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# Understanding continuance intention of mobile instant messaging

## Motivators and inhibitors

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### Abstract

**Purpose** – The purpose of this paper is to examine the continued usage of mobile instant messaging (IM) from the perspectives of both motivators and inhibitors.

**Design/methodology/approach** – To cast light on the motivators and inhibitors of continuance intention (CI) to use mobile IM, 268 responses from Chinese mobile IM users were collected via an online survey.

**Findings** – The results suggest that perceived system quality, procedural switching cost and relational switching cost (RSC) positively affect resistance to change (RTC), while perceived user base, perceived quality of communication, RSC and RTC positively affect the CI. Among them, RTC has the greatest effect on the CI, and RSC has the largest effect on RTC.

**Originality/value** – Extant research has mainly focussed on the motivators behind the continued usage of mobile services. However, the inhibitors, such as switching cost and RTC, have been less considered in the research on the continued usage of mobile services. Also, only a little research has examined the components of switching costs and how they affect the intention to continue using mobile services. The current study attempts to fill these research gaps.

**Keywords** Continuance intention, Resistance to change, Inhibitors, Mobile instant messaging, Motivators

**Paper type** Research paper

### 1. Introduction

In recent years, mobile services such as mobile instant messaging (IM) and mobile social networks have gained increasing popularity. According to a report released by China Internet Network Information Center, by the end of June in 2014, the number of mobile internet users in China has reached 527 million, accounting for 83.4 percent of all internet users in China, while 87.1 percent of mobile internet users use mobile IM services, and the mobile IM service was ranked as the top one mobile service among mobile users (CNNIC, 2014a). Though there is a big market for mobile IM services in China, the competition is fierce as there are various mobile IM service providers offering similar services, such as mobile QQ, WeChat, mobile Fetion and mobile MSN, thus mobile IM users can easily find alternative mobile IM service providers and switch to alternatives. As Bhattacherjee (2001) argues, promoting the initial adoption and the usage of information systems (IS) and acquiring users is only the first step in achieving

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IS success, retaining those users is the most vital for IS success. Therefore, studying how to maintain mobile IM users and to facilitate their continuance usage is meaningful for both IS researchers and the practitioners.

In the literature, extant research has employed different theories to examine the continued usage of mobile services, such as Technology Acceptance Model (TAM) (Davis, 1989), the unified theory of acceptance and usage of technology (UTAUT) (Venkatesh *et al.*, 2003) and IS continuance model based on expectation-confirmation theory (ECT) (Bhattacherjee, 2001; Oliver, 1980). Regarding mobile services, one dominant stream of research on continued usage usually examines the factors that motivate individuals to continue using mobile services, such as flow, perceived value, information quality, system quality, trust, social influence, perceived usefulness and satisfaction (Joo *et al.*, 2014; Kim and Oh, 2011; Lee *et al.*, 2009; Liu *et al.* 2010; Wang and Lin, 2012; Zhou and Li, 2014).

However, Zhou (2014) argues that the continuance intention (CI) of individuals to use mobile services is an interplay between motivators and inhibitors. In the literature, the inhibitors, such as switching costs and resistance to change (RTC), are less considered in the research on the continued usage of mobile services. In addition, though previous research examines the effect of switching costs on the continued usage of mobile services, only a little research has examined the components of switching costs and how they affect the continued usage of mobile services. Thus, the current study attempts to examine the CI in the research context of mobile IM services by integrating both motivators (perceived user base (PUB) and perceived system quality) and inhibitors (switching costs and RTC), and by decomposing switching costs as the procedural switching cost (PSC), financial switching cost (FSC) and relational switching cost (RSC).

In this research the empirical data were collected among mobile IM users in China via an online survey. The objective of this study is to develop a model that captures both the motivators and the inhibitors of the CI with regard to mobile services. In doing so, this research sheds light on the continued usage of mobile services in relation to both motivators and inhibitors, thus adding more knowledge to our understanding of the subject. In addition, the investigation of the effects of different switching costs on the CI will offer a more complete understanding of how switching costs affect the continued usage of mobile services. This research also makes suggestions as to how mobile IM service providers can retain their current users.

The rest of this paper is organized as follows. A literature review on the continued usage of mobile services is provided in the next section. Section 3 puts forward the research model and research hypotheses. Section 4 describes the research strategies, such as measurement development, data collection, and research validity and reliability. The research results are presented in Section 5, and Section 6 follows up with a discussion. Section 7 presents the research implications and limitations.

