Exploring the Roles of Network Externality, Privacy Concern, and Gratifications on Use Intensity and Continuance of WeChat Usage

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Graduation Project
Presented to the Faculty of Graduate School of
The Chinese University of Hong Kong
In Partial Fulfillment of Requirements
for the Degree of

Master of Science
in
New Media

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School of Journalism and Communication
The Chinese University of Hong Kong

May 2015

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Abstract

The purpose of this study is to examine how network externalities, privacy concern, and perceived gratifications influence the intensity and continuance intention of WeChat usage among Chinese university students. Data were collected in a medium sized university in southeastern China with a sample of 434 WeChat users. Results show that (i) perceived external prestige and number of WeChat users were positively related to gratifications of WeChat usage, (ii) only perceived external prestige and social gratification were positively related to intensity of WeChat usage, and (iii) privacy concern, number of peer users, perceived external prestige, perceived complementarity, social gratification, documentation gratification, and intensity of WeChat usage all positively predicted continuance intention.

Keywords: network externalities, privacy concern, WeChat, continuance intention, users and gratifications.

Introduction

Instant Messaging (IM) is a social media tool offering real-time text transmission over the Internet (Che & Yang, 2014). In recent years, with the popularity of smart-phones, mobile Instant Messaging services like WhatsApp have gained large user base. WeChat, a WhatsApp equivalent in the west and a mobile instant text and voice messaging service developed by Tencent Holdings Ltd. in China on January 21, 2011, has become pervasive in China. By the end of 2013, the coverage rate of WeChat in China's total Internet users reached 61.9% (CNNIC, 2013), and the number of monthly active users of WeChat achieved 355 million (Tencent, 2013 Fourth Quarter and Annual Results Announcement). To interact with friends on WeChat, services like text-messaging, one-to-many messaging, hold-to-talk voice messaging, location sharing, and photo/video sharing can be provided.

Though WeChat has flourished in China, users may also run off in the future. For example, micro-blogging such as Weibo, after fast growth from 2010 to 2012 in China, the user base and usage rate of it decreased from 2012 to June 2014 (CNNIC, 2013, 2014). The usage rate dropped from 54.7% in 2012 to 43.6% in June 2014 (CNNIC, 2014). As competition of social media is getting intense, users' retention becomes a significant topic. What's more, continued use is imperative to the long-term sustainability of social media (Chen, 2013). Consequently, this study focuses on the users' continuance intention of using WeChat.

Prior researchers have studied why people used social media (Cheung, Chiu, & Lee, 2011; Lin & Lu, 2011), of which research models were mainly based on uses and gratifications theory, social presence theory, and social influence theory. Also found by Wu,

Wang, and Tsai (2010), gratification attributes are the most influential factors motivating continuous use. Thus, this study attempts to examine how various kinds of gratifications perceived by users predict the continuance intention of using WeChat.

Moreover, media uses as well as gratifications of using it are complex processes which may be influenced by other factors. Network externalities, which has been defined as “the value or effect that users obtain from a product or service will bring about more values to consumers with the increase of users, complementary product, or service” by Katz and Shapiro (1985), were found play important roles in why people join SNS (Baker & White, 2010; Kim, Kim, & Lee, 2013; Lin & Lu, 2011). Network externalities can be crucial factors to be considered for the survival and growth of Mobile Instant Message services (Kim et al., 2013). In consequence, in predicting the WeChat continuous usage, network externalities were taken into account.

Besides motivating factors for continuous usage, inhibiting elements should also be considered. Previous study demonstrated that the user behaviors were also affected by privacy concern, which had negative effects on continuous usage, associated with information disclosure (Zhou & Li, 2014). So the impacts of privacy concern will also be tested.

To our knowledge, the studies of social media continued usage are prolific among South Korean researchers, given to the bloom of social media in that country. However, such studies in the context of China are limited, and this study is trying to fill the gap.

Theoretical Background

Intensity and continuance intention of WeChat usage

Continuance, in the information technology context, refers to sustained use of a technology by individual users over the long-term after their initial acceptance (Yoon & Rolland, 2015). Among the studies of Information System (IS), it has been recognized that IS success depends a lot on the continuous usage rather than the primitive acceptance (Bhattacherjee, 2001; Limayem, Hirt, & Cheung, 2007; Venkatesh & Davis, 2000). Thus, this study will concentrate on the continuance intention of using WeChat.

From previous studies, the positive relationship between actual behaviors and behavioral intention has been supported (Denga, Lua, Weib, & Zhang, 2010; Limayem, et al., 2007; Young, 2013). For instance, Mutaz, Enas, and Anastasia (2013) found that continuance participation intention of Facebook had significant effect on continuance participation behavior. Also, significant effect of continuance intention of using information system on continued use was also found by Young, Min, Kim, and Lee (2013).

And this study will test the predicting effect of intensity of WeChat usage on continuance intention. That is, if a person uses one technology frequently in daily life, he/she will get involved and has higher intention to continuously use it. As a result, the hypothesis is drawn:

H1: Users' intensity of WeChat usage is positively correlated with continuance intention of usage.

Uses and Gratifications

Uses and Gratifications Theory (UGT) is an influential theory that explains why individuals actively select specific media outlets to fulfill gratification needs, which considers audience as an active but not a passive consumer of media. Diverging from other media effect theories that question "what does media do to people?" UGT focuses on "what do people do with media (Katz & Elihu, 1959)?" Also, gratifications are conceptualized as “needs satisfactions,” which are obtained when a person’s needs are met by certain types of media sources that match their expectations (Katz, Blumler, & Gurevitch, 1974).

With the booming of Internet, some researchers combined pre-existing measures of interpersonal, traditional media, and new media gratifications measures in order to shed light on why people use the Internet. After assessing the responses to their survey, the researchers found that people used the Internet for interpersonal reasons, to pass time, information-seeking, convenience, and entertainment purposes (Papacharissi & Rubin, 2000).

What’s more, in the context of social media, UGT has also been applied to many researches. Based on prior studies, the gratifications such as “information-seeking”, “entertainment”, “fashion”, “recognition”, “social”, and “documentation” were employed to explain why people use social media (Barker, 2009; Chen, 2011; Hou, 2011; Ian & Lee, 2014; Ku, Chen, & Zhang, 2013; Liu, Cheung, & Lee, 2010; Young, 2010).

For example, two prior studies about uses and gratifications of Facebook found that information is a motivational factor for users (Park, Kee, & Valenzuela, 2009; Raacke & Bond, 2008). Also, since social media provided a way of playing game, relieving boredom, escaping reality, and passing time, entertainment motivation were also found related with

social media use (Muntinga, Moorman, & Smit, 2011). Comparing three kinds of CMC technologies -- SNS, IM, and E-mail, Ku, Chu, and Tseng (2013) also found that relationship maintenance, information seeking, amusement, and style were the general gratifications among the three technologies. Also, there were two specific gratifications, which were the sociability gratification sought from using instant messaging and social networking sites, as well as the gratification of killing time sought from using instant messaging. Also, In the studies about Twitter gratifications, "self-documentation" has been identified by researchers (Chen, 2011; Liu, Cheung, & Lee, 2010), which referred to using social media for documenting important events, emotions, and footprints during one's lifetime.

Palmgreen (1984) systemized the U&G approach by considering why people used particular media, how social and psychological needs influenced motivations, and how these related to specific media use behaviors. Since then, the U&G framework has been applied to examine the relationships among motivations for media use, behavioral patterns related to media use, and attitudes toward specific media use (Lin, 1999). Based on existing literature, gratifications obtained from a CMC technology were positively correlated with an individual's technology use (Leung, 2001).

What's more, the study of Alhabash, Chiang, and Huang (2014) found that for inactives, risk avoiders, and coactives, the motivation for entertainment was the strongest in predicting intensity to use Facebook. And for risk takers, self-expression was the strongest motivation to predict Facebook use intensity. Thus, based on the discussion, RQ1 and H2a is proposed:

RQ1: What gratifications are associated with using WeChat?

H2a: Perceived gratifications are positively correlated with intensity of using WeChat.

Also, according to the IS continuance model proposed by Bhattacherjee (2001), satisfaction towards information system predicts the continuance intention of usage. What's more, most empirical studies supported that satisfaction was a strong predictor of continuance intention of using technology. For example, in the study of Ku et al. (2013), gratifications perceived from social networking sites were positively correlated with one's continuance intention of using it. Zhao and Lu (2012) also indicated that the satisfaction of micro-blogging service also positively correlated with the continuance intention of usage.

Also found by Zhao and Lu (2011), perceived usefulness affected satisfaction and both factors determined user loyalty of mobile instant message. However, compared to the effect of satisfaction, perceived usefulness had a relatively larger effect on loyalty, which might show that users are utilitarian. What's more, the gratification of playfulness was also found to have a strong effect on intention, which suggests that playfulness plays an important role in the context of a pleasure-oriented information system (Chiang, 2013). As a result, H2b is suggested:

H2b: Perceived gratifications are positively correlated with continuance intention of using WeChat.

Also, the following research question is asked:

RQ2: Which gratifications will be the strongest predictors of (a) intensity of WeChat usage; (b) continuance intention?

Privacy concern

Privacy concern reflects a user's concern regarding information disclosure (Zhou et al., 2014).

Smith, Milberg, and Burge (1996) argued that information privacy was constructed by four dimension: collection, errors, unauthorized secondary use, and improper access. And in the context of Internet, the Internet Users' Information Privacy Concern (IUIPC) was developed by Malhotra, Kim, and Agarwal (2004). Collection, control, and awareness are the three dimensions of IUIPC.

Previous studies have examined the effect of privacy concern on user behavior in a variety of contexts, such as online shopping (Slyke, Shim, Johnson, & Jiang, 2006), software firewalls (Kumar, Mohan, & Holowczak, 2008), online health information disclosure (Bansal, Zahedi, & Gefen, 2010), blogs (Chai, Das, & Rao, 2011), and instant messaging (Lowry, Cao, & Everard, 2011).

And the negative relationship between privacy concern and using intensity of social media has been supported by many researches (Antheunis, Tates, & Nieboer, 2013; Gim, 2012; Zhou et al., 2014). For example, Antheunis et al. (2013) found that privacy concern and the unreliability of information were main barriers for patients to use social media in health care. Also, in the case of Facebook study, significantly negative relationship was found between privacy concern and self-disclosure on Facebook (Lili, Tatjana, Marjan, & Marko, 2015).

However, some researchers also found that users rarely allowed their privacy concern to affect their online behavior (Acquisti & Gross, 2006; Boyd & Hargittai, 2010; Debatin, Lovejoy, Horn, & Hughes, 2009; Tufekci, 2008; Yao, Rice, & Wallis, 2007; Yao & Zhang, 2008; Youn & Hall, 2008). That is, concern for the security of one's private information on the Web is not necessarily accompanied by a corresponding behavior, such as revealing less

information (Debatin et al., 2009). Invented by Barnes (2006), the notion of "privacy paradox" indicates that though Internet users concerned about privacy, their behaviors do not reflect these concerns. Several explanations were suggested for this paradox, mainly concerning a lack of awareness and literacy.

What's more, it is found by Taddicken (2014) that privacy concerns hardly impacted one's self-disclosure on Social Web, but different variables like perceived social relevance and the number of applications moderated the relation. Though the correlation between privacy concern and social media use is ambiguous, it is reasonable to assume that with high privacy concern, users will use less WeChat to avoid exposing too much information about them. Then, the H3a is drawn:

H3a: Privacy concern is negatively correlated with intensity of WeChat usage.

As for the relationship between privacy concern and continuance intention of technology use, it was found by researchers that privacy concern had significantly negative relationship with the continuance intention of using social networking sites (Ku et al., 2013; Zhao et al., 2014). However, in Kim's study about the effects of privacy concern on SNS continuance intention, no significant relationship has been found between them (Kim, 2012).

From previous studies, the correlations between privacy concern and social media continuance intention are not clear, either. In consequence, more empirical studies are needed to test the relationship. And also, H3b was suggested as below:

H3b: Privacy concern is negatively correlated with continuance intention of WeChat usage.

Network externalities

Katz and Shapiro (1985) defined network externalities as "the value or effect that users obtain from a product or service will bring about more values to consumers with the increase of users, complementary product, or service."

Many researchers (Gupta & Mela, 2008; Katz & Shapiro, 1985; Lin & Bhattacherjee, 2008) have pointed out the two types of network externalities: direct and indirect. On the one hand, direct network externalities derive from the increase in users of a particular product or service, where user's benefits increase. On the other hand, indirect network externalities display an increased sense of user value from using a product or service, as the effect the user obtains from such product or service increases with the growth of related complementary products.

According to the literature review, five dimensions are constructing the variable "network externalities" in this study.

For the direct network externalities, "number of WeChat users", "number of peer users", "perceived external prestige" are being tested. Sledgianowski and Kulviwat (2009) believed that a user intends to use an SNS once its participants reach a significant number. Thus, the "number of WeChat users" is exploited. Peer network externalities refer to the number of friends who are using the social media (Lin & Hu, 2011). Since WeChat was designed for interacting with friends with strong-tied relationships, the "number of peer users" is also a significant factor that may influence the WeChat usage. Moreover, "perceived external prestige" refers to an individual's own assessment of what others think about the group (Mael & Ashforth, 1992). It reflects the social value assigned by individuals to their group

membership (Dutton, Dukerich, & Harquail, 1994).

As for the indirect network, “perceived complementarity” and “perceived compatibility” are being considered. Perceived compatibility refers to the degree to which an individual perceives that the social media platform is consistent with the existing public service channels and popular communication media (Chiu, Cheng, Huang, & Chen, 2013). Perceived complementarity refers to the availability of functions or applications serving to fill out or to complete the social networking service (Chiu et al., 2013). Some researchers have modeled perceived complementarity as an element of network externalities (Lin & Bhattacherjee, 2008; Lin & Lu, 2011; Zhou & Lu, 2011), while other studies have modeled perceived compatibility as a component (Gandal, 1994; Sheremata, 2004). And this study will take both factors into consideration.

The positive relationship between network externalities and satisfaction of social media has been supported by previous studies. Ling & Lu (2013) has found that network externalities had positive relationship with perceived interactivity of micro-blog, which further predicted the satisfaction of it. Also, Chiu, Cheng, Huang, and Chen (2013) argued that three components of network externalities -- external prestige, perceived compatibility, and perceived complementarity had positive effect on SNS identification and satisfaction, which in turn had positive effects on users’ subjective well-being and loyalty toward SNS.

What’s more, prior researches supported positive correlation between network externalities and continuance intention of SNS. Found by Kim (2012), network externalities shown significantly positive effect on SNS continuance intention. In the study of blog continuance intention, the factors affecting the blog continuance intention were perceived

feedback, perceived usefulness, perceived enjoyment, and perceived network externalities, among which the perceived network size and perceived complementarity constructed the variable network externalities. Moreover, perceived network size, perceived complementarity, and perceived feedback were of importance on the formation of a user's motivation of using a blog (강희택, 2012).

Also, in more specific field, like the continuance intention of using nurses' blended e-learning, user network, which includes subjective norm and network externality, was found profoundly affected the continuance intention of using such technology (Cheng, 2014).

However, in the comparison study of Facebook and Kakao Talk in South Korea, the results suggested that the effect of network externality on continued intention was not significant among Facebook users while it was significant among Kakao Talk users (Kim, 2013). Also in the study of Matti and Jari (2011) about social virtual worlds, perceived network externalities exerted a significant influence of perceived enjoyment, usefulness, as well as purchasing intention of the social virtual worlds, but did not have a direct effect on the continuous usage.

Based on the discussion above, it is generally supported that network externalities have significant effects on the satisfaction and continuance intention of using SNS. Moreover, since the more network externalities perceived by a person, the more friends, and more services he or she can interact with on the social media. Then the continuance intention and intensity of usage are supposed to be higher.

