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Understanding users' switching behavior of mobile instant messaging applications: An empirical study from the perspective of push-pull-mooring framework



Yongqiang Sun ^{a,*}, Dina Liu ^a, Sijing Chen ^a, Xingrong Wu ^a, Xiao-Liang Shen ^b,
Xi Zhang ^{c,**}

^a School of Information Management, Wuhan University, Wuhan, Hubei, 430072, PR China

^b Economics and Management School, Wuhan University, PR China

^c College of Management and Economics, Tianjin University, PR China

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ABSTRACT

This study employs push-pull-mooring (PPM) framework originated from human migration literature as the theoretical paradigm to explore the key factors influencing users' switching intention in the context of mobile instant messaging (MIM) applications. The research model was tested with 240 valid responses among Chinese MIM users. The results show that fatigue with incumbent MIM and subjective norm have significant positive effects on switching intention, while inertia negatively affects switching intention. In addition, affective commitment, switching costs and habit are found to be significant to inertia. This study sheds light on the switching behavior of MIM users, and helps explain the key determinants of switching intention of MIM users. The findings also help practitioners make appropriate strategies for maintaining current users as well as attracting new users.

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1. Introduction

In recent years, smart phones and related operating systems have a flourishing development. Many kinds of service applications formerly performed on computers are available on smart phones. Among them, mobile instant messaging (MIM) is a typical example that has gained increasing popularity. According to a recent report issued by China Internet Network Information Center (CNNIC), by the end of June in 2016, the number of mobile internet users in China has reached 656 million, accounting for 92.5 percent of all internet users in China, while 91.9% of internet users use MIM applications, ranked as the top one among the mobile service applications.

As a significant communication alternative to the traditional

short message services (SMS), MIM offers more user-friendly features and tremendous conveniences for customers (Deng, Lu, Wei, & Zhang, 2010), such as freely message sending, audio chat, video chat, group chat, and so on. Compared to computer-based services, the unique advantages such as ubiquity, convenience and immediacy of mobile context enable users to interact with their friends regardless of time and geographical constraints (Gao & Bai, 2014). What's more, MIM is different from traditional online services in that it can serve as an integrated platform that connects various services (e.g., social networking, e-payment, and online gaming) in its own domain (Oghuma, Libaque-Saenz, Wong, & Chang, 2016). Thus, mobile services companies fight fiercely for customers by developing new functionalities or issuing different versions of MIM applications, such as mobile QQ, WeChat, and Momo in China. That's to say, MIM users can easily find alternatives and switch between MIMs with low cost (Zhou & Lu, 2011). As promoting the initial adoption is only the first step in achieving the success of a service, retaining existing users is the most critical for its success (Chang, Liu, & Chen, 2014). In addition, users' switching behavior from incumbent service to alternatives may lead to user churn and profitability decline of the service (Ganesh & Reynolds, 2000).

* Corresponding author.

** Corresponding author.

E-mail addresses: syq@mail.ustc.edu.cn (Y. Sun), liudinaisu@163.com (D. Liu), csj16912@163.com (S. Chen), wuxingrong55@yahoo.com (X. Wu), xlshen@whu.edu.cn (X.-L. Shen), jackyzhang@tju.edu.cn (X. Zhang).

Therefore, it is imperative to study the switching behavior between MIMs from users' perspective and identify the determinants of users' intention to switch from incumbent MIM to another, which is meaningful for both information system (IS) researchers and practitioners. Despite the importance of research on switching behavior, existing literature has concentrated on investigating the initial adoption and continuance usage of MIM applications (Che & Cao, 2014; Gan, 2015; Oghuma et al., 2016; Yoon et al., 2015). Little attention has been devoted to examining the switching behavior of MIM users and comprehensively identifying its antecedent factors.

In particular, this study tries to solve this problem through the lens of push-pull-mooring (PPM) framework. PPM framework, as a dominant paradigm in human migration literature, is successfully introduced by Bansal, Taylor, and James (2005) to fully summarize previous findings in consumers' switching behavior. The PPM model serves as an integrated framework to investigate different antecedents to users' switching intention, consisting of push factors that drive users away from incumbent service, pull factors that attract users to an alternative, and mooring factors that either hamper or facilitate the switching decision (Bansal et al., 2005). Through the lens of the PPM framework, several studies have addressed switching behavior in IS field, such as blog services (Zhang, Cheung, Lee, & Chen, 2008), web browsers (Ye, Potter, & Potter, 2011), mobile services (Calvo-Porrà & Lévy-Mangin, 2015), social network services (Cheng, Yang, & Lim, 2009), and online games (Hou, Chern, Chen, & Chen, 2011). Among prior literature on IS switching utilizing the PPM framework, however, there seems to be several research gaps which require further investigation.

First, most previous studies have generally taken dissatisfaction and alternative attractiveness derived from human migration studies as push and pull factors respectively, but pay less attention to the specific factors triggered by specific contexts that promote or prevent users' switching choices. Thus, considering the specific context of MIM, we further identify fatigue with incumbent MIM as a push factor and subjective norm as a pull factor to capture the mobile-based and social-oriented aspects of MIM, which has been rarely investigated in prior studies.

Second, most researchers have identified cognitive-based mooring factors, such as switching costs, but neglected other kinds of mooring components, like affective and subconscious ones. Except switching costs, affective commitment and habit, which separately represent affective and subconscious aspects, may also generate mooring effects on individuals' switching choices.

Third, besides understanding different kinds of mooring factors, we are also interested in the exact mechanism by which the mooring factors influence users' switching decisions. Inertia, which refers to users' conscious continuance of the status quo rather than switching to a potentially better alternative, may be a good theoretical explanation to understand the underlying mechanism of mooring effects.

Generally, in order to fill these gaps, the primary purpose of this study is to address the critical antecedents and their roles in users' switching intention in MIM context. The PPM framework is utilized as theoretical lens to explore the key determinants of MIM users' switching intention. Specifically, dissatisfaction and fatigue with incumbent MIM are identified as push factors, while alternative attractiveness and subjective norm are posited to form pull effects. Furthermore, we proposed that affective commitment, switching costs and habit representing affective, cognitive and subconscious mooring components respectively, are critical sources of inertia, and inertia plays a key role in the mooring effects.

The remainder of the paper is organized as follows. In the next section, previous literature on MIM adoption and PPM framework are reviewed. Then, the research model is proposed and the hypotheses are developed. Consequently, the survey procedure is

demonstrated and the data analysis results are reported. Finally, the key findings of the study, the theoretical and practical implications, as well as the limitations are discussed.

