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Tao Wang

Southwestern University of Finance and Economics, ccnuwt@swufe.edu.cn

Minghui Kang

Southwest Jiaotong University, kmhui66@hotmail.com

Bin Fu

Chungnam National University, fubin@cnu.ac.kr

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UNDERSTANDING USER ACCEPTANCE OF MICRO-BLOG SERVICES IN CHINA USING THE EXTENDED MOTIVATIONAL MODEL

Tao Wang, School of Economic Information Engineering, Southwestern University of Finance and Economics, Chengdu, P. R. China, ccnuwt@swufe.edu.cn

Minghui Kang*, School of Economics Management, Southwest Jiaotong University, Chengdu, P. R. China, kmhui66@hotmail.com

Bin Fu, School of Business Administration, Chungnam National University, Daejeon, South Korea, fubin@cnu.ac.kr

Abstract

The growing popularity of micro-blogs has drawn an increasing amount of attention from users keen to expand friendship, facilitate information sharing and information seeking. Given the extensive use of micro-blog services, there is a pressing need to understand users' behavioral intentions in micro-blog services. Although there are some studies exploring the factors explaining micro-blog users' acceptance, none of research has been reported from both of the technological characteristics and network effects of micro-blog services. This study extended motivational model with socio-technical approach as a theoretical framework to examine the roles of technological factors and network effect factors in determining micro-blog users' behavioral intentions. This study suggests that interactivity, convenience, accessibility, network size, existing social contacts, performance expectancy, sense of belonging and hedonic expectancy together provide a strong explanation for micro-blog use intention. The results of this study provide directions for system administrators and service providers to achieve higher levels of micro-blog usage by developing multi-faceted strategies.

Keywords: micro-blog, behavioral intention, motivational model, social-technical theory

* Corresponding Author

1 INTRODUCTION

The emergence of Web 2.0 has brought about several new social technologies (Agrifoglio *et al.*, 2010). Among these, micro-blogs have emerged as a popular tool for short, frequent communication via Web postings (Ebner *et al.*, 2010; Hsu *et al.*, 2010; Liu *et al.*, 2010). Micro-blogs are known as a new form of social media which combines the social networking characteristics of SNS with the convenience and immediacy of instant messaging, the individual touch of blogs, and the variety of subjects of online community discussions (Zhao and Rosson, 2009). It's a new form of communication channel in which users can briefly describe their current status in short posts distributed by instant messages, mobile phones, email or the web posts limited to 140 text characters in length (Ebner *et al.*, 2010; Hsu *et al.*, 2010).

Micro-blogs emphasize the user's interaction and involvement (Ebner *et al.*, 2010). Users are the key to a successful micro-blog platform. Without users' usage, micro-blogs would be a cyberspace filled with empty pages (Günther *et al.*, 2009). Therefore, research on the factors motivating individuals' behavioral intentions towards the adoption of micro-blogs remains a high priority. There has been a significant proliferation in the number of micro-blog adoption research (Agrifoglio *et al.*, 2010; Ha and Kwon, 2011; Hughes and Palen, 2009; Zhang *et al.*, 2011; Zhao, 2011). However, most studies proposed their research models based on technology acceptance models like TAM and ignored the intrinsic motivations. On the other hand, a micro-blog is identified as a socio-technical system which connects people socially, thus, its imperative to take an integrative view in promoting adoption of micro-blog services by considering socio-technical factors such as sense of belonging (Hughes and Palen, 2009; Java *et al.*, 2007), however, previous study seemed to ignore these factors in studying the adoption of micro-blogs. Given the limitations of previous micro-blog research, in order to fill the gaps, this study attempted to adopt Motivational Model and Socio-technical approach as the underlying theoretical foundations to reveal the factors that shape the micro-blog use intention.

By drawing from previous research to identify potential determinants of individual's adoption of micro-blogs, this study investigates whether interactivity, convenience, accessibility, network size and existing social contacts can influence user's behavioral intention of micro-blog services through motivational and socio-technical factors such as performance expectancy, sense of belonging, hedonic performance. Understanding what motivates individuals to adopt micro-blog services are important because such efforts will not only contribute to the advancement of micro-blog but also shed light on developing effective strategies to promote micro-blog usage.