## 2. Literature review

The continued usage of mobile services has recently received much attention from researchers. They have explored individuals' continued usage of mobile services in a variety of research contexts, such as mobile internet services (Kim *et al.*, 2010), mobile social networking services (Zhou and Li, 2014), mobile IM services (Deng *et al.*, 2010), mobile payment (Kim *et al.*, 2010; Yang *et al.*, 2012) and mobile learning (Joo *et al.*, 2014; Liu *et al.*, 2010).

One main stream of research on the continued usage of mobile services examines motivators for continued usage by applying dominant IS continuance theories such as

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TAM, UTAUT and ECT. Joo *et al.* (2014) investigated mobile learning based on TAM and found that perceived usefulness and perceived ease of use affect a user's satisfaction with mobile learning, which, in turn, affects the intention to use. Liu *et al.* (2010) extended TAM in the context of mobile learning and noted that perceived near-term/long-term usefulness and personal innovativeness affect the mobile learning adoption intention. Some other theories, such as value theory, IS success model and two-factor theory, have also been used to examine CI in mobile services. Kim *et al.* (2010) found that perceived usefulness, perceived value and habit affect the CI, while Kim and Oh (2011) found that utilitarian value and hedonic value affect the CI to use mobile data services. Furthermore, Lee *et al.* (2009) found that information quality (the motivational factor) and system quality (the hygiene factor) affect the CI to use mobile data services.

Recently, the inhibitors, which keep mobile service users from switching to alternative mobile services, have attracted the attention of researchers. For example, Zhou (2014) investigated the continued usage of mobile services and found that switching cost and RTC (inhibitors) affect the continuance usage together with trust, flow and perceived usefulness (motivators). Deng *et al.* (2014) also found that individuals' continued usage of a mobile health service is determined by both inhibitor (RTC) and motivators (perceived value, attitude and perceived behavior control).

Prior research findings on the continued usage of mobile services indicate that the continued usage decision, with regard to mobile services, is determined by both motivators and inhibitors. In this study, we attempt to explore both the motivators and inhibitors of the CI in the research context of mobile IM services.

## 3. Research model and hypotheses

### *3.1 PUB*

PUB refers to "the degree to which an individual thinks a certain size of users is already using the system" (Kang, 1998). It represents a user's perception about the number of users using a mobile IM service. Cheng and Tang (2010) found that the benefits of adopting a service grow as the number of people using it increases. The significant effect of PUB on CI has been empirically validated in prior research. For example, Hong *et al.* (2013) investigated continued usage regarding IM and found that PUB is positively associated with the CI. Kim *et al.* (2008) and Wang *et al.* (2005) also found that PUB affects the CI to use short text messaging and IM indirectly through perceived usefulness.

As a source of informational or potentially normative influence (Li *et al.*, 2005), a large number of users may affect the CI an individual has with regard to a particular service. When individuals perceive there is large number of current users using a communication technology, they intend to continue using it (Lou *et al.*, 2000). In other words, individuals are more likely to continue using a communication technology, if there are more users using it. In addition, when users perceive the user base of a mobile IM service to be large, they believe they can interact with more peers and strengthen their connection with them, which leads to them maintaining their relationship with the IM service provider and being resistant to changing to alternative mobile IM services. On the other hand, if the IM service provider has a small user base, the users might not be able to interact with their contacts conveniently or benefit from the expected utility of the mobile IM service, which might cause them to switch to alternatives. Thus, we propose the following hypotheses:

*H1.* PUB positively affects RTC with respect to mobile IM services.

*H2.* PUB positively affects the CI with respect to mobile IM services.

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*3.2 Perceived system quality*

System quality reflects the technical level of a system with respect to information production (DeLone and McLean, 1992). In mobile IM services, system quality refers to user perception of the system performance regarding real-time communication and the complementary functions of the IM service, including perceived quality of communication (PQC) and perceived quality of complementary functions (PQCF) (Hong *et al.*, 2013). Previous studies have shown the effects of system quality on user behavior in various contexts, such as IM (Hong *et al.*, 2013) and mobile value-added services (Wang and Lin, 2012). For this study, we followed the research of Hong *et al.* (2013) and decomposed perceived system quality as PQC and PQCF.

