

December 2001

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Recommended Citation

Mao, En and Palvia, Prashant, "Information Technology Acceptance: How Much Do We Know?" (2001). *AMCIS 2001 Proceedings*. 335.

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INFORMATION TECHNOLOGY ACCEPTANCE: HOW MUCH DO WE KNOW?

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Abstract

Motivated by the inconclusive results in the existing IT acceptance research, this study proposes to test and validate the key determinants of IT acceptance. First, the IT acceptance literature is reviewed and analyzed. The problems and inconsistencies in the literature are discussed. Then, a research model is proposed. Finally, the expected outcomes are presented.

Introduction

While it is difficult to directly measure IT contribution because of its hidden and intangible benefits, researchers have developed other measures, such as information technology acceptance, which directly relates IT usage (Martinsons and Hempel 1998). A sound understanding of the determinants of IT technology will help IT managers effectively plan for IT implementation strategies and promote IT usage.

In the IT acceptance research area, the technology acceptance model (TAM, Davis 1986, 1989), based on the Theory of Reasoned Action (TRA), is widely known and studied. In TAM, “perceived usefulness” and “perceived ease of use” are hypothesized as key determinants of IT acceptance through two mediating variables, user attitude and intention. The TAM model has been replicated and tested extensively and the main constructs of the model are found to be reliable and valid (e.g., Adams et al. 1992; Chau 1996; Chin and Todd 1995; Davis and Venkatesh 1995; Segars and Grover 1993; Taylor and Todd 1995). However, many studies proposed extensions and modifications (e.g., adding constructs and variables) to TAM based on the theory of reasoned action (TRA, Ajzen and Fishbein 1980; Fishbein and Ajzen 1975), the theory of planned action (TPA, Ajzen and Madden 1986), innovation diffusion theory (Rogers 1995), and empirical results.

While there are some convergent results from the existing IT acceptance research, the effects of some determinants remain debatable. For example, while “perceived usefulness” has consistently been found significant in determining IT acceptance, “perceived ease of use” has not. This is particularly evidenced in studies where additional variables were introduced. Another significant disagreement in the existing IT acceptance studies is that researchers have not reached a consensus on the importance of social norm.

In this study, we review the current literature in the area of IT acceptance. Then, a research model is developed to determine significant IT acceptance variables and validate the effect of social norm. We propose to test this research model using multiple data sets. Finally, the potential contributions of this study are presented.

Literature Review

One reason that the results of some variables are inconsistent is that IT acceptance studies often select few variables due to the difficulty of testing large research models. In order to validate the significant determinants of IT acceptance, we intend to test a large set of relevant variables in our research. To develop the set of variables, several research streams are reviewed: the innovation diffusion theory (IDT), the theory of reasoned action (TRA), and the technology acceptance model (TAM).

Innovation Diffusion Theory

Among the research concepts and paradigms developed in innovation diffusion research, a major finding is that innovations (e.g. IT) possessing certain attributes are adopted more rapidly. Relative advantage, compatibility, complexity, observability, and trialability are five perceived attributes of innovation identified by Rogers (1995), who stated that these attributes are extensively studied and tested in many innovation diffusion studies.

In their meta-analysis of innovation diffusion literature, Tornatzky and Klein (1982) reviewed 75 articles and discovered more than 30 innovation characteristics. They investigated ten major innovation characteristics: compatibility, relative advantage, complexity, cost, communicability, divisibility, profitability, social approval, trialability, and observability. The results show that compatibility, relative advantage, and complexity are the most robust measures of innovation attributes that affect innovation diffusion.

Theory of Reasoned Action (TRA)

While innovation diffusion research provides strong empirical evidence in many areas, it lacks the vigor and theoretical foundation required to explain human behavior. The theory of reasoned action model (TRA) proposed by Fishbein and Ajzen (1975) (also see, Ajzen and Fishbein 1980; Fishbein and Ajzen 1979) has been incorporated into recent social science literature. The theory focuses on predicting behavioral intention and actual behavior based on behavioral beliefs and subjective norms. According to TRA, “a behavioral intention measure will predict the performance of any voluntary act, unless the intention measure does not correspond to the behavioral criterion in terms of action, target, context, time-frame and/or specificity” (Sheppard et al. 1988, p. 325). Its strong predictive power of human behavior has drawn attention from multiple disciplines, such as psychology, sociology, marketing, and MIS (Sheppard et al. 1988). In the MIS area, it serves as a theoretical foundation for technology acceptance and usage models and theories.

Technology Acceptance Model (TAM)

In a search for measures for key constructs predicting information technology use, Davis (1986, 1989) suggested and validated two key determinants of technology use: “perceived usefulness” (PU) defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (p. 320), and “perceived ease of use” (EOU) as “the degree to which a person believes that using a particular system would be free of effort” (p. 320). Simply put, the more useful and easier to use the technology is, the more likely the user will use it. The two constructs echo some of the major innovation attributes proposed in innovation diffusion research. In fact, perceived usefulness parallels relative advantage and perceived ease of use parallels complexity (Davis et al. 1989; Karahanna et al. 1999). The resulting model was named technology acceptance model (TAM) (Davis 1989).