2. Literature review

2.1. Mobile instant messaging adoption

Mobile instant messaging (MIM) is a kind of mobile applications that enables users to contact with others instantly on various mobile terminals without time and geographical restrictions. In addition to its basic functionality for social communication, MIM is further served as an integrated platform that incorporates a variety of additional services (e.g., social networking, e-commerce, corporate advertising, e-payment, and social games), demonstrating great opportunities for mobile business (Oghuma et al., 2016; Yoon et al., 2015). With the increasing usage of various MIMs such as WhatsApp, WeChat, and Line throughout the world, users' adoption behavior of MIM has drawn more and more attention from IS researchers in recently years (Sun, Wang, Shen, & Zhang, 2015; Wang & Sun, 2016; Zhan, Sun, Wang, & Zhang, 2016).

Research on IS adoption behavior includes initial adoption and post-adoption. Post-adoption behavior is independent of initial adoption in that users are able to reevaluation the performance of a particular system through a period of experience and interaction with the system (Kim & Malhotra, 2005). In addition, research on continuance behavior and switching behavior are two streams of post-adoption behavior research (Ye, Seo, Desouza, Sangareddy, & Jha, 2008). Most studies have focused on users' initial adoption or continuance usage of MIM, and have shown a variety of factors that affect individual usage of MIM. Based on perceived usefulness and perceived enjoyment, Yoon et al. (2015) investigated the impacts of technical characteristics, individual characteristics, and social influence factors on individual adoption of MIM. Che and Cao (2014) examined MIM users' psychological motivations, attitudes, trust, and their associated behavior. In consideration of both network externalities and flow experiences, Zhou and Lu (2011) identified referent network size, perceived complementarity, perceived enjoyment, and attention focus as influential factors of MIM user loyalty. From a social cognitive perspective, Gan (2015) found that perceived user base, habit, and resistance to change positively predict MIM users' continuance intention. Drawing upon expectation-confirmation model, Oghuma et al. (2016) argued that perceived usability, perceived security, perceived service quality, and confirmation determine the continuance intention of MIM usage.

Compared to literature on users' initial adoption or continuance usage of MIM, relatively few studies have been conducted to explore the switching behavior of MIM users. Switching behavior is generally defined as an action that a consumer chooses an alternative to replace previously adopted service providers (Bansal & Taylor, 1999). Peng, Zhao, and Zhu (2014; 2016) primarily investigated the role of networks, relative deprivation, and trust on MIM users' switching intention by introducing a migration theory from social network perspective. Hou (2015) adopted two factor theory to examine the effects of hygiene factors (e.g., socializing, entertainment, and system quality) and motivators (e.g., attractiveness of alternative, peer influence, and critical mass) on MIM users' switching intention. However, these studies concentrating on the impact of specific aspects are not sufficient to fully explain MIM users' switching behavior. In order to comprehensively understand all kinds of factors associated with MIM users' switching behavior, this study aims to propose a research model by taking push-pull-mooring (PPM) framework into account.

2.2. The push-pull-mooring (PPM) framework

A number of scholars have investigated the switching behavior in IS field on the basis of push-pull-mooring (PPM) framework (Nimako & Ntim, 2013). The PPM framework is regarded as the most dominant paradigm in migration literature that explains why human move from one place to another over an extended period (Bansal et al., 2005). In PPM framework, reasons for inducing human's migration can be classified into push, pull and mooring effects. Push effects refer to the negative factors compelling people away from original location. Pull effects refer to positive factors drawing prospective migrants to a certain destination. Mooring effects refer to the supplementary factors facilitating or hampering migration decisions according to personal or social context (Moon, 1995). In light of prior research about switching behavior in IS field, we summarize different research contexts and various constructs of push, pull and mooring effects in Table 1.

Among these prior studies on IS users' switching behavior, most of them used dissatisfaction and alternative attractiveness to represent the push and pull effects respectively. There must be some other critical factors that facilitate or hamper users' switching choice. Considering the specific context of MIM as a mobile-based platform that connecting various services, users are in the face of massive information from their social contacts and all kinds of services in MIM anytime and anywhere. With information flooding, social network expanding, and service functions increasing, users tend to suffer from a feeling of fatigue, which subsequently results in their discontinuance usage intention of the incumbent service (Zhang, , Zhao, , Lu, , & Yang, 2015). Hence we identify fatigue with incumbent service as another important push factor that make users give up the usage of incumbent service and turn to an alternative one. On the other hand, most users take MIMs as means of managing relationship with others, and they are inclined to perceive an alternative MIM preferred by their friends as more attractive (Hou, 2015). Thus, subjective norm is applied together with alternative attractiveness to form the pull effects. In addition, previous research has focused mainly on cognitive-based mooring factors, such as switching costs. In fact, other kinds of factors such as affective and subconscious ones may also produce mooring effects. Therefore this study proposes affective commitment, switching costs and habit to respectively represent affective, cognitive and subconscious sources of mooring effects, and take

inertia as the mechanism through which these three mooring factors affect users' switching intention.

Based on the prior studies on mobile instant messaging and the pull – push – mooring framework, the research question of this study is:

RQ: What are the factors that affect user' intention to switch from incumbent MIM to an alternative one? Specifically, what pull, push, and mooring factors should be considered within the research context of mobile instant messaging?

3. Research model and hypotheses

Built on the PPM framework, this study aims to explore the push, pull and mooring factors that influence users' intention to switch from incumbent MIM to another one. In particular, users' fatigue and dissatisfaction with incumbent MIM are considered as push factors, while pull factors includes alternative attractiveness and subjective norm. For the mooring effects, various antecedent of inertia (e.g., affective commitment, switching costs and habit) as well as the role of inertia are investigated in this study. The whole research model is illustrated in Fig. 1.

3.1. Push effects

3.1.1. Dissatisfaction with incumbent MIM

As a core concept in service post-adoption research, satisfaction is defined as “the summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience” (Oliver, 1981). Human migration research also takes satisfaction or dissatisfaction as a primary push factor that drives individuals away from the original place (Bansal et al., 2005). Prior studies have shown the negative impact of satisfaction on users' intention to switch service providers, such as email services (Kim, Shin, & Lee, 2006), blog services (Zhang et al., 2008), and Web browser service (Ye et al., 2011).

Since most users' switching intention is derived from their dissatisfaction with the incumbent service, as the opposite of satisfaction, dissatisfaction is supposed to more directly capture users' psychological states to switch (Cheng et al., 2009). Previous research also empirically verified that dissatisfaction with incumbent service positively affects users' intention to switch to another

Table 1
Constructs and measures.

