

The Adoption of Social Networks in Thailand

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Abstract

Based on results from previous studies a theoretical model of the adoption of online social networks is formulated incorporating social factors, psychological characteristics, and usage factors. The model is tested and developed using data collected by questionnaire from a sample of 322 users in Thailand. In addition, the data is analyzed in order to determine the extent to which key characteristics of Thai society are evident in the use of online social networks. The results confirm the importance of factors reported in previous studies and identify unreported significant indirect causal effects of Social Norms and Social Identity on Intention involving the intervening variables Perceived Ease of Use and Perceived Usefulness. Analyses show that key characteristics of Thai society are evident in the context of the use of online social networks in Thailand.

Keywords: Thai society, social influence, psychological characteristics, usage factors.

Introduction

Social networks have been studied as complex sets of relationships between members or social systems at all scales. Their structure consists of individuals or organizations represented by nodes that are tied together by one or more types of relationships including friendship, kinship, common interests, financial exchanges, beliefs, knowledge, and prestige. Since about 1994 online (virtual) communities or Internet based social networks have been used by members as increasingly important means of communication for social and professional interaction. They take the form of an information system where people make contacts using web space to share information using convenient publishing tools (e.g. bulletin boards and weblogs) with social software designed to support chat rooms and forums where voice, video, text, or avatars provide the means of communication. A social network site or service (SNS) is an online platform or service that focuses on building and reflecting social networks among individuals who share interests and/or activities (Boyd, 2007). A SNS allows a representation of each user, their social links, and services including email and instant messaging. Online community services are often referred to as SNS but the essential difference is that SNS are individual-centered while online community services are group-centered.

Since the late 1990's the growth in the popularity and number of SNS has increased significantly and in 2010 it is estimated that there are about 200 active sites most of which have

been established since 2000. A variety of social networking models have emerged as SNS application domains have expanded to include government, business, education, and medicine (www.wikipedia.org). Although no statistics on all SNS users in Thailand are available it is expected that the number of users is large given the 17.2 million Internet users in 2010 with a penetration of 26 percent and an average annual growth rate of 66 percent across the years 2000 to 2010. Currently, Facebook is regarded as the most popular SNS with an estimated 517 million users worldwide with 60 percent in North America and Europe and 18 percent in Asia where Facebook is used by 11 percent of Internet users compared to 26 percent worldwide (www.internetworldstats.com). In Thailand there are estimated to be 5.7 million Facebook users corresponding to 33 percent of Thai Internet users (www.facebakers.com) and on average these users are members of 12 groups and each day they spend 55 minutes online, contact 8 of their 130 friends on the site, write 25 comments, become a fan of 2 other pages, and are invited to 3 events (<http://cdn.mashable.com>).

Researchers from different fields of study have begun to investigate the increasing importance of SNS in relation to identity, privacy, social capital, youth culture, and education. A SNS is a human-centric information system used for developing human relationships and it is quite different from other task-oriented information systems such as management information systems which aim to provide users with information or automated processes in order to increase their work performance. Because of the close relationship with human social behavior an individual's intention to use SNS cannot be determined by only considering the technical performance or the usefulness of outputs (Rau et al., 2008; Steinfield et al., 2008; Song and Kim, 2006).

Despite a number of studies on various types of virtual community services (Chan et al., 2004; Dholakia et al., 2004; Hsu and Lu, 2004; Hsu et al., 2007; Hsu and Lin, 2008) the research on SNS remains limited (Boyd and Ellison, 2007). In particular, no previous studies of the adoption of SNS in Thailand were found and this is not compatible with the high importance given to the use of social media for national development in Thailand's National ICT Policy Framework 2011-2020 (www.ict2020.in.th). In addition, Thai society has been identified as having unique characteristics with respect to dimensions such as power distance, uncertainty avoidance, collectivism, femininity, and short term orientation (Hofstede, 2009) and these dimensions have proved useful in studying the influences of characteristics of Thai society in relation to Internet based applications (Prompattanapakdee, 2009; Wattanasupachoke and Tanlamai, 2005; Kitiyadisai, 2003; Lertwongsatien and Wongpinunwatana, 2003). Consequently, in Thailand it is important to develop an improved understanding of the important factors which affect the use of SNS and the extent to which characteristics of Thai society are reflected in the use of SNS.

Against this background, this study develops a causal model including social, psychological, and usage factors derived from previous studies in order to explain an individual's intention to use SNS. Data collected by questionnaire is analyzed in order to test and simplify the model using structural equation modeling (SEM) techniques and the results of analyses are examined in relation to key characteristics of Thai society. Findings are compared to those from previous studies and theoretical and practical conclusions are presented.

Research Design and Methodology

The study aims to develop theoretical knowledge with practical implications. A cross-sectional field study design is used to identify relatively strong effects on dependent variables, which enhances the statistical results, and this is a feasible approach for measuring complex variables when independent variables cannot be manipulated (Boudreau et al., 2001). The unit of analysis is an individual who resides in Thailand and uses SNS. Data is collected using a self administered questionnaire where the measurement of variables is based on existing measuring instruments. Data analysis uses descriptive statistics and SEM techniques.

The questionnaire was developed in the English and Thai languages and both versions were reviewed by a focus group of five experienced SNS users. Minor corrections related to language translation were incorporated and then the Thai language version was administered in a pilot study with a sample of 10 SNS users. No further modifications were required and the Thai language version was used in the full study.

Because the number of SNS users in Thailand is unknown a purposive sampling method is used. A sample size of 300 was determined which satisfies the criteria for the statistical validity of the descriptive and SEM statistical techniques used (Kline, 2005). Sampling was done using Facebook and Hi5 SNS as sampling frames. These sites were selected due to their popularity and they provided contact information for users who were asked to complete the questionnaire. Questionnaires were distributed electronically using the Google Document web service. All questions were mandatory and this resulted in no missing answers. The administration process took three weeks and produced 322 usable survey responses.

Related Literature

The first part of the review presents an overview of the nature and focus of recent studies of virtual communities and SNS that are used in the second part to identify important constructs related to an individual's intention to use SNS. The last part presents a framework used for examining the relationship between the results of analyses and key characteristics of Thai society.

An Overview of Previous Studies

Table 1 presents an overview of recent studies of virtual communities and SNS. In line with the research design of this study, attention is given to quantitative studies where the unit of analysis is an individual.

From Table 1 it is seen that there are a number of studies on various types of virtual community services and most are explanatory in nature and use quantitative analyses of data collected by questionnaires. Most of the SNS studies are of the same nature and have been conducted in America and European contexts. Many develop and test causal models of constructs which influence the adoption of SNS. These models are formulated by including additional constructs derived from studies of information systems, social and psychological influences on user or group behavior, online communities, and communication science in well known models of technology adoption such as: the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975);

the technology acceptance model (TAM) (Davis, 1989); and the theory of planned behavior (TPB) (Ajzen, 1991) which, as noted by Kwon and Wen (2009), are focused normally on the mandatory use of task-oriented systems.

Table 1. The nature and focus of recent studies

Nature and Focus of the Study	Reference
Studies of Virtual Communities	
<i>Approach:</i> Explanatory; <i>Unit of Analysis:</i> An individual; <i>Data Collection:</i> Questionnaire; <i>Data Analysis:</i> Quantitative	
Critical success factors for a virtual community	Kim et al. (2009)
Factors that motivate people to participate in blog activities	Hsu & Lin (2008)
Relationships among intensity of use, psychological well-being, and social capital	Steinfeld et al. (2008)
Knowledge sharing behavior in virtual communities	Hsu et al. (2007)
Social comparisons motivating contributions to an online community	Harper et al. (2007)
Factors affecting virtual community usage	Song & Kim (2006)
User's acceptance of online games	Hsu and Lu (2004)
A model of social influences on consumer participation in a virtual community	Dholakia et al. (2004)
<i>Approach:</i> Explanatory; <i>Unit of Analysis:</i> An individual; <i>Data Collection:</i> Interviews; <i>Data Analysis:</i> Qualitative	
Recognition and participation in a virtual community	Chan et al. (2004)
<i>Approach:</i> Exploratory; <i>Unit of Analysis:</i> An individual; <i>Data Collection:</i> Questionnaire; <i>Data Analysis:</i> Quantitative	
Self-disclosure in online communities in Japan	Ishii (2008)
A comparison of web surfing behaviors among American and Asian teenagers	Yum & Hara (2005)
Studies of SNS	
<i>Approach:</i> Explanatory; <i>Unit of Analysis:</i> An individual; <i>Data Collection:</i> Questionnaire; <i>Data Analysis:</i> Quantitative	
Factors encouraging SNS users to continue participating	Jin et al. (2009)
Factors affecting SNS usage	Kwon and Wen (2009)
Personality characteristics factors influencing SNS behavior	Wehrli (2008)
Empirical evaluation of determinants of user participation in SNS	Krasnova et al. (2008)
Dispositional factors in the use of SNS	Bibby (2008)
Differences among users and non-users of SNS	Hargittai (2007)
<i>Approach:</i> Exploratory; <i>Unit of Analysis:</i> An individual; <i>Data Collection:</i> Interviews; <i>Data Analysis:</i> Content analysis	
Reasons for using SNS	Brandtzæg & Heim (2009)

Important Constructs

The important constructs derived from previous studies are organized into three categories: social influences, which refer mainly to the behavior of an individual in relation to group membership; psychological characteristics, which characterize an individual and are evident in their behavior; and usage factors, which relate to the individual's perceptions of the usefulness and ease of use of the SNS and their intention to use it.

