What is Gender's Influence in Wireless Internet Access Technology Acceptance

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ABSTRACT

This paper studied the mobile communications technology subscribers' usage behavior on the mobile Internet access technology using a combined model of technology acceptance model, the theory of rationed action, and the theory of social cognitive. Especially, the main focus of the paper was to found out the role the gender was playing in determining users' behavior to accept the wireless Internet access technology. In our empirical study, it was discovered that extent to which that male and female accepted the wireless Internet access technology was different significantly. The data from the empirical study confirmed the proposed relationships among some constructs in the combined model, i.e., perceived usefulness, perceived ease of use, subjective norm, self-efficacy, and intention to use wireless Internet access technology. More important was that the data analysis also detected the effect of gender on these relationships, which meant that whether the user was a male or female would influence these relationships. The findings in this research provided us some practical and academic implications, and the limitations were discussed. It was necessary to study this issue facing the coming of the 3rd mobile communications technology, while few researches had been conducted in this domain.

INTRODUCTION

The advance of information communications technology (ICT) changed the whole society drastically in the past decades. A great variety of information technologies (IT) and services had been adopted by the society in different levels. Information system (IS) research was a newly emerging research discipline mainly regarding the application and influence of IT or information communications technology (ICT) in the society. In this research field, more and more studies had been conducted about the users' ICT accepting behavior, to understand the conditions under which information systems were or were not accepted and used by end users. Some theories and theoretical models were established to examine user acceptance and usage behavior on IT, which included Davis's technology acceptance model (TAM) and later extended model (TAM2) [1, 2, 3], Ajzen and Fishbein's theory of reasoned action (TRA) [4], [5], Bandura's theory of social cognitive (TSC) [6] etc. Adapted from TRA, TAM posited that user acceptance was determined by two key beliefs, namely perceived usefulness and perceived ease of use. TAM2 extended TAM to include subjective norm (or social pressure) as another determinant of acceptance, consistent with what TRA suggested. TSC proposed self-efficacy would positively affect perceived ease of use to substantial extent. The robustness of these models had been established through several applications and replications.

However, most studies were focused on some computing technologies or systems while only few on communications technology or systems [7], although they both were belonging to ICT and the influence of ICT on the whole society became increasingly important with its popular applications. In these limited studies on users' ICT adoption, most were done from economical or technical perspectives, rather than from individual psychological or behavioral aspects. Facing the coming of the new information era with the 3rd generation mobile communications (3G), the way that we would use IT would be changed by the 3G's more

powerful mobile communicating capacity and its seamless access to wireline Internet. However, it was ironical that we did not have enough studies on why and how the mobile Internet access technology was adopted and used by users, especially from psychological or behavioral angle. This study tried to make up this missing. Specifically, we would test the applicability of those theories and models in one particular wireless Internet access technology, wireless application protocol (WAP).

Actually, there must exist some other determinants or influencing factors to the technology acceptance or usage, such as Gender by logical thinking. Some psychology research had indicated that gender would influence the decision-making process, and schematic processing by women and men was different [8]. For instance, from an information processing perspective, there were known differences in determinants of self-esteem between both sexes [9]. In IS, only few studies had explored the gender's role in technology acceptance and usage [10, 11]. While men still represented a majority of the work force, the number of women at all levels of the organizational hierarchy continued to rise, so it was necessary and imperative to detect the gender's effect on technology acceptance. To understand better about how different sexes would influence the decision-making process of men and women about an ICT would be helpful to prompt the social gender equity.

THEORETICAL DEVELOPMENT

Figure 1 showed the proposed model in this paper, based on TAM, as developed by Davis et al. [2], together with some constructs from TRA and TCS. Specifically, we proposed that gender would moderate the perceived usefulness (PU) –intention (ITU), perceived ease of use (PEOU) – intention (ITU), subjective norm (SN) – intention (ITU), perceived ease of use (PEOU) - perceived usefulness (PU), and self-efficacy (SE) – perceived ease of use (PEOU) relationships.

Perceived Usefulness

Perceived usefulness (PU) was defined as the extent to which a person believed that using a particular technology would enhance her/his job performance [2]. A significant body of IS research had shown that

Figure 1. Proposed Technology Acceptance Model
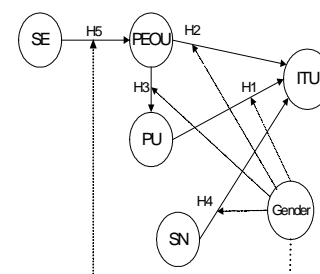
perceived usefulness was a strong determinant of usage intention and user acceptance. Some research indicated that men may place great emphasis on work, accomplishment, and men were motivated by achievement needs to a greater extent than women. They concluded that men might be more task oriented than women. Therefore, we expected factors that were related to productivity enhancement more salient for men than for women.

H1: Perceived usefulness will influence behavioral intention to use a wireless Internet access technology more strongly for men than for women.