Previous research	Push factors	Mooring factors	Pull factors	Research contexts
(Zhang et al., 2008)	Satisfaction	Switching costs	Attractive alternatives	Blog services
(Cheng et al., 2009)	Dissatisfaction	Switching costs	Attraction	Social network sites
(Ye et al., 2011)	Satisfaction	Subjective norm; Perceived switching costs; Habit	Relative advantage; Perceived relative ease of use; Perceived relative security	Web browser
(Hou et al., 2011)	Low enjoyment; Low service; Satisfaction; Perception of insufficient participants	Low switching costs; Weak social relationship; High need for variety; Successful prior switching experience	Attractiveness of the alternative	MMORPGs (massively multiplayer online role playing games)
(Hsieh, Hsieh, Chiu, & Feng, 2012)	Weak connection; Writing anxiety	Switching cost; Past experience	Enjoyment; Relative usefulness; Relative ease of use	From blogs to social network services
(Chang et al., 2014)	Regret; Dissatisfaction	Switching costs	Alternative attractiveness	Social network sites
(Fei & Bo, 2014)	Dissatisfaction	Switching costs	Relative attractiveness	Social network sites
(Hou, Shang, Huang, & Wu, 2014)	Low socializing; Low enjoyment; Low system quality	Switching costs; Group cohesion	Attractiveness of the alternative; Peer influence	Social network sites

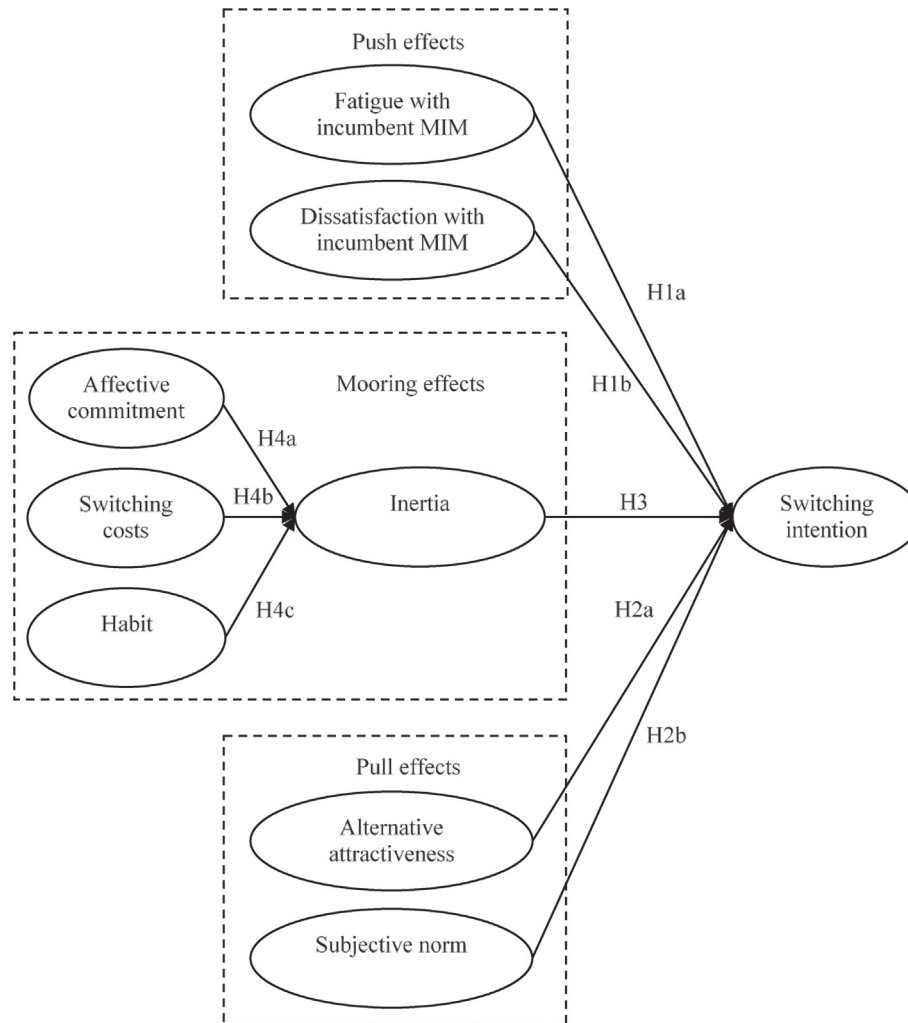


Fig. 1. Research model.

service (Chang et al., 2014; Cheng et al., 2009; Fei & Bo, 2014). In MIM context, it is also suggested that the extent of users' dissatisfaction with their prior MIM is highly associated with their switching intention (Peng et al., 2014). As such, in current study, we suppose that users' dissatisfaction with incumbent MIM is one of the push factors that influences MIM users' switching intention. Therefore, the following hypothesis is proposed:

H1a. Users' dissatisfaction with incumbent MIM has a positive impact on their intention to switch to another MIM provider.

3.1.2. Fatigue with incumbent MIM

The phenomenon of fatigue has been studied as a psychological concept referring to negative feelings in different disciplines, such as psychology, clinical medicine and occupational domains (Craig, Tran, Wijesuriya, & Boord, 2006; Hardy, Shapiro, & Borrill, 1997; Piper, Lindsey, & Dodd, 1987). In the context of social network services (SNS), Bright et al. (2015) described SNS fatigue as a feeling of being overwhelmed due to information overload. Thara, Chua, and Goh (2014) defined SNS fatigue from the perspective of multidimensional negative feelings in the experience of SNS usage and interactions. By referring to these studies, this study defines fatigue with incumbent MIM as a user's subjective and self-evaluated negative perceptions (e.g., tiredness, exhaustion,

overwhelmed) from incumbent MIM usage.

Some recent studies have investigated the consequences of fatigue in SNS context. Maier, Laumer, Eckhardt, and Weitzel (2012) found the fatigue feelings such as emotional exhaustion that users experienced in Facebook would lead to their discontinuous usage intention. Thara et al. (2014) further indicated that users who suffer from fatigue experience were found to take short breaks from the environment, decrease the frequency of SNS activities, or even suspend their SNS usage. Yao, Phang, and Ling (2015) examined the influence of two SNS fatigue factors including SNS activity overload and monitoring concern on users' switching intention. Thus we assume that users who have a feeling of fatigue with incumbent MIM are more likely to stop using it and intend to switch to an alternative one. Therefore, the following hypothesis is proposed:

H1b. Users' fatigue with incumbent MIM has a positive impact on their intention to switch to another MIM provider.

3.2. Pull effects

3.2.1. Alternative attractiveness

According to PPM framework, the attractive attributes of the destination will pull the migrants to this place (Moon, 1995). This

conceptualization which describes the positive characteristics of alternative service is termed as alternative attractiveness according to research on service switching behavior (Bansal et al., 2005). When users perceive the key attributes of an alternative service as better, they are more likely to be attracted to switch to this alternative one (Cheng et al., 2009). Existing literature has indicated that alternative attractiveness has a positive impact on users' switching intention (Kim et al., 2006).

As for MIM applications, sociality and entertainment are considered as core attributes that are positively impact users' attitude towards MIMs (Che & Cao, 2014). Such attributes exemplify alternative attractiveness, in that users tend to switch to a new MIM better meeting their entertainment or social needs than the incumbent one (Hou, 2015). Thus we propose that a MIM user attracted by the advantages of an alternative MIM will have more chance to form the switching intention. Therefore, the following hypothesis is proposed:

H2a. Users' perception of alternative attractiveness has a positive impact on their intention to switch to another MIM provider.