PQC reflects the perceptions of communication functions regarding mobile IM, for example, text or video chatting. When individuals use an IM service, they can communicate with others easily and conveniently. As Ahn *et al.* (2007) argue, a high level of communication quality provides more convenience and reliability and faster responses for users, which can help enhance their perception of the utility of the IM service, encouraging them to continue using it. Roca *et al.* (2006) also argue that a high communication quality in mobile IM services will help users to foster their communication goals, and enhance user satisfaction toward it, which encourages users to continue using it. Based on the above discussion, we also assume that if users perceive that the communication quality provided by a mobile IM service provider is good, they will keep the relationship with the service provider. On the other hand, if an IM service is difficult to use or responds slowly, users may change to alternative services. Thus, we propose that:

*H3.* PQC positively affects RTC with respect to mobile IM services.

*H4.* PQC positively affects the CI with respect to mobile IM services.

The PQCF reflects user perceptions of different complementary services integrated into a mobile IM service, such as news or games. In addition to the basic communication service in mobile IM, IM service providers also offer various complementary services. If the complementary services provided by mobile IM are visually attractive, easy to use, and respond fast, users will be encouraged to continue using the mobile IM service. The positive relationship between the perceived quality of complementary services and the CI has been empirically validated in the research of Wang and Lin (2012) and Zhou (2013). In addition, if the quality of complementary services offered by mobile IM service providers is good, it will enhance user perception about the utility of the current IM service. Thus, they will keep their status and resist switching to alternative services. Hence, we propose that:

*H5.* PQCF positively affects RTC with respect to mobile IM services.

*H6.* PQCF positively affects the CI with respect to mobile IM services.

*3.3 Switching costs*

Switching costs refer to a user's perception of the magnitude of the additional costs of switching from a current service provider to an alternative one (Yanamandram and White, 2006). Switching costs encompass the measured monetary effect, but also the time and effort involved, as well as the psychological effect of becoming a user of another service provider (Dick and Basu, 1994). According to Burnham *et al.* (2003), switching costs include PSC, FSC and RSC. PSC involves the expenditure of time and effort, FSC means the loss of financially quantifiable resources, and RSC involves psychological or emotional discomfort due to the loss of identify and the breaking of bonds (Burnham *et al.*, 2003).

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In this research, PSC refers to the time and effort spent on a new mobile IM service. Users expect to use a mobile IM service easily and conveniently. If it takes too much effort for users to learn how to use a new IM service or a long time to adapt to it, users will not perceive the ease of use of the new mobile IM service, but will feel it is difficult to use (Deng *et al.*, 2010). Thus, the perceived PSC will discourage users from changing to a new IM service. In other words, when users perceive a high PSC for a new IM service, it will increase the switching barrier. Hence, users may remain with their current IM service and be resistant to change (Zhou, 2014). In addition, prior studies suggest that a PSC positively impacts on the continued usage of specific services, such as online services (Kim and Son, 2009) and SNSs (Park, 2014). Drawing on prior findings, we propose that the PSC affects the CI with regard to mobile IM services. Thus, the following hypotheses are proposed:

*H7.* PSC positively affects RTC with respect to mobile IM services.

*H8.* PSC positively affects the CI with respect to mobile IM services.

In this research, FSC reflects the possible loss arising from abandoning the current mobile IM service. Some users obtain financial quantifiable resources through, for example, playing games or even purchasing. These resources are accepted by some online stores in exchange for real merchandise, such as small gifts. If users switch to alternative mobile IM services and the accumulated resources cannot be transfer to alternatives, the users will lose all the accumulated resources. Thus, a perceived high switching cost will discourage users to change to alternatives and keep the relationship with the current service provider. According to Zhou (2014), if users perceive high FSCs arising because they switch to an alternative service, they will continue using their current mobile IM service rather than change. Accordingly, we propose that:

*H9.* FSC positively affects RTC with respect to mobile IM services.

*H10.* FSC positively affects the CI with respect to mobile IM services.