In consequence, H4a, H4b, and H4c are proposed:

H4a: Network externalities are positively correlated with perceived gratifications.

H4b: Network externalities are positively correlated with intensity of WeChat usage.

H4c: Network externalities are positively correlated with continuance intention of WeChat usage.

And here are the other four research questions of this study:

RQ3: How can network externalities predict (a) perceived gratifications; (b) intensity of WeChat usage; (c) continuance intention?

RQ4: How do privacy concern, network externalities predict perceived gratifications?

RQ5: How do privacy concern, network externalities, and perceived gratifications predict intensity of WeChat usage?

RQ6: How do privacy concern, network externalities, perceived gratifications, and intensity of WeChat usage predict users' continuance intention?

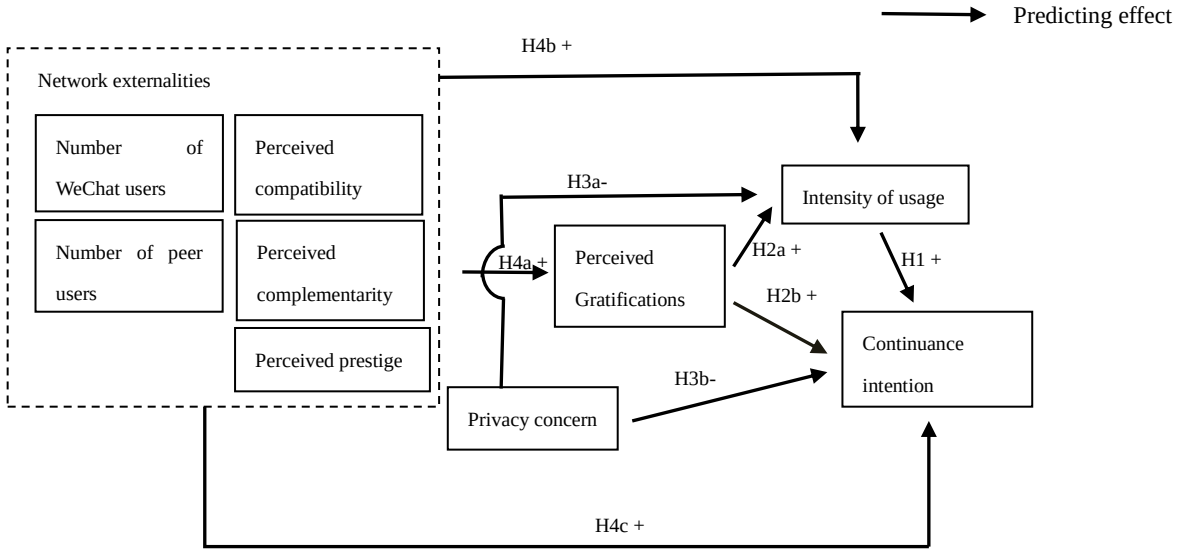

Figure 1: Research hypothesis model

Methodology

Data collection and sampling

Focus group was employed among university students from mainland China to figure out the functions and gratifications from WeChat usage. These results were used to facilitate the design the questionnaire. Data were collected by paper-based questionnaires in classrooms of a medium sized university in southeastern China using convenient sampling. Total 434 valid questionnaires were collected, including 46.5% males and 53.5% females, and the response rate was 92%. Table 1 presents the details of respondents' characteristics.

The questionnaire was piloted before the formal survey was conducted.

(* Insert Table 1 about Here *)

Measurement

Network externalities. Since network externalities have five dimensions, each dimension was measured separately.

For the "number of WeChat users (NU)", 2 items were drawn from the study of Lin & Lu (2011a, 2011b). Sample items included "I think a good number of people use WeChat;" "I think there will still be many people joining WeChat." The Cronbach's α was .77.

For the "number of peer users (NP)", 2 items were also adopted from Lin & Lu (2011a, 2011b). Sample items were "I think many friends around me use WeChat;" "I anticipate many friends will use WeChat in the future." The Cronbach's α was .72.

For the "perceived external prestige (EP)", 3 items were adopted from the studies of Chiu et al. (2013), Chong, Ooi, & Arumugam (2009), as well as Mael & Ashforth (1992), Wei, Marthandan. Sample items were "People think highly of WeChat." The Cronbach's α

was .81.

For the "perceived compatibility (PC)", 3 items were adopted from the research of Lin, Tsai, Wang, & Chiu (2011). Sample items included "WeChat is highly compatible with my mobile devices;" "WeChat is highly compatible with the websites I usually visit." The Cronbach's α was .78.

For the "perceived complementarity (CO)", 3 items were adopted from the articles of Lin & Lu, (2011), and Lin et al. (2011). Sample items were "A wide range of applications is available on WeChat;" "A wide range of games is available on WeChat." The Cronbach's α was .80.

Privacy concern. The scale to measure "privacy concern (PRC)" was adapted from Dinev & Hart (2006) with 4 items. Sample items included "I am concerned that the information I submit to mobile SNS could be misused" and "I am concerned that a person can find private information about me on the Internet." The Cronbach's α was high at .92.

Perceived gratifications. According to the focus group and literature review, primarily six kinds of gratifications were included, which are the information-seeking, entertainment, recognition, social, documentation, and fashion gratifications. What's more, the scale used by Leung (2013) to measure the gratifications of social media using was adopted. Also, several additional items were constructed on the basis of focus group.

