Learning the Determinants of Satisfaction and Usage Intention of Instant Messaging

CHIEH-PENG LIN, Ph.D.,¹ HSU-NIEN HUANG, M.B.A.,² SHENG-WUU JOE, DBA,³ and HWA-CHUN MA, Ph.D.(c)⁴

ABSTRACT

This study proposes a model for evaluating usage intention toward interactive information technology. The test results reveal that usage intention is influenced directly by satisfaction, perceived ease of use, perceived personalization, and perceived social interaction, while being also influenced indirectly by perceived reliability, perceived instantaneity, perceived ease of use, perceived social image, and perceived social interaction via the mediation of satisfaction.

INTRODUCTION

The concept of information systems (IS) success has been emphasized from various perspectives such as information technology (IT), marketing, consumer behavior, and so on. A lack of IS usage has long been an impediment to the success of an information system.¹ Predicated upon the usage intention not being a random variable, a few models that try to delineate usage intention and its independent variables have been proposed,² including the well-known IS success model proposed by DeLone and McLean.³ They synthesized and updated a 7-factor taxonomy of IS success from the diversity of IS success measures contained in the previous studies they reviewed.⁴ The categories of the taxonomy include Information Quality, System Quality, Service, User Satisfaction, Intention to Use, Use, and Net Benefits.⁴ While having contributed to the understanding of IS success, DeLone and McLean’s model neglects some other important variables that interact with today’s technological change.⁵ This study differs from previous works in two critical areas. First, this study modifies the IS success model⁴ by investigating critically independent variables that are not available in the area of traditional information systems. Second, while the previous literature indicates inconclusive arguments regarding whether the independent variables (e.g., perceived ease of use) influence usage intention directly³,⁵,⁶ or indirectly,⁷ this study obtains empirical results pertaining to this dispute by examining the possibility of both direct and indirect influences.

RESEARCH FRAMEWORK

This study proposes six independent variables, as shown in Figure 1, derived respectively from system quality, information quality, and social quality originally proposed by Akar et al.⁸,⁹ and DeLone and McLean.⁴

Hypotheses development

Satisfaction theories suggest that the primary predictor of human behavior is individuals’ behavioral intention, which in turn is determined by their sat-

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satisfaction (affect) and cognitive beliefs toward the target behavior.\textsuperscript{10} Although these theories do not confirm specific beliefs relevant for a particular behavior on IT usage, they agree on the beliefs–satisfaction–intention–behavior chain of causality that ultimately culminates in user behavior.\textsuperscript{11} Satisfaction is an affect that may be captured as a positive (satisfied), indifferent, or negative (dissatisfied) feeling.\textsuperscript{11} Affect (as attitude) has been theorized and validated in the MIS area (e.g., TAM-based studies) as an important determinant of intention regarding IS use.\textsuperscript{12,13} These previous findings suggest a substantial relationship between satisfaction and usage intention.\textsuperscript{14} Evidence shows that the user's satisfaction with IT may lead to IT usage established via increased usage intention.\textsuperscript{10,14} Thus, the hypothesis is derived as follows.

\textbf{H1: Satisfaction is positively related to usage intention.}

Reliability is a quantifiable measure useful in the management of IS.\textsuperscript{15} Perceived reliability can be conceptualized as the extent to which users of the interactive IT believe that the IT is reliable for transmitting important information among users and keeping personal and private information secure.\textsuperscript{16} Perceived reliability is critical to user satisfaction and usage intentions on the interactive IT because it reflects a capability of the IT to perform the promised service dependably, safely, and accurately.\textsuperscript{17} Zhu et al.\textsuperscript{18} indicated that perceived reliability has a direct positive effect on perceived service quality and customer satisfaction by electronic banking systems. Online consumers are disillusioned and dissatisfied with unreliable response, late deliveries, and inaccurate billing,\textsuperscript{19} suggesting that perceived reliability plays an influential role on increasing user satisfaction with the IT. The hypotheses are thus proposed as follows.

\textbf{H2: Perceived reliability is positively related to satisfaction.}

\textbf{H2a: Perceived reliability is positively related to usage intention.}

Most practitioners realize the advantage of using the Internet to share information via real-time information processing,\textsuperscript{20} suggesting the importance of instantaneity in the area of interactive IT. Online brokerage users attribute their service dissatisfaction to brokers’ inability to maintain efficient server uptime, execute timely orders, and provide margin rates.\textsuperscript{21} The lack of real-time service tends to prevent potential users from using the IT or purchasing products or services through online shopping.\textsuperscript{22} It is noted that negative dissatisfaction, resulting from slow access or inefficient online links and other technical problems, is ISP users’ primary reasons for IT service termination.\textsuperscript{11} Consequently, the hypotheses are proposed as follows.

\textbf{H3: Perceived instantaneity is positively related to satisfaction.}

\textbf{H3a: Perceived instantaneity is positively related to usage intention.}

Perceived ease of use for interactive IT refers to the degree to which the prospective online users expect the IT usage to be free of effort.\textsuperscript{13} Perceived ease of use is analogous to the \textit{ease of understand-}
ing, which was categorized in the dimension of information quality. Perceived ease of use has been found to be a stronger predictor of usage intention than perceived usefulness in previous research. The theoretical foundations for perceived ease of use as a predictor of usage behavior are derived from several diverse research streams, including self-efficacy theory, a cost-benefit paradigm, and adoption of innovations research. Some empirical studies affirm a significant effect of perceived ease of use beliefs in predicting intention via two pathways: (a) a direct effect on usage intention and (b) an indirect effect on usage intention via satisfaction. The hypotheses are thus stated as follows.

H4: Perceived ease of use is positively related to satisfaction.

H4a: Perceived ease of use is positively related to usage intention.

Perceived personalization can be defined as the extent that users are provided with adequate information or functions based on their individual habits, preferences, and usage patterns. Personalization should have a much wider application than its current format, including establishing customer relationship (satisfaction), service integration, and knowledge management. Previous studies have examined the influence of the personalized service provided by Internet retailers on customer satisfaction. Therefore, the hypotheses about perceived personalization are stated as follows.

H5: Perceived personalization is positively related to satisfaction

H5a: Perceived personalization is positively related to usage intention.

Social image is regarded as the extent to which online users may derive respect and appreciation from peers, family members, or referent others in their social network for their IT usage. Given that people in general are likely to weigh the opinions of others in a society, social image becomes important in any study related to interactive IT. Therefore, IT frequently leads to mutual influences among users with a common social setting and has proven to be a significant social motivation for IT usage in general. Even if an individual does not have a favorable reaction to the IT, the individual will tend to comply with others’ views and intend/use the IT to attain a favorable reaction from important referents, indicating the important influence of social image on usage intention. From these findings, the hypotheses are as follows.

H6: Perceived social image is positively related to satisfaction.

H6a: Perceived social image is positively related to usage intention.

Perceived social interaction is a behavioral tendency displayed by an interactive IT user to cultivate and maintain online relationships with others via mutual communications. It has been found that the greater the degree of interactivity, the more likely the Web site will be considered a popular one, suggesting that the perceived social interaction may substantially influence online users’ pleasant experiences toward the IT, strengthening their satisfaction and usage intention. High satisfaction and usage intention are achieved through such an optimal experience of pleasant social interactions with online others. The hypotheses are thus as follows.

H7: Perceived social interaction is positively related to satisfaction.

H7a: Perceived social interaction is positively related to usage intention.

METHODS

Participants

The participants surveyed in this study are made up of staffs from several well-known companies in Taiwan. Table 1 lists the characteristics of the sample. A majority of respondents from manufacturing and servicing industries is understandable because

<table>
<thead>
<tr>
<th>Table 1. Sample Characteristics</th>
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<tbody>
<tr>
<td><strong>Characteristic</strong></td>
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<tr>
<td>Gender</td>
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<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Age</td>
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<tr>
<td>Under 20</td>
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<td>20-29</td>
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<td>30-39</td>
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<td>40 or above</td>
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<tr>
<td>Industry</td>
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<tr>
<td>Manufacturing</td>
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<tr>
<td>Servicing</td>
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<td>Others</td>
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</table>
people working in these two industries count more heavily on using IM to improve their productivity than do those working in other industries such as farming and fishing.

