

# An Empirical Study on Moderating Effects of Espoused National Cultural Values on Internet Community Stickiness

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## Abstract

Recently, the concept of web site stickiness receives attention as a measure of strategy to influence user's visit and behavior on web sites. Web site stickiness means site visit frequency and stay duration. This study investigates the moderating effect of espoused national cultural values on Internet community stickiness with the assumption that dimensional values of national culture can be internalized as individual's espoused values. Espoused values (i.e., espoused national cultural values) are defined as the degree to which an individual embraces the values of his or her national culture. Our findings can be summarized as follows. First, femininity and power distance moderate the influence of user participation on Internet community stickiness. Second, uncertainty avoidance and power distance moderates the effect of social influence on Internet community stickiness. However, femininity and collectivism do not moderate the effect of social influence on Internet community stickiness. Third, uncertainty avoidance, femininity, and collectivism moderate the influence of network effect on Internet community stickiness. Fourth, masculinity does not moderate the influence of usefulness on Internet community stickiness.

Keywords : National Culture, Espoused Values, Stickiness, Internet Community

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## 1. Introduction

Understanding of and adaptation to national culture are indispensable issues for global companies. Effective management in accordance to national culture helps fast and sustainable competitiveness [Hoecklin, 1996]. Recent development of information technologies facilitates international transactions and collaborations both on- and off-line, and renders more importance to understanding and application of national culture.

Information service companies provide information systems and information services to their local clients and advance to foreign countries based on their experiences in their local countries. For example, MySpace, which offers the largest social network in the world, launched their business in Korea. CyWorld, similar business model to MySpace, advanced to China, Japan, U.S., and Chinese Taipei. Regardless of early ambitious embarkment, these companies suffer difficulty in developing the localized services to their new clients in new national culture [Khaslavsky, 1998]. These examples testify that success in a country does not guarantee success in other countries [Zakaria and Stanton, 2003]. Such phenomenon results from the fact that services are sensitive to differences in language, economy, and national cultures [Ford et al., 2003]. National culture also makes important influence on IS effectiveness and efficiency [Leidner and Kayworth, 2006]. Therefore, interests in national culture have recently risen up in IS studies.

Despite such importance, IS studies have

not paid enough attention to comparative analysis over national culture, especially to Internet services from the standpoint of national culture. The critical issue about national culture is ecological fallacy trap that assumes that national culture scores can explain everyone's behaviors in a national culture [Srite and Karahanna, 2006]. This trap is not accepted in academia because individuals accept and embrace national cultural values differently, and develop individual's espoused values. Espoused values (i.e., espoused national cultural values) are defined as the degree to which an individual embraces the values of his or her national culture [Srite and Karahanna, 2006]. Behavioral IS studies have included numerous individual traits as moderators in IT adoption model. Such traits include age [Venkatesh et al., 2003], gender [Venkatesh and Morris, 2000; Venkatesh et al., 2003], experience [Venkatesh et al., 2003; Davis et al., 1989; Karahanna et al., 1999; Taylor and Todd, 1995; Venkatesh and Morris, 2000], and voluntariness [Hartwick and Barki, 1994]. However, national culture was never considered as moderator in IS adoption models.

Business transactions are active on Internet communities overcoming chronological and geographical constraints, and therefore, must be the appropriate subject in investigating the influence of national culture on Internet. Internet community means cyberspace-based communities where participants feel membership, share information and knowledge about common interests, and regularly meet to continue relationship [Armstrong and Hagel, 1996]. The

early Internet community sites such as Cy-World and I Live School first focused on personal relationship, and afterwards have included blog features blurring the distinction between community and blog site. These sites have evolved into social network services (SNS) and observed new entrants as People2, Nplug, and Linknow. Internet community service vendors (or Internet community companies) create margins by selling digital contents (game, music, and avatar) and providing marketing services (commercials and alliance marketing). Internet community companies used to put priority on the number of members as source of profit, but have shifted to stickiness that is measured by visit frequency and stay duration [Reichheld and Schecter, 2000; Guenther, 2004; Gillespill et al., 1999]. Therefore, this study investigates the influential factors for the success of Internet community companies (i.e., internet community stickiness) with special interest in national culture regarding the causal relationship among all these factors. Our research questions can be summarized as follows :

- First, do user participation, social influence, network effect, and usefulness make influence on Internet community stickiness?
- Second, do espoused national values that are characterized by uncertainty avoidance, masculinity/femininity, individualism/collectivism, and power distance moderate the influences of those factors on Internet community stickiness?

## 2. Theoretical Background

### 2.1 Technology Adoption Model

IS studies have adopted theory of reasoned action (TRA) [Ajzen and Fishbein, 1980], theory of planned behavior (TPB) [Ajzen, 1991], and technology acceptance model (TAM) [Davis, 1989] to explain and predict individual user's adoption of information technology. Among those theories, TAM has attracted the most attention. TAM states that perceived ease of use (PEU) influences perceived usefulness (PU), which in turn leads to intention to use IT. Later models such as TAM2 expanded the original TAM by including subjective norm [Venkatesh and Davis, 2000]. Subjective norm means the significant other's belief that certain behavior should be conducted or not. All the TRA, TPB and TAM2 in common conclude that subjective norm is an important factor for individual's adoption of information technology.

### 2.2 Motivation Theory

According to motivation theory [Deci, 1975], IS use is determined by both intrinsic and extrinsic motivation factors [Malhotra and Galletta, 2004; Van der Heijden, 2004]. Extrinsic motivation factors mean compensations and benefits from the result of task execution, whereas intrinsic motivation factors mean the sense of achievement and responsibility during execution of tasks. According this framework, PU in TAM is an extrinsic motivation factor

because it is the expected benefits gained from user's participation in system development and usage [Van der Heijden, 2004]. However, user's participation in Internet community is related to intrinsic motivation because users voluntarily organize a community and make digital contents to share with community members and to achieve common goals.

Van der Heijden [2004] distinguished utilitarian IS from hedonic IS in terms of the pursued values of IS. Utilitarian IS such as Excel, accounting IS, groupware, and ERP targets at improving task performances, whereas hedonic IS such as movie web site, computer game, and game-based education provides fun and entertainment to users and eventually helps self-achievement [Van der Heijden, 2004; Kang and Kim, 2006]. Internet community site such as mini-home page and blog sites can be categorized as hedonic IS because it purports to help voluntary chasing for fun and entertainment. Motivation factors have different influences on intention to use IS according to different types of IS. Utilitarian IS is more influenced by extrinsic factors because such IS focuses on task execution, whereas hedonic IS is more involved with intrinsic factors such as fun and entertainment [Van der Heijden, 2004]. Internet community sites represent hedonic IS because users voluntarily visit and participate in various activities on these sites for the sake of intrinsic motivation reasons such as challenge and attainment [Van der Heijden, 2004].

