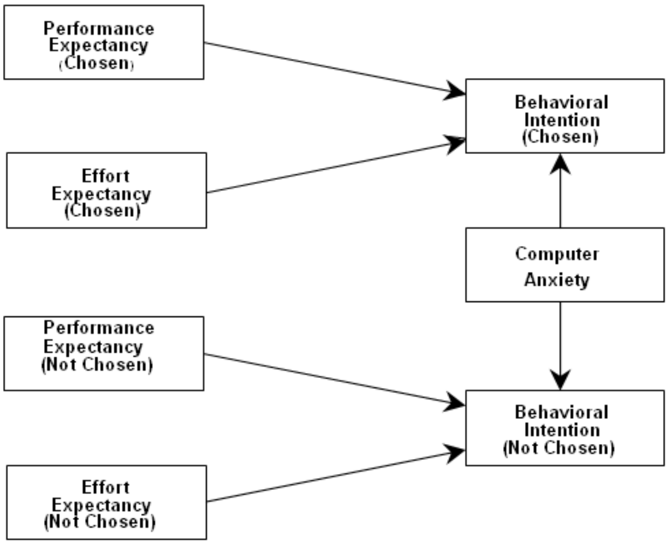

Figure 4. Two-group modeling approach.

variance explained in the dependent variable by the *full model*, containing the interaction terms, was compared to that of the base model, which contained only the direct effects. The statistical significance of this increase in variance explained was then assessed. The approach is analogous to the hierarchical testing of moderating effects in multiple linear regression, but employing PLS as the underlying technique. Pavlou and El Sawy (2006) employed a similar approach.

Given the statistical limitations imposed by the number of participants in this research (e.g., the heuristic of 10 cases per effect on any endogenous variable), interactions were tested for performance and effort expectancy separately, as detailed below. Despite not being the main focus of this study, additional validation of the research framework employed was obtained by modeling the intentions to adopt for each of the two technologies evaluated by the participants as antecedents to a dummy-coded variable indicating the actual choice made. The results strongly support the comparative nature of this research, with both paths strongly significant (at the $p < 0.0001$ level) and the variance explained in the choice variable just short of 68%.

Convergent and discriminant validity were assessed following the extant procedures outlined by Gefen and Straub (2005). Only those indicators that loaded significantly in their latent variable were retained in the final model. An examination of the loading patterns revealed no cross-loadings of any important magnitude, and in all cases the square root of the average variance extracted was larger than any correlations among pairs of latent constructs. Composite reliabilities were also above recommended thresholds.

HYPOTHESIS TESTING AND RESULTS

Tables 2a[2] and 2b contain the results of the testing of H1a and H1b. As can be seen from the results, both performance and effort expectancy are significantly associated with behavioral intention for both the chosen and the not chosen technologies ($p < 0.05$). The standardized betas shown in Table 2b also indicate significance with regard to the relationship between performance and behavioral intention and effort expectancy and behavioral intention ($p < 0.05$). These results

Table 2a. Measurement Model – Base Models.

	CR	BI (CH)	PE (CH)	EE (CH)	BI (NCH)	PE (NCH)	EE (NCH)
BI (CH)	0.8681	**0.833**					
PE (CH)	0.8678	0.452**	**0.790**				
EE (CH)	0.9593	0.456**	0.429**	**0.925**			
BI (NCH)	0.9519				**0.932**		
PE (NCH)	0.9629				0.467**	**0.931**	
EE (NCH)	0.9738				0.459**	0.480**	**0.950**

Note: Models were estimated independently of each other. Elements in the diagonal are the square root of the average variance extracted (AVE); off-diagonal elements are correlations between the latent constructs. CH = Chosen, NCH = Not Chosen, CR = Composite Reliability, BI = Behavioral Intention, PE = Performance Expectancy, EE = Effort Expectancy.
*Correlation significant at the 0.05 level (two-tailed), **Correlation significant at the 0.01 level (two-tailed).

Table 2b. Base Models.

Block	Term	Behavioral Intention (Chosen)		Behavioral Intention (Not Chosen)	
		B	R^2	B	R^2
Base Model	PE	0.314*	0.288	0.321*	0.290
	EE	0.321*		0.305*	

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. PE = Performance Expectancy, EE = Effort Expectancy.
*$p < 0.05$.

provide clear support for H1a and H1b and are in keeping with previous results obtained for UTAUT suggesting validity of the measurement models (Venkatesh et al., 2003).

H2a and H2b focus on the moderating effects of gender as reported by prior studies. As can be seen from Table 3, the results parallel those of prior studies with the observed gender effect negatively related to performance expectancy (PE) and positively related to effort expectancy (EE). Based on the coding of gender employed in this research, these results suggest that the effects of PE on behavioral intention (BI) are stronger for men than are for women, while the converse is true for the effects of EE on BI (which are stronger for women than for men). This is evidenced by the negative path coefficient from PE to BI, indicating that women place less importance than men on the level of expected performance derived from use of the focal technology, and by the positive path emanating from EE to BI, suggesting in this case that women place more of an emphasis on levels of ease of use associated with the technology under consideration than men do. These results are significant only for the chosen technology, although the coefficients are of the expected sign for the not-chosen technology. This provides support for H2a and H2b and replicates prior work.

H3a and H3b focus on the proposed relationships between psychological gender-role and BI. We find little evidence of this relationship; significance for these coefficients was found only in the moderating relationships for the not-chosen technology. The signs of the coefficients parallel those obtained in the testing of H2, however. As such, we can find no support for H3a but we find some support for H3b. Other research that has examined these relationships, albeit using a different theoretical basis (Venkatesh et al., 2004) indicates that masculine individuals form their intentions based on utilitarian attitudes toward technology, whereas more feminine individuals emphasize their ability to use the technology more. These results are robust to the gender of the individual, thus showing that psychological gender-role provides additional variance beyond the dichotomous classification of participants into male and female, thus increasing the explanatory power of the model. When viewed in conjunction with the results obtained for H2, and in keeping with earlier findings related to this construct, we find support for gender (either biological or role; see Table 4) as a moderator within the model.

Table 3. Moderating Effects of Biological Gender.

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.275*	0.321	0.031	0.331*	0.378	0.010
	EE	0.322*			0.330*		
	GENDER	-0.032			-0.276*		
	PE x GENDER	-0.159⁺			-0.132		
EE Interaction only	PE	0.278⁺	0.346	0.086	0.420*	0.368	0.000
	EE	0.329*			0.310*		
	GENDER	-0.023			-0.318**		
	EE x GENDER	0.258*			0.003		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy.
**p* < 0.05, + *p* <0.10, ***p* < 0.01.

Table 4. Moderating Effects of Psychological Gender-Role (BSRI).

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.263⁺	0.304	0.015	0.213⁺	0.340	0.041
	EE	0.336*			0.364*		
	BSRI	0.091			-0.076		
	PE x BSRI	-0.126			-0.236⁺		
EE Interaction only	PE	0.320*	0.297	0.008	0.420**	0.368	0.069
	EE	0.294⁺			0.218⁺		
	BSRI	0.060			-0.253*		
	EE x BSRI	-0.080			0.319**		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, BSRI = Bem Sex Role Index.
p < 0.05, + p <0.10, **p< 0.01.

To provide a thorough investigation into the various forms of risk-taking behavior, recall that two different approaches were employed: (a) Lottery A, looking at sure gain versus a risky proposition, and (b) Lottery B, a choice between two risky propositions. The results for each of these measures are shown in Tables 5a and 5b.

Lottery A (sure gain vs. risky proposition) displays somewhat equivocal results with regard to its potential moderating effect. As shown in Table 5a, the construct displays a negative moderating effect for both PE and EE for both technologies but is significant only for EE in the chosen technology and PE for the not-chosen technology ($p < 0.05$). For Lottery B, we find a slightly different set of relationships. The results in Table 5b indicate the construct provides a negative moderation for PE and EE in the chosen technology and EE in the not-chosen technology, but a positive moderation for PE in the not-chosen technology. Further, significance

Table 5a. Moderating Effects of Risk Propensity (Measure Lottery A).

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.303	0.410	0.002	0.224*	0.401	0.084
	EE	0.326*			0.228^{+}		
	RP-A	-0.351**			0.251*		
	PE x RP-A	-0.059			-0.324*		
EE Interaction only	PE	0.362**	0.509	0.101	0.295	0.323	0.006
	EE	0.121			0.157		
	RP-A	-0.290*			0.210^{+}		
	EE x RP-A	-0.396*			-0.147		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, RP-A = Risk Propensity, Lottery Measure A.
**p* < 0.05, + p <0.10, ***p* < 0.01.

Table 5b. Moderating Effects of Risk Propensity (Measure Lottery B).

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.341*	0.335	0.037	0.306**	0.395	0.060
	EE	0.283^{+}			0.299*		
	RP-B	-0.079			0.209*		
	PE x RP-B	-0.158			0.254*		
EE Interaction only	PE	0.409**	0.343	0.045	0.146	0.418	0.083
	EE	0.195			0.280^{+}		
	RP-B	-0.139			0.237*		
	EE x RP-B	-0.280*			-0.337*		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, RP-B = Risk Propensity, Lottery Measure B.
**p* < 0.05, + p <0.10, ***p* < 0.01.

is found only for PE in the chosen technology and EE in both technologies. While similarities exist between the two tests of risk propensity, the differences are notable. When considered together, the results provide support for H4a and H4b, suggesting that risk-taking propensity is a moderator for both PE and EE and their relationship to BI.

The results for the test of self-esteem (one of the core self-evaluation constructs) are found in Table 6. The results suggest that self-esteem (SE) plays an important moderating role with regard to the PE– and EE–BI relationships. Interestingly, SE serves as a positive moderator for the chosen technology and in a negative capacity for the not-chosen technology. It would seem that SE provided the subjects with a form of enhancement of the differences between the two technologies (this will be discussed further immediately below). Also, given the prior relationships between SE and gender reported in the literature, SE appears to be a strong candidate to better explain the previously reported gender moderation in UTAUT. Given these results, we find support for H5a, and H5b.

Continuing with our tests of the individual components within the core self-evaluation construct (see Table 7), we find locus of control (LC) to be a significant moderator within the model. While significant for both PE and EE for both technologies, LC appears to positively moderate PE while negatively moderating EE for the chosen technology and negatively moderating both variables for the not-chosen technology. While the reasoning behind these findings requires further thought and discussion (and, given the exploratory nature of this research, possibly further study), the results obtained provide clear support for H6a, and H6b.

In much of the psychology literature, neuroticism is characterized as an opposing core self-evaluation to self-esteem. When viewed in combination with the results obtained for self-esteem, we see continued evidence of this characterization. A review of Table 8 indicates neuroticism to be a potential moderator within UTAUT but more clearly for PE than for EE. As such, we find clear support for H7a, with limited support for H7b.

The final component in the core self-evaluation construct is computer self-efficacy (CSE). Recall this variable was measured at the general domain level (GCSE) as conceptualized by Marakas et al. (1998) and operationalized by Johnson & Marakas (2000). As shown in Table 9, GCSE is a significant moderator for both PE and EE with regard to the

Table 6. Moderating Effects of Self-Esteem.

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.235^+	0.347	0.031	0.238*	0.368	0.074
	EE	0.305*			0.226^+		
	SE	-0.155^+			-0.165^+		
	PE x SE	0.211^+			-0.344*		
EE Interaction only	PE	0.399**	0.387	0.071	0.236^+	0.323	0.029
	EE	0.095			0.326*		
	SE	-0.309*			-0.087		
	EE x SE	0.346*			-0.200^+		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, SE = Self-Esteem.
*$p < 0.05$, + p <0.10, ** $p < 0.01$.

Table 7. Moderating Effects of Locus of Control.

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.279	0.368	0.043	0.221*	0.318	0.026
	EE	0.189+			0.335+		
	LC	-0.232+			0.007		
	PE x LC	0.239*			-0.204+		
EE Interaction only	PE	0.281*	0.381	0.056	0.220+	0.336	0.044
	EE	0.220+			0.301*		
	LC	-0.256*			0.020		
	EE x LC	-0.266*			-0.253*		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, LC = Locus of Control.
*$p < 0.05$, + $p < 0.10$, **$p < 0.01$.

Table 8. Moderating Effects of Neuroticism.

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.228+	0.329	0.038	0.222*	0.384	0.056
	EE	0.312*			0.298*		
	NE	-0.047			0.210+		
	PE x NE	0.223+			0.258+		
EE Interaction only	PE	0.388**	0.436	0.145	0.341*	0.333	0.005
	EE	0.144			0.236+		
	NE	-0.122			0.237*		
	EE x NE	0.429**			0.080		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, NE = Neuroticism.
*$p < 0.05$, + $p < 0.10$, **$p < 0.01$.

chosen technology, suggesting that higher levels of GCSE contribute to the formation of PE and EE perceptions and to the choice process. In addition, the results suggest that higher levels of GCSE in a choice setting will have a greater effect on the formation of EE perceptions than on PE perceptions. Further, the results suggest that GCSE is not a salient moderator with regard to the not-chosen technology. Here again, we see evidence of a type of enhancement in differentiating between the two technologies brought forth by the subject's GCSE perceptions. Given these results, we find clear support for H8a, and H8b.

Computer anxiety is generally characterized as a deterrent to forming sound perceptions regarding a technology. A review of Table 10 suggests this characterization to be salient in its moderating effects in UTAUT. Consistent with the results obtained with self-esteem, these findings clearly position higher levels of computer anxiety as a negative moderator to forming PE and EE perceptions and their relationships to BI. Given these results, we find support for H9a, and H9b.

Hypotheses 10 and 11 propose both GCSE and computer anxiety (CANX) will have an antecedent relationship to the formation of effort expectancy perceptions. Table 11 contains the results obtained with regard to the testing of these hypotheses. Tested separately, both GCSE and CANX display significant direct effects with EE for the chosen technology, suggesting that higher levels of GCSE and lower levels of CANX will directly affect perceptions of ease of use. When tested together, however, the effect of CANX on the formation of effort perceptions appears to supplant the effects of GCSE. Given that CANX often has been positioned as an antecedent to GCSE (Marakas et al., 1998), these results suggest that, in the presence of high levels of CANX, a person's GCSE perception is less important than her feelings of concern with regard to forming a perception of effort expectancy. Given these results, we find support for H10 and H11.

Table 9. Moderating Effects of Generalized Computer Self-Efficacy.

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.343*	0.451	0.113	0.280*	0.353	0.018
	EE	0.369*			0.300*		
	GCSE	-0.367**			-0.240*		
	PE x GCSE	0.363**			0.145		
EE Interaction only	PE	0.236*	0.589	0.251	0.336*	0.348	0.013
	EE	0.473**			0.280*		
	GCSE	-0.162+			-0.216*		
	EE x GCSE	0.529***			-0.124		

Note: Models for the chosen and not chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, GCSE = Generalized Computer Self-Efficacy.
** p < 0.01, * p < 0.05, + p <0.10.

Table 10. Moderating Effects of Computer Anxiety.

Block	Term	Behavioral Intention (Chosen)			Behavioral Intention (Not Chosen)		
		B	R^2	ΔR^2	B	R^2	ΔR^2
PE Interaction only	PE	0.356*	0.371	0.083	0.273*	0.438	0.119
	EE	0.222			0.268*		
	CANX	-0.060			0.300*		
	PE x CANX	-0.292*			0.403**		
EE Interaction only	PE	0.371**	0.433	0.145	0.314*	0.328	0.009
	EE	0.270*			0.363*		
	CANX	0.008			0.211+		
	EE x CANX	-0.405**			0.102		

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. Changes in R^2 for the interaction terms are calculated using the base model with the direct effect of the moderator variable as the reference. PE = Performance Expectancy, EE = Effort Expectancy, CANX = Computer Anxiety.
**p* < 0.05, + p <0.10, ***p* < 0.01.

Table 11. Antecedents to Effort Expectancy.

Block	Term	Effort Expectancy (Chosen)		Effort Expectancy (Not Chosen)	
		B	R^2	B	R^2
GCSE only	GCSE	0.290**	0.084	0.129	0.017
CANX only	CANX	-0.361**	0.130	-0.350**	0.123
Both GCSE and CANX (no relationship between GCSE and CANX)	GCSE CANX	0.131 -0.291$^+$	0.142	-0.091 -0.398*	0.128
Both GCSE and CANX (GCSE and CANX related)	GCSE CANX	0.101 -0.308*	0.139	-0.083 -0.389*	0.123

Note: Models for the chosen and not-chosen technologies were estimated independently of each other. The same indicators used in the estimation of the interaction effects were used in these models in order to maintain consistency. GCSE = Generalized Computer Self-Efficacy, CANX = Computer Anxiety.
*p < 0.05, **p < 0.01, ***p < 0.001.

LIMITATIONS TO THIS STUDY

As with all empirical investigations, certain limitations must be acknowledged when interpreting the results. First, the sample size of this study was admittedly, albeit necessarily, smaller than ideal. Early in the research design, we chose to focus only on subjects who were actively employed in the accounting domain to increase the external validity of the study. We believe this constraint contributed positively to the results obtained and the conclusions derived thereof, but resulted in challenges associated with finding professionals who were willing to give of their valuable time to participate in the manipulation. The subject recruitment process took over 6 months with several subjects from a wide variety of Midwestern accounting firms (both Big 4[3] and independent) ultimately taking part.

While we are logically comfortable with the test power for those results reaching the p < .05 level or below, the relatively small sample size obtained may be a contributing factor to several of the relationships being significant at the more liberal 0.10 level (statistically suggesting the results would have reached greater significance with a slightly larger sample). Further, the smaller sample size precluded us from the best practice of testing all moderators in unison. In addition, the proportion of men and women in the sample data collected was not completely balanced, although the imbalance was not severe (see Table 1). When researchers employ moderated regression approaches to testing the effects of dichotomous variables as possible moderators in a relationship between continuous variables, as was done here, unequal proportions of participants in each group leads to an increase in the likelihood of committing a Type II error (that is, a decrease in statistical power to detect a significant difference). Although the small sample size is a limitation that overall affects the research presented here, this particular issue of unbalanced groups is most directly of importance for the results presented in Table 3, where the moderating effects of gender were assessed. That said, we believe the skill set and perspective brought to this exercise by the business professionals (as opposed to random subjects or convenience samples, such as students) contributes both to the external validity of the study and the generalizability of the results and conclusions.

Another possible limitation to consider lies with the method by which the data were collected. While clearly falling into the experimental category of methods, the use of a voluntary Web-delivered vehicle for data collection raises questions of possible loss of experimental control. Given our desire to use accounting professionals as subjects, we determined that bringing them to a laboratory setting would prove inconvenient and further exacerbate the challenges in reaching a suitable sample size for analysis. Further, by allowing the subjects to participate while in their natural work setting, we believe any possible concerns or anxieties associated with a more formal experimental setting were reduced. Subjects were clearly instructed to complete the exercise in one sitting and to not begin the exercise unless they felt reasonably confident they had a minimum of 1 hour uninterrupted in which to complete the project. Start time and completion time for each subject was analyzed to ascertain the extent to which these criterion were met. In all cases, subjects participated in the exercise during normal business hours with no subject's completion time being statistically different than the mean completion time for the exercise. Given this, we believe minimal loss of experimental control occurred.

The research model tested in this study, shown in Figure 2, did not include the important construct of social influence, which is a direct determinant of intention to adopt, and whose relationship with the latter is also affected by gender (Venkatesh et al., 2003). Due to the constrained nature of the research design employed here, where participants were asked to make hypothetical adoption decisions, their ability to form valid perceptions of social influence was surely limited. Past research examining these effects found that they appear to be more relevant in contexts where mandatory usage of the specific technology is required, but not directly significant when operating in contexts where technology usage is under the control of the individual (Venkatesh & Davis, 2000). Even in mandatory settings, the effect of social influence on intentions appears to be limited to the early stages of adoption and usage. All this should not be taken to mean that we believe the construct not to be worthy of careful examination; to the contrary, we believe social factors play an important role in technology adoption within organizations. However, we believe that, due to the inherently social nature of the construct, in order for these investigations to be meaningful, they should be conducted in field settings where these effects are important to the individual adopter.

Finally, we must consider the closed set of two technologies as a possible limitation. We believe the setting for this study to be novel in the sense that it represents more than one technology under consideration, the use of actual and available technologies, and the use of subjects professionally engaged in the same domain in which the study was framed. The extent to which choices made in hypothetical scenarios, such as the ones employed here compare to those in real-life adoption settings, is related, at least partially, to the degree to which both the decision makers and technology alternatives compare to those in actual settings. In this research, the participants involved in the evaluation and selection of technologies were professionals in the field of practice from which the technologies were drawn, which we believe to be representative of the community of users who would be involved in these processes in organizational adoption scenarios. As well, the technologies chosen for this research were commercially available products. On the other hand, participants were aware that this was a hypothetical scenario that had been constructed for research purposes, and that was a likely influence on their behavior. While we cannot know the participants' state of mind while they were completing the research, the time taken by the participants to complete the tasks, which we obtained by accessing the logs of the Website used to set up the research, provides some evidence that thought was given to the research scenario presented to them.

Nonetheless, the selection and adoption of a technology such as an organization-wide accounting package would clearly entail the review of multiple candidate packages before a final pair of two could be compared. Further, it is probable that many hours of discussion among the selection committee would occur with regard to the functional requirements upon which the final selection will be based. Given this, it is possible that the framing of the subject to simply compare and select among a choice set of two candidates may limit the richness of the true choice process. We believe future research needs to investigate this issue to determine the extent to which multiple candidates affect the choice process.

DISCUSSION

A number of recent studies in the stream of literature examining user acceptance of information technology have shown the presence of a moderating effect of the gender of the user, such that certain relationships are stronger for men than for women, and vice versa. Gender effects such as this one are useful in that they put in evidence the presence of an underlying dynamic that affects relationships of interest; however, they provide neither an explanation for the occurrence of those effects, nor a lever that can be incorporated into design considerations such that it would be possible to develop technologies enjoying wider acceptance.

The present research set out to investigate a number of different potential explanations for the observed gender effects. In particular, we identified a number of individual traits that exhibit gender differences and could plausibly be responsible for the moderating influences that have hitherto been identified as related to the gender of the users. Through an analysis of data collected from business professionals employing commercially available technologies within their professional discipline, we uncovered a number of interesting effects that we believe can form the basis for future investigations in this area. Results from our analyses are summarized in Table 12.

In light of the limitations discussed in the previous section, it is clear that our results should be regarded as preliminary and in need of replication. We believe, however, that our results contribute to a better clarification of the underlying dynamics of the observed gender effect or, at the very least, provide interesting directions for future research. We see the current status of research in this area as limiting for one major reason. While there is no doubt as to the existence of a gender effect in all of the central relationships in our models explaining user acceptance of technology, there is little that can be done, from an applied standpoint, with knowledge of such an effect. Thus, designers and marketers are presented with several moral, societal, and possibly legal constraints. Understanding how such an effect operates, on the other hand, may potentially provide both researchers and practitioners with a better understanding of the adoption process, ultimately leading to increased success in the adoption of technology.

We see our findings, shown in Table 12, as belonging to three separate groups. First, Hypotheses 1, 2, 3, 10 and 11 were included with an eye toward replicating past research and thus establishing the adequacy of our research design to examine an effect that can be repeatedly found in the extant literature. While not designed as a test of the UTAUT, which has been successfully replicated many times since it was first published, we deemed it necessary to show that our research model worked as expected according to the theory on which it was based.

Table 12. Summary of Hypotheses Testing.

	Hypothesis	Results
1	Replication of UTAUT	Supported
2	Moderating effect of biological gender	Support only for chosen technology
3	Moderating effect of psychological gender	Support only for not-chosen technology
4	Moderating effect of risk propensity	Partially supported
5	Moderating effect of self-esteem	Supported
6	Moderating effect of locus of control	Supported
7	Moderating effect of neuroticism	Support only for chosen technology
8	Moderating effect of computer self-efficacy	Support only for chosen technology
9	Moderating effect of computer anxiety	Supported
10	Computer self-efficacy as antecedent of effort expectancy	Supported
11	Computer anxiety as antecedent of effort expectancy	Supported

Results from these hypotheses confirm this, as well as the presence of some effect related to gender of the participants (biological or psychological) in the relationships. Finally, we replicated past findings about the role of computer self-efficacy and computer anxiety as determinants of perceptions of the amount of effort required to use the technology.

In the second group of hypotheses (from 4 to 7), we investigated potential candidates for the observed gender effect that can be deemed to be largely invariant over the life of the individual, such as risk propensity and personality traits. While almost by definition these cannot be manipulated or changed in any way, and may thus be deemed of more limited applicability by both researchers and practitioners, we believe knowing of their existence and importance is nonetheless valuable. At the very least, researchers can control for these constructs in future investigations and thus reduce any potential confounds, as well as better highlight the value and contribution of their research against the findings reported here. These personality traits, particularly neuroticism, seem to be involved in moderating the relationships between PE and EE, and BIs toward new technologies.

Finally, we investigated the roles that computer SE and CANX may play in moderating these relationships. Interaction effects involving these constructs showed large effect sizes when explaining variance in the dependent variable of interest, adoption intention. These large effects, in addition to the extensive literature dealing with interventions able to improve those perceptions, make these two variables particularly attractive as targets for further research. While we believe that further research, likely in the form of a research program, is required before these findings (or any others in the technology acceptance literature) can be practically applied in the design and development of technology artifacts, we do believe these results have direct implications for technology implementation and change management programs.

Hypotheses tests associated with these two variables, reported in Tables 9 and 10 in their role as moderators and in Table 11 in their role as antecedents, are very clear in their significance and direction: Both constructs have dual effects on intentions to adopt. First, higher levels of computer SE lead to higher PE associated with using the application, which in turn has a positive effect on the intention to adopt it. Furthermore, that last relationship is also strengthened for those users with higher levels of computer SE, leading to even more positive intentions toward the technology for any levels of EE. Through these two channels, computer SE significantly impacts technology adoption. Opposite effects can be seen for CANX: Users with higher levels of CANX perceive applications as being harder to use, which leads in turn to a more limited intention to adopt them in the future. As well, CANX negatively affects that relationship, such that potential adopters with higher levels of CANX are even less likely to adopt the technology.

These findings are even more relevant when considering the existence of extensive literature bearing on the modification of these two important constructs, largely based on the seminal work of Bandura (1986, 1997). There is also extensive work published on different intervention methods in the psychology, education, and management disciplines, and even within the information systems domain itself, directly concerned with computer self-efficacy (Davis & Yi, 2004; Johnson & Marakas, 2000; Yi & Davis, 2003). As a result, we believe the design and development of implementation and change management programs associated with the introduction of new technologies in the workplace could draw from these findings and others in this domain to incorporate those in the future.

