International Journal of u- and e- Service, Science and Technology
Vol.9, No. 10 (2016), pp.235-244
http://dx.doi.org/10.14257/ijunesst.2016.9.10.22

What Are the Important Factors Switching Intention to Volatile Social Networking Services?

Haengnam Sung[1], Byung-Hyuk Ahn[2], Yeonsu Jeong[2] and Dae-Yul Jeong[2*]

[1]College of Business, Gyeongsang National University
501, Jinju-Daero, Jinju 52828, South Korea
[2]Department of Management Information System, Gyeongsang National University
501, Jinju-Daero, Jinju 52828, South Korea
[1]haena@gnu.ac.kr, [2]bahn@gnu.ac.kr, [2]arisesang@gnu.ac.kr, [2]dyjeong@gnu.ac.kr

Abstract

In May 2014, the European Court of Justice ruled that Google should delete all the search results it had used. Since then, a social consensus about 'the right to be forgotten' has been formed around the world. This kind of consensus has also been around social network services. Snapchat allows you to set times for deleting pictures you have sent to your friends. Zap deletes all the shared pictures and video clips in 24 hours. These fast growing volatile SNS is due to the increasing awareness of 'the right to be forgotten'. A simple picture or a video clip mistakenly put on a social networking site may haunt a person when the picture or the video clip remains on the site. A simple mistake in writing an article on a social network may lead to ostracism. Worried and tired users tend to migrate to volatile SNS such as Snapchat or Zap, which provide relative comfort in uploading contents. This paper uses the push-pull-mooring model of the migration theory in finding the factors which affect SNS users' switching intention to volatile social networking services. The results show that users tend to switch to volatile SNS when the service provides more privacy protection, volatility, and better system security.

Keywords*: Volatile Social Networking Services (Volatile SNS), Push-Pull-Mooring Model, Migration Theory, Switching Intention, SNS Overload, SNS Exhaustion, Privacy Concern, Volatility, System Security*

1. Introduction

In May 2014, Google was reported to have been inundated with requests from European users for removal of search results leading to personal information from the world's biggest search engine. 'The right to be forgotten' has been one of the key social agendas of the European Union and the regional bloc has, for years, debated on whether individuals should be allowed to have personal data about them deleted from the internet. The European Court of Justice finally ruled that personal information that did not affect public interests must be removed upon request [1]. There has been controversy about its legislation in Korea [1]. The 'right to be forgotten' is the rights of internet users to ask their personal data or their past records to be deleted after some period of time [2]. To meet the emerging consensus on the 'right to be forgotten', several instant messaging application such as Snapshot, Zap, and Sling Shot have been developed and used. A report says 43% of cell phone users in U.S. use mobile instant messaging or volatile instant messaging applications [3]. Users' demand for volatile messaging service lead to third generation of SNS which is characterized as volatile, closed, and anonymous.

*Corresponding Author

ISSN: 2005-4246 IJUNESST

Particularly, the social interests and needs of ‘the right to be forgotten’ have come up with consideration on the use of volatile SNS.

2. Literature Review

2.1. Social Networking Service

Social networking service is defined as a web-based service that allows individuals to construct a public or semi-public profile, articulate a list of other users with whom they share a connection, view and traverse their list of connections [4]. It is also called as social media, social software, or micro-blog. Social media are divided into two types depending on the degree of openness, open and closed type [5]. Most of the research subjects on SNS have been usage motivation, purpose, and consistent intention to use based on technology acceptance model or information system success model [6].

2.2. Volatile SNS

There is no generally accepted definition of volatile SNS. We need to understand volatile Instant Messaging (IM). PC Magazine Encyclopedia(2016) defines IM as exchanging text messages in real time between two or more people logged into a particular instant messaging service[7]. IM came of age in 2000. Although the interactive message tool dates back to the 1970s, when researchers began to send real-time text messages on Unix-based networks, the technology became instantly popular in the late 1990s, when America Online (AOL) engineers introduced the Buddy List [8].

Volatile IM is not defined yet. The concept of volatility comes when we send message in real time without using AOL instant messenger or accessing the server [9]. Volatile IM is an instant messaging service which does not store messages on either the server or the client computer. It is similar to those chatting applications such as Snapchat, Zap, and Sling shot.

Volatile SNS should be more than a volatile IM and should provide volatility to usual SNS services. We have experienced that celebrities often get embarrassed because of his/her spoken words in old times or video clips uploaded several years ago. Volatile SNS should be a platform in which uploaded contents are erased as time passes. Also, users of volatile SNS can set the time to erase the contents. We define volatile SNS as a social networking service in which users can manage the volatility and uploaded contents are erased at the time user set.

2.3. Migration Theory

Migration theory provides a theoretical framework not only for a migrant to move between geographic places or between cultures, but it also provides a useful framework for consumers to switch online and offline services [10]. Push-pull-mooring model is a dominant paradigm in migration literature [11]. Push effect refers to factors that cause people leave their original residence. Pull effect refers to factors that attract people to a destination. Mooring effect refers to individual lifestyle and cultural issues which facilitate or inhibit the migration [12].

Zhang, Cheung, Lee and Chen(2008) have recently interpreted predictors in terms of the effect of push, pull and mooring factors on bloggers’ intentions to switch blog services. Their study results indicate that push effects in terms of satisfaction, is the strongest factor affecting switching intentions, followed by pull effects (attractive alternatives) and mooring effects (sunk costs) [13], which is close to the context of SNS switching in our research. Hsieh, Hsieh, Chiu and Feng(2012) applies push-pull mooring model for the switching from blogs to Facebook [10]. Park, Kim, Choi and Kim(2014) tries to explain the users' switching intention between social network games [14]. Park and Kim(2014) tries to find the factors that cause users to switch from open SNS to closed SNS [15].

Sung, Ahn, Jeong and Jeong (2016) tries to find the reasons of users to switch from open and closed SNS to volatile SNS [16].

3. Research Model and Hypotheses

3.1. Research Model

This study tries to find the factors which cause users to switch from their current SNS(open or closed) to other volatile SNS and to see the relationship between causing factors and the switching intention. We apply push-pull-mooring model to define causing factors as push effect, pull effect and mooring effect. The suggested research framework is shown on Figure 1.

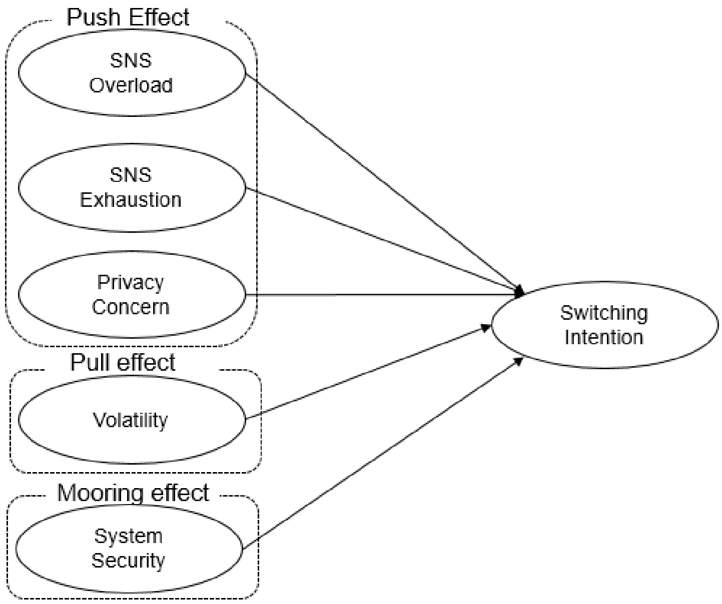

Figure 1. Research Framework

3.2. Research Hypotheses

Push effects in push-pull-mooring model are negative factors that cause people to leave their places. In using SNS, we suggest three negative factors as push effects, which are SNS overload, SNS exhaustion, and privacy concern. Pull effects are attractive factors of a destination. Volatility is a positive factor of a new volatile SNS which attracts users. We suggest volatility as a pull effect. Mooring effects are factors that either facilitate or inhibit migration. In using SNS, we suggest system security which guarantees volatility.

H1: SNS overload is positively related to users' intention to switch to volatile SNS.

H2: SNS exhaustion is positively related to users' intention to switch to volatile SNS.