Intensity of WeChat usage. To measure the intensity of WeChat usage, users were asked the question that "on average, how frequently have you visited WeChat over the past month?" And a five-point Likert-type scale ranging from "never" (1) to "always" (5) was used.

Continuance intention of using WeChat. To measure the continuance intention of using

WeChat, 3 items adapted from Bhattacherjee (2001) were employed. Sample items were "I intend to continue using WeChat in the future rather than discontinue it" and "If I could, I would like to discontinue my use of WeChat (reversed item)". The Cronbach's α was .68.

Except for the Intensity of WeChat use, all of the items were measured by the five-point Likert-type scale, ranging from "strongly disagree" (1) to "strongly agree" (5).

Findings

Total 42-item questionnaire was developed to collect responses from 434 Chinese university students to identify their continuance intention of using WeChat. Descriptive results and the bivariate relationships for all main variables are presented in Tables 2 and 3.

Factor analysis of perceived gratifications

To answer RQ1, after deleting items with low communalities values, principal components of factor analysis (with Varimax rotation, Fixed number of five factors to extract, and factor loading greater than .50) produced a five-factor gratification structure and accounted for 79.74% of the total variance as shown in Table 4. The first factor was "Social" (4 items; α = .88), indicating the gratifications of using WeChat for contacting and improving relationship with others. "Recognition" (α = .88) was the second factor with three items characterizing that WeChat allows users to build up personal identity and confidence, as well as to gain respect and support from others. "Information-seeking" (α = .77) was the third factor. It contains three items illustrating WeChat satisfies users' needs of getting information and knowledge. For the fourth factor, "documentation" (α = .90), includes two items reflecting that the needs of documenting one's life and footprints gratified by WeChat. The

fifth factor, "fashion" (α = .85) contains two items indicating WeChat can keep one trendy and stylish.

As shown by the results, the primitive entertainment gratification and the item "To meet people" for social gratification were deleted based on the results of factor analysis.

(* Insert Table 4 about Here *)

Hypothesis testing

H1 hypothesized that intensity of WeChat usage positively related with continuance intention. Table 5 shows that Intensity of WeChat (β = .16, p<0.001) usage is significantly linked to the continuance intention. Thus, H1 is fully supported.

H2a and H2b hypothesized that perceived gratifications positively related with (a) Intensity of WeChat usage; (b) continuance intention. Table 5 indicates that only social gratification (β = .15, p<0.01) is significantly correlated with intensity of WeChat usage. What's more, only social gratification (β = .12, p<0.01) and documentation gratification (β = .18, p<0.001) have positive relationships with continuance intention of using WeChat. In consequence, H2a and H2b are only partially supported.

H3a and H3b hypothesized that privacy concern negatively related with (a) intensity of WeChat usage; (b) continuance intention. Results on Table 5 show that no significant relationship has been found between privacy concern and intensity. However, positive relationship has been found between privacy concern (β = .23, p<0.001) and continuance intention. Thus, H3a and H3b are rejected.

H4a hypothesized that network externalities are positively related with perceived gratifications. Also, number of peer users (β = .11, p<0.05), perceived external prestige (β = .30, p<0.001), and perceived complementarity (β = .22, p<0.001) have been found

positively related with perceived gratifications. Thus, H4a is partially supported.

H4b and H4c hypothesized that network externalities are positively linked with (a) intensity of usage; (b) continuance intention. Table 5 shows that only perceived external prestige (β = .15, p<0.01) is positively related with intensity of usage. Thus H4b received little support. Also, number of peer users (β = .49, p<0.001), perceived external prestige (β = .28, p<0.001), and perceived complementarity (β = .01, p<0.05) have been found positively related with continuance intention. So that H4c is partially supported.

(* Insert Table 5 about Here *)

Using gratifications and network externalities as predictors

To answer RQ2, Table 5 shows that after controlling for demographics, privacy concern, and network externalities, among five dimensions of gratifications, social gratification (β = .15, p<0.01) is the only and strongest predictor of intensity of WeChat usage. This indicates that for Chinese university students, the more they are motivated by social gratifications, the more they will use WeChat. Also, to predict continuance intention, documentation gratification (β = .18, p<0.001) is the strongest one, followed by social gratification (β = .12, p<0.01). This indicates the more Chinese university students are motivated by documentation and social gratifications, the higher of their continuance intention in using WeChat.

To answer RQ3, Table 5 indicates that perceived external prestige (β = .30, p<0.001) is the strongest predictor in influencing perceived gratifications, followed by perceived complementarity (β = .22, p<0.001) and number of peer users (β = .11, p<0.05). Also, in predicting continuance intention, number of peer users (β = .49, p<0.001) is the strongest one, followed by perceived external prestige (β = .28, p<0.001) and perceived complementarity (β

= .01, p<0.05). This means that for Chinese university students, the higher assessment of WeChat, larger quantity of their friends on WeChat, and more complementary functions on WeChat will strengthen their perceived gratifications and continuance intention of using it. What's more, in predicting intensity of usage, perceived external prestige (β = .15, p<0.01) is the only predictor among five dimensions of network externalities.

However, statistically speaking, number of WeChat users, which illustrates the user base of WeChat, and perceived compatibility, which demonstrates the compatibility of WeChat with other SNSs, mobile devices, and websites, are not predict gratifications, intensity, and continuance intention.

