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Abstract

Acceptance of information technology by targeted users has been examined considerably by previous information systems (IS) research. A review of extant literature suggests a focus on the effects of important individual differences, such as attitidinal beliefs, perceptions, basic computer skills, gender, and age. Several theoretical models or frameworks prevail and have been empirically tested using various technologies and/or organizational contexts. Few studies (if any) have investigated the impact of an individual's cognitive style on his or her technology acceptance decision. The current research discusses the relationship between cognitive style and technology acceptance and empirically tests hypotheses it suggests. We anchor our analysis using the KAI cognitive theory (Kirtons 1977) and conducts a survey study to test the effect of cognitive style on the individual's decision on whether to accept a new technology. We synthesize relevant previous research and propose a factor model that explains or predicts technology acecptance by targeted university students. Our model encompasses the effect of cognitive styl and includes other important acceptance drivers, and is tested empirically using the evaluative respeonses to Microsoft ACCESS™ by 428 undergraduate students. An investigative locus of our study is comparing the responses by innvotors and adapters. We observe that cognitive style to have a significant effect on the individual's technology acceptance decision-making, and that innovators are more likely to accept a new technology than adaptors. Using the subjects' responses, we test the model as a whole as well as the hypotheses it suggests. Based on our data analysis, we highlight our important findings and discuss their implications to user acceptance research as well as the practices for fostering use of information technology by university students.

Keywords: technology acceptance, cognitive style, individual differences

1. Introduction

Investigations of individuals' acceptance of information technology have received considerable attention from information systems (IS) researchers and practitioners alike. Different theoretical models or frameworks have been developed to explain or predict an individual's decision on whether or not to accept a new technology. Of particular prevalence are the Technology Acceptance Model (Davis 1989), the Theory of Planned Behavior (Ajzen, 1991), the Self-Efficacy Theory (Bandura 1977), and the Innovation Diffusion Theory (Rogers 1995). A review of extant literature suggests a focus on the effects of important individual differences, such as innovativeness (Agarwal and Prasad 1998), playfulness, self-efficacy, anxiety, gender, age, and others. Such differences have been shown to affect individuals' attitudinal beliefs, perceptions and evaluations of a new technology.

Effects of fundamental individual differences have been studied by researchers in IS, marketing, production management, and organizational behavior. People vary considerably in cognitive style, a fundamental characteristic that may influence their technology acceptance decisions. In this light, it is important to understand the relationship between cognitive style and technology acceptance of a new technology. Such understanding can provide valuable insights to designing effective technology training and dissemination plans for fostering greater acceptance among targeted users. Cognitive style has been examined in the context of organizational technology implementation (Benbasat and Taylor 1978) but its influence on individuals' acceptance of a new technology has not yet been investigated.

In this study, we develop a factor model for explaining university students' acceptance of new technologies. We empirically test the model and the hypotheses it suggests, using the evaluative responses to Microsoft ACCESS by 428 subjects. Our model consists of constructs that are derived from a synthesis of relevant prior research and represent key acceptance drivers of the user acceptance phenomenon studied. Our model is built upon multiple but related theoretical premises (including cognitive style) and its causal links suggest the hypotheses to be tested in the study. Specifically, we hypothesize cognitive style to have positive direct effects on perceived usefulness, perceived ease of use, and subject norm. In the next section, we review relevant previous research and discuss our motivation.

2. Literature Research and Motivation

Prior IS research has investigated user technology acceptance from different theoretical perspectives. Of particular importance is the Technology Acceptance Model (TAM), which is adapted from the Theory of Reasoned Action (Fishbein and Ajzen 1975). This model is parsimonious and has demonstrated reasonably satisfactory explanatory power for initial user acceptance across different technologies, organizational contexts and user groups. According to TAM, perceived usefulness and perceived ease of use are critical to the individual's technology acceptance decision-making.