H3: Privacy concern is positively related to users' intention to switch to volatile SNS.

H4: Volatility is positively related to users' intention to switch to volatile SNS.

H5: System security is positively related to users' intention to switch to volatile SNS.

3.3. Operational Definition

In order to test the research hypotheses in this study, we reviewed the operational definitions, measurements and related questions of previous researches and modified them to fit to this study. Every factor consists of several questions with 5 Likert scale(1=strongly disagree and 5=strongly agree) to enhance the validity and reliability of the survey.

SNS overload is defined as burdens that users bear in using SNS due to too much share of information or relationship overload. SNS overload consists of three questions based on Park and Kim(2014)[15]. SNS exhaustion is defined as mental or psychological exhaustion in using SNS and consists of four questions based on Maier (2014)[17]. Privacy concern is defined as awareness of a possible invasion of users' privacy in using SNS. It consists of three questions based on Park and Kim (2014) [15].

Volatility is defined as the degree of allowing users to set some criteria to erase their uploaded contents(writings, pictures, and video clips). Because there is little reference, we modify three questions based on Sung, Ahn, Jeong and Jeong(2016)[16]. Also, system security is little reference. System security is defined as the degree of assurance volatility in using SNS. We modify three questions based on Sung, Ahn, Jeong and Jeong(2016)[16].

Switching intention is defined as users' intention to switch to a volatile SNS and consists of four questions based on Park and Kim(2014)[15].

4. Analysis and Results

4.1. Sample Characteristics

Among 211 university students, 55.9 percent were male and 44.1 percent were female. 46.0 percent were 3~4 years SNS usage period and 20.9 percent were 5~6 years SNS usage period. 34.6 percent were more than 11 times and 23.2 percent were 6~8 times (per day). Table 1 shows the results of sample characteristics.

Table 1. Sample Characteristics

Gender	Freq.	Percent	Job	Freq.	Percent	Traffic	Freq.	Percent
male	118	55.9	student	211	100	1~2 times	35	16.6
female	93	44.1	total	211	100%	3~5 times	29	13.7
total	211	100%	Use Period	Freq.	Per.	6~8 times	49	23.2
Age	Freq.	Per.	less than 1year	11	5.2	9~10 times	25	11.8
20~29	211	100	1~2 years	28	13.3	more than 11	73	34.6
total	211	100%	3~4 years	97	46.0	total (*per day)	211	100%
Education	Freq.	Per.	5~6 years	44	20.9			
undergraduate	211	100	more than 7 years	31	14.7			
total	211	100%	total	211	100%			

4.2. Factor Analysis

4.2.1. Exploratory Factor Analysis: Some of the questions we used in this study are those we developed without reference to previous research. Thus, we first performed exploratory factory analysis to evaluate the internal consistency and discriminant validity of our research measurement model. Factors are extracted by principal component analysis and rotated by varimax method under the assumption that factors are mutually independent.

In factor analysis, we generally consider a factor as significant one if the corresponding eigen value is greater than 1 and factor loading is more than 0.4. In social science, however, we usually choose a factor with 0.6 or higher factor loading [18]. By the criteria, only one measure item was dropped in SNS overload measurement. Table 2 shows the result of exploratory factor analysis.

The result shows that 3 factors of SNS overload, SNS exhaustion, and privacy concerns are identified as push effects. Their eigenvalues are 2.481, 3.389, and 2.534 respectively. Volatility as a pull effect, system security as a mooring effect, and switching intention all have eigenvalues of 2.534, 2.623, and 3.496 respectively. Thus, we conclude that the convergent validity and the discriminant validity of the measurement factors are adequate.

Table 2, shows Cronbach's alpha coefficients of SNS overload, SNS exhaustion, privacy concern, volatility, system security, and switching intention which are .889, .928, .924, .889, .912, and .956 respectively. Since the Cronbach's alpha coefficients are greater than 0.8, we can conclude that factors show high reliability and thus have internal consistency. Table 2, also shows that the cumulative dispersion of every factor, the sum of 85.254, which shows the high explanation power.

