

A COMPARATIVE EXAMINATION OF INDIVIDUAL DIFFERENCES AND BELIEFS ON TECHNOLOGY USAGE: GAUGING THE ROLE OF IT

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ABSTRACT

This research examines the invariance of individual differences and belief variables across two technologies. Previous research has demonstrated that e-Commerce is more complex than Internet technologies; thus, examining the two technologies simultaneously provides further insight into the influence of the IT itself on usage behavior. Using a framework that is theoretically grounded in the Technology Acceptance Model (TAM) and tested through TAM and the Graphic, Visualization, & Usability (GVU) Center's 10th WWW User Survey scale items, study results indicate that different factors drive the Internet and e-Commerce usage decision.

Keywords: Technology Acceptance; User Beliefs; Electronic Commerce

INTRODUCTION

Collectively, the information systems literature suggests that factors contributing to IT acceptance vary with the technology, target users, and context [20]; consequently, the identification of factors that consistently predict the technology acceptance decision has proven to be challenging. [16] expressed alarm at the extreme variance among findings noting that factors found to be important for one innovation study are found to be considerably less important, not important at all, or even inversely important in another study. Despite the lack of success in identifying specific factors, the adoption literature demonstrates the salience of three classes of variables — individual differences, social influences, and perceptions regarding the features of a technology — on the technology acceptance decision. Individual differences refer to dissimilarities among people including differences in perceptions and behaviors, traits and personality characteristics, and circumstances [1]. Social influences are generally studied within the context of normative and control beliefs. Normative beliefs refer to the attitudes and beliefs of referent others, which help shape behavior through overt communication or more subtle forms of suggestions, whereas control beliefs are intended to capture the individual's perception of socially constructed constraints and opportunities [27]. Finally, perceptions regarding the features of a technology represent an individual's cognitive evaluation of the consequences of using a particular technology.

A sizeable number of studies have successfully integrated these three classes of variables into Davis' Technology Acceptance Model (TAM) [13]. TAM is grounded in the assumption that people form an intention toward adopting a technology based on their beliefs about the consequences of adopting and their evaluation of these consequences. The framework highlights a beliefs-attitude-

intentions continuum whereby a variety of external factors influence beliefs; beliefs and subjective evaluations produce attitudes; and attitudes predict intention behavior. TAM has garnered widespread empirical support explaining approximately 40 percent of the variance in behavioral intention. In its original conceptualization, TAM examined perceptions related to the features of a technology. Later studies employ a TAM framework to examine individual differences (e.g., [1], [41]) and a variety of social influences including subjective norms (e.g., [14], [36], [41]), communication channels (e.g., [15], [28]), image (e.g., [41], [27]), trust (e.g., [19]) and other social factors (e.g., [41], [11]). In most instances, the mixed empirical results underscore the salience of population, context, and technology on findings.

Some researchers (e.g., [16], [17], [35]) point to various attributes of technologies as a potential cause for the paradoxical findings. From an organizational perspective, [16] reports that a primary attribute, such as cost or complexity, allows a technology to be classified without reference to a specified organization thus implying that studies based on primary attributes will be more consistent because users view the technology in the same way. Secondary attributes, on the other hand, embody more subtle differences such as whether the technology is viewed as routine or radical, as a means or an ends, and/or a variation or reorientation. Consequently, study results may be contradictory because of the differing impact of the technology on users.

[17] introduced a related argument by distinguishing between two types of technologies in terms of the knowledge burden that each type imposes on the user. Type 1 technologies (e.g., personal computers, word processing packages, graphics software) are generally independent use technologies that are intended to facilitate self-contained tasks performed by individual users. These technologies impose a relatively small knowledge burden and typically require only a few hours of training before users achieve basic proficiency. In contrast, Type 2 technologies (e.g., software development process technologies) involve significant knowledge barriers to adoption including a lengthier training process and a situation where user ability, not just willingness to use, is a determining factor. As such, experience, attitudes, training, and supervisory desires become valid predictor variables [31]. Differing study results, then, may be attributable to differences in the ability to manipulate the technology.

[35] point to the fact that not enough attention is paid to the technology itself as well as to the tendency to treat technologies as an independent and stable constant despite the empirical evidence that highlights the impact of system design on perceptions and use. Adopting the perspective that technology use is a function of how

the technology merges with the social environment, they point to the salience of cultural, normative, and regulatory influences on the usage decision. Consequently, the inconsistencies in findings among studies may be attributed to contextual differences.

