HOW PERSONALITY AFFECTS CONTINUANCE INTENTION: AN EMPIRICAL INVESTIGATION OF INSTANT MESSAGING

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Abstract

The five-factor model (FFM) of personality has been widely used to predict cognitions, attitudes and behaviors in management and psychological research. However, FFM personality seldom appeared in the information system (IS) research field. This study incorporated FFM into the IS continuance model to explain how the personality traits influence individuals’ IS continuance intention. The data were collected from a public university in China via an online survey. The findings support that user satisfaction and perceived usefulness are key to continuance intention. The results also support that perceived enjoyment and perceived usefulness are positively associated with user satisfaction, and perceived enjoyment is the dominant variable in affecting user satisfaction with the technology use. Interestingly, only two personality traits of Big-five factors – conscientiousness and extraversion – were found to have direct effects on perceived enjoyment. The study provides an important basis for better understanding the effects of individuals’ personality characteristics on their technology continuance.

Keywords: Personality, Five-factor Model, Technology Continuance, Instant Messaging (IM).
1 INTRODUCTION

Individual differences are related with his/her cognitions, attitudes and user satisfaction with a system use, and ultimately information system (IS) success (Agarwal & Prasad 1999; Zmud 1979). As a domain of individual differences, personality has not received sufficient attention in the IS field. As we know, the five-factor model (FFM) of personality was widely used to predict cognitions, attitudes and behaviors in management and psychological research. However, FFM personality seldom appeared in the IS field. Devaraj et al. (2008) firstly introduced FFM personality into the IS field and found some interesting and meaningful results for better understanding the technology acceptance issue. Since the continued usage is even more important than acceptance for IS success (Bhattacherjee 2001; Wang 2009), the continuance usage issue has attracted great attention from IS scholars (Bhattacherjee 2001; Hong et al. 2006). Following Devaraj et al. (2008), this study introduced FFM personality traits into the context of technology continuance.

IS continuance model (Bhattacherjee 2001) is a parsimonious framework to explore the system continuance phenomenon. The model posits that user satisfaction and perceived usefulness (PU) are the salient predictors to influence users’ continuance intention, and user satisfaction is the dominant one. To our knowledge, people generally could perform a behavior when they have a positive attitude toward it. Fisher and Hanna (1931) found that a large part of dissatisfaction resulted from emotional maladjustment, and the emotional formation had a close relationship with individual’s personality. The five-factor model illustrates that personality consists of five relatively independent dimensions which provide a meaningful taxonomy for studying individual differences. The purpose of this study is to incorporate the FFM into the IS continuance model and further examine the relationship of these five personality constructs to the IS continuance intention.

The rest of this paper is organized as follows. First, it introduces the IS continuance model and the FFM of personality; second, based on the theories and related prior research, it develops the research model and proposes the research hypotheses. Third, it discusses the research methodology and then conducts the data analysis. Finally, it concludes with implications for theory and practice derived from the results.

2 THEORETICAL FOUNDATIONS

2.1 IS Continuance Model

Continuance refers to a form of post-adoption behaviors which follow initial acceptance (Rogers 2003). The IS continuance model (Bhattacherjee 2001) posits that a users’ intention to continue use is determined primarily by his or her satisfaction with previous usage and perceived usefulness (PU), and satisfaction is the stronger predictor. In addition, user satisfaction is positively influenced by PU, which is positively associated with confirmation of expectation (COE). IS continuance model has been widely used to explain the usage behaviors in the post-adoption context, such as continuance, extended use and innovative use (Bhattacherjee et al. 2008; Hsieh & Wang 2007; Wang et al. 2008).

2.2 Five-Factor Personality Model

Personality reflects an individual’s stable, consistent, and distinctive set of mental and emotional characteristics. Personality traits define our essence and are reflected in our thoughts and behaviors. Although a large number of traits have been invented in the personality research, a five-factor model (FFM) of personality, also termed the Big Five (Goldberg 1990) has been widely used to describe the most salient aspects of personality.

FFM of personality suggests that the domain of personality can be described by five superordinate constructs - openness to experience, neuroticism, agreeableness, conscientiousness and extraversion.
Openness to experience, which is associated with scientific and artistic creativity and divergent thinking, represents the flexibility of thought and tolerance of new ideas. Neuroticism, also called emotional stability, is characterized by anxiousness, depression, insecurity and hostility. Agreeableness, or likability, is associated with the traits such as courtesy, flexibility, trust, good-nature, cooperation, forgiveness, soft-heart, and tolerance. Conscientiousness reflects the motivation and persistence in the goal-oriented behavior. Extraversion is described by being sociable, gregarious, assertive, active, and ambitious (Barrick & Mount 1991).

3 RESEARCH MODEL AND HYPOTHESES

The research model is developed through the incorporation of the FFM of personality and IS continuance model to investigate the influence of individuals’ personality factors on their IS continued usage. The theory of reasoned action (TRA) provides a good guide for our thinking about how personality affects the technology acceptance (Ajzen & Fishbein 1980). TRA suggested that external or exogenous variables might affect the established TRA relationships between beliefs, attitudes, intentions, and behavior. As an external variable, the effect of personality on the technology acceptance has been investigated in Devaraj et al. (2008), while its effect on continuance has not been touched in the IS field. Since continuance intention is an ex post reconfirmation of the initial adoption decision, the technology acceptance does not guarantee continued use. Therefore, a large number of IS scholars has shifted their attention from technology adoption to continuance (Bhattacherjee 2001; Bhattacherjee et al. 2008; Hong et al. 2006). However, there is a virtual dearth of research that has linked the personality factors into the IS continuance research.

Figure 1. Research Model

This study integrates Big-five personality to IS continuance model to explore the mechanism of personality in affecting the IS continuance intention. Figure 1 depicts the research model of this study. In the research model, confirmation of expectation (COE) in IS continuance model is omitted but perceived enjoyment (PE) is added. According to motivation theory, people would like to throw their time and efforts to use a technology if they have intrinsic motivation and extrinsic motivation. Perceived usefulness (PU) represents the instrumental aspect of technology use, while PE characterizes the hedonic aspect of using a technology. Therefore, PU is a form of extrinsic motivation and PE is a form of intrinsic motivation. Our target technology is instant messaging (IM) service, which is an Internet-based application that provides a real-time communication between people. IM provides a close face-to-face channel for geographically dispersed people to communicate
via a combination of text message, voice and video. In the IM usage context, the importance of PE might be much larger than that of COE, and PE would be an important variable to link Big-five personality factors to the IS continuance intention. Accordingly, the present research incorporates PE rather than COE into the model.

3.1 User Satisfaction and Perceived Usefulness

IS continuance model suggests the relationships among perceived usefulness, user satisfaction and continuance intention (Bhattacherjee 2001). As an experience-based affect, user satisfaction is defined as a post-acceptance affect with the prior usage of an information system. Many previous studies have validated the association between user satisfaction and continuance intention (e.g. Bhattacherjee et al. 2008; Hong et al. 2006). The present study focuses on such communication technologies as the IM service. If the individual users are satisfied with their prior IM usage, it is reasonable to believe that they are more likely to form the continuance intention rather than discontinuance. This leads to the first hypothesis:

H1: User satisfaction is positively associated with continuance intention.

In our research, PU is defined as an evaluation belief about the communication technology that builds and maintains interpersonal relationships in a voluntary social context (Li et al. 2005). Specifically, PU reflects a general perception about the efficiency in providing instant feedback, conveying multiple cues, and expressing feelings and emotions in the IM context. Originally, the usefulness-intention association was derived from an acceptance context (Davis et al. 1989). Based on this, Bhattacherjee (2001) extended and supported this relationship in a continuance context. In addition, previous studies have revealed that PU impacts individuals’ affect of technology usage in the acceptance context (e.g. Karahanna et al. 1999), and many post-acceptance studies have also found the positive relationship between PU and user satisfaction (e.g. Wang & Hsieh 2006). Hence:

H2: Perceived usefulness is positively associated with continuance intention.

H3: Perceived usefulness is positively associated with user satisfaction.

3.2 Perceived Enjoyment

PE is defined as the perception of the fun, enjoyment, and pleasure inherent in using communication technologies to keep and develop interpersonal relationships (Davis et al. 1992). Prior studies found that PE has a positive relationship with perceived ease of use (PEOU) (Venkatesh et al. 2000), and PEOU has a positive relationship with user satisfaction at the post-acceptance stage (Hsieh & Wang 2007). Since the IM service is quite simple and easy, individuals can handle the usage procedure on their own. Viewed from this perspective, PEOU is not an important variable in the present study. Therefore, we believe that PE would directly affect user satisfaction over and beyond the mediation of PEOU. Hence:

H4: Perceived enjoyment is positively associated with user satisfaction.

The association between PE and PU was not presented in the Motivational Model (Davis et al. 1992). Venkatesh et al. (2000) revealed that these two factors can be related via PEOU. More straightly, Li et al. (2005) found the directly positive relationship between PE and PU. Hence:

H5: Perceived enjoyment is positively associated with perceived usefulness.

3.3 Big-Five Personality Factors

The management literature has demonstrated that psychological predispositions have main effects on a number of individual variables (Barrick & Mount 1991; Barrick et al. 2001). As a grounded theory, the FFM of personality has been widely used as a parsimonious and comprehensive framework describing the structure and nature of personality (Digman 1990; Goldberg 1990).
Openness to experience represents the flexibility of thought and tolerance of new ideas. The higher the individuals possess the openness-to-experience personality, the more likely they are willing to try novel and different things. On the contrast, those low on this dimension of personality are more conservative, and inherently feel very uncomfortable with change. From this point, we believe that the openness-to-experience personality will influence the individuals’ perceptions and attitudes about the technology use. Those individuals high in openness-to-experience are less threatened by the change from the adopted technology, and they are more likely to hold the positive perception of enjoyment about the communication technology usage. Hence:

H6: Openness to experience is positively associated with perceived enjoyment.

Neuroticism is characterized by insecurity, anxiousness and hostility. Neurotic people are anxious, embarrassed, depressed, and tend to negative emotions when they face changes. By contrast, unneurotic people are emotionally stable and well-adjusted, and prone to positive reactions toward new things. TRA identified neuroticism as one of the personality variables affecting beliefs about behavior (Ajzen & Fishbein 1980). Normally, neurotic personalities are likely to view the new technology as threatening and stressful, and form negative beliefs about the technology use. Thus, people high in neuroticism are less likely to feel the enjoyment and pleasure of the IM service. Hence:

H7: Neuroticism is negatively associated with perceived enjoyment.

Agreeableness involves getting along with others in pleasant and satisfying relationships (Organ & Lingl 1995). Agreeable people are kind, considerate, likable, helpful, and cooperative. Agreeable personalities are more likely to relate to technology beliefs when the technology contributes to collaboration and cooperation (Devaraj et al. 2008). The IM service provides an interactive online communication to help geographically dispersed people around the world to easily communicate with others to exchange information in real-time. Therefore, agreeable people are more likely to feel the enjoyment and pleasure of the IM usage, and form the positive beliefs about the technology usage. Hence, it would be reasonable to expect the positive relationship between agreeable personalities and perceived enjoyment of the IM service. This leads to the eighth hypothesis:

H8: Agreeableness is positively associated with perceived enjoyment.

Conscientiousness personality reflects an intrinsic motivation to achieve, and perform at a high level, and take actions to improve individuals’ job performance (Devaraj et al. 2008). Since conscientious people have a strong sense of purpose and will, they are responsible and scrupulous (George & Zhou 2001). Here, PE refers to the perception of the fun, enjoyment, and pleasure inherent in using communication technology to keep and develop interpersonal relationships. The distinctive features of IM, such as instant feedback, multiple cues and feeling and emotion expression allow the IM service to be a good alternative to face-to-face communication. Given their strong motivation to keep and develop interpersonal relationships, conscientious people are more likely to carefully consider the effect of IM usage, and feel the enjoyment and pleasure in the process of the IM use. Hence:

H9: Conscientiousness is positively associated with perceived enjoyment.

Extraversion is described by being sociable, gregarious, active and assertive. TRA explicitly suggests that extraversion personality will have an effect on one’s beliefs about a particular behavior (Ajzen & Fishbein 1980). Since extrovert individuals are social, active and outgoing, they are more likely to place a high value on close and warm interpersonal relationships compared with introvert ones (Devaraj et al. 2008). Given the importance of IM to interpersonal relationships, it is reasonable to expect that people high in extraversion are more likely to feel the enjoyment and pleasure of the IM use. Hence:

H10: Extraversion is positively associated with perceived enjoyment.

