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Understanding online social support and its antecedents: A socio-cognitive model

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Abstract

Little attention has been paid in previous literature to understanding the factors that drive online social support from a perspective of social psychology. This study validates a research model that examines the above issue. In the setting of information technology, this study postulates self-efficacy and online support expectancy as the key drivers of information technology usage, whereas information technology usage and referent network size jointly influence online social support. This study contributes to the social science literature by extending information technology usage models to the area of rarely explored online social support and by presenting an operationalization of referent network size in the area.

Keywords: Social support; Online networks; Survey research

1. Introduction

Considered the physical and emotional comfort given to people by their family, colleagues, friends, and others, social support is an important value that holds a key to the competitive advantage for online communities. While strong social support culture can assist a community to become powerful and influential in a virtual world, weak ones cause fatal crises for the community. Therefore, investigating the formation of such social support using social psychology should be considered an important issue for both academic and business areas. For social scientists, social support represents a focal point around which social ecological models of human interaction and social actions can be developed (Vaux, 1988). For practitioners, it promises

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powerful techniques for the prevention and amelioration of psychological problems such as anxiety, stress, and depression (LaRocco, House, & French, 1980). Therefore, understanding the factors and processes that drive the formation of social support is an important area of sociological research.

Social support is defined as "the exchange of verbal and non-verbal messages conveying emotion, information, or referral, to help reduce one's uncertainty or stress" (Walther & Boyd, 2002, p. 154). The roots of social support research can be traced back to Durkheim (1897/1951), who demonstrated using social epidemiological data that diminished social ties to family, community, and church and the corresponding dissolution of clear social roles and norms contributed to higher incidences of suicides among certain social groups. Subsequent research suggests that people engage in social relationships that they find rewarding (i.e., those that generate love, status, information, money, goods, or services) and that these relationships persist over time to the extent one can continue to provide resources of value to another (Thibaut & Kelley, 1959). Others (e.g., Cutrona & Suhr, 1992; Hirsch, 1980) have proposed typologies of social support, including (1) emotional support, such as expressions of caring, concern, and sympathy towards relieving pain and stress, (2) informational support, such as advice, factual input, and feedback to help network members evaluate actions and make decisions, (3) instrumental support, such as providing financial or practical assistance (e.g., job referrals) for a network member in need, and (4) socializing support, such as providing companionship or verbal reinforcement about one's choices. Still others have examined the relationship between social support and psychological distress, size and structure of a social network, and individual differences such as attachment motivation and relationship commitment (Vaux, 1988).

Though social support research has historically been conducted within the context of personal, face-to-face relationships or networks, there is increasing evidence that people use Internet-based information technology (IT) to derive social support comparable to face-to-face settings (Walther & Boyd, 2002). Network IT, in this context, refers to tools such as Usenet news, discussion boards, and list serve that help build, foster, and maintain online social networks (also called "virtual communities"). More specifically, given that network effects reflect the utility or value that a user derives from goods (or services) based on the number of other users using similar or compatible goods (e.g., Schilling, 2002), the IT exhibiting such effects are considered network IT in this study. For example, IT users may choose specific IT products such as compression utility (e.g., WinZip and WinRAR) based on what their coworkers are using or are likely to use, what application software is available for the target system, and the expected level of vendor support for that system. These examples suggest an important role of network IT in the area of IT research. Previously unknown people aggregate in these online networks to share valuable information, experiences, or empathy about a common cause, such as coping with terminal illnesses like cancer or AIDS, overcome personal crises like drug or alcohol addiction, or share profit-making opportunities like stock tips or rumors. For example, the "Systers" mailing list, originally intended for female computer scientists to share information, evolved into a forum for deriving social support (Sproull & Faraj, 1995). Research indicates that these networks are effective in providing emotional support, instrumental aid, and companionship, even when they are comprised of virtual strangers (Wellman & Gulia, 1999). However, the dynamics of IT-mediated social support remain quite different from

that of face-to-face social support, given the geographic dispersed nature of online networks, the willingness of network members to trust and interact with virtual strangers, the focused nature of network interaction on a singular objective, and the frequent participation of network members in multiple online networks to meet different social needs.