In spite of its popularity and considerable empirical support, it has been criticized for parsimony. Mathieson (1991) concludes that TAM is predictive but does not generate enough of the information necessary for creating and promoting user acceptance. Venkatesh and Davis (2000) advocate the need for a better understanding of key technology acceptance determinants. A fundamental concern is the value of perceived usefulness and perceived ease of use, which are broad and often cannot generate point to specifics directly applicable for technology design and management interventions. A review of the literature suggests the validity of TAM, which can be and should be extended by incorporating other key acceptance determinants specific to the phenomenon studied. Thus, models that use perceived usefulness and perceived ease of use to mediate the effects of such determinants are desirable and can provide specific insights to improved technology design, user training, and management strategies for increasing technology acceptance. In this connection, understanding individual differences and their effects is critical.

Considerable prior research has investigated importance individual differences and their impacts on IS success outcomes. Various individual differences have been studied, including characteristics pertinent to demographic, situational, cognitive or personality-related consideration (Zmud 1979). Broadly, individual differences refer to prominent or noticeable dissimilarities between or among individuals, including perceptions and behaviors. According to TAM, the difference in individuals' beliefs about a technology is likely to affect their acceptance of the technology. Several IS studies have investigated the relationships between key individual differences and technology acceptance, including Alavi and Joachimsthaler (1992). The collective findings highlight the importance of user motivation and capability in organizational technology implementation.

Cognitive style is a fundamental individual characteristic and refers to consistent individual differences in preferred ways of organizing and processing information and experience. Prior IS research has examined how cognitive-style differences affect IS design and implementation (Benbasat and Taylor 1978). Zmud (1979) reports that cognitive style has significant effects on IS design and use. Cumulating findings from previous decision support research also suggest greater system usage and better individual performance when a decision aids matches the user's cognitive style (e.g. Davis 1989). However, few, if any studies have explicitly investigated the effect of cognitive style on individuals' technology acceptance decisions.

The theoretical premises of cognitive style include logical and non-logical processes in decision-making, the use of heuristics, and the distinct neurological activities associated with the two halves of the brain (Sperry 1973). Alternative conceptualization and operationalizations of cognitive style exists in the literature. Among them, the Kirton Adaption-Innovation (KAI) theory is well established and suggests individuals located on a continuum of cognitive style of problem-solving and decision-making that ranges from adoption to innovation. Both adaptive and innovative styles are fundamental cognitive styles but they are creative in different ways. Adaptors prefer operating in consensually-agreed paradigms and usually are skilled in initiating changes for improving or adapting current ways of doing things. On the other hand, innovators are likely to re-construct a problem and often tend to perceive the existing paradigm as a part of the problem rather than completely accepting it as is. An innovator prefers working outside the agreed paradigm and is often skilled in initiating changes manifesting different, if not fundamentally or drastically different ways of doing things.

Cognitive style affects how an individual processes information and learns. Findings from several studies suggest a significant correlation between cognitive style and job function (and performance) (Allinson & Hayes 1996). In our case, we posit that individuals who vary in cognitive style may considerably differ in their decision-making for whether or not to accept a new technology. Lucas (1975) suggests adapters to be more willing to use information systems, particularly systems based on quantitative models or mathematical methods. On the other hand, Huber (1983) questions the relevance of cognitive style in IS research. The cumulating emergence of robust instruments and encouraging resultant evidences show that such investigations "continue unabated". In the light of enduring concerns about how to get targeted users (such as university students, knowledge workers or business manager) to adopt a newly available technology, it is essential to understand and test how cognitive style may affect individuals' acceptance decision-making. This reinforces the importance of understanding the underlying processes linking individual traits to their behaviors.