3.2.2. Subjective norm

Subjective norm refers to an individual's perception that significant others think s/he should whether or not engage in a particular behavior (Ajzen, 1991). In the Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) models, subjective norm is a direct predictor of individuals' behavioral intention (Ajzen, 1991, 2003), including users' adoption of a new technology (Hung, Ku, & Chang, 2003). Users' adoption and usage decision may be greatly affected by social factors such as the choice of significant others, since they use MIM as a way to interact with their friends, relatives and other important persons (Zhou & Lu, 2011).

Subjective norm as a main social factor has been found to affect users' willingness to switch to an alternative (Bansal et al., 2005; Ye et al., 2011). Since most users regard MIMs as means of maintaining relationships with their friends, they will perceive an alternative MIM as more attractive and have a stronger switching intention on account of the recommendations of these people (Hou, 2015). Thus we consider subjective norm as a pull factor that motivates MIM users to switch. When a user receives invitations by significant others, s/he would be likely to switch to the suggested new MIM. Therefore, the following hypothesis is proposed:

H2b. Users' subjective norm has a positive impact on their intention to switch to another MIM provider.

3.3. Mooring effects

3.3.1. Inertia

Status quo bias (SQB) theory is a useful theoretical perspective to explain why individuals prefer to maintain the status quo instead of switching to a new (potentially better) alternative (Samuelson & Zeckhauser, 1988). The concept of inertia, which is viewed as a manifestation of status quo bias, is defined as "user attachment to, and persistence in, existing behavioral patterns (e.g., the status quo), even if there are better alternatives or incentives to change" (Polites & Karahanna, 2012). Following the work of Polites and Karahanna (2012), this study conceptualizing inertia as a multidimensional construct comprising three components, namely behavioral-, cognitive-, and affective-based inertia. Behavioral-based inertia refers to that individuals continue using a service simply because it is what they have always done. Cognitive-based inertia refers to that individuals consciously keep using the incumbent service even if they recognize that it is not the best,

most efficient, or most effective. Affective-based inertia refers to that individuals' usage of a service continues in that they enjoy doing so, or they are emotionally attached to the incumbent service (Polites & Karahanna, 2012).

Inertia may lead to individuals' resistance to change irrespective of their beliefs of the alternatives (Barnes & Stack, 2016). Specifically, inertia in IS context reflects a bias toward the status quo in that users prefer to use the incumbent system (the status quo) even in the presence of better alternatives. Inertia will result in lowered perceptions of the ease of use and relative advantages of an alternative system and have a negative effect on the intention to adopt it (Polites & Karahanna, 2012). Thus we argue that inertia has a negative impact on users' switching intention. Regarding to MIM applications, users will prefer to stick to the incumbent MIM since inertia makes them perceive a new MIM as less attractive. That is to say, inertial MIM users are less likely to generate switching intention, even when they realize the superiority of alternative ones. Therefore, the following hypothesis is proposed:

H3. Inertia has a negative impact on users' intention to switch to another MIM provider.

3.3.2. Antecedents of inertia

Existing research on mooring effects has primarily focused on cognitive-based factors, such as switching costs (Fei & Bo, 2014; Zhang et al., 2008). However, affective and subconscious components may also need to be taken into consideration. Polites and Karahanna (2012) pointed out that inertia is affected by both conscious determinants (e.g., switching costs) and subconscious habit. Since switching costs and habit are considered as cognitive and subconscious sources respectively, we further identify affective commitment as an ideal affective antecedent that corresponds to affective-based inertia. Therefore, this study proposes that in addition to switching costs, both affective commitment and habit are significant antecedents of inertia. Inertia is the mechanism through which affective commitment, switching costs, and habit inhibit switching intention.

Commitment is defined as an individual's attachment to a particular target, which results in an inclination to maintain a relationship (Fullerton, 2005). Based on the psychological bond between an individual and a particular commitment target, commitment is composed of three dimensions: affective, continuance, and normative commitment (Allen & Meyer, 1990). As the core dimension of commitment, affective commitment has been used in many studies as the sole indicator of commitment (Hashim & Tan, 2015; Jin, Lee, & Cheung, 2010), therefore this study also chooses affective commitment to grasp the affective component of inertia. Affective commitment refers to an emotional attachment to, identification with, and involvement in the target and reflects a desire to stay in the relationship (Allen & Meyer, 1990). In IS context, affective commitment is identified as a crucial factor affecting the online service continuance intention, with plenty of studies demonstrating that affective commitment facilitates users to maintain the relationships with the incumbent service because of their emotional attachment and belongingness to the service (Bateman, Gray, & Butler, 2011; Hashim & Tan, 2015; Jin et al., 2010). Without a strong sense of affective attachment, users may easily switch to an alternative (Hashim & Tan, 2015). Thus we propose that once users are affectively committed to their incumbent MIM, they may express inertia for staying in the status quo to maintaining their relationship with the incumbent MIM. Therefore, the following hypothesis is proposed:

H4a. Users' affective commitment to incumbent MIM has a positive impact on inertia.

Switching costs refer to user perceptions of the costs related to changing service providers (Jones, Mothersbaugh, & Beatty, 2000). One explanation for SQB (e.g., inertia) is rational decision making, which suggesting that individuals tend to take the costs of switching behavior into account and make decisions that maximize their benefits (Samuelson & Zeckhauser, 1988). SQB occurs when switching costs are relatively higher than switching benefits. Switching costs include sunk, setup and continuity costs (Patterson & Smith, 2003). Sunk costs are users' perception of time, money and effort they have already invested in the usage of current service (Rusbult, 1980). Sunk costs can result in inertia once users perceived their previous investments in the incumbent service as relatively high. Setup costs are the additional money, time, effort and hassle required to adopt a new service (Patterson & Smith, 2003). Users may be reluctant to change and maintain the status quo when they realize it is not worthwhile to take extra time and effort in initiating a new service. Continuity costs are the opportunity costs since users will lose specific benefits accumulated through continuous usage of the incumbent service, if their relationship with the service is terminated (Patterson & Smith, 2003). Continuity costs can also lead to inertia, in that users stick to the current service because of the specific benefits they may obtain, regardless of potential superior alternatives. Therefore, the following hypothesis is proposed:

H4b. Users' switching costs of incumbent MIM have a positive impact on inertia.