While the Internet is widely acknowledged as a social medium that connects people and builds relationships, little is known about why people use network IT for social support and the social consequences of such usage (Eastin & LaRose, 2005). Contemporary models of IT usage, such as the technology acceptance model (TAM) (Davis, Bagozzi, & Warshaw, 1989), the motivational model (MM) (Davis, Bagozzi, & Warshaw, 1992), and the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003), have examined the role of IT for deriving utilitarian and/or hedonic outcomes, but remain silent on its potential role for deriving social support from a social psychology aspect. Our study attempts to fill in this gap in the literature by theoretically postulating a model of IT-mediated online social support and then empirically testing this model via a longitudinal survey of instant messaging (IM) usage among undergraduate student subjects at a Taiwanese university. IM was chosen as our target IT of interest because it is a network technology that is well suited for building online networks for social support, and the student population was selected because this population represents one of the largest user groups of IM.

Virtual communities are considered a variety of social or professional groups interacting via the Internet. It does not necessarily suggest a strong bond among the group members. For example, when a user enters an IM community, this user can take on many identities simultaneously by logging into different IM networks with different usernames. More specifically, a user can just log into both Yahoo and MSN networks simultaneously using completely two different usernames—one Yahoo and one MSN (Tran, Yang, & Raikundalia, 2004).

In light of the aforementioned gap in the previous literature of online social support, the two research questions of interest to this study are (1) What factors drive one's use of network IT for online social support and how? (2) What are the consequences of network IT usage for online social support? Understanding these research questions is important for theoretical and practical reasons. Theoretically, the recent emergence of online networks offers us a unique opportunity for building theories of IT-mediated social support, an increasingly relevant yet under-examined area of research. Such theories may help bridge the gap between IT usage and social support literature. From a practical standpoint, an improved understanding of the key determinants of network IT usage for social support may help IT vendors design product features, interfaces, and services that are better-suited to the needs of the target user population and manage its diffusion in an effective manner.

2. Theory and research model

To build a model of IT-mediated social support, we draw from key postulates and findings in social cognitive theory (SCT) (Bandura, 2001). SCT has proven helpful for understanding individual use of computer technologies (Compeau, Higgins, & Huff, 1999), and given the theory's focus on social and cognitive processes that govern human behavior, it may be useful for understanding IT usage in the social support context as well. However, to the best of our

knowledge, this theory has not previously been used to studying the role of IT in social support or the usage of network IT such as Usenet news or online bulletin boards.

While other theories of IT usage, such as theory of reasoned action (TRA), technology acceptance model (TAM), motivational model (MM), and unified theory of acceptance and use of technology (UTAUT), concentrate primarily on the expected consequences (i.e., benefits) of IT usage, SCT gives prominence to the concept of *self-efficacy*, defined as one's belief in his or her ability to perform a specific behavior. In the IT usage context, IT *self-efficacy* can be defined as users' beliefs in their personal ability to use a given IT (Compeau et al., 1999). The notion of IT self-efficacy suggests that our expectations of the positive outcomes of IT usage may not necessarily motivate our IT usage behavior, unless we also believe in our ability to use the target IT appropriately. As Compeau et al. (1999) stated, IT usage "is not just about convincing people of the benefits to be derived from a technology (selling the technology). It must also be about coaching, teaching, and encouraging individuals to ensure that they have the requisite skills and confidence in their skills to be successful in their use" (p. 146).