3. Research Model and Hypotheses

We target the acceptance of Microsoft ACCESS™ by university students. The technology acceptance decisions by our subjects are expected to profoundly affect their performance at school and in workplaces as well as to greatly determine the dissemination of a new technology in various organizations and industry sectors. Specifically, we develop a factor model for explaining their acceptance decisions and empirically test the model using subjects' responses to Microsoft ACCESS™, a widely available PC-based relational database technology. As shown in Figure 1, our model states that an individual's actual use of a technology is jointly determined by perceived subject norm and his or her intention. Consistent with TAM, perceived usefulness and perceived ease of use shape an individual's intention for using the technology. In our context, key determinants of perceived usefulness and perceived ease of use include computer efficacy, information quality and cognitive style. Of particular importance in our empirical investigation are the direct effects of cognitive style on perceived usefulness, perceived ease of use, and subjective norm.

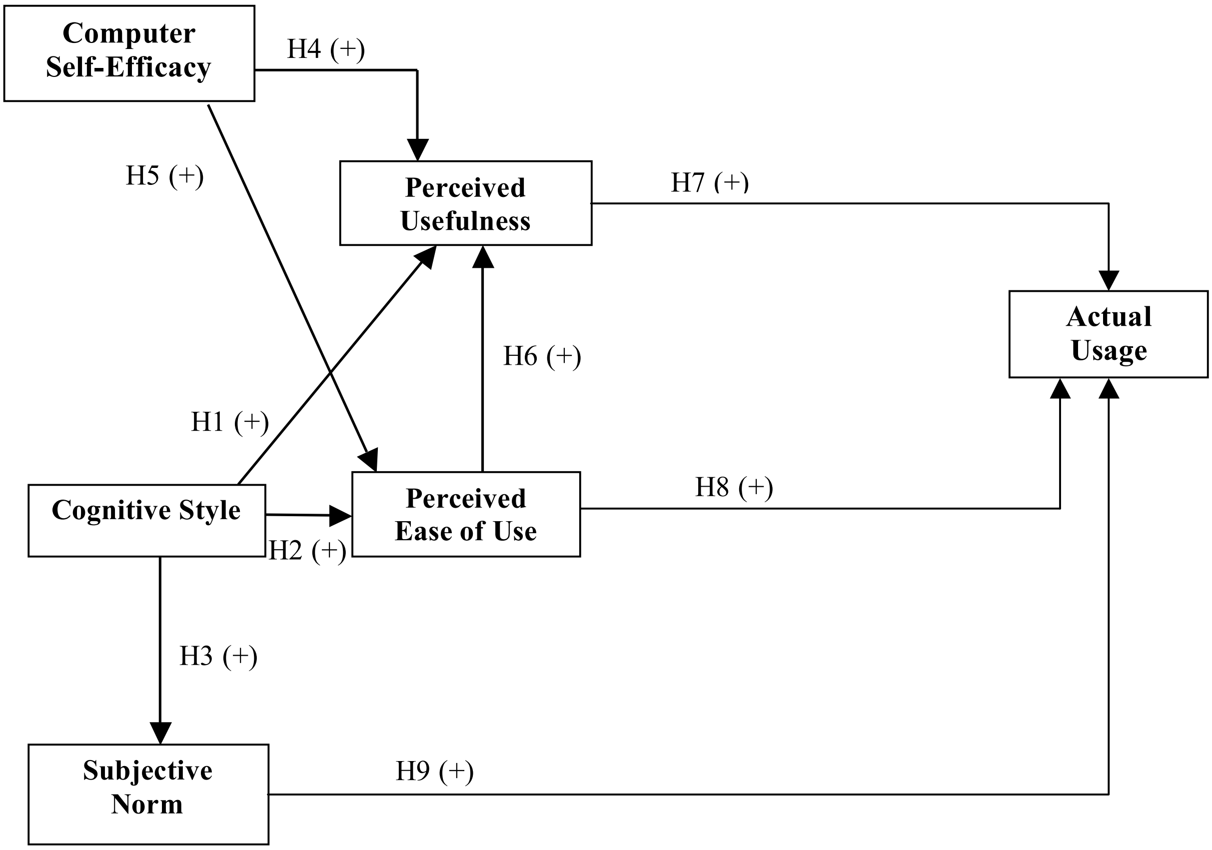

Figure 1: Research Model

Perceived usefulness refers to the extent to which an individual believes that using the technology will enhance her or his job performance, hereby reflecting the performance-use contingency (Davis 1989). The cumulating empirical evidences suggest perceived usefulness to be an important technology acceptance driver, such as Taylor and Todd (1995). We posit that cognitive style has a significant effect on perceived usefulness. In general, innovators are relatively non-conformists, prefer alternative approaches to problem solving and are fond of exploration. Therefore, innovators are more likely to appreciate the "utility" of a new technology than adaptors who, on the other hand, tend to be task-oriented and prefer existing or familiar ways of doing things. Accordingly, we test the following hypothesis.

H1: *Innovators are more likely to perceive higher perceived usefulness than adaptors.*

Perceived ease of use is the extent to which a person believes his or her use of a technology to be free of effort (Davis 1989). Perceived ease of use is concerned with an individual's assessment of the effort required for or involved in using a technology. While assessing whether or not to accept a technology, innovators think tangentially and attempt to find new ways of approaching the problem. They are more adept at dealing with unstructured solutions, including from unsuspected angles. Thus, innovators are likely to find the adapting an unstructured task such as evaluating a new technology easier than adapters. Perceptions of the comfort level of using a technology may be higher for innovators than for adapters. Therefore, we test the following hypothesis.

H2: *Innovators are more likely to perceive higher perceived ease of use than adaptors.*

