

A REVIEW OF INTERNET SHOPPING FACTORS: DO THE TECHNOLOGY ACCEPTANCE MODEL OR THEORY OF REASONED ACTION MODEL APPLY?

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ABSTRACT

Electronic commerce and Internet shopping have exploded in the last decade. At last estimate total electronic Business to Consumer sales amounted to an estimated \$130 billion in 2006 [8]. This manuscript is a first attempt to test two common theories of behavior and test their applicability to Internet shopping. It is important to understand the factors involved in Internet shopping behavior to maximize productivity and consumer experiences.

Internet shopping (IS) is an important form of transacting business exchanges between business and consumers and has become extremely popular among teens and young adults as well as the population at large. Internet shopping offers unique advantages over brick and mortar stores and other forms of commerce but still has not gained complete support among all demographics. The elderly and minorities are less likely to use electronic commerce than other groups. This study reviews Internet shopping (IS) and its use, and attempts to determine factors that influence its success. The Technology Acceptance Model (TAM), based on Davis's work [7], is first tested to model IS behavior. Perceived usefulness was positively associated with intention to use Internet shopping but perceived ease of use was not. This manuscript also explores Internet shopping using the Ajzen and Fishbein [1] model of human behavior known as Theory of Reasoned Action (TRA). Specifically, findings reveal that attitude towards Internet shopping was positively associated with intention to use IS but subjective norm was not.

Generally, the study finds that neither TAM nor TRA models IS behavior, but does find that perceived usefulness and attitude do affect behavioral intention. This study has important implications for researchers to further explore these relationships and for practitioners who can use these findings to influence and popularize an important method of commerce. The two factors which do influence "intention to use" Internet shopping are usefulness and attitude.

Keywords: Technology Acceptance Model, TAM, TRA, Theory of Reasoned Action, Internet shopping, behavior, factor analysis, structural equation modeling

INTRODUCTION

Electronic commerce and Internet shopping have exploded in the last decade. At last estimate total electronic Business to Consumer sales amounted to an estimated \$130 billion in 2006 [8]. Internet shopping allows consumers to purchase products and services over the Internet in the comfort of their home or office without the need to visit a brick-and-mortar store. It is particularly appealing to those consumers who seek convenience and speed [37] and do not want to take the time to visit a traditional store [14].

Electronic commerce is a global phenomenon [5]. This is evident in additional body of literature with researchers analyzing Internet shopping behavior in countries such as Taiwan, Greece, Singapore, and Hong Kong. [5, 29, 14, 37, 17].

Internet shopping (IS) is an important form of transacting business exchanges between business and consumers. It has become extremely popular among teens and young adults as well as the population at large. Internet shopping offers unique advantages over brick and mortar stores and other forms of commerce, but still has not gained complete support among all demographics.

MOTIVATION FOR THE STUDY

Internet shopping has been accepted and embraced by the teen and young adult population. But the general and elderly population has been much slower to adapt to the technology. In January 2009 80% of all Internet users 18-32 used the Internet for shopping while less than 50% of older Americans shop online [16].

There are specific advantages to Internet shopping, which are not being reaped due to lower adoption, such as easier price comparison and direct delivery. This study explores the factors associated with Internet shopping behavior and intentions and attempts to determine the significant variables associated with higher IS behavior.

