Web-site Acceptance Model (WAM): Perceived Social Influence on the Usage of a Web-site

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Abstract

The Internet has grown explosively since its inception in early 1990s. In this study, we investigated the psychological mechanism to explain Internet usage. Website Acceptance Model (WAM), which is extended from Technology Acceptance Model (TAM), is presented by including the construct of perceived social influence (PSI). We investigated the relationship between PSI and two major belief constructs in TAM - perceived usefulness (PU) and perceived ease of use (PEU). Using a structural equation modeling, we found that (a) PSI does not have the significant direct effect on WWW usage, (b) PSI has stronger indirect effect on WWW use through PEU than through PU. These two results show that PEU is a complete mediator between PSI and WWW usage, and that WWW usage can be explained and predicted with the affect-related factors rather than the task-related issues.

1. Introduction

The Internet has grown explosively since its inception in early 1990s. The total value of goods and services traded in the US alone is estimated around US\$327 billion with an average annual growth rate of 110% (Forrester Research, 2000). However, despite the hype of the Internet technology, Internet adoption is not as smooth sailing as many business organizations assumed it would be [34]. Therefore, understanding the influential factors for web site usage is a timely important issue in the IS research area.

Studies and models are abundant in explaining and predicting IS acceptance or use. One of the popular frameworks is the Technology Acceptance Model (**TAM**) [13][14][15]. TAM is an individual psychological model to predict individual's adoption and usage of information technologies. And, perceived ease of use (**PEU**) and perceived usefulness (**PU**) are two major variables explaining attitude and intention of IS use. The subsequent TAM studies established the robustness of TAM through several applications and replications [1][15][21][31][44][50]. Although a few studies have already investigated influential factors for the use of Inyoung Choi College of Business Administration, Ewha Womans University #11-1 Daehyun-Dong, Sodaemun-Ku, Seoul, 120-750, South Korea TEL & FAX: + 82-2-3277-4411, Email: iychoi@ewha.ac.kr

WWW, the robustness to explain Internet usage is not proved yet[2][10]928][33].

Internet usage is different from automation tool such as spreadsheet and word processor. While these programs are often used to conduct task, web sites are being used not only as a "tool" to conduct tasks, but also as a "media" to communicate [4][39]. According to media selection theory, social influences have an effect on individual's adoption of web sites. Therefore, our study proposes and tests empirically the modified TAM, which is called Web-site Acceptance Model (WAM), including the perceived social influence constructs to explain and predict of Internet usage.

2. Perceived Social Influence (PSI)

Social influence can be defined as "an individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with others, in specific social situations" [48]. A recent longitudinal TAM study by Venkatesh & Davis [51] found that social influence is changeable; its impact is significant in the early stage of IS adoption, whereas its impact dissipates as IS usage gets matured. However, they conceptualized social influence only as subjective norm without considering other dimensions of social influence.

In an effort to operationalize social influence, we focus on the following three issues. First, aligned with other psychological models regarding IS adoption, social influence should be perceived prior to any features which has effect on individual's IS usage. So, we call this construct as perceived social influence (PSI). Second, PSI is a multi-dimensional construct including subjective norm (social norm), visibility, and image from the related IS adoption theories such as TAM, TRA, TPB (Theory of Planned Behavior)[3], the decomposed TPB [45], and innovation theory[33]. The subjective norm of TRA is the representative construct. It is defined as "the individual's perception of a referent other's opinion about the individual's performance of the behavior."[18, p.302]. Although Davis et al. [15] insisted no significant relationship between social norms and usage, they attributed this unexpected finding to the weak psychometric properties of their social norms scale and the particular IS context of their research (i.e., use of a word processing system). Davis called for further research to assess generalization of this finding, and to investigate conditions and mechanisms effecting on social influences[15].

Two other dimensions of PSI are from Moore & Benbasat's[33] study: image and visibility. Image is defined as "the degree to which adoption/usage of the innovation is perceived to enhance one's image or status in one's social system."[33, p.195]. This is close to Chau's[9] long-term PU and Tornatzky & Klein's[47] social approval. Chau[9] proposed that near-term PU is related with functionality of computer systems on improving job performance or enhancing job satisfaction, whereas long-term PU is related with improving one's social status. Tornatzky & Klein[47] identified social approval is addressed most frequently in over 100 innovation studies.

