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Home telehealth acceptance model: The role of innovation

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This study aims at exploring the role of user innovativeness in the home telehealth acceptance model, clarifying whether innovativeness is the antecedent to or moderator of the Technology Acceptance Model (TAM); it also aims to discover the influences of related discussion on user acceptance. The results show that innovation is both the antecedent to and the moderator of TAM. Attitude toward using home telehealth services could be enhanced through improvement of individual innovation. Suggestions are proposed for individuals with high or low innovation, respectively.

Key words: Home telehealth, technology acceptance, user innovation, health care, telemedicine, moderator analysis.

INTRODUCTION

Home telehealth is defined as "the use of tele-communications by home care providers to link patients or customers to one or more out-of-home sources of care information, education, or service by means of telephones, computers, interactive television, or some combination of each" (Home Care Management Associates Ltd., 1998). The purposes of home telehealth services are to prevent diseases, monitor diseases, and promote home healthcare, whereas telemedicine services relate primarily to diagnosis and treatment. Furthermore, clinical applications of home telehealth services have proven the effectiveness in the field of pediatrics and geriatrics (Grimm and Anglin, 2006; Hebert et al., 2006; Koch, 2006; Moehr et al., 2006). The benefits of home telehealth services include cost efficiency (Bott et al., 2007; Buysse et al., 2007; Jerant et al., 2001; Johnston et al., 2000; Puentes et al., 2007), and improvements to the quality of life (Schopp et al., 2006). Hence, home telehealth will become a trend in the 21st century (Haux, 2006; Miller, 2007).

In spite of the growing popularity of home telehealth services, evaluation studies of the integrated model framework are few in number, particularly those in Asian countries (Koch, 2006). As the healthcare system is user-centered, this study targets healthcare professionals, rather than the general public (Kim and Chang, 2007; Wilson and Lankton, 2004), as the research subjects (Chau and Hu, 2002; Pare et al., 2006; Schaper and Pervan, 2007; Tabish, Jennifer, and Roger, 2008; Wu et al., 2007; Zheng et al., 2007). Therefore, studies conducted from the perspective of users could make the overall evaluation system more comprehensive (Wilson and Lankton, 2004).

Rogers (1995) defined "innovativeness" as the acceptance of a new idea, behavior, or objective by individuals. Home telehealth services constitute innovativeness when

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accepted by users or individuals as a new idea or behavior. In Taiwan, home telehealth was introduced in 2008, and is regarded a newly emerged service with very few users. As a result, usage behavioral intention (BI), rather than actual usage, is an accurate indicator of actual need for home telehealth.

This study attempted to provide a clear understanding of the factors affecting user innovativeness decisions, thus allowing service providers to develop appropriate marketing strategies and effectively enhancing user acceptance. Studies of user innovativeness have flourished in recent years, as users are an important source of innovation in many different industries (Viktor and Cornelius, 2007). Therefore, this study aimed to explore the role of user innovativeness in the home telehealth acceptance model, whether innovativeness is an antecedent to or a moderator of Technology Acceptance Model (TAM), and discovering the influences of related discussion on user acceptance. The results can provide valuable references for management, policy makers, and future research.

LITERATURE REVIEW AND THEORETICAL BACKGROUND

TAM

TAM (Davis, 1989; Davis et al., 1989) originates from the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975), and comprises five constructs: perceived ease of use (PEOU), perceived usefulness (PU), attitudes toward use (ATT), behavioral intention to use (BI), and actual system use (AU). The definition of PEOU is "the degree to which a person believes that using a particular system would be free from effort," and that of PU is "the degree to which a person believes that using a particular system would enhance job performance." PU and PEOU are the key factors required for the acceptance of new information technologies (ITs); furthermore, PEOU affects PU, and ATT directly affects BI (Davis, 1989).

Although technological advancements have been made on information systems (IS), TAM disregards social influence on technological acceptance. For example, Legris et al. (2003) argued that social evolution or an innovative model can enhance the explanatory power of TAM, thereby addressing the issue of limited medical informatics in the field of health care. The development of TAM relies on providing greater healthcare (Chau and Hu, 2002; Kim and Chang, 2007; Raghupathi, 1997; Schaper and Pervan, 2007; Zheng et al., 2007).

There are a number of studies on the applications of TAM in healthcare. Chau and Hu (2002) suggested that TAM may be more adept than the Theory of Planned Behavior (TPB) in examining personal technology acceptance. Wilson and Lankton (2004) indicated that future research should consider using other methods or constructs to develop a better model. Therefore, this study aimed to investigate the key factors affecting individual acceptance of e-health care.

Innovativeness

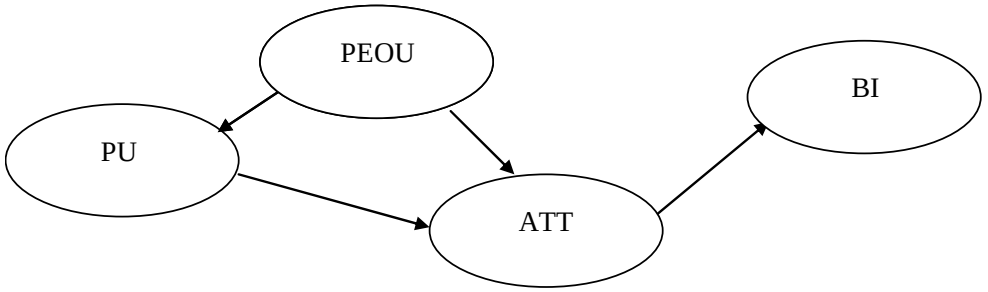
Rogers (1995) defined innovativeness as "the degree to which an individual or other units of adoption is relatively earlier in adopting new ideas than other members of the social system." Goldsmith and Hofacker (1991) defined innovativeness as "the relative willingness of a person to try a new product or service." There are divergent definitions on innovativeness (Roehrich, 2004). Gatignon and Robertson (1985) concluded that, "consumers who depend on normative influences (desire for conformity) adopt more slowly." Rogers defined innovators as those individuals or units of adoption possessing a high level of innovativeness (Rogers, 1995). Agarwal and Prasad (1998) indicated that perceptions of innovation are independent key variables regarding technological information adoption.

The nature of TAM is that "the non-existence of moderating influences the relationship between perceptions and adoption decisions"; it can be inferred that it has a significant moderating influence on personal innovativeness (Agarwal and Prasad, 1998).

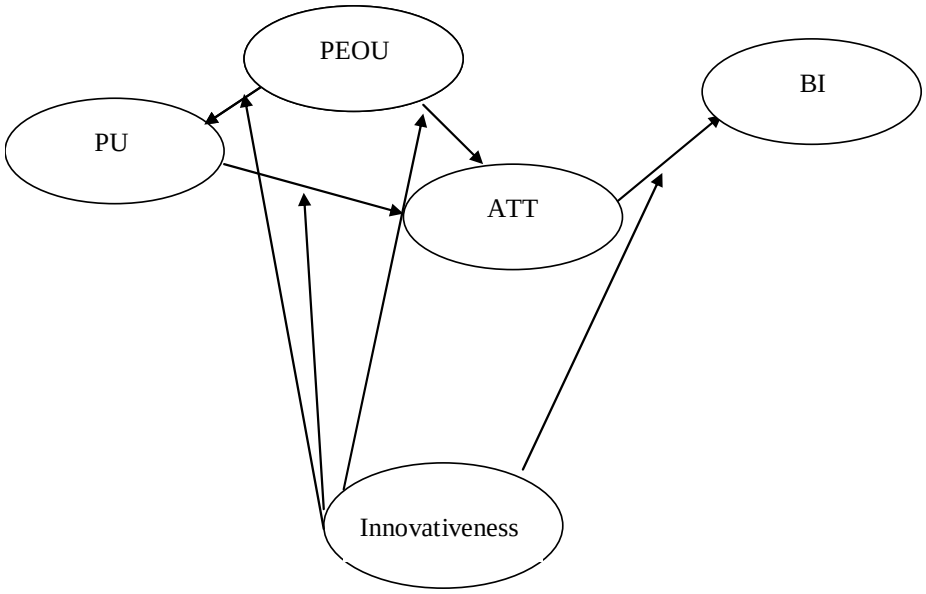
Schillewaert et al. (2005) pointed out that individual innovativeness directly affects technology adoption, positively affects PEOU, and indirectly affects adoption through usefulness and ease of use. Moreover, other researches referred to consumer innovativeness as a force leading to innovative behavior, which is also cited and studied by researches on diffusion of innovation (Brian et al., 2005; Li, 2003; Pamela et al., 2004; Roehrich, 2004). Hung et al. (2003) surveyed the adoption of WAP (Wireless Application Protocol) services in Taiwan based on the innovation diffusion theory, and found that WAP has greater acceptance with higher personal innovativeness. Shintaro (2007) also pointed out that BI tends to increase with personal innovativeness. Hence, this paper adopts the definition of Rogers (1995) and proposes the following hypotheses (Figure 1).

Hypothesis 1 (Moderator hypotheses)

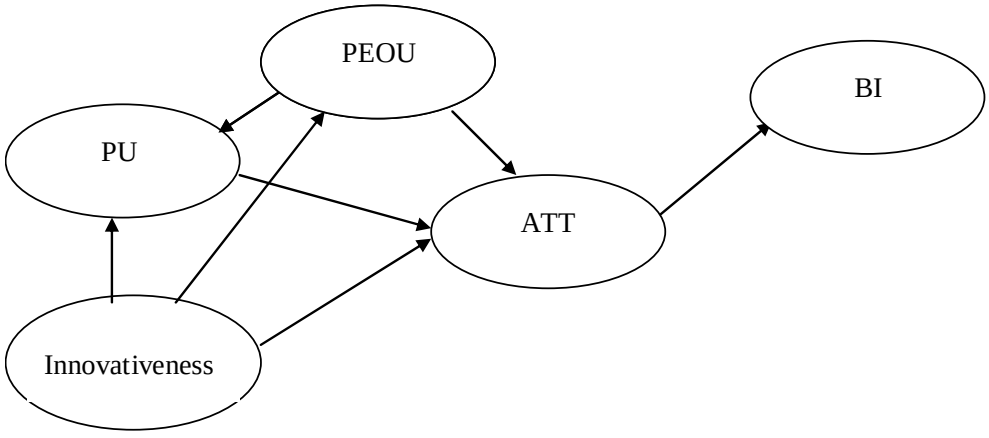
H_{1a}: High versus low innovativeness strengthens the effect of perceived ease of use (PEOU) on perceived usefulness (PU). H_{1b}: Perceived ease of use (PEOU) strengthens attitude toward using (ATT). *H1c:* Perceived usefulness (PU) strengthens attitude toward using (ATT). *H1d:* Attitude toward using (ATT) strengthens behavioral intention to use (BI).



(a) Original model: TAM.



(b) Innovativeness as a moderator



(c) Innovativeness as an antecedent.

Figure 1a-c. Alternative conceptualizations of Innovativeness. Note: perceived ease of use (PEOU), perceived usefulness (PU), attitude toward using (ATT), behavioral intention to use (BI).

Hypothesis 2 (Antecedents hypotheses)

H2a: Innovativeness has a positive effect on perceived ease of use (PEOU). *H2b:* Innovativeness has a positive effect on perceived usefulness (PU). *H2c:* Innovativeness has a positive effect on attitude toward using (ATT).

Table 1. Fit indices for measurement and structural models (TAMs: Original model and Innovativeness as an antecedent).

Fit indices	Recommended value	Measurement model	Structural models of TAM	
			Original	Innovativeness
GFI	≥ 0.9	0.85	0.95	0.94
AGFI	≥ 0.8	0.82	0.93	0.91
NFI	≥ 0.9	0.98	0.99	0.99
CFI	≥ 0.9	0.99	0.99	0.99
RMSEA	≤ 0.1	0.057	0.052	0.052
RMR	≤ 0.05	0.05	0.018	0.019
χ^2 / d.f.	≤ 3	2.21	2.09	2.08

METHOD

Research design and data collection

Since home telehealth is in its incipient stage in Taiwan, a convenience sample is appropriate for those with little knowledge of home telehealth, which could undermine the effectiveness of a questionnaire. Home telehealth can also facilitate the promotion of home health care regarding the senior population, the prevention of diseases, and the monitoring of diseases. The subjects of this study were visitors, aged over 15 years, to the Taiwan International Senior Lifestyle and Health Care (SenCARE 2007) exhibition. This exhibition, sponsored by the Taiwan External Trade Development Council (TAITRA) and supported by the Telecare Industry Alliance of Taiwan, is the largest ever hosted in Taiwan and focuses on a comprehensive spectrum of resources for senior citizens. The exhibition showcases products and services for physiological monitoring (including home telehealth), emergency aid products and services. This study collected 369 valid samples. Most respondents are female (53%), aged over 65 (44%), followed by the age groups of 45 to 54 (28%) and 55 to 64 (27%), have university degree (35%), followed by post-graduate degree (18%), and have an average monthly income of NT$50,000 - NT$80,000 (US$1 ≈ NT$32.55).