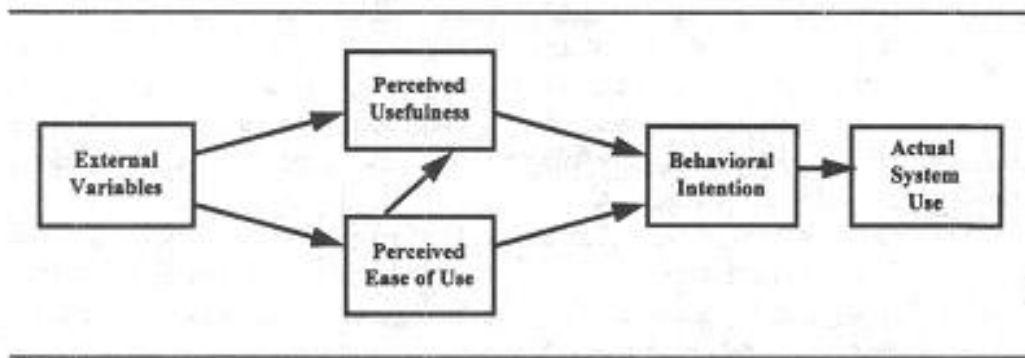
Technology Acceptance Model

One of the most important models for understanding adoption of information technology is the Technology Acceptance Model (TAM). The model was first proposed by Davis in 1989 and includes two key factors, perceived usefulness and perceived ease of use that are proposed to influence acceptance of a technology. According to Davis [7] perceived usefulness is defined as “the degree to which a

person believes that using a particular system would enhance his or her job performance”. Others have extended this definition to include overall task performance [26, 10, 28].

Again according to Davis [6] perceived ease of use is “the degree to which a person believes that using a particular system would be free of effort”. This is generally how easy the system or technology is to use. In an initial model, Davis, Bagozzi, and Warshaw [6] suggested external variables as a key influencing variable but later Venkatesh and Davis [32] have suggested that external variables are mediated by TAM and have not been included in our model. The original Technology Acceptance Model is illustrated in Figure 1 [32]. As noted, our model was used without the external variables.

Figure 1: Technology acceptance model.



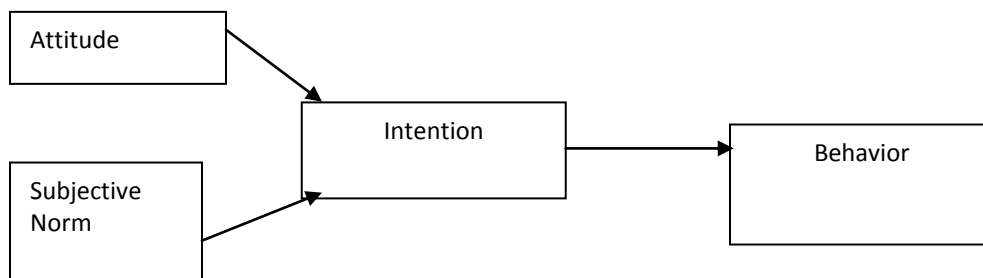
Theory of Reasoned Action

In order to explore influences on Internet shopping behavior, another common model was selected, Theory of Reasoned Action developed by Ajzen and Fishbein [1]. The model uses four

factors: attitude, subjective norm, intention, and behavior. TRA remains an important model for measuring user behavior [25, 34, 4, 30, 35, 19] (Figure 2).

The model is:

Figure 2 Theory of Reasoned Action



TRA has shown successful application to general consumer information technologies [11, 23], organizational knowledge sharing [18] and “Hsu and Lu [12] find one important TAM construct -- perceived usefulness -- does not directly affect behavioral intention, while the two TRA constructs -- attitude and subjective norms -- do.” [35]. Intention to use is a common behavioral factor [21, 2]. Actual behavior generally follows intention in a variety of models [27, 2].

Definitions of the models factors are as follow:

- Attitude is how we feel about the behavior and is generally measured as a favorable or unfavorable mind-set.
- Subjective norm is defined as how the behavior is viewed by our social circle or those who influence our decisions.
- Intention is defined as the propensity or intention to engage in the behavior.

Behavior is the actual activity itself.

Hypotheses

In order to determine the applicability of the Technology Acceptance Model or Theory of Reasoned Action to Internet shopping behavior, a series of hypotheses were developed.

The model and factors explored include the original factors of the Davis [7] work, usefulness and ease of use and include two other factors from later work, behavioral intention to use and actual system use [32]. The model used in this study closely follows the works of Qui, Davis, and Gregory [26] as well as Liu, Liao, and Peng, [20]. Due to the multidimensional nature of Internet shopping, the null hypotheses were assumed.