Based on SCT, self-efficacy plays an important role in shaping individual users' behaviors of IT usage. Self-efficacy is based on an individual's self-reflective capabilities, and stronger beliefs in one's ability to use a specific IT may thus lead to greater levels of IT usage (Bandura, 1986). Weaker IT self-efficacy beliefs are also expected to relate to lesser degrees of IT usage. This positive relationship between IT self-efficacy and IT adoption and usage was empirically validated by Compeau et al. (1999), Hill, Smith, and Mann (1987), and Taylor and Todd (1995) and is likely to hold in the specific instance of network IT usage as well. This expectation leads to our first hypothesis:

H1: IT self-efficacy is positively related to network IT usage.

SCT postulates that individual behavior is the joint outcome of one's IT self-efficacy and his or her expectations of the outcomes (i.e., benefits) of IT usage. Outcome expectations are judgments of or beliefs about the likely consequences of enacting specific behaviors (Bandura, 1986). These beliefs are important because people generally do not perform specific behaviors unless an incentive outcome is expected from such behaviors (Bandura, 2001). The notion of outcome expectations is also consistent with the perceived usefulness construct in TAM and MM, the performance expectancy construct in UTAUT, and cognitive beliefs in TRA. The expected positive association between outcome expectations or its variants, perceived usefulness and performance expectancy, has been validated in numerous empirical tests of the above theories such as Compeau et al. (1999), Davis et al. (1989), Taylor and Todd (1995), and Venkatesh et al. (2003), among others, across a wide variety of IT. However, given our study's focus on social support outcomes of network IT usage, instead of instrumental outcomes in TAM, MM, and UTAUT, the outcome expectations construct in SCT has been labeled *online support expectancy* in this study. Furthermore, the positive association between this construct and IT usage behavior is likely to hold as in the case of any instrumental IT. In light of these expectations, we hypothesize:

H2: Online support expectancy is positively related to network IT usage.

In addition to the above associations, SCT also postulates that self-efficacy influences one's perceptions of outcome expectations. As Bandura (1978) states, "the outcomes one expects

derive largely from judgments as to how well one can execute the requisite behavior" (p. 241). Since a person with low self-efficacy will likely have lesser likelihood of performing a given behavior and thereby have a lower chance of realizing the potential outcomes of that behavior, they may view the target behavior as being less beneficial. In other words, IT self-efficacy is therefore expected to influence IT usage behavior not only in a direct manner, but also indirectly, mediated by outcome expectations. The positive association between IT self-efficacy and outcome expectations was empirically validated by Compeau et al. (1999) in their study of personal computer usage, and is likely to also hold for network IT usage. Hence, we propose our third hypothesis:

H3: IT self-efficacy is positively related to online support expectancy.

Although much of prior IT usage research has stopped at IT usage as the dependent variable (e.g., Davis et al., 1989), we extend our examination of network IT usage further to consider the consequences of such usage and the potential factors that may mitigate the realization of usage outcomes. SCT is concerned with explaining individual behaviors, but does not explain the consequences of such behaviors. Hence, we draw from the social support literature to examine the extent to which network IT usage may influence the way people relate to each other in IT-mediated social networks.

Network IT usage may facilitate each of the four domains of social support mentioned earlier: emotional, informational, instrumental, and socializing support. In the context of IT-mediated social support, greater usage of network IT is therefore purported to increase social interaction and support in online networks (Silverman, 1999). Users who make good use of a network by frequently offering, sharing and exchanging information, opinions, and files with others are likely familiar to those other users whom they can turn to for online support when in need. This greater awareness, engendered by increased network IT usage, enhances the level of online social support available to and realized by these users, as empirically validated by Furlong (1989) in a study of online network usage among elderly users. This expectation leads to the following hypothesis:

H4: Network IT usage is positively related to online social support.

Though it is expected that using network IT will increase one's social support in an online network, this association may not necessarily hold under all circumstances, such as when the user's online network is not large enough. With few exceptions, a larger network size generally implies greater availability of network resources, such as knowledgeable people who can provide valuable information regarding a specific problem, which can translate into higher levels of social support (Cohen & Wills, 1985). Hu, Wood, Smith, and Westbrook (2004) indicated that 72% of college students reported that most of their online communication is with friends, suggesting a critical role of referent network size in their IT application. Hence, network size is expected to be positively related to the realization of social support outcomes from network IT usage. Note that this association is not limited to online networks, in that individuals with larger personal or face-to-face networks also derive greater social support from their larger network base than those with smaller networks. However, given that online networks are not restricted by geographical limitations and can easily exceed in size compared to most personal networks, the extent of social support realized from a large online network

may be greater than social support from smaller personal networks. Furthermore, even though an online network may be limitless in size, the social support received by a given user (e.g., empathy related to a certain problem) is restricted to those network members within his or her online social circle, and not to the universe of all network members. In other words, a user's *referent network size*, and not the overall network size at large, defines the extent of social support realized by a network IT user. This expectation leads to the hypothesis:

H5: Referent network size is positively related to online social support.

3. Methodology

3.1. Subjects and procedures

The hypotheses described above were empirically tested using a survey of instant messaging (IM) use among undergraduate student subjects in Taiwan. IM was chosen for this study because this technology is a dominant means of communication among the younger population (Baron, 2005). IM is also a network IT with unique networking features, such as real-time communication, polychronic discussion, and information sharing, which distinguish IM from other communication IT such as electronic mail. IM allows users to create multiple Avatars or online identities, maintain a contact list of people, know instantly whether their network partners are available online, have "popup" recipient notification of messages received, initiate online conferences with more than one network partner, and maintain multiple distinct conversations with different network partners at the same time (Li, Chau, & Lou, 2005).

Subjects were drawn using stratified random sampling from the population of undergraduate students at a large private university in Taiwan. One class from each grade level (i.e., freshman, sophomore, junior and senior) across three business departments (general business, international business, and management information systems) was randomly chosen for this study. We specifically recruited undergraduate students, because this population represents one of the largest user groups of IM technologies in Taiwan and elsewhere.

This study uses the same survey dataset as Lin and Bhattacherjee (2008). Data were collected at two points in time, separated 1 month apart. The two hard copy questionnaires were matched by a unique identifying code. Of the 480 questionnaires distributed to subjects, 317 questionnaires were returned across both time periods for an effective response rate of 66%. Five respondents noted that they did not use IM, and were thereby dropped from the sample. Respondents consisted of 25.96% males and 74.04% females, and these percentages were similar to those of the management college surveyed in this study. On average, 20.19% of respondents used IM for more than 4 h per day, 38.78% used it for 2–4 h per day, and 41.03% used it for less than 2 h per day.

The constructs in this study were measured using scales drawn and modified from the existing literature, and several steps are employed to choose items for measurement. First, the candidate items from the existing literature are translated into Chinese. Second, a pretest consisting of a focus group of five students that had previously used IM. Focus group members were provided with a definition and explanation of each construct along with their candidate items, and were

asked to examine each item individually, evaluate if these items fit the construct reasonably accurately, and suggest alternatives for confusing or ambiguous items. Based on the feedback from focus group members, some of the items were slightly reworded to fit the IM context and the Chinese language, while a few items that were less relevant in the IM context were dropped. Third, two pilot tests were conducted to improve item readability and clarity. Finally, to examine whether the semantic content of the items might have changed during the translation process, the translated Chinese items were retranslated back into English by a different judge and compared with the original set of English items. A high degree of correspondence between the original and translated items assured us that the translation process did not introduce any language biases in the Chinese language questionnaires.

Three of our five constructs of interest, online support expectancy, IT self-efficacy, and referent network size were measured at time T_1, and the remaining two constructs, network IT usage and online social support, were measured at time T_2 1 month later. Wherever possible, constructs measures were derived from prior research, after adjusting the wording for IM usage. All items except those of referent network size and network IT usage were measured using five-point Likert scales anchored between "strongly disagree" and "strongly agree."