Measures of the constructs

This study is based on the definitions and constructs related to TAM (Davis, 1989; Davis et al., 1989) and innovativeness (IN) (Rogers, 1995). TAM encompasses four constructs: perceived ease of use (PEOU), perceived usefulness (PU), attitude toward use (ATT), behavioral intention to use (BI). The operationalization and sources of the measurement items of this study are shown in Appendix A. The measurement is based on a Likert 5-point scale, where 1 denotes “strongly disagree” and 5 denotes “strongly agree”.

Data analysis methods

Confirmatory factor analysis (CFA) was conducted to examine the reliability and validity of the measurement model, and structural equation modeling (SEM) was applied to interpret the causal model, using LISREL 8.7. The study applied the maximum likelihood method to estimate each of the path coefficients, and used the following seven indicators to evaluate the model’s overall goodness of fit: chi-square statistic/degree of freedom, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), normed fit index (NFI), comparative fit index (CFI), root mean square residual (RMR), and root mean square error of approximation (RMSEA).

RESULTS

Reliability and validity of the measurement model

In this study, the measurement model included 17 indicators that describe 5 latent constructs (PEOU, PU, IN, ATT, BI). Seven goodness-of-fit indices, as proposed by Hu and Bentler (1999), were used to assess the overall model fit: Chi-square statistic/degree of freedom, GFI, AGFI, NFI, CFI, RMR, and RMSEA. The results of CFA are presented in Table 1. The goodness-of-fit indices suggested that the measurement model is a good fit. This study further evaluated the psychometric properties of the measurement model in terms of reliability, convergent validity and discriminant validity.

CFA was conducted to examine the reliability and validity of the measurement model, and Cronbach’s alpha, and constructed reliability to assess the internal consistency of the measurement model (Table 2). The construct reliabilities (ranging from 0.83 - 0.92) and alpha coefficients (ranging from 0.82 - 0.92) of all five constructs were greater than the benchmark of 0.6, as suggested by Bagozzi and Yi (1988), thus indicating high internal consistency and the reliability of each construct.

The construct validity included convergent and discriminant validities. Table 2 shows the test results of convergent validity. As seen, all values of the standardized factor loadings of the indicators of each construct were within the range of 0.74 to 0.90, which are greater than the suggested level of 0.50 (Hair et al., 2006); moreover, they were statistically significant at $p < 0.01$. Hence, the convergent validity of the measurement indicators was acceptable. In addition, this study conducted a discriminant validity test to differentiate the

Table 2. Reliability and validity results.

Categories	Standardized factor loading
Perceived ease of use (0.91, 0.91) [a]	
PEOU1	0.83
PEOU2	0.85
PEOU3	0.88
PEOU4	0.84
Perceived usefulness [b] (0.90, 0.91) [a]	
PU1	0.84
PU2	0.89
PU3	0.87
Innovativeness (0.83, 0.82) [a]	
IN1	0.77
IN2	0.84
IN3	0.74
Attitude toward using (0.90, 0.89) [a]	
ATT1	0.89
ATT2	0.85
ATT3	0.84
Behavioral intention to use (0.92, 0.92) [a]	
BI1	0.90
BI2	0.84
BI3	0.89
BI4	0.83

a Values in parentheses for constructs indicate construct reliability and Cronbach's alpha, respectively.

constructs used in this study, following the method suggested by Hair et al. (2006) of pairing two latent constructs, and then subjects them to two models of CFA. The first model allows unconstrained correlation estimation between the two constructs, while the other model provides a constrained correlation, set at 1, between the two constructs.

This study applied the chi-square difference test to compare the first and second models. All chi-square difference values were statistically significant at $p < 0.01$. Hence, discriminant validity was confirmed.

Structural model (original model: TAM)

SEM can interpret the causal model, and the structural model of the original TAM is a good fit to the data (Table 1). Figure 2 presents the results of TAM. PEOU significantly and positively affects PU and ATT (standardized path coefficients are 0.96 and 0.33, respectively). PU (standardized path coefficients = 0.63) significantly and positively affects ATT. ATT (standardized path coefficients = 0.99) significantly and positively affects BI.