Social Influences

Three constructs representing social influences on an individual were identified (Social Norms, Social Identity, and Perceived Critical Mass)

Social Norms are rules of behavior that cause people in communities to behave in ways that are accepted by others. Once a particular behavior becomes established as a rule it continues in force because people prefer to conform to the rule given the expectation that others are going to conform (Lewis, 1969). Social norms have a direct influence on intention to use services in a virtual community (Hsu and Lu, 2004; Song and Kim, 2006; Hsu and Lin, 2008) and the TRA and TPB provide theoretical bases for an established relationship between social norms and user behavior (Teo and Pok, 2003; Venkatesh et al., 2003) Social norms also have a significant impact on the development of an individual's social identity within a virtual community (Dholakia et al., 2004; Riedlinger et al., 2004).

Social Identity refers to an individual's knowledge that they belong to certain social groups together with the emotional and value significance to them of this group membership (Tajfel, 1978). Those who have a strong social identity are likely to perceive others inside their group in ways that distinguish them positively from those outside the group and a group which provides people with a positive self-image is preferred (Clement et al., 2001). In the SNS context social identity is the positive perception of belonging to a community where people have the motivation to initiate social interaction with others and this has a significant positive impact on their intentions to use SNS (Hsu and Lin, 2008; Harper et al., 2007). Also, social identity has positive indirect effects on intention through its positive effects on the individual's perceptions of usefulness and ease of use of SNS (Kwon and Wen, 2009).

Perceived Critical Mass refers to the fact that the value of a technology to a user and their intention to use it increase with the number of its adopters and a perception of critical mass is rapidly strengthened as more people participate (Hsu and Lu, 2004; Cheung et al., 2000).

Psychological Characteristics

Eight constructs representing psychological characteristics were identified in previous studies (Telepresence, Flow Experience, Self-presentation, Openness, Agreeableness, Extraversion, Conscientiousness, and Neuroticism).

Telepresence is the extent to which one feels presence in a virtual environment rather than an immediate physical environment (Kim and Biocca, 2004; Steuer, 1995; Sheridan, 1992).

Telepresence means that a user perceives that they are in touch simultaneously with multiple spaces and this decreases efforts taken for psychological transportation and thus strong feelings of telepresence lead to increases in the perceived usefulness and ease of using SNS (Kwon and Wen, 2009). Kim and Biocca (2004) noted that information in a mediated environment is seen to be more accessible when a user experiences telepresence. In the context of SNS if an individual experiences telepresence then they will be more exposed to responses from others and are more likely to experience enjoyment and encouragement which increases their level of involvement and intentions to use SNS (Kwon and Wen, 2009).

Flow experience refers to the holistic experience that people have when they act with total involvement (Csikszentmihalyi and LeFevre, 1989). In the context of Internet usage Hoffman and Novak (1997) conceptualized flow experience as a cognitive state involved with online navigation. Hsu and Lu (2004) defined flow experience as an extremely enjoyable experience where an individual engages in an online game activity with total involvement, enjoyment, control, concentration, and intrinsic interest and they showed that flow experience has a positive influence on intention to play online games.

Self-presentation refers to the impression that an individual conveys to others that they are a certain kind of person or possess certain characteristics. Self-presentation is done consciously or unconsciously and it is necessary for the smooth functioning of social interaction (Ishii, 2008). The information conveyed does not need to be complex and it may only refer to observable characteristics. Since these characteristics create an impression on others individuals normally attempt to create a positive impression (Leary, 1996). Krasnova et al. (2008) regarded self-presentation as a means of satisfying the need for esteem and it has a positive effect on intentions to use SNS.

The next five psychological characteristics are personality traits and the measurement of these traits has a long history of development in the study of personality (McCrae and Costa, 1990).

Openness refers to the propensity of individuals to display imagination, curiosity, originality, and open-mindedness and it has a positive effect on intention to use SNS (Wehrli, 2008; Bibby, 2008).

Agreeableness reflects the extent to which an individual is courteous, kind, flexible, trusting, cooperative, and forgiving. Agreeableness is associated with positive relationships with others and fosters peer acceptance and friendship (Jensen-Campbell et al., 2002). Agreeableness has a favorable influence on the quality of social interactions and a positive influence on SNS adoption (Wehrli, 2008; Bibby, 2008).

Extraversion refers to the extent to which an individual is outgoing, active, assertive, and talkative. Extraverts are expected to approach others easily and engage in social interaction. Extraverted people are considered to very likely to adopt SNS (Wehrli, 2008).

Conscientiousness refers to the extent to which an individual is responsible, dependable, careful, and organized with a high desire to achieve. It has been shown to be associated with performance in the workplace and in educational achievement (De Raad and Schouwenburg,

1996). Wanberg et al. (2000) reported that conscientious individuals displayed high levels of contacting and questioning and it has a positive influence on the adoption of SNS (Wehrli, 2008).

Neuroticism refers to the extent to which an individual experiences and display negative attributes such as anxiety, sadness, embarrassment, depression, guilt, and it is associated with an inability to cope with stress (Wehrli, 2008; Bibby, 2008). Individuals with high levels of neuroticism have higher maintenance costs on their relationships with others. They believe that they are not attractive to others and are fearful of rejection. Neuroticism is proposed to have a negative effect on the intention to use SNS (Wehrli, 2008).

Usage Factors

Three constructs associated with systems usage were identified among previous studies (Perceived Ease of Use, Perceived Usefulness, and Intention).

Perceived Ease of Use refers to as the degree to which a person believes that using a system is free of effort. In the TAM perceived ease of use and perceived usefulness are significantly correlated with system usage (Agarwal and Prasad, 1999; Davis et al., 1992; Jackson et al., 1997; Venkatesh, 1999). In virtual communities Hsu and Lu (2004) reported that ease of use has a positive influence on perceived usefulness and intention to use and that it has a positive effect on the individual's feeling of flow experience.

Perceived Usefulness is the degree to which a person believes that using a system enhances their job performance (Davis, 1989). In the context of SNS, it is interpreted as the degree to which the system provides useful community activities and responses in terms of its features, functionality, and reliability (Brandtzaeg and Heim, 2009; Erickson, 2002). When users feel that SNS is useful their intention to use is increased (Hsu and Lu, 2004).

Intention refers to a user's willingness to continue to use SNS. From the discussion the 13 constructs above it is seen that there is evidence that each of these constructs has a positive influence on the user's intention to use SNS except for neuroticism where the effect is negative.

Characteristics of Thai Society

The use of SNS is concerned with human behavior which may vary across different societies. Thai society is first and foremost a hierarchically structured society where collectivism and interpersonal relationships are of utmost importance and the influence of reference groups strongly impact an individual's behavior and people try to surround themselves with others who are consistent with their own identities and beliefs (Pornpitakpan, 2000; Komin, 1990). The five dimensions of societies described in Table 2 are due to Hofstede (2009) and are used in this study as a framework for examining the relationships between the findings of the study and key characteristics of Thai society noting that these five dimensions are not independent of each other and observed behaviors may reflect more than one of these dimensions to varying degrees.

Table 2. Characteristics of societies

Dimension	Description	Comments on the Relevance to Thai/Asian/Whole World Societies
Collectivism	The extent to which people are integrated into strong, cohesive groups, which continue protecting them in exchange for unquestioning loyalty.	This is the highest scoring dimension for Thai society and it is close to the average for all Asian societies and greater than the average for the whole world. This indicates close long-term commitment to the member's group (family, extended family, or extended relationships). Loyalty to the group is paramount, and over-rides most other societal rules and regulations. The society fosters strong relationships where everyone takes responsibility for other members of their group.
Femininity	The extent to which the men and women have the same modest, caring values.	The next highest scoring dimension for Thai society is Femininity. For both men and women the society is less assertive and competitive and more caring on average than the whole of the world and all other Asian societies.
Power Distance	The extent to which the less powerful members of society accept and expect that power is distributed unequally.	Power Distance and Uncertainty Avoidance are the next two equally highest scoring dimensions for Thai society. Power Distance is slightly lower in Thailand than in all Asian societies but greater than the average for the whole of the world. On average Uncertainty Avoidance in Thailand is about the same as for the rest of the world but is slightly higher than for all Asian societies. In Thailand inequities in the distribution of power are accepted and expected while rules, laws, policies, and regulations are readily accepted in order to eliminate or avoid uncertainty.
Uncertainty Avoidance	The extent to which the members of a society are uncomfortable in unstructured situations involving uncertainty and ambiguity.	
Short Term Orientation	The extent to which members have respect for tradition, fulfilling social obligations, and protecting one's 'face'.	This is the lowest scoring dimension for Thai society and it implies that there is an emphasis on showing respect for tradition, fulfilling social obligations, and protecting one's 'face'. It is slightly below the average for the whole world but greater than the average for all Asian societies.

Note: The comments on the relevance of each dimension to Thai/Asian/Whole World societies are derived from the assessments provided by Hofstede (2009).

Theoretical Model

Based on the review of related literature the theoretical model shown in Figure 1 was developed. There are 14 variables including nine exogenous independent variables and five endogenous variables which have at least one variable as a proposed cause. The endogenous variable Intention is the dependent variable and the other four endogenous variables are intervening variables. The 21 research hypotheses associated with the cause and effect relationships notated in Figure 1 are presented in Table 3 with a reference to a previous study that supports the hypothesis.