- H1: Internet shopping technology will not provide a TAM model fit for behavioral intention and behavior.
- H2: Internet shopping technology will not provide a TRA model fit for behavioral intention and behavior.

Given the assumption that neither model would fit the data, individual factors were then hypothesized to influence intention to use IS.

- H3: Usefulness of Internet shopping is positively associated with intention to use IS.
- H4: Ease of use of Internet shopping is positively associated with use of IS.
- H5: Attitude toward Internet shopping is positively associated with intention to use IS.
- H6: Subjective norm for Internet shopping is positively associated with usefulness of IS.

METHODOLOGY

A survey was prepared and pre-tested with a small group of students at a northeastern US university. The survey was modified based on preliminary tests and administered to 128 students at a small southeast US university. The survey was a comprehensive survey of Internet shopping behavior

For each of the TAM factors, survey questions were patterned after prior research. Ease of use, usefulness, and intention factor questions were modeled after Davis [7], intention was based on Venkatesh and Morris [33], and behavior was based on common usage terminology and piracy behavior factor in Woolley and Eining [34]. These survey questions and abbreviations are shown in Table 1.

Table 1. Survey Questions and Factors

Factor	Abbreviation	Questions/Variables
Perceived Ease of use	EA	It is easy to become skilled Internet shopping.
Perceived Ease of use	EA	Learning to use Internet shopping is easy.
Perceived Ease of use	EA	Internet shopping is clear and understandable
Perceived Ease of use	EA	Internet shopping is flexible.
Perceived Ease of use	EA	Internet shopping is easy to do.
Perceived Usefulness	USEF	I find Internet shopping useful.
Perceived Usefulness	USEF	I can improve my performance by Internet shopping.
Perceived Usefulness	USEF	I can accomplish things more quickly by Internet shopping.
Perceived Usefulness	USEF	I can enhance my effectiveness by Internet shopping
Perceived Usefulness	USEF	I can improve my productivity by Internet shopping
Behavioral Intention	INTENTION	I predict I will use Internet shopping
Behavioral Intention	INTENTION	I intend to use Internet shopping
Behavioral Intention	INTENTION	I plan to use Internet shopping
Actual System Use	USE	I plan to use Internet shopping in the future.
Actual System Use	USE	I currently use Internet shopping.
Actual System Use	USE	I will continue to use Internet shopping.

For each of the relevant TRA factors, survey questions modeled prior research. Subjective norm and attitude were based on Fitzmaurice [9]. Intention factor questions were modeled after Ilie, Van Slyke et al. [15], and behavior was based on common usage terminology and piracy behavior factor in Woolley and Eining [34].

The variables needed to test the theory of reasoned action include:

- *Attitudes* –The survey contained five questions that addressed respondents’ attitudes toward Internet shopping. Questions asked if they felt that Internet shopping was useful, worthwhile and valuable.
- *Subjective Norm* – Subjective norm is defined as a person's "perception that most people who are important to him think he should or should not perform

the behavior in question" [1]. The survey contained four questions to measure subjective norm. Two of the questions asked included “Most people who are important to me think I should use Internet shopping” and “People who I listen to could influence me to use Internet shopping.”

- *Behavioral Intentions* – The behavioral intentions are the probability that the subject will use Internet shopping. The survey questions asked the respondents if they plan to use Internet shopping.
- *Behavior* - behavior is the transmission of intention into action. The questions formulated in the survey asked if the respondents currently use, plan to use or will continue to use Internet shopping.