The cognitive processing that takes place internally to an individual may determine to extent to he or she is influenced by the surrounding social system and its norms. Subjective norm refers to the degree to which an individual believes that people who are important to him or her think that he or she should perform the behavior in question (Fishbein and Ajzen 1975). Prior research show both peer and superior influences to be important to an individual's acceptance of a new technology (Mathieson 1991). Individuals vary in incorporating the opinions or feedback from referent others peers and superiors in their decision-making. Innovators are relatively insensitive to issues that threaten group cohesion or create differences or even conflicts in a group. They challenge rules and manage to shock people out of wits. Innovators are creative and tend to stand out by taking unique or unusual ways to approaching problems. Subjective norms developed by the superiors and peers in a social system may have weaker influences on innovators than on adapters who tend to comply with the existing norms or way of doing things. Hence, we test the following hypothesis.

H3: *Innovators are less likely to be influenced by subjective norms than adaptors*.

One of important constructs which have found consistent support as important predictors of an individual's cognitive interpretations of information technology is computer self-efficacy (Lewis et al 2003). Computer self-efficacy refers to an individual's judgment of his or her capability to use computers in different contexts (Compeau and Higgins 1995). Individuals with high computer self-efficacy are more likely to form positive perceptions of information technology and have been shown to use the technology more frequently as compared with those with low self-efficacy. Findings from these and other studies suggest computer self-efficacy to affect an individuals' assessment of a technology's usefulness and ease of use. Accordingly, we test the following hypotheses.

H4: *Computer self-efficacy has a significant positive effect on the perceived usefulness of a technology*.

H5: *Computer self-efficacy has a significant positive effect on the perceived ease of use of a technology*.

Based on the respective suggestions by TAM and TPB, we also test the following hypotheses.

H6: *Perceived ease of use has a significant positive effect on the perceived usefulness of a technology.*

H7: *Perceived usefulness has a significant positive effect on actual usage of technology.*

H8: Pe*rceived ease of use has a significant positive effect on actual usage of technology.*

H9: *Subjective norm has a significant positive effect on actual usage of technology.*

4. Research Design and Data Collection

To test our model and hypotheses, we conducted a survey study that involved 428 undergraduate students attending the business school of a major university located in the Western United States of America. Details of our survey instrument and data collections are as follows.

4.1 Survey Instrument Development

The items for measuring cognitive style were adopted from the three subscales of the 32-item KAI Inventory (Kirton 1976). When responding to each item, the subject was asked to reflect and present, consistently and for a long time, a certain image of himself or herself, as compared to others. We employed a 5-Point Likert scale for item, ranging from "very easy" to "very difficult" to indicate the degree of ease or difficulty with which he or she could present such an image portrayed by the presented measurement item. A low total score (summarized across all items) indicates a cognitive style leaning toward the adaptive end, whereas a high total score suggests a style closer to the innovative end of the continuum. The overall range of scores is from 32 (extremely adaptive) to 160 (extremely innovative), with a mean of 96. Findings from a considerable number of studies show a satisfactory internal consistency of the KAI, such as an average Cronbach's alpha of 0.88 and a test-retest reliability between 0.82 and 0.88.

Most of the items for measuring the constructs included in our model, were adopted from relevant prior research (such as Davis 1989), with appropriate wording choices or modifications to tailor to our study context; i.e., university students' using MS ACCESS. The scales for measuring perceived usefulness and perceived ease of use were adapted from those used by Igbaria (1990), which are similar to the scales used by Davis et al. (1989). We adopted the items for perceived ease of use, subjective norm, and behavioral intention from the previously validated measurement inventories (Davis 1989). We measured each item using a 5-Point scale, with 1 being "strongly disagree" and 5 being "strongly agree." We used the items developed by Compeau and Higgins (1995) to measure computer self-efficacy. The measurement items used in the study are listed in Appendix.

4.2 Data Collection

With the assistance from the instructors, we recruited subjects from the Introduction to Management Information Systems class required by the school studied. This course is designed to provide students with sufficient computer literacy for upper-division business classes and the business world. Common Microsoft Office applications (including Word, PowerPoint, Excel, and ACCESS) are included as part of the course curriculum. In our case, ACCESS was taught in a 5-week period, followed after MS Word, PowerPoint, and Excel. We collected subjects' responses at the end of the 5-week period designated for their learning and use of ACCESS. With the assistance of the instructors, we recruited subjects for their voluntary participations in the study. The students were offered credits in their courses for their participation as well. Among the 550 students contacted, a total of 428 agreed to take part and complete the surveys, showing an effective response rate of 78%. Analysis of our subjects shows an approximately 7-to-3 gender distribution in favor of males and their age ranged between 17 and 48 years, with an average age of 22 years old. Most of the respondents were of business majors (approximately 65%) and there were few who had not yet declared their majors.

5. Analysis Results

Important descriptive statistics are summarized in Table 1, including means and standard deviations. We assessed the constructs' reliability in terms of the respective Cronbach's alpha values as well as their inter-correlations. As shown in Table 1, the alpha value of each investigated construct is greater than 0.7, exceeding the commonly suggested reliability threshold for exploratory research (Hair et al. 1998).

	Means	STD	PEOU	PU	SN	Cog. Style	CSE	AU	Cronbach's Alpha
PEOU	3.53	1.10	1.00						0.87
PU	4.15	1.41	0.65	1.00					0.92

SN	3.27	1.30	0.37	0.60	1.00				0.85
Cog. Style	3.72	0.63	0.18	0.27	0.15	1.00			0.82
CSE	4.47	1.14	0.35	0.41	0.33	0.17	1.00		0.74
AU	2.81	4.76	0.13	0.30	0.24	0.13	0.08	1.00	0.74

Table 1: Descriptive Statistics, Correlation Coefficients, and Reliability

We examined the convergent and discriminant validity of our instrument by performing a principal axis factor analysis with an oblique rotation primarily because of the plausible correlation between the constructs investigated (Loehlinm 1992). As summarized in Table 2, our confirmatory factor analysis results suggest the constructs exhibiting satisfactory convergent validity (manifested by measurement items loaded highly on their respective constructs) as well as satisfactory discriminant validity (manifested by measurement items loaded significantly being on their construct than on other constructs).

