

## THE ANTECEDENTS AND CONSEQUENCE OF SATISFACTION IN MOBILE LOCATION-BASED SERVICES

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**ABSTRACT.** *With the rapid growth of smartphones and web 2.0, mobile location-based services (LBS) has become a major component of mobile commerce. Mobile LBS apps can help consumers make purchasing decisions at nearby stores as well as acquire personalized information. The purpose of this study is to analyze the factors affecting satisfaction and continuous use intention in mobile LBS and focus on suggesting implications of the study. The PLS structural equation was used to test the measurement models and hypotheses of this study. The results of this study showed that satisfaction is positively affected by perceived benefits, ubiquity, flow experience, innovativeness, and personalization. Perceived benefits has the greatest impact on satisfaction, whereas personalization has the least impact on satisfaction. Second, satisfaction has a positive effect on continuous use intention. Therefore, since the perceived benefits, ubiquity, and flow experiences of mobile LBS are the main influencing factors for satisfaction and continuous use intention, managers should make efforts to improve on this part.*

**Keywords:** Innovativeness, Flow experience, Personalization, Ubiquity, Perceived benefits, Satisfaction, Continuous use intention, Mobile location-based services

**1. Introduction.** The explosive growth of smartphones and tablets has shifted from desktop commerce to mobile commerce. LBS plays an important role in mobile devices [1]. Companies are using mobile LBS as an important marketing tool. Evolution of mobile communication technology provides marketers with advertising channels such as mobile LBS. Marketers can also use this new technology to deliver personalized marketing messages based on consumers' geographic locations and their anticipated needs [2]. Consumer and advertiser spending on LBS was expected to reach \$10 billion by 2016 [3]. Many retailers are leveraging the features of LBS to attract consumers to stores, increase brand awareness, and interact with consumers [1].

LBS has changed the way consumers collect price and product information. About 40% of smartphone owners use their phones to compare prices in stores, and smartphones have become the top mobile shopping activity [4]. As LBS is attracting attention as a marketing tool, various researches on LBS have been conducted. However, there are few studies on the factors affecting LBS satisfaction, and it can be said that there is no research that investigates the factors of satisfaction by integrating innovativeness, flow experience, personalization, ubiquity, and perceived benefits. In this study, innovativeness, flow experience, personalization, ubiquity, and perceived benefits are presented as evaluation factors of mobile LBS [2,5-8]. Thus, this study confirms the factors affecting

satisfaction with LBS characteristics. Also, we investigate how the satisfaction of mobile service affects the intention of continuous use.

**2. Literature Review and Hypothesis.** Recently, the influence of mobile LBS has been attracting much attention. Mobile LBS can be defined as a network-based service that integrates location-derived information of the mobile device and other information to provide added value to the user [9]. Innovators do not rely on the subjective judgment of others about innovation, but they do behave like active information retrieval [10]. Innovative people are more likely to adopt mobile LBS than those who do not. It is likely that more innovative individuals will see more positive attitudes toward information disclosure through the use of mobile LBS [5]. Thus, it is expected that innovativeness can affect satisfaction of mobile LBS.

Flow experience can be defined as a kind of objective and interactive experience with playful and exploratory trait [11]. Qi et al. [12] suggested that flow experience is one of the factors influencing the data service consumption of mobile users. In a computer-mediated environment, researchers have confirmed that flow experience affects attitudes and behavior [6]. Thus, it is expected that flow experience can affect satisfaction of mobile LBS. In general, personalization has been defined as the ability to provide personalized content and services to individuals based on their preferences and behavioral knowledge [13]. Consumers may also provide their personal information for personalized service or information access [2]. In many studies, personalization has been identified as a major factor for providers [14]. The more personalized the product or service is, the more likely it is to satisfy consumers' needs and thus they use it more [15]. Therefore, personalization is expected to affect the satisfaction of mobile LBS.

Ubiquity means that users can access mobile services without regard to time and place [16]. Ubiquity is closely tied to mobile LBS, and if it is not provided properly, it will complain about mobile LBS. The outstanding advantages of mobile technology are accessibility regardless of time and place, and ubiquity can affect the intent to use [17]. Therefore, ubiquity is expected to affect the satisfaction of mobile LBS. Reyes et al. [18] defined benefit as the level of benefit that the organization and supply chain derive from RFID implementation, including customer service, productivity, asset management, and communication. Thus, it can be assumed that perceived benefits of mobile LBS users have a positive effect on satisfaction and continuous use intention. Meanwhile, many previous studies have confirmed that the relationship between satisfaction and continuous use intention is positive in mobile services [16]. Likewise, mobile LBS satisfaction is expected to have a positive effect on continuous use intention. Based on previous studies, the following hypotheses are presented to confirm the relationship between evaluation factors, satisfaction, and continuous use intention of mobile LBS.