Table 2. Survey Questions and Factors

Factor	Abbreviation	Questions/Variables
Attitude	ATTITUDE	Internet shopping is good.
Attitude	ATTITUDE	Internet shopping is useful.
Attitude	ATTITUDE	Internet shopping is worthwhile.
Attitude	ATTITUDE	Internet shopping is helpful.
Attitude	ATTITUDE	Internet shopping is valuable.
Subjective Norm	Subjective Norm	Most people who are important to me think I should use Internet shopping.
Subjective Norm	Subjective Norm	Close friends and family think it is a good idea to use Internet shopping
Subjective Norm	Subjective Norm	Important people want me to use Internet shopping
Subjective Norm	Subjective Norm	People who I listen to could influence me to use Internet shopping
Subjective Norm	Subjective Norm	Most people who are important to me think I should use Internet shopping.
Behavioral Intention	INTENTION	I predict I will use Internet shopping
Behavioral Intention	INTENTION	I intend to use Internet shopping
Behavioral Intention	INTENTION	I plan to use Internet shopping
Actual System Use	BEHAVIOR	I plan to use Internet shopping in the future.
Actual System Use	BEHAVIOR	I currently use Internet shopping.
Actual System Use	BEHAVIOR	I will continue to use Internet shopping.

The overall demographics of the group reflected the student population with 96% of the participants between the ages of 18 and 24. The gender mix was slightly skewed with a 64% female participation.

The questions measured a five point Likert scale with level of agreement from 1 = strongly agree to 5= strongly disagree.

SPSS 16 and AMOS 16 were used to analyze the data and test the proposed hypotheses. Factor analysis and scale reliability as well as structural equation modeling were conducted similar to Wooley and Eining [34], and Moore [22].

RESULTS

Confirmatory factor analysis and scale reliability testing was used to determine the factors used in the model. All the factors were confirmed with one component determined and eigenvalues over 1.0 which is generally seen as the level of acceptability [22]. The five Ease of use

questions resulted in one component with an eigenvalue over 1.0 at 3.264. The component matrix elements all were above .5 (minimum acceptable, [22]) and scale reliability provided a Cronbach’s alpha of .857, well above the minimum acceptable of .7 [24]. The four Attitude questions resulted in one component with an eigenvalue over 1.0 at 3.583. The component matrix elements all were above .5 (minimum acceptable, [22] and scale reliability provided a Cronbach’s alpha of .899, well above the minimum acceptable of .7 [24]. The four Subjective norm questions resulted in one component with an eigenvalue over 1.0 at 2.688. The component matrix elements all were above .5 (minimum acceptable, [22]) and scale reliability provided a Cronbach’s alpha of .835, well above the minimum acceptable of .7 [24]. The five Usefulness questions also resulted in one factor with an eigenvalue over one, at 3.833. All components were over .5 and Cronbach’s alpha was .922. As noted, these are all well above minimum levels. Intention and its three variables clearly resulted in one factor with an

eigenvalue over one, at 2.709. All components were over .5 and Cronbach's alpha was at .946. These were certainly above minimum levels. Finally, actual behavior was measured by three variables and it demonstrated one factor with an eigenvalue over 1.0, at 2.564. All components were over .5 and Cronbach's alpha was .946. In all cases and by all measures all factors met acceptable levels.

Once the factors were determined, the results were analyzed in AMOS 16.0 to test the hypotheses and develop the model using structural equation modeling (SEM).

The results of the analysis are shown in the tables below.

H1: Internet shopping technology will provide a TAM model fit for behavioral intention and behavior.

Ease of use, as shown was not a significant variable with a p of .155. Overall the RMSEA for the TAM model also was .245, well above the maximum acceptable of .08 [31]. The null hypothesis could not be rejected. Hypothesis one was supported. TAM is not a model for Internet shopping

Table 3. TAM Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
usef <--- ea	.457	.089	5.127	***	
intent <--- usef	.619	.083	7.503	***	
intent <--- ea	.117	.083	1.421	.155	
use <--- intent	.634	.077	8.209	***	

Table 4. TAM RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.245	.135	.373	.003
Independence model	.375	.323	.429	.000

H2: Internet shopping technology will provide a TRA model fit for behavioral intention and behavior.

TRA model also was .472 (table 6), well above the maximum acceptable of .08 [31]. Hypothesis two was supported. TRA is not a model for Internet shopping.