### 2.3 National Culture and Individual' Espoused Values

Hofstede's [1980] definition of national culture is classic in management studies. Hofstede [1980] defines that national culture is the collective mental programming that characterizes a group of people from other groups. National culture is observed both at individual and collective levels. The sensitive issue is ecological fallacy trap that presumes that national cultural scores can explain and predict individual's behaviors of a national culture. This fallacy is not accepted because individuals internalized national culture in diverse and different ways. Espoused national cultural values (espoused values in short) are defined as the degree to which an individual embraces the values of his or her national culture [Srite and Karahanna, 2006]. These espoused values affect individual's decision to adopt technology [Srite and Karahanna, 2006]. So, measurement of individual's cultural value system helps predict individual's behaviors. Hofstede [1980] proposed four dimensions that characterize national culture through surveys of IBM employees from 66 different countries : i.e. uncertainty avoidance, individualism/collectivism, masculinity/femininity, and power distance.<sup>1)</sup>

#### (1) Uncertainty avoidance

Uncertainty avoidance is the orientation to

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1) Hofstede and Bond [1988] later added the short-term vs. long-term orientation as the fifth dimension of national culture.

avoid uncertainty and ambiguity because people in certain culture feel unstable under such situations. Strong uncertainty avoidance is characterized by high dependency on rules, absolute truth, and expert's advices and propensity for stability. Weak uncertainty avoidance accepts uncertainty, risks and diversity.

(2) Individualism vs. collectivism

Individualism puts priority on individual objectives for every behavior, and treasures him- or her-self and family members in direct line. Meanwhile, collectivism weighs group objectives for behaviors, manages and protects group members based on their commitment and loyalty, treasures prestige, and values coordination with social environments.

(3) Masculinity vs. femininity

This dimension is not related to gender issue. Masculinity prefers achievement, heroism, and dogmatic decision, whereas femininity treasures relationship, modesty, cares for the weak, and quality of life. Masculine culture weighs monetary earnings, power, and social status, whereas feminine culture prefers soft, cooperative, and non-competitive behaviors.

(4) Power distance

Power distance means the degree of acceptance of unfair distribution of power and inequality in society. Society with high power distance takes social inequality for granted, accepts hierarchical orders, and is authoritative. Society with low power distance emphasizes human rights and opportunity equality,

and insists that rankings do not override social equality in organization.

### 3. Research model and hypotheses

Our study regards the user's participation as influential factor for Internet community stickiness based on motivation theory [Deci, 1975; Malhotra and Galletta, 2004; Van der Heijden, 2004] and the follow-up studies in IS discipline [Olson and Ives, 1981; Doll and Torkzadeh, 1989; Barki and Hartwick, 1994; Hutton and Beeler, 1997]. Independent variables also include social influence, network effect, and usefulness. Previous studies found that usefulness, ease-of-use, social influence, and supporting conditions influence intention to use IS [Venkatesh et al., 2003] and that network effect, usefulness, and adoption costs influence usage behaviors [Zhu et al., 2006]. However, internet community does not require substantial adoption costs nor organizational supports because users voluntarily visit and participate in various activities. Therefore, adoption costs and supporting conditions are excluded in our model. Ease-of-use is also excluded because it influences intention to use IS, but does not last its influence on continuous use [Davis et al., 1989; Karahanna et al., 1999; Bhattacharjee, 2001]. Furthermore, numerous studies about internet-based IS even cast doubt on the influence of ease-of-use on intention to use [Kang and Kim, 2006; Kim, 2005; Ko and Kwon, 2008].

Experiences and demographic variables such as gender, age, and income moderate the im-

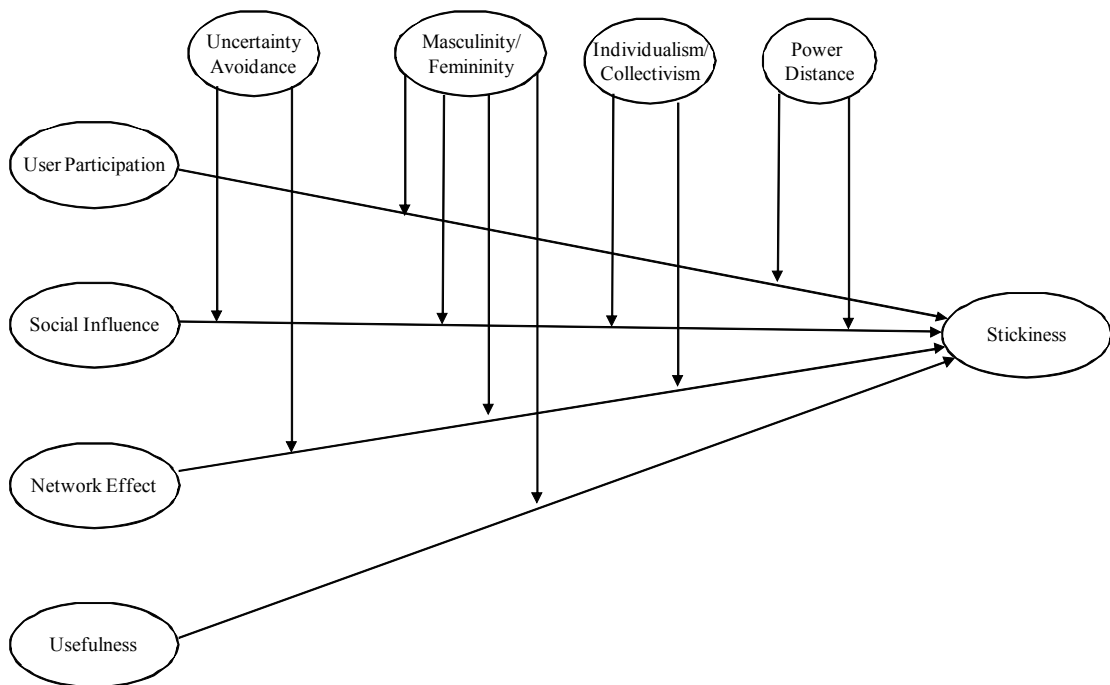
impact of social influence and usefulness on intention to use IS [Venkatesh et al., 2003; Davis et al., 1989; Karahanna et al., 1999; Taylor and Todd, 1995; Venkatesh and Morris, 2000]. However, these studies did not consider the issue of culture and espoused values. Therefore, we have the espoused values as moderating variables that affect the influence of independent variables on the dependent variable (i.e., Internet community stickiness). Our research model is depicted in <Figure 1>.

### 3.1 User participation

Users participate in business activities in various ways until products and services are delivered to them. User's participation can be categorized into consuming participation, op-

tional participation, and prosuming participation [Tapscott and Williams, 2006]. Consuming participation is the traditional mode of user participation where users just consume the given products. Optional participation is more proactive than consuming participation because it allows customers to choose options and customize the products to satisfy idiosyncratic needs. Prosuming participation is the most proactive mode of user participation because users get involved with design, manufacturing/assembly, marketing, and consumption to create and consume what they want.

User participation in internet community sites contains all those three aspects of user participation as mentioned above. First, consuming participation is effective for Internet community sites because users just visit oth-



<Figure 1> Research Model

er's internet community sites and involve with various activities without making mini-home page or blog sites. Second, optional participation is also effective because users can choose option functions available at internet community sites to customize the web site. Third, prosuming participation is effective for internet community site because users can make a web page or produce digital contents in person by using various tools such as photoshop.

Recently, the concept of stickiness receives attention as a measure of strategy to influence user's visit and behavior on web sites. Stickiness means site visit frequency and stay duration [Holland and Baker, 2001; Guenther, 2004; Gillespill et al., 1999; Park et al., 2003]. High stickiness of web site means frequent visit and long stay duration. Users frequently visit a web site when they perceive high value on it [Holland and Baker, 2001]. Frequent visit enhances familiarity, which in turn increases the value of a web site [Hammond et al., 1988]. Stay duration is a useful measure for the performance of web site [Bucklin and Sismeiro, 2000]. Long stay duration implies that users are exposed to more contents and are more likely to conduct electronic commerce [Gillespill et al., 1999; Park et al., 2003].

Optional and prosuming participation are associated with intrinsic motivation. By choosing options available at a web site, users can experience a sense of achievement which is an intrinsic motivation factor. Prosuming participation is triggered by more proactive motivation than optional participation because

users have stronger desire to make and produce customized contents by using various tools other than options offered by web site. Both optional and prosuming participation encourage intrinsic motivation (or vice versa), and eventually increase stickiness. Ginzberg [1981] states that user's participation in IS development encourages user's positive attitude towards the system and helps the success of IS. Malhotra and Galletta [2004] and Van der Heijden [2004] conclude that users with intrinsic motivation are more satisfied with IS, use IS more often and longer, and achieve better task performances by using IS. Therefore, we generate the following hypothesis.

**Hypothesis 1 : User participation makes positive influence on internet community stickiness.**

Masculine culture is ego-centric and goal-oriented, whereas feminine culture focuses on relationship and quality of life [Hofstede 1980]. Internet community sites such as CyWorld are characterized by such feminine culture. For example, users can chat with friends, upload and share photographs, invite friends to an event, and offer special gifts each other on such sites. Such user's participation and activities well reflect the features of feminine culture rather than masculine culture. Therefore, user's participation is more likely to lead to stickiness when users have embraced feminine values.

**Hypothesis 1a : The influence of user participation on internet community stickiness is larger for individuals with espoused feminine values.**

People with low power distance easily access to other people, propose opposite opinions, prefer candid communication and critiques [Hofstede, 1980; Hofstede and Associates 1998], and support democracy based on participation [Srite and Karahanna, 2006]. Low power distance also prefers discussion and participatory decision making by referring to other's opinions.

**Hypothesis 1b : The influence of user participation on internet community stickiness is larger for individuals with low espoused power distance values.**

### 3.2 Social influence

Social influence means the internalization of subjective values of the reference group [Triandis, 1980]. Numerous IS studies have identified that social influence is an important factors for IS use [Cooper and Zmud, 1990, Hartwick and Barki, 1994; Taylor and Todd, 1995; Karahanna et al., 1999; Venkatesh and Davis, 2000; Venkatesh et al., 2003]. Subjective norm is the most popular operationalization of social influence. Other sub-dimensions of social influence include image [Venkatesh and Davis, 2000], social factors [Venkatesh et al., 2003], and visibility [Yang and Kwon 2003]. Our study conceptualizes social influence as

subjective norm and image for the relevancy to Internet community site. Subjective norm means the degree of belief that reference groups expect certain behaviors on me [Fishbein and Ajzen, 1975]. Image means the perceived degree of enhancement of social status and image by adopting and using an innovative technology [Moore and Banbasat, 1991]. Venkatesh et al. [2003] and Yang and Kwon [2003] find that social influence makes positive impact on IS adoption and use. Brown and Venkatesh [2005] find that social influence also affects adoption of technology at home. Ko and Kwon [2008] confirm that social influence makes significant impact on using internet community sites. Therefore, we generate the following hypothesis.

**Hypothesis 2 : Social influence makes positive impact on Internet community stickiness.**

Uncertainty about IS can be reduced by informational and normative influences [Srite and Karahanna, 2006]. Uncertainty can be reduced when users get information from friends and colleagues about their experiences of using IS or by observing their usage behavior. Normative influence can also reduce uncertainty by colleague's or boss' enforcing norms in regards to using IS. Such normative pressures work as evidences that IS is a socially accepted or desirable instrument in conducting tasks. So, users with high uncertainty avoidance tend to follow other's opinions to reduce uncertainty and to visit web sites that



others recommend. Therefore, we generate the following hypothesis.

**Hypothesis 2a : The impact of social influence on Internet community stickiness is larger for individuals with high espoused uncertainty avoidance values.**

Feminine culture values human relationship, collaboration, and coordination with others [Hofstede 1980]. People with feminine values tend to be affected by close friends or colleagues [Venkatesh et al., 2004]. Bem [1975] contends that feminine-cultured people used to obey and adapt to the group pressure. Venkatesh and Morris [2000] argue that females are more affected by social influences more than males in adopting IS. Therefore, we generate the following hypothesis.

**Hypothesis 2b : The impact of social influence on Internet community stickiness is larger for individuals with espoused feminine values.**

Collective culture emphasizes group's attainment rather than individual's and also stresses obedience [Hofstede 1980]. Such culture also treasures group norms, values, beliefs, and adheres to keep them [Bond and Smith, 1996; Hui and Triandis, 1985; Marcus and Kitayama, 1991; Trindis, 1989]. Therefore, we generate the following hypothesis.

**Hypothesis 2c : The impact of social influence on Internet community stickiness**

**is larger for individuals with espoused collective values.**

Society with low power distance believes that human relationship is equal and never accepts unequal distribution of wealth, power, and prestige. In such society, people express their own opinions and image freely and respect other's efforts as well. Students can always raise questions even though they are not asked to, can argue with teachers, and criticize or disagree with what teachers have said in the class [Hofstede, 1980]. Students can also exchange their opinions without any constraints. Under the country of low distance power, people can exchange social influences relatively easily.

**Hypothesis 2d : The impact of social influence on Internet community stickiness is larger for individuals with low espoused power distance values.**

### 3.3 Network effect

Network effects means that network product and service increase their value as the number of users increases [Farrell and Saloner, 1986; Katz and Shapiro, 1994; Zhu et al., 2006]. Network can be categorized into one-way and two-way network [Economides, 1996]. Gurbaxani [1990] find that network effect influences diffusion of computer network. Brynjolfsson and Kemerer [1996] prove the influence of network effect on IS adoption by identifying that users intend to pay more price

on spreadsheet package with larger user base. Kauffman et al. [2000] report that banks with larger network adopts ATM earlier than banks with smaller network. Zhu et al. [2006] also prove that network effect influences IS use. Internet community site is the two-way network where network value increases as more users and more networks get aboard. Therefore, we generate the following hypothesis.

**Hypothesis 3 : Network effect makes positive influence on Internet community stickiness.**

People with high uncertainty avoidance prefers stability rather than innovation [Hofstede, 1980]. Faced with choosing products or services, people with high uncertainty avoidance follow other's choice to reduce uncertainty about their decision-making [Surowiecki, 2004]. Users with high uncertainty avoidance prefers to visit and use popular web sites to reduce uncertainty about the value of web sites. Therefore,

**Hypothesis 3a : The influence of network effect on Internet community stickiness is larger for individuals with high espoused uncertainty avoidance values.**

Masculine values chase for self-objectives, whereas feminine values treasure social needs and relationship enhancement [Hofstede, 1984]. Therefore, users with feminine culture are network-oriented [Tannen, 1990] and frequently use the web sites where more people are lin-

ked and more diverse web sites are connected because they can satisfy desires for social relationship better on such sites. Therefore,

**Hypothesis 3b : The influence of network effect on Internet community stickiness is larger for individuals with espoused feminine values.**

People with collective values have strong desire to belong to a society or group and maintain high commitment to it [Triandis 1989], whereas individual values look down on commitment and loyalty and regard themselves as independent center of society [Redding and Baldwin 1991]. Therefore, users with collective culture prefer the web sites where more users and linked and more diverse web sites are connected. Therefore,

**Hypothesis 3c : The influence of network effect on Internet community stickiness is larger for individuals with espoused collective values.**

### 3.4 Usefulness

Usefulness means the degree of belief that users can improve task performances by using IS [Davis, 1989]. TAM insists that perceived usefulness influences intention to use IS [Pfeffer, 1982; Davis, 1989; Bhattacharjee, 2001; Gu et al., 2006]. Therefore, users of internet community site will visit frequently and use the web site more when they perceive usefulness on that site [Holland and Baker, 2001].

**Hypothesis 4 : Usefulness makes positive influence on Internet community stickiness.**

Usefulness is deeply related to attaining task objectives and making progress on tasks. Such utilitarian perspective well reflects the masculine culture [Venkatesh and Morris 2000; Venkatesh et al., 2004]. Taylor and Hall [1982] conduct a meta-analysis and prove that masculinity is significantly associated with utilitarian behaviors. Venkatesh and Morris [2000] state that male's decision to adopt IT is significantly influenced by perceived usefulness. Therefore,

**Hypothesis 4a : The influence of usefulness on Internet community stickiness is larger for individuals with espoused masculine values.**

## 4. Research methodology

### 4.1 Data collection

We collected 250 surveys from undergraduate and graduate students in November 2007, and used 205 reliable responses for analysis. Internet community sites that respondents were using included CyWorld mini-home page (69.4%), Naver blog (22.3%), Daum blog (7.3%), Yahoo blog (0.5%), and others (0.5%). Usage frequencies per week ranged from less than five times (55.3%), to 6~10 times (36.9%), 11~20 times (5.3%), and more than 21 times (2.5%). The average stay duration ranged from less

than 10 minutes (52.9%), to 11~20 minutes (19.9%), 21~30 minutes (13.6%), 31~60 minutes (11.2%), and more than 60 minutes (2.4%).

### 4.2 Survey items

The survey items were adopted from previous studies, and were adapted to reflect the comments from the interviews with users of Internet community site. A pilot test was conducted to test reliability and validity of the survey items. Through such couple of prior steps, our measurement items were revised and finalized [Rossiter, 2002].

Multiple items were developed for each construct. Five point Likert scale was used, ranging from 'Very unlikely' (point one) to 'Very likely' (point five). <Appendix 1> lists up our survey items and the sources of each item. We pay special attention to the constructs of user participation and stickiness because they are relatively less used constructs than other ones in IS studies.

User participation is the second-order construct that consists of two formative first-order constructs of optional and prosuming participation. The survey items of optional and prosuming participation were adopted from Doll and Torkzadeh [1989], Topscott and Williams [2006], and Ko and Kwon [2008], and were revised later to fit to our research context (i.e., internet community site). User participation in our study means that users make or use the cyber-spaces such as mini-home page and blog on the platform provided by internet community sites. Optional participa-

tion was measured by how much the users depend on the design and content options provided by service vendors in making their own mini-home page and blog. Prosuming participation was measured by the usage level of mini-room, skin, and layout that help users creatively design their ideas, by the usage level of the function of the design publication such as skin made by oneself, and by the content-making functions such as up-loading photographs.

Stickiness is also a second order construct that consists of visit frequency and stay duration. The measurement items of these two first-order constructs were adopted from Holland and Baker [2001] and Guenther [2004] and were revised to fit to the context of internet community site. Visit frequency was measured by the numbers of visits on the internet community sites of their own and on the sites others made. Items were measured by five point Likert scale ranging from 'Never visit' (point one) to 'Frequent visit' (point five). Respondents were also asked to fill in the frequency of visits on the sites per week. Respondents were also asked to fill in the stay duration per visit.

Javis et al. [2003] suggested the four criteria in identifying formative and reflective indicator such as direction of causality between construct and indicators, interchangeability among indicators, covariation among indicators, and nomological net among indicators. Formative indicators have the causal direction from indicators to construct, do not have interchangeability among indicators, do not need

covariation among indicators, and do not require antecedent nor dependent variables of indicators. Based on these criteria, we judge that optional participation, prosuming participation, number of users, network linkage, visit frequency, stay duration, and national culture have the formative indicators, whereas subjective norm and image have the reflective indicators. Usefulness is the first-order construct that has the reflective indicators.