Compared to innovation diffusion theory in which a larger set of innovation attributes are proposed, TAM only accounts for two behavioral beliefs, PU and EOU. However, the literature reveals that EOU is insignificant in some studies (e.g. Adams et al. 1992; Hu et al. 1999, see also Table 1; Igbaria et al. 1995). Some recent studies include a fuller set of perceived beliefs about using an innovation (e.g., Agarwal and Prasad 1997; Karahanna et al. 1999; Moore and Benbasat 1991). Although the studies show the importance of other behavioral beliefs, the combinations of the behavioral beliefs are inconsistent.

In addition, the findings of the effect of subjective norm on attitude are inconclusive. In early TAM studies, subjective norm, the combination of the “beliefs that certain referents think the person should or should not perform the behavior in question” (Fishbein and Ajzen 1975), was investigated and found to have no impact on behavioral intention. Instead of questioning the results, many studies simply excluded the dimension of subjective norm, a significant construct in TRA. Many argue that the research settings of the studies (e.g., Davis et al. 1989; Mathieson 1991) that found subjective norm had no significant influence on intention were different from organizational environment. Many of those studies were set in a laboratory environment and participants were students; therefore, there were no real consequences associated with behaviors (Taylor and Todd 1995). The absence of consequences resulted in insignificant subjective norm effect. In the field studies, subjective norm was found to be a significant determinant of usage (e.g., Lucas and Sptitler 1999; Karahanna et al. 1999; Robertson 1989).

Furthermore, inconsistent results from their study prompted Adams et al. (1992) to speculate that user experience or other user characteristics may also play a part in technology acceptance. Agarwal and Prasad (1999), in answering whether individual differences are germane to technology acceptance, found that with regard to technology, level of education has significant impacts on beliefs about usefulness of an IT. Also, training influences beliefs about the ease of use of an IT (Nelson and Cheney 1987).

Individual innovativeness in relation to IT innovation, defined as “the willingness of an individual to try out any new information technology” (Agarwal and Prasad 1998, p.26) was also found to be a driver of innovation adoption.

Further investigation of the TAM literature reveals that certain inconsistencies exist but they are rarely dealt with and not clearly answered. Table 1 gives a summary of the findings from some widely cited studies. In this table, the results suggest that perceived usefulness (PU) is consistently found to be a significant determinant of attitude or usage. On the contrary, the findings on perceived ease of use (EOU) are mixed. Only three studies in Table 1 found EOU to be a significant factor in determining attitude or usage. Regardless of statistical significance, the relationship between PU and attitude/usage is consistently stronger than the relationship between EOU and attitude/usage.

Table 1. TAM Study Results

Studies	Reported Findings and Other Information						
	IT	N	Subject	Field Survey (Y/N)	PU→A/ PU→U	EOU→A/ EOU→U	BI/ R ²
(Davis et al. 1989)	E-Mail	109	IBM employees in Canada 6-month experience	Y	.56 (S)	.32 (S)	
(Adams et al. 1992)	E-Mail	116	10 firms 21 month experience	Y	.36 (S)	.05 (NS)	U 15.5%
	Vmail	68	10 firms	Y	.31 (S)	.13 (NS)	U 17%
	WP	73	Students	N	.21 (S)	-.03 (NS)	U 4%
(Bagozzi et al. 1992)	WriteOne	96	MBA students No Exp	N			U .35
(Hendrickson et al. 1993)		51	Students Exp varied	N	S	S	
(Igarria et al. 1995)	PC	236	PT MBA (Avg. Age = 29)	N	.10 (S)	.09 (NS)	
(Hu et al. 1999)	Telemedicine	421	Physicians in Hong Kong	Y	.45 (S)	.08 (NS)	BI 37%

Abbreviations: PU – Perceived Usefulness; EOU – perceived Ease of Use; A – Attitude; BI – Behavioral Intention; WP – WordPerfect; S – significant; NS – not significant

In summary, the results of IT acceptance research are mixed. Further studies are required to validate the effects of variables such as perceived ease of use and subjective norm on technology acceptance and usage.

Research Methodology

Based on the review of the relevant theories and studies, a research model (omitted) encompassing seven behavioral beliefs (i.e. usefulness, ease of use, image, compatibility, trialability, visibility, and result demonstrability), subjective norm, attitude, behavioral intention, and IT usage behavior is proposed. Additional variables, level of education, training, and individual innovativeness are also included as factors influencing user behavioral intention. The proposed variables will be operationalized using existing scales and measures. The scales will be pretested and pilot tested for reliability.

We propose to test the research model using multiple field survey data sets. Each data set will be controlled for organizational factors (e.g. size), respondent level of education, training, and individual innovativeness. To explore and analyze the variables relationships, PLS (Partial Least Square), which has minimum requirements on sample size and measurement scales will be applied (Gopal et al. 1992). This method will allow us to focus on examining the variable relationships in question.

Potential Contribution

If the inconclusive variable relationships are validated by the results of the proposed study, we may help organizations design better end-user IT acceptance and usage strategies. Also, this study may contribute to the theoretical development in the IT acceptance area by validating the key determinants

References

Available upon request from En Mao.