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
AU-1	0.26	0.11	0.05	-0.25	**0.95**	0.06
AU-2	0.18	0.12	0.04	-0.19	**0.72**	0.08
PEOU-1	0.51	0.06	0.13	-0.36	0.15	**0.81**
PEOU-2	0.57	0.16	0.29	-0.22	0.18	**0.82**
PEOU-3	0.52	0.20	0.18	-0.27	0.13	**0.86**
PEOU-4	0.45	0.10	0.22	-0.31	0.12	**0.70**
PU-1	**0.78**	0.25	0.24	-0.58	0.30	0.57
PU-2	**0.74**	0.29	0.22	-0.58	0.37	0.46
PU-3	**0.84**	0.20	0.36	-0.38	0.28	0.47
PU-4	**0.85**	0.19	0.22	-0.50	0.33	0.52
PU-5	**0.80**	0.14	0.35	-0.51	0.33	0.46
SN-1	0.50	0.08	0.14	**-0.67**	0.24	0.30
SN-2	0.38	0.14	0.20	**-0.76**	0.23	0.22
SN-3	0.36	0.04	0.27	**-0.82**	0.26	0.25
SN-4	0.38	0.15	0.29	**-0.82**	0.27	0.19
CSE-1	0.31	0.02	**0.46**	-0.33	0.10	0.27
CSE-2	0.15	0.12	**0.80**	-0.14	0.02	0.00
CSE-3	0.15	0.16	**0.84**	-0.21	0.05	0.06
CSE-4	0.33	0.15	**0.41**	-0.28	0.08	0.34
CSE-5	0.38	0.09	**0.57**	-0.18	0.13	0.29
C-1	0.11	**0.72**	0.15	-0.05	0.06	0.00
C-2	0.20	**0.73**	0.14	-0.15	0.11	0.19
C-3	0.12	**0.73**	0.10	-0.08	0.13	0.08
C-4	0.11	**0.55**	0.03	-0.14	0.13	0.27
C-5	0.11	**0.53**	0.01	-0.08	0.10	0.26
C-6	-0.04	**0.42**	0.11	-0.14	0.13	-0.11
C-7	0.12	**0.65**	0.07	-0.03	0.14	0.11
C-8	0.18	**0.60**	0.18	-0.14	0.13	0.00

Table 2: Factor Analysis Results

We took the structural equation modeling approach to test our research model and the causal paths it suggests. Specifically, we used LISREL to test the overall model and our hypotheses. We examined the extent to which our data fit the overall model. According to our analysis, the Tucker-Lewis index (also known as the non-normed fit index, NNFI) as well as the comparative fit index (CFI) is 0.94, exceeding the commonly suggested threshold of 0.90 (Bentler and Bonett 1980). We also examined additional common model fit indexes that include the ratio between Chi-squares and degree of freedom, NFI, and RMSEA. AS summarized in Table 3, our data show a RMSEA below the commonly suggested threshold of 0.08 (Browne and Cudeck 1992). The parsimony-adjusted NFI (James et al. 1982) is 0.91, quite satisfactory in relation to the commonly suggested value of .60 (Netemeyer et al. 1990). Judged by these important fit indexes and their respective common threshold values, our data shows a satisfactory fit to the research model under examination.

Fit Index	Recommended Value	Observed Value
Chi-square/degree of freedom	≤ 3.0	2.40
CFI	≥ 0.9	0.94
NNFI	≥ 0.9	0.94
NFI	≥ 0.6	0.91
RMSEA	≤ 0.08	0.07

Table 3: Overall Model Fit Assessments

We examined the statistical significance and the magnitude of each causal path specified by our research model. As summarized in Table 4, eight out of the nine postulated paths were found to be statistically significant. The individual difference variable of cognitive style was found to be an important determinant of perceived usefulness, perceived ease of use and subjective norm (*p-value* < 0.01). Similarly, computer self-efficacy was found to be a potent factor for both perceived usefulness and perceived ease of use (*p-value* < 0.05). Perceived usefulness was found to be affected by perceived ease of use (*p-value* < 0.0001). While perceived usefulness exhibited significant influence on actual usage (*p-value* < 0.0001) and perceived ease of use negatively affected usage (*p-value* < 0.0001); the relationship between subjective norm and actual usage however was not significant statistically.