H1a: Innovativeness has a positive impact on satisfaction of mobile LBS.

H1b: Flow experience has a positive impact on satisfaction of mobile LBS.

H1c: Personalization has a positive impact on satisfaction of mobile LBS.

H1d: Ubiquity has a positive impact on satisfaction of mobile LBS.

H1e: Perceived benefits have a positive impact on satisfaction of mobile LBS.

H2: Satisfaction has a positive impact on continuous use intention of mobile LBS.

**3. Research Method.** This study focuses on identifying the factors affecting the satisfaction of mobile LBS and examining how the improvement of satisfaction affects continuous use intention. The research model is presented as in Figure 1.

Table 1 is an operational definition of the research variables used in this study, and the previous studies were used to ensure reliability and validity. The questionnaire consisted of 3 items of innovativeness, 4 items of flow experience, 4 items of personalization, 4 items of ubiquity, 4 items of perceived benefits, 3 items of satisfaction and 3 items of

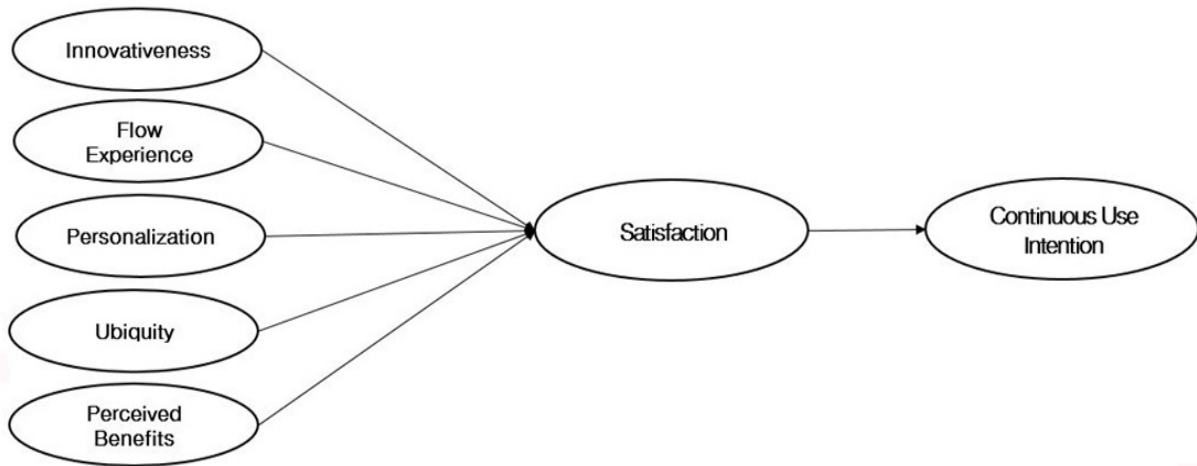


FIGURE 1. Research model

TABLE 1. Operational definitions

Constructs	Operational definitions	References
Innovativeness	The degree of willingness to try out LBS	[2,5]
Flow experience	The degree to which users are deeply engrossed LBS	[6]
Personalization	The degree to which users are provided with customized information using location information	[7]
Ubiquity	The extent to which users can use location-based services anytime and anywhere	[8]
Perceived benefits	The degree to which users benefit from LBS	[2]
Satisfaction	The extent to which users are satisfied with LBS	[19]
Continuous use intention	The intention of users to continue to use LBS	[19]

continuous use intention. Each construct comprises multiple items that are measured by a seven-point scale of Likert-type. 1 is strongly disagree and 7 is strongly agree. Of the 231 questionnaires, 31 ones were eliminated due to missing or inappropriate data, resulting in a final sample of 200 respondents. The questionnaire survey was conducted for the respondents who have experienced mobile LBS recently. SPSS 15.0 and partial least square (PLS) were used to test the validity and reliability of the questionnaire items and to process the hypothesis model fitting and testing.

4. **Results.** According to the characteristics of the sample, 60.5 percent of the female respondents, 57.0 percent of the female students were in the 20s and 30s, and 41.5 percent of the students were in the occupation.

TABLE 2. Sample characteristics

Item		Frequency (%)	Item		Frequency (%)
Gender	Male	79(39.0)	Occupation	Student	83(41.5)
	Female	121(60.5)		Office worker	44(22.0)
	Total	200(100.0)		Technician	22(11.0)
Age	20-30	114(57.0)		Education	12(6.0)
	31-40	54(27.0)		Others	39(19.5)
	41+	32(16.0)		Total	200(100.0)
	Total	200(100.0)			

Table 3 shows that the factor loading value of the measurement model is over 0.7 and the AVE value is more than 0.5, indicating that there is convergent validity [20]. The composite reliability and Cronbach's alpha value are over 0.7, so that the reliability of the research constructs is identified.

Fornell and Larcker [21] argued that the discriminant validity is obtained when a correlation between two variables is lower than the AVE square root value for any of the two variables. Therefore, Table 4 shows that the discriminant validity of all variables is confirmed.

The structural model results are shown in Figure 2 and Table 5. Bootstrapping is used to assess the significance levels of the standardized coefficients. The  $R^2$  value for

TABLE 3. Convergent validity and reliability

Variables	Items	Factor loadings	AVE	Composite reliability	Cronbach's alpha
Innovativeness	IN1	.929	.834	.938	.902
	IN2	.915			
	IN3	.895			
Flow Experience	FE1	.856	.808	.944	.921
	FE2	.918			
	FE3	.924			
	FE4	.897			
Personalization	PE1	.859	.791	.938	.912
	PE2	.915			
	PE3	.899			
	PE4	.884			
Ubiquity	UB1	.888	.827	.950	.930
	UB2	.943			
	UB3	.919			
	UB4	.887			
Perceived Benefits	PB1	.874	.801	.941	.917
	PB2	.894			
	PB3	.919			
	PB4	.891			
Satisfaction	SA1	.931	.845	.942	.908
	SA2	.914			
	SA3	.911			
Continuous Use Intention	CI1	.933	.839	.940	.904
	CI2	.935			
	CI3	.880			

TABLE 4. Discriminant validity

Variables	1	2	3	4	5	6	7
Innovativeness	<b>.913</b>						
Flow Experience	.292	<b>.899</b>					
Personalization	.192	.389	<b>.889</b>				
Ubiquity	.382	.406	.455	<b>.909</b>			
Perceived Benefits	.350	.605	.481	.576	<b>.894</b>		
Satisfaction	.432	.601	.510	.658	.713	<b>.919</b>	
Continuous Use Intention	.462	.590	.473	.632	.639	.759	<b>.916</b>

\*The diagonal bold is the square root of AVE.