**Measures**

The constructs in this study were measured using 5-point Likert scales drawn and modified from existing literature. Usage intention and satisfaction are modified from Bhattacherjee.11 Perceived reliability is modified from Lee and Lin16 and McKinney et al.10 Perceived instantaneity is modified from Lee and Lin. 16 Perceived ease of use is modified from Venkatesh and Morris.6 Perceived personalization is modified from Lee and Lin16 and the content of Yahoo Web sites. Perceived social image is modified from Belen del Río et al.28 and Brown and Venkatesh.30 Finally, perceived social interaction is modified from Choi and Kim 29 and Moody.31

**Data analysis**

A two-step procedure applied SEM (structural equation modeling) for data analysis. In the measurement model, the values of average variance extracted are all larger than the 0.50 criteria. The overall goodness-of-fit indices (χ²/df smaller than 2.0; root mean residual [RMR] smaller than 0.05 root-mean-squared error of approximation [RMSEA] smaller than 0.10; comparative fit index [CFI] and non-normed fit index [NNFI] greater than 0.9 despite normed fit index [NFI] and goodness of fit index [GFI] less than 0.9) indicate that the fit values of the model are all satisfactory. Despite NFI and GFI being less than 0.90, the overall model fit is still quite good given that a good model’s fit need not meet all of the criteria in order to be deemed acceptable. Reliabilities (Cronbach’s α) exceed 0.7 for each construct, suggesting that the reliability is satisfactory.

**Table 2. Path Coefficients and t Values Across the Three Models for Comparison**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Indirect model</th>
<th>Direct model</th>
<th>Complete model</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>0.64** (t = 8.27)</td>
<td>0.22** (t = 3.22)</td>
<td>0.28* (t = 1.97)</td>
</tr>
<tr>
<td>H2</td>
<td>0.17** (t = 2.58)</td>
<td>—</td>
<td>0.21** (t = 3.00)</td>
</tr>
<tr>
<td>H3</td>
<td>0.21* (t = 2.34)</td>
<td>—</td>
<td>0.25** (t = 2.58)</td>
</tr>
<tr>
<td>H4</td>
<td>0.25** (t = 2.77)</td>
<td>—</td>
<td>0.21* (t = 2.25)</td>
</tr>
<tr>
<td>H5</td>
<td>-0.02 (t = -0.23)</td>
<td>—</td>
<td>-0.07 (t = -0.74)</td>
</tr>
<tr>
<td>H6</td>
<td>0.24* (t = 2.28)</td>
<td>—</td>
<td>0.24* (t = 2.16)</td>
</tr>
<tr>
<td>H7</td>
<td>0.23** (t = 2.55)</td>
<td>—</td>
<td>0.20* (t = 2.09)</td>
</tr>
<tr>
<td>H2a</td>
<td>—</td>
<td>-0.12 (t = -1.49)</td>
<td>-0.13 (t = -1.66)</td>
</tr>
<tr>
<td>H3a</td>
<td>—</td>
<td>-0.10 (t = -0.88)</td>
<td>-0.11 (t = -1.03)</td>
</tr>
<tr>
<td>H4a</td>
<td>—</td>
<td>0.27* (t = 2.51)</td>
<td>0.22* (t = 2.17)</td>
</tr>
<tr>
<td>H5a</td>
<td>—</td>
<td>0.23* (t = 2.18)</td>
<td>0.22* (t = 2.22)</td>
</tr>
<tr>
<td>H6a</td>
<td>—</td>
<td>0.08 (t = 0.68)</td>
<td>0.05 (t = 0.44)</td>
</tr>
<tr>
<td>H7a</td>
<td>—</td>
<td>0.25* (t = 2.30)</td>
<td>0.21* (t = 2.00)</td>
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</table>

*p < 0.05; **p < 0.01.