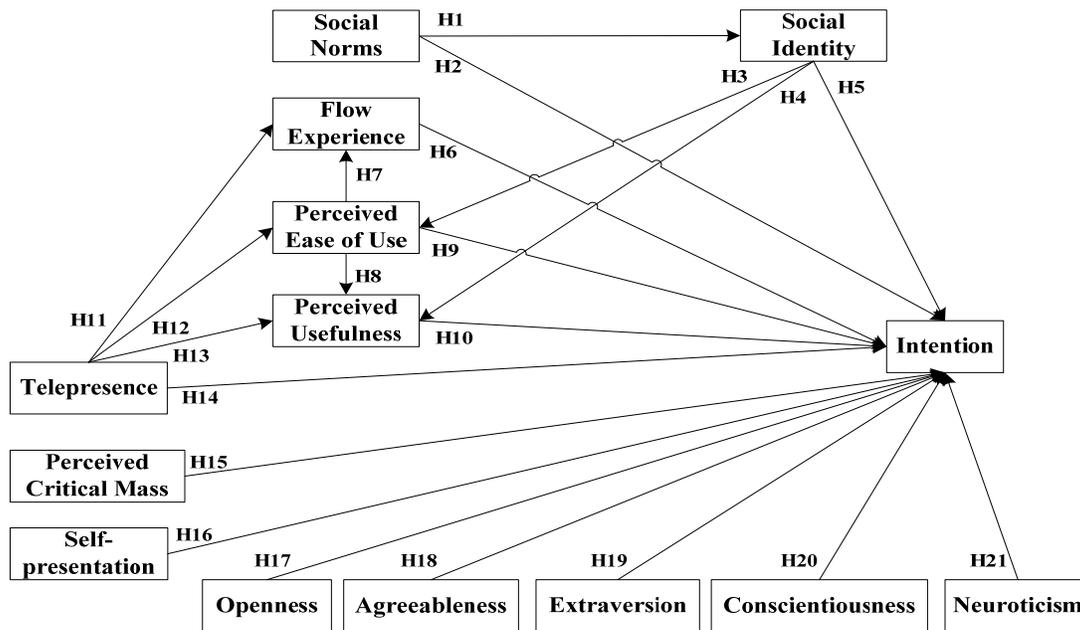


Figure 1. Theoretical model.

Table 3. Research hypotheses

	Hypothesis	Reference
H1	Social Norm has a significant positive direct effect on: Social Identity	Dholakia et al. (2004)
H2	Social Norm has a significant positive direct effect on Intention	Hsu and Lu (2004)
H3	Social Identity has a significant positive direct effect on Perceived Ease of Use	Kwon and Wen (2009)
H4	Social Identity has a significant positive direct effect on Perceived Usefulness	Kwon and Wen (2009)
H5	Social Identity has a significant positive direct effect on Intention	Hsu and Lin (2008)
H6	Flow Experience has a significant positive direct effect on Intention	Hsu and Lu (2004)
H7	Perceived Ease of Use has a significant positive direct effect on Flow Experience	Hsu and Lu (2004)
H8	Perceived Ease of Use has a significant positive direct effect on Perceived Usefulness	Hsu and Lu (2004)
H9	Perceived Ease of Use has a significant positive direct effect on Intention	Hsu and Lu (2004)
H10	Perceived Usefulness has a significant positive direct effect on Intention	Hsu and Lu (2004)
H11	Telepresence has a significant positive direct effect on Flow Experience	Kwon and Wen (2009)

Hypothesis		Reference
H12	Telepresence has a significant positive direct effect on Perceived Ease of Use	Kwon and Wen (2009)
H13	Telepresence has a significant positive direct effect on Perceived Usefulness	Kwon and Wen (2009)
H14	Telepresence has a significant positive direct effect on Intention	Kwon and Wen (2009)
H15	Perceived Critical Mass has a significant positive direct effect on Intention	Hsu and Lu (2004)
H16	Self-presentation has a significant positive direct effect on Intention	Krasnova et al. (2008)
H17	Openness has a significant positive direct effect on Intention	Wehrli (2008)
H18	Agreeableness has a significant positive direct effect on Intention	Wehrli (2008)
H19	Extraversion has a significant positive direct effect on Intention	Wehrli (2008)
H20	Conscientiousness has a significant positive direct effect on Intention	Wehrli (2008)
H21	Neuroticism has a significant negative direct effect on Intention	Wehrli (2008)

Note: Significance refers to statistical significance at a level of 0.05 or less.

Table 4 shows the details of the measurement of each of the variables in Figure 1 together with a reference to a previous study which was used as the source of an existing measuring instrument.

Table 4. Measurement of the model variables

Variable	Indicators for Latent Variables	Measuring Instrument	Variable	Indicators for Latent Variables	Measuring Instrument
Social Identity	SI1-4	Hsu & Lin (2008)	Perceived Critical Mass	PCM1, 2	Hsu & Lu (2004)
Social Norms	SN1-3	Hsu & Lu (2004)	Openness	OP1-5	Buchanan et al. (2005)
Self-presentation	SP1-4	Krasnova (2008)	Agreeableness	AG1-5	Buchanan et al. (2005)
Telepresence	TP1-4	Kwon & Wen (2009)	Extraversion	EX1-5	Buchanan et al. (2005)
Perceived Ease of Use	PEU1-3	Kwon & Wen (2009)	Conscientiousness	CC1-5	Buchanan et al. (2005)
Perceived Usefulness	PU1-3	Kwon & Wen (2009)	Neuroticism	NU1-5	Buchanan et al. (2005)
Flow Experience	FE1, 2	Hsu & Lu (2004)	Intention is a single interval scale variable		Hsu & Lu (2004)

In Table 4 the indicators for the latent variables are measured on a 5-point Likert scales treated as interval scale measures in the analyses. Intention is a single interval scale variable measured on a 5-point Likert scale. The questions and measurement scales used in the questionnaire are shown in the Appendix.

Data Preparation and Preliminary Analyses

Data Preparation

The data from the 322 completed questionnaires was entered into an SPSS worksheet and 10 percent were selected at random and checked for the accuracy of data entry. No errors were found and among the distributions of the model variables no outliers (i.e. values 3 or more standard deviations from the mean) were detected.

Principle Component factor analysis was used to examine the construct validity (convergent and discriminant) of the measures of the indicators associated with latent variables and their internal consistency reliability was assessed using Cronbach alpha coefficients. The objective is to arrive at a set of indicators for each latent variable with a Cronbach alpha coefficient of at least 0.7 (George and Mallery, 2003), an eigenvalue no less than 1, and significant loading factors with magnitudes of at least 0.4 on only the associated latent variable (Straub et al., 2004). As a result of the factor analysis only the three indicators TP1, OP1, and EX1 were removed because they had significant cross loadings on more than one latent variable. Otherwise, a satisfactory set of valid and reliable measures was achieved for all of the latent variables. The results are presented in Appendix Tables A1 and A2.

Preliminary Analyses

Questions in section 1 of the questionnaire were used to develop a profile of the respondents. The sample of 322 respondents included 114 males and 208 females with ages in the range 15-50 years. The mean age of respondents is 27 years. Ninety two percent of the respondents are less than 36 years of age and among this group the majority (65 percent) is of age 20-36 years. Fifty six percent of the respondents hold a bachelor degree and many (28 percent) hold a master degree and only 2 percent have either a doctoral degree or only a primary school level of education. The mean number of years of experience with SNS is 2.6 years and 48 percent have more than 3 years experience while only 9 percent have less than 1 year of experience. Thus respondents have considerable formal education and SNS experience to draw upon and this is expected to enhance the validity of their responses.

Most of the respondents (80 percent) reside in Bangkok or in other urban or suburban regions (14 percent) while the remainder (6 percent) is distributed in small numbers across rural areas in Thailand. This reflects the low penetration of Internet use in rural areas where access, affordability, and Internet performance are significant barriers. Forty eight percent of respondents use SNS only at home while a further 41 percent use SNS at home as well as at a school/university or with mobile technologies. Only nine percent of respondents access SNS from only: Net Cafés; a school/university; or using mobile technologies. Twenty six percent of

respondents use only one SNS and among them Facebook (90 percent) is much more popular than Hi5 (10 percent). Many respondents (54 percent) use both Facebook and Hi5 and the use of Facebook in combination with a second SNS other than Hi5 (4 percent) is more popular than the use of Hi5 with another SNS (1 percent). However, there are a number of users who use Facebook, Hi5, and one other SNS (15 percent) and the most popular other site is Twitter with Multiply and MySpace used less often.

Appendix Table A3 presents descriptive statistics for the model variables. It is noted that the magnitudes of skewness and kurtosis for all of the variables are within the limits of 3 and 7, respectively, and this justifies the use of maximum likelihood estimation in the subsequent SEM analyses (Kline, 2005). T-tests were used to examine differences between males and females for the means of the three respondent profile variables (Age, Level of Education, and Number of Years of SNS Use) and each of the 14 model variables. The only significant difference ($p < 0.05$) was for the age of respondents where on average males are 28 years of age which is 2 years older than the average for females.

Appendix Table A4 presents the correlation coefficients among Age, Level of Education, Number of Years of SNS Use and the 14 the model variables. The 14 model variables are significantly ($p < 0.05$) positively correlated with each other with only five exceptions where there is no significant correlation between: Openness and Telepresence or Flow Experience; Telepresence and Extraversion or Agreeableness; and Neuroticism and Intention. Although significant correlations do not represent significant causal effects it is noted that with the exception of Neuroticism all of the correlations associated with the variables in the causal relationships in the theoretical model (Figure 1) are significant ($p < 0.05$) with positive directions as specified for the causal relationships. Also, the three respondent profile variables Age, Level of Education, and Number of Years of SNS Use do not have significant correlations with Intention.

