ANALYSIS OF INTENTION TO REPURCHASE SMART DEVICES BY INNOVATIVE CUSTOMERS AND NON-INNOVATIVE CUSTOMERS

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Abstract. *This paper analyzed the customer's intention to repurchase smart devices based on previous researches analysis and suggested them as a research model. For statistical test of the research model, the survey was conducted on consumers who purchased smart devices within 6 months, and a total of 158 respondents were analyzed. The research model tested the feasibility of the model through a survey of consumers who repurchased smart devices. In addition, this paper studied the affected repurchase factors according to the innovative tendency of customers. In conclusion, this paper analyzed that customer's innovative tendency has a limit to the decisive impact on the intention to repurchase smart devices. In other words, it is difficult to study that innovation has a great impact on repurchasing smart devices.*
Keywords: Smart device, Intention to repurchase, Innovative tendency

1. **Introduction.** A variety of smart devices are now on the market, and they are bringing about a variety of personal and social changes. Consumers use smart devices to handle personal affairs and for social network services. As the global paradigm of the smart device market changes, there is a need to study the influence of smart device purchases and their influences on users. Many consumers already use smartphones. The global market research firm CCS and Google Insight predicted that 1.6 billion smartphones would be sold in 2016 with an increase to 2 billion by 2019 [1]. Smartphones have already become part of the social structure and are now an important part of the information technology (IT) device market. However, other smart devices have yet to be used as much as smartphones [1]. Google analyzed 49,122 consumers in 44 countries in 2014-2015, and the results revealed that the average penetration rate of smartphones was 64%. However, the average penetration rate of other smart devices such as tablet PCs was only 27% [1]. This indicates that the current spread of smart devices is concentrated on smartphones, which means that there is still a chance for the smart device market to expand. This paper examines customer intentions to repurchase smart devices (continuous use intentions) in relation to expanding the market share of smart devices. Many studies have investigated consumer intentions to purchase smartphones, but research on other smart devices has been lacking. This study examines the intentions of customers to repurchase smart devices, which could reveal information to help continue the spread of smart devices and establish effective business strategies. To do so, it is necessary to widely spread information about the usefulness of smart devices through word of mouth and recommendations from customers who already use smart devices, which can be a very important factor in marketing strategies. In addition, since smart devices are high-tech IT products, customer innovation tendencies could be an important factor in repurchasing products. Innovative

customers are active in accepting innovative technologies or exploring new ideas, and they have a positive acceptance of perceived risk or uncertainty [2,3]. Various studies have previously investigated the purchase intentions of high-tech IT products according to customers' innovation tendencies [2,4,5]. According to Roger, only about 2.5% of all customers are "innovators", and 13.5% are early adopters. In other words, most customers are non-innovative customers [3]. This paper analyzed the intention of consumers to purchase smart devices based on the business phenomenon. And this paper analyzed how innovativeness of consumers affects repurchase intention. Also, in this study, research hypotheses and research models were completed through previous studies, and statistical tests of research hypotheses were conducted through questionnaires on consumers. In this way, the significance of the research hypothesis and the validity of the research model were verified.

2. **Technology Acceptance Model.** This study considers the characteristics of smart device products based on Davis et al.'s technology acceptance model (TAM). The purpose goal of this model is to identify variables that affect user adoption of computer technology, services, and software based on "perceived usefulness" and "perceived ease of use" [6]. Perceived usefulness indicates the degree of subjective belief that the introduction of new technologies or systems will increase the productivity and efficiency of work [6]. Perceived ease of use refers to the idea that new technologies and systems are considered readily usable (Davis et al.). Davis et al. argue that these factors directly or indirectly affect user attitudes and intentions toward new technologies and service systems [6]. TAM is based on Fichbein and Ajzen's theory of reasoned action (TRA), which is used to predict behavior based on social psychology [7]. Attitudes toward behavior and subjective norms influence behavioral intentions. Studies indicate that when customers purchase a new IT device, they are more likely to use the technologies that are easier to use [8-11]. Perceived usefulness and perceived ease of use have also been found to affect consumer [8-11].

3. **Research Hypotheses.**

3.1. **Factors affecting purchasing behavior.** Assail points out that customer experience and external environmental factors are the main input variables in making purchase decisions based on complex decision making [12]. The recognized usefulness of a product, its ease of use, and the practicality or convenience are the main factors considered when choosing a product or brand. Based on analyses of these prior studies, the following research hypotheses are presented.

   H1: The perceived usefulness of a smart device has a positive impact on customer satisfaction.

   H2: A smart devices perceived ease of use has a positive impact on customer satisfaction.