Moderating the effects of innovativeness

This study aims to clarify whether TAM is affected by innovativeness. Since innovativeness is a multiple and continuous variable, this paper tests the significance by an interaction latent variable to determine the interactive effect (moderating effect). Holmbeck (1997) indicated that, to examine the interactive effects of continuous variables through latent variable analysis, all possible products of the measureable indicators can serve as indicators of interactive latent variables. Joreskog and Yang (1996) and Jaccard and Wan (1996) suggested that, fewer terms and more continuous variables should be used to test the significance of the interactive effects.

This study follows the suggestions of the above researchers (Holmbeck, 1997; Jaccard and Wan, 1996; Joreskog and Yang, 1996) to examine the interactive

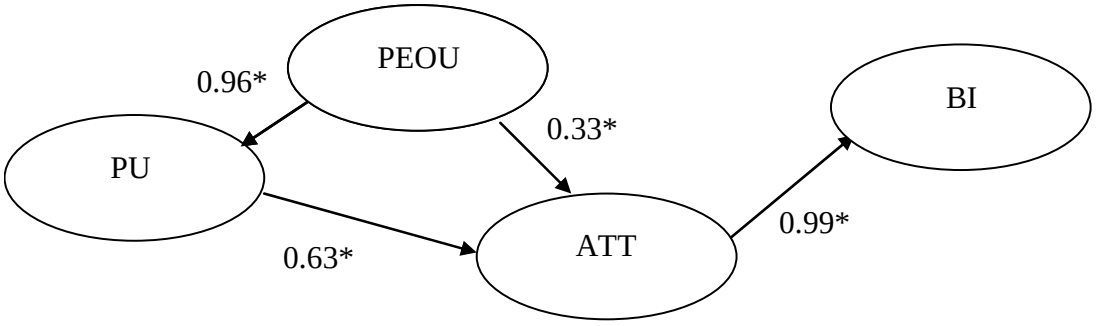


Figure 2. Original TAM. Note: perceived ease of use (PEOU), perceived usefulness (PU), attitude toward using (ATT), behavioral intention to use (BI). *Path coefficient is significant at the 0.05 level.

Table 3. The results of moderating effects—innovativeness from continuous variable analysis.

Path	Model-fit indices						Interaction latent variable	
	NFI	CFI	NNFI	IFI	PNFI	PGFI	Unstandardized Path coefficients	t-value
PEOU → PU	0.91	0.92	0.90	0.92	0.78	0.56	0.14**	11.56
PEOU → ATT	0.91	0.92	0.90	0.92	0.78	0.54	0.20**	8.38
PU → ATT	0.93	0.93	0.92	0.93	0.79	0.56	0.33**	5.36
ATT → BI	0.93	0.93	0.92	0.93	0.78	0.54	0.07**	6.24
Recommended value	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.9	≥ 0.5	≥ 0.5		

** t-value>1.96.

Table 4. The results of Cluster analysis: mean, sample size.

Clusters	Innovativeness		
indicators	High (n=139)	Medium (n=110)	Low (n=120)
In1	4.31	3.19	2.58
In2	4.29	3.33	2.55
In3	4.22	3.85	2.48

effects, and selects the innovativeness latent variable with the largest factor loading (innovativeness 2; IN2).

This study then crosses it with each latent variable indicator to create their respective interactive latent variables (that is, cross innovativeness with PEOU to further create an interaction latent variable, such as innovativeness 2 (IN2)× each indicator of PEOU, resulting in 4 interaction indicators). This study also tests the interactive effect (moderating effect), as shown in Table 3. The moderating effects of innovativeness on the four models (PEOU→PU, PEOU→ATT, PU→ATT, and ATT→BI) invariably provide a good fit to the data. According to Hair et al. (2006), the adopted criteria are: Normed Fit Index (NFI), Comparative Fit Index (CFI), Non-Normed Fit Index (NNFI), Incremental Fit Index (IFI) ≥ 0.9 , Parsimony Normed Fit Index (PNFI), and Parsimony Goodness of Fit Index (PGFI) ≥ 0.5. Moreover, path coefficients for the interactive latent variables of the four models all reach statistical significance, indicating that innovativeness acts as a moderator of TAM.

To visualize the nature of significant interactive effects, this study employs the following method. First, it applies cluster analysis to categorize innovativeness, and K-means clustering to the innovativeness data, with k = 2 to 4. Since the pseudo – F from the 3-cluster partition is greater than the k=2 and k=4 solutions (Calinski and Harabasz, 1974), this study performs a k-means cluster on k=3. The results of the 3-mean clustered analyses are reported in Table 4. The three groups are high – innovativeness (sample size 139), medium -innovativeness (sample size 110), and low -innovativeness (sample size 120). This paper then conducts multiple-group SEM to test the moderating effects of innovativeness across the three groups.