The third dimension of PSI is visibility. Visibility means "the degree to which the innovation is visible in the organization": i.e., the more a potential adopter can see an innovation, the more likely she/he is to adopt it [33, p.195). Visibility is the very close concept to "critical mass"[29] and "network externality"[39] that assert the usefulness of a network is primarily a function of the number of participants in the network.

3. The Research Model

Figure 1 is the research model including PSI, PEU and PU. In this model, like other studies of TAM[1][9], the attitude construct is excluded to simplify the model. And, Internet use, not behavioral intention, is chosen for the dependent variable because it may be the more appropriate measure of technology innovation diffusion rather than the early adoption or acquisition [17].

3.1 Impact of PSI on PU & PEU

In TRA, all the external stimuli are assumed to influence behavior only indirectly via attitude or subjective norm [18, 396]. TAM inserts two cognitive factors (PU and PEU) between external stimuli and attitude, and insists that external stimuli influence a person's attitude toward a behavior indirectly through PU and PEU.

In TAM, external stimuli have been defined diversely such as the various individual differences, situational constraints, managerially controllable interventions [15], the task and user characteristics and so on [44]. While TAM is focused on individual psychological features, media selection theories also argue that the characteristics of media depend on the perceptions of the user, and the meaning of media is socially constructed [8]. These perspectives insinuate that individual's beliefs are socially constructed through interactions with others. Thus, we predict that these social influences must have an effect on the PU and PEU.

H1: PSI will have significant effect on determining PEU of the Internet.

H2: PSI will have significant effect on determining PU of the Internet.

3.2 PEU and PU

Davis [13] proposes that PEU influences PU, but not vice versa." [13, 477-8]. This theoretical relationship has been supported by numerous empirical studies even though some studies argue the opposite relationship [9][12][13][14][31][44][45][50]. Like previous theoretical and empirical arguments, our study also assumes that PEU influences PU, not vise versa, under the Internet environment.

H3: PEU will have significant impact on determining PU of the Internet.

3.3 Influence of PU & PEU on Internet Use

Traditionally, TAM research has argued that PU influences IS use. whereas PEU does not [2][9][12][14][44]. Davis[12] assumed that PEU does not influence on IS use, even though it influences PU. Adams, Nelson & Todd[1] warned not to focus on PEU in identifying the antecedents to IS use. However, several TAM studies empirically suggested the significant influence of PEU on IS use[46][47]. All these empirical findings and theoretical arguments imply that PEU could also influence the Internet use.

H4: PEU of a system will have significant impact on Internet use.H5: PU of a system will have significant impact on Internet use.

3.4 Impact of PSI on Internet Use

Adams, Nelson & Todd[1] and Subramanian[43] reported that PU and PEU explain only explain around 30% of the variance of IS use. These results imply that there must be additional factors that influence individual usage of IS. We can find a possible answer (i.e., missing factor) from other IS use theories: TRA, TPB, and Innovation perspective. Commonly these alternative theories include the "social influence" factors as an antecedent of IS use. Moore & Benbasat's[33] innovation perspective includes two important social influence constructs - visibility and image. Agarwal & Prasad [2] found that the current usage is influenced by perceptions of visibility. Numerous studies also reported subjective norm is an important determinant of IS adoption or use [12][22][27][45]. Some studies delicately tested the influence of subjective norm by differentiating IS use in terms of chronological diffusion of technology, and identified that subjective norm influences only early IS adoption[22][26]. Media selection theories have consistently insisted the direct impact of social influences on the selection of media. Our study includes visibility, image, and subjective norm as three dimensions of PSI, and tests how this composite construct, PSI, works with other individual perceptions.

H6: PSI will have significant impact on the Internet use.



Figure 1. Research Model

4. Methodology

4.1 Data Collection

A total of 420 questionnaires are distributed to under-graduate students who major in MIS in a college of management in New England area. Samples are homogeneous in terms of demographic features such as age, grade, and major. We explain the objective of this research and the meaning of each measurement item. Students are asked to fill out the survey anonymously on the voluntary basis. In total, 206 valid questionnaires are returned out of 420 handouts, recording 49.0% of return ratio.