In response, this study examines the invariance of individual differences and belief variables on two technologies — the Internet and e-Commerce. A sizeable literature has demonstrated the empirical validity of the TAM instrument on both the *Internet/WWW* (e.g., [11], [22], [23], [40]) and *e-Commerce* (e.g., [19], [20], [26], [28], [30]) despite the fact that e-Commerce embodies a more complex process that transcends the boundaries of a web (or Internet) interface [20]. Given this difference in complexity, examining the two technologies simultaneously may provide further insight into the influence of IT on usage behavior. To achieve this research objective, we capture individual differences and belief constructs from TAM-based studies and a satisfaction construct in response to [5]'s finding that satisfaction is a key predictor of the continued use decision. Variables that measure an individual's satisfaction and level of comfort with using technology are extracted from The Graphic, Visualization, & Usability (GVU) Center's WWW User Survey [21], developed by researchers at Georgia Institute of Technology. Given the empirical support for TAM and [5]'s IS Continuance Model coupled with the GVU's success in capturing a variety of user characteristics, adopting key variables from these sources may lead to valuable insights into the adoption decision.

The paper is organized as follows: the first section reviews the influence of individual differences and usefulness beliefs on IT adoption. The second section aligns the TAM with the GVU 10th Survey and presents the measurement model and hypotheses. The third section outlines the research findings while the final section provides conclusions and directions for future research.

LITERATURE REVIEW

The technology acceptance research domain draws from a number of frameworks including those developed in social psychology, learning theory, organizational dynamics, and decision-making literature. A sizeable body of literature has targeted user perceptions, social/normative influences, beliefs, and attitudes based on the empirical support of several acceptance and diffusion models including the Theory of Reasoned Action (TRA) [3], Theory of Planned Behavior (TPB) [4], Diffusion of Innovation [37], and the Technology Acceptance Model (TAM) [13]. The TRA, which measures voluntary usage behaviors, posits that beliefs influence attitude formation and intentions, which in turn influence user behavior. The TPB incorporates the notion of perceived behavioral control as an independent influence on behavioral intention. Diffusion models capture perceptions as antecedents to the decision to adopt a technology. Key diffusion constructs include the innovation's perceived attributes, the individual's attitudes and beliefs, and communications received from the social environment regarding the innovation [27]. In contrast, TAM employs a beliefs-attitude-intentions paradigm that predicts technology acceptance by measuring behavioral intentions through two belief constructs: perceptions of usefulness (PU) and ease of use (PEOU). Attitudes and usefulness beliefs are significantly correlated with intentions while ease of use beliefs predicts usefulness perceptions.

A considerable number of TAM-based studies examine intentions and use within the context of Internet and e-Commerce technologies (e.g., [9], [15], [20], [28], [29], [33]). Since the intent

of this study is to determine whether different factors influence the use of the Internet and e-Commerce, the fact that the TAM instrument has proven to be robust with both technologies indicates that it is a suitable theoretical framework. The most common uses for the Web, in rank order, include browsing, entertainment, work, and shopping. A 2004 Stanford University study [38] of 1,518 users ranging in age from 18 to 64 years found that online users typically spend their time e-mailing, instant messaging, or in chat rooms (57 percent); playing games (20 percent), surfing (15 percent surfing), and shopping (10 percent).

To strengthen our focus on the technological itself, we limit our selection of variables to those that have been identified as valid predictors of intentions and usage behavior in multiple studies. Previous TAM research has demonstrated that individual differences, as an external variable, are a valid predictor of technology acceptance. Individual differences refer to dissimilarities among people including differences in perceptions and behaviors, traits and personality characteristics, and circumstances [1], [42]. While some differences such as age, gender, and education have resulted in mixed findings, other factors such as self-efficacy, satisfaction, and comfort have emerged as largely consistent predictor variables.