In the current research, RSC involves psychological or emotional discomfort due to reestablished interpersonal relationships in a new mobile IM service. If users switch to an alternative mobile IM service, they will lose the social relationships established in the current mobile IM service (Lee *et al.*, 2011). Furthermore, users may also feel uncomfortable due to the perceived risks or uncertainties in using a new mobile IM service (Deng *et al.*, 2010). Thus, users may choose to stay with the current service and be resistant to changing to alternatives (Deng *et al.*, 2010). In other words, a high RSC will enhance a user's unwillingness to switch to alternatives. In addition, as Park *et al.* (2014) suggest, social relationships established in prior IS usage may develop a "lock-in" phenomenon, which will strengthen a user's willingness to continue using their current service, such as SNS. Hence, we assume that the RSC affects the CI in the research context of mobile IM services, and propose that:

*H11.* RSC positively affects RTC with respect to mobile IM services.

*H12.* RSC positively affects the CI with respect to mobile IM services.

### *3.4 RTC*

RTC is conceptualized as a user's tendency to resist or avoid making changes (Oreg, 2003). It reflects a user's desire to seek routine, i.e., an "inclination to adopt routines" (Oreg, 2003). If mobile users resist changing to other services, it indicates that they wish to keep their current status (Bovey and Hede, 2001) and prefer to maintain the current

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situation of using a particular service (Kim and Kankanhalli, 2009). Piderit (2000) argues that a user's resistance to changing to an alternative is related to their cognitive, emotional and intentional responses, such as CI. Prior researchers have examined the effect of RTC on IS adoption and continued usage (Kim and Kankanhalli, 2009; Al-Somali *et al.*, 2009; Zhou, 2014). For example, Zhou (2014) found that RTC affects the continuance usage of mobile internet services. Al-Somali *et al.* (2009) note that RTC influences the attitude of users toward the use of online banking, which in turn affects its adoption. Thus, we assume that RTC will affect the CI in the context of mobile IM services, and propose that:

*H13.* RTC positively affects the CI with respect to mobile IM services.

The research model is presented in Figure 1.

## 4. Research method

### *4.1 Measurement development*

The research model consists of eight constructs, including CI, RTC, PUB, PQC, PQCF, PSC, FSC and RSC. All the measurement items were adapted from prior research to ensure the validity of these constructs and to fit the mobile IM services context. The items of PUB, PQC and PQCF were adapted from Hong *et al.* (2013). The items of PSC, FSC and RSC were taken from Tseng and Teng (2014). The items of RTC were modified from Zhou (2014). The items of CI were adapted from Bhattacherjee (2001).

The research questionnaire was originally created in English. It was translated into Chinese by a researcher and then translated back into English by another researcher

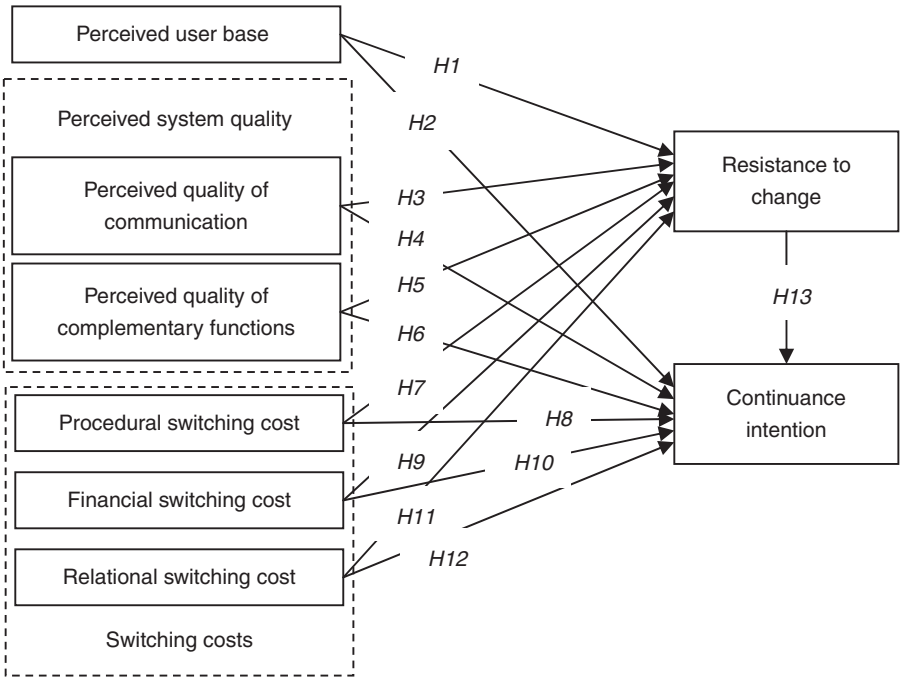


**Figure 1.**
Research model

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to ensure the consistency of the content. All items were measured with a seven-point Likert scale, ranging from "strongly disagree (1)" to "strongly agree (7)."