One possible issue that may limit the contribution of this research is the degree of permanence of gender effects observed in technology acceptance research. Indeed, Venkatesh et al. (2003) interpreted some of their findings as indicating that gender differences in the use of information technology may be transitory and may possibly disappear as younger generations of users are raised in a environment where technology is pervasive. If that were the case, gender differences with respect to technology use may represent an area of research that, while certainly interesting, will slowly decrease in importance as those differences disappear over time. In this scenario, the value of our findings, which were obtained from a sample of business professionals, would be diminished. We believe, however, this not to be the case, for multiple reasons.

First, to the extent that gender differences in the use of information technology and other areas of life are the result of innate biological differences between the sexes, these are by definition permanent in the timespan in which social science researchers operate. Alternatively, if those differences are the result of one or more of the social and cultural factors affecting development discussed above, those would have to had changed drastically for the younger generations (now and in the future) for these differences to be transitory. As much as societies have changed in the last few decades in this regard, this is unfortunately not the case in many areas of the world, across countries of different economic conditions and societal values and traditions. For example, research conducted in five U.S. universities (Goh, Ogan, Ahuja, Herring, & Robinson, 2007) shows that the gender of a mentor has an effect on the extent to which students develop their computer SE, where students with male mentors exhibited higher levels of the construct than students with female mentors. In particular, women students who worked with male mentors reported higher levels of computer SE than women students who worked with female mentors. We take these findings as evidence that some of the culture-based gender issues discussed above still have an important impact on how students (and, later, professionals) of both genders develop their attitudes toward technology. Indeed, Goh and colleagues concluded that, ―Possibly the most important implication of this study is that IT-related programs that are committed to attracting and retaining women need to address deeply-seated stereotypes and praxis surrounding the roles of women in these departments" (p. 36).

Finally, there is evidence that, contrary to expectations that these differences may disappear or be tempered as younger generations are raised in a technology-pervasive environment, young individuals today still exhibit both gender differences in this regard, as well as difficulties using technology. The research just cited (Goh et al., 2007), as well as work by Mcilroy, Sadler, and Boojawon (2007) in the U.K., provide some evidence of this. In the first case, and in addition to the findings discussed above, the sex of the students significantly predicted their levels of computer SE, whereas age did not. In the study by McIlroy et al. (2007), between 33% and 41% of students surveyed exhibited some degree of computer phobia, as measured by two separate scales. Significantly, approximately 20% of the students exhibited moderate to high levels of computer phobia, an important minority. Moreover, the authors indicated these findings are in line with prior research going back more than 10 years; thus, the issue does not seem to have abated. Results from both studies are even more striking when considering data were collected from young populations of college students in developed countries, which one would expect, based on arguments by Venkatesh et al. (2003), to exhibit little of these difficulties. Altogether, we take these as evidence that the issue of gender differences related to information technology remains a worthwhile area of research.

CONTRIBUTION AND FUTURE RESEARCH

We believe this research makes several contributions to the rich stream of investigation into technology adoption in general and UTAUT specifically. The use of multiple technologies from which the selection was made combined with the use of actual technologies available within the domain of the professional subjects is, to our best knowledge, a first in the UTAUT literature. We also believe this study represents one of the first to meet the mandate brought forth by Davis, Venkatesh, and others to begin focusing our attention on practical applicability of the model rather than on investigating possibilities of additional explanatory power. To that end, we believe we have demonstrated UTAUT in an actual technology adoption setting and have furthered our understanding of its value thereof.

This research also represents a novel approach to modeling the relationships between the constructs of interest in order to further the comparability and consistency of the obtained results—by simultaneously including both the chosen and not-chosen technologies in the same model and constraining indicators to those that significantly loaded on their intended construct when direct effects on both intentions were present. The fact that the pattern of loadings was different between chosen and not-chosen technologies (particularly for the CANX construct) may in itself be a fruitful area of future research. It may indeed be the case that facets of the same concept play different roles in a context where comparisons between technologies are made.

It is important to note that the alternative constructs to gender tested herein displayed moderating effects with significant explanatory power over previously observed gender effects, both statistically and conceptually (i.e., they provide the ―why" behind the differences). While some of these moderators are largely stable over a lifetime (i.e., neuroticism), others are more malleable (i.e., computer SE, CANX) and thus provide for actionable mechanisms by which to influence technology selection (as gender provides social, and possibly legal challenges in this regard).

We believe the differential results obtained with regard to the chosen versus not-chosen technologies are a fruitful area for further investigation. More research is needed to understand the mechanisms and reasons for these disparate effects. While the underlying UTAUT model held very well in both cases (indicating a common approach to evaluation), the proposed moderators did not play a consistent role in the comparison. Another direction for future research may involve disentangling those factors that affect the overall ability to choose from those that have effects on only the chosen or only the not-chosen technology.

This research can be considered both replicative and exploratory in nature. Given this, future research should focus on explicitly investigating the alternative choice behaviors under consideration, rather than the more traditional focus solely on the chosen technology. In the case of technology selection, behavioral alternatives should include other possible technologies in the same choice set. In the case of individual acceptance of a technology already selected for use, alternatives might be related to resistance and thus use different evaluation models and/or approaches to arrive at a specific behavioral intention.