In addition to conscious sources like affective commitment and switching costs, inertia may also have subconscious origins. Polites and Karahanna (2012) introduced the habit literature to extending the theoretical explanations of SQB beyond conscious antecedents, considering habit as the subconscious antecedent of inertia. Habit is defined as "learned sequences of acts that have become automatic responses to specific cues, and are functional in obtaining certain goals or end-states" (Aarts, 1999). Similar to inertia, habit is mentally efficient and enables individuals to stay in the status quo automatically (Polites & Karahanna, 2012). It is worth noting that habit and inertia are two distinct concepts: habit is a learned automatic response triggered by environmental cues without conscious control, whereas inertia is a conscious continuance of the status regardless of the presence of superior alternatives (Polites & Karahanna, 2012). For online service switching, when users have habituated to the use of a certain service, they will be less likely to carefully compare the relative advantages among different alternatives. Instead, they tend to simply represent a habitual response to committed to their existing behavioral patterns. As a spontaneous response, habit is beneficial in nature for minimizing the costs in the process of individual decision making. Furthermore, users who seek to avoid the stress from change will find that it is comfortable to engage in habitual behavior which requires few cognitive resources, and then continue with the status quo (Wood & Quinn, 2004). Therefore, the following hypothesis is proposed:

H4c. Users' habit of incumbent MIM has a positive impact on inertia.

4. Method

4.1. Measurement

Nine constructs were measured using multi-item perceptual scales in this study. All these items were measured by 7-point Likert scales ranging from "strongly disagree" (1) to "strongly agree" (7). Table 2 lists the measurement scales used in this study. Four items

for fatigue with incumbent MIM (FWIM) were developed based on the scale of work-related fatigue from Yperen and Hagedoorn (2003). The scale for dissatisfaction with incumbent MIM (DWIM) was adapted from Bhattacharjee (2001). We used the a nine-item scale for inertia (IN) developed by Polites and Karahanna (2012) that taps each of its three dimensions (e.g., affective-based (ABI), behavioral-based (BBI), and cognitive-based (CBI)). We adapted the affective commitment scale developed by Allen and Meyer (1990). The scales for switching cost (SC) and alternative attractiveness (AA) were employed from Jones et al. (2000). The scale for habit (HA) was tailored from Petersen (2007). The scale for subjective norm (SN) was adapted from Taylor and Todd (1995). Finally, the scale for switching intention (SW) was adapted from Kim et al. (2006).

4.2. Data collection

In order to collect the data, we conducted an online survey using SOJUMP (<http://www.sojump.com/>), which is one of the most professional online survey services in China. This survey began in the early September 2016, and lasted for one week. Snowball sampling strategy was adopted to collect the data as it was suitable for the studies relevant to social network, which is the case of this study. We firstly invited student users of MIM applications from a university located in Central China to answer the questionnaire by sending them an invitation message with the URL to the online questionnaire on SOJUMP. At the same time, we asked them to spread the invitation message with the URL to their friends using the MIM applications. This questionnaire was divided into two parts: the demographics and MIM usage information of respondents, and the scales of 9 constructs in the research. The participants were assessed with screening questions to ensure that they were current users of MIM applications (e.g., Wechat, Mobile QQ, and MOMO). Respondents were required to answer all items according to their MIM usage experience. In addition, IP addresses were recorded and checked to exclude duplicated respondents in this survey.

As a result, a total of 240 valid questionnaires were returned. Table 3 shows the demographic distribution of the sample. Among these valid respondents, male accounts for 45.4% and female accounts for 54.6%. 73.8% of respondents were between the ages of 20 and 29. We compared the demographics information of our sample and the population of China's mobile Internet users. The population data was obtained from a report published by China Internet Network Information Center (CNNIC) in June 2016, which showed that young users, especially at the age of 20–29 years old, constituted the largest groups to China's mobile Internet users, suggesting that our sample is representative for investigating the MIM-related issues. For education background demographics, most of the respondents get a colleges' degree or higher. Most respondents (53.7%) had 7 or more years of MIM experience, 95.8% had more than one year of MIM experience.

5. Results

PLS (Partial least squares) was adopted in this study to test both the measurement model (i.e., measures underlying each construct) and structural model (i.e., relationships among the conceptual constructs of interest) simultaneously (Gefen & Straub, 2005). PLS is more suitable for the current study in that compared to the covariance-based structural equation modeling (CB-SEM), PLS requires a relatively small sample size, has no restriction on normal distribution, and is more appropriate for exploratory analysis (Chin & Newsted, 1997). In addition, PLS is capable of modeling second-order constructs that are formatively composed of first-order

Table 2
Measurement items.

Constructs		Items	Measure
Fatigue with incumbent MIM (Yperen & Hagedoorn, 2003)		FWIM1	I find it difficult to relax after continually using my incumbent MIM.
		FWIM2	After a session of using my incumbent MIM, I feel really fatigued.
		FWIM3	After using my incumbent MIM, it takes effort to concentrate in my spare time.
		FWIM4	During my incumbent MIM use, I often feel too fatigued to perform other tasks well.
Dissatisfaction with incumbent MIM (Bhattacharjee, 2001)		DWIM1	I feel dissatisfied about my overall experience using my incumbent MIM.
		DWIM2	I feel displeased about my overall experience using my incumbent MIM.
		DWIM3	I feel frustrated about my overall experience using incumbent MIM.
		DWIM4	I feel terrible about my overall experience using incumbent MIM.
Inertia (Polites & Karahanna, 2012)	Affective based	ABI1	I will continue using my incumbent MIM because it would be stressful to change.
		ABI2	I will continue using my incumbent MIM because I am comfortable doing so.
		ABI3	I will continue using my incumbent MIM because I enjoy doing so.
	Behavioral based	BBI1	I will continue using my incumbent MIM simply because it is what I have always done.
		BBI2	I will continue using my incumbent MIM simply because it is part of my normal routine.
		BBI3	I will continue using my incumbent MIM simply because I've done so regularly in the past.
	Cognitive based	CBI1	I will continue using my incumbent MIM even though I know it is not the best way of doing things.
		CBI2	I will continue using my incumbent MIM even though I know it is not the most efficient way of doing things.
		CBI3	I will continue using my incumbent MIM even though I know it is not the most effective way to do things.
Affective commitment (Allen & Meyer, 1990)	AC1	I feel emotionally attached to my incumbent MIM	
	AC2	I feel a strong sense of belonging to my incumbent MIM.	
	AC3	My incumbent MIM has a great deal of personal meaning for me.	
Switching costs (Jones et al., 2000)	SC1	In general it would be a trouble to switch to other MIMs.	
	SC2	It would take a lot of time and effort to switch to other MIMs.	
	SC3	I would lose a lot if I were to switch to other MIMs.	
Habit (Petersen, 2007)	HA1	Choosing my incumbent MIM has become automatic to me.	
	HA2	Using my incumbent MIM is natural to me.	
	HA3	When I need to communicate with others, using my incumbent MIM is an obvious choice for me.	
Alternative attractiveness (Jones et al., 2000)	AA1	If I need to change MIM, there are other good MIMs to choose from.	
	AA2	I would probably be happy with the features and services of another MIM.	
	AA3	Compared to my incumbent MIM, there are other MIMs with which I would probably be more satisfied.	
Subjective norm (Taylor & Todd, 1995)	SN1	People who influence my behavior would think that I should use another MIM to communicate with them.	
	SN2	People who are important to me would think that I should use another MIM to communicate with them.	
	SN3	My friends and acquaintance expect me to use another MIM to communicate with them.	
Switching intention (Kim et al., 2006)	SI1	I am considering switching from my incumbent MIM to others.	
	SI2	The chance of my switching to another MIM is high.	
	SI3	I am determined to switching to another MIM.	