A two-stage pre-testing of the questionnaire was employed to assess the content validity. Three experts in the field of IS were invited to assess its logical consistencies, contextual relevance, validity and clarity. Next, the wording of the initial questionnaire was modified based on their comments. Then, 15 users with rich mobile IM usage experience were selected for a pilot survey, and feedback on the questionnaire was solicited. According to their comments, some items were revised to improve the questionnaire's clarity and understandability. The final items are listed in the Appendix.

### *4.2 Data collection procedure and sample*

This study aims to examine the factors determining the CI of individuals to use mobile IM services in relation to both motivators and inhibitors. The empirical data in this study were collected from university students at a university campus in Southern China through an online survey. As students represent the largest group (24.9 percent) of mobile internet users in China (CNNIC, 2014b), the sample was considered appropriate. The respondents were asked to indicate what motivated their CI regarding the use of the current mobile IM services in use based on their prior experience.

We scrutinized all 281 responses and dropped those (13 responses) with the same values for all questions. As a result, we obtained 268 valid responses. In all, 45.5 percent of the respondents are male and 54.5 percent are female. The respondents were mainly aged between 18 and 28 years old, with the majority (83.2 percent) being between 18 and 22 years of age. In general, the demographic information of the respondents in this research is consistent with that of mobile services users in China. According to the report from CNNIC (2014b), the majority of mobile internet users are younger than 30 years old, and there is no significant gender difference among users. A total of 27.6 percent of respondents had used mobile IM for more than five years, while 21.6 and 20.9 percent had experiences of two to three years and one to two years, respectively. The frequently used mobile IM services included mobile QQ (40.7 percent) and WeChat (38.1 percent). Both mobile QQ and WeChat are free application software launched by Tencent in China. They provide IM services through mobile phones, enabling users to conveniently communicate with others.

### *4.3 Research validity and reliability*

This study employed partial least squares (PLS) to evaluate the proposed hypotheses and research model. Data analysis were conducted in two steps: assessment of the measurement model and assessment of the structural model.

To evaluate the measurement model, we conducted convergent and discriminant validity tests. Convergent validity measures whether items can effectively reflect their corresponding factor, and can be assessed by examining composite reliability (CR), item reliability and average variance extracted (AVE). 0.70 is the recommended value for CR in order for it to be a reliable construct (Chin, 1998); and generally acceptable values of AVE should be $> 0.50$ (Fornell and Larcker, 1981). Item reliability can be satisfied when values of the standardized outer loading scores are higher than 0.70 (Chin, 1998). In this research the item loadings are over 0.70. As shown in Table I, the value of CR exceeds 0.70, the value of AVE exceeds 0.50, and $\alpha$ values are larger than 0.70. The test results in the current research indicate good reliability, confirming the convergent validity of the measurement model (Fornell and Larcker, 1981).

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Discriminant validity measures whether two factors are statistically different. The evaluation criterion for discriminant validity is that the square root of each construct's AVE should be greater than the correlation of the construct with other latent variables (Fornell and Larcker, 1981). As also shown in Table I, for each variable the square root of the AVE (all diagonal values in italics) is significantly larger than its correlations with other variables. This verifies the good discriminant validity of the measurement model.

Moreover, we tested the cross-loadings of all the items included in this research, and found that each within-construct item loading is higher on the measured construct than the cross-loadings on the other items, supporting the discriminant validity of this research instrument (Chin, 1998).

As data were self-reported, common method bias is a possible explanation for the relationships found in the studies. Thus, we conducted a Harman's single-factor test to examine whether the common method effect was present (Podsakoff and Organ, 1986). The results from the exploratory factor analysis show that the eight factors that were extracted explain 79.3 percent of the total variance; and the largest variance explained by an individual factor is 13.8 percent. Hence, none of the factors can explain the majority of the variance, indicating common method bias does not concern this research.

## 5. Results

Figure 2 depicts the results of the path coefficients and the corresponding levels of significance. The explained variance of RTC and continuance usage is 27.1 and 48.7 percent, respectively. RTC is significantly affected by PQC, PQCF, PSC and RSC, therefore supporting *H3*, *H5*, *H7* and *H11*. CI is significantly influenced by PUB, PQC, RSC and RTC, thus *H2*, *H4*, *H12* and *H13* are supported. The other hypotheses (*H1*, *H6*, *H8*, *H9* and *H10*) are not supported.