Further, alternative research methods that can capture the richness present in field settings where technology adoption decisions happen are strongly needed. This need goes beyond conducting survey research in field settings; rather, triangulation, verification, and enrichment of these results by qualitative means should also be a focus of attention. We believe conducting this research would allow researchers to uncover other factors involved in the multidimensional and complex nature of user acceptance of technologies that may help further our understanding of the phenomena and, possibly, have important design implications.

In closing, we believe the results of this research present an opportunity for both the academic and applied research communities to further explore the nature of the technology acceptance process such that its processes can be understood in a manner that allows for prescriptive actions to be taken to improve its outcomes. It is our hope that the relevant research communities will embrace this direction.

ENDNOTES

1. Personal pronoun use is intended to be inclusive.

2.Table 2a represents the PLS measurement for the base research model under study. For ease of exposition, we have chosen to exclude representation of the measurement models for the additional variables and relationships under study. They are available from the authors upon request.

3. These represent the four largest accountancy organizations in the world (Wikipedia, 2010).

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All correspondence should be addressed to
Miguel I. Aguirre-Urreta,
School of Accountancy and Management Information Systems,
College of Commerce, DePaul University,
1 E. Jackson Blvd.,
Chicago, IL 60604
maguirr6@depaul.edu

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APPENDIX A – LIST OF SURVEY ITEMS BY MEASURE

Demographics

What is your gender?

Male

Female

What is your age group?

- 18 - 25
- 26 - 35
- 36 - 45
- 46 - 55
- 56 - 65
- 66 or older

What is your highest level of education?

- Some high school or less
- Graduated high school
- Vocational/technical school
- Some college
- Graduated college
- Post-graduate study

Which of the following best represents your approximate household income?

- Less than $20,000
- $20,000 - $40,000
- $40,000 - $60,000
- $60,000 - $80,000
- $80,000 - $100,000
- $100,000 - $150,000
- $150,000 or more

Which of the following best describes your job level?

- Executive / Top Management
- Middle Management
- Supervisory
- Administrative / Clerical
- Technical

BSRI

For this section, please answer the questions as to how the term describes you best according to the following scale:

1 = Never or almost never true
2 = Usually not true
3 = Sometimes but infrequently true
4 = Occasionally true
5 = Often true
6 = Usually true
7 = Always or almost always true

Adaptable
Truthful
Affectionate
Compassionate
Eager to soothe hurt feelings
Gentle
Loves children
Sensitive to the needs of others
Sympathetic
Tender
Understanding
Conceited
Warm
Aggressive
Assertive
Defends own beliefs
Dominant
Forceful
Has leadership abilities
Independent
Strong personality
Willing to take a stand
Conscientious
Willing to take risks
Conventional
Jealous
Moody
Reliable
Secretive
Tactful

Computer Anxiety

Please indicate the extent to which you agree with each of the following statements, using a 7-point scale, where,

1 = Strongly disagree
2 = Disagree
3 = Somewhat disagree
4 = Neither agree nor disagree
5 = Somewhat agree
6 = Agree
7 = Strongly agree

I look forward to using a computer on my job
I hesitate to use a computer for fear of making mistakes that I cannot correct
If given the opportunity, I would like to learn about and use computers
I have avoided computers because they are unfamiliar and somewhat intimidating to me
I feel computers are necessary tools in both educational and work settings
The challenge of learning about computers is exciting
I am confident that I can learn computer skills
Anyone can learn to use a computer if they are patient and motivated
Learning to operate computers is like learning any new skill – the more you practice, the better you become
I am afraid that if I begin to use computers I will become dependent upon them and lose some of my reasoning skills
I feel apprehensive about using computers
I have difficulty in understanding the technical aspects of computers
It scares me to think that I could cause the computer to destroy a large amount of information by hitting the wrong key

[*Note*: Reverse-coded items are in italics]

Locus of Control

My life is determined by my own actions
My life is chiefly controlled by powerful others
It's chiefly a matter of fate whether or not I have a few friends or many friends
Often there is no chance of protecting my personal interest from bad luck happenings
I am usually able to protect my personal interests
I can pretty much determine what will happen in my life
When I make plans, I am almost certain to make them work
Even if I were a good leader, I would not be made a leader unless I play up to those in positions of power
It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune
I feel like what happens in my life is mostly determined by powerful people
Whether or not I get to be a leader depends on whether or not I'm lucky enough to be in the right place at the right time

[*Note*: Reverse-coded items are in italics; same response instructions as the previous measure]

Neuroticism

My mood often goes up and down
Sometimes I feel miserable for no reason
I am an irritable person
My feelings are easily hurt
I often feel "fed up"
I am often tense or high strung
I often worry too long after an embarrassing experience
I often feel lonely
I am often troubled by feelings of guilt

[Note: Same response instructions as the previous measure]

Performance Expectancy

The system would be useful for the job under analysis
Usage of the system will allow tasks to be completed more quickly
Usage of the system will lead to increased productivity
Using the system can increase the quality of output on the job

[Note: Same response instructions as the previous measure]

Effort Expectancy

Interactions with the system would be clear and understandable
It would be easy to become skillful at using the system
The system would be easy to use
Learning to operate the system would be easy

[*Note*: Same response instructions as the previous measure]

Self-esteem

I feel that I am a person of worth, at least on an equal plane with others
I feel that I have a number of good qualities
I am able to do things as well as most people
All in all, I am inclined to feel that I am a failure
I feel that I do not have much to be proud of
On the whole, I am satisfied with myself
I wish I could have more respect for myself

[*Note*: Reverse-coded items are in italics; same response instructions as the previous measure]

Behavioral Intention

I would choose this software to be implemented in my organization
If this software package were available, I would likely recommend it for adoption in my organization
I would propose this package as a good candidate for the needs of my organization

[*Note*: Same response instructions as the previous measure]

Generalized Computer Self-Efficacy

For each of the following questions please select YES or NO. If yes, indicate how confident you are with your ability (100-point scale).