## 5. Analysis results

PLS (Partial Least Square) 3.0 was used for data analysis [Fornell and Bookstein 1982, Gefen et al., 2000]. We chose PLS for a couple of reasons. First, both formative and reflective indicators are used in our research model [Chin, 1998]. Second, PLS is an appropriate method for the exploratory model that needs further verification [Teo et al., 2003]. Because there are no studies about the influence of user participation or network effect on internet community stickiness, we believe that PLS is an appropriate tool for our study.

### 5.1 Measurement model

Measurement modeling tests convergent validity, internal consistency, and discriminant validity. Our study uses the Bootstrap method to test convergent validity and investigates the loadings and their t-values. <Table 1> demonstrates the result of this test and proves that 29 items out of 33 items have the loading values greater than 0.7 [Fornell and Larcker,

<Table 1> Convergent validity and discriminant validity of first-order constructs

	Items	Convergent validity				CFA	Discriminant validity													
		Loading value	T-Statistic	Composite Reliability	AVE		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Optional	OP1	0.827	39.415	0.812	0.683	0.827	0.826													
	OP2	0.827	39.415			0.827														
Prosuming	PP1	0.862	52.979	0.852	0.742	0.861	0.407	0.861												
	PP2	0.862	52.979			0.861														
Image	Image1	0.838	40.164	0.868	0.687	0.838	0.464	0.229	0.829											
	Image2	0.805	30.299			0.805														
	Image3	0.843	36.360			0.843														
SN	SN1	0.837	37.434	0.838	0.635	0.837	0.204	0.236	0.327	0.797										
	SN2	0.862	35.190			0.862														
	SN3	0.680	13.437			0.680														
#user	User1	0.720	18.961	0.775	0.535	0.720	0.277	0.067	0.307	0.295	0.731									
	User2	0.791	37.059			0.791														
	User3	0.679	19.752			0.679														
Linkage	Link1	0.677	19.822	0.763	0.518	0.677	0.357	0.158	0.213	0.281	0.315	0.720								
	Link2	0.738	24.377			0.738														
	Link3	0.744	23.807			0.744														
Usefulness	Useful1	0.650	12.328	0.841	0.642	0.650	0.333	0.241	0.259	0.140	0.252	0.109	0.801							
	Useful2	0.849	36.805			0.849														
	Useful3	0.886	53.811			0.886														
Stay	Stay1	0.913	61.216	0.909	0.833	0.913	0.320	0.195	0.302	0.238	0.198	0.235	0.321	0.913						
	Stay2	0.913	61.216			0.913														
Frequency I	Fre-I-1	0.893	64.418	0.887	0.797	0.893	0.461	0.277	0.379	0.225	0.333	0.300	0.483	0.466	0.893					
	Fre-I-2	0.893	64.418			0.893														
Frequency II	Fre-II-1	0.920	74.024	0.917	0.847	0.920	0.309	0.270	0.304	0.127	0.205	0.269	0.293	0.390	0.552	0.920				
	Fre-II-2	0.920	74.024			0.920														
UAI	UAI1	0.841	44.655	0.829	0.708	0.841	0.063	-0.062	0.082	0.053	0.010	0.080	0.016	0.007	0.055	0.056	0.841			
	UAI2	0.841	44.655			0.841														
MAS	MAS1	0.879	47.846	0.872	0.772	0.879	0.018	0.119	0.028	0.082	0.061	0.054	-0.039	-0.022	0.040	0.002	-0.070	0.879		
	MAS2	0.879	47.846			0.879														
IDV	IDV1	0.872	46.667	0.864	0.761	0.872	-0.176	-0.043	-0.056	-0.130	-0.124	-0.005	-0.158	-0.008	-0.107	0.018	0.061	-0.054	0.872	
	IDV2	0.872	46.667			0.872														
PDI	PDI1	0.778	32.870	0.754	0.605	0.778	-0.131	-0.073	0.078	0.064	-0.104	-0.093	-0.198	-0.058	-0.021	-0.081	0.137	-0.020	0.216	0.778
	PDI2	0.778	32.870			0.778														

Note) Diagonals in the discriminant validity test are the square root values of AVEs.

1981] and that their t-values exceed 2.576 which is the boundary criterion at the significance level of 0.01. Internal consistency is measured by composite reliability [Fornell and Larcker, 1981], and exceeds the criterion value of 0.7 [Nunnally, 1987; Thompson et al., 1995; Werts et al., 1974]. Average variance extracted (AVE) also exceeds 0.5 [Fornell and

Larcker, 1981], which is an important criterion of discriminant validity [Chin, 1998]. All these analyses conclude that our measurement items have satisfactory level of convergent validity and internal consistency.<sup>2)</sup>

2) Formative indicators (i.e., optional participation, prosuming participation, number of users, network linkage, visit frequency, and stay duration) do not sa-

(Table 2) Convergent validity and discriminant validity of second-order constructs

2nd-order constructs	Items	Convergent validity				CFA				Discriminant validity			
		Loading value	T-Statistic	Composite Reliability	AVE	Participation	SI	Network	Stickiness	1	2	3	4
Participation	Optional	0.957	23.062	0.796	0.670	0.957	0.455	0.389	0.457	0.819			
	Prosuming	0.651	6.022			0.651	0.271	0.142	0.311				
SI	Image	0.950	16.590	0.762	0.627	0.456	0.950	0.326	0.380	0.463	0.792		
	SN	0.593	4.675			0.236	0.593	0.346	0.237				
Network effect	#user	0.820	7.209	0.795	0.660	0.252	0.362	0.820	0.320	0.368	0.390	0.812	
	Linkage	0.805	6.756			0.348	0.271	0.805	0.314				
Stickiness	Stay	0.693	9.496	0.820	0.610	0.326	0.330	0.270	0.693	0.478	0.400	0.390	0.781
	Frequency I	0.947	27.353			0.452	0.350	0.362	0.947				
	Frequency II	0.671	8.757			0.334	0.300	0.299	0.671				

Note) Diagonals in the discriminant validity test are the square root values of AVEs.

PLS analysis conducts confirmatory factor analysis (CFA) for validity tests rather than exploratory factor analysis [Gefen and Straub, 2005]. The results of CFA are summarized in <Table 1> and <Table 2>. CFA requires that factor loadings of indicators for relevant constructs should be greater than 0.7 [Srite and Karahanna, 2006], and that those loading values should be greater than cross-loading values [Gefen and Straub, 2005; Srite and Karahanna, 2006, Bhattacharjee and Sanford, 2006].