Finally, to assess the model goodness fit in PLS, we conducted the Stone-Geisser-Test of predictive relevance (Tenenhaus *et al.*, 2005). $Q^2$ represents a measure of how well the observed values are reconstructed by the model and its parameter estimates; the model has predictive relevance if $Q^2$ is $> 0$ (Chin, 2010). In our model, $Q^2$ is 0.195 and 0.337 for RTC and CI, respectively.

## 6. Discussion

As shown in Figure 2, perceived system quality, PSC and RSC positively affect RTC, while PUB, PQC, RSC and RTC positively affect continuance usage.

Regarding the factors affecting RTC, RSC has the strongest effect. RSC is related to interpersonal relationships. When RSC is high, users usually maintain their strong

| | AVE | CR | $\alpha$ | PUB | PQC | PQCF | PSC | FSC | RSC | RTC | CI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PUB | 0.805 | 0.943 | 0.918 | *0.897* | | | | | | | |
| PQC | 0.702 | 0.876 | 0.788 | 0.463 | *0.838* | | | | | | |
| PQCF | 0.836 | 0.939 | 0.903 | 0.214 | 0.459 | *0.914* | | | | | |
| PSC | 0.722 | 0.886 | 0.805 | 0.033 | −0.001 | 0.036 | *0.85* | | | | |
| FSC | 0.88 | 0.956 | 0.932 | −0.116 | −0.045 | 0.061 | 0.218 | *0.938* | | | |
| RSC | 0.807 | 0.893 | 0.761 | 0.063 | 0.156 | 0.105 | 0.19 | 0.209 | *0.898* | | |
| RTC | 0.768 | 0.909 | 0.849 | 0.125 | 0.268 | 0.307 | 0.259 | 0.172 | 0.387 | *0.876* | |
| CI | 0.729 | 0.888 | 0.81 | 0.322 | 0.421 | 0.312 | 0.12 | 0.031 | 0.323 | 0.623 | *0.854* |

**Table I.** Research validity and reliability

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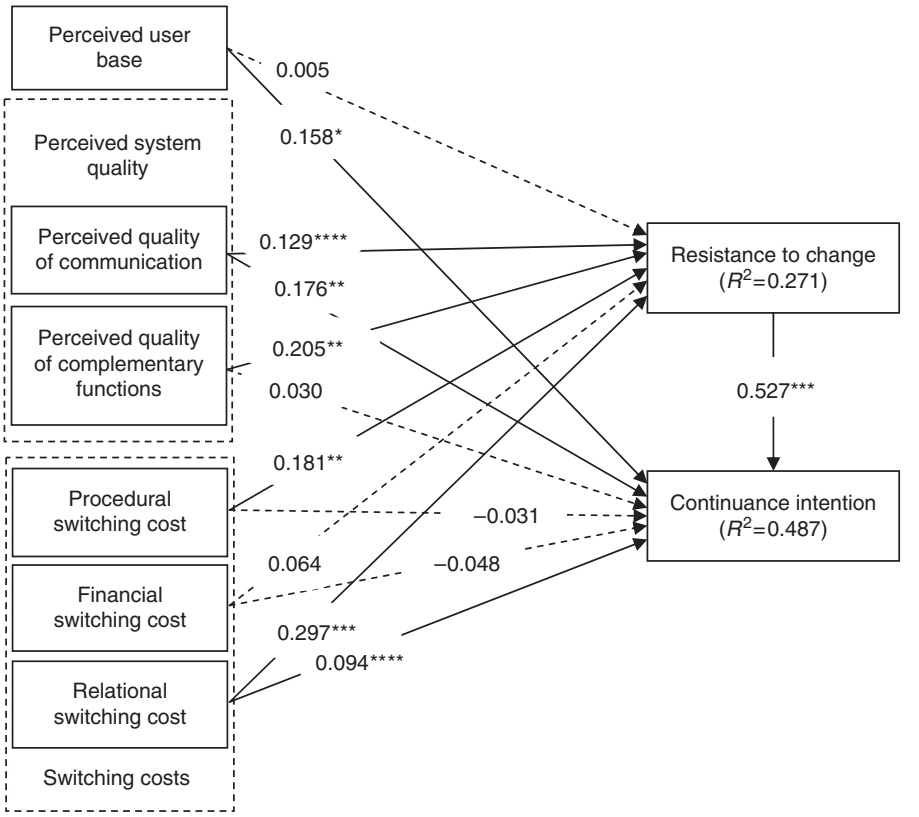