3.2. **Customer satisfaction and repurchase intention.** Customer satisfaction is a very important factor in product sales. Therefore, many scholars have examined customers' purchase intentions based on customer satisfaction. In other words, customer satisfaction is the degree to which customers feel that their expectations about products or services are realized. Customer satisfaction is also perceived as a variable that influences the likelihood of customers reusing services [13]. The relationship between customer satisfaction and repurchasing has also been explained through empirical studies [14]. Empirical studies supporting this relationship establish that customer satisfaction for products and services is strongly related to behavioral intent to reuse products from the same manufacturer or service provider [15]. In summary, the relationship among customer satisfactions, repurchase intention, and recommendation intention is positively correlated with customer satisfaction [16]. Many scholars argue that satisfaction is an important factor in repurchase intention, but it is not a sufficient condition and cannot

explain repurchase intention on its own. It also raises the need for research related to repurchase intentions after customer satisfaction [17]. However, it can be concluded that customer satisfaction affects post-purchase attitude and repurchase intention [18]. Thus, the following hypothesis is presented based on previous studies on customer satisfaction.

H3: Customer satisfaction with a smart device has a positive effect on the repurchase intention of the product.

4. Research Model and Measurements.

4.1. **Research process.** This study analyzed the satisfaction of customers who purchased smart devices and the intention to repurchase according to previous research. First, previous research was analyzed regarding the benefits that customers perceive when they are satisfied with using smart devices. The value of smart devices that consumers perceive was also analyzed, along with usefulness and ease of use. In order to verify the statistical validity of the research model, a survey was conducted with 200 consumers who had directly purchased smart devices (the survey excluded cases where the smart device was received as a gift or for some other reason without purchasing it directly). In addition, non-innovativeness tendencies were derived using questionnaires to analyze consumers' tendencies. The statistical validity of the research model was also verified based on the consumer survey results, and the implications were analyzed. Based on the statistical data, the effect of non-innovative consumer tendencies on the satisfaction and repurchase of smart devices was analyzed.

4.2. **Data collection.** The survey participants were adults in their 20s and 30s from Seoul, South Korea. Seoul is a metropolitan city with more than 10 million people and a high penetration rate of smartphones, as well as a well-equipped network infrastructure. In addition, consumers living in Seoul are more active in purchasing and using advanced information and communication equipment than consumers in other countries. According to a survey by the Korean government (the Ministry of Science, ICT and Future Planning) in 2017, on average, Koreans were found to be replacing smartphones and tablet PCs when the contract with Telecom Company expires [19]. This rate is faster compared to those of customers in the US and China. In other words, customers living in Seoul are more aggressive in purchasing smartphones and smart devices. The 200 survey participants had recently purchased smart devices within the last 6 months. The questionnaire consisted of 30 items with a seven-point Likert scale, including a questionnaire of six items about customers' personal inclinations. The questionnaire was distributed and collected to increase the response rate. After excluding questionnaires that were not answered completely, a total of 158 questionnaires were analyzed.

4.3. **Analysis method.** The descriptive statistics of the survey were analyzed to determine the means and standard deviations of the responses using SPSS 24.0. A factor analysis and reliability analysis (Cronbach's α test) were conducted to analyze the validity and reliability of the research variables. To analyze the relationship between the variables, the path coefficient was then measured through the fit analysis of the research model and the structural equation model. Customers were considered to be non-innovative if their averages were less than four points on the six non-innovativeness questionnaire items. The influence of the non-innovative tendencies in the repurchase of smart devices was also analyzed.

4.4. **Research model and hypothesis.** Figure 1 shows the proposed research model used to study factors affecting the repurchase of smart devices. The operational definitions of the research variables and scales are summarized in Table 1.

FIGURE 1. Research model

TABLE 1. Operational definitions of the research variables and scales

Variable	Latent variable	Operational definition	Scale	Literature reviews
Independent variable	Perceived usefulness	A subjective belief that using smart devices will increase work productivity and efficiency	Likert 7 point scale	[8-11]
	Perceived ease of use	Subjective belief that smart devices will not require mental or physical effort	Likert 7 point scale	
Mediator variable	Customer satisfaction	Various factors in customer satisfaction of smart device	Likert 7 point scale	[20,21]
Dependent variable	Repurchase intention	Influence of satisfaction of customers using smart devices on repurchase	Likert 7 point scale	[22,23]

TABLE 2. KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.824
Bartlett's test of sphericity	Approx. Chi-Square	1696.560
	df	0.276
	Sig.	0.000

5. **Research Results.** The validity of the measurement items was verified through the Kaiser-Mayer-Olkin (KMO) index and Bartlett's test. Factors were extracted using the maximum likelihood method, and factor rotation was performed through the direct Oblimin method. Only factors with factor loading greater than 0.5 and eigenvalues greater than 1 were extracted. The factor loadings ranged from 0.611 to 0.913, and the KMO index was 0.824. The probability of significance is 0.000, