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How social influence affects we-intention to use instant messaging: The moderating effect of usage experience

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Abstract With the advent of Web 2.0, the business world is fast changing its way of communicating and collaborating. In this study, we regarded the use of instant messaging in team collaboration as a social behavior and examined the changing roles of social influence processes in the formation of usage we-intention (i.e. social intention). Building on the belief-desire-intention model and the social influence theory, an integrated model was developed and empirically tested using survey data collected from 482 students. The results demonstrated that desire partially mediates the effects of group norm and social identity on we-intention to use. In addition, the effect of group norm is more significant for users with lower usage experience, whereas the effect of social identity is more significant for users with higher usage experience. We believe this study provides several important implications for both research and practice.

Keywords We-intention · Social influence · Instant messaging · Desire · Experience · Social computing · Web 2.0

We are the ones we've been waiting for; we are the change that we seek!
– *Barack Obama* (2008)

1 Introduction

The popularity of Web 2.0 has launched a business revolution that is making the Internet as a platform for information sharing, collaboration and networking (O'Reilly 2006b). According to the latest data released by Internet World Stats (2008), the number of Internet users has reached nearly 1.5 billion by the end of June 2008. People around the world are connected through the use of Web 2.0 technologies to communicate and work together. The business opportunities created by the Web 2.0 wave have attracted many companies to increase their investment in Web 2.0 tools and some executives even considered this investment as a strategic move (McKinsey and Company 2007).

However, there are many different interpretations of what Web 2.0 means and its scope. This is reflected in the statement by O'Reilly (2005) that "Web 2.0 doesn't have a hard boundary, but rather, a gravitational core". In this study, we narrowed our focus to some basic common characteristics of Web 2.0 tools that facilitate creativity, collaboration and information sharing among users, give more emphasis to social interaction and collective intelligence, create a user-centered networked community and allow users engage in an interactive and collaborative

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manner (Orange 2008). In this regard, a number of Internet-based applications and services, including wikis, blogs, RSS, podcasts, social networking and instant messaging, are generally referred to as Web 2.0 tools. Among these technologies, according to the CIO Web 2.0 survey (Lundberg 2008), instant messaging is the most popular technique that is used for internal collaboration. A recent survey report from Forrester Research (Young et al. 2007) also revealed that instant messaging is by far the most valuable Web 2.0 tools for enterprises. Thirty-seven percent of respondents perceived substantial business value from instant messaging, compared to an average of 16% for other Web 2.0 technologies in this survey. As identified by O'Reilly (2006b), a major rule for success on Web 2.0 platforms is how to "harness network effects to get better the more people use them". In this study, we therefore try to address this question by looking at the use of instant messaging in team collaboration. A better understanding of the various factors motivating the use of instant messaging in a team setting will help us devise schemes to enable more people to use the technology in order to harness network effects, thereby increasing its chances of success as a Web 2.0 platform.

In the past two decades of Information Systems (IS) research, studies on information technology adoption and diffusion primarily focused on individual usage intention (I-intention) in which one has full control over his/her usage behavior. Several factors (i.e., perceived usefulness, perceived ease of use, attitude, subjective norm, etc.) were identified as important antecedents of individual intention (Venkatesh et al. 2003). Although prior intention-based studies have contributed greatly to our understanding of technology usage, some critical gaps remain (Bagozzi 2007).

First, the traditional I-intention approach may not be appropriate in investigating the acceptance and use of Web 2.0 applications because there are two or more people involved in the usage behavior and an individual cannot use these tools by him/herself alone. The use of Web 2.0 technologies therefore requires collective efforts and interdependence among a group of users (Li et al. 2005) and the network effect appears to be at play in the adoption and diffusion of these technologies (Beck et al. 2008). In this regard, the concept of we-intention, implying "*an implicit or explicit agreement between the participants to engage in a joint action*" (Tuomela 1995), is a more appropriate but relatively unexplored issue in the IS discipline. In prior studies, we-intention is also referred to as "social intention" (Bagozzi and Dholakia 2006b) or "collective intention" (Bagozzi 2007).

Second, prior studies defined social influence as "*the degree to which an individual perceives that significant others believe he or she should use the new system*" (Venkatesh et al. 2003). The primary focus of these studies, however, has been placed on normative perspective of compliance. In this regard, recent studies have demonstrated that it is important and necessary to differentiate compliance from other social influence processes, such as internalization and identification (Bagozzi 2007; Malhotra and Galletta 2005).

Third, some studies demonstrated that intention-based models often used in the IS field have not addressed how multiple reasons for acting are transformed into a decision to act (Bagozzi 2007; Bagozzi and Dholakia 2002). The criticism is that these intention-based models fail to consider how decision become stimulated and energized (Bagozzi 2007). It is thus important to incorporate motivational factor, such as action desire based on belief-desire-intention model, as an essential mediator between reasons for action and behavioral intention (Perugini and Bagozzi 2001, 2004).

This study attempts to fill these gaps in the literature by proposing and testing a social influence model on the use of instant messaging in team collaboration. The objective of this study is to investigate the effects of different social influence processes on we-intention to use instant messaging, the mediating effect of desire to use, as well as the moderating effect of usage experience. The remainder of this study proceeds as follows. In section 2, the theoretical background of this study is briefly reviewed. The research model and hypotheses are provided in section 3. The research method and the results are presented in section 4 and 5 respectively. This paper concludes with a discussion of the key findings and suggests directions for future research.

2 Theoretical background

The theoretical foundation of this study is reviewed in this section. Specifically, we first discuss the concept of we-intention, followed by a brief review of social influence theory, belief-desire-intention model and users' experience studies.

2.1 We-intention

Prior studies have suggested that it is necessary and beneficial to reconceptualize behavioral intentions when two or more participants are involved (Bagozzi 2000, 2007). In this respect, philosophical writing on collective intentionality (Gilbert 1989; Tuomela 2005) has provided a research opportunity for this issue. We-intention can be considered as the intention to participate in a group and act as an agent of the focal group (Bagozzi 2000). Scholars in philosophy have contributed a lot to the conceptual and

logic foundation of we-intention (Bratman 1997; Gilbert 1989; Tuomela 1995, 2005). For example, Tuomela (1995) has identified four presumptions for we-intention to occur: (1) a member of a collectivity intends to do his or her own part of the group action, (2) each member believes that the joint action opportunities, to some extent, exist and other members will perform their parts, in addition, (3) there is a mutual belief among all the participants that the opportunities for joint action will obtain, and finally, (4) the intention to perform one's own part depends on (2) and (3). In fact, the beliefs required for we-intention are purely subjective and represent one's own perception of the reality (Tuomela 2005). Therefore, if the above conditions are satisfied, a member can even be the only agent with we-intention in the focal group (Bagozzi and Dholakia 2002).

However, there are several unique characteristics that distinguish we-intention from I-intention. First, different from I-intention to perform a personal behavior where other people are not involved as essential parts, we-intention highlights the collective commitment and the social nature of a group action. If group members are collectively committed to performing a behavior, there will be publicly mutual interdependent promises among all the participants and each member cannot be released from the obligation merely by changing his/her own mind Second, the joint action opportunity should be obtained with some nonzero probability for we-intention to occur. Group member believes that not only he/she will perform his/her own part of the group action, but also with some probability other members will perform the joint action together. Third, collectivity condition is another central feature of we-intention. Collectivity condition supposes that necessarily if the intention content is satisfied for one member, it should be satisfied for all the members in the group (Tuomela 2005).

2.2 Social influence theory

Davis et al. (1989) emphasized the role of social influence in information technology acceptance and usage behavior and suggested Kelman's (1958) theoretical distinction of social influence processes can be considered as a base for developing knowledge in this area. Kelman's (1958) social influence theory identified three different processes of social influence, including compliance, internalization, and identification. Compliance occurs when an individual accepts the social influence to get support or approval from significant others. In this regard, subjective norm reflects the influence of expectations of particular others and is often used to represent social normative compliance (Venkatesh et al. 2003). Internalization occurs when an individual accepts the social influence because the similarity of one's goals and values with that of other group members. In this respect, group norm represents a shared agreement among participants about their shared goals and expectations (Turner 1991) and constitutes what Kelman (1958) terms "internalization" (Bagozzi and Dholakia 2002). Identification occurs when an individual accepts the social influence to establish and maintain a satisfying self-defining relationship to another person or group. Tajfel (1978) stated that social identity is "a part of an individual's self-concept which derives from his knowledge of his membership of a social group together with the value and emotional significance attached to that membership." (p. 63). Some recent studies have used this concept to capture the social influence underlying identification process (Bagozzi and Dholakia 2006a; Song and Kim 2006).

Although prior IS research tends to be preoccupied with the effects of social normative compliance, more recent research has started to investigate other important aspects of the social influence processes and their roles in influencing IT-related user behavior (Cheung and Lee 2009; Lee et al. 2006). Social influences play an important role in the formation of intrinsic motivation, which has been shown to significantly drive the voluntary use of IT for non-work related purposes (Lee et al. 2005). As social computing continues to gather momentum, social psychology based theoretical lenses will become more important to help us understand new patterns of user behaviors emerging from social computing.