2 RESEARCH BACKGROUND

2.1 Overview of micro-blog services in China

Micro-blog is a fast growing market in China and is the core focus of the investment market. Micro-blog receive great attentions by public in China. According to the data released by CNNIC, there were 249.9 million micro-blog users in China in 2012. Micro-blog has become the most popular way in which Chinese netizens disclose information (Global Times, 2011). Given the high competition, Chinese micro-blog services have also developed innovative multimedia features that allow users to send pictures and videos directly to their followers, while Twitter only allows users to provide links to pictures or videos that are posted online (Agrifoglio *et al.*, 2010; Zhao and Rosson, 2009). In addition, micro-blog sites in China obtain a more comprehensive portal page, their portal pages feature far more than Twitter's, with extensive lists including rankings, hot topics (Zhang *et al.*, 2011).

2.2 Micro-blog acceptance

IS acceptance has been much discussed in the IS research field (Barnes and Bähringer, 2011; Hong *et al.*, 2002), as it is important for both survival and success of information system in practice. Some

research has been conducted on micro-blog acceptance. For example, Hsu *et al.* (2010) developed a model of micro-blog adoption based on the commitment-trust theory. Their results suggested that use intention was strongly determined by satisfaction, corporate image which together provides a strong explanation for micro-blog user behavior. One limitation of these studies is that many researches proposed a model without explaining various influencing factors such as emotional effect or interpersonal effect. On the other hand, few studies added intrinsic motivation such as enjoyment to be a critical determinant of use intention, for example, Agrifoglio *et al.* (2010) investigated the process of acceptance and use of technology by users, focusing on the role of intrinsic and extrinsic motivation in determining it. Their findings showed that intrinsic and extrinsic motivations positively affect behavioral intention to Twitter use. However, these researches still appear to ignore interpersonal factors. Micro-blog is a socio-technical information system (Trist, 1963; Rhui, 2012), users can get performance or interpersonal outcomes through the system as well as in the process of communicate with other (Barnes and Bähringer, 2011; Günther *et al.*, 2009; Ha and Kwon, 2011; Hsu *et al.*, 2010; Hughes and Palen, 2009; Java *et al.*, 2007). Thus, an extended range of review on Motivational Model and Socio-technical Theory was performed.

2.3 Extending Motivational Model with Socio-technical Theory

Motivation theory posits that behavior can be both extrinsically and intrinsically motivated (Davis *et al.*, 1992). Extrinsic motivation in IS research is defined as the performance of an activity because it is perceived to be instrumental in achieving valued outcomes that are distinct from the activity itself. Performance expectancy is a form of extrinsic motivation (Ryan and Deci, 2000). Intrinsic motivation in IS research refers to the fact of doing an activity for its own sake: the activity itself is fun, ideology, and etc. Hedonic expectancy is described as a form of intrinsic motivation (Ryan and Deci, 2000). Several studies have confirmed that both intrinsic and extrinsic motives are significant predictors of behavioral usage (Davis *et al.*, 1992; Lin and Lu, 2011; Vankatesh *et al.*, 2012; Yi and Hwang, 2003).

A critical review of Motivational Model has revealed that there is a need to include other components (such as sense of belonging) in order to provide a broader view and a better explanation of information technology adoption (Teo *et al.*, 2003). Specifically, factors related to social change processes should be incorporated in the context of social software adoption (Chai and Kim, 2012; Rhui, 2012; Trist, 1963). Since a socio-technical system provides a useful framework to help us understand the way in which social technology is adopted and used, Recent literature has recognized the role of socio-technical factors in promoting adoption of social software (Chai and Kim, 2012; Rhui, 2012). Thus, an integration of Motivational Model with Socio-technical approach will have a better explanatory ability for studying factors affecting individuals' willingness to use micro-blogs (Trist, 1963).

2.4 Technological characteristics and network effects

Motivational Model and related theories have been successfully applied in a wide range of settings and across diverse technologies (Davis *et al.*, 1992; Lin and Lu, 2011; Ryan and Deci, 2000; Yi and Hwang, 2003). Yet there is nothing in Motivational Model by itself that directly helps us in understanding what leads to the adoption of information technology. Motivational Model argues that beliefs about intrinsic & extrinsic motivations influence the decision to adopt and use, but what influences these motivations remains unknown. Thus, in order to understand the factors that influence the performance and hedonic beliefs, it needs to turn to theories that focus on the situation of use.