I believe I have the ability to describe how a computer works
I believe I have the ability to install new software applications on a computer
I believe I have the ability to identify and correct common operational problems with a computer
I believe I have the ability to unpack and set up a new computer
I believe I have the ability to remove information from a computer that I no longer need
I believe I have the ability to understand common operational problems with a computer
I believe I have the ability to use a computer to display or present information in a desired manner

Risk Propensity

The following 10 questions present two alternative options to choose from. Both options are equivalent in terms of their expected value. Please indicate your selection without making any mental calculations.

100 chances out of 100 to GAIN 10,000 dollars or 25 chances out of 100 to GAIN 40,000 dollars / 75 chances out of 100 to GAIN nothing

100 chances out of 100 to GAIN 20,000 dollars or 20 chances out of 100 to GAIN 100,000 dollars / 80 chances out of 100 to GAIN nothing

100 chances out of 100 to GAIN 30,000 dollars or 10 chances out of 100 to GAIN 300,000 dollars / 90 chances out of 100 to GAIN nothing

100 chances out of 100 to GAIN 40,000 dollars or 30 chances out of 100 to GAIN 133,333 dollars / 70 chances out of 100 to GAIN nothing

100 chances out of 100 to GAIN 50,000 dollars or 40 chances out of 100 to GAIN 125,000 dollars / 60 chances out of 100 to GAIN nothing

50 chances out of 100 to GAIN 15,000 dollars / 50 chances out of 100 to GAIN 5,000 dollars or 30 chances out of 100 to GAIN 33,333 dollars / 70 chances out of 100 to GAIN nothing

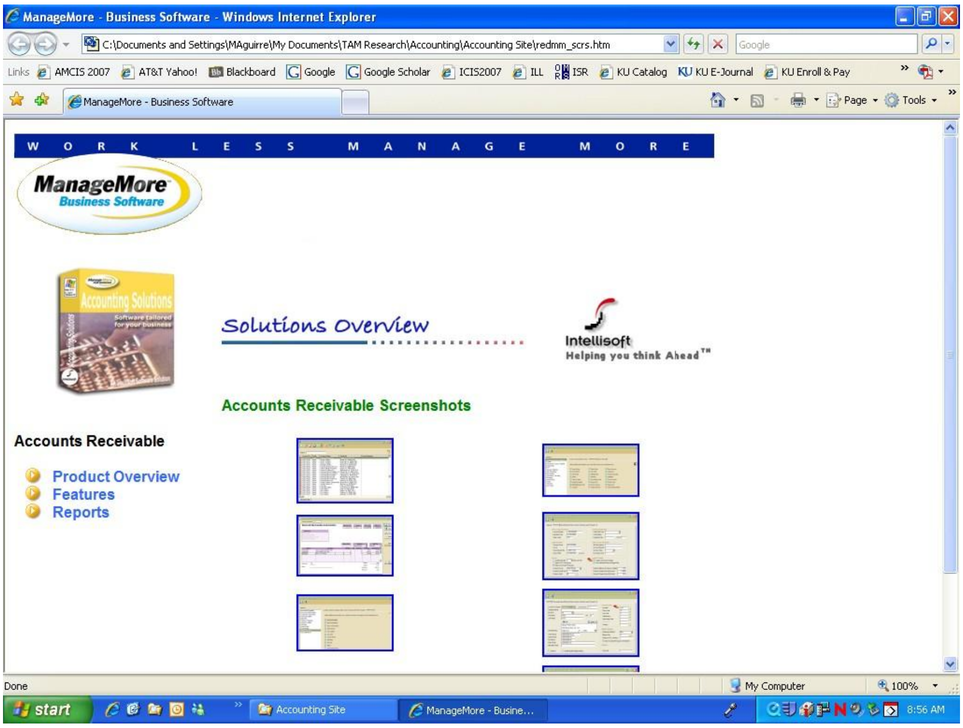
60 chances out of 100 to GAIN 25,000 dollars / 40 chances out of 100 to GAIN 12,500 dollars or 25 chances out of 100 to GAIN 80,000 dollars / 75 chances out of 100 to GAIN nothing

50 chances out of 100 to GAIN 40,000 dollars / 50 chances out of 100 to GAIN 20,000 dollars or 25 chances out of 100 to GAIN 120,000 dollars / 75 chances out of 100 to GAIN nothing

40 chances out of 100 to GAIN 50,000 dollars / 60 chances out of 100 to GAIN 33,333 dollars or 20 chances out of 100 to GAIN 200,000 dollars / 80 chances out of 100 to GAIN nothing

50 chances out of 100 to GAIN 75,000 dollars / 50 chances out of 100 to GAIN 25,000 dollars or 30 chances out of 100 to GAIN 250,000 dollars / 70 chances out of 100 to GAIN nothing

APPENDIX B – SCREENSHOTS OF EXPERIMENTAL MATERIALS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ManageMore Business Software
Solutions Overview
Intellisoft
Helping you think Ahead™
Accounts Receivable Screenshots
Accounts Receivable
Product Overview
Features
Reports
Done
My Computer
100%
start
Accounting Site
ManageMore - Busine...
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