi and Warshaw, 1989) and with previous literature (e.g., Venkatesh and Morris, 2000; Venkatesh, Morris and Ackerman, 2000; Pai and Huang, 2011), it was found that the total effect of PU was significant and greater than PEOU on BI (H1). However, notwithstanding with the suggestions of Davis (1989), a statistically not significant relation between PEOU and BI was observed (H2). This is not uncommon and has been reported in many other studies (e.g., McCoy, Everard and Jones, 2005; Abbasi, Irani and Chandio, 2010). The most significant relation of PEOU and PU with BI has always been between PU and BI (Alsajjan and Dennis, 2010). These findings are relevant to the context of the current study, which showed that the respondents (academics) are driven to accept the Internet technology primarily based on its usefulness, which is established by perceived relative advantages. A possible explanation for the not significant relation of PEOU on BI could be derived from the study of (Davis, 1986), who argued that the impact of PEOU may influence BI indirectly through PU. Results of the present study indicate that PEOU has an indirect effect on BI via a strong direct significance on PU (H3). This finding suggests that PEOU increased the perception of usefulness of the Internet technology. Similar results were also found by (Venkatesh *et al.*, 2003) in the UTAUT with a direct effect of effort expectancy (i.e., PEOU) on performance expectancy (i.e., PU), and by Alsajjan and Dennis (2010) in an Internet banking acceptance model with an effect of perceived manageability (similar to PEOU in the present study) on PU.

From the perspective of control beliefs, contrary to the literature (e.g., Mathieson, 1991; Hasan and Ahmed, 2010; Wang and Wang, 2010), SE produced a not significant effect on BI. One possible justification could be given from the previous literature, which referred SE as a similar concept to both PEOU (Davis, 1989; Alsajjan and Dennis, 2010) and internal control (Venkatesh and Morris, 2000). It was observed and discussed in H2 that there was a not significant 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 a not significant effect of SE on PU and (Venkatesh *et al.*, 2003) found a not significant effect on BI.

Consistent with the previous literature (Taylor and Todd, 1995a; Mathieson, 1991; Taylor and Todd, 1995b; Puschel *et al.*, 2010), the impact of external constraints i.e. facilitation conditions (i.e. TF and RF) were fully supported.

From the moderator perspective of age, results were consistent with literature to develop hypotheses in the framework. Specifically it was noticed, in terms of establishing cognitive intention towards acceptance, the older group sample was more sensitive than the younger age sample i.e., R^2=0.38 and R^2 = 0.32 respectively. This finding is consistent with (Venkatesh *et al.*, 2003) study in which the author reported that the impact of performance expectancy (similar to PU) was higher in the younger age group. Consistent with the TAM (Davis, 1989; Davis, Bagozzi and Warshaw, 1989), the highest significant path within both groups was PU→BI, which suggested that both groups perceived the higher importance of technology (i.e. the Internet in the present study) usefulness in their tasks, which in turn established positive intentions towards acceptance behaviour.

The age only evoked a moderating impact between two groups at path RF→BI and PEOU→PU. The negative and statistically not significance of RF in the older age groups revealed 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) who found that a higher age reduced PBC due to lower SE and cognitive skills.

The second moderating impact PEOU→PU revealed that the path was statistically significant in the younger age group and statistically not significant in the older age group. This finding can be interpreted in accordance with the previous literature (Venkatesh *et al.,* 2003; Wang *et al.,* 2009) which showed a higher impact of effort expectancy (similar to PEOU in the present study) towards BI in only younger age individuals. Furthermore, it was also noticed that increased age showed 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 they might have less perception of the importance of usefulness of a technology.

4. CONCLUSION

The study supports the TAM's extendibility and reliability in the developing country context. According to the findings, academics' working in HEI intention to accept internet technology is mainly affected by perceiving usefulness of the internet technology in their teaching and research tasks. Besides, perception of ease of use, technology facilitation and available resources were also main contributors of developing intention. More specifically, it is noticed that academics' older in age behaviour was influence due to the perception of usefulness. These findings may be guideline for the HEI policies makers, who should focus on increasing age in academics and their impact on acceptance intention behaviour.

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