Table 2. Exploratory Factor Analysis

Items	OV	EX	PC	VO	SS	SI	Cronbach's α	Eigen-value	Dispersion	Cum. Disp.*
ov1	**0.88**	-0.034	-0.051	-0.013	0.06	-0.075	0.889	2.481	12.406	12.406
ov2	**0.906**	-0.109	-0.037	-0.02	0.047	-0.028				
ov3	**0.912**	-0.071	-0.081	0.019	-0.07	0.04				
ex1	-0.102	**0.881**	0.103	0.064	0.047	0.122	0.928	3.389	16.947	29.353
ex2	-0.036	**0.91**	0.089	0.12	-0.028	0.102				
ex3	-0.064	**0.887**	0.147	0.077	-0.065	0.035				
ex4	-0.048	**0.88**	0.127	0.059	-0.032	0.127				
pc1	-0.101	0.188	**0.825**	0.236	0.139	0.276	0.924	2.534	12.671	42.024
pc2	-0.099	0.178	**0.851**	0.143	0.095	0.299				
pc3	-0.032	0.16	**0.84**	0.171	0.094	0.28				
vo1	0.038	0.087	0.175	**0.793**	0.026	0.334	0.889	2.527	12.635	54.659
vo2	-0.034	0.133	0.205	**0.849**	0.064	0.298				
vo3	-0.019	0.102	0.129	**0.869**	0.063	0.252				
SS1	-0.005	0.035	0.007	0.081	**0.915**	0.131	0.912	2.623	13.116	67.775
SS2	0.059	-0.016	0.108	-0.015	**0.908**	0.125				
SS3	-0.011	-0.102	0.151	0.074	**0.903**	0.1				
SI1	0.01	0.142	0.192	0.271	0.187	**0.854**	0.956	3.496	17.479	85.254
SI2	0.007	0.133	0.243	0.287	0.105	**0.852**				
SI3	-0.024	0.146	0.284	0.251	0.181	**0.841**				
SI4	-0.087	0.061	0.238	0.239	0.054	**0.857**				

OV: SNS Overload, EX:SNS Exhaustion, PC: Privacy Concern, VO: Volatility,
SS: System Security, SI: Switching Intention
* cumulative dispersion

4.2.2. Confirmatory Factor Analysis: Table 3, shows the result of confirmatory factor analysis. The goodness of fits for the measurement model of Figure 1, are: $\chi^2 = 298.048(df = 155,\ p = 0.000)$, $\chi^2 / df = 1.923$, RMSEA = 0.059, RMR = .036, GFI = .902, AGFI = .868, NFI = .938, TLI = .962, and CFI = .969. Factor loadings of the confirmatory factor analysis are all higher than 0.8 (p-values are less than 0.01) and all the critical ratio values are between 15.633 and 29.424 (greater than 1.96). Standardized regression coefficients (beta) are all greater than 0.802 (greater than 0.7) and all the construct reliabilities are greater than 0.891 (greater than 0.5)[19]. Thus, we can conclude that the measurement model has construct validity.

Table 3. Confirmatory Factor Analysis

Variables	Items	Estimate	Std. Estimate	Std. Error	t-value	Composite Reliability	AVE	Cronbach's α
SNS Overload	1*	1	0.886			.891	.741	.889
	2	0.979	0.872	0.057	17.119			
	3	0.931	0.802	0.06	15.633			
SNS Exhaustion	1*	1	0.866			.937	.788	.928
	2	0.941	0.911	0.046	20.592			
	3	0.869	0.87	0.046	18.947			
	4	0.884	0.859	0.048	18.538			
Privacy Concern	1*	1	0.918			.912	.796	.924
	2	0.984	0.916	0.042	23.4			
	3	0.930	0.854	0.046	20.223			
Volatility	1*	1	0.929			.894	.733	.889
	2	0.89	0.858	0.046	19.452			
	3	0.86	0.810	0.049	17.564			
System Security	1*	1	0.893			.897	.731	.912
	2	0.974	0.88	0.05	19.32			
	3	0.923	0.871	0.048	19.034			
Switching Intention	1*	1	0.941			.948	.820	.956
	2	0.970	0.922	0.034	28.143			
	3	0.969	0.933	0.033	29.424			
	4	0.933	0.879	0.039	24.144			
Model Fit Indices: $\chi2(155)$=298.048, $\chi2/df$=1.923, p=.000, GFI=.902, AGFI=.868, NFI=.938, CFI=.969, TLI=.962, RMR= .036, RMSEA=0.059, *Reference variables, AVE: Average Variance Extracted								