This study conducts a series of multiple-group analyses with LISREL 8.7, and examines whether these

Table 5. The results of moderating effects.

Path	Unstandardized Path coefficient			The chi-square difference Statistics
	High-innovativeness (n=139)	Medium-innovativeness (n=110)	Low-innovativeness (n=120)	
PEOU → PU	0.37**	0.56**	0.40**	$\Delta\chi^2 = 22.5$**
PEOU → ATT	0.20*	ns	0.68**	$\Delta\chi^2 = 6.32$**
PU → ATT	ns	ns	ns	$\Delta\chi^2 =$ ns (Continuous variable analysis with Innovativeness shows significance)
ATT → BI	1.19**	1.02**	0.65**	$\Delta\chi^2 = 27.12$**

Note: $\Delta\chi^2$ is the testing statistics which testing the path coefficients is the same for the two groups and is the value of chi-square with two degree of freedom, ($\chi^2_{0.05}(2) = 5.991$), ** $p < 0.05$, * $p < 0.1$, ns (insignificant) is $p > 0.1$.

innovativeness groups differed from the path coefficient of the structural model. To test the path coefficient, Byrne (1994) suggested that the multiple-group analyses should have two stages: 1) constrain the factor loadings of the measured research variables to equal the innovativeness groups, 2) evaluate the chi-square statistics of the combined model, so that all path parameters of TAM can vary across the innovativeness groups. This procedure can test whether the measurement is invariant across the innovativeness groups. This study evaluates the chi-square statistics of the combined model, and constrains the path parameters from PEOU to PU (each pair of these two latent constructs) to equal the innovativeness groups. Then, it conducts a chi-square difference test to compare the first-stage model with the second-stage model. If reaching a significant level, innovativeness qualifies as a moderator of TAM.

As Table 5 shows, innovativeness is a moderator of TAM, and it has a significant moderating effect on all four relationships (PEOU→PU, PEOU→ATT, PU→ATT, and ATT→BI) (Tables 4 and 5). (1) As for PEOU→PU, three groups of innovativeness show positive effects, and the medium-innovativeness group displays greater significance effects than the other two. (2) Regarding PEOU→ATT, three groups of innovativeness show positive effects, and the low-innovativeness group displays greater significance effects than the other two, indicating that a lower innovativeness has effects of greater significance on PEOU->ATT. (3) Regarding PU→ATT, the continuous variable analysis shows a significant difference, indicating that innovativeness qualifies as a moderator in this relationship. (4) Regarding ATT→BI, there is a positive effect on the three groups, and the high-innovativeness group displays greater significance effects than the other two, indicating that the higher innovativeness significantly affects ATT→BI. In sum, in regard to TAM, PEOU acts as the key factor in the lower innovativeness group, thus, hypotheses 1a, 1b, 1c, and 1d are all supported.

Modeling innovativeness as an antecedent to TAM

This study employs SEM to explore innovativeness as an antecedent to TAM. All goodness-of-fit indices for the structural model reach the recommended value, as shown in Table 1. It indicates that the model of innovativeness, as an antecedent to TAM, is a good fit to the data. Moreover, hypotheses 2a, 2b, and 2c are all evidenced, as shown in Figure 3, indicating that innovativeness (standardized path coefficients for H2a, H2b, and H2c are: 0.89, 0.26, and 0.56, respectively) has a significant positive effect on PEOU, PU, and ATT, thus innovativeness qualifies as an antecedent to PEOU, PU, and ATT. On the other hand, the following relationships are shown in the model of the original TAM. First, PEOU has a significant positive effect on PU and ATT (standardized path coefficients are 0.73 and 0.52, respectively). Second, ATT (standardized path coefficient is 0.99) has a significant positive effect on behavioral intention to use (BI).