2.3 Belief-desire-intention model

The belief-desire-intention (BDI) model was originally developed by Bratman (1987) to explain behavioral intention. At the heart of the BDI model, action desire represents a motivational stimulus needed to induce an intention to act and transforms the various reasons for acting into a motivation to do so (Perugini and Bagozzi 2001). There are several important criteria distinguishing desire from intention, such as perceived performability, action-connectedness and temporal framing (for a detailed discussion, see Perugini and Bagozzi 2004). The role of desire as a motivator has been widely acknowledged in prior studies in the sense that, people will give a self-reflective consideration to their desires and accept them as motivating reasons to act (Frankfurt 1988). Empirical supports for the motivational role of desire can be found in Bagozzi and Dholakia (2002), Dholakia et al. (2004), and Perugini and Bagozzi (2001).

2.4 Usage experience

Experience is a general concept comprising knowledge of or skills in an object or an event obtained through the

involvement in or exposure to that object or event. There is a board range of studies examining the moderating effect of usage experience in information technology acceptance and usage behavior (Karahanna et al. 1999; Thompson et al. 1994; Venkatesh and Davis 2000; Venkatesh et al. 2003). For example, Thompson et al. (1994) examined the direct, indirect and moderating effects of usage experience on the relationships between six attitude/belief components and utilization. The results suggested that the moderating influence of experience on the relationships between five of six antecedents and utilization was generally quite strong. Further studies investigating the moderating effect of usage experience on the relationship between subjective norm and usage intention consistently demonstrated that subjective norm become less important with increasing experience (Karahanna et al. 1999; Venkatesh and Davis 2000; Venkatesh et al. 2003).

3 Research model and hypotheses

The research model, as shown in Fig. 1, integrates the social influence theory and the belief-desire-intention model to investigate we-intention to use instant messaging in team collaboration. We expect that usage experience will moderate the effects of three social influence processes differently. The constructs and their relationships are discussed in detail in the following sections.

3.1 The mediating effect of desire

According to the belief-desire-intention model, desire transforms the reasons to act into an overall motivation to do so and is hypothesized as the most proximal determinant of behavioral intention (Bagozzi and Dholakia 2002; Dholakia et al. 2004; Perugini and Bagozzi 2001). Consistent with this view, we believe that if people are aware of and accept their desires to use instant messaging for team collaboration, they will develop a we-intention to use it together. Therefore,

> **H1:** Desire has a positive impact on we-intention to use instant messaging for team collaboration.

Social influence underlying the compliance process is represented by subjective norm in the current study. Subjective norm has received considerable attention in the IS field and stated that people accept the social influence because of the expected favorable reactions from significant others. It provides the reasons to perform the behavior in question but does not provide the necessary motivations to do so. In this study, we believe desire to use instant messaging for team collaboration transforms subjective norm into a motivation to engage in the collective usage behavior. Therefore,

> **H2a:** Effect of subjective norm on we-intention is mediated by desire to use instant messaging for team collaboration.

Internalization is characterized by group norm in this study. The social influence underlying group norm is captured by the congruence of one's values/goals with that of other group members. In the current study, people who may use instant messaging in team collaboration share the common tasks and goals. Therefore, group norm provides the potential for using instant messaging together, however, similar to subjective norm, it does not incorporate the motivations to use. In accordance with previous studies (Dholakia et al. 2004), the effect of group norm on we-intention to use instant messaging is believed to be mediated by users' desires. Therefore,

> **H2b:** Effect of group norm on we-intention is mediated by desire to use instant messaging for team collaboration.

Identification in this study is achieved through the effect of social identity, which refers to one's conception of self in

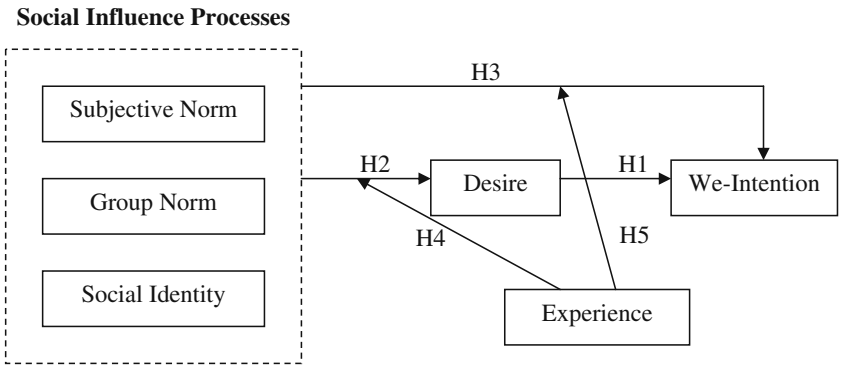

Fig. 1 Research model and hypotheses

terms of the relationship to another person or group (Bagozzi and Lee 2002). Similar to the aforementioned arguments, usage desire is hypothesized to transform social identity into a motivation to use instant messaging. People who are supposed to establish and maintain satisfying self-defining relationships with other group members will be more likely to be motivated to engage in the instant messaging usage behavior. Therefore,

> **H2c:** Effect of social identity on we-intention is mediated by desire to use instant messaging for team collaboration.

3.2 The direct effects of social influence

Although desire mediates the effects of social influence on we-intention to use instant messaging, we believe the mediating effects are partial. This is because decision making involves both deliberative and evocative mental processes (Dulany 1997). Deliberative mental process refers to the thinking process involving reflection and evaluation. This is consistent with Frankfurt's (1988) argument that people make a self-reflective consideration to their desires and accept them as motivators to act. In contrast, evocative mental process automatically and directly associates and activates mental states that are not propositional. The two-process account is also in accordance with recent studies that suggested participation in virtual community involves both effortful and habitual components (Dholakia et al. 2004). For the latter participation, group members may belong to the virtual community for a long time beforehand and therefore develop their participation intentions automatically due to the reasons to act. In the current study, we believe that, under the evocative mental process, people may develop we-intentions to use instant messaging in team collaboration directly because of favorable reactions, common goals/values and positive relationships. Therefore,

> **H3a:** Subjective norm has a positive impact on we-intention to use instant messaging for team collaboration.
> **H3b:** Group norm has a positive impact on we-intention to use instant messaging for team collaboration.
> **H3c:** Social identity has a positive impact on we-intention to use instant messaging for team collaboration.

3.3 The moderating effect of usage experience

The moderating effect of usage experience has been widely investigated in a wide range of behaviors (Davis et al. 1989; Karahanna et al. 1999; Thompson et al. 1994; Venkatesh and Davis 2000; Venkatesh et al. 2003). Specifically, these studies found that subjective norm functions only in the early usage stages when opinions toward an information technology are relatively ill-informed (e.g., Venkatesh et al. 2003). The effect of subjective norm will attenuate over time due to the actual experience gained during system usage. Consistent with this view, we believe that usage experience will moderate the effects of subjective norm on both desire and we-intention to use instant messaging for team collaboration. Therefore,

> **H4a:** The impact of subjective norm on desire to use instant messaging for team collaboration is stronger for users with lower usage experience.
> **H5a:** The impact of subjective norm on we-intention to use instant messaging for team collaboration is stronger for users with lower usage experience.

In addition to subjective norm, the moderating effects of usage experience in internalization and identification processes are also investigated in the current study. In particular, the impact of internalization was found to be weaker with increased experience in recent literature (Venkatesh and Davis 2000). In this study, prior to or at the beginning of using instant messaging, users' knowledge and beliefs about instant messaging are vague. As a result, they may rely more on the opinions of others - here, other group members with common goals and values — as a basis of their usage decision. After a period of time, the direct experience provides concrete information about instant messaging, supplanting reliance on social cues as a basis of decision. The influence of group norm thus attenuates after users possess direct usage experience on the strength and weakness of using instant messaging in team collaboration. Therefore,

> **H4b:** The impact of group norm on desire to use instant messaging for team collaboration is stronger for users with lower usage experience.
> **H5b:** The impact of group norm on we-intention to use instant messaging for team collaboration is stronger for users with lower usage experience

A recent study has indicated that experienced members are more engaged in Linux user groups because of the greater degree of identification for them (Bagozzi and Dholakia 2006a). In this study, with increased usage experience and direct social interactions, experienced users of instant messaging may build long-term and stable relationships with other group members than novice. Users with a higher level of experience thus may have a strong attachment and belongingness toward the collaborative group. In addition, after a long time of

using instant messaging in team collaboration, the value connotation attached to the group membership is more apparent to experienced users. A growing awareness of group membership and a deep understanding of the values associated with the membership, as well as sustained satisfying relationships with other group members lead to the use of instant messaging in team collaboration. Therefore,

H4c: The impact of social identity on desire to use instant messaging for team collaboration is stronger for users with higher usage experience.

H5c: The impact of social identity on we-intention to use instant messaging for team collaboration is stronger for users with higher usage experience.

4 Research method

The research model was empirically examined in a large sample of university students who have used QQ group in team collaboration (see Fig. 2). QQ is the most popular instant messaging in Mainland China and estimated to have over 300 million active accounts at the end of March 2008. As a key component of QQ software, QQ group (http://group.qq.com) provides an online platform for people with common interests and goals to communicate and collaborate together as a group. Details about measures, data collection and sample characteristics are reported in this section.

4.1 Measures

All the measures have been validated in prior studies (see Appendix A). Minor changes in the wordings were made so as to fit them into the current investigation context of instant messaging. Experience was measured by a single ordinal scale question that assessed the frequency of using instant messaging for team collaboration (from 1=never to 7=always). We adapted items for subjective norm, group norm and social identity from Bagozzi and Lee (2002) and items for desire and we-intention from Bagozzi and Dholakia (2002). Since this study was conducted in Mainland China, the questionnaire was translated into Chinese first and a backward translation method was used to ensure the consistency between the Chinese and the original English version of the questionnaire.

4.2 Data collection

Both a paper-and-pencil survey and an online survey were used for data collection. This mixed method mitigates the coverage errors or other biases resulting from data collection method (Wallace et al. 2004). All participation in this study was voluntary yet motivated by a lucky draw among successful respondents. A screening question was asked first to identify respondents who have used instant messaging for team collaboration. This study was then introduced as "opinion survey". Respondents were asked to "imagine that you are using QQ group to discuss a topic with other members that you regularly collaborate with and

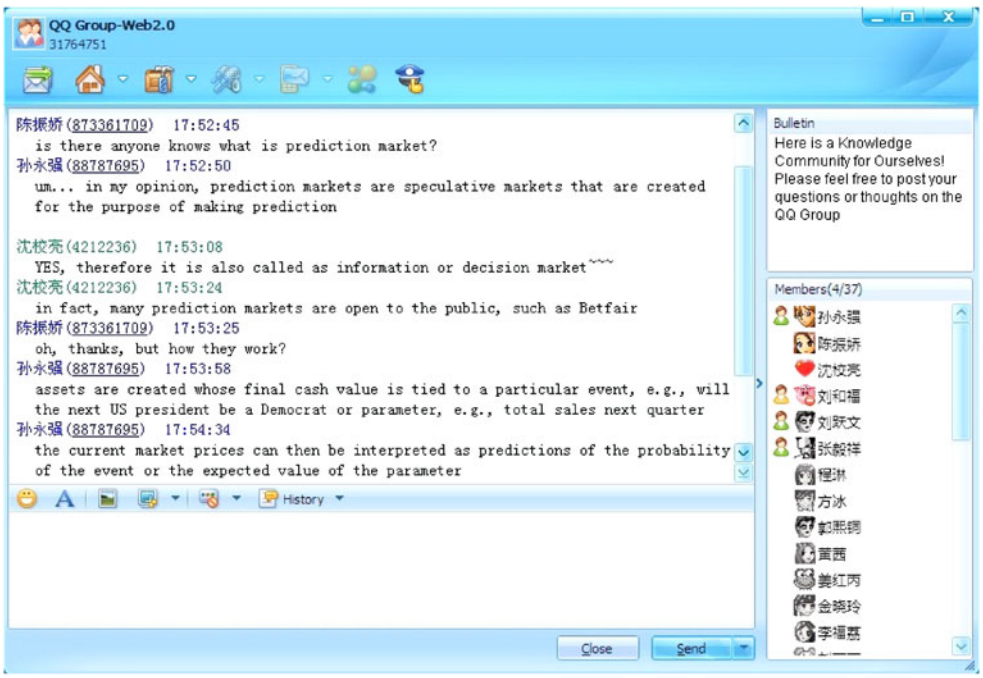

Fig. 2 Team collaboration within QQ group

then picture briefly in your mind the name and image of each group member, please write down your nickname and their nicknames in the table below." These instructions were designed to capture the group with which the respondents develop we-intention to use instant messaging for team collaboration.

4.3 Sample characteristics

For the paper-and-pencil survey, a group of business students in a local university in Mainland China were invited to participate in. A total of 301 usable questionnaires were collected in this manner. An online survey was conducted at the same time and a total of 181 usable questionnaires were received. A further analysis of the two samples revealed no significant difference in the composition of respondents. Among the overall respondents, 313 were male (64.9%) and 169 were female (35.1%). Most of them (60.6%) were aged between 21 and 25. On the whole, most of the respondents have more than two-year of experience with instant messaging (89.4%) and spend more than one hour on instant messaging every day (85.5%). Table 1 provides a summary of the overall sample characteristics.

5 Results

PLS-Graph (Partial Least Squares) version 3.00 was used to test the hypothesized relationships. The PLS procedure (Wold 1989) is a second-generation multivariate technique which can estimate the measurement model and the structural model simultaneously in one operation. Different from the covariance-based SEM (structural equation modeling) approach (i.e., LISREL) that is more suitable for theory testing, the component-based SEM approach (i.e., PLS) is more predictive-oriented (Joreskog and Wold 1982) and is considered to be the most appropriate in the initial exploratory stages of theory development (Chin 1998). As discussed before, this study is one of the first attempts to examine we-intention in the use of instant messaging and thus it is exploratory in nature. Based on this reasoning, we have chosen PLS as the primary data analysis technique. Following the two-step analytical procedures (Hair et al. 1998), the measurement model was first examined and then the structural model was assessed.