4.3. Correlation Analysis

Table 4, shows the result of correlation analysis. Means of each factor show that users feel overload (mean = 3.291) in using current SNS while it is not a kind of exhaustion (mean = 1.94). Correlation between privacy concern and volatility are high (.476). Switching intention is highly correlated with both privacy concern and volatility. This indicates that users who are more concerned about their privacy tend to switch to volatile SNS if the service provides volatility. We can see that the square roots of average variance extracted (AVE) greater than individual correlation coefficients, which means the measurement model have discriminant validity [20].

Table 4. Correlation Analysis

Variables	Mean	Standard Deviation	Correlation					
			(1)OV	(2)EX	(3)PC	(4)VO	(5)SS	(6)SI
(1)OV	3.291	.896	1(.861)					
(2)EX	1.940	.858	-.158*	1(.888)				
(3)PC	2.828	1.012	-.160**	.352**	1(.892)			
(4)VO	2.791	.950	-.039	.254**	.476**	1(.856)		
(5)SS	3.645	1.016	.022	-.020	.245**	.158**	1(.855)	
(6)SI	2.724	1.024	-.072	.278**	.603**	.618**	.288**	1(.906)
OV: SNS Overload, EX:SNS Exhaustion, PC: Privacy Concern, VO: Volatility, SS: System Security, SI: Switching Intention *p<.05 **p<.01 ( ): Square Root Average Variance Extracted								

4.4. Result of Hypothesis Tests

The results of hypothesis test of structural equation model are show in Table 5 and Figure 2. The structural model satisfies the corresponding goodness of fit criterion. The goodness of fits for the model in Figure 1 are: $\chi^2 = 298.048(df = 155,\ p = 0.000)$, $\chi^2 / df = 1.923$, RMSEA = 0.059, RMR = .036, GFI = .902, AGFI = .868, NFI = .938, TLI = .962, and CFI = .969. The result of structural equation modeling analysis shows some hypotheses are not supported. SNS overload and SNS exhaustion do not have positive relationship with switching intention. All of privacy concern, volatility, and system security, however, have positive relationship with switching intention.

Table 5. Results of Hypothesis Testing

Hypothesis: Path	Estimate	Std. Estimate	Std. Error	Critical Ratio	p-value	Results
H1: SNS Overload → Switching Intention	0.038	0.033	0.054	0.691	0.489	not supported
H2: SNS Exhaustion → Switching Intention	0.056	0.05	0.056	0.997	0.319	not supported
H3: Privacy Concern → Switching Intention	0.368	0.367	0.061	6.033	***	supported
H4: Volatility → Switching Intention	0.435	0.427	0.058	7.461	***	supported
H5: System Security → Switching Intention	0.156	0.144	0.052	2.967	0.003**	supported
Model Fit Indices: χ2(155)=298.048, χ2/df=1.923, p=.000, GFI=.902, AGFI=.868, NFI=.938, CFI=.969, TLI=.962, RMR= .036, RMSEA=.059 *** p<.001, **p<.01						