DISCUSSION

This study explores the role of user innovativeness in the home telehealth acceptance model, and clarifies whether innovativeness is an antecedent to or a moderator of TAM. The improvements of innovation for individuals can enhance the attitude toward using home telehealth. The following is a summary of the findings of this study. The original model (TAM) reveals that the impact of PU on

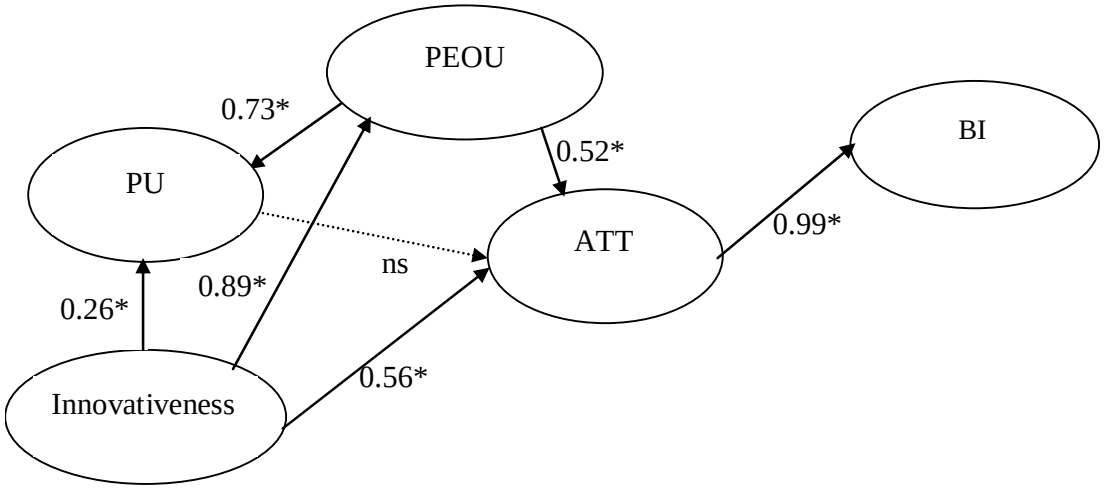


Figure 3. TAM of innovativeness as an antecedent. Note: perceived ease of use (PEOU), perceived usefulness (PU), attitude toward using (ATT), behavioral intention to use (BI). *Path coefficient is significant at the 0.05 level.

ATT, with respect to home telehealth services, is higher than that of PEOU. This result is consistent with that of Chau and Hu (2002), who investigated physicians' acceptance of telemedicine technology, and found that PU is a critical determinant of attitude, as well as in previous application researches (Agarwal and Prasad, 1999; Hung and Chang, 2007; Keil et al., 1995; Schepers and Wetzels, 2007; Venkatesh et al., 2003; Zheng et al., 2007) on TAM. PEOU significantly affects PU, and this result is consistent with previous researches (Agarwal and Prasad, 1999; Davis, 1989; Davis et al., 1989; Kim and Chang, 2007; Legris et al., 2003; Schepers and Wetzels, 2007; Venkatesh et al., 2003) on TAM. As Moehr et al. (2006) indicated that patients and their families, rather than merely the providers, should gain more knowledge on home telehealth use in order to generate the full clinical value of the home telehealth system. In sum, TAM provides an acceptance model for home telehealth services, with a focus on PU for improving ATT. In addition, enhancing users' PEOU can strengthen PU. Therefore, education and training is important for users' ease of use of the home telehealth system, as the users realize that home telehealth is a useful, convenient and easily used service.

Innovativeness acts as a moderator of TAM, and has significant positive moderating effects on all four relevant relationships (PEOU→PU, PEOU→ATT, PU→ATT, and ATT→BI). Specifically, there are two key findings: (1) In TAM, PEOU acts as a key factor for the group with the lower level innovativeness; (2) regarding the group of relatively high innovativeness, the effect on ATT→BI has greater significance. Therefore, in response to the two groups of different levels of innovativeness, the suggestions are as follows.

For the low innovativeness group, strategists should strengthen the PEOU on home teleheath in order to decrease resistance to or rejection of home telehealth; effective methods include education, training, or medium promotions that would assist in understanding home telehealth. Physical contacts, demonstrations, interactive teaching, or following the instructions of trainers can acquaint potential users to home telehealth, thus avoiding possible problems and enhancing the level of acceptance. As for technology developers, ease of use is the priority, including the development of a user-friendly interface and features of easy operation for users, in order to enhance users' willingness to adopt the system and increase market share.

As for the high innovativeness group, attitude toward using home telehealth is the priority because it has a significant positive effect on acceptance. Therefore, improvement to individual attitudes toward use can enhance the acceptance of home telehealth.