Older (younger) individuals: have higher (lower) levels of education; are less (more) influenced by the number of other users of SNS; are more (less) extraverted and conscientious; and are less (more) likely to display neurotic behavior, which is only common among those who emphasize self-presentation and have strong feelings of telepresence and flow experience. Individuals who have longer (shorter) periods of SNS use are likely to: have higher (lower) levels of education; be more (less) accepting of social norms, place more (less) emphases on social identity and self-presentation; and be more (less) influenced by the number of other SNS users. Also, they are more (less) likely to display agreeable, open, extraverted, and conscientious behaviors and to perceive SNS to be more (less) useful and easy to use.

T-tests were used to examine significant differences between the means of the 14 model variables and the *neutral point* value of 3 on their measuring scales. Table 5 shows the model variables, which represent individual/group characteristics, with means significantly greater than, not different from, or less than the *neutral point* value of 3. These three classifications are interpreted to mean that for the group the characteristic has high, moderate, low importance, respectively.

Table 5. Level of importance of characteristics represented by model variables

Individual/Group Characteristics														
	Perceived Life Satisfaction	Perceived Critical Mass	Openness	Perceived Ease of Use	Agreeableness	Intention	Social Identity	Conscientiousness	Social Norms	Extroversion	Flow Experience	Self-presentation	Telepresence	Neuroticism
Mean	4.07	4.05	4.05	3.90	3.80	3.53	3.46	3.38	3.31	3.10	2.74	2.70	2.66	2.14
Significance	Means are significantly greater than the neutral point ($p < 0.01$)									Mean is not significantly different from the neutral point ($p < 0.01$)	Means are significantly less than the neutral point ($p < 0.01$)			
Level of Importance	High									Moderate	Low			

From Table 5 it is seen that nine (four) model variables represent characteristics that on average are of high (low) importance while Extraversion is moderately important. It is noted from Appendix Table A4 that the nine (four) characteristics of high (low) importance are significantly positively correlated ($p < 0.05$) with each other. T-tests showed that the means for all of the four characteristics of low importance are significantly greater than the value 1 on their measurement scales ($p < 0.01$) which represents an unimportant characteristic. Consequently, although their importance is considered to be low they are certainly not unimportant characteristics of the group.

The results of the preliminary analyses in this section are incorporated in the discussion of the findings of the study in section 8 of this article.

Model Analysis and Development

Figure 2 shows the results of the SEM analysis of the theoretical model in Figure 1 using Amos 5 software.

Because the structure of the model in Figure 2 has theoretical support from previous studies the measurement component of the model was formulated as a latent structured regression model (Schumaker and Lomax, 1996). The notation *, **, or *** is used with unstandardized effects to indicate statistical significance at a level of 0.05, 0.01, or 0.001, respectively. Standardized effects are shown in parentheses with the magnitudes classified as small (S), medium (M), or large (L) (Cohen, 1988).

Table 6 shows the values of the range of fit statistics recommended by Kline (2005). The values indicate that the model fit is not very satisfactory and there are 11 small direct effects in Figure 2 represented by broken lines which are not statistically significant. Consequently, modifications to the model may result in a simpler model with improved fit statistics.

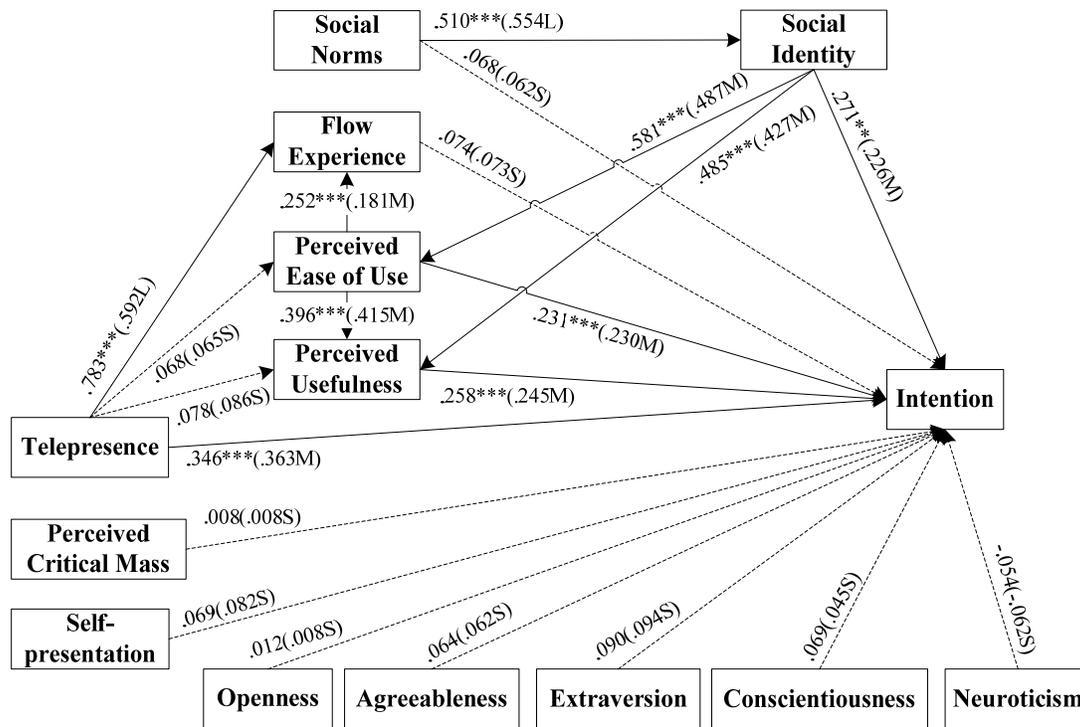


Figure 2. SEM analysis of the theoretical model.

Table 6. Theoretical model fit statistics

Model	N	N _c	NC (χ^2/df)	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
Theoretical Model	322	181	1958.822/1024 = 1.913	0.091	0.795	0.764	0.783	0.883	0.882	0.053
			R ² : SI (0.307); FE (0.386); PEU (0.213); PU (0.542); IN (0.465)							

Note: R² is the proportion of variance explained by the variables which affect these variables.

Each of the 11 direct effects in Figure 2 which are not statistically significant were made optional and the specification search facility in Amos 5 was used to evaluate the resulting hierarchy of 2048 (2¹¹) models. Following the recommendation by Kline (2005) the model with the smallest value of Normed Chi-Square (NC) was selected as the final model. The final model is shown in Figure 3 with direct effects shown in the same format as in Figure 2.

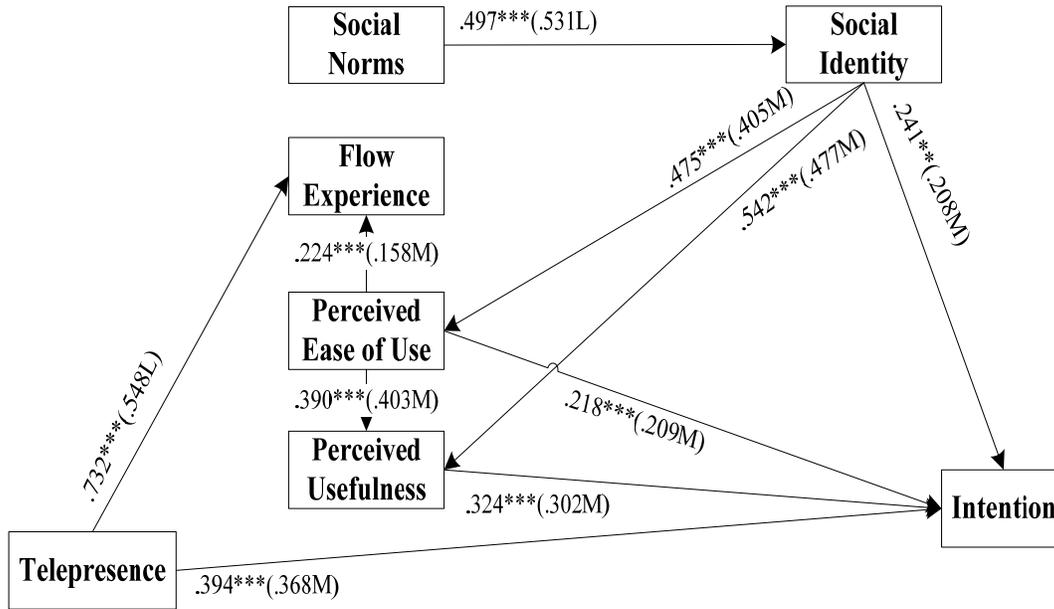


Figure 3. Final model.

The fit statistics associated with the final model are shown in Table 7.

Table 7: Fit statistics for the final model

Model	N	N _c	NC (χ^2/df)	RMR	GFI	AGFI	NFI	IFI	CFI	RMSEA
Final Model	322	176	227.484/142 = 1.602	0.049	0.943	0.901	0.912	0.950	0.950	0.049
			R ² : SI (0.382); FE (0.396); PEU (0.313); PU (0.556); IN (0.476)							

Note: R² is the proportion of variance explained by the variables which affect these variables.

In the final model all of the direct effects are at least medium in magnitude and statistically significant at a level of .01 or less. The model has a satisfactory set of fit statistics and reasonable proportions of the variance associated with the endogenous variables are explained. Table 8 shows the complete analysis of all of the effects in the final model.

From Table 8 it is seen that all of the effects are positive and statistically significant ($p < 0.05$) and in the final model Flow Experience has emerged as a dependent endogenous variable. The total of all of the indirect effects of Social Norms and Social Identity on Intention is greater than the direct effects which highlights the importance of the mediation effects of the two intervening variables (Perceived Ease of Use and Perceived Usefulness) in these relationships.

Table 8. Analysis of all effects in the final model

Causal Variable		Type of Effect	Endogenous Variable					
			Intervening Variable		Dependent Variable			
			Social Identity (SI)	Perceived Ease of Use (PEU)	Perceived Usefulness (PU)	Flow Experience (FE)	Intention (IN)	
Exogenous Independent	Social Norms (SN)	Direct	.497***(.531L)	Nil	Nil	Nil	Nil	
		Indirect	Nil	SN-SI-PEU .236***(.215M)	SN-SI-PU .270***(.253M) SN-SI-PEU-PU .092***(.084S)	SN-SI-PEU-FE .053*(.034S)	SN-SI-IN .120*(.107M) SN-SI-PU-IN .044***(.087S) SN-SI-PEU-IN .051***(.043S) SN-SI-PEU-PU-IN .030***(.026S)	
		Total Indirect	Nil	.236***(.215M)	.362**(.337M)	053*(.034S)	.245**(.263M)	
		Total	.497***(.531L)	.236***(.215M)	.362**(.337M)	053*(.034S)	.245**(.263M)	
	Telepresence (TP)	Direct	Nil	Nil	Nil	.732***(.548L)	.394***(.368M)	
		Indirect	Nil	Nil	Nil	Nil	Nil	
		Total Indirect	Nil	Nil	Nil	Nil	Nil	
		Total	Nil	Nil	Nil	.732***(.548L)	.394***(.368M)	
	Endogenous Intervening	Social Identity (SI)	Direct	Nil	.475***(.405M)	.542***(.477M)	Nil	.241**(.208M)
			Indirect	Nil	Nil	SI-PEU-PU .185*** (.163M)	SI-PEU-FE .106*(.064S)	SI-PEU-IN .104**(.085S) SI-PU-IN .176***(.144M) SI-PEU-PU-IN .060***(.049S)
			Total Indirect	Nil	Nil	.185***(.163M)	.106*(.064S)	.340*** (.278M)
			Total	Nil	.475***(.405M)	.727***(.640L)	.106*(.064S)	.581***(.486M)
Perceived Ease of Use (PEU)		Direct	Nil	Nil	.390***(.403M)	.224**(.158M)	.218***(.209M)	
		Indirect	Nil	Nil	Nil	Nil	PEU-PU-IN .126***(.122M)	
		Total Indirect	Nil	Nil	Nil	Nil	.126***(.122M)	
		Total	Nil	Nil	.390***(.403M)	.224**(.158M)	.344***(.331M)	
Perceived Usefulness (PU)		Direct	Nil	Nil	Nil	Nil	.324***(.302M)	
		Indirect	Nil	Nil	Nil	Nil	Nil	
		Total Indirect	Nil	Nil	Nil	Nil	Nil	
		Total	Nil	Nil	Nil	Nil	.324***(.302M)	

Table Notes: (a) Effects are shown using the same format as in Figures 2 and 3 and variables on all indirect paths are labeled, (c) Sobel's (1986) test was used to determine the statistical significance of indirect effects with one intervening variable and the guidelines by Cohen and Cohen (1983) were used to determine the statistical significance of indirect effects involving more than one intervening variable, (d) Non parametric bootstrapping with a random sample size of 1000 was used to determine the statistical significance of the total of indirect effects and the total of all effects.

Discussion

Interpretation of Causal Effects

As a basis for the following discussion of the causal effects in the final model Table 9 summarizes the nature of the effects detailed in Table 8.

Table 9. The nature of total effects

Type of Variable	Endogenous Variable					
	Variable	Intervening Variable			Dependent Variable	
		Perceived Usefulness	Perceived Ease of Use	Social Identity	Flow Experience	Intention
Exogenous Independent Variable	Social Norms	Medium, Only indirect	Medium, Only indirect	Large, Only direct	Small, Only indirect	Medium, Only indirect
	Telepresence	Nil	Nil	Nil	Large, Only direct	Medium, Only direct
Intervening Variable	Social Identity	Large, Mainly direct	Medium, Only direct	Nil	Small, Only indirect	Medium, Mainly indirect
	Perceived Ease of Use	Medium, Only direct	Nil	Nil	Medium, Only direct	Medium, Mainly direct
	Perceived Usefulness	Nil	Nil	Nil	Nil	Medium, Only direct

Note: All effects are positive and significant ($p < 0.05$).

Effects on the two dependent variables (Intention and Flow Experience) are discussed first:

Intention to continue to use SNS is strongest among individuals who, in order of decreasing importance: place a high value on group membership; feel very engaged by the virtual environment created by SNS; find SNS very easy to use and useful; and are very willing to accept the need to conform to the rules and behaviors of the group. Perceptions that SNS are very easy to use and useful not only have important direct effects on intention but also play a significant role in strengthening the most important effect on intention that results from an individual placing a high value on group membership. An increased willingness to accept the need to conform to the rules and behaviors of the group has only indirect effects on intention each of which is increased

by its strong role in increasing the value that an individual places on group membership. Feeling engaged in the virtual environment of SNS has an important direct effect on increasing the user's intention to use SNS.

Flow Experience describes the feelings an individual derives from being totally committed when conducting activities using SNS and is strongest for individuals who feel very engaged by the virtual environment created by SNS and perceive SNS to be very easy to use. Placing a high value on group membership and being very willing to accept the need to conform to the rules and behaviors of the group also have positive but less important indirect effects on flow experience.

Significant effects due to the two independent variables (Social Norms and Telepresence) have been discussed above in relation to the effects on the dependent variables. Additional comments regarding the effects of these two independent variables include:

Social Norms refer to an individual's willingness to accept the rules and behaviors of the group. This acceptance has its greatest direct effect on increasing the value that an individual places on group membership. Its effects on the perceptions that SNS are useful and easy to use are important but indirect resulting from the large effect it has on increasing the value which an individual places on group membership.

Telepresence is a feeling of being very engaged by the virtual environment created by SNS and, as noted above, strong feelings of telepresence lead directly to being totally committed when conducting activities using SNS and to strong intentions to continue using SNS.

Some effects involving the three intervening variables (Social Identity, Perceived Ease of Use, and Perceived Usefulness) have been discussed above. Additional comments regarding the effects of these three intervening variables include:

Social Identity refers to the value that an individual places on group membership and this is increased directly if an individual is willing to accept the rules and behaviors of the group. In turn it has significant direct effects on increasing intentions to use SNS and the individual's perceptions that SNS are useful (**Perceived Usefulness**) and easy to use (**Perceived Ease of Use**) both of which then play significant mediation roles in further increasing intentions to use SNS. However, placing a high value on group membership has only a small indirect effect on flow experience by increasing the perception that SNS are easy to use.

In terms of the overall structure of the final model it is seen that among the 14 constructs derived from previous studies two constructs (Social Norms and Social Identity) representing social influences, two constructs (Telepresence and Flow Experience) representing psychological characteristics, and two systems usage constructs (Perceived Ease of Use and Perceived Usefulness) have emerged as the most important for understanding an individual's intention to use SNS. Telepresence and Social Norms are the important independent variables, Flow Experience and Intention are dependent variables, and Social Identity, Perceived Ease of Use, and Perceived Usefulness play an important role as intervening variables as well as having their own important positive direct effects on intention to use SNS.

Comparison with the Findings of Previous Studies

Table 10 identifies the research hypotheses associated with the theoretical model (see Table 2) which are supported by the findings of the study.

Table 10. Research hypotheses supported by the findings

	Hypothesis	Reference
H1	Social Norm has a significant positive direct effect on: Social Identity	Dholakia et al. (2004)
H3	Social Identity has a significant positive direct effect on Perceived Ease of Use	Kwon and Wen(2009)
H4	Social Identity has a significant positive direct effect on Perceived Usefulness	Kwon and Wen (2009)
H5	Social Identity has a significant positive direct effect on Intention	Hsu and Lin (2008)
H7	Perceived Ease of Use has a significant positive direct effect on Flow Experience	Hsu and Lu (2004)
H8	Perceived Ease of Use has a significant positive direct effect on Perceived Usefulness	Hsu and Lu (2004)
H9	Perceived Ease of Use has a significant positive direct effect on Intention	Hsu and Lu (2004)
H10	Perceived Usefulness has a significant positive direct effect on Intention	Hsu and Lu (2004)
H11	Telepresence has a significant positive direct effect on Flow Experience	Kwon and Wen (2009)
H14	Telepresence has a significant positive direct effect on Intention	Kwon and Wen (2009)

Note: All direct effects are positive and statistically significant ($p < 0.01$).

The research hypotheses in Table 11 were not supported by the findings of the study. However, from the correlations among model variables in Appendix Table A4 it is seen that although significant causal effects referred to in the hypotheses are not supported there are significant correlations between the variables in the hypotheses that have the same direction as that hypothesized for the causal effect. The only exception is H21 where the direction of the correlation between Neuroticism and Intention is the same as in the hypothesis but the correlation is not significant.