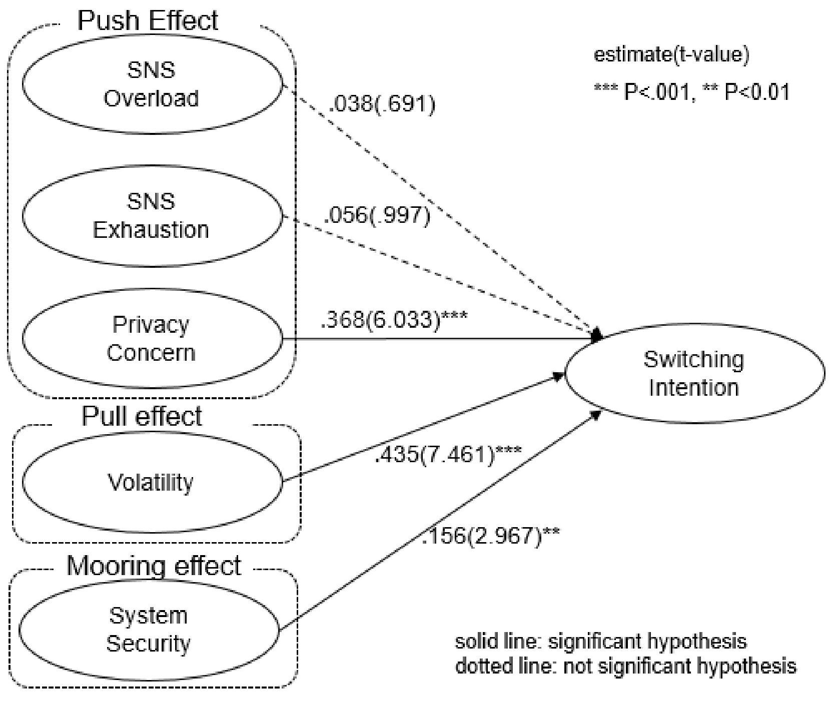

Figure 2. Results of Hypothesis Testing

In summary, users do not switch to volatile SNS even though their current SNS give them dissatisfaction(push effect). Rather, some users with privacy concern may switch to volatile SNS because guaranteeing the volatility is a good choice(pull factor). In other words, current SNS providers can keep their users by providing volatility in their services

5. Conclusion

This study tries to find out whether SNS users will switch their SNS sites if another SNS provides volatility in their services. A finding is that users of SNS, whether they are open type or closed type, they may switch to another SNS if 1) they are more concerned about their privacy, and 2) the new SNS provides volatility. If the new SNS guarantees the volatility, the switching intention will be higher.

Another finding is that users tend to stick on their current SNS even though they feel overloaded or exhausted. This can be explained as follows; 1) users are not yet exhausted by using SNS (average is 1.94), which means they still enjoy their current SNS, and 2) they feel that a new SNS will be almost the same with the current one unless the new SNS provides different services including volatility.

One weak point of the study is generalizability of result because of data gathering range. The next study needs to expand the area of the survey to get more general findings

References

[1] S. Oh, "The Right to be Forgotten in Korea", http://www.humanrightskorea.org/2014/right-to-be-forgotten-korea/, **(2014)**.

[2] V. M. Schönberger, "Delete: The Virtue of Forgetting in the Digital Age", Princeton University Press, **(2011)**.

[3] Trend Specturm. "USA 43% of Smartphone Users Have a Mobile Messaging App to Use IM or Volatile", http://trendspectrum.co.kr/?p=32682/, **(2015)**.

[4] D. M. Boyd and N. B. Ellison, "Social Network Sites: Definition, History and Scholarship", Journal of Computer-Mediated Communication, vol. 13, no. 1, **(2007)**, pp. 210-230.

[5] H. Y. Lee, S. E. Cho, H. Y. Kim, E. Y. Han, H. W. Lee, Y. Bae, S. Y. Mon and J. H. Lee, "The Role of Social Platform in Socio-cultural Changes in Korea", Korea Information Society Development Institute, Research Report, **(2014)**, pp. 1-191.

[6] L. Gao and X. Bai, "An Empirical Study on Continuance Intention of Mobile Social Networking Services: Integrating the IS Success Model, Network Externalities and Flow Theory", Asia Pacific International Journal of Marketing, vol. 26, no. 2, **(2014)**, pp. 168-189.

[7] PC Magazine Encyclopedia, "Instant Messaging, www.pcmag.com/encyclopedia/term/45045/instant-messaging/, **(2016)**.

[8] C. Lewis and B. Fabos, "Instant Messaging, Literacies, and Social Identities", Reading Research Quarterly, vol. 40, no. 4, **(2005)**, pp. 470-501.

[9] M. Kiley, S. Dankner and M. Rogers, "Advances in Digital Forensics IV", Edited I. Ray, Springer-Verlag, New York, **(2008)**, pp. 129-138.

[10] J. K. Hsieh, Y. C. Hsieh, H. C. Chiu and Y. C. Feng, "Post-adoption Switching Behavior for On-line Service Substitutes: A Perspective of the Push-Pull-Mooring Framework", Computers in Human Behavior, vol. 28, no. 5, **(2012)**, pp. 1912-1920.