Discriminant validity is verified when the square root values of AVE are greater than

the correlation values on the same rows and columns [Fornell and Larcker, 1981]. <Table 1> confirms that our constructs satisfy the criteria of discriminant validity. In sum, our measurement items satisfy the requirements of convergent validity, discriminant validity, and internal consistency.

PLS does not support analysis at the second order factor level. Therefore, the first order factors measured by multiple items should be transformed into single indicators to represent the second order level factor [Rai et al., 2006; Agarwal and Karahanna, 2000]. Such transformation uses factor score, multivariate mean, and weighted average using factor loadings [Agarwal and Karahanna, 2000; Ulaga and Eggert, 2006; Rai et al., 2006]. We tested all the three measures of factor score, multivariate mean, and weighted average using factor loadings, but could not identify any differences among them. So, we chose to use multivariate mean which is the most popular among those three methods. Multivariate mean is the summated mean values of observed

tisfy the criteria for convergent validity (greater than 0.7) and internal consistency (greater than 0.7) [Rai et al., 2006; Chin, 1998; Bollen and Lennox, 1991]. Factors loadings of optional participation and prosuming participation on user participation are 0.957 ( $p < 0.001$ ) and 0.651 ( $p < 0.001$ ). Image and subjective norm load on social influence by 0.950 ( $p < 0.001$ ) and 0.593 ( $p < 0.001$ ), respectively. number of users and network linkage load on network effect by 0.820 ( $p < 0.001$ ) and 0.805 ( $p < 0.001$ ), respectively. Visit frequency and stay duration load on stickiness by 0.693 ( $p < 0.001$ ) and 0.947 ( $p < 0.001$ ), respectively. Subjective replies about visit frequency also has significant loading on stickiness ( $\beta = 0.671$ ,  $p < 0.001$ ).

indicators. This method is especially recommended when new construct is developed [Hair et al., 1995].

We also tested the convergent validity, internal consistency, and discriminant validity of the second-order constructs. <Table 2> demonstrates that t-values of all the factor loadings exceed 2.576 which is the boundary value at the significance level of 0.01. Composite reliability exceeds 0.7, confirming internal consistency. Discriminant validity is also verified because the square root values of AVE are greater than 0.5, and also exceed the correlation values of the same rows and columns.

5.2 Structural model

<Figure 2> demonstrates that user participation, network effect, social influence, and usefulness explain 40% of variances of stickiness. This result exceeds the 10% criteria

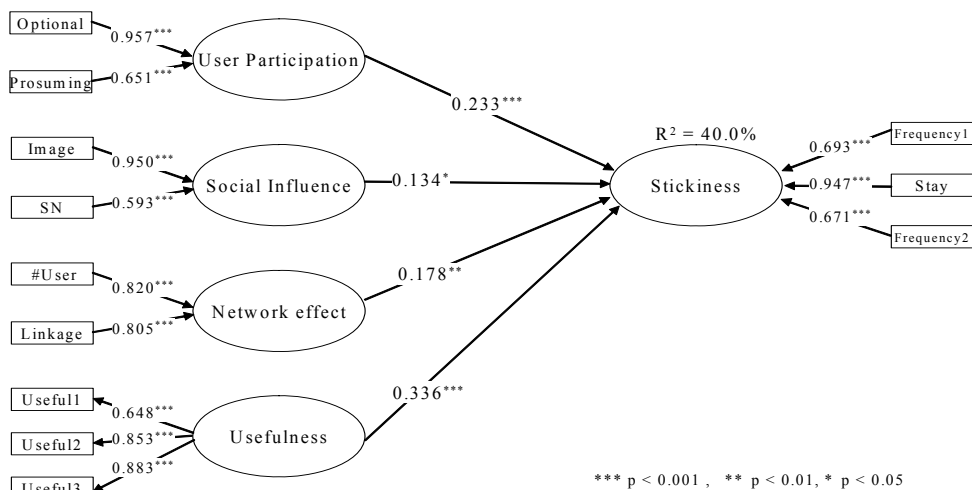
recommended by Falk and Miller [1992]. We calculated t-values of each path coefficient by using bootstrap method. <Figure 2> and <Figure 3> summarize that four independent variables to stickiness are all significant : i.e., user participation ( $\beta = 0.233, p < 0.001$ ), social influence ( $\beta = 0.135, p < 0.05$ ), network effect ( $\beta = 0.178, p < 0.01$ ), and usefulness ( $\beta = 0.336, p < 0.001$ ). Therefore, hypothesis 1, 2, 3, and 4 are all accepted.

Independent variables	Path coefficients	t-value	Results
User participation	0.233	3.399***	Support H1
Social influence	0.134	1.989*	Support H2
Network effect	0.178	2.608**	Support H3
Usefulness	0.336	5.319***	Support H4

Note) \*\*\* p < 0.001, \*\* p < 0.01, \* p < 0.05.

<Figure 2> Path analysis

The moderating effect of espoused values on the influences of four independent varia-



<Figure 2> Path analysis

bles on internet community stickiness are summarized in <Table 4> whose details are available at <Appendix 2>. Significance of differences between two path coefficients is tested by the method recommended by Chin [1998] and Keil et al. [2000].

First, our analysis concludes that the influence of user participation on stickiness is larger in the group of espoused feminine values ( $\beta = 0.286, p < 0.01$ ) than masculine values ( $\beta = 0.162, p = \text{non-significant}$ ) with significant path coefficient difference ( $\beta = -0.124, p < 0.001$ ). So, hypothesis 1a is supported. Power distance also moderates the causality of user participation on stickiness, so that low espoused power distance values substantiate the influence of user participation ( $\beta = 0.246, p < 0.01$ ) more than high power distance ( $\beta = 0.209, p = \text{non-significant}$ ). The difference of path coefficients between two value groups in terms of power distance is significant ( $\beta = -0.037, p < 0.01$ ), supporting hypothesis 1b.