Self-efficacy, or an individual's judgment of their ability to perform a computer related task, has received substantial empirical support as an antecedent to technology use. Some [e.g., 12] report that self-efficacy will not only predict technology use over a lengthy period of time but will influence choices about what technologies to adopt and how each will be used. As an antecedent to usefulness beliefs, [8] reports a significant, albeit negative relationship between self-efficacy and PU that is attributed to a user's ability to realize the benefits and limitations of a technology when the level of computer literacy is high. While some studies grounded in Social Cognitive Theory (SCT) report that the influence of self-efficacy on use is short term (as cited by [41]), performance expectancy [41], a construct similar to self-efficacy, demonstrated a strong, significant link with intentions across three time periods.

Because satisfaction is generally conceptualized as a psychological or affective state, it is classified as an individual difference. This study adopts [5]'s satisfaction construct rather than TAM's attitude construct based on [24]'s finding that attitude represents an emotion (e.g., pleasure) while satisfaction represents an evaluation of that emotion (i.e., whether a consumption experience was as pleasurable as expected). In [5]'s IS Continuance Model, usefulness and confirmation (a cognitive appraisal of the expectation-performance discrepancy) are antecedents to satisfaction, a reliable predictor of the intent to continue to perform a behavior. GVU results underscore the efficacy of the satisfaction variable since 90 percent of respondents indicated satisfaction with their computer skills and 96 percent were *somewhat* or *very comfortable* with their Internet skills. Consequently, we use both satisfaction and comfort with using computers and the Internet as a measure of an individual's favorable disposition toward technology.

Beliefs

The beliefs construct is intended to capture the usefulness of the two technologies in terms of productivity and user benefit dimensions. Usefulness has consistently demonstrated a strong correlation with intentions in both voluntary (e.g., [34], [36]) and mandatory use (e.g., [7], [43]) environments as well as in

the continued use (or post adoption) decision [5]. The predictive validity of the usefulness construct using both Internet and e-Commerce technologies has also been established. [19] and [20] reported a significant relationship between usefulness and e-Commerce intentions and adoption. [20] examined the usefulness construct within an e-Commerce environment and concluded that the PU construct influenced adoption of a Web site for both purchase and inquiry objectives. In other work, [34] reported a significant correlation between perceived near-term consequences (a proxy for the usefulness construct) and Internet/WWW use. It is worth noting, however, that [29] concluded that the predictive validity of the usefulness construct is limited to work-related (rather than entertainment-related) usage behavior.

Aligning TAM with the Gvu 10th Survey

A key objective in developing the TAM was to capture beliefs (ease of use and usefulness) that influence an individual's intention to use a technology. Analogously, the Graphic, Visualization, & Usability (GVU) Center's WWW User Survey, developed by researchers at Georgia Institute of Technology and first administered in 1994, is intended to capture beliefs (e.g., satisfaction, comfort) that influence technology use. A key difference between the two instruments is that TAM examines intentions to use a technology while the Gvu embodies a post adoption context since it captures past and current usage. However, [25] reports that intentions predict both self-reported and actual usage when an information system has already been installed. As an added precaution, variables in this study are limited to those that have demonstrated predictive validity in both cross sectional (e.g., intentions) and longitudinal (e.g., continued use) studies.

Based on the shared intent of the two instruments, we develop a framework that captures use within the context of Internet and e-Commerce technologies. The framework is theoretically grounded in TAM and tested through TAM and Gvu scale items to assess the invariance of the identified constructs across technologies. Given the wide empirical support of the TAM with respect to usefulness beliefs predicting technology use coupled with Gvu's success in capturing satisfaction and comfort beliefs, extracting scale items from both instruments may lead to valuable insights.

RESEARCH METHOD

The research framework models individual differences, usefulness beliefs, and satisfaction relative to Internet and e-Commerce use. The proposed models depict a unidirectional *individual differences-beliefs-behavior* continuum to measure the relative strength of the association between these factors on usage

behavior. Given the previous empirical support for individual differences and beliefs, it is expected that the variables will provide insight into the salience of the technology. The research model is shown in Figure 2.2.1.

Behavior

The behavior construct represents a user's subjective estimate of the amount of time or frequency that he/she actually spends using the technology. The construct captures both work and entertainment related use. The Internet conceptualization examines use as a function of the time spent working or playing on the Internet while the e-Commerce conceptualization examines use within the context of shopping online for personal and professional reasons.