Table 3
Demographic statistics.

Variables	Levels	Frequency	Percentage (%)
Gender	Male	109	45.4
	Female	131	54.6
Age	<20	27	11.2
	20–29	177	73.8
	30–39	12	5.4
	>39	23	9.6
Education	High school or below	31	21.9
	College's degree	25	10.4
	Bachelor's degree	91	37.9
	Master's degree or higher	93	38.8
Length of use	<1 year	10	4.2
	1–3 years	24	10.0
	4–6 years	77	32.1
	>7 years	129	53.7

Table 4
Reliability.

Construct	AVE	Composite Reliability	Cronbach's Alpha
FWIM	0.592	0.852	0.779
DWIM	0.805	0.943	0.920
HA	0.667	0.857	0.754
SC	0.783	0.915	0.861
AC	0.816	0.930	0.887
IN-ABI	0.753	0.901	0.832
IN-BBI	0.809	0.927	0.882
IN-CBI	0.868	0.952	0.924
AA	0.804	0.925	0.881
SN	0.843	0.941	0.907
SI	0.848	0.944	0.910

Notes: FWIM: Fatigue with incumbent MIM; DWIM: Dissatisfaction with incumbent MIM; HA: Habit; SC: Switching costs; AC: Affective commitment; IN-ABI: Affective-based inertia; IN-BBI: Behavioral-based inertia; IN-CBI: Cognitive-based inertia; AA: Alternative attractiveness; SN: Subjective norm; SI: Switching intention.

factors, such as our conceptualization of inertia. Specifically, SmartPLS was used as the main analysis technique in this study. Following the recommended two-stage analytical approach, measurement model and structural model will be examined and reported respectively (Anderson & Gerbing, 1988).

5.1. Measurement model

Before testing hypotheses, we evaluated the reliability and validity of the construct measures first. The reliability of the measurements was examined using average variance extracted (AVE), composite reliability (CR) and Cronbach's Alpha. The critical values for AVE, CR are 0.5 and 0.7 respectively, and the recommended

value for Cronbach's Alpha is 0.7 (Fornell & Larcker, 1981). Table 4 shows that the minimum values of AVE, CR and Cronbach's alpha were 0.592, 0.852 and 0.754 respectively. Each value was higher than the recommended value, suggesting that all constructs were reliable.

Discriminant validity can be tested using correlation matrix and square roots of AVE for key constructs. The square root of the AVE of each construct should be higher than the correlation of the specific construct with all the other constructs in the model (Fornell & Larcker, 1981). Table 5 shows that the squared roots of all AVE were greater than the correlations with other constructs, suggesting sufficient discriminant validity.

Table 5
Correlation matrix and square roots of AVE.

	FWIM	DWIM	HA	SC	AC	IN-ABI	IN-BBI	IN-CBI	AA	SN	SI
FWIM	0.769										
DWIM	0.566	0.897									
HA	0.206	0.125	0.817								
SC	0.311	0.361	0.570	0.885							
AC	0.248	0.246	0.535	0.604	0.903						
IN-ABI	0.077	0.025	0.493	0.441	0.586	0.868					
IN-BBI	0.177	0.173	0.653	0.599	0.631	0.646	0.899				
IN-CBI	0.399	0.418	0.321	0.411	0.457	0.266	0.392	0.932			
AA	0.279	0.278	0.402	0.321	0.334	0.336	0.484	0.340	0.897		
SN	0.403	0.252	0.332	0.251	0.407	0.236	0.269	0.393	0.429	0.918	
SI	0.390	0.275	0.146	-0.001	0.150	0.098	0.003	0.295	0.311	0.548	0.921

Note: The bold numbers in the diagonal row represent the square roots of the average variance extracted (AVE).

The convergent validity of the reflective and formative constructs was examined in different ways. For reflective constructs, convergent validity was assessed by seeing whether the item loadings on the respective constructs were high enough (Gefen & Straub, 2005). As shown in Table 6, all item loadings were over 0.7, suggesting satisfactory convergent validity.

For the formative constructs, the item weights were evaluated. In this model, inertia is a second-order formative construct including three first-order constructs, namely affective-based, behavioral-based and cognitive-based inertia, and there are several reflective items for each first-order construct. As shown in Table 7, the weights were significant for all the three first-order constructs: affective based inertia ($w = 0.393$, $t = 16.619$), behavioral based inertia ($w = 0.453$, $t = 17.827$), and cognitive based

inertia ($w = 0.417$, $t = 13.595$). Taken together, both reflective and formative constructs have satisfactory convergent validity.

5.2. Structural model

Figure 2 presents the results of the PLS analysis of the structural model. As expected, fatigue with incumbent MIM ($\beta = 0.171$, $t = 2.688$, $p < 0.01$) and subjective norm ($\beta = 0.466$, $t = 7.131$, $p < 0.01$) have significant positive effects on switching intention, validating H1a and H2b. Contrary to our expectation, the impacts of dissatisfaction with incumbent MIM ($\beta = 0.064$, $t = 0.888$, $p > 0.1$) and alternative attractiveness ($\beta = 0.116$, $t = 1.741$, $p > 0.05$) are only modest, rejecting H1b and H2a. Affective commitment ($\beta = 0.289$, $t = 4.634$, $p < 0.01$), switching costs ($\beta = 0.189$, $t = 2.647$, $p < 0.01$) and

Table 6
Cross-loadings.