According to previous studies, system characteristics are widely recognized as external variables that are capable of influencing users' beliefs and intention to adopt new IS. Previous research supports this argument by showing that system characteristics can significantly affect the intention to use IS (Davis *et al.*, 1992). However, these studies either used a dummy variable to represent different information systems or adopted a single overall construct, such as perceived system quality. Therefore, there is a need to identify specific system characteristics and examine their individual effects on users' adoption intentions. This research identified two system characteristic dimensions: technological dimension and

network effect dimension, both of the two dimensions were considered to be able to cover the major characteristics of micro-blog services (Davis *et al.*, 1992; Hong *et al.*, 2002; Lin and Lu, 2011). Technological context referred to the intrinsic features of a specific system. Technological characteristics which had been frequently studied were, service quality, web design, response time and etc. (Venkatesh and Davis 2000; Hong *et al.*, 2002; Lin and Lu, 2011). With different focuses on usability of a system, researchers selected their own set of technological variables. This research selected interactivity, convenience, accessibility to reflect the technological characteristics of micro-blog services.

Network effects of micro-blog services refer to the complementarity of the product, such as the number of users (Lin and Lu, 2011; Pae and Hyun, 2002; Wu *et al.*, 2007; Zhou and Lu, 2011). For instance, the value of the e-mail service depends on the number of users, i.e., how many people we can reach using such service (Lin and Lu, 2011). Several researchers have investigated the value of network effects of information technology (Lin and Lu, 2011; Pae and Hyun, 2002; Wu *et al.*, 2007; Zhou and Lu, 2011). This research proposed that network effects play a strategic role in the micro-blog context, among which perceived network size (Lin and Lu, 2011) and existing social contacts (Zhou and Lu, 2011) are identified as two important network effects.

3 RESEARCH MODEL AND HYPOTHESES

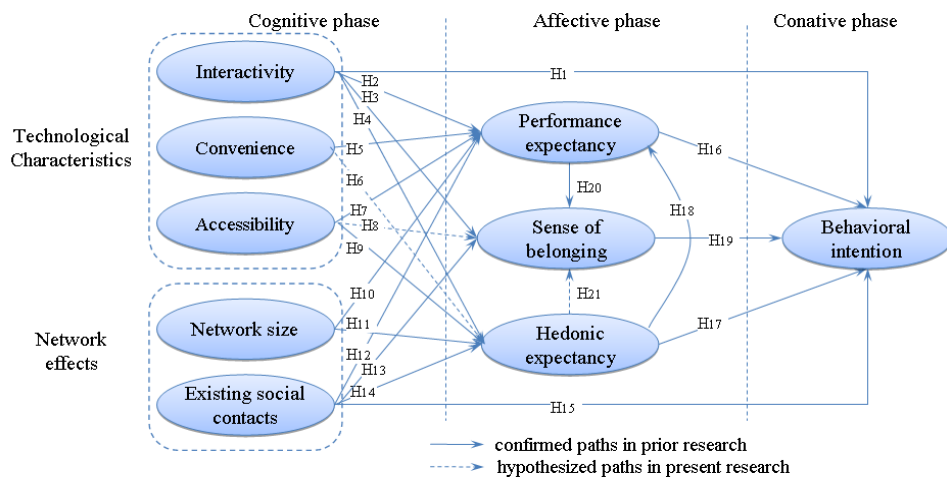


Figure 1. Conceptual research framework

This study proposes a model based on Motivational Model to predict the behavioral intention towards micro-blog services (Davis *et al.*, 1992). In addition, the interpersonal factor - sense of belonging, adopted from Socio-technical approach (Teo *et al.*, 2003; Trist, 1963), is added to the original Motivational Model (Davis *et al.*, 1992). Based on the literature review, this research also identified a number of external factors that may affect external and intrinsic motivations. These constructs can be categorized into two dimensions: technological characteristics and network effects.

3.1 Technological characteristics of micro-blog services

Micro-blog services integrate the characteristics of computer-mediated communication tools. That is, users on a micro-blog service are allowed to communicate with each other with a high responsiveness (Zhao, 2011; Zhao and Rosson, 2009). Interactivity is a vital concept in computer-mediated communication system as it is usually considered as a major advantage of computer-mediated communication medium (Zhao and Rosson, 2009). Johnson *et al.* (2006) tested the relationship of perceived interactivity to enjoyment, effectiveness, efficiency and trust. Teo *et al.*, (2003) noted that the higher the interactivity level of a Web, the more connectedness and attractive it is. This research

hypothesizes that that the interactivity users perceive when using the micro-blog services positively influences performance expectation, sense of belonging, hedonic expectation and behavioral intentions:

H1. Interactivity is positively related to behavioral intentions

H2. Interactivity is positively related to performance expectancy

H3. Interactivity is positively related to sense of belonging

H4. Interactivity is positively related to hedonic expectancy

Compared to regular blogs, micro-blogs fulfill a need for an even faster mode of communication (Agrifoglio *et al.*, 2010). The user interface is very simple and the message must not be longer than 140 characters, by encouraging shorter posts, it lowers users' requirement of time and thought investment for content generation (Ebner *et al.*, 2010; Java *et al.*, 2007). This is one of its main differentiating factors from blogs in general (Zhao and Rosson, 2009). Heijden (2001) confirmed a positive influence of convenience on perceived usefulness; later research conducted by Tang and Chiang (2009) and Kim *et al.* (2010) reconfirmed this relationship between convenience and perceived usefulness. We hypothesize that:

H5. Convenience is positively related to performance expectancy

H6. Convenience is positively related to hedonic expectancy

Easy access to micro-blog services is another important technology feature that allows users to view or post updates frequently and in real time (Zhao and Rosson, 2009). The micro-blog platform is publicly accessible and the accessibility is nearly ubiquitous. Users can access to micro-blog services depend on which platform they are on, whether it's a computer, or mobile device, ordinary or smart phone, and etc. (Günther *et al.*, 2009). Park (2009) confirmed the influence of accessibility on perceived usefulness in the context of mobile payment adoption and e-learning acceptance. A later study conducted by Kim *et al.* (2010) further investigated the effects of accessibility on perceived enjoyment. We hypothesize that:

H7. Accessibility is positively related to performance expectancy

H8. Accessibility is positively related to sense of belonging

H9. Accessibility is positively related to hedonic expectancy

3.2 Network effects on micro-blog services

Because micro-blog is mainly utilized as a social platform for facilitating interaction and communication among users, the utility of micro-blog services depends heavily on the number of group users (Zhou and Lu, 2011). Thus, micro-blog services show effects of network effects. That is, the value of micro-blog services rises with the number of users (Lin and Lu, 2011). When the number of group users reaches a critical mass, micro-blog services provide subsequent users with more social connections and information. Present study identified two kinds of network effects of micro-blog services, namely perceived network size (Lin and Lu, 2011) and existing social contacts (Zhou and Lu, 2011). Perceived network size refers to users' perceptions of the overall members of a system (Lin and Lu, 2011). A number of researchers have pointed out that the degree to which users perceive network size influences their attitude towards the information technology (Lin and Lu, 2011; Wu *et al.*, 2007; Zhou and Lu, 2011). Lin and Lu (2011) believed that a user intends to use an SNS once its participants reach a significant number. That is because when users perceive more members joining micro-blog services, more people can help them become acquainted with those outside their individual network, further expanding their connections, and finding more enjoyment and usefulness by interacting and sharing messages with more members (Lin and Lu, 2011; Zhou and Lu, 2011). Thus, we hypothesize:

H10. Perceived network size is positively related to performance expectancy

H11. Perceived network size is positively related to hedonic expectancy

Existing social contacts refer to the users' perceptions of number of their peers, friends, family who are already using the system before they adopt it (Zhou and Lu, 2011). Micro-blogs are increasingly used to keep up with close social ties (Hughes and Palen, 2009). Users link their social networks in

real life online to make further contacts (Zhang *et al.*, 2011); hence, greater numbers of existing social contacts in micro-blogs helps to connect to more mutual friends and interaction and sharing between more friends creates a greater sense of pleasure, efficiency or effectiveness. Based on Lin and Lu (2011) and Zhou and Lu (2011)'s research, existing social contacts are believed to have direct effects on behavioral intention, performance and hedonic expectancy towards information technology. In addition, existing social contacts are also confirmed to have effects on sense of belonging in previous studies (Chai and Kim, 2012). Consequently, this research hypothesizes that:

H12. *Existing social contacts are positively related to performance expectancy*

H13. *Existing social contacts are positively related to sense of belonging*

H14. *Existing social contacts are positively related to hedonic expectancy*

H15. *Existing social contacts are positively related to behavioral intentions*

3.3 Performance expectancy, hedonic expectancy and sense of belonging

Performance expectancy in the current study is defined as an evaluative belief about the micro-blog services that builds and maintains interpersonal relationships in a social context (Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012). Performance expectancy is a very general perception about the efficiency of the information technology in providing instant information, feedback, conveying multiple cues, and expressing feelings and emotions (Venkatesh *et al.*, 2003). Hedonic expectancy is defined as the perception of the fun, enjoyment, and pleasure inherent in using an information technology (Venkatesh *et al.*, 2012), following the definition from Davis *et al.* (1992). Hedonic expectancy was also an inseparable part of one's use of communication technologies in the social context. According to diffusion theory, individuals are willing to accept innovations if those innovations provide a unique advantage compared to existing solutions (Venkatesh *et al.*, 2003; Venkatesh *et al.*, 2012). Thus, the following hypothesis can be derived:

H16. *Performance expectancy is positively related to behavioral intentions*

H17. *Hedonic expectancy is positively related to behavioral intentions*

An intrinsic motivation variable such as hedonic expectancy is argued to increase the deliberation and thoroughness of cognitive processing and lead to enhanced perceptions of an extrinsic motivation variable such as performance expectancy (Venkatesh *et al.*, 2003; Yi and Hwang, 2003). Li *et al.* (2005) confirmed that the fun, pleasure, and enjoyment derived from using instant messenger positively affected an individual's perception of the usefulness of instant messenger in supporting the interaction process. The current study proposes that perceived enjoyment has a direct positive effect on perceived usefulness.

H18. *Hedonic expectancy is positively related to performance expectancy*

For successful micro-blog services, simply having a web-based community network is not enough. Inspired from the socio-technical theory, a factor peculiar to virtual communities online, and not present in traditional software, is sense of belonging (Chavis *et al.*, 1986; Teo *et al.*, 2003). Chavis *et al.* (1986) define it as "a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that members' needs will be met through their commitment to be together." Sense of belonging is an appropriate indicator of social subsystem in socio-technical systems to measure the involvement in a micro-blog service (Chai and Kim, 2012; Rhui, 2012). So in order to make the member to visit the site, the members' sense of belonging should be established. Teo *et al.* (2003) has concluded that subjects with a higher sense of belonging put in more time and effort to their online participation. Chai and Kim (2012) reported that subjects with a higher sense of belonging put in more time and effort in their online participation. The following hypothesis can be formulated:

H19. *Sense of belonging is positively related to behavioral intentions*

A sense of belonging grows from active participation and experience (Wilkinson *et al.*, 1998). The process of interaction is considered a key factor for fostering a sense of belonging. The effect of

performance expectancy on sense of belonging has been confirmed in previous study (Teo *et al.*, 2003), although the effect of hedonic expectancy on sense of belonging has not been supported in previous studies, it's our belief that hedonic expectancy should also enhance participants' sense of belonging because an enjoyable experience would enhance participants' interests in the activities of the virtual community. Thus, the sense of belonging can be built up through the performance and hedonic of a technology.

H20. Performance expectancy is positively related to sense of belonging.

H21. Hedonic expectancy is positively related to sense of belonging.

4 RESEARCH DESIGN AND METHODOLOGY

4.1 Measurement development

All measurement items were adapted from previous literature, with minor modifications in wording to make them relevant in the context of micro-blogs. A five-point Likert scale was used for all ratings. To enhance the validity of the proposed model's measurement items, a pilot study was performed with bachelor's degree students (n=17) in a MIS program who were frequent micro-blog users to reduce possible ambiguity in the questions. Respondents were asked about any difficulty they may have encountered in the survey. Comments and suggestions on the item contents and structure of the instrument were solicited. Several revisions of questionnaire items were made.

4.2 Survey procedure

This research takes China as the site of the empirical investigation because the supporting infrastructure required for micro-blog developments has been put in place. China has aggressively pursued the development of IT and has created a rapidly growing IT infrastructure. According to CNNIC's report, up to December, 2011, the number of net citizens in China has reached 457 million, the number of mobile net citizens in China has reached 303 million.

A Total of 620 questionnaires were distributed in the formal survey between March, 2012 and June, 2012. The questionnaires were distributed through the mail, personal visits to people who were working in diverse industries and social institutions, including schools, universities, offices, companies that were drawn at random in the city of Fuzhou, Wuhan and Xi'an in China. Altogether, 338 questionnaires were collected. After reviewing, 42 questionnaires were eliminated due to invalid answers, leaving 296 questionnaires for the empirical analysis. Our sample comprised 43.2% male and 56.8% female respondents. The respondents are relatively young and generally well educated.

5 DATA ANALYSIS AND RESULTS

5.1 Measurement model development

Both of validity and reliability were determined to evaluate the measurement model. Hair *et al.* (1998) indicates that Cronbach's α value of 0.7 is the minimum acceptable value for reliability. The α value of each construct is over 0.7, which represents good reliability. Content validity and construct validity are often used to measure validity. The variables in this study were derived from existing literature, thus exhibiting strong content validity. Construct validity was examined by investigating discriminant validity and convergent validity. The convergent validity of the scales was verified by using the criteria suggested by Fornell and Larcker (1981). All the factor loadings for all items exceed the acceptable level of 0.6, and all factor loadings are significantly related, via t-tests at $p < 0.001$, to their respective constructs, the composite reliability of the constructs ranged from 0.77 to 0.86, and thus all exceeded the generally accepted value of 0.70. In addition, the AVE ranged from 0.53 to 0.67. Hence, all three conditions for convergent validity were met. Discriminant validity was examined using

criteria suggested by Fornell and Larcker (1981). The shared variance between each pair of constructs was less than the average variances extracted, providing evidence of discriminant validity.

5.2 Test of structural model for all respondents

To assess how well the model represents the data, this research employed AMOS 6.0 to evaluate 'goodness of fit' indices. $\chi^2/df=1.87$, RMSEA=0.05, GFI=0.86, AGFI=0.84, CFI =0.92, NFI=0.85 and IFI=0.91 are all within the commonly accepted thresholds suggested in the literature (Fornell and Larcker 1981, Hair *et al.* 1998). The fit indices indicate that the model provides a reasonably good fit.

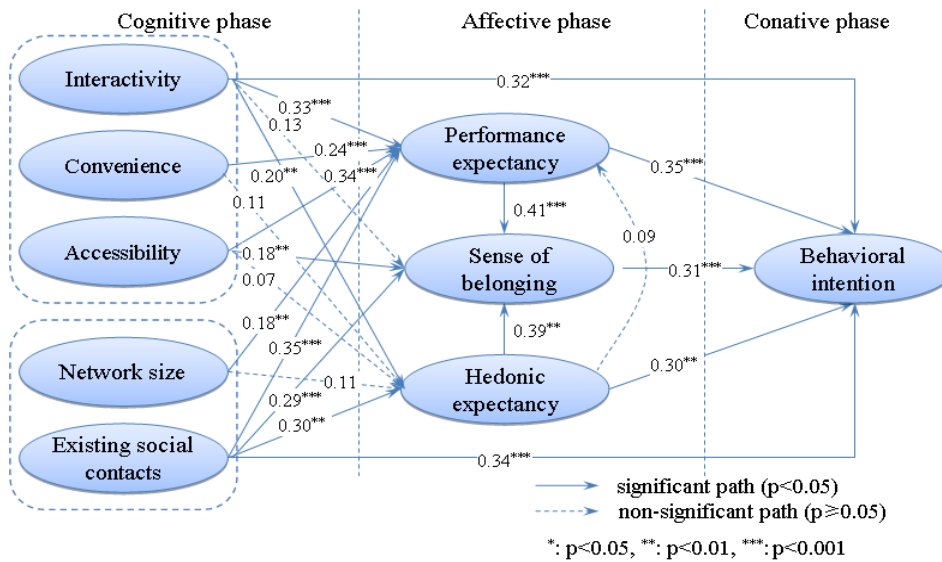


Figure 2. Test of structural model for respondents (n=296)

The standardized path coefficients for the research model are discussed as follows: The effects of interactivity on performance expectancy, hedonic expectancy and behavioral intention are significant ($\beta_{PI-CI}=0.319$, $t=3.668$, $p<0.001$; $\beta_{PI-PE}=0.334$, $t=4.176$, $p<0.001$ and $\beta_{PI-HE}=0.196$, $t=1.067$, $p<0.005$). Hence, the first hypothesis (H_1) second hypothesis (H_2) and fourth hypothesis (H_4) receive strong support by the study's results. These findings are consistent with previous research. According to these findings, enhanced interactivity can positively influence behavioral intentions directly and indirectly through performance expectancy and hedonic expectancy. These results indicate that when users perceive a micro-blog service to be interactive, they will be more likely to form favorable beliefs of usefulness and enjoyment and will adopt the micro-blog service

The effects of convenience, accessibility, and perceived network size on performance expectancy are significant ($\beta_{CO-PE}=0.244$, $t=4.012$, $p<0.001$; $\beta_{AS-PE}=0.344$, $t=4.198$, $p<0.001$; $\beta_{NS-PE}=0.176$, $t=3.143$, $p<0.005$). Hence, the fifth, seventh, tenth hypothesis (H_5 , H_7 , H_{10}) are supported. These results are consistent with previous research. These results mean that a convenient and pervasively accessible system is helpful in building a favorable belief of micro-blog services in terms of system performance, in addition, the larger network size is perceived, the more favorable usefulness can be formed.