Table 1 Sample characteristics

Characteristics	Number (N=482)	Percentage (%)
Age		
< 21	97	20.1%
21 – 25	292	60.6%
26 – 30	76	15.8%
>30	17	3.5%
Gender		
Male	313	64.9%
Female	169	35.1%
Experience with Instant Messaging		
<=2 Years	51	10.6%
2–5 Years	224	46.5%
>5 Years	207	42.9%
Time Spent on Instant Messaging per Day		
<1 h	70	14.5%
1–2 h	201	41.7%
>2 h	211	43.8%

5.1 Measurement model

Convergent validity was assessed by examining the composite reliability and the average variance extracted (Hair et al. 1998). A composite reliability of 0.70 or above and an average variance extracted of more than 0.50 are deemed acceptable (Fornell and Larcker 1981). Except for the full sample, two sub-groups of higher experience and lower experience were differentiated based on the mean value of usage experience (Mean=4.89). Thus, values from one to four are categorized as lower experience (n=188) and values from five to seven are grouped as higher experience (n=294). As shown in Table 2, all the measures exceed the recommended thresholds.

Discriminant validity indicates the degree to which measures of two constructs are empirically distinct (Bagozzi et al. 1991). To demonstrate adequate discriminant validity of the constructs, the square root of the average variance extracted for each construct should be greater than the correlations between that construct and all other constructs (Fornell and Larcker 1981). As shown in Table 2, all constructs exhibit satisfactory discriminant validity.

5.2 Structural model

In this section, hypotheses 1 to 3 were first tested with the full sample (n=482) to examine the mediating effect of desire and the direct effects of social influence on we-intention to use instant messaging. The research model was then evaluated with the two sub-groups of higher and lower experience to test hypotheses 4 and 5, the moderating effect of usage experience. Test of significance of all paths were performed using the bootstrap re-sampling procedure.

5.2.1 Tests of hypotheses 1 to 3

The mediating effect of desire was tested in accordance with the four steps outlined by Baron and Kenny (1986)

Table 2 Reliability and discriminant validity

	CR	AVE	SN	GN	SI	DE	WE
Full Sample (N=482)							
SN	.930	.870	**.933**				
GN	.898	.814	.127	**.902**			
SI	.911	.673	.149	.487	**.820**		
DE	.916	.785	.155	.415	.559	**.886**	
WE	.905	.827	.117	.443	.527	.738	**.909**
Higher Experience (N=294)							
SN	.947	.899	**.948**				
GN	.877	.781	.180	**.884**			
SI	.882	.600	.179	.453	**.775**		
DE	.902	.754	.173	.300	.539	**.868**	
WE	.892	.805	.133	.343	.511	.695	**.897**
Lower Experience (N=188)							
SN	.864	.764	**.874**				
GN	.908	.832	.012	**.912**			
SI	.912	.675	.043	.392	**.822**		
DE	.903	.756	.079	.406	.393	**.869**	
WE	.886	.795	.024	.418	.341	.683	**.892**

CR=Composite Reliability, AVE=Average Variance Extracted, SN=Subjective Norm, GN=Group Norm, SI=Social Identity, DE=Desire, WE=We-Intention

*The bold numbers in the diagonal row are square roots of average variance extracted

and Judd and Kenny (1981). As shown in Table 3, except for subjective norm, both group norm and social identity are significantly correlated with we-intention, indicating that there is an effect that may be mediated. In the second testing step, group norm and social identity are found to be significantly associated with desire, but subjective norm is not (H2a is not supported). The three social influence factors are then tested with desire and we-intention included to determine mediating effects. The results demonstrate that desire exerts a significantly effect on we-intention (step 3 is met), but the effects of group norm and social identity on we-intention controlling for desire are also significant (step 4 is not met), indicating partial mediation (H2b and H2c are supported).

The research model with full sample finally accounts for 57.6% of the variance in we-intention to use instant messaging for team collaboration (see Table 4). The results indicate that desire has the strongest impact on we-intention, with a path coefficient at 0.619, followed by group norm and social identity, with path coefficients at 0.130 and 0.119 respectively (H1, H3b and H3c are supported). Both group norm and social identity are significantly associated with desire, with path coefficients at 0.182 and 0.461 respectively. Subjective norm, however, does not exert any significant effects on both desire and we-intention (H3a is not supported).

5.2.2 Tests of hypotheses 4 and 5

To evaluate the moderating effect of usage experience, the research model is tested with the two sub-groups of higher and lower usage experience. As shown in Table 4, two different influence patterns are found for the two sub-groups. For these users with higher usage experience, the impact of social identity is more important, in contrast, the impact of group norm is stronger for users with lower usage experience (H4b, H4c, H5b and H5c are supported). Subjective norm is not significant for neither group, indicating that beta coefficients associated with subjective norm are not significantly different from zero and therefore there is no difference between both groups (H4a and H5a are not supported).