From Tables 10 and 11 it is seen that with the exception of the influence of Neuroticism on Intention there is full or partial support for all of the research hypotheses derived from previous studies. Consequently, there is no convincing evidence that the relationships among the model variables are very different for SNS users in Thailand compared to users in developed western societies. However, the analysis of the final model has identified findings not previously reported involving important indirect effects associated with Social Norms and Social Identity and significant mediation effects involving Perceived Ease of Use and Perceived Usefulness and these need to be examined in subsequent studies: (a) Social Norms has significant ($p < 0.01$) positive medium indirect effects on Intention, Perceived Ease of Use, and Perceived Usefulness; (b) Social Norms and Social Identity have significant ($p < 0.05$) positive but small indirect effects on Flow Experience; (c) The total of the indirect effects of Social Identity on Intention are

significant ($p < 0.001$) and greater than the significant ($p < 0.01$) direct effect; and (d) Perceived Ease of Use and Perceived Usefulness are significant mediators in indirect effects.

Table 11. Research hypotheses not supported by the findings

	Hypothesis	Correlation	Reference
H2	Social Norm has a significant positive direct effect on Intention	Positive, significant	Hsu & Lu (2004)
H6	Flow Experience has a significant positive direct effect on Intention	Positive, significant	Hsu & Lu (2004)
H12	Telepresence has a significant positive direct effect on Perceived Ease of Use	Positive, significant	Kwon & Wen (2009)
H13	Telepresence has a significant positive direct effect on Perceived Usefulness	Positive, significant	Kwon & Wen (2009)
H15	Perceived Critical Mass has a significant positive direct effect on Intention	Positive, significant	Hsu and Lu (2004)
H16	Self-presentation has a significant positive direct effect on Intention	Positive, significant	Krasnova et al. (2008)
H17	Openness has a significant positive direct effect on Intention	Positive, significant	Wehrli (2008)
H18	Agreeableness has a significant positive direct effect on Intention	Positive, significant	Wehrli (2008)
H19	Extraversion has a significant positive direct effect on Intention	Positive, significant	Wehrli (2008)
H20	Conscientiousness has a significant positive direct effect on Intention	Positive, significant	Wehrli (2008)
H21	Neuroticism has a significant negative direct effect on Intention	Negative, not significant	Wehrli (2008)

Note: For all statistically significant correlations $p < 0.05$.

Characteristics of Thai Society

In order to assess the extent to which characteristics of Thai society are evident in the findings of the study the level of importance of individual/group characteristics (Table 5), the meanings associated with the questions used for model variables (Appendix), and the results of analyses in section 6 are related to the five characteristics of Thai society using the framework of dimensions in Table 2. The results are presented in Table 12 and the discussion following the table. In Table 12 individual/group characteristics are represented by model variables with their level of importance (high, moderate, low) or results of data analysis. The nature of their support for the characteristic of Thai society is described as either direct, if the support is very evident, or indirect if the support is present but less evident.

Table 12. Evidence of characteristics of Thai society

Characteristics of Thai Society	Individual/Group Characteristic (Level of Importance in the Group)	Support for Characteristic of Thai Society
Collectivism: The extent to which people are integrated into strong, cohesive groups, which protect them in exchange for unquestioning loyalty.	Social Identity (High)	Direct
	Social Norms (High)	Direct
	Agreeableness (High)	Direct
	Perceived Critical Mass (High)	Indirect
	Extraversion (Moderate)	Indirect
Femininity: The extent to which the men and women have the same modest, caring values.	No significant differences between males and females for all individual/group characteristics	Direct
	Self-presentation (Low)	Direct
	Extraversion (Moderate)	Direct
	Agreeableness (High)	Direct
Power Distance: The extent to which the less powerful members of society accept and expect that power is distributed unequally.	Social Norms (High)	Indirect
	Perceived Critical Mass (High)	Indirect
	Agreeableness (High)	Indirect
Uncertainty Avoidance: The extent to which the members of a society are uncomfortable in unstructured situations involving uncertainty and ambiguity.	Social Identity (High)	Direct
	Social Norms (High)	Direct
	Conscientiousness (High)	Direct
	Openness (High)	Direct
	Perceived Critical Mass (High)	Indirect
Short Term Orientation: The extent to which members have respect for tradition, fulfilling social obligations, and protecting one's 'face'.	Social Identity (High)	Direct
	Social Norms (High)	Direct
	Agreeableness (High)	Direct
	Perceived Critical Mass (High)	Indirect
	Self-presentation (Low)	Indirect

It is noted that the high importance of conscientious behavior provides indirect support for Short Term Orientation as a means of protecting one's 'face' but it also provides indirect support for the opposite Long Term Orientation which is associated with the attribute of perseverance. From Table 12 it is seen that all of the characteristics of Thai society are evident in the findings of the study although only indirect support was found for Power Distance as a characteristic of Thai society.

The low importance of feelings of telepresence and flow demonstrate that the SNS environment does not create experiences for Thai SNS users that are very different from the normal reality of Thai society. Individuals do not demonstrate neurotic antisocial behavior, they

have strong intentions to continue to use SNS, and they perceive SNS to be usefulness and ease to use. These individual/group characteristics together with the direct and/or indirect evidence of support for each of the key characteristics of Thai society in Table 12 indicate that the social context created within the SNS environment is compatible with the user's normal experiences and behaviors as a member of Thai society.

Conclusion

From a theoretical perspective the study has shown that the most important causal relationships in understanding an individual's adoption of SNS involve: two social influences (Social Identity and Social Norms), two psychological factors (Telepresence and Flow Experience), and two usage factors (Perceived Ease of Use and Perceived Usefulness) (Figure 3). In terms of significant causal effects or significant correlations (Tables 10 and 11) there is full or partial theoretical support for the findings from previous studies which were conducted mainly in developed western societies. However, significant indirect causal effects of Social Norms and Social Identity on Intention involving mediation effects due to the intervening variables Perceived Ease of Use and Perceived Usefulness were found and these have not been reported in previous studies.

The findings indicate that each of the five key characteristics of Thai society (Collectivism, Femininity, Power Distance, Uncertainty Avoidance, and Short Term Orientation) is evident in characteristics of the individuals/group (Table 12) and that the social context experienced within the SNS environment is compatible with the normal experiences and behaviors of members of Thai society. In particular, the important factors that positively affect the user's intention to use SNS reflect directly or indirectly most of the key characteristics of Thai society.

The findings of the study have practical implications for those responsible for the development and provision of SNS for commercial, community service, or other individual reasons. As with any Internet based systems there is a risk of not having clear profiles of the individual users and their expectations. The results of this study contribute to improving those understandings among developers and providers of SNS especially if the target is Thai users. The importance of social influences highlights the need for SNS developers and providers to focus on functionality to support social interactions. It must be easy and convenient for individuals to find, form, and participate in coherent supportive groups of associates who have common interests and values. Realistic and interesting content is required to encourage enjoyable feelings of telepresence and flow, social identification, and the ease of use and usefulness of SNS which ultimately lead to a strong intention to continue usage. Although traditional personality traits such as openness, agreeableness, extraversion, and conscientiousness may not be direct significant causes for continued use of SNS among Thai users they do reflect key characteristics of Thai society and thus contribute to ensuring that the SNS environment is compatible with everyday life experiences, which enhance the likelihood of SNS usage among Thai users. Perceived Usefulness and Perceived Ease of Use are important determinants of the adoption and use of almost all information systems and SNS are not an exception. In order to ensure that these perceptions are accommodated developers and providers must pay careful attention to technical and aesthetic features of interface design, methods of interaction, and efficient and effective functionality of SNS.

Public and private sector organizations are increasingly recognizing the potential of SNS. The use of SNS for viral marketing campaigns and by special interest groups, professions, and members of organizations for knowledge sharing are important applications. The results of this study provide insights into the relationships among characteristics of users and characteristics of Thai society that must be addressed if these applications are to gain and maintain acceptance in the context of Thailand. In particular, personality traits that are positively correlated with continued use of SNS may be used to determine the presentation style and content as well as the types of products and services that will be well received by individuals in SNS viral marketing campaigns and it is also noted that SNS have been used already by individuals seeking public support (e.g. politicians).

In order to establish the external validity of the results of this study there is a need for the study to be repeated particularly in light of the fact that the sample of respondents represents predominantly those who live in urban and suburban areas in Thailand. There is also a need for other related studies including those which focus on: usage factors in combination with social influences, or psychological factors separately; specific types of SNS; users in rural areas; and different categories of age, level of education, income, and gender. Longitudinal studies are needed to examine possible changes in the importance of factors as users gain more experience with SNS.

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APPENDIX

Questionnaire

The questionnaire is notated to indicate the labels used for variables and indicators for latent variables.

Section 1: Profile of Respondents

1. Gender: Male, Female
2. Age (Years): 20 or less, 21-25, 26-30, 31-35, 36-40, more than 40.
3. Highest level of formal education: Primary School, High School/Diploma, Bachelor's Degree, Master Degree, Doctoral Degree
4. The Province where you live in Thailand:
5. Place of SNS usage. You may select more than one: Home only, School/University Campus only, Net Café only, Mobile Technologies only. **Note:** All other combinations of these places of use where also available for selection.
6. Number of years of SNS usage: less than 1 year, 1-2 years, 2-3 years, more than 3 years
7. SNS providers that you use. You may select more than one: Hi5 only, Facebook only, Other only. **Note:** All other combinations of these providers were available for selection and participants were asked to identify all "other" sites used.

Section 2: Model Variables

For each item responses are measured on a 5-point scale: Strongly Agree (5), Agree (4), Neutral (3), Disagree (2), and Strongly Disagree (1). The three highlighted indicators TP1, OP1, and EX1 were deleted as a result of factor analysis.