Contrary to expectation, present study found no evidence of a statistically significant relationship between convenience, accessibility, perceived network size and hedonic expectation, the effects of convenience, accessibility, and perceived network size on hedonic expectancy are non-significant ($\beta_{CO-HE}=0.109$, $t=2.192$, $p=0.105$; $\beta_{AS-HE}=0.068$, $t=2.639$, $p=0.103$; $\beta_{NS-HE}=0.112$, $t=4.291$, $p=0.203$), showing that they do not act as antecedences of hedonic expectation. Hence, the sixth, ninth, eleventh hypotheses (H_6 , H_9 , H_{11}) are not supported. According to the analytical results, the hedonic expectancy of the micro-blog services does not rise even when users feel the use and operation of micro-blogs is convenient and pervasive accessible as well as when they feel the network size is large. These results

are not consistent with previous research, possible explanations may be that users view simplicity and pervasive access as the relative advantages of micro-blogs compared to other information technologies, for example, micro-blog enables users to maintain the “always connected with others” status and interact with other users or peers at anytime from anywhere which helps improve their working and living efficiency and effectiveness. However, they don't think such characteristics would contribute to an enhanced sense of enjoyment and playfulness when using the services. That is, convenience and accessibility are more helpful for producing performance outcomes such as efficiency or effectiveness other than hedonic outcomes. In addition, micro-blogs build individual-centered networks and forms self-centered groups, where, despite a critical mass of users, it is difficult to arouse an enjoyable mood in a user if one lacks development in the connection with others.

The analysis indicates that the effect of existing social contacts ($\beta_{SC-PE}=0.348$, $t=4.764$, $p<0.001$; $\beta_{SC-HE}=0.304$, $t=4.023$, $p<0.005$; $\beta_{SC-CI}=0.343$, $t=4.982$, $p<0.001$) on performance expectancy, hedonic expectancy, and behavioral intentions are significant. Thus hypothesis 12, 14 and 15 are accepted. These findings are consistent with previous research. These results mean that perceptions of the number of peers, family and friends will have significant influence in behavioral intentions directly or indirectly through performance expectancy and hedonic expectancy. Because individuals strongly believe that the breadth of peers, family or friends using the same micro-blog services is important.

The effects of accessibility and existing social contacts on sense of belonging are significant ($\beta_{AS-SB}=0.182$, $t=3.244$, $p<0.005$; $\beta_{SC-SB}=0.287$, $t=4.164$, $p<0.001$). Hence, the eighth, thirteenth hypothesis (H_8 , H_{13}) are supported. These results mean that accessibility of a micro-blog service and existing social contacts within a micro-blog service will exert positive effects in forming a sense of belonging. In contrast, the effects of interactivity on sense of belonging is non-significant ($\beta_{IN-SB}=0.130$, $t=2.154$, $p=0.067$), showing that interactivity does not act as antecedences of sense of belonging. Hence, the third hypothesis (H_3) is not supported. This result can be explained as that: unlike a technological feature of accessibility, not all of users have experiences of taking full advantage of interactivity, some of them are purely passive receiver of information. Thus, a sense of belonging can only be formed indirectly by an enhanced interactivity through performance expectancy or hedonic expectancy.

In addition, performance expectancy has substantial effects on behavioral intentions and sense of belonging ($\beta_{PE-CI}=0.354$, $t=4.735$, $p<0.001$; $\beta_{PE-SB}=0.411$, $t=5.186$, $p<0.001$), validating the hypothesis 16 and 20 (H_{16} , H_{20}). The results indicate that individuals intend to use micro-blog services because they perceive the service to be useful for their lives/study/tasks. And when individuals perceive the service to be useful, they are more likely to form a sense of belonging to the micro-blog service.

This research also confirmed that hedonic expectancy has a substantial effect on sense of belonging ($\beta_{HE-SB}=0.393$, $t=4.345$, $p<0.005$), while has no influence on performance expectancy ($\beta_{HE-PB}=0.092$, $t=1.033$, $p=0.232$), validating the hypothesis 21 and discarding hypothesis 18. The results indicate that individuals' perception of usefulness will not be enhanced no matter how they perceive the service to be interesting. However, when they perceive the service to be interesting, they are more likely to form a sense of belonging to the micro-blog service. A possible explanation to these findings may be that the chief aim of micro-blogs is not to generate enjoyment or playfulness, micro-blogs are mainly employed as a effective tool for individuals to expand friendship, facilitate information sharing and information seeking, thus hedonic expectancy is not confirmed to enhance perceptions of an extrinsic motivation variable such as performance expectancy.