4 RESEARCH METHOD

The research model was empirically tested using an online survey of IM users among undergraduate and post-graduate students enrolled in two business courses of the author at a public university in
China. Given that the university students frequently use internet to communicate and do assignments, it is a good way to collect data via the online survey. The author put the announcement of the survey collection to the students in her virtual classroom. At the same time, the announcement was also released via the QQ group of the class. Students received a nominal amount of course credit for completing the survey. Of a total of 439 students in these two courses, 228 returned the complete questionnaires, resulting in an effective response rate of 51.9%.

The questionnaire items were taken from previous studies and reworded to suit the context of this study. The Big-five factors of personality were measured with the NEO-Five Factor Inventory (Costa & McCrae 1992), which is a well-validated measure of the big five. Based on this, some modifications were made in order to control the length of these five instruments. In addition, continuance intention, user satisfaction and PU were measured using the validated scales from Bhattacherjee (2001). PE was measured using a three-item scale from Davis et al. (1992) and Venkatesh (2000). All the items were measured on a five-point Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

5 DATA ANALYSIS AND RESULTS

Structural Equation Modeling was applied for data analysis using partial least squares (PLS), that is, SmartPLS 2.0.

5.1 Measurement Model Assessment

The measurement model was evaluated prior to the structural model. The acceptability of the measurement model was assessed by the reliability of individual items, internal consistency between items, and the model’s convergent and discriminant validity. In subsequent process of data analysis, the five personality factors were treated as separate factors. Table 1 shows the composite reliability, average variance extracted (AVE), and square root of the AVE as well as the correlations between the constructs. For internal consistency, the composite reliability values of all the constructs were above 0.707, indicating adequate internal consistency (Nunnally & Bernstein 1994). The AVE for each construct was higher than 0.50, suggesting that observed items explain more variance than the error terms (Fornell & Larcker 1981). In addition, the square root of the AVE for each construct was higher than the correlations between it and all other constructs, suggesting that discriminant validity was verified.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Composite Reliability</th>
<th>AVE</th>
<th>OP</th>
<th>AG</th>
<th>NE</th>
<th>CO</th>
<th>EX</th>
<th>PE</th>
<th>PU</th>
<th>US</th>
<th>CI</th>
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<tr>
<td>OP</td>
<td>0.80</td>
<td>0.57</td>
<td>0.75</td>
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<tr>
<td>AG</td>
<td>0.79</td>
<td>0.56</td>
<td>0.07</td>
<td>0.75</td>
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<tr>
<td>NE</td>
<td>0.84</td>
<td>0.63</td>
<td>0.14</td>
<td>0.16</td>
<td>0.79</td>
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<tr>
<td>CO</td>
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<td>0.61</td>
<td>0.14</td>
<td>0.16</td>
<td>0.32</td>
<td>0.78</td>
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<tr>
<td>EX</td>
<td>0.88</td>
<td>0.65</td>
<td>0.18</td>
<td>0.07</td>
<td>0.31</td>
<td>0.37</td>
<td>0.81</td>
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<tr>
<td>PE</td>
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<td>0.06</td>
<td>0.07</td>
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<tr>
<td>PU</td>
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<td>0.05</td>
<td>0.24</td>
<td>0.20</td>
<td>0.60</td>
<td>0.89</td>
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<tr>
<td>US</td>
<td>0.94</td>
<td>0.81</td>
<td>0.06</td>
<td>0.04</td>
<td>0.12</td>
<td>0.22</td>
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<td>0.74</td>
<td>0.61</td>
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<td>CI</td>
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<td>0.58</td>
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<td>0.26</td>
<td>0.51</td>
<td>0.42</td>
<td>0.49</td>
<td>0.76</td>
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</table>

Note: (1) OP: Openness; AG: Agreeableness; NE: Neuroticism; CO: Conscientiousness; EX: Extraversion; PE: Perceived Enjoyment; PU: Perceived usefulness; US: User satisfaction; CI: Continuance intention (2) The shaded numbers on the diagonal are the square root of the variance shared between the constructs and their measures. Off-diagonal elements are correlations among constructs.