Second, the impact of social influence on

stickiness is larger for high espoused uncertainty avoidance value group ( $\beta = 0.168, p < 0.05$ ) than for the low uncertainty avoidance group ( $\beta = 0.132, p = \text{non-significant}$ ). The difference of path coefficients is also significant ( $\beta = 0.036, p < 0.01$ ), supporting hypothesis 2a. However, the espoused feminine values ( $\beta = 0.026, p = \text{non-significant}$ ) do not demonstrate the stronger impact of social influence on stickiness than masculine values ( $\beta = 0.331, p < 0.01$ ) with significant path coefficient difference in reverse direction ( $\beta = 0.305, p < 0.001$ ). Therefore, hypothesis 2b is rejected. Hypothesis 2c is also rejected because the impact of social influence on stickiness is not different between collective and individual values ( $\beta = 0.019, p = \text{non-significant}$ ). However, social influence makes larger impact on stickiness for low espoused power distance value group ( $\beta = 0.263, p < 0.001$ ) than for high power distance group ( $\beta = 0.015, p = \text{non-significant}$ ) with significant path coefficient difference ( $\beta = -0.248, p <$

<Table 4> Moderation effects

Independent variables	Moderators	Differences in path coefficient	t-value	Result
User participation	Femininity	-0.124	-7.809	Support H1a
	Power distance	-0.037	-2.636	Support H1b
Social influence	Uncertainty avoidance	0.036	2.591	Support H2a
	Femininity	0.305	19.277	Reject H2b
	Collectivism	0.019	1.396	Reject H2c
	Power distance	-0.248	-21.667	Support H2d
Network effect	Uncertainty avoidance	0.219	15.769	Support H3a
	Femininity	-0.132	-9.136	Support H3b
	Collectivism	0.112	8.673	Support H3c
Usefulness	Masculinity	-0.047	-2.913	Reject H4a



0.001). So, hypothesis 2d is supported.

Third, the influence of network effect on stickiness is larger for high espoused risk avoidance value group ( $\beta = 0.261, p < 0.05$ ) than for low risk avoidance group ( $\beta = 0.042, p = \text{non-significant}$ ) with significant path coefficient difference ( $\beta = 0.219, p < 0.001$ ). Therefore, hypothesis 3a is supported. The influence of network effect on stickiness is also more noticeable at the espoused feminine value group ( $\beta = 0.223, p < 0.01$ ) than at the masculine values ( $\beta = 0.091, p = \text{non-significant}$ ) with significant path coefficient difference ( $\beta = -0.132, p < 0.001$ ), supporting hypothesis 3b. The espoused collective values have larger influence of network effect ( $\beta = 0.220, p < 0.05$ ) than individual values ( $\beta = 0.108, p = \text{non-significant}$ ) with significant path coefficient difference ( $\beta = 0.112, p < 0.001$ ), supporting hypothesis 3c.

Fourth, the influence of usefulness on stickiness is smaller for the espoused masculine values ( $\beta = 0.292, p < 0.05$ ) than for feminine values ( $\beta = 0.339, p < 0.001$ ) with significant differences ( $\beta = 0.219, p < 0.001$ ). This direction, however, is reverse to the hypothesis, rejecting hypothesis 4a.

### 5.3 Discussion

#### (1) Moderation effect on user participation

Our study found that femininity (hypothesis 1a) and power distance (hypothesis 1b) moderate the influence of user participation on stickiness. Femininity values human relationship and caring for others [Hofstede 1980]. Internet

community well reflects such characteristic of feminine values so that user's participation on mini-home pages and blogs fit well to the feminine values. Previous studies identified that people with low espoused power distance values prefer participant leadership [Srite and Karahanna, 2006] and free communication and debates [Hofstede, 1980; Hofstede and Associates 1998]. Therefore, low power distance is the well-coordinate values with internet community sites, moderating the influence of user participation on stickiness.

#### (2) Moderation effect on social influence

Uncertainty avoidance (hypothesis 2a) and power distance (hypothesis 2d) moderate the impact of social influence on stickiness. Because informational influence reduces uncertainty [Srite and Karahanna, 2006], people with high espoused uncertainty avoidance values appreciate the value of information, and therefore are sensitive to social influences during the development of stickiness. People with low espoused power distance values freely express their opinions and self-images and also respect other's opinion and image expressions [Hofstede, 1980; Hofstede, 1984]. Because such values well fit to the nature of internet community, people with such values can be more active on internet community and maintain stickiness to those web sites.

However, femininity (hypothesis 2b) and collectivity (hypothesis 2c) do not moderate the impact of social influence on stickiness. Previous studies imply that people with feminine values are receptive to environmental influen-

ces [Venkatesh et al., 2004], and adaptive to group pressures [Bem, 1975]. Our study demonstrates the opposite result that masculine values strengthen the impact of social influence on stickiness. This result may come from the interaction between image (component of social influence) and assertion (component of masculine values). This interaction effect between masculine values and social influence deserves future study for the sake of better explanation of behaviors on cyberspace.

### (3) Moderation effect on network effect

Uncertainty avoidance (hypothesis 3a), femininity (hypothesis 3b), and collectivity (hypothesis 3c) moderate the influence of network effect on stickiness. Large number of users helps reduce uncertainty about service quality [Surowiecki, 2004]. Therefore, people with high uncertainty avoidance prefer large network effect to reduce uncertainty. This phenomenon contends that uncertainty avoidance moderates the influence of network effect on stickiness. People with high espoused feminine values are network-oriented [Hofstede, 1984, Tannen, 1990] and prefer the web sites where more people are available and diverse web sites are linked. Therefore, femininity moderates the influence of network effect on stickiness. People with espoused collective values have strong desire to belong to a group and society [Triandis 1989]. Therefore, collective values moderate the influence of network effect on stickiness.

### (4) Moderation effect on usefulness

Our hypothesis was based on previous stu-

dies of Taylor and Hall [1982] and Venkatesh and Morris [2000] that masculinity moderates the influence of usefulness on stickiness (hypothesis 4a), but was rejected due to the opposite result that femininity wields the moderating effect on the influence of usefulness on internet community stickiness. Previous findings about the moderating role of masculinity were extracted from utilitarian IS where task execution was the major concern. Meanwhile, internet community sites are close to hedonic IS where feminine activities are more encouraged and appreciated. Such feminine characteristics of internet communities conduct stronger impact on the influence of usefulness on stickiness. For the sake of triangulation of our arguments, it is necessary to investigate the influence of masculine values on hedonic IS.

## 6. Conclusion

### 6.1 Summary of findings

Our study investigates the moderating role of espoused individual values on the influential factors on internet community stickiness. Espoused individual values mean the individually embraced four dimensions of national culture [Srite and Karahanna, 2006]. The direct influences of independent factors on internet community stickiness are all significant. The moderation effects can be summarized as follows.

First, femininity and power distance moderate the influence of user participation on in-

ternet community stickiness. High feminine values and low power distance promote the influence of user participation on stickiness.

Second, uncertainty avoidance and power distance moderate the impact of social influence on stickiness. High uncertainty avoidance and low power distance increase the impact of social influence on stickiness. However, femininity and collectivity do not moderate the impact of social influence on stickiness.