	FWIM	DWIM	HA	SC	AC	IN-ABI	IN-BBI	IN-CBI	AA	SN	SI
FWIM1	0.723	0.267	0.152	0.187	0.228	0.114	0.125	0.261	0.178	0.339	0.341
FWIM2	0.827	0.558	0.148	0.228	0.114	0.016	0.091	0.328	0.234	0.316	0.333
FWIM3	0.700	0.481	0.250	0.378	0.270	0.147	0.276	0.293	0.311	0.252	0.141
FWIM4	0.825	0.486	0.141	0.257	0.205	0.007	0.138	0.356	0.199	0.310	0.303
DWIM1	0.459	0.851	0.156	0.276	0.155	0.026	0.185	0.330	0.251	0.219	0.202
DWIM2	0.512	0.907	0.168	0.330	0.263	0.078	0.217	0.371	0.258	0.221	0.225
DWIM3	0.530	0.913	0.085	0.356	0.255	0.013	0.136	0.393	0.231	0.239	0.284
DWIM4	0.524	0.917	0.062	0.323	0.199	-0.018	0.101	0.396	0.264	0.226	0.263
HA1	0.284	0.115	0.741	0.368	0.313	0.252	0.373	0.241	0.249	0.324	0.287
HA2	0.120	0.067	0.881	0.478	0.443	0.500	0.675	0.242	0.412	0.255	0.027
HA3	0.148	0.138	0.822	0.535	0.553	0.410	0.501	0.309	0.297	0.262	0.114
SC1	0.265	0.258	0.589	0.909	0.533	0.431	0.558	0.374	0.259	0.244	-0.011
SC2	0.279	0.341	0.470	0.900	0.508	0.354	0.526	0.349	0.256	0.168	-0.039
SC3	0.284	0.364	0.446	0.844	0.562	0.381	0.505	0.368	0.341	0.251	0.049
AC1	0.258	0.272	0.520	0.622	0.906	0.515	0.645	0.424	0.329	0.346	0.045
AC2	0.206	0.197	0.469	0.537	0.936	0.536	0.578	0.408	0.277	0.365	0.124
AC3	0.206	0.192	0.459	0.469	0.868	0.540	0.480	0.406	0.299	0.396	0.251
ABI1	0.193	0.199	0.353	0.444	0.480	0.765	0.437	0.322	0.159	0.282	0.126
ABI2	0.029	-0.019	0.458	0.385	0.543	0.932	0.638	0.198	0.380	0.200	0.100
ABI3	-0.007	-0.097	0.467	0.326	0.502	0.898	0.594	0.185	0.321	0.141	0.035
BBI1	0.153	0.125	0.566	0.537	0.538	0.578	0.917	0.358	0.419	0.186	-0.001
BBI2	0.189	0.230	0.625	0.583	0.580	0.622	0.901	0.308	0.504	0.258	-0.055
BBI3	0.135	0.111	0.574	0.496	0.586	0.543	0.880	0.393	0.382	0.284	0.065
CBI1	0.362	0.382	0.312	0.382	0.470	0.298	0.382	0.929	0.333	0.424	0.306
CBI2	0.383	0.336	0.293	0.382	0.401	0.244	0.369	0.936	0.319	0.343	0.248
CBI3	0.371	0.452	0.290	0.385	0.402	0.196	0.344	0.929	0.296	0.328	0.269
AA1	0.253	0.226	0.328	0.216	0.233	0.281	0.389	0.315	0.889	0.318	0.330
AA2	0.220	0.257	0.451	0.385	0.392	0.334	0.507	0.284	0.900	0.431	0.217
AA3	0.271	0.272	0.327	0.298	0.307	0.299	0.429	0.307	0.902	0.428	0.265
SN1	0.354	0.257	0.318	0.273	0.374	0.218	0.283	0.379	0.410	0.925	0.507
SN2	0.355	0.255	0.305	0.22	0.385	0.211	0.259	0.391	0.412	0.934	0.500
SN3	0.401	0.183	0.291	0.175	0.361	0.221	0.199	0.313	0.358	0.895	0.500
SI1	0.378	0.246	0.163	0.009	0.121	0.107	0.039	0.264	0.294	0.529	0.919
SI2	0.366	0.269	0.134	0.011	0.159	0.100	0.027	0.276	0.350	0.516	0.934
SI3	0.330	0.245	0.102	-0.025	0.135	0.062	-0.065	0.276	0.207	0.464	0.909

Note: The bold numbers reflect the item loadings on the respective constructs.

Table 7
Weight and T-value of each first-order construct of inertia.

first-order construct	Weight	T-value
ABI	0.393	16.619
BBI	0.453	17.827
CBI	0.417	13.595

habit ($\beta = 0.441$, $t=6.425$, $p < 0.01$) are found to be significant to inertia, supporting H4a, H4b and H4c. These three antecedents jointly explain 61.3% of the variance of inertia. Finally, inertia has a significant negative effects ($\beta=-0.142$, $t=2.92$, $p < 0.05$) on switching intention, supporting H3. Overall, the model explains 35.4% of the variance in users' intention to switch to another new MIM.

6. Discussion

With the rapid development of mobile services and exploding growth of MIM users, it is necessary to identify and explicate the determinants of mobile users' switching intention towards MIM applications. Therefore, this study applies PPM framework originated from human migration literature to understand users' switching intention between MIMs. The key findings from the results are discussed as follows.

First, fatigue with incumbent MIM and subjective norm have significant impact on MIM users' switching intention as expected. Subjective norm is found to be the most powerful factor that pulls users to switch. It is reasonable that if users receive the significant others' suggestions to use a new MIM, they would have high switching intention in order to keep their relationships. In addition, fatigue with incumbent MIM as a push factor will enhance users' switching intention in that users' fatigue with a MIM application will push them to look for alternatives to get rid of the fatigue experience.

Second, affective commitment, switching costs and habit are found to be significant to inertia, and inertia negatively affects switching intention, supporting our assumptions that three mooring factors (i.e., affective commitment, switching costs and habit) influence switching through the mechanism of inertia. In other words, without inertia that bias users to the status quo, users may be attracted by a better alternative, regardless of their keen affective commitment to the incumbent MIM, perception of high switching costs and strong habit of current MIM usage.

Third, dissatisfaction with incumbent MIM and alternative attractiveness fail to influence switching intention, which is surprisingly inconsistent with the findings of prior studies (Cheng et al., 2009). A potential reason may be that users primarily use MIM as a communication tool to interact and maintain relationships with their friends. According to our online survey conducted among 240 Chinese MIM users, 76.7% of the users utilize WeChat (one of the most famous MIM applications in China) as their most frequently used MIM application in the present. Since a great proportion of friends are using a certain MIM application, users have to choose the same service to keep themselves in touch with their friends, even though they are dissatisfied with this one or attracted by an alternative one.

6.1. Theoretical implications

This study can extend and advance theoretical understanding on switching behavior especially in the research context of mobile instant messaging in several ways. First, prior studies on switching behavior based on PPM employ a cognition-centric framework to

analyze the push and pull factors, while this study extends the traditional PPM by highlighting the affective and social determinants in terms of the research context of MIM. Specifically, beyond dissatisfaction and alternative attractiveness which are regarded as the main push and pull factors respectively according to the cognition-centric logic, this study proposes that fatigue with incumbent MIM (an affective factor) and subjective norm (a social factor) can reflect the push effects and pull effects in this specific research context. The ubiquitous nature of MIM exposes users to all kinds of information without the restriction of time and space, and is more likely to make them experience a feeling of fatigue. The social network among MIM users makes users to consider both individual preference and social influence when making a decision. It implies that future research on switching behavior should break through the cognition-centric logic and take social and affective factors into account.