4.2 Reliability and Validity

Reliability assesses the internal consistency of scale items[35]. Cronbach's alphas are used to assess the internal consistency reliability of the scales. As shown in Table 1, the reliability coefficients ranged from 0.65 to 0.96, which is significantly higher than the acceptable level of 0.6 [36].

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Construct	Items	Cronbach's alpha
PU	4	.9571
PEU	4	.9065
Image	4	.9188
Visibility	3	.7985
Subjective Norm	2	.8415
Internet Use	2	.6485

	Table 2	. Fac	tor Ar	nalysis of	f Scales	5
	F1	F2	F3	F4	F5	F6
PU1	.891	.157	.161	.110	.125	.004
PU2	.904	.195	.192	.010	.010	.005
PU3	.913	.196	.105	.005	.108	.005
PU4	.892	.009	.179	.103	.009	.107
PEU1	.160	.815	.008	.119	.007	.149
PEU2	.197	.844	.009	.126	.009	.002
PEU3	.117	.877	.104	.001	.118	.150
PEU4	.125	.861	.002	.102	.137	.156
IMG1	.208	.004	.858	.104	.109	.002
IMG2	.229	.112	.862	.005	.008	.002
IMG3	.006	.005	.852	.003	.152	008
IMG4	.010	.008	.921	.005	.010	.006
VS1	.195	.004	.001	.876	.152	.010
VS2	.151	.007	.005	.890	.156	.006
VS3	004	.008	.227	.734	.003	.005
SN1	.182	.164	.227	.219	.832	.108
SN2	.180	.263	.160	.142	.851	001
USE1	.008	.001	.120	.008	001	.862
USE2	.009	002	.250	.009	.009	.800
Eigen Value	6.587	2.771	1.187	1.920	2.044	0.994
% of	34.669	14.583	6.245	10.107	10.758	5.232

* PU = Perceived Usefulness, PEU =Perceived Ease of Use, IMG = Image, VS = Visibility SN = Social Norm

Variance

Convergent validity is assessed by factor analysis of the scales. The factor loadings are shown in Table 2. Through Varimax rotation, the 25 items are cleanly loaded onto 6 factors - PEU, PU, image, visibility, subject norm, and IS use.

5. Data Analysis

Our empirical test consists of two phases. The first phase is to check the fitness of the model and examine the support of hypotheses in our dataset.

5.1 Test of the Proposed WAM model

Some measures are suggested to test model fitness[5][6][19][23]. The chi-square for this model with 22 degrees of freedom is not significant (chisquare = 17.309, p = 0.746). However, for large samples, the chi-square statistic frequently indicates poor model fit even though the model fits the data well[7][30][38]. Instead, Chi-square divided by degrees of freedom is recommended with the value below 5 [53]. In our dataset, the value of Chi-square divided by degrees of freedom is 0.787, which satisfies the criterion value. GFI and AGFI should be greater than 0.90 and 0.80, respectively, and RMSEA should be lower than 0.08 [7][25]. In our dataset, GFI is 0.983, and AGFI is 0.964, and. RMSEA is lower than 0.08. These four measures indicate that our model fits to the dataset (Table 3).

Table 3. Fit Measures	for the pro	posed model
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Fit Index	Fit Measures
Df	22
χ^2	17.309
P value(>0.05)	p=0.746
$\chi^2/df(<5)$	0.787
GFI(>0.90)	0.983
AGFI(>0.80)	0.964
RMSEA(<0.08)	0.000

5.2 Results and Analysis

Test results of our hypothesis 1-6 are summarized in Table 4 and figure 2. The results are not entirely consistent with our hypotheses.