Predicting perceived gratifications

To exam the relative influence of demographics, and network externalities on perceived gratifications, hierarchical regression was run (see Table 5). Using perceived gratifications as the dependent variable, no significant predictor was found in the demographic block. When privacy concern was entered into the second block, it was found to be a significant predictor (β = .15, p < 0.001) and accounted for 4% of the variance. When entering the network externalities in the third block, only number of peer users (β = .11, p < 0.05), perceived external prestige (β = .30, p < 0.001), and perceived complementarity (β = .22, p < 0.001) were significant. This block explained 13% of the variance, for a total of 17% for the regression equation.

Predicting intensity of usage

Similarly, to examine the relative influence of demographics, network externalities, privacy concern, and gratifications on intensity of WeChat usage, hierarchical regression was run (see Table 5). Using intensity as a dependent variable, education level was the only significant predictor ($\beta = -.11$, $p < 0.05$) in the first block, which accounted for 1% of the variance. When privacy concern was entered into the second block, it was found not to be a significant predictor. The third block was network externalities of WeChat. The results showed that perceived external prestige significantly predicted intensity of usage ($\beta = 0.15$, $p < 0.01$), which accounted for 2% of the variance. Finally, the gratification was entered. And social gratification significantly predicts intensity of use ($\beta = 0.15$, $p < 0.01$), which accounted for 2% of the variance. The equation accounted for 5% total variance.

Predicting continuance intention

In predicting continuance intention, education level was the only significant predictor ($\beta = .11$, $p < 0.05$) in the first block, which accounted for 1% of the variance. When privacy concern ($\beta = .23$, $p < 0.001$) was entered into the second block, it was found to be a significant predictor, which accounted for 51% of the total variance. This indicates that for Chinese university students, those with higher concern of privacy will have higher continuance intention of WeChat usage. The third block was network externalities of WeChat. The results showed that number of peer users ($\beta = .49$, $p < 0.001$), perceived external prestige ($\beta = .28$, $p < 0.001$), and perceived complementarity ($\beta = .01$, $p < 0.05$) significantly predicted continuance intention, which accounted for 27% of the variance. The fourth block was gratifications, for

which social (β = .12, $p < 0.01$) and recognition (β = .18, $p < 0.001$) significantly predicts continuance intention, and accounted for 4% of the variance. Finally, the intensity was entered. And it significantly predicts continuance intention (β = .16, $p < 0.001$), which accounted for 2% of the variance. The equation accounted for 39% total variance.

Discussion and Conclusions

Network externalities and gratifications

One goal of this study is to explore the relationship between network externalities and perceived gratifications from WeChat. The results partially support the findings of Chiu, Cheng, Huang, and Chen (2013) that three components of network externalities -- external prestige, perceived compatibility, and perceived complementarity had positive effect on Facebook identification and satisfaction. However, in this study, it is the number of peer users, external prestige, and perceived complementarity that positively influence WeChat gratifications.

The lack of influence of perceived compatibility in this study may be explained by that in social media industry, WeChat has gotten the monopoly in China, which means most users are clustering on this social platform. On the one hand, Chinese government has blocked the SNSs from outside boarders like Facebook. On the other hand, the loss of users of Sina Weibo and Renren, who are two main social media platforms in China, due to the lack of innovation and approaches to get profit (CNNIC, 2014) strengthen the monopoly of WeChat. In consequence, the condition in China is different from the competitive environment in social media industry outside mainland China, where Snapchat, Twitter, LinkedIn, MySpace,

Pinterest, etc. are all strong competitors of Facebook. In consequence, whether WeChat is compatible with other SNSs and websites is not important. And it has no significant influences on users' gratifications from WeChat among Chinese university students.

Network externalities, privacy concern, gratifications, and intensity of WeChat usage

Another aim of this study was to explore the effect of network externalities, privacy concern, and gratifications on the intensity of WeChat usage. However, only perceived external prestige and social gratification positively predicts the intensity of WeChat usage.

WeChat contains the functions of instant messaging and SNS, where users can send messages to friends as well as share texts, photos, and videos in friend circle to let others comment and like. In consequence, the activities on it are primarily social, which is different from Sina Weibo that was designed as a medium for people to exchange information and forward others' opinions (Mo & Leung, 2014). Thus, social gratifications are predicting the intensity of usage.

Also, WeChat is a social media platform mainly filled with strong-relationship friends and relatives (Hui, 2014), which can be identified through its approaches of adding friends and viewing comments. For example, if one want to view the comments of a post published by his/her friend on WeChat, only the comments issued by their common friends can be seen. This means that users may need not to build personal identity among relatively intimate people on WeChat. What's more, support from most of intimate friends on WeChat can be gotten through other approaches like making phone calls or offline interactions. In consequence, this may explain why recognition gratification is not related with intensity of

WeChat usage.

Moreover, privacy concern is found has no significant relationship with intensity of WeChat usage. Such result may also because WeChat is filled with strong-tied relationship friends and equipped with complete privacy settings, which allows users to use it with little worry about privacy. For instance, user can prevent specific friends from viewing his/her friend circle. Another explanation of this relationship may be the "privacy paradox" indicating that though Internet users concerned about privacy, their behaviors do not reflect these concerns (Barnes, 2006). That is, concerns for the security of one's private information on the Web is not necessarily accompanied by a corresponding behavior, such as revealing less information (Debatin, et al., 2009).