Finally, the impacts of hedonic expectancy and sense of belonging are positively associated ($\beta_{HE-CI}=0.296$, $t=4.242$, $p<0.001$; $\beta_{SB-CI}=0.313$, $t=4.341$, $p<0.001$) with behavioral intentions, rendering support for hypothesis 17 and 19 (H_{17} , H_{19}). According to this finding, the inclusion of intrinsic motivation in the acceptance process of micro-blog services was particularly important. The effect of sense of belonging on behavioral intentions was verified to be significant. This is an important finding because sense of belonging is not an original construct in original IS adoption model and thus is often not considered by IS researchers.

6 DISCUSSIONS AND IMPLICATIONS

This research provides an integrated view of users' behavioral intention from the extrinsic/intrinsic motivation and socio-technical perspective. A total of 16 hypotheses were statistically supported. Among these, performance expectancy was the strongest direct antecedent of behavioral intentions. This study also indicated that existing social contacts, interactivity, sense of belonging and hedonic expectancy was direct predictors of the behavioral intentions to use micro-blog services.

Besides these direct determinants of behavioral intention. Interactivity, convenience, accessibility, network size and existing social contacts were found to influence behavioral intentions indirectly through performance expectancy. Accessibility and existing social contacts were found to be positively related to sense of belonging; Interactivity and existing social contacts were found to influence behavioral intention indirectly through hedonic expectancy. In addition, performance expectancy and hedonic expectancy were also found to be mediated by sense of belonging in determining individuals' behavioral intentions.

6.1 Theoretical and practical implications

From a theoretical perspective, this study contributes to theoretical development regarding technology acceptance in the context of micro-blogs. This study is among the first to test empirically the determinants of users' behavioral intentions towards the adoption of micro-blog services from technological characteristics and network effects of the technology. The findings contribute to theoretical development of behavior formation regarding IT adoption in the context of micro-blogs. Results indicate that both factors of technological characteristics and network effects, including convenience, accessibility, interactivity, perceived network size and existing social contacts, affect micro-blog use intention directly or indirectly through intrinsic and extrinsic motivations. Second, although several studies aimed at extending Motivational Model in the past, few of studies have established a research model by extending the Motivational Model with Socio-technical theory to explain users' behavioral intentions. This study contributes to the Motivational Model by adding the construct of sense of belonging into the model. The results of this study provide support for the extended Motivational Model. The empirical findings demonstrate that employing sense of belonging construct would be a worthwhile extension of the Motivational Model in the micro-blog context.

From a practical perspective, the findings will give useful insights and guidelines for micro-blog service providers to improve and perfect their design and service to meet users' requirements. Specifically, software designers can improve their micro-blog products by paying more attention to interactivity, convenience, and accessibility. They could develop more personalized and valued-added services that will better meet users' needs and improve their perceived usefulness and enjoyment. When designing a micro-blog platform, it is essential to reduce the complexity of web pages to enable individuals to find what they want conveniently. For example, service providers should provide more intuitive functions in their micro-blog products, they can build a search window on the homepage through which users can easily find the people they want to follow or the information they want to see. Accessibility is also an important issue that must be addressed. The software designers should develop more system access measures and technologies and make micro-blogs more compatible with other platforms, software, applications and devices. In terms of network effects, it would be difficult for mobile service providers to control the objective network size and existing social contacts, but they can affect perceived network size and existing social contact by adopting some strategies. For micro-blog service providers, connecting their micro-blog platforms with other platforms with a huge number of users would be a very useful tool to expand the network size and existing social contacts, they can also take other strategies to achieve the goal. For example, inviting and persuading many celebrities to join the platform, or letting users know their friends are also using the platform by sending an e-mail would be effective methods. Managers or executives can also use the findings to formulate their strategies for encouraging users to adopting micro-blogs in the future.

6.2 Limitations and suggestions for future research

This study has several inherent limitations due to the sampling methods and measurement instruments used. These limitations indicate avenues for further research.

First, one limitation of this study is its limited sampling frame. A convenience sampling method was used to select the sample. The subjects used in the survey were drawn from three cities (Fuzhou, Wuhan, and Xi'an) located in China. There is no evidence that the sample is representative of the whole population of Chinese micro-blog users. Future studies should investigate and compare different samples to increase representativeness. Second, the survey data used in this research were gathered at a single time point and the survey process was not longitudinal. However, measuring the adoption of a new information technology unavoidably involves some retrospective analysis. A longitudinal investigation would be more convincing in explaining how user adoption behavior changes over time. Third, the survey was conducted in China. The research model and constructs can also be applied to other countries and other social software. However, cultural differences between countries should be considered further. An interesting extension to this study would be to compare the use of micro-blog services in different countries to examine whether the factors predicting the adoption of micro-blog services differ.

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