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		Path	Remarks
		Coefficient	
H1	PSI -> PEU	0.39**	Supported
H2	PSI -> PU	0.51**	Supported
H3	PEU -> PU	0.25*	Supported
H4	PU -> USE	0.05	Rejected
H5	PEU -> USE	0.44**	Supported
H6	PSI -> USE	0.02	Rejected
* n <(1 ** = -0.05		

Table 4. Summary of Results (path coefficient)

p<0.1, **p<0.05

The paths from PSI to PU and PEU are significant with 0.51 and 0.39, respectively. Therefore, both hypothesis 1 and 2 are supported: i.e., PSI has an effect on PEU and PU. The path from PEU to PU is marginally significant, supporting hypothesis 3. Hypothesis 4 and 5 get the partial support: i.e., PEU influences WWW adoption, whereas PU doesn't. These two results suggest more on PEU than PU in WWW usage. The relative importance between PU and PEU on IS use has been a long argument in TAM studies. Our result suggests that the conflicting results can be attributable to the nature of the technology itself. The Internet is for personal purposes such as fun and sympathy. Also, it is being used to communicate with virtual community or to search personally useful information [4][39]. Our results address that WWW usage goes through different psychological mechanisms from those of taskrelated usages. Perceived ease of use promotes revisiting of web sites more than task-related usefulness does. Finally, the path from PSI to IS use (hypothesis 6) is not supported in our sample.

This result implies that people do not use computer systems blind-folded. Even though they may refer to someone else's opinions, but their decision for a web site is based on personal recognition of functional ease-of-use. We can conclude that PEU influence on WWW usage mediating Perceived Social Influence.



Figure 2. Path Coefficient of Internet Usage

6. Discussion and Conclusion

TAM is a parsimonious framework that explains and predicts individual's voluntary adoption of technologies and tools. We combined this framework with the media selection theory to explain individual's adoption of web sites (not the WWW technology itself). We found that individual psychological procedures of adopting tools and technologies are different from those of adopting web sites. Most noticeably, WWW use is more influenced by PEU than by PU. Also, PSI has only indirect effect on WWW usage through PEU on mediating with PSI. We could draw the following three generic implications from these results. First, the findings of traditional media trait theories are also effective in explaining the adoption of web sites. Media theories have insisted that easeof-use and accessibility are more important than the quality of information and task-support in media selection. This coincidence verifies our argument that we cannot understand the web site usage enough as long as we presume WWW as a technology. Second, web site is not just about information, but about the way information is communicated. Users will choose information of inferior quality just because acquiring it requires less work than high quality information. Currently, web usability is one of the promising research agenda. We argue that it is not surprising to tap this issue from the standpoint of ease-of-use. Even though all the web sites run on the same IT

infrastructure (Internet, WWW, multimedia, etc.), the longevity and popularity of web sites depend on how much they can make users feel comfortable. Third, we may well be more attentive to the affectrelated stimuli if we intend to enhance PEU of web sites. The current usage of web site is more related to the personal fun or curiosity reasons rather than task-oriented reasons. This "emotional the personalization" may be ascribable to the perceived ease-of-use of selected web sites. This analogy proposes that the features or designs of web sites should be based on users' affective responses not on the task-related performances or technical productivities. Web site is not just an instrument to procure information, but also a communication media to exchange personal emotions and privacies. Personalization techniques have been used as an enhancement of transaction processing systems. Emotional personalization is a new domain where new techniques should fill in.

Like other social studies, this study has several limitations. First, we used only perceptual measures of IS use. Many studies have shown that individuals' perceptions of IS usage are sometimes quite different from their actual usage pattern [11][16][42][49]. Second, our results might be exacerbated by our sample characteristics. The subjects in our sample are undergraduate students. They use the Internet for personal purposes such as chatting and searching information for fun or simple curiosity. Besides, their major (MIS) may have aggravated the sample bias. Considering the background of our sample data, our study confirms that social influence turns weak as users become systems. experienced with information Organizational issues are not considered in our study. IS implementation studies have emphasized the importance of organization issues (such as structure, size, industry, support, change management, etc.). These issues may have to be considered in the future study. Third, since we used a cross-sectional data set, with both independent and dependent variables collected contemporaneously, the results are susceptible to the same method bias. That is, the correlation between independent and dependent variables, and the explained variance of the dependent variable, might have been inflated because these were all measured at the same time within the same questionnaire. Fourth, a more detailed WAM should be developed. As we conceptualized web site as the combination of technology and media, more psychological constructs other than PEU, PU, and PSI could be included. Furthermore, antecedents to PEU of web site should be investigated comprehensively and intensively.

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