Path	Path Coefficient	Hypothesis
Cognitive Style –> PU	0.30	H1: Supported, *p-value* < 0.01
Cognitive Style –> PEOU	0.42	H2: Supported, *p-value* < 0.01
Cognitive Style –> SN	0.31	H3: Supported, *p-value* < 0.01
CSE –> PU	0.22	H4: Supported, *p-value* < 0.05
CSE –> PEOU	0.35	H5: Supported, *p-value* < 0.05
PEOU –> PU	0.63	H6: Supported, *p-value* < 0.0001
PU –> Usage	1.28	H7: Supported, *p-value* < 0.0001
PEOU –> Usage	-0.63	H8: Not Supported, *p-value* < 0.05
SN –> Usage	0.35	H9: Not Supported, *p-value* > 0.05

Table 4: Hypothesis Testing Results

6. Discussion

Our analysis results suggest cognitive style to be a crucial determinant of technology acceptance by individuals. Our findings also show the importance of other acceptance drivers that include perceived technology usefulness, perceived ease of use and subjective norm. Cognitive style can affect an individual's decision on whether or not to accept a new technology. Our analysis results seem to suggest significant impacts of cognitive style on the technology adoption and usage in organization or work contexts. We note that individuals having innovative cognitive style are more likely to accept a new technology than those having adaptive cognitive style. As hypothesized, the perception of a technology's usefulness and its ease of use seem to be more salient in the initial acceptance decision by innovators than that by adopters. Contrary to the directional relationship that we hypothesized between cognitive style and subjective norm, innovators appear to weigh the importance of subjective norm more heavily than adaptors. This can be partially explained by the likelihood of the innovator's caring more about the opinions of his or her peers and supervisors when assessing technology use and its perceived ease of use than others. Our study generates empirical evidence suggesting plausible causal effects of cognitive style on key technology acceptance determinants which should be considered for extending prevalent parsimonious theoretical models or frameworks.

Computer self-efficacy also exhibits strong effects on the hypothesized impact of perceived usefulness and perceived ease of use. Our finding is consistent with that reported by Compeau and Higgins (1995), who comment that self-efficacy influences performance expectations, including items highly similar to those found in perceived usefulness. Also the result showing empirical support for a significant relationship between general computer self-efficacy beliefs and perceptions about the ease of use of a specific technology was consistent with the results of different studies including Agarwal et al. (2000). Our analysis results show a positive association between perceived usefulness and technology usage as well as between perceived ease of use and perceived usefulness. These findings are consistent with the predictions by TAM (Venkatesh et al 2003). Interestingly, the perceived ease of use shows a negative effect on technology usage. One plausible explanation might be our subjects' relatively limited experiences in using the technology. There might exist important moderators affecting the relationship between perceived ease of use and technology usage, or even reversing the directionality (positive versus negative) of the relationship (Lewis et al 2003). Similarly, the observed statistically insignificant relationship between subjective norm and actual usage might be in part explained by the importance of referent others' feedback concerning technology use. In this connection, our study apparently did not consider the impacts on technology usage.