Online support expectancy was assessed using three items extended from Cohen and Wills (1985), who examined the individuals' expectation of social support obtained through IM usage. These items examined the extent to which subjects expected to get personal advice related to their concerns, emotional support due to stressful life situations, and share private worries and fears with trusted people via IM usage. These three items tapped into user expectancies of the informational, emotional, and socializing support dimensions of social support, respectively, while expectancy regarding the fourth dimension of instrumental support was excluded by virtue of its uncertain and uncommon occurrence in online support networks. Furthermore, this instrument was similar to that used in prior empirical studies that investigated social support in different online environments (Eastin & LaRose, 2005).

IT self-efficacy was measured with three Likert-scaled items modified from Compeau and Higgins (1995a) that respectively captured subjects' self-rated level of confidence in their ability to understand and use terms and words related to IM, the different functions of IM, and the ways of troubleshooting problems related to IM. Similar items related to IT self-efficacy have been widely applied in previous research examining an individual's judgment on his or her ability to use a technology to accomplish a particular job or task (Compeau & Higgins, 1995b; Compeau et al., 1999; Eastin & LaRose, 2005).

Referent network size was measured using three items that asked subjects to indicate what percentage of their friends, peers at work or school, and personal circle that used IM, on a 10-point scale with ranges such as 0–9%, 10–19%, 20–29%, and so forth. Perceptual scales were not used for this construct, because we wanted to capture subjects' actual referent network and not their perceptions of the size of that network. This scale was a modified version of Schilling's (2002) scale, and was developed based on pretest interviews of student subjects regarding their IM use. Note the difference between the referent network size and the traditional construct of normative influence (or termed subjective norm or social influence) lies upon that the former construct takes observations on others' IT usage more heavily (or precisely) than the latter. On the other hand, the latter emphasizes only on an individual's perception towards people's thinking rather than their usage. As the theory of social network counts largely on a network size

that individuals observe supposedly by themselves, normative influence (or termed subjective norm or social influence) is therefore not appropriately applied in this study.

Network IT usage was measured one month after the previous constructs using two fill-in items that asked subjects to enter the average number of hours per day that they communicated with others using IM over the previous month and the average number of people they contacted using IM per day during that same time period. The third item asked subjects to check on a seven-point interval scale that amount of time they used IM's reading, chatting, dialogue, and message or file transmission (but not IM standby) functions per day over the last 1 month. These items were based on IT usage measures employed by Thompson, Higgins, and Howell (1991), and our joint utilization of fill-in and interval-scaled measures were designed to reduce common method bias that typically arise in survey instruments when all items employ similar measurement scale (e.g., Likert- or interval-scaled).

Lastly, given that online social support is a relatively new and less-studied construct, we first examined prior empirical measures of this construct (e.g., Cutrona & Suhr, 1992; Hirsch, 1980). From this set of items, four items that were closest to the type of support derived from IM were selected. These items examined, using Likert scales, the extent to which subjects actually received personal advice from trusted people, emotional support due to stressful life situations, shared private worries and fears, and met people whose company they enjoyed, using IM over the last 1 month. Though the items were similar to online support expectancy items described earlier, online support expectancy measured the expectations of support and online social support measured the realized levels of support from IM usage. Validations of the above measurement scales are described next.

3.2. Data analysis and results

Two pilot tests with 65 and 61 student subjects, respectively were conducted to refine the measurement scales (i.e., improve item readability and clarity) before the actual survey. Pilot test respondents excluded those that participated in the pretest as well as those in the subsequent survey. Subjects were asked to fill out the survey questionnaire and comment on any confusing item in the questionnaire. Additionally, the pilot test data were subjected to exploratory factor analysis (EFA) and reliability analysis to identify items that loaded poorly on their hypothesized scales, which were then reworded or dropped. This iterative process of instrument refinement led to considerable improvement in content validity and scale reliability.