**Figure 2.**
The results estimated by PLS

**Notes:** *$p$<0.05, **$p$<0.01, ***$p$<0.001, ****$p$<0.10

relationships with their friends by using the same mobile IM service (Deng *et al.*, 2010). If the users switch to other service providers, they will lose these relationships unless their friends switch too; therefore, they resist changing to alternatives. PSC and the PQCF also significantly affect RTC. Users will resist changing to other alternative services with a high PSC, because a high PSC indicates that it will take too much time and effort to learn another mobile IM service (Lee *et al.*, 2011).

Complementary functions are normally integrated into mobile IM services. Regarding this, users often like to use some of the complementary services of their current mobile IM service, e.g., reading news, sharing posts and playing games via the same platform. When these kinds of complementary functions are high-quality, i.e., such as easy to use, work reliably and respond quickly, users are more likely to keep using the current service, and thus show RTC (Wang and Lin, 2012).

The PQC is found to have a weak effect on RTC. Due to the intense competition among mobile IM service providers, when users perceive poor quality communication from their mobile IM services, they may easily change to other alternatives.

Among the factors affecting CI, RTC has the strongest effect. RTC reflects a preference for maintaining the current status or situation (Kim and Kankanhalli, 2009). When users resist switching to other alternative services, they seek to maintain

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their status and avoid change (Zhou, 2014), thus users intend to keep their current service provider and do so with the intention to continue using that service. The results also indicate that PQC and PUB have significant effects on CI. Percieved quality of communication reflects one aspect of system quality regarding real-time communication. When a mobile IM service has good communication quality, it improves a user's perception about its utility, making them further satisfied with the service (Wixom and Todd, 2005). Once users are satisfied with their current service provider, they continue to use it. Additionally, when users perceive that a large number of others are using the same mobile IM service, it increases the opportunities for them to communicate with each other. Through the frequent interactions, their relationships are strengthened, and thus they will continue to use the same services. RSC has also been found to weakly affect CI. The possible reason for the weak influence of RSC on the CI might be due to the fact that service quality is still a dominant factor in determining the CI of mobile services. If mobile IM users switch to alternative services, they might only lose some of the established relationships with others, but not all. Nowadays, individuals use various communication technologies to keep in contact with others; hence users can still maintain contacts with some friends on other networks.

The results also indicate, however, that PQCF, PSC and FSC also have no significant effect on the CI, in contrast to what we predicted. Although these inconsistent results call for further investigation, we could find possible explanations. One is that users adopt a mobile IM service mainly for communication with others, and focus more on its communication quality, but not its complementary functions. So, a user continuing to use a mobile IM service may not be determined by the perceived quality of its complementary functions. In contrast, the users of mobile IM services might use the communication function to interact with connections, rather than using the functions that could lead to financial cost when using their current mobile IM service, such as games, virtual purchasing. This might also help to explain why the FSC has no significant influence on the CI and RTC. Also, as most mobile IM services have similar user interfaces, it is usually easy for them to learn a new IM service, indicating that less time and effort, in other words, low PSC, would be needed to switch to other service providers. In addition, the PUB was found to have no significant effect on RTC. One possible explanation is that a user's decision to switch or not to switch to an alternative service will be determined by the current mobile IM service quality and the switching cost, or the attractiveness of the alternatives no matter whether the user base is large or small.

## 7. Implications and limitations

First, from a theoretical perspective, this study expands the research scope on the post-adoption behavior of users of mobile services with reference to both motivators and inhibitors. This research highlights the importance of inhibitors in explaining continued behavior. As noted earlier, extant studies on continuance behavior as related to mobile services were mainly focussed on motivators, and fewer studies have examined the effects of inhibitors on the CI. This study tries to fill this research gap. Second, this research provides a new perspective for explaining mobile user behavior and advances our understanding of post-adoption usage by integrating both motivators and inhibitors in order to examine the CI behavior of mobile service users. The research findings show that CI is an interplay between motivators and inhibitors, and both inhibitors and motivators are important determinants of the CI. Our findings are consistent with the prior research findings of Zhou (2014). Third, our research

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provides evidence that locking mobile service users into a relationship prevents them from switching to alternative services and helps to retain users. This helps to understand the relationship between the switching and continuance behavior of mobile users. Fourth, this study examined three types of switching costs (procedural, financial and RSC) and revealed their different effects on the CI. This provides a more complete understanding of the effects of switching costs on mobile service users' post-adoption behavior.