6 Discussion and conclusion

In recent years, many companies seek to ride the Web 2.0 wave to change the way they do business. The social aspects of Web 2.0 services provide tremendous business

Table 3 Results of mediating effect test

IV	M	DV	IV → DV	IV → M	IV + M → DV		Mediating
					IV → DV	M → DV	
SN	DE	WE	.027^{ns}	.065^{ns}	−.013^{ns}	.619***	-
GN	DE	WE	.242***	.182***	.130***	.619***	Partially
SI	DE	WE	.405***	.461***	.119**	.619***	Partially

1. The mediating effect is tested in accordance with the four steps outlined by Baron and Kenny (1986) and Judd and Kenny (1981).

2. IV=Independent Variable, M=Mediator, DV=Dependent Variable, SN=Subjective Norm, GN=Group Norm, SI=Social Identity, DE=Desire, WE=We-Intention

^{ns}: non-significant; *p<0.05, **p<0.01, ***p<0.001

Table 4 Results of moderating effect test

	Full Sample (N=482)		Higher Experience (N=294)		Lower Experience (N=188)		Diff Higher vs. Lower
	R^2	β	R^2	β	R^2	β	
	.576		.517		.493		
SN-WE		$-.013^{ns}$		$-.014^{ns}$		$-.028^{ns}$	-
GN-WE		.130***		.100*		.156*	***
SI-WE		.119**		.153**		$.043^{ns}$	***
SN-DE		$.063^{ns}$		$.073^{ns}$		$.064^{ns}$	-
GN-DE		.182***		$.061^{ns}$		.298***	***
SI-DE		.461***		.498***		.274***	***
DE-WE		.619***		.585***		.605***	

1. The significance of difference in path coefficients between the sub-groups of higher experience and lower experience was calculated using the procedure described in Keil et al. (2000).

2. SN=Subjective Norm, GN=Group Norm, SI=Social Identity, DE=Desire, WE=We-Intention

^{ns}: non-significant; *p<0.05, **p<0.01, ***p<0.001

opportunities for companies to connect their employees and encourage collaboration. In this study, we regard the use of Web 2.0 technology as a social behavior and examine the impacts of social influence on we-intention to use instant messaging in the context of team collaboration. In the following sections, we first discuss the key findings of this study, and then address the limitations, as well as the implications for both research and practice.

6.1 Discussion of key findings

This study integrates the belief-desire-intention model and the social influence theory to examine we-intention to use instant messaging in the context of team collaboration. Usage experience is hypothesized as an important moderator of the relationship between social influence and desire, as well as the relationship between social influence and we-intention. The measurement model is confirmed with adequate convergent and discriminant validity of all the measure and the structural model explains 57.6% of the variance in we-intention and 34.3% of the variance in desire to use instant messaging. The results of this study support most of the proposed hypotheses.

6.1.1 Social influence and desire

Three different social influence processes are included in our research model. Except for subjective norm, both group norm and social identity are found to be significant determinants of desire and we-intention, supporting the hypotheses that social influence is particularly important in understanding the adoption and use of instant messaging in team collaboration. This validates prior studies that have demonstrated the power of social influence in explaining virtual community participation (Bagozzi and Dholakia 2002; Dholakia et al. 2004). The insignificance of subjective norm may be due to the fact that we employed a student sample and the use of instant messaging for group discussion among them tends to be voluntary. In this sense, our finding is also consistent with prior studies suggesting that subjective norm matters only when the use of a technology is mandatory (Karahanna et al. 1999; Venkatesh et al. 2003). Desire partially mediates the effects of group norm and social identity on we-intention to use instant messaging in this study. This is consistent with belief-desire-intention model, demonstrating that desire transforms multiple reasons for acting into a motivation to do so (Perugini and Bagozzi 2001).

6.1.2 Effect of usage experience

Usage experience is found to be an important moderator in this study. Specifically, the effect of group norm is more significant for users with lower usage experience. This is because at the start of using instant messaging for team collaboration, people will be more likely to rely on suggestions from these with common interests or goals. However, after obtaining actual usage experience from working with others, they will develop their own opinions toward instant messaging and therefore the effect of group norm will attenuate. This finding is also consistent with the statement by Venkatesh and Davis (2000) that "internalization will weaken over time since greater direct experience will furnish concrete sensory information". In contrast to group norm, the effect of social identity is found to be more important when users gain such knowledge and experience. This may be due to the fact that people with higher usage experience are more likely to establish close personal relationships with other group members and be involved in group actions (Bagozzi and Dholakia 2006a). Finally for

the same reasons that we mentioned before, the effect of subjective norm is non-significant for both groups, and therefore no difference is found in this study.