This study has made several research contributions by extending existing user technology acceptance models using cognitive style and empirically testing its effects on key acceptance drivers, including perceived technology usefulness, perceived ease of use, and subjective norm. Prior research emphatically considers user acceptance from the lens of cognitive processing whereby perceived usefulness, perceived ease of use and the resultant intention are affected by the individual's cognitive processing and ability. In this vein, results from this study advance user acceptance research by explicitly scrutinizing the importance of cognitive style and generating empirical evidence supporting its effects on the individual's acceptance decision-making. Our findings contribute to the technology implementation research by examining the effect of key individual differences at the individual-level technology adoption. Such effects can be integrated with analysis of organization-level technology adoption decision-making, which together can provide richer insights into technology implementation management. In addition, our analysis results can be applied to improve the management practice, particularly suggesting that organizations should concentrate on individuals of innovative cognitive style to be early adopters, and then depute them on taking active roles facilitating subsequent technology disseminations. Our results also have important practical implications for preparing today's workforces in terms of designing user training programs for new technologies. Specifically, training programs should be structured to the needs of different individuals, in light of the differences in their cognitive styles and information processing ability. For example, trainers need to emphasize new technology's ease of use and usefulness specifically for adapters to make them motivated to use a new technology since they may be skeptical about applying new technology in the workplace. Hence similar to line of argument of Morris and Venkatesh (2000), this study singles out the need for understanding the decision-making processes of the users for a new technology. Technology implementation is likely to vary across different groups within the organization and hence is likely to affect various groups of workers differently. Hence, there is burgeoning need to conduct a thorough user analysis to understand the process and requirements of different groups in the development process for the new technology. Then, those groups may be brought into the development process early on to increase the acceptability and use of a new technology.

One potential limitation of this study involves the measurement and analysis of the primary construct of interest—cognitive style. There are various conceptualizations available in the literature on cognitive styles (e.g. logical and non-logical decision-maker, Barnard 1938; two halves brain theory, Sperry 1973). It is possible that each of these constructs affects one's view of technology adoption differently, and further research in this area might serve to further our understanding of the underlying causal mechanisms related to cognitive style-based differences in technology adoption and usage. Future work should take into account the different conceptualizations reflecting different psychological processes underlying how cognitive style differences affect technology acceptance. Other possible limitations could be the student sample of this study which might provide limited external validity and the typical technology used by the sample (MS Access). Therefore, future research should examine the generalizability of the results to real organizational settings and technologies.

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Appendix: Listing of the Measurement Items Used in the Study

AU-1: In the last 2 weeks, I on average used *MS ACCESS* ____ hours a week.
AU-2: In the last 2 weeks, I on average used *MS ACCESS* for ______ percent of my data management needs (tasks).
PEOU-1: Learning to use *MS ACCESS* is easy for me.
PEOU-2: I find it not difficult to get *MS ACCESS* to do what I want it to do.
PEOU-3: I find *MS ACCESS* to be flexible to interact with.
PEOU-4: It is easy for me to become skillful at using *MS ACCESS.*
PU-1: Using *MS ACCESS* enables me to accomplish my tasks more quickly.
PU-2: Using *MS ACCESS* improves my class (or work) performance.
PU-3: Using *MS ACCESS* increases my productivity.
PU-4: Using *MS ACCESS* makes it easier for me to organize and store important data.
PU-5: Overall, I find *MS ACCESS* useful in my work.
SN-1: People who influence my behavior think that I should use *MS ACCESS.*
SN-2: People who are important to me would think that I should use *MS ACCESS.*
SN-3: People those opinion I value would prefer me to use *MS ACCESS* rather than the other data management software applications (such as MS Excel).
SN-4: I think that those people who are important to me would want me to use *MS ACCESS* rather than other data management software applications (such as MS Excel).
CSE-1: I can use *MS ACCESS* if I have never used this software application like it before.
CSE-2: can use *MS ACCESS* if I have seen someone else using it before trying it myself.
CSE-3: I can use *MS ACCESS* if I can contact someone for help if I got stuck.
CSE-4: I can use *MS ACCESS* if someone else helps me get started.
CSE-5: I can use *MS ACCESS* if someone shows me how to do it first.
C-1: I have original ideas.
C-2: I like to proliferate ideas.
C-3: I am stimulating.
C-4: I like to cope with several new ideas at the same time.
C-5: I will always think of something when stuck.
C-6: I would sooner create than improve.
C-7: I have fresh perspectives on old problems.
C-8: I often risk doing things differently.