[11] H. S. Bansal, S. F. Taylor and Y. S. James, " 'Migrating' to New Service Providers: Toward a Unifying Framework of Consumers' Switching Behaviors", Journal of the Academy of Marketing Science, vol. 33, no. 1, **(2005)**, pp. 96-115.

[12] B. Moon, "Paradigms in Migration Research: Exploring 'Mooring' as Schema", Progress in Human Geography, vol. 19, no. 4, **(1995)**, pp. 504-524.

[13] Z. K. Zhang, M. K. Cheung, K. O. Lee and H. Chen, "Understanding the Blog Service Switching in Hong Kong: An Empirical Investigation", in Proceedings of the 41st Annual Hawaii International Conference on System Sciences(HICSS 2008); HI, USA. **(2008)**.

[14] E. K. Park, Y. H. Kim, J. I. Choi and S. S. Kim, "A Study on Switching Intention of Social Network Game`s User -Focused on Kakaotalk Platform Game", Journal of the Korea Service Management Society, vol. 15, no. 1, **(2014)**, pp. 23-20.

[15] H. S. Park and S. H. Kim, "An Empirical Study of SNS User's Switching Intention Toward Closed SNS", Information System Review, vol. 16, no. 3, **(2014)**, pp. 135-160.

[16] H. Sung, B. H. Ahn, Y. Jeong and D. Y. Jeong, "Why Switch to a Volatile Social Network Services?", Advanced Science and Technology Letters, (Business 2016), Jeju, Korea, vol. 126, **(2016)** April 19-21, pp. 94-97.

[17] C. Maier, S. Laumer, A. Eckhardt and T. Weitzel, "Giving Too Much Social Support: Social Overload on Social Networking Sites", European Journal of Information Systems, vol. 24, **(2015)**, pp. 447-464.

[18] J. K. Hair, W. C. Black, B. J. Babin and R. E. Anderson, "Multivariate Data Analysis, 7th Edition", Pearson, **(2009)**.

[19] A. Timothy and P. D. Brown, "Confirmatory Factor Analysis for Applied Research, 2nd Edition", The Guilford, **(2015)**.

[20] J. Cohen and P. Cohen, "Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences, 3rd Edition", Routledge, **(2002)**.

Authors

Haengnam Sung, received a B.S. degree in Management Information System from Gyeongsang National University, Korea, 2000, M.S. degree in Management Information System from Gyeongsang National University, Korea, 2003, and Ph. D. degree in Management Information System from Gyeongsang National University, Korea, 2009. In 2004, she joined the lecturer of Gyeongsang National University(GNU) and Gyeongnam National University of Science and Technolgy(GnTech). Her research interests include MIS, Electronic Commerce and Learning(e-Learning, m-Learning).

Byung-Hyuk Ahn, is professor of Management Information System at Gyeongsang National University(GNU) as well as research fellow of BERI at GNU. He got his Ph. D. from Kent State University, United States, in Business Administration. His research interests are in Database System, Datamining, and Optimization Model.

Yeongsu Jeong, received a B.S. degree in Management Information System from Gyeongsang National University, Korea, 2006, M.S. degree in Management Information System from Gyeongsang National University, Korea, 2011, and doctor course completion in Management Information System from Gyeongsang National University, Korea, 2013. In 2014, she joined the lecturer of Gyeongsang National University(GNU) and Gyeongnam National University of Science and Technolgy(GnTech). Her research interests include MIS, Knowledge Management, Digital Contents and Cognitive Dissonance.

Dae-Yul Jeong, is professor of Management Information System at Gyeongsang National University(GNU), research fellow of BERI at GNU and research fellow of Cultural Convergence Business Model Team of BK21 Plus, Korea. He got his Ph. D. from Busan National University, Korea, in Management Science and Management Information System. His research interests are in e-Commerce, e-Learing, Digital Information Goods and Distribution System, Information Resources Management, and Object-oriented System Analysis and Design. He is chief editor of The Journal of Internet Electronic Commerce Research, and editor of The Journal of Information System Research in Korea.