The final survey data, with a sample size of 312 matched responses from two surveys, were analyzed (with the CALIS procedural of SAS software) using a two-step structural equation modeling (SEM) approach proposed by Anderson and Gerbing (1998). CFA analysis was first done on all items corresponding to the four constructs measured in Liker-type scales. Data collected for network IT usage were not included in this analysis because the data were collected with fill-in measures and hence were distinct from the Likert-scaled items of the other constructs.

The goodness-of-fit of the CFA model was assessed using a variety of fit metrics, as shown in Table 1. The normalized Chi-square (Chi-square/degrees of freedom) of our CFA model was smaller than the recommended maximum of 3.0, the root mean square residual (RMR) was smaller than 0.05, the root mean square error of approximation (RMSEA) was smaller

Table 1
Standardized loadings and reliabilities for data collected.

Construct	Indicators	Standardized loading	*t*-Statistic	AVE	Composite reliability
Referent network size	RU1	0.91	20.25	0.78	0.91
	RU2	0.96	21.89		
	RU3	0.76	15.54		
IT self-efficacy	SE1	0.71	12.46	0.55	0.78
	SE2	0.84	14.79		
	SE3	0.66	11.48		
Online support expectancy	OSE1	0.70	12.07	0.51	0.76
	OSE2	0.77	13.41		
	OSE3	0.67	11.58		
Online social support	OSS1	0.67	12.43	0.56	0.84
	OSS2	0.81	15.89		
	OSS3	0.77	14.87		
	OSS4	0.74	14.21		

Goodness-of-fit indices ($N = 312$): $\chi^2_{59} = 76.13$ (p-value < 0.066).
NFI = 0.96, NNFI = 0.99, CFI = 0.99, GFI = 0.96, AGFI = 0.94, RMR = 0.03, RMSEA = 0.03.

than 0.08, the comparative fit index (CFI) was greater than 0.90, the normed fit index (NFI) exceeded 0.90, the non-normed fit index (NNFI) was greater than 0.90, goodness-of-fit index (GFI) exceeded 0.80, and the adjusted goodness-of-fit index (AGFI) exceeded 0.80. These figures suggested that our hypothesized CFA model fit well with our empirical data (Bentler & Bonett, 1980).

Convergent validity was assessed using three criteria recommended by Fornell and Larcker (1981). First, as evident from the t-statistics listed in Table 1, all factor loadings were statistically significant at $p < 0.001$, and exceeded the required minimum of 0.60, the minimum required to assure convergent validity of construct (Anderson & Gerbing, 1998). Second, the average variance extracted (AVE) for each construct exceeds 0.50 (Fornell & Larcker, 1981), suggesting that the hypothesized items capture more variance in the underlying construct than that attributable to measurement error. Third, the composite reliabilities for each construct exceeded 0.70, satisfying the general requirement of reliability for research instruments. Hence, our empirical data met all three criteria required to assure convergent validity.

Discriminant validity was assessed by Chi-square difference tests based on the Bonferroni method. Controlling for the experiment-wise error rate by setting the overall significance level to 0.001, the Bonferroni method indicated that the critical value of the Chi-square difference should be 12.87. Chi-square difference statistics for all pairs of constructs exceeded this critical value of 12.87 (Table 2), thereby assuring discriminant validity for our data sample.

Table 2
Chi-square difference tests for examining discriminant validity.

	2	3
1. Referent network size	253.40	223.28
2. IT self-efficacy	–	197.90
3. Online support expectancy		–

Unconstrained χ^2 (df = 24) = 30.76.
All χ^2 differences were significant at the 0.001 significance level via the Bonferroni method.