Perceived Ease of Use

Perceived ease of use (PEOU) was defined as the degree to which a person believed that using the system would be free from efforts [2]. Perceived ease of use had been proved to have positive effect on both usage intention and perceived usefulness in TAM research. Some research indicated that women typically displayed lower computer aptitude and higher levels of computer anxiety compared to men. Further, women tended to be more anxious than men about computer use. Since perceived ease of use had typically been seen as a hurdle to IT acceptance, low evaluations of ease of use could cause an increase in the salience of such perceptions in determining user's acceptance decisions.

H2: Perceived ease of use will influence behavioral intention to use a wireless Internet access technology more strongly for women than for men.

Davis et al. [2] showed that perceived ease of use was a determinant of perceived usefulness. They interpreted this relationship by stating that technologies that were easier to use might ultimately be more useful. Thus, technologies that were perceived as easier to use would facilitate use and task accomplishment more than that were seen as difficult to use. In other words, the technology that was easier to use will generate the best cost/benefit ratio for achievement-oriented individuals. As proposed in H1, men appeared highly motivated by achievement-related factors like usefulness:

H3: Perceived ease of use will influence perceived usefulness of a wireless Internet access technology more strongly for men than for women.

Subjective Norm

Subjective norm (SN) was defined as the degree to which an individual believed that people who were important to her/him thought she/he would perform the behavior in question [4]. In the technology domain, both peer and superior influences had been shown to be strong determinants of subjective norm [12]. TRA and TAM2 illustrated that subjective norm was an important factor facilitating intention to use a technology. Some research indicated that women were strongly motivated by affiliation needs and preferred person-oriented professions, and had a greater awareness of other's feelings compared to men. Research dating back over a decade suggested that women be more easily influenced by others than men, and recent evidence was consistent with a gender schema view that women tended to be more compliant:

H4: Subjective norm will influence behavioral intention to use a wireless Internet access technology more strongly for women than for men.

Self-Efficacy

Self-efficacy was defined as one's beliefs about his/her ability to perform a specific behavior in TSC [6]. Bandura [6] and other psychology and IS research supported self-efficacy as a determinant of perceptions of ease/difficulty. As mentioned above, women displayed lower computer aptitude and higher levels of computer anxiety, so higher levels of computer anxiety among women can be expected to lead to lowering of self-efficacy, which in turn could lead to lowering of ease of use perceptions. Conversely, the women who had some higher self-efficacy would increase their perception of the easiness to use the computer quickly.

H5: Self-efficacy will influence perceived ease of use about a wireless Internet access technology more strongly for women than for men.

RESEARCH METHODOLOGY

Wireless Application Protocol (WAP) technology was one dominant mobile Internet access technology used in China nowadays, so it was chosen as the targeted researched technology in this study. A total of 280 mobile service users who had WAP use record around China were selected from the customer list of one mobile operator in China, randomly. 252 agreed to participate in this study. One questionnaire to measure the constructs in the research model was mailed to them respectively [2, 6, 12]. Multi-items measurement validated in previous research was adopted here to measure all these constructs, all with seven point Likert-Scales (See appendix A for the measurement scales adopted in this study). One and a half months later, totally 172 completed questionnaires (considerable response rate of 68% in the mail survey) were mailed back, 94 (54.6%) were males and 78 (45.4%) females. The respondent demographics analysis did not find any significant difference in the average age, education level, and income level of the male and female. So we needed not include these control variables into the model analysis.

DATA ANALYSIS AND RESULTS

Partial Least Squares (PLS) was used to analyze the data. PLS was an extremely powerful structural equation modeling (SEM) technique that had been used extensively in IS research [13]. Additionally, SPSS for window version 11.5.0 was used to conduct some basic data analyses of descriptive statistics. Table 1 presented the descriptive statistics (means and standard deviations) of the different variables, categorized by gender. With the exception of SN, the mean values between women and man were statistically significantly different (p-value< .05) by the One-way Analysis of Variance (ANOVA) with the single factor (Gender) variable.

With PLS, the structural model was tested with the data from the entire sample (i.e., women and men pooled together) and each of the sub-samples (i.e., women taken separately and men taken separately). Table 2 presented the path coefficients for each of the sub-samples so that the readers may clearly see the magnitudes of any differences between men and women across each of the constructs. We also conducted a test of the differences in path coefficients between two sub-samples.

As indicated in table 2, compared to women, men placed a greater emphasis on PU in determining ITU, as hypothesized (H1). Women weighted PEOU more strongly in determining ITU than men did, consistent with H2. In fact, PEOU was not a significant determinant of ITU for men at all. Consistent with H3, PEOU had more positive effect on PU for men than for women. Contrary to H4, SN was not a significant factor influencing ITU for women, possibly due to the variance suppression in SN (SD=0.5). However, SN did play a significant role in determining ITU among men, providing support for H4 partially. As proposed in H5, self-efficacy (SE) was one of the important determinants of PEOU for both women and men, indicated by the large path coefficients and big T-test values (not shown in Table), and furthermore, SE did influence PEOU more strongly for women than for men.