Innovativeness acts as an antecedent to TAM, and the findings are below: (1) Innovativeness acts as an antecedent to PEOU, PU, and ATT, and there is a significant positive effect for all relevant indicators. However, among the effects of innovativeness on PEOU, PU, and ATT, the effect on PEOU is the most significant, followed by ATT and lastly PU. (2) Innovativeness and PEOU have significant positive effects on PU, while the effect of PEOU on PU is more significant. (3) Innovativeness and PEOU have significant positive effects on ATT, while the effect of innovativeness on ATT is more significant. (4) In the model, ATT has a significant positive effect on behavioral intention toward use (BI), which is consistent with the original TAM. (5) The model shows good fit, and thus, is a useful reference for future

studies. This result is consistent with that of Wilson and Lankton (2004), who suggested that future research should consider using other methods or constructs to develop an improved model.

Innovativeness refers to the degree that an individual or other units of adoption possesses regarding relatively early intentions of adopting new ideas, in comparison with social peers (Rogers, 1995). It possesses four important features: (1) a change in concept or material (including renovation and innovation), and such change is differentiated from the traditional group or individual cognition or behavior; (2) an ability to influence others in accepting an innovative idea or material; (3) contributions to problem solving or decision making for organizations or society; (4) the speed of acceptance for innovativeness as a function of time. Therefore, information, new ideas and concepts are accepted more quickly by individuals with higher innovativeness regarding changes to the original personal cognition or behavior, and further influencing surrounding groups, peers, or other individuals. Finally, this paper proposes suggestions regarding the relationship model for innovativeness as an antecedent to TAM.

Among the effects of innovativeness on PEOU, PU, and ATT, PEOU has the most significant effect, followed by ATT and PU is the last. The effects are all positive. In other words, a higher innovativeness leads to a higher PEOU of the home telehealth system, and a higher attitude toward its use. Hence, it is critical to enhance user innovativeness, and further elevate PEOU of home telehealth, and update and change the users' ideas regarding home telehealth. Such users may also influence others' acceptance of innovation, thus leading to increased acceptance and adoption of the home telehealth system.

Contrary to the traditional TAM (where PU is positively affected by PEOU), TAM includes innovativeness to explore its relationship with TAM. The results indicate that though both PEOU and innovativeness have significant positive effects on PU, PEOU has a more significant effect on PU. Thus, it is critical to improve the PEOU in order to enhance the users' PU of the system. Enhancing PEOU and PU is important for improving the attitudes toward using home telehealth, as the traditional TAM suggests. However, this study improves the attitude toward using home telehealth through individual innovativeness, and uses innovativeness as a key factor on attitudes toward using the home telehealth system.

These finding provide an important reference for industrial applications.

As the traditional TAM suggests that, attitudes toward using the home telehealth system can improve behavioral intentions for the use of home telehealth. Contrary to the traditional TAM, this study determines innovativeness as an antecedent to TAM, and regards it as an important element in making decisions on acceptance and adoption of the home telehealth system.

Conclusion

The traditional TAM serves an acceptance model for user home telehealth. Different from traditional TAM studies, this study incorporates innovativeness to discuss the acceptance of home telehealth. The two key findings are below: (1) innovativeness is an antecedent to and moderator of TAM; (2) enhancement of attitudes toward using the home telehealth system is achievable by improving PEOU and PU, as the traditional TAM suggests. This study finds that individual innovativeness can enhance ATT. Updating and changing users' ideas regarding home telehealth may influence others' acceptance of innovativeness, thus, achieving acceptance and adoption of the home telehealth system and increasing market share. Therefore, to strengthen the high and low innovativeness groups, it is important to prioritize the high innovativeness group over the low innovativeness group.

The suggestions for the two groups are proposed as follows. Regarding the high innovativeness group, it is important to strengthen the attitude toward using home telehealth services, thus enabling rapid assimilation and adoption of information, new ideas and concepts. The adjustments to original cognition and behaviors can further influence surrounding groups and individuals.

Regarding the low innovativeness group, it is critical to decrease the resistance to and rejection of home telehealth services, and to strengthen the perceived ease of use through effective methods, such as education, training, or medium promotions, in order to increase the understanding of home telehealth system. In addition, other methods, such as physical contact, demonstrations, interactive teaching, and following instructions of trainers, can help potential users to understand the home telehealth system, thereby avoiding possible problems and enhancing levels of acceptance. As for technological developers, the key is the ease of use, such as user-friendly interface and features of easy operations, to enhance users' willingness to adopt the system and increase market share.

Conflict of Interests

The authors have not declared any conflict of interests.

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