Network externalities, privacy concern, gratification, and intensity considering continuance intention

Results show that the most powerful predictor affecting continuance intention is number of peer users, followed by external prestige. What's more, perceived complementarity also predicts continuance intention with less importance. It is partially consistent with previous findings that perceived complementarity, external prestige, perceived compatibility, and perceived network size predict the user loyalty towards Facebook in Taiwan (Chiu, Cheng, Huang, & Chen, 2013). However, prior study found that perceived complementarity is more important than perceived external prestige, perceived compatibility, and perceived network size. Also, the lack of influence of perceived compatibility in this study may also be explained by the monopoly of WeChat in China.

What's more, for perceived gratifications, documentation gratification is more

significant than social gratification in predicting the continuance intention. This means the more gratification users perceived from documenting one's life and footprints on WeChat, the more likely they will continuously use WeChat. Moreover, intensity of usage also significantly predicts continuance intention.

However, in contradiction with the hypothesis, privacy concern is positively predicts the continuance intention of using WeChat. This may also be explained by that WeChat is a social media platform mainly filled with intimate friends and the private setting of it is relatively sound. In consequence, compared to other social media like Sina Weibo, whose platform is more open, using WeChat is relatively safer for those with high privacy concerns.

Implications and Limitations

Overall, this study makes theoretical contributions in several ways. First, this study identified five motivations for using WeChat and built on U&G theory to explain the intensity and continuance intention of WeChat usage. Second, by controlling the effect of demographics, this study analyzed the relationship between network externalities, privacy concern, gratifications from WeChat and intensity to provide insights into the individual continuance intention of WeChat usage. Third, this study applied the continuous use of social media in the context of China, and provided empirical evidence to address the inconsistent findings that may be caused by the specific context of WeChat and special Chinese environment.

There are also several limitations of this study. First, since the questionnaires are mainly collected in the classroom, and there are relatively less classes for senior students who are about to graduate, the skewed grade distribution may not reflect the actual distribution at a

typical university in mainland China. Such data, with over 56% being freshman and sophomore students in the sample, may lead to biased results in the level of continuance intention and intensity of WeChat usage. Future research efforts should try to select samples randomly in order to eliminate these methodological limitations. Second, the reliability α for the variable “continuance intention” is low with .68, which is marginal so that the results may have been affected. Third, the subjects of this study are only Chinese students from a southern university in China. Thus, the generalizability of this research may be affected. Future study can investigate other groups of WeChat users to get more insights.

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Table 1. Descriptive Statistics of Survey Respondents (N=434)

Demographics		Number	%
Gender	Male	202	46.5
	Female	232	53.5
Age	< 21	206	47.5
	21-23	152	35
	> 23	76	17.5
Education level	Freshman & Sophomore	244	56.2
	Junior & Senior	108	24.9
	Post-graduate	82	18.9
Major	Arts & fine arts	62	14.3
	Science	36	8.3
	Engineering	126	29
	Social science	210	48.4

Table 2. Descriptive Results on Main Measures.

	Network externalities					Intensity of usage	Continuance intention
	NU	NP	EP	PC	CO		
Mean score	4.2	4.29	3.69	3.43	3.03	3.9	3.77
SD	0.74	0.72	0.76	0.73	0.78	0.98	0.74
Min	1	1	1	1	1	1	1
Max	5	5	5	5	5	5	5

Note. N = 434. SD = standard deviation; Min = minimum values; Max = maximum values

Table 3. Zero-Order Pearson Correlation Matrix for Observed Variables.

	2	3	4	5	6	7	8	9	10	11	12	13
Network externalities												
1. NU	.80**	.54**	.34**	.26**	.29**	.30**	.00	.31**	.17**	.12*	0.83	.44**
2. NP		.57**	.38**	.27**	.34**	.35**	.01	.36**	.20**	.10*	0.58	.51**
3. EP			.58**	.35**	.17**	.31**	.12*	.24**	.24**	.16**	.13**	.49**
4. PC				.49**	.21**	.25**	.18**	.23**	.23**	.15**	0.83	.32**
5. CO					.27**	.20**	.20**	.28**	.24**	.17**	0.57	.29**
Privacy concern												
6. PRC						.21**	.09	.21**	.18**	.06	0.91	.23**
Gratifications												
7. Social							.26**	.35**	.39**	.14**	.18**	.36**
8. Recognition								.28**	.44**	.43**	.12*	.13**
9. Information-seeking									.33**	.15**	.36	.30**
10. Documentation										.40**	.15**	.32**
11. Fashion											.10*	.17**
WeChat usage												
12. Intensity												.23**
13. Continuance intention												

Note. N = 434. *. Correlation is significant at 0.01 level (2-tailed). **. Correlation is significant at the 0.05 level (2-tailed)

Table 4. Factor Analysis of Gratifications.

To what extent do you agree with the statements below? I use WeChat to…	Factors					Mean	SD
	1	2	3	4	5		
Social (Factor mean=3.98, sd=.90)							
1. To allow people to find me easily	.76					4.01	.99
2. To keep in contact with family and friends	.90					4.04	1.05
3. To interact with my family and friends easily	.89					4.06	1.04
4. To improve my relationship with my friends and family	.78					3.82	1.09
Recognition (Factor mean=2.76, sd=.89)							
5. To establish my personal identity		.80				2.86	.97
6. To gain respect and support		.89				2.77	.98
7. To build up my confidence		.88				2.65	1.02
Information-seeking (Factor mean=3.59, sd=.81)							
8. To obtain useful information			.89			3.58	.98
9. To broaden my knowledge base			.87			3.32	1.01
10. To find out what is going on in society and others' lives			.60			3.87	.96
Documentation (Factor mean=3.47, sd=.99)							
11. To document important events of my life				.87		3.43	1.06
12. To document footprints of my life				.87		3.5	1.02
Fashion (Factor mean=2.85, sd=.99)							
13. To look stylish					.84	2.72	1.04
14. To look fashionable					.92	2.99	1.08
Eigenvalue	5.08	2.35	1.56	1.20	.98		
Variance explained (%)	21.58	17.99	14.51	13.30	12.37		
Cronbach's α	.88	.88	.77	.90	.85		

Note. N = 434. SD = standard deviation.
Scale used: 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree.