Individual Differences

Individual differences are measured (using a 5 point Likert scale) within the context of self-efficacy, satisfaction, and comfort levels primarily because the constructs have received previous empirical support in multiple cross sectional and longitudinal studies. Self-efficacy which is an individual's judgment regarding their ability to use a computer, is operationalized in terms of an individual's assessment of their skill level in performing computer related tasks. Satisfaction reflects an individual's affective evaluation of their computer skills and is measured in terms of the level of satisfaction. Finally, comfort refers to an individual's propitious feelings regarding their use of computers and the Internet and is also measured in terms of the level of comfort.

Beliefs

Beliefs are measured with TAM scale items, which capture productivity and benefit dimensions in terms of a user feeling more productive and realizing the benefits of the technology. The PEOU construct is excluded because although it has a significant effect on intentions, it is less important in explaining post adoption usage (e.g., [18], [20]).

Hypotheses

Based on Fichman's Type 1 and Type 2 classifications, it would appear that e-Commerce, as a Type 2 technology, would impose a heavier knowledge burden on users (e.g., recall [20]'s argument that e-Commerce represents a more complex activity than merely surfing). Yet Gvu results demonstrated that nearly 33 percent of *novice* users reported shopping online. This finding presents an opportunity to examine whether the salience of self-efficacy (a subjective judgment regarding one's ability to perform

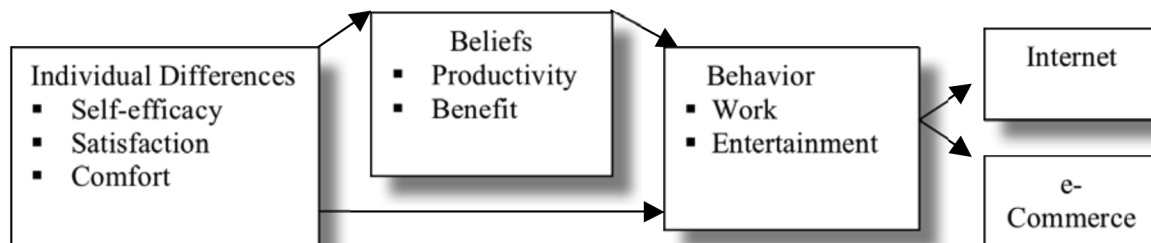


Figure 2.2.1: Conceptual Model

computer related tasks) is more closely aligned with e-Commerce usage behavior. Given the increased complexity of e-Commerce technologies coupled with the security issues that e-Commerce presents (e.g., identify theft, credit card fraud), we believe that the two technologies will differ with respect to the salience of the self-efficacy variable. As such, we predict that self-efficacy will be more strongly correlated with the e-Commerce usage decision relative to the Internet use decision.

H1: Self-efficacy will be more strongly correlated with the e-Commerce usage decision compared to the Internet use decision

While [20] reports that the usefulness construct influences the adoption of a Web site for both purchase and inquiry objectives, [29] reports that its correlation with use is limited to work related contexts. Since the primary Internet activities are entertainment-related (e-mailing, instant messaging, game playing, etc), as reported in the Stanford University study, it is possible that beliefs regarding the usefulness of the technology are less important for Internet users. Given this difference between the two technologies, we predict that usefulness will mediate the relationship between individual differences and use in the e-Commerce model.

H2: Usefulness beliefs will mediate the relationship between individual differences and e-Commerce use but not Internet use.

Similarly, because the Internet use consists primarily of entertainment rather than work related activities, we predict the two technologies will differ with individual differences having a direct correlation with Internet use.

H3: Individual differences will be directly correlated with Internet use but not e-Commerce use.

Finally, e-Commerce's increased complexity (relative to Internet technologies) implies that it represents a more focused technology in that users generally have a viable reason for using. [1] noted that users may overlook skill deficiencies or the complexities of a technology when they have a definite purpose for using. It is conceivable that this would extend to one's level of comfort and satisfaction with using. In contrast, the use of an Internet technology is less focused; therefore, a favorable

disposition toward the technology (comfort) and a positive evaluation of the consequences of using (satisfaction) should be higher for Internet users as compared to e-Commerce users. Thus, we posit that satisfaction and comfort levels will be more strongly correlated with Internet use.

H4: Levels of satisfaction and comfort will be more strongly correlated with Internet use compared to e-Commerce use.