Third, uncertainty avoidance, femininity, and collectivity moderate the influence of network effect on stickiness. High uncertainty avoidance, femininity, and low power distance facilitate the influence of network effect on stickiness.

Fourth, the influence of usefulness on stickiness is not moderated by masculinity.

## 6.2 Implications and future research agenda

This study is the first effort about the relationship between espoused individual values and internet community stickiness. Identification of independent variables on stickiness is also the contribution of this study.

We call for future attention to two rejected hypotheses about the moderating role of femininity between social influence and stickiness and the moderating role of masculinity between usefulness and stickiness. Analyses on these two hypotheses identified causality in opposite direction in the moderating role. We believe that masculinity and femininity may well be refined and decomposed because they can be far more complicated characteristics of

espoused individual values. Future studies may well also include the type of IS such as utilitarian and hedonic IS in investigating the influences of espoused individual values on behaviors on cyberspace. Most of all, future studies may well conduct cross-national study and verify whether our study findings are repeated when data samples are from multiple countries.

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## &lt;Appendix 1&gt; Questionnaire and Source

Construct	Source	Sub-construct	Questionnaire
User Participation	Doll and Torkzadeh [1989], Topscott and Williams [2006]	Optional *(formative)	I designed my web site through using the function category
			I made my web site through choosing and using the digital contents such as items
		Prosuming (formative)	I designed my web site through using the design functions such as mini-room, skin, and layout
			I developed my web site through using the design function such as the skin that I made
Social Influence	Moore and Banbasat [1991]	Image (reflective)	Internet community is helpful to present my personality
			Internet community is helpful to differentiate myself
			Internet community is helpful to decorate myself
			Internet community is helpful to show off myself
	Fishbein and Ajzen [1975], Yangand Kwon [2003]	Subjective norm (reflective)	My friends suggest using Internet community to me
			My friend want me to use Internet community
Network linkage	Brynjolfsson and Kemerer [1996]	Number of user (formative)	A large number of those close to me use Internet community
			I use Internet community having a large number of members
			I like Internet community having a large number of members
	Farrell and Saloner [1986] Qizhi and Kauffman [2002]	Network linkage (formative)	I use the mobile service connected with Internet community
			I use the messenger service that Internet community provides
			I use the function informing the information such as birthday, friend news, and new message
Usefulness (Reflective)	Bhattacharjee [2001]		I can buy digital contents by millage points
			My Internet community is helpful to get useful information
			My Internet community is not useful to me
			My Internet community is useful to my life
Stickiness	Holland and Baker [2001] Guenther[2004]	Visit frequency (formative)	My Internet community is generally useful to me
			I frequently visit my Internet community
		Stay (formative)	I frequently visit Internet community of my friends and acquaintances
			I stay long at my Internet community
		Visit frequency (open question)	I stay long at Internet community of my friends and acquaintances
			Please write the visit frequency of your Internet community for a week
National Culture	Hofstede [1980, 1991] Srite and Karahanna [2006]	Uncertainty avoidance (formative)	Please write the visit frequency of your friends and acquaintances
			I enjoy going to new and unfamiliar places
			Safety and security are the most important things in life
			Not knowing what is going to happen next makes me feel anxious and uncomfortable
	Hofstede [1980, 1991] Srite and Karahanna [2006]	Collectivism/ individualism (formative)	I like not knowing what will happen tomorrow
			People are more likely to succeed in life if they are dominant and aggressive
			I would thrive in a cooperative work setting more than one emphasizing competitiveness
			People are more likely to succeed in their lives if they are compassionate and understanding
	Hofstede [1980, 1991] Srite and Karahanna [2006]	Masculinity/ Femininity (formative)	I admire people who are aggressive and dominant
			I prefer to participate in team sports or activities rather than in individual sports or activities
			I prefer it when my grade is based on my personal performance and not on the performance of a group that I am working in
			I am more proud when I achieve things as an individual than when I accomplish things while working with others in a group
	Hofstede [1980, 1991] Srite and Karahanna [2006]	Power distance (formative)	Given the choice, I would prefer working on a group paper instead of working on an individual paper
			I would feel comfortable socializing with my instructor outside of class
			One of the reasons a college degree appeals to me is the added prestige it will provide
			Status and responsibility distinctions between students and instructors are barriers to effectiveness in the classroom
			I prefer that instructors make all the decisions about how the courses I take will be structured and conducted

Note) \*(formative) means formative indicator and (reflective) means reflective indicator.



<Appendix 2> Analysis between group by national culture

Independent variables	High uncertainty avoidance		Low uncertainty avoidance		Comparison between group	
	Path coefficients	t-value	Path coefficients	t-value	Differences in path coefficient	t-value
User participation	0.182	1.899	0.296	2.974	-0.114	-8.292
Social influence	0.168	2.163	0.132	1.093	0.036	2.591
Network effect	0.261	2.551	0.042	0.452	0.219	15.769
Usefulness	0.310	2.927	0.373	4.226	-0.063	-4.522

Independent variables	Masculinity		Femininity		Comparison between group	
	Path coefficients	t-value	Path coefficients	t-value	Differences in path coefficient	t-value
User participation	0.162	1.287	0.286	2.849	-0.124	-7.809
Social influence	0.331	2.606	0.026	0.263	0.305	19.277
Network effect	0.091	0.705	0.223	2.867	-0.132	-9.136
Usefulness	0.292	2.301	0.339	3.297	-0.047	-2.913

Independent variables	Collectivism		Individualism		Comparison between group	
	Path coefficients	t-value	Path coefficients	t-value	Differences in path coefficient	t-value
User participation	0.149	1.527	0.354	4.352	-0.205	-16.328
Social influence	0.135	1.583	0.116	1.071	0.019	1.396
Network effect	0.220	2.523	0.108	1.108	0.112	8.673
Usefulness	0.403	4.329	0.283	3.414	0.120	9.744

Independent variables	High power distance		Low power distance		Comparison between group	
	Path coefficients	t-value	Path coefficients	t-value	Differences in path coefficient	t-value
User participation	0.209	1.861	0.246	2.814	-0.037	-2.636
Social influence	0.015	0.178	0.263	3.298	-0.248	-21.667
Network effect	0.114	1.146	0.327	3.855	-0.213	-16.512
Usefulness	0.501	4.777	0.132	1.759	0.369	29.035

## ■ Author Profile



Sun-Dong Kwon

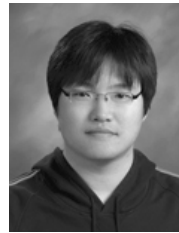
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