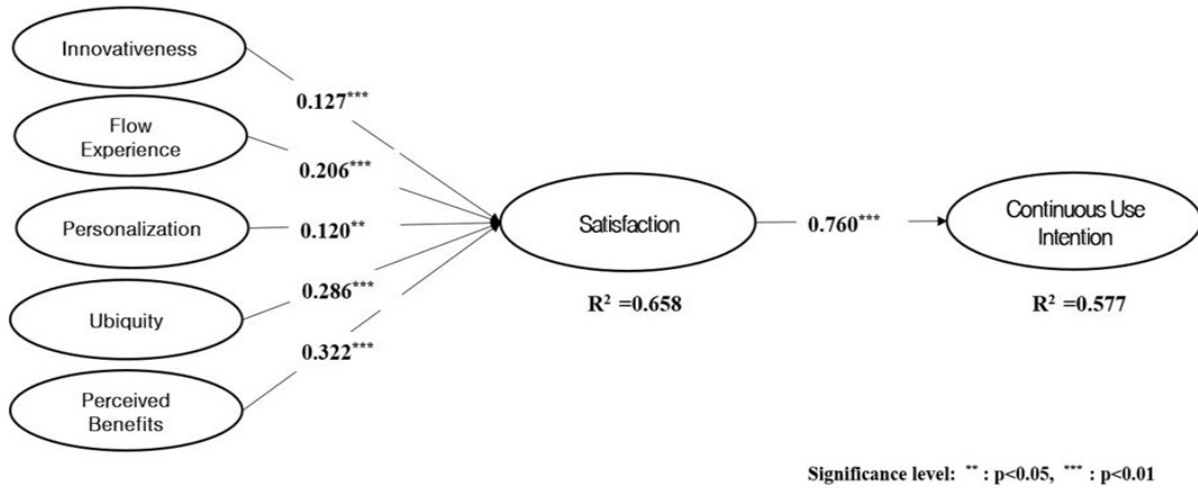


FIGURE 2. Path model

TABLE 5. Hypothesis testing

Hypotheses	Path	Path coefficient	t-value	Results
H1a	Innovativeness → Satisfaction	.127	2.756***	Supported
H1b	Flow Experience → Satisfaction	.206	3.105***	Supported
H1c	Personalization → Satisfaction	.120	2.341**	Supported
H1d	Ubiquity → Satisfaction	.286	4.752***	Supported
H1e	Perceived Benefits → Satisfaction	.322	4.654***	Supported
H2	Satisfaction → Continuous Use Intention	.760	21.390***	Supported

Significance level: \*\*: p < 0.05, \*\*\*: p < 0.01

satisfaction is 0.658 and the R<sup>2</sup> for continuous use intention is 0.577. R<sup>2</sup> values between 0.50 and 0.75 indicate that the model has a moderately strong explanatory capability [22].

H1a was accepted because innovativeness showed a positive effect on satisfaction at the level of 0.01. H1b was accepted because flow experience showed a positive effect on satisfaction at the level of 0.01. H1c was accepted because personalization showed a positive effect on satisfaction at the level of 0.05. H1d was accepted because ubiquity showed a positive effect on satisfaction at the level of 0.01. H1e was accepted because perceived benefits showed a positive effect on satisfaction at the level of 0.01. H2 was accepted because satisfaction showed a positive effect on continuous use intention at the level of 0.01.

**5. Conclusions.** The purpose of this study is to identify factors affecting satisfaction and continuous use intention in accepting mobile LBS. The results of the empirical analysis are as follows. First, ubiquity was expected to have more influence on satisfaction than other factors, but rather perceived benefits had the greatest impact. This shows that ubiquity is important in mobile LBS, but the benefits perceived by users are more important. Since the perceived benefits of mobile LBS can provide direction for actual behavior [5], there is a need to provide benefits from the perspective of mobile LBS users.

Second, it is also shown that innovativeness and personalization have minimal effects on satisfaction of mobile LBS. In particular, personalization has the least impact on satisfaction, which suggests that the quality of mobile LBS customization information may be not high. On the other hand, personalization in mobile LBS can also be seen as a privacy issue, which can be negative for the acceptance of the services due to the

possibility of leakage of personal information. Therefore, it is necessary to vary the degree of personalization according to the type of mobile LBS [23]. Also, the more innovative individuals, the more positive attitudes toward new products or new services can be expected. However, the low level of impact of personal innovativeness on mobile LBS satisfaction can be attributed to the lack of uniqueness of this service. Thus, it is necessary to develop a service attribute expressing the uniqueness of mobile LBS.

Third, satisfaction has a significant effect on continuous use intention of mobile LBS. If users are satisfied with mobile LBS, they will likely use the service repeatedly and continuously. Mouakket [24] argued that use satisfaction of Facebook has been shown to stimulate habitual behavior, resulting in the formation of habits and, consequently, increased intent to use. Thus, we suggest that the satisfaction of using mobile LBS has become a habit and positively influences the intention of continuous use. Meanwhile, it is confirmed that satisfaction of mobile LBS plays an important role in improving the intention of continuous use. However, considering that user's innovativeness and personalization of mobile LBS had a little effect on satisfaction, it seems necessary to improve this part in the future.

The limitations of this study and the direction of future research are as follows. First, it is necessary to develop factors affecting satisfaction according to type of mobile LBS. In addition to the influencing factors used in this study, there will be significant influencing factors. Second, this study was analyzed using cross-sectional data. Longitudinal studies will be needed to identify user's needs for mobile LBS over time. Third, to generalize the results of this study, it is necessary to select a sample that enhances the representation.