This research identified significant motivators and inhibitors for retaining mobile service users. From a managerial perspective, the results imply that mobile service providers should retain users by optimizing service quality and increasing their user base to encourage users to continue using their services, while also minimizing switching behavior among mobile service users. Thus, service providers need to take RTC and switching costs into account, so as to facilitate the continuance usage of mobile IM services. Service providers also need to provide high-quality communication (e.g. seamless communication with friends and quick responses) and complementary functions (e.g. games, videos and music) to make their users satisfied with the current services, thus making them resist switching to other services. Also, they can facilitate the CI of users by increasing switching costs, such as by providing a good interface design for convenient usage and a more interactive design for frequent interactions (Zhou, 2013).

Although this study has revealed interesting and useful findings on post-adoption behavior in mobile services, there are a few limitations that should be borne in mind. First, the data in this study were collected from China. Hence, care should be taken when generalizing these results to other countries. A related and open question can be whether an individual's cultural background has an impact on a user's continuance usage behavior. Second, besides PUB, perceived system quality and switching costs, other factors may exist, such as flow and habit, which affect CI. Future research should try to examine other motivators or inhibitors that might affect continued usage intention of mobile services. Third, we mainly conducted a cross-sectional study. A longitudinal research may provide more insight into factors affecting user behavior.

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## Appendix. Measurement items and their sources

(1) Perceived user base (PUB) (Hong *et al.*, 2013):

- PUB1: the number of users using this mobile IM is large;
- PUB2: most of my friends are using this mobile IM;
- PUB3: most of my classmates (colleagues) are using this mobile IM; and
- PUB4: many people in the groups which I joined in are using this mobile IM.

(2) Perceived quality of communication (PQC) (Hong *et al.*, 2013):

- PQC1: the communication functions (e.g. text, audio, and video chatting) of my IM have a quick response time;
- PQC2: the communication functions of my IM work reliably; and
- PQC3: the communication functions of my IM are easy to use.

(3) Perceived quality of complementary functions (PQCF) (Hong *et al.*, 2013):

- PQCF1: the complementary services (e.g. news, game, etc.) of my IM have a quick response time;
- PQCF2: the complementary services of my IM work reliably; and
- PQCF3: the complementary services of my IM are easy to use.

(4) Procedural switching cost (PSC) (Tseng and Teng, 2014):

- PSC1: it would take some effort to learn to use other services if I switched to another IM service provider;
- PSC2: it would take time to adapt to other services if I switched to another IM service providers; and
- PSC3: it is complicated to go through the steps for setting up as a new member if I switch to other IM service providers.

(5) Financial switching cost (FSC) (Tseng and Teng, 2014):

- FSC1: it would be a loss to me if the financial benefits I have accumulated in this mobile IM could not be carried over to another;
- FSC2: it would be a loss for me if the premiums I have accumulated in this mobile IM could not be carried over to another; and
- FSC3: it would be a loss for me if the reward points I have accumulated in this mobile IM could not be carried over to another.

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(6) Relational switching cost (RSC) (Tseng and Teng, 2014):

- RSC1: I would miss using my current mobile IM if I switched to another one; and
- RSC2: I am more comfortable using my current mobile IM than I would be if I switched to another one.

(7) Resistance to change (RTC) (Zhou, 2014):

- RTC1: I would not willingly change the preference I have to use the services presented by this service provider;
- RTC2: I would not substitute this service provider with another service provider; and
- RTC3: even if my close friends were to recommend another service provider, I would not change the preference I have to use the services presented by this service provider.

(8) Continuance intention (CI) (Bhattacherjee, 2001):

- CI1: I intend to continue using this mobile IM rather than discontinue its use;
- CI2: my intention is to continue using this mobile IM rather than to use any alternative means; and
- CI3: if I could, I would like to discontinue my use of this mobile service (reversed item).

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