DATA ANALYSIS AND FINDINGS

Data Collection

The study sample is comprised of undergraduate students at a large University in the South-East USA. A questionnaire was administered to evaluate beliefs related to Internet and eCommerce usage. [38]'s report of the linkage between education and the use of Internet technologies coupled with the type of activities typically performed online (e.g., e-mailing, instant messaging, game playing, etc.) implies that college students are a suitable population for this type of study because they typically engage in such activities [39]. Moreover, nearly 88 percent of GVU respondents reported having at least some college, a finding that mirrors the Stanford University finding that 76 percent of respondents reported having at least some college. Thus, the use of college students demonstrates a satisfactory fit with the demographics of online user identified in both the GVU and Stanford studies. The sample consisted of 593 engineering and business students. Each student possessed general computer skills and had computer and Internet access provided through numerous university computer laboratories. The survey instrument was administered in a classroom setting thereby providing a response rate of over 90 percent.

Measurement Model

A confirmatory factor analysis using LISREL 8.7 was conducted to test the measurement models. The model fit is evaluated based on a variety of indices generated by LISREL and shown in Table 3.2.1.

Table 3.2.1 demonstrates that the recommended thresholds for all statistics are met or exceeded in both the Internet and e-Commerce Models. The Non-Normed Fit Index and the Comparative Fit Index, which measure the superiority of the model

Table 3.2.1: Goodness of Fit Statistic

Measure	Internet Model	E-Commerce Model
Goodness of fit (GFI)	.98	.97
Adjusted goodness of fit (AGFI)	.95	.97
Non-normed fit index (NNFI)	.96	.96
Comparative fit index (CFI)	.998	.97
Root Mean Square Error Approximation (RMSEA)	.06	.07
RMSEA Confidence Interval	.05 - .08	.05 - .09
Root mean square residual (RMR)	.02	.03
Standardized RMR	.03	.03
Expected cross validation index (ECVI)	.17	.18
Confidence interval for ECVI	.14 - .22	.15 - .23
Incremental Fit Index	.98	.97

Table 3.2.2: Factor Loadings and Reliability Analysis

Factor Name	Scale Items	Factor Loading	Alpha
Individual Differences	REQSKILL	.71	.82
	SATSKILL	.76	
	COMFCOM	.85	
	COMFINT	.80	
Beliefs	PRODUCT	.85	.72
	BENEFIT	.88	
Behavior	TIMEWORK	.83	.59
	TIMEPLAY	.81	
	FREQPERS	.85	.72
	FREQPROF	.88	

REQSKILL = required skill, SATSKILL = satisfaction with skill, COMFCOM = comfort using computers, COMFINT = comfort using the Internet, PRODUCT = productivity, BENEFIT = benefits, TIMEPLAY = time spent playing, TIMEWORK = time spent working, FREQPERS = online shopping for personal reasons, FREQPROF = online shopping for professional reasons

fit as compared to a baseline or independence model, exceeds .90 when an adequate model is represented. The ECVI represents an index of how well a solution obtained in one sample is likely to fit an independent sample or alternative model and is assessed based on the statistic fitting within a specific confidence interval. We include the RMSEA for three reasons: 1) it is adequately sensitive to model misspecification, 2) it provides a means to develop appropriate conclusions about model quality, and 3) it provides a confidence interval [32]. The RMSEA statistic, which should be less than .10, is 0.06 and 0.07 for the Internet and e-Commerce models respectively. In line with accepted practices, both RMSEA figures fall within a range that does not exceed the 10 percent benchmark. Collectively, these statistics indicate that the model is parsimonious and robust with respect to goodness of fit measures.

Construct validity determines the extent to which a scale measures a variable of interest and is assessed through tests of convergent and discriminant validity. The former represents the degree to which two or more measures co-vary while the latter measures the degree to which two or more concepts are unique. The reliability and convergent validity of the constructs were estimated by Cronbach's alpha, principal components analysis, and the squared multiple correlations respectively. In line with recommended guidelines, the reliability of all scale items exceeds the .70 threshold with the exception of the time playing/time

working constructs (.59). Factor loadings on the Individual Differences, Beliefs, and Behavior scales indicated that each model demonstrated convergent validity with factor loadings well in excess of the 0.60 benchmark. Further, each indicator loaded on a distinct factor (with eigenvalues in excess of 1) providing evidence of discriminant validity. Factor loadings and reliabilities are reported in Table 3.2.2.