Table 5. Hierarchical Regression of Gratification, Intensity of WeChat Usage and Continuance Intention

	Perceived Gratifications β	Intensity of using WeChat β	Continuance intention β
Predictors			
Block 1: Demographics			
Gender	-.03	.04	.01
Age	-.07	-.03	.00
Education level	-.03	-.11*	.11*
Major	-.04	.03	-.01
Adjusted ΔR^2	--	.01*	.01*
Block 2: Privacy Concern	.15***	.04	.23***
Adjusted ΔR^2	.04***	--	.51***
Block 3: Network externalities			
number of WeChat users (NU)	.01	-.02	.01
number of peer users (NP)	.11*	-.08	.49***
Perceived external prestige (EP)	.30***	.15**	.28***
Perceived compatibility (PC)	.08	-.01	-.03
Perceived complementarity (CO)	.22***	-.01	.01*
Adjusted ΔR^2	.13***	.02**	.27***
Block 4: Perceived Gratifications			
Social	--	.15**	.12**
Recognition	--	.06	-.01
Information-seeking	--	-.05	.05
Documentation	--	.09	.18***
Fashion	--	.07	.01
Adjusted ΔR^2	--	.02***	.04***
Block 5: Intensity of WeChat usage	--	--	.16***
Adjusted ΔR^2	--	--	.02***
R^2	.18	.05	.40
Adjusted R^2	.17	.05	.39

Note: Figures are standardized beta coefficients from final regression equation with all blocks of variables included for the entire sample. *p < .05; ** p < .01; *** p < .001; N = 434.

Appendix

Questionnaire:

1. Perceived Gratifications:

To what extent, do you agree with the descriptions below (1= strongly disagree 5=strongly agree): I use WeChat to...	1	2	3	4	5
Information-seeking					
To obtain useful information					
To broaden my knowledge base					
To find out what is going on in society and others' lives					
Entertainment					
Because it is pleasant					
To have fun					
Recognition					
To establish my personal identity					
To gain respect and support					
To build up my confidence					
Social					
To meet people					
To allow people to find me easily					
To keep in contact with family and friends					
To interact with my family and friends easily					
To improve my relationship with my friends and family					
Documentation					
To document important events of my life					
To document footprints of my life					
Fashion					
To look stylish					
To look fashionable					

2. Network externalities and Privacy concern

To what extent, do you agree with the descriptions below (1= strongly disagree, 5= strongly agree):	1	2	3	4	5
Network externalities					
number of WeChat users (NU)					
I think a good number of people use WeChat.					
I think there will still be many people joining WeChat.					
number of peer users (NP)					
I think many friends around me use WeChat.					
I anticipate many friends will use WeChat in the future.					
Perceived external presitge (EP)					
People think highly of WeChat.					

WeChat is considered one of the best social networking sites.					
WeChat is looked upon as a prestigious social networking site.					
Perceived compatibility (PC)					
WeChat is highly compatible with my mobile devices.					
WeChat is highly compatible with the websites I usually visit.					
WeChat is highly compatible with other social networking sites.					
Perceived Complementarity (CO)					
A wide range of applications is available on WeChat.					
A wide range of activities on WeChat can be joined.					
A wide range of games is available on WeChat.					
Privacy concern (PRC)					
I am concerned that the information I submit to mobile SNS could be misused.					
I am concerned that a person can find private information about me on the internet.					
I am concerned about providing personal information to mobile SNS, because of what others might do with it.					
I am concerned about providing personal information to mobile SNS, because it could be used in a way I did not foresee.					

3. Continuance intention

To what extent, do you agree with the descriptions below (1= strongly disagree, 5= strongly agree):					
	1	2	3	4	5
Continuance intention					
I intend to continue using WeChat in the future rather than discontinue it.					
I intend to recommend my friends to use WeChat in the future.					
If I could, I would like to discontinue my use of WeChat (reversed item).					

4. On average, how often do you use WeChat last month?

1. Never 2. Seldom 3. Sometimes 4. Often 5. Always

5. Gender: (1) Male (2) Female

6. Your age: (1) 17 and below (2) 18~20 (3) 21~23 (4) 24~26 (5) 27~29 (6) 30~32 (7) 33 and above

7. Education level: (1) freshman and below (2) sophomore (3) junior (4) senior (5) master (6) Phd

8. Your Major: 1. 经济学院 2. 法学院 3. 师范学院 4. 文学院 5. 外国语学院

6. 传播学院　7. 艺术设计学院　8. 数学院　9. 物理学院　10. 化学院
11. 生命科学学院 12. 电子科学技术学院　13. 材料学院
14. 机电与控制工程学院　15. 光电工程学院 16. 信息工程学院
17. 计算机学院　18. 建筑学院　19. 土木工程学院　20.医学院
21. 管理学院　22. 高尔夫学院