Second, this study integrates the status quo bias (SQB) theory and PPM framework by proposing inertia as a key factor capturing the mooring effects. Although status quo bias (SQB) theory which describes individuals' preference to maintain the status quo instead of switching to a potentially better alternative has been used to explain users' new technology acceptance or resistance, its role in switching behavior has rarely been examined in prior studies. As SQB well articulates the tradeoff between new technology and incumbent technology, it is suitable to be used to explain the switching behavior. Specifically, we propose inertia as a mooring factor which bias users toward the status quo and makes them prefer to continue using the incumbent service other than switching to a new technology.

Third, this study identifies the antecedents of inertia based on a cognitive – affective – subconscious framework. Most of prior studies on switching behavior treat cognitive factors (such as switching costs) as the major causes to explain why users have the inertia to make a change, while other important factors such as affective and subconscious factors are neglected. In this study, we further take affective commitment and habit to represent affective and subconscious mooring factors respectively, providing a comprehensive picture of inertia formulation. The cognitive – affective – subconscious framework suggests that inertia is not only induced by cognitive evaluations, but also induced by positive affect and habit related to incumbent technology. Future researchers can pay attention to the affective and subconscious factors beyond the cognitive factors.

6.2. Practical implications

For practitioners, this study offers guidance on how to have a place in the competitive market. First, subjective norm has the strongest impact on users' switching intention, hence service providers may utilize users' subjective norm by encouraging friends and family members to recruit new users and to retain existing ones.

Second, as inertia negatively influence users' switching intention, it is feasible for service providers to enhance inertia by strengthening users' affective commitment to the incumbent service, increasing users' switching costs, or encouraging habitual usage of the incumbent service. For instance, some marketing strategies such as rewards program may be effective to increase the affective commitment and switching costs of users.

Third, since fatigue with incumbent service leads to users' switching choice, service providers can provide users with a more controllable environment to prevent users from being too fatigue. For example, they can offer an option that users are able to set limit to the time they spend on the service, therefore minimizing users' fatigue feelings.

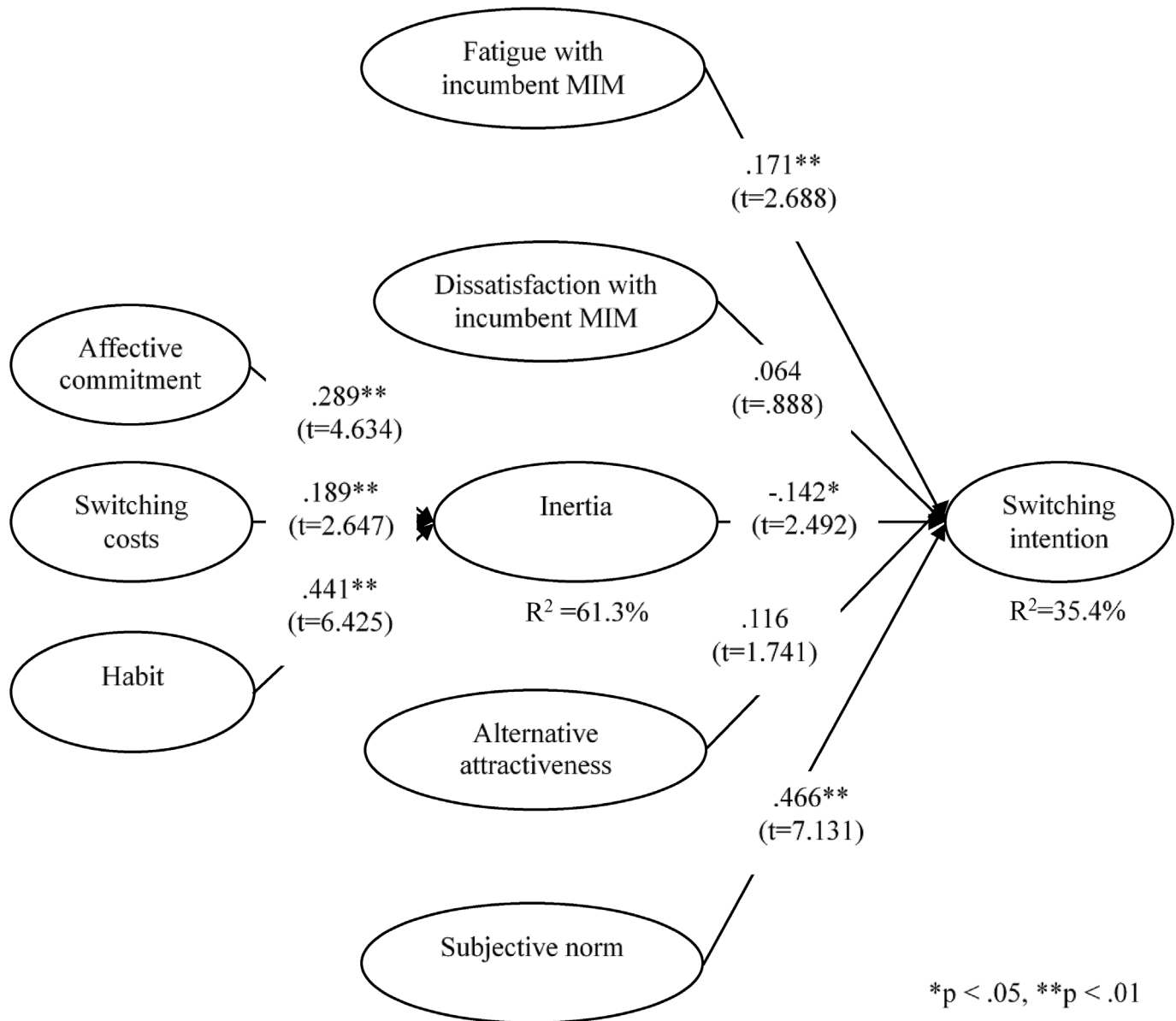


Fig. 2. Results of structural model.

6.3. Limitations and future research

There are some limitations in this paper that can be further improved in future studies. First, the samples were restricted to China. The factors that affect users' switching intention towards MIM applications may vary in different countries, cultures or regions. It is significant to conduct cross-cultural investigations on this subject for better explanations of the results in a global perspective. Studies on cultural differences in switching behavior are supposed to provide cross-cultural references for MIM companies to cater to different individuals. Further, most of respondents in this study are young (20–29 years old), so whether the conclusion can be applied to other users needs to be further investigated in future research too.

Second, the dependent variable is constructed to measure switching intention rather than actual behavior. Since it is not necessary for users to completely stop using incumbent service and switch to an alternative in the context of MIMs, there may be a

gradual transition period for users to intend to try the new service and simultaneously use the incumbent one (Chang et al., 2014).

The last but not least, the structural model only explains 35.4% of variance. This indicates that some important factors are not included in the research model. For example, individual differences may play an important role in users' switching intention. Future research may pay close attention to individual difference variables, like personal innovativeness and mindfulness in technology to further explore the users who are inclined to switch.

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