Table 1. Inter-Construct Correlations: Consistency and Reliability Tests
The loadings of nine constructs and their t-values are used to assess the item reliability. Except for CI1 (0.69), OP1 (0.66), OP3 (0.62), AG1 (0.67) and AG3 (0.63), the loadings of all the other items were well above the 0.70 guideline and statistically significant at the 0.05 level (Hair et al. 1998). The reason for low loading of these items may be the reverse coding. Given that the low loadings were close to 0.7 and statistically significant at the 0.05 level (only OP3 and AG3 at the 0.1 significant level), it is reasonable to accept the satisfactory item reliability for the measurement model.

5.2 Structural Model Assessment and Hypothesis Testing

Figure 2 presents a graphical depiction of the PLS results, which exhibits the standardized path coefficients among the constructs using the bootstrapping resampling method and the values of the squared multiple correlation for dependent variables. The results of this study indicate that seven of ten causal links specified by the model were supported. The paths from user satisfaction (H1) and PU (H2) to continuance intention were found to be positive and significant, with path coefficients of 0.37 (t=3.61) and 0.19 (t=1.67) at the 0.01 and 0.1 significant level, respectively. Thus, H1 and H2 were supported. PU and PE explained 26% of the variance in continuance intention. In addition, the paths from PU (H3) and PE (H4) to user satisfaction were also found to be positive and significant, with path coefficients of 0.27 (t=2.62) and 0.58 (t=6.04) at the 0.01 significant level, respectively. These two constructs explained 59% of the variance in user satisfaction. Hence, H3 and H4 were supported.

As hypothesized, PU is positively correlated with PE, with a path coefficient of 0.60 (t=8.35) at the 0.01 significant level. PE explained 36% of the variance in PU. Thus, H5 was supported.

Furthermore, only two paths from Big-Five factors of personality (conscientiousness and extraversion, respectively) to PE were found to be positive and significant, with path coefficients of 0.22 (t=2.41) and 0.32 (t=3.06), respectively. Hence, H9 and H10 were supported. Interestingly, the author did not observe statistically significant relationships between openness to experience, neuroticism, agreeableness and PE, indicating that H6, H7 and H8 were not supported.

Figure 2. Research Results
6 DISCUSSION AND IMPLICATIONS

6.1 Discussions of Findings

The present study has provided a good explanation of continuance intention about IM usage (26%). The research found that user satisfaction and PU were significant determinants of continuance intention, and the effect of user satisfaction on continuance intention was stronger than that of PU. The research also found that PE had indirect effects on continuance intention via user satisfaction and PU. Specifically, PE and PU collectively explained 59% of the variance in user satisfaction, and PE is the dominant variable in shaping the satisfaction with the technology use. It should be noted that the inclusion of PE in the IS continuance model provided significantly greater explanation of user satisfaction than the original IS continuance model (Bhattacherjee 2001). The findings of this study reflected that IM users are more likely affected by the hedonic aspect of the technology in the communication process rather than PU. Thus, PE should be considered in future continuance research about the online communication technologies.

At the same time, PE explained 36% of the variance in PU. Different from information systems in a workplace setting such as ERP systems, IM is concerned with its social nature to maintain and build interpersonal relationships in real time. The measurement of PU in this study focused more on the communication effectiveness of IM users. From this point, the perceptions of the hedonic utility directly shaped the formation of users’ PU.

Unexpectedly, only two personality traits of Big-five factors – conscientiousness and extraversion – were found to have direct effects on PE. These findings reflect that conscientious and extrovert individuals are more likely to accept the technology, and form the positive beliefs of the enjoyment and pleasure about IM usage. Contrary to our hypotheses, openness to experience, neuroticism and agreeableness have no direct effects on PE. Following the alternative model in Devaraj et al (2008), the author linked openness to experience, neuroticism, and agreeableness to continuance intention. However, the author did not find the statistically significant effects. These relationships might not be simple linear relationships, and thus need future research for further examination.

6.2 Limitations

This study has some limitations. First, the data were collected from a student sample, and thus they may not reflect the perceptions of the users in other age groups or in other social contexts. It should be cautious when generalizing from student-based studies to working adults, e.g. interpersonal relationships in organizational settings. Second, it should be cautious not to generalize the findings to technologies beyond such online communication technologies as IM. The relationships specified and tested in the present study may not exist in other enterprise-based technologies. Therefore, future research should examine these relationships in an enterprise-based IS context. Third, different IM tools from different vendors and service providers were used among the students. As we investigated from the respondents, the most frequently used IM tools are QQ, Fetion and MSN. In the present study, we did not examine the difference in the features of these online communication technologies. Fourth, the dependent variable is continuance intention, but not actual usage. The objective data of actual usage is not easy to collect because they keep in the hands of the IM providers. The continuous usage may depend not only on continuance intention, but also the habit (Limayem et al. 2007) and user satisfaction (Bhattacherjee 2001). Therefore, future research should examine the habit and its relationship with user satisfaction and continuance intention in predicting continuous usage.

6.3 Implication for research

From a research standpoint, the research model provides an important perspective for studying the continuance issue about computer-mediated communication technologies. The original relationships in IS continuance model were supported in this study. Specially, user satisfaction and PU were both
positively related to continuance intention, and user satisfaction was the stronger determinant. Moreover, the direct effect of PU on user satisfaction was also verified. These results corroborate earlier work in the IS research field (Bhattacherjee 2001).

Further, unlike IS continuance model, PE not COE was included in the research model. The study found positive relationships between PE, PU and user satisfaction, and PE was the stronger determinant of user satisfaction than PU. Similar with prior studies (e.g. Hsieh & Wang 2007), the effects of PU seems to diminish at the post-adoptation stage. This may be related to the IM context. IM is a tool for social communication to maintain interpersonal relationships, but not to enhance users’ work performance. Therefore, it would be necessary to explore how IM usage is carried out in a business context and how IM usage influences their work performance in the future research.

Finally, given the importance of PE in the IM usage context, more attention should be paid. This study linked Big-five factors of personality to PE. With the exception of openness, neuroticism, and agreeableness, the general supports for these hypotheses were found. It is noted that Devaraj et al (2008) was one of the early studies to investigate the relationships between personality variables and the technology acceptance model. The present study can be viewed as one of the first studies to relate personality factors to the technology continuance model. Future research would examine the role of personality variables in other established models in IS research, such as IS success model. As a useful framework for identifying the relevant dimensions of personality, the addition of Big-five factors of personality might increase the explanatory power of these established models.

6.4 Implication for practice

From the perspective of practice, this study sheds light on the types of people who hold positive beliefs about the enjoyment of a communication technology. IS continuance model suggests that these beliefs are associated with continuance intention. For jobs where communication is critical to individual success, organizations could benefit from knowledge of the types of people who are likely to have positive beliefs toward the technology. The organizations could look for and recruit the individuals with these traits using Big-five selection tests. However, to date, we are uncertain about the effects of IM usage on employees’ work performance in organizations. Some researchers suggested that IM might lead to an increase in task interruption (e.g. Czerwinski et al. 2000), while others argued that strategic use could reduce IM interruption (Garrett & Danziger 2008). Accordingly, an important study for both theory and practice is to investigate how employees’ IM usage affects their work performance and how managers design suitable polities and regulations in organizations to ensure their appropriate use.

From the perspective of IM service providers and vendors, the significant effects of PE and PU on user satisfaction suggested that hedonic outcomes and instrumental utility of the communication technology must be paid further attention. The strong effect of PE on user satisfaction indicated that the fun and enjoyment of IM is the dominant variable at the post-adoptation stage. The enjoyment aspect of IM could come from its capabilities of displaying smiley, avatars, icons and interactive features. Given their importance to user satisfaction, these interactive features should be strengthened and kept updated frequently. Furthermore, the research found that user satisfaction was a stronger determinant of continuance intention than PU. Therefore, vendors must continuously explore the design methods to improve the entertainment aspect of IM use to increase user satisfaction.

In conclusion, this study incorporates PE and its linkage with Big-five factors of personality into the IS continuance model. The study has raised many interesting future research directions. We hope that it will attract more attentions from IS scholars to further explore the relationships between individual personality traits and IS users’ behavior in the post-acceptance stages to better solve the issue of IS discontinuance. In a word, integrating PE and Big-five factors of personality into IS continuance model provides additional avenue for better understanding PU, user satisfaction and continuance intention.
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