Social Influences	Indicator	Social Influences	Indicator
1. My friends think that I should use SNS.	SN1	6. Activities in my SNS community are an important part of my life.	SI3
2. People who are important to me think that I should use SNS.	SN2	7. As a member of a SNS community, I am the type of person who likes to engage in my SNS.	SI4
3. People who influence my behavior encourage me to use SNS.	SN3	8. Most people in my group (e.g. university campus, office) use the SNS frequently.	PCM1
4. Using SNS would enhance my chance to meet members who have common interests.	SI1	9. Most people in my city use the SNS frequently.	PCM2
5. Members in my SNS have a strong feeling of "one group".	SI2		

For questions 5 and 6: "flow" is used to describe a state of mind sometimes experienced by people who are totally involved in some activity. One example of flow is where a user is playing extremely well and achieves a state of mind where nothing else matters but the online game. You are engaged with total involvement, concentration, and enjoyment.

Psychological Characteristics	Indicator	Psychological Characteristics	Indicator
1. When the SNS session ends, I felt like I have actually met other people.	TP1	19. I have frequent mood swings.	NU4
2. I feel that the SNS creates a new world.	TP2	20. I panic easily.	NU5
3. While engaged in the SNS, I feel that I am in a different society.	TP3	21. I am always prepared.	CC1
4. While engaged in the SNS, the SNS world seems more real or present to me compared to the "real world".	TP4	22. I make plans and stick to them.	CC2
5. Do you think you have ever experienced <i>flow</i> in using the SNS (See note above).	FE1	23. I usually carry out my plans.	CC3
6. Most of the time I use the SNS I feel that I am in <i>flow</i> (See note above).	FE2	24. I get chores done right away.	CC4
7. I usually want to be the center of attention.	SP1	25. I always pay attention to details.	CC5
8. I enjoy having an audience.	SP2	26. I have a good word for everyone.	AG1
9. I engage in behavior that wins the notice of others.	SP3	27. I respect others.	AG2
10. I may enjoy being dramatic or witty.	SP4	28. I believe that others have good intentions.	AG3
11. I am the life of the party.	EX1	29. I accept people as they are.	AG4
12. I am confident and comfortable in social situations.	EX2	30. I make people feel at ease.	AG5
13. I make friends easily.	EX3	31. I have a vivid imagination.	OP1
14. I know how to captivate people.	EX4	32. I enjoy hearing new ideas.	OP2
15. I feel comfortable around people.	EX5	33. I am curious about many areas of knowledge.	OP3
16. I often feel blue.	NU1	34. I have a wide variety of interests.	OP4
17. I am often down in the dumps.	NU2	35. I like change and new experiences.	OP5
18. I dislike myself.	NU3		

Usage Factors	Indicator	Usage Factors	Indicator
1. Learning to use the SNS is easy for me.	PEU1	5. Using the SNS would improve my efficiency in sharing information and connecting with others.	PU2
2. The process of using the SNS is clear and understandable.	PEU2	6. The SNS is a useful service for communication.	PU3
3. I find the SNS easy to use.	PEU3	7. I will frequently return to the SNS that I use in the future.	IN
4. Using the SNS enables me to acquire more information or meet more people.	PU1		

Table A1. Factor analysis

Indicator	Component												
	NU	CC	OP	EX	PEU	SP	AG	PU	SI	SN	TP	FE	PCM
NU3	.824	-.005	-.076	-.099	-.017	.058	-.079	.018	-.028	.064	.148	.096	.000
NU2	.810	.014	-.125	-.011	.063	.001	-.029	-.137	-.013	.020	.275	.116	.009
NU1	.809	-.048	-.120	-.053	.000	.083	-.016	-.079	-.052	-.013	.262	.057	-.008
NU4	.725	-.049	.153	-.050	-.056	.298	-.079	-.001	.096	.006	-.038	.082	.131
NU5	.665	-.061	-.110	.005	-.161	.265	.007	.119	.147	-.028	-.205	.188	.080
CC3	-.060	.832	.036	.154	-.015	-.010	.105	.060	.085	.016	.070	.054	.040
CC2	.007	.827	.068	.166	.003	.048	.087	.148	-.004	.048	-.065	.088	.033
CC4	-.020	.707	.068	.135	.042	.029	.079	.003	.101	.028	.068	.178	.151
CC1	-.163	.624	.107	.209	.228	.032	.218	.045	-.007	.048	-.042	-.046	-.031
CC5	.089	.582	.136	.007	.008	.121	.274	.069	-.001	.075	.086	-.017	.167
OP4	-.073	.056	.809	.047	.108	.022	.075	.119	-.001	-.085	-.054	.063	.079
OP3	-.119	.143	.804	.092	.202	.081	.138	.077	.070	.062	.009	-.062	.035
OP2	-.013	.175	.758	.046	.169	.062	.208	.153	.006	.077	-.111	-.047	.094
OP5	-.023	-.059	.645	.295	.219	-.108	.013	.059	.116	.080	-.013	.069	.157
EX3	-.015	.125	.138	.774	.064	.138	.092	.185	-.002	.057	.097	.061	.077
EX5	-.178	.189	.042	.742	.230	.140	.078	-.028	.148	.110	-.127	-.071	.066
EX4	.057	.116	.070	.730	.012	.263	.132	.056	.110	-.021	.043	.133	.133
EX2	-.127	.202	.170	.669	.185	.246	.089	.105	.061	.107	-.036	-.049	-.023
PEU3	-.028	-.009	.163	.032	.833	.054	.057	.210	.099	.059	-.047	.083	.140
PEU2	-.015	.052	.124	.165	.833	.041	.065	.206	.080	.029	.056	.070	.081
PEU1	-.012	.029	.220	.073	.804	.060	.089	.242	.082	-.038	.010	.134	.094
SP3	.062	.061	-.016	.269	-.002	.755	.027	.047	.221	.109	.062	.230	.037
SP2	.124	.047	.069	.096	.054	.738	.103	.209	-.047	.145	.132	.036	.145
SP1	.152	.053	.045	.147	.117	.727	.052	.071	.135	.027	.200	.116	.105
SP4	.193	-.007	-.045	.216	.069	.657	-.164	-.058	.083	.127	.065	.221	-.057
AG2	-.066	.263	.061	-.034	.096	.124	.779	.103	.028	-.017	.018	-.079	.125
AG1	-.044	.148	-.002	.087	.098	.086	.754	.013	.034	.035	.088	.027	.121
AG3	-.057	.118	.154	.154	.026	-.011	.689	.216	.071	.150	-.050	.113	-.046
AG4	-.016	-.029	.311	.175	.095	-.272	.614	.138	-.026	.107	-.099	.060	.036
AG5	.002	.122	.226	.377	.010	-.075	.415	.198	.090	.145	.067	.104	.101
PU2	-.037	.128	.114	.066	.263	.095	.109	.795	.214	.103	.137	.077	.100
PU3	-.057	.128	.116	.084	.250	.033	.129	.781	.212	.094	.005	.064	.102
PU1	-.003	-.054	.094	.095	.277	.063	.099	.754	.201	.127	.179	.104	.152

SI2	-.030	.012	-.051	.078	-.028	.070	.078	.164	.794	.110	.079	.021	.178
SI3	.086	.044	.100	.054	.214	.018	-.057	.147	.718	.201	.246	.173	.012
SI4	-.006	.108	.160	.127	.214	.156	-.027	.202	.688	.127	.179	.205	-.003
SI1	.030	-.034	.000	-.004	.025	.108	.146	.349	.557	.182	.117	.109	.306
SN3	.018	.063	-.006	.005	.025	.089	-.013	.070	.129	.850	.182	.118	.121
SN2	.051	.044	-.041	.065	.057	.022	.091	.029	.181	.836	.183	.093	.099
SN1	-.043	-.021	.091	.066	-.033	.122	.091	.154	.068	.737	.040	.143	.179
TP3	.172	.000	-.052	.034	-.054	.058	-.038	.059	.010	.135	.790	.163	.078
TP2	.004	.043	.030	-.039	.006	.232	.078	.217	.268	.237	.698	.164	.062
TP4	.104	.017	-.129	-.017	.060	.067	.006	.034	.300	.113	.630	.315	-.028
FE1	.063	.060	.033	-.032	.086	.127	.039	.083	.038	.133	.166	.876	.116
FE2	.138	.073	-.037	.022	.101	.115	.016	.035	.135	.126	.229	.845	.092
PCM1	.019	.069	.087	.036	.115	.012	.035	.058	.100	.078	.080	.025	.839
PCM2	.044	.047	.038	.046	.057	.043	.030	.077	.033	.168	-.027	.134	.790

Total Variance Explained

Component	Initial Eigenvalues	Percentage of Variance	Cumulative Percentage	Rotation Sums of Squared Loadings		
				Total	Percentage of Variance	Cumulative Percentage
NU	9.864	20.987	20.987	3.243	6.901	6.901
CC	5.484	11.669	32.656	2.983	6.347	13.248
OP	3.004	6.392	39.048	2.848	6.059	19.307
EX	2.569	5.465	44.513	2.809	5.977	25.284
PEU	2.305	4.904	49.417	2.739	5.827	31.111
SP	1.813	3.858	53.275	2.736	5.822	36.933
AG	1.579	3.359	56.634	2.623	5.582	42.514
PU	1.417	3.016	59.650	2.603	5.538	48.053
SI	1.349	2.871	62.522	2.530	5.384	53.436
SN	1.268	2.697	65.218	2.435	5.181	58.617
TP	1.158	2.464	67.682	2.200	4.680	63.297
FE	1.091	2.108	69.790	2.138	4.549	67.846
PCM	1.034	1.988	71.778	1.848	3.932	71.778

Notes: (a) Extraction Method: Principal Component Analysis, (b) Rotation Method: Equamax with Kaiser Normalization and rotation converged in 9 iterations, (c) Kaiser-Meyer-Olkin measure of sampling adequacy 0.860, (d) Bartlett's Test of Sphericity: Chi-Square 8331.816 (approx.), degrees of freedom 108, and significance 0.000, (e) Components with eigenvalues less than 1 are not shown, (f) Three indicators TP1, OP1, and EX1 were removed as they had significant cross loadings on more than a single component.