To examine discriminant validity we compared the shared variances between constructs with the average variance extracted for the individual constructs. The analysis shows that the shared variance between constructs was lower than the average variance extracted for individual constructs thus confirming discriminant validity. The correlation matrix, shown in Table 3.2.3, demonstrates that multicollinearity is not a problem since the largest correlation, at 0.69, is below the .80 cutoff recommended by [6].

Hypothesis Testing

Hypothesis 1 posits that perceptions of self-efficacy will be more closely tied to e-Commerce use as compared to Internet use. To test this hypothesis, we regressed the e-Commerce dependent variables (frequency of online shopping for personal and professional reasons) and then the Internet dependent variables (time spent playing and working on computers) on the self-efficacy construct. The hypothesis is supported with results indicating a significant difference in the linkage between self-efficacy and use in the two models. The association between self-efficacy and shopping online for personal reasons ($F=5.73$, $df=4$, $p<.001$) and shopping for professional reasons ($F=2.790$, $df=4$, $p<.05$) is significant in both cases. In contrast, the association between time spent playing on computers ($F=.167$, $df = 4$) and time spent working on computers ($F=.797$, $df=4$) was insignificant, which provides sufficient evidence to support the hypothesis.

Hypothesis 2 states that usefulness beliefs will mediate the relationship between individual differences and e-Commerce use. Three regressions are performed to test for mediation [6]: (1) regressing the mediator on the predictor variable(s), (2) regressing the dependent variables on the predictor variables, and (3) regressing the dependent variable(s) on both the predictor and

Table 3.2.3: Correlation Matrix

Variable	Mean	S.D.	1	2	3	4	5	6	7	8	9	10
1 Satisfaction	4.1	.87	1									
2 Required Skill	4.2	.79	.44	1								
3 Comfort with Computers	4.3	.85	.53	.59	1							
4 Comfort with the Internet	4.5	.79	.56	.44	.69	1						
5 Productivity	4.1	.84	.32	.37	.37	.38	1					
6 Benefit	4.2	.76	.26	.30	.26	.35	.56	1				
7 Time Playing	2.3	1.2	-.18	-.18	-.29	-.23	-.16	-.17	1			
8 Time Working	2.3	1.2	-.22	-.16	-.27	-.21	-.24	-.17		1		
9 Online shopping (personal)	3.9	1.2	.20	.25	.19	.19	.20	.21			1	
10 Online shopping (prof'l)	4.2	1.1	.13	.16	.14	.08	.15	.14				1

mediator variables. If the predictor variables are significant on the second regression and insignificant on the third regression, a mediating effect is present. When usefulness is regressed on individual differences, self-efficacy (required skill) is significant with respect to productivity beliefs ($F=4.97$, $df=4$, $p<.001$) and the perceived benefits ($F=4.45$, $df=4$, $p<.005$) of the technology. Comfort with computers ($F=2.64$, $df=4$, $p<.05$) and satisfaction with one's skill level ($F=2.83$, $df=4$, $p<.05$), however, are only significant with respect to the productivity dimension of usefulness. When the dependent variables in the e-Commerce model are regressed on the individual differences variables, a significant relationship is found between self-efficacy (required skill) and frequency of shopping online for personal ($F=5.73$, $r^2=0.09$, $df=4$, $p<.001$) and professional ($F=2.79$, $r^2=0.05$, $df=4$, $p<.05$) reasons. The other variables (comfort with computers, comfort with the Internet, satisfaction) demonstrate an insignificant linkage. Consequently, the hypothesis is partially supported. Usefulness mediates the relationship between comfort with computers and satisfaction (in terms of the productivity dimensions of usefulness) while self-efficacy demonstrates a direct link with the usage decision.

Hypothesis 3 posits that there is a direct correlation between individual differences and Internet use. To test for this effect, the work and entertainment related behavior variables are regressed onto individual differences. Results indicate that only comfort with computers demonstrates a significant link for both entertainment ($F=3.68$, $r^2=0.09$, $df=4$, $p<.001$) and work related usage ($F=3.53$, $r^2=0.10$, $p<.001$).