6.2 Limitations

Before highlighting the implications for research and practice, the limitations of this study are first discussed. First of all, the data were collected from a student sample and respondents use instant messaging primarily for class assignment or group project discussion. This is different in nature from the tasks conducted in business context. Although university students are future workers, generalization of the findings from this study should be made with caution. Second, we have not examined the actual instant messaging usage behavior. A longitudinal study is highly recommended for future research on this topic. Third, this study was conducted in a collectivistic culture. Previous studies have found that culture exhibits a significant effect on information technology adoption and diffusion (Tan et al. 1998). It is also important to note that the effect of social identity is stronger in a collectivistic culture (Bagozzi and Lee 2002). A cross-cultural study investigating the impacts of social influence processes on we-intention to use other Web 2.0 applications across different cultures thus is left for future research.

6.3 Implications for research

As we mentioned before, this study is expected to fill several gaps in the literature. First, this study addresses an important area of research that has the potential to increase our understanding of behavioral intention in a group context. Different from I-intention approach, we-intention (i.e. social intention) reflects an intention to use a communication or collaborative technology in concert with other group members and highlights the joint efforts of all participants. This is particularly important for Web 2.0 based information systems because "the real heart of Web 2.0 is harnessing collective intelligence" (O'Reilly 2006a). In this sense, this study provides a challenging opportunity for future research to examine emerging issues regarding Web 2.0. Second, the results of this study suggest that internalization and identification play important roles in the development of we-intention. In this regard, this study provides some useful insights into other social influence processes, in addition to the commonly used social normative compliance process. Third, desire is found to be a mediator between social influence and we-intention in this study. Prior studies have criticized intention-based models for the neglecting of the transformation from reasons for acting to decision to act. The evidence of mediation effect highlights the importance of including desire as a mediator between users' beliefs and behavioral intention. Fourth, the results of this study indicated that the effect of internalization decreased with the accumulation of usage experience, whereas the effect of identification increased with greater experience. Future research could further examine the changing effects of social influence processes over time in other Web 2.0 services.

6.4 Implications for practice

This study is also practically important as well because the use of instant messaging in the workplace continues to grow at a steady pace. From a managerial perspective, here are two major guidelines for business practice. First, two social influence processes, internalization and identification, were found to be especially important for the development of desire and we-intention to use instant messaging. Therefore, team managers should encourage group members to make good use of some special features of instant messaging, such as chat room, e-business card and presence awareness, to declare group norms and values to all members and enhance their attachment and a feeling of belongingness toward the group. Second, the different influence patterns among different experience groups remind managers to employ different strategies in facilitating the use of instant messaging in team collaboration. In particular, for users with lower usage experience, group norm seems more important and therefore some features of instant messaging, such as message history or bulletin, that could help to convey group goals and values should be wisely used. In contrast, social identity is more important for users with higher usage experience and therefore managers should carefully consider how to strengthen close relationships with the group and other members. Some regular discussions using chat room provided by instant messaging seems to be a good choice.

In summary, this study provides several valuable insights in the understanding of the impact of social influence processes on we-intention to use instant messaging in team collaboration. With the widespread use of instant messaging in business settings, the opportunity to collaborate and respond to real-time business event is greater than before. As an important concept to understand the use of instant messaging in team collaboration, we-intention therefore should deserve more attention in the future. In addition, future research should continue to enrich this line of research by considering other forms of Web 2.0 technologies, such as Wikipedia, Youtube and Flickr.

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Appendix A. Questionnaire items

Subjective norm

- Most people who are important to me think that I should/should not use instant messaging for team collaboration. (7-point "should-should not" scale)
- Most people who are important to me would approve/disapprove of me using instant messaging for team collaboration. (7-point "approve-disapprove" scale)

Group norm

Using instant messaging for team collaboration can be considered as a goal. For each of the members in your group, please estimate the strength to which each holds the goal. (7-point "weak-strong" scales)

- Strength of the shared goal by yourself
- Average of the strength of the shared goal by other members

Social identity

- Please indicate to what degree your self-image overlaps with the identity of the group with which you collaborate through instant messaging. (7-point "not at all-very much" scale)
- How attached are you to the group with which you collaborate through instant messaging? (7-point "not at all-very much" scale)
- How strong would you say your feelings of belongingness are toward the group? (7-point "not at all-very much" scale)
- I am a valuable member of the group. (7-point "does not describe me at all-describes me very well" scale)
- I am an important member of the group. (7-point "does not describe me at all-describes me very well" scale)

Desire

- I desire to use instant messaging for team collaboration. (7-point "disagree-agree" scale)
- My desire for using instant messaging in team collaboration can be described as: (7-point "no desire at all-very strong desire" scale)
- I want to use instant messaging for team collaboration. (7-point "does not describe me at all-describes me very well" scale)

We-intention

- I intend that our group use instant messaging for team collaboration. (7-point "disagree-agree" scale)
- We intend to use instant messaging for team collaboration. (7-point "disagree-agree" scale)

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