**Table 3. Analysis of Direct and Indirect Effects Based on the Complete Model**

<table>
<thead>
<tr>
<th>Path</th>
<th>Indirect effect to usage intention through satisfaction</th>
<th>Direct effect to usage intention</th>
<th>Total effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>F3 → F1</td>
<td>0.059</td>
<td>100%</td>
<td>0.000</td>
</tr>
<tr>
<td>F4 → F1</td>
<td>0.070</td>
<td>100%</td>
<td>0.000</td>
</tr>
<tr>
<td>F5 → F1</td>
<td>0.059</td>
<td>21%</td>
<td>0.220</td>
</tr>
<tr>
<td>F6 → F1</td>
<td>0.000</td>
<td>0%</td>
<td>0.220</td>
</tr>
<tr>
<td>F7 → F1</td>
<td>0.067</td>
<td>100%</td>
<td>0.000</td>
</tr>
<tr>
<td>F8 → F1</td>
<td>0.056</td>
<td>21%</td>
<td>0.210</td>
</tr>
</tbody>
</table>

Note: F1, Usage intention; F2, Satisfaction; F3, Perceived reliability; F4, Perceived instantaneity; F5, Perceived ease of use; F6, Perceived personalization; F7, Perceived social image; F8, Perceived social interaction.
In the measurement model herein, all factor loadings for indicators measuring the same construct are significant, showing that all indicators effectively measure their corresponding construct and support convergent validity. Besides, by using the Bonferroni method under the overall 0.01 level, the critical value of the chi-square test is $\chi^2(1, 0.01/28) = 12.74$. Since the chi-square difference statistics for every two constructs all exceed 12.74 in the model, according to the empirical test results of this study, discriminant validity is successfully achieved. Table 2 lists the test results for three respective structural models, indicating robust test results given that the results for the indirect, direct, and complete models are consistent. It is shown in the complete model that 9 paths out of 13 are significant. Further analysis of indirect and direct effects based on the complete model is performed as shown in Table 3.

**RESULTS**

The test results in Table 2 reveal that four paths are not supported (H5, H2a, H3a, and H6a are not supported), while the remaining paths are all significant (H1, H2, H3, H4, H6, H7, H4a, H5a, and H7a are supported). Further analysis of indirect and direct effects is performed as shown in Table 3.

**DISCUSSION**

This study proposes and empirically evaluates several independent variables that are salient in influencing the success of interactive IT through a modification of the model of DeLone and McLean. The findings imply that an investment in raising user satisfaction and its predictors may pay off for IT providers, providing a complementary contribution for previous research indicating that IS satisfaction may have salient predictors in addition to those identified using the ECT (expectancy-confirmation theory) lens. As satisfaction acts as an important mediator in the formation of usage intention, IT providers must put increased emphasis on market surveys, particularly on user satisfaction, as a checkpoint for understanding their overall satisfaction accumulated by the five variables (reliability, instantaneity, ease of use, social image, and social interaction).

Perceived ease of use and perceived social interaction are the only two independent variables having both direct and indirect influences on usage intention, indicating their great weight on usage intention. This finding brings on an additional complementary contribution of previous research suggesting that IT can be used to foster interpersonal connection in a social world through discussion groups, Internet communities, e-mail, bulletin boards, and so on. It is important to note that management should design different strategies to enhance user usage intention according to the existing direct and/or indirect effects of antecedents in this study, given that the strategies directly lifting usage intention may not be workable for effectively boosting satisfaction. More specifically, indirect effects implying a long model path (with a mediator) to influence usage intention should be strengthened with long-term and stable strategies (e.g., offering trustworthy service warranty, continuous upgrades in IT, etc.). On the other hand, direct effects implying a short model path (without a mediator) to influence usage intention should be strengthened with short-term and protean strategies (e.g., promoting the latest fad in IT functions, temporary vogue in online services, preferential price, etc.).

**REFERENCES**


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