Hypothesis 4 states that satisfaction and comfort are more strongly correlated with Internet use compared to e-Commerce use. This hypothesis was tested by entering all variables into the equation and then removing each variable separately and as a block to see if a significant change in the value of F occurred. Results indicated that in the Internet model, the removal of the comfort and satisfaction variables lead to a significant change in the predictive validity of the model. In terms of time spent playing on the Internet, the changes induced by the removal of the comfort variables ($F=15.8$, $p<.001$) and satisfaction variables ($F=18.6$, $p<.001$) caused a significant change in the F value. The same result occurred with respect to the time spent working variable where the removal of the comfort ($F=9.74$, $p<.001$) and satisfaction ($F=29.26$, $p<.001$) resulted in a significant change in the model. The e-Commerce model did not result in a similar finding. In the case of shopping for professional reasons, there was no change in the significance of the model when the comfort and satisfaction variables were removed. In the case of the shopping for personal reasons, a slight change occurred when the comfort variables ($F=3.2$, $p<.05$) were removed.

DISCUSSION AND LIMITATIONS

This study examined the invariance of individual differences and usefulness beliefs on two technologies — the Internet and e-Commerce. The purpose was to determine whether the technology exerts an influence on the efficacy of variables that have received empirical support in previous studies. Results indicate that different factors drive Internet and e-Commerce use decision. A major difference with respect to the individual differences variable is that self-efficacy is closely associated with e-Commerce technologies whereas comfort with computers is more closely linked to Internet technologies. The signifi-

cance of the self-efficacy construct may be attributable to the increased knowledge burden as well as the risk (e.g., identity fraud) that users face when using e-Commerce technologies. An interesting finding is that while *comfort with computers* exerts an influence on both entertainment and work related usage behavior, there is no relationship between *comfort with the Internet* and use. Survey respondents were clearly comfortable using both computers and the Internet (88 and 90 percent respectively); therefore, this result implies that once an individual is favorably disposed toward using computers, that affective response spills over into other areas of use including the Internet and e-Commerce.

Usefulness mediates the relationship between satisfaction (an individual's subjective evaluation of the consequences of using the technology) and comfort with computers and the usage decision, which provides support for the argument that e-Commerce is a more complex technology. One implication is that a website must be perceived as useful (rather than merely available) before an individual is willing to visit the site for either personal or professional reasons. In contrast, the salience of the productivity dimension is only true for work related Internet usage.

These results demonstrate that the efficacy of individual differences and beliefs are not invariant across technologies and provide additional support for the argument that more attention must be paid to the technology itself. Further, these findings demonstrate that some of the inconsistent results found in the literature may be attributable to the target technology employed in a particular study. [35] argue that there is not a "one-size-fits-all" conceptualization of use and these findings support that view. Moreover, these findings provide additional support for Fichman's (1992) argument regarding the need to investigate the potential knowledge burden that a technology imposes. This study found that the antecedents to e-Commerce use, as a complex technology, differed from those that were correlated with Internet use.

One limitation of this study is that while the two technologies differ in terms of complexity, additional insights may have been gained if there were a more substantial difference in the level of complexity. A second limitation is the generalizability of the study since the sample is comprised of undergraduate students. However, this sample population demonstrated a satisfactory fit with the demographics of online users identified in both the Gvu and Stanford research, and therefore was appropriate for the context of this study. The IS community may gain additional insight into antecedents to the individual usage decision if future studies compare simple and complex technologies simultaneously in an organizational setting.

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APPENDIX 1: SCALE ITEMS

Individual Differences Scale Items

Construct	Individual Differences Measures
SATSKILL	How satisfied are you with your current skill level?
REQSKILL	I have the required skills to accomplish most computer-related tasks, or at least know where to go to get answers
COMFCOM	How comfortable are you using computers?
COMFINT	How comfortable are you using the Internet?

Belief Scale Items

Construct	Belief Measures
PRODUCT	I use computers, including the Internet, to make me more productive
BENEFIT	I feel that use of the Internet directly benefits me in many ways

Behavior Scale Items

Construct	Behavior Scale Items
TIMEPLAY	How many hours a week do you spend on your computer, including time on the Internet, having fun/playing?
TIMEWORK	How many hours a week do you spend on your computer, including time on the Internet, for work/school?
FREQPERS	How often do you shop for personal reasons over the Internet? (including gathering product/service/vendor information, placing orders, making purchases, and/or customer support)
FREQPROF	How often do you shop for professional reasons over the Internet? (including gathering product/service/vendor information, placing orders, making purchases, and/or customer support)