## REFERENCES

- [1] X. Zou and K.-W. Huang, Leveraging location-based services for couponing and infomediation, *Decision Support Systems*, vol.78, pp.93-103, 2015.
- [2] H. Xu, X. Luo, J. M. Carroll and M. B. Rosson, The personalization privacy paradox: An exploratory study of decision making process for location-aware marketing, *Decision Support Systems*, vol.51, pp.42-52, 2011.
- [3] N. Patel, The 10 billion rule location, *Strategic Analytics*, 2011.
- [4] MarketWatch, *5 Top Price-Compare Apps*, <http://www.marketwatch.com/story/5-of-the-best-price-comparison-apps-1332470>, 2012.
- [5] H. Xu and S. Gupta, The effects of privacy concerns and personal innovativeness on potential and experienced customers' adoption of location-based services, *Electron Markets*, vol.19, pp.137-149, 2009.
- [6] V. M. Landers, S. E. Beatty, S. Wang and D. L. Mothersbaugh, The effect of online versus offline retailer-brand image incongruity on the flow experience, *Journal of Marketing Theory and Practice*, vol.23, no.4, pp.370-387, 2015.
- [7] X. Guo, X. Zhang and Y. Sun, The privacy-personalization paradox in mHealth services acceptance of different age groups, *Electronic Commerce Research and Applications*, vol.16, pp.55-65, 2016.
- [8] H. Yun, C. C. Lee, B. G. Kim and W. J. Kettinger, What determines actual use of mobile web browsing services? A contextual study in Korea, *Communications of the Association for Information Systems*, vol.28, pp.313-328, 2011.
- [9] J. S. Barnes, Known by the network: The emergence of location-based mobile commerce, in *Advances in Mobile Commerce Technologies*, E.-P. Lim and K. Siau (eds.), Hershey, Idea Group, 2003.
- [10] E. M. Rogers, *Diffusion of Innovations*, 4th Edition, Free Press, New York, 1995.
- [11] H. Chen, R. Wigand and M. Nilan, Flow experience on the web, *Computers in Human Behavior*, vol.15, no.2, pp.585-608, 1999.
- [12] J. Qi, L. Li, Y. Li and H. Shu, An extension of technology acceptance model: Analysis of the adoption of mobile data services in China, *Systems Research and Behavioral Science*, vol.26, pp.391-407, 2009.
- [13] G. Adomavicius and A. Tuzhilin, Personalization technologies: A process-oriented perspective, *Communications of the ACM*, vol.48, no.10, pp.83-90, 2005.
- [14] J. Sutanto, E. Palme, C.-H. Tan and C. W. Phang, Addressing the personalization-privacy paradox: An empirical assessment from a field experiment on smartphone users, *MIS Quarterly*, vol.37, no.4, pp.1141-1164, 2013.

- [15] H. S. Ying and D. Bodoff, The effects of web personalization on user attitude and behavior: An integration of the elaboration likelihood model and consumer search theory, *MIS Quarterly*, vol.38, no.2, pp.497-520, 2014.
- [16] T. Zhou, An empirical examination of users' post-adoption behavior of mobile services, *Behavior & Information Technology*, vol.30, no.2, pp.241-250, 2011.
- [17] S. Kim and G. Garrison, Investigating mobile wireless technology adoption: An extension of the technology acceptance model, *Information Systems Frontiers*, vol.11, pp.323-333, 2009.
- [18] P. M. Reyes, S. Li and J. K. Visich, Determinants of RFID adoption stage and perceived benefits, *European Journal of Operational Research*, vol.254, pp.801-812, 2016.
- [19] T.-P. Liang, Y.-T. Ho, Y.-W. Li and E. Turban, What drives social commerce: The role of social support and relationship quality, *International Journal of Electronic Commerce*, vol.16, no.2, pp.69-90, 2011.
- [20] J. F. Hair, R. Anderson, R. Tatham and W. Black, *Multivariate Data Analysis*, 5th Edition, Prentice-Hall, NJ, 1998.
- [21] C. Fornell and D. Larcker, Evaluating structural equation models with unobservable variables and measurement error, *Journal of Marketing Research*, vol.18, no.1, pp.39-50, 1981.
- [22] J. F. Hair, C. M. Ringle and M. Sarstedt, PLS-SEM: Indeed a silver bullet, *Journal of Marketing Theory and Practice*, vol.19, no.2, pp.139-151, 2011.
- [23] L. Barkhuus and A. Dey, Location-based services for mobile telephony: A study of user's privacy concerns, *Proc. of the INTERACT, 9th IFIP TC13 International Conference on Human-Computer Interaction*, Zurich, Switzerland, 2003.
- [24] S. Mouakket, Factors influencing continuance intention to use social network sites: The Facebook case, *Computers in Human Behavior*, vol.53, pp.102-110, 2015.
- [25] J.-I. Shin and S.-H. Jang, Factors affecting satisfaction and continuous use intention in location-based services, *Proc. of the 12th International Conference on Innovative Computing, Information and Control*, Kurume City, Japan, p.105, 2017.