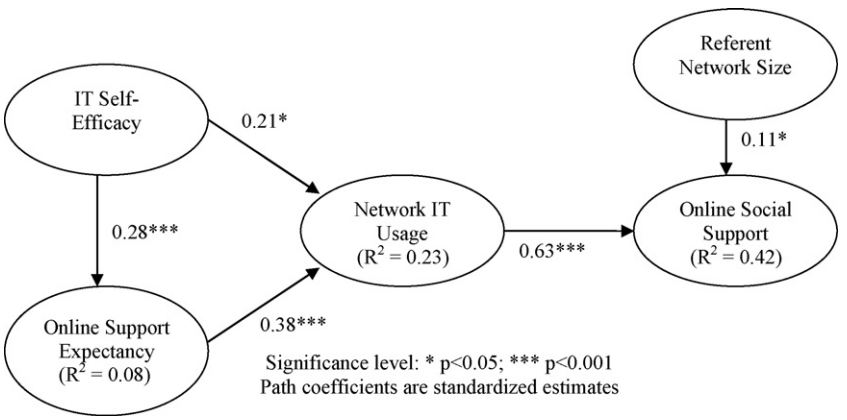

Fig. 1. Empirical analysis of research model.

Collectively, the above results suggested that instruments used for measuring the constructs of interest in this study were statistically adequate.

3.3. Structural model testing

The CFA model was next modified to reflect the hypothesized associations described in our research model for purposes of hypotheses testing. This structural model was also tested using the SEM approach. Results of this analysis are presented in Fig. 1.

All five of our hypothesized associations were validated at $p < 0.05$ significance level or better (see Fig. 1). Furthermore, in view of the uneven gender distribution in our subject sample (74% female), we reanalyzed our model with gender as a control variable, and our results from this analysis were not significantly different from those without the gender control.

4. Discussion

This research reports several findings of potential interest for future online social support research in social psychology. First, this study provided an illustrative example of how a research model of IT usage may be extended to studying online social support. Most prior models of IT usage stop at usage as the dependent variable of interest (e.g., Davis et al., 1989), without examining the potential impact of such usage. This study not only examines the individual impact of using a network IT, but also examines a type of impact rarely examined in IT usage research—namely, social support. While most instances of IT typically examined in prior research were either productivity tools (e.g., Venkatesh et al., 2003) or hedonic tools (e.g., Van der Heijden, 2004) where individual impact may include outcomes such as productivity gains or enjoyment, we demonstrate that IT usage may also be used to achieve other goals such as deriving social support for the IT user. In this sense, this study helps expand the boundaries of extant IT usage research by considering atypical impacts of IT usage such as social support and by incorporating theories and constructs from social support within IT usage research.

Furthermore, the results provide some preliminary evidence of IT-mediated social support, a nascent yet emerging area that bears tremendous potential for future research.

Second, we examine a class of IT that is unique and different in many ways than traditional IT such as productivity software or decision support tools that are extensively investigated in prior research. Our investigation of network IT in general, and instant messaging in particular, places greater demand on researchers to expand upon our extant theories of IT usage that are better-suited towards studying traditional IT. One such key extension is the role of the network. Despite suggestions from network theory that the size of a network influences one's network participation behavior (Liebowitz & Margolis, 1995), we find that network size in our study influences social support directly, rather than indirectly via network IT usage. Based on our limited evidence, it may be premature to conclude that network size has no direct effect on network IT usage, and we urge future researchers to explore this area in greater depth using a more varied subject sample and different types of network IT.

Third, we suggest an operational measure of network size that is unique from and potentially more useful than much of the prior research. While prior studies (e.g., Sun, Xie, & Cao, 2004) have operationalized network effects in terms of the *total* network size (i.e., total number of users), we use a different measure in *referent* network size by only considering a small subject of the total network size that is known to a given network user. Another way of viewing this distinction is that total network size focuses on a macro view of the network, while referent network size focuses on a micro view. Psychology theories suggest that individual behavior is not so much governed by objective reality, as it is by individual perceptions of that reality. Hence, we believe that our measure of referent network size is more amenable to building psychological models of IT-mediated social support. However, it is left for future research to empirically compare the relative efficacy of the total and referent network size measures in shaping one's network adoption decision.