Table 1. Descriptive Statistics by Gender

	Women		Men		Significance of Difference Between Women and Men
	Mean	SD	Mean	SD	
PU	4.3	1.0	4.9	0.9	**
PEOU	5.2	0.9	5.7	1.0	*
SN	4.8	0.5	4.6	0.9	NS
ITU	4.2	1.2	5.8	1.3	**
SE	4.4	0.8	5.3	0.9	***

*NS: Non-Significant; * p<0.05; ** p< 0.01; *** p < 0.001*

Table 2. Gender Differences in the Relationships Among the Combined Model

	Entire Sample		Women		Men		Diff Women VS. Men
	R^2	β	R^2	β	R^2	β	
	.43		.43		.53		
PU-ITU		.33 **		.29 **		.45 ***	***
PEOU-ITU		.32 ***		.43 **		.05	**
SN-ITU		.27*		.15 ns		.33 ***	**
PEOU-PU		.42 ***		.23 *		.66 ***	***
SE-PEOU		.45 ***		.50 ***		.47 ***	*

Note: 1. The three difference columns present the significance of difference in path coefficients, and they were calculated using the procedure described in Cohen and Cohen [14] (pp. 55-56). 2. The R^2 reported corresponds to the percentage of the variance of ITU that can be explained by the whole model. NS: Non-Significant; * p<0.05; ** p< 0.01; *** p < 0.001

DISCUSSIONS

This research had addressed the question: "Are men and women different with respect to technology adoption, especially, for mobile Internet access technology adoption?" rather than examining some static mean differences between women and men, this research focused on examining the gender differences in the path relationships among the nomological framework of technology acceptance. Some important and interesting findings emerged from this work.

The current research revealed that some theoretical propositions in IS research can be applied to user behavioral adoption with ICT, such as mobile Internet access technology here. Moreover, gender would play an important moderating effect to influence people's decisions-making process to accept a mobile Internet technology. Especially, men considered perceived usefulness to a greater extent than women, while women were concerned with perceived ease of use more than men in making decisions regarding the use of a new mobile technology. As expected, self-efficacy can affect people's ease of use perception about a new technology more strongly for women than for men. Unexpected was that subjective norm did not influence the women's decision, however, it acted substantial effect on men's intention to use the mobile technology. This inconsistent finding with that in IS research maybe was due to the unique characteristic of mobile communications technology: the stronger network effect launched by a communications technology can easily transform the function of subjective norm to the usefulness of this technology since more people using it, more valuable it would be.

Applying some referred theories into the telecommunications technology adoption area was of academic implication, which was helpful to understand different sexes' adoption behavior and the determinants. However, more concerned by the author probably was the industrial and social implications of this research. As the coming of the new mobile communications technology, 3G, more and more affiliated technologies and services would be launched. It was imperative to understand what would influence consumers' decision to accept them. Particularly meaningful, understanding the difference in different genders' behavior could prompt to provide them a gender equity with respect to using such popular mobile technologies influential to people's daily life.

In current China, mobile Internet was more accessible than wireline Internet (with over 270 million mobile subscribers while 57 million wireline Internet users by 2003), so mobile network was an important platform to promote IT usage. Paying corresponding emphasis on usefulness, ease of use, social subjective norm and users' self-efficacy regarding the role of the gender should provide a better environment for both male and female to adopt mobile IT.

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APPENDIX A: MEASUREMENT SCALES

Perceived Usefulness (PU) (source: [2])
PU1: Using WAP services improves my information-collecting ability.
PU2: Using WAP services make it easier for me to access Internet.
PU3: WAP is useful in my life.

Perceived Ease of Use (PEOU) (source: [2])
PEOU1: Learning to use WAP services to access Internet is easy for me.
PEOU2: I find it easy for me to use WAP services to access Internet.
PEOU3: Overall, I find WAP services easy to use.

Self-Efficacy (SE) (source: [15])
SE1: I could complete the task using some mobile communication technology if I had seen someone else using it before trying it myself.

SE2: I could complete the task using some mobile communication technology if I had a lot of time to be familiar with the technology.

SE3: I could complete the task using some mobile communication technology if I had used similar technology before to do the same job.

Subjective Norm (SN) (source: [12])

SN1: My friends would think that I should use WAP to access Internet.

SN2: My colleagues would think that I should use WAP to access Internet.

SN3: People who influence my behavior would think that I should use WAP to access Internet.

Intention to Use (ITU) (source: source: [2])

ITU1: I intend to use WAP service to access Internet when possible.

ITU2: I intend to use WAP service to visit world-wide-web as often as needed.

ITU3: I intent to use WAP service to do job-related or entertaining work.

ITU4: To the extent possible, I would use WAP service in my daily life frequently.

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