Even though all factors were significant in the SEM model (table 5), overall the RMSEA for the

Table 5. TRA Regression Weights: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
intent <--- Sn	.205	.079	2.603	.009	
intent <--- attitude	.482	.079	6.090	***	
use <--- intent	.634	.082	7.768	***	

Table 6. TRA RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.472	.379	.571	.000
Independence model	.398	.347	.452	.000

H3: Usefulness of Internet shopping is positively associated with intention to use IS.

usefulness was positively associated with intention to use Internet shopping. This correlation was significant at the p<.001 level. The coefficient was .496. Usefulness of Internet shopping did have an impact on intention to use IS. H3 was accepted.

All factors were then analyzed in a multiple linear regression analysis. As shown in table 7,

H4: Ease of Use of Internet shopping is positively associated with intention to use IS.

Similarly, ease of use was not found to have a positive and significant correlation with intention to use IS. This association was found to be at $p < .332$. Ease of use does not have an impact on intention to use IS. Hypothesis 4 was rejected.

H5: Attitude towards Internet shopping is positively associated with Usefulness of IS.

Venkatesh and Davis [32] have proposed an association between ease of use and usefulness. Our study found that attitude did have a significant positive impact on ease of use at $p < .042$. H5 was accepted.

H6: Subjective norm for Internet shopping is positively associated with use of Internet shopping.

Subjective norm was not associated with Internet shopping intention with $p < .879$. H6 was rejected.

Table 7. Regression Analysis Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.003	.074		.040	.968
	Ea	.083	.085	.082	.975	.332
	Usef	.496	.122	.494	4.072	.000
	Sn	-.016	.102	-.015	-.153	.879
	Attitude	.220	.107	.217	2.064	.042
a. Dependent Variable: intent						

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.697 ^a	.486	.464	.73720467
a. Predictors: (Constant), attitude, ea, sn, usef				

LIMITATIONS AND DISCUSSION

As with any study there are limitations to this study. First, the study examines primarily traditional students at one undergraduate university location. Results ought to be replicated across other locations to confirm the preliminary findings of the study. Also, only students were studied. Though this group does represent a population of significant users, results may be different with non-students or with other age groups. Another limitation is the sample size. Though sizable, the number of participants can be increased to improve reliability. Finally, the study only examines the use of two models of human behavior. Though lack of support for the Technology Acceptance Model and the Theory of Reasoned Action has been demonstrated, there are other models which could be tested.

IMPLICATIONS AND DISCUSSION

Overall, it has been demonstrated that neither the Technology Acceptance Model nor the Theory of Reasoned Action models can serve as a model for Internet shopping behavior. Research has shown that Internet shopping provides exclusive advantages over traditional shopping. But, Internet shopping is used much less frequently in some cases. Understanding the factors associated with intention and behavior associated with Internet shopping can focus efforts to increase Internet shopping usage.

First, it was shown that intention to use Internet shopping is positively and significantly affected by perceived usefulness of Internet shopping. It has been suggested that use of a technology can be improved if users are educated about the benefits of the technology. [36, 3]. Education in the media or in schools on the benefits and advantages of Internet shopping can allow

greater use of this technology and improve overall communications. As a result, significant positive cost and productivity improvements for businesses and individuals are possible.

The second finding is that attitude is significantly and positively associated with intention to use IS. Efforts to improve attitude such as training, education, and safety efforts can lead to higher rates of use.

CONCLUSION

Overall, this study has provided significant factors that influence and model Internet shopping intention and behavior. We see this as the start of an exploration of ways to increase and improve penetration of this valuable technology. Studies can be developed to confirm these findings with larger and more diverse sample groups, but preliminary findings suggest that Internet shopping does not adhere to the technology acceptance model or the theory of reasoned action but is subject to efforts to improve behavior through attention to the significant influencing factors of attitude, usefulness, and behavioral intention. Overall, this is a fertile research area that deserves further attention.

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