Fourth, we also demonstrates that SCT is applicable to understanding network IT usage, just as it towards understanding usage of non-network IT such as computers in general. Given that SCT has received lesser interest among IT usage research compared to more popular theories such as TAM, this study provides an additional validation of this theory as a parsimonious yet powerful model of IT usage behavior and suggests that it is generalizable across different types of IT from productivity tools such as personal computers (e.g., Compeau et al., 1999) to network IT such as instant messaging.

Fifth, the findings of this study provide several implications for both vendors and users of network IT products and services. Given the increasing prevalence of online networks in our personal lives and technology choice decisions, IT vendors, managers, and marketers must understand what factors drive one's use of network IT and what are the outcomes of such usage, if they are to financially profit from such usage. Our study finds that network IT usage is influenced by both IT self-efficacy and online support expectancy, which suggest that management should not only design marketing strategies to promote the role of IT in deriving online social support, but also provide users in need with educational programs that help improve their IT self-efficacy. Furthermore, of the two predictors of network IT usage, IT self-efficacy seems to be the primary influence driving network IT usage, given that it influences usage both directly and indirectly via online support expectancy, while online support expectancy only appears to have a direct effect on network IT usage. This suggests that if IT

vendors or managers are faced with resource constraints and have to prioritize their limited IT implementation resources, then educational programs geared at increasing users' self-efficacy should come before marketing programs targeting at user expectancies. Given the significant effect of IT self-efficacy on social support outcomes, it is also possible that users may realize the benefits of using network IT usage even without explicit marketing programs, once they gain proficiency and confidence in their ability to use such IT.

For users, our study suggests that the benefit they derive from IT usage is not entirely linked to their own usage, but also corresponds to extraneous factors such as their referent network size. If a user's network size is too small, then his or her online social support may be limited, eventually hurting the perception of network IT and the marketing efforts by the IT providers. To derive adequate support benefits from IT usage, users should not only enhance their ability to use IT and their usage behavior, but also cultivate a large enough referent network that can be effective in providing the level of network support that they desire. At the same time, IT managers and vendors should take proactive steps to enlarge users' online network and avoid circumstances that may lead to social isolation. For example, network IT providers can reward users for bringing their friends and family into their personal network, or for collecting work colleagues into a professional network. Management may also encourage users to host online social events with people in their referent networks.

5. Limitations

The empirical results of this research should be interpreted in light of their limitations. First, since our study employed a student sample, its findings may not precisely reflect the perceptions of non-student user groups of IM such as organizational users or older users. The restricted nature of our sample suggests that any generalization of our findings to other contexts should be made with caution. However, given the prevalence of IM usage among younger adults and college students, our findings may be fairly reflective of the IM user population at large.

The second limitation of our study is the possibility of common method bias, given that several of our study's constructs were measured perceptually using Likert scales. To test for this bias, we conducted Harmon's single factor test (Podsakoff & Organ, 1986). In this test, if a substantial amount of common method variance is present in the data sample, then either a single factor will emerge from the factor analysis or one general factor will account for the majority of the covariance in the independent and dependent variables. An exploratory factor analysis of all items for the four constructs in Table 1 revealed four factors explaining 27.22%, 22.34%, 21.73% and 28.71% of the total variance, respectively. These figures indicate that the variances are adequately distributed among multiple factors, suggesting that common method bias was probably not a significant problem in our data sample.

Finally, there may be several other predictors of network IT usage beyond IT self-efficacy and online support expectancy that were examined in this study. For instance, the unified theory of IT acceptance and usage (Venkatesh et al., 2003) suggests effort expectancy and social influence as additional predictors of IM usage, and the motivational model (Davis et al., 1992) suggests intrinsic motivation as a possible predictor. Given our theoretical focus on

SCT, we have limited our consideration of IM usage predictors to those suggested by SCT, but future researchers are advised to consider additional predictors of network IT usage and compare their explanatory ability to those examined in this study.

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