Table A2. Internal consistency reliability

Variable	Indicators	Cronbach Alpha	Variable	Indicators	Cronbach Alpha
Social Identity	SI1, SI2, SI3, SI4	.8177	Perceived Critical Mass	PCM1,PCM2	.7669
Social Norms	SN1, SN2, SN3	.8348	Openness	OP2,OP3,OP4,OP5	.8353
Self-presentation	SP1, SP2, SP3, SP4	.8286	Agreeableness	AG1,AG2,AG3,AG4,AG5	.7790
Telepresence	TP2,TP3,TP4	.7766	Extraversion	EX2,EX3,EX4,EX5	.8425
Perceived Ease of Use	PEU1,PEU2,PEU3	.8947	Conscientiousness	CC1,CC2,CC3,CC4,CC5	.8224
Perceived Usefulness	PU1,PU2,PU3	.8944	Neuroticism	NU1,NU2,NU3,NU4,NU5	.8883
Flow Experience	FE1,FE2	.8873			

Table 2 Note: For Cronbach alphas: $0.9 \leq \text{Excellent} \leq 1$; $0.8 \leq \text{Good} < 0.9$; $0.7 \leq \text{Acceptable} < 0.8$ (George and Mallery, 2003).

Table A4. Correlation coefficients for respondent profile and model variables

Variable	Profile Variable			Model Variable													
	A	E	U	SN	SI	PCM	TP	FE	SP	EX	NU	CC	AG	OP	PEU	PU	
Age (A)	1																
Level of Education (E)	.594	1															
Number of Years of Use (U)	-.081	.156	1														
Social Norms (SN)	.027	.051	.155	1													
Social Identity (SI)	-.001	.046	.185	.424	1												
Perceived Critical Mass (PCM)	-.148	.002	.139	.311	.292	1											
Telepresence (TP)	.067	.052	.077	.411	.479	.158	1										
Flow Experience (FE)	-.080	.002	.107	.336	.367	.235	.476	1									
Self-presentation (SP)	.003	.043	.147	.287	.353	.193	.369	.361	1								
Extraversion (EX)	.128	.141	.213	.199	.278	.176	.071	.124	.428	1							
Neuroticism (NU)	-.110	-.040	-.001	.077	.104	.097	.277	.273	.339	-.089	1						
Conscientiousness (CC)	.157	.210	.188	.157	.190	.201	.113	.170	.188	.410	-.070	1					
Agreeableness (AG)	-.016	.028	.132	.227	.225	.219	.083	.123	.185	.380	-.021	.438	1				
Openness (OP)	-.057	-.048	.148	.115	.208	.217	-.053	.055	.184	.356	-.045	.277	.405	1			
Perceived Ease of Use (PEU)	-.102	-.061	.195	.129	.341	.239	.112	.218	.201	.315	-.052	.193	.282	.440	1		
Perceived Usefulness (PU)	-.020	-.004	.155	.309	.561	.295	.303	.260	.264	.311	-.026	.253	.391	.353	.542	1	
Intention (IN)	.039	.094	.102	.301	.520	.229	.376	.248	.235	.284	-.005	.200	.328	.275	.465	.587	

Notes: (a) For highlighted correlation coefficients $p < 0.05$, (b) For the profile variables Age (A) and

Number of Years of Use (U) measures are based on the mid points of the categories and for Level of Education (E) categories are represented by 6, 12, 16, 18, and 22 which correspond to the expected number of years to complete the awards, (c) Latent variables were converted to single interval scale measures using the mean of the responses for their indicators. For each latent variable the statistical significance and the direction of the correlations shown in the table applied to all of the indicators for the latent variable.

Table A3. Descriptive statistics for model variables

Variable (Indicator)	Mean	Std. Deviation	Skewness	Kurtosis	Variable (Indicator)	Mean	Std. Deviation	Skewness	Kurtosis
Openness (OP)					Social Identity (SI)				
OP2	4.13	.808	-.877	1.117	SI1	3.99	1.029	-.902	.254
OP3	4.06	.833	-.638	.189	SI2	3.60	1.064	-.496	-.305
OP4	4.12	.796	-.699	.320	SI3	3.09	1.151	-.146	-.729
OP5	3.89	.900	-.733	.515	SI4	3.16	1.174	-.177	-.743
Agreeableness (AG)					Social Norms (SN)				
AG1	3.72	.860	-.368	-.014	SN1	3.73	1.070	-.657	-.096
AG2	4.13	.751	-.623	.402	SN2	3.10	1.123	-.157	-.601
AG3	3.73	.832	-.368	.152	SN3	3.10	1.140	-.260	-.589
AG4	3.95	.758	-.398	.133	Self-presentation (SP)				
AG5	3.43	.877	-.050	.051	SP1	2.67	1.180	.060	-.877
Extraversion (EX)					SP2	2.61	1.093	-.388	-.294
EX2	3.16	.976	-.146	-.108	SP3	2.66	1.097	.125	-.572
EX3	3.34	1.053	-.277	-.285	SP4	2.15	1.100	.599	-.543
EX4	2.95	1.044	-.002	-.340	Telepresence (TP)				
EX5	3.05	1.032	-.055	-.364	TP2	2.93	1.222	-.091	-.931
Conscientiousness (CC)					TP3	2.81	1.230	.002	-.984
CC1	3.43	.848	-.237	.334	TP4	2.23	1.175	.558	-.637
CC2	3.34	.872	.022	-.357	Perceived Ease of Use (PEU)				
CC3	3.35	.916	-.132	-.331	PEU1	3.96	.896	-.555	-.085
CC4	3.23	.984	.058	-.565	PEU2	3.81	.886	-.316	-.508
CC5	3.55	.963	-.216	-.471	PEU3	3.93	.858	-.393	-.411
Flow Experience (FE)					Perceived Usefulness (PU)				
FE1	2.89	1.311	-.026	-1.145	PU1	4.02	.901	-.890	.790
FE2	2.59	1.222	.189	-1.051	PU2	4.03	.894	-.935	.946
Neuroticism (NU)					PU3	4.16	.828	-.845	.408
NU1	2.08	1.069	.648	-.595	Perceived Critical Mass (PCM)				
NU2	1.72	1.031	1.274	.569	PCM1	4.15	.897	-.917	.364
NU3	1.95	1.031	.752	-.384	PCM2	3.95	1.074	-.833	-.040
NU4	2.72	1.171	.119	-.835	Intention (IN)	3.53	.8251	-.415	.245
NU5	2.23	1.126	.513	-.691					

Table A4. Correlation coefficients for respondent profile and model variables

Variable	Profile Variable			Model Variable													
	A	E	U	SN	SI	PCM	TP	FE	SP	EX	NU	CC	AG	OP	PEU	PU	
Age (A)	1																
Level of Education (E)	.594	1															
Number of Years of Use (U)	-.081	.156	1														
Social Norms (SN)	.027	.051	.155	1													
Social Identity (SI)	-.001	.046	.185	.424	1												
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Telepresence (TP)	.067	.052	.077	.411	.479	.158	1										
Flow Experience (FE)	-.080	.002	.107	.336	.367	.235	.476	1									
Self-presentation (SP)	.003	.043	.147	.287	.353	.193	.369	.361	1								
Extraversion (EX)	.128	.141	.213	.199	.278	.176	.071	.124	.428	1							
Neuroticism (NU)	-.110	-.040	-.001	.077	.104	.097	.277	.273	.339	-.089	1						
Conscientiousness (CC)	.157	.210	.188	.157	.190	.201	.113	.170	.188	.410	-.070	1					
Agreeableness (AG)	-.016	.028	.132	.227	.225	.219	.083	.123	.185	.380	-.021	.438	1				
Openness (OP)	-.057	-.048	.148	.115	.208	.217	-.053	.055	.184	.356	-.045	.277	.405	1			
Perceived Ease of Use (PEU)	-.102	-.061	.195	.129	.341	.239	.112	.218	.201	.315	-.052	.193	.282	.440	1		
Perceived Usefulness (PU)	-.020	-.004	.155	.309	.561	.295	.303	.260	.264	.311	-.026	.253	.391	.353	.542	1	
Intention (IN)	.039	.094	.102	.301	.520	.229	.376	.248	.235	.284	-.005	.200	.328	.275	.465	.587	

Table 4 Notes: (a) For highlighted correlation coefficients $p < 0.05$, (b) For the profile variables Age (A) and Number of Years of Use (U) measures are based on the mid points of the categories and for Level of Education (E) categories are represented by 6, 12, 16, 18, and 22 which correspond to the expected number of years to complete the awards, (c) Latent variables were converted to single interval scale measures using the mean of the responses for their indicators. For each latent variable the statistical significance and the direction of the correlations shown in the table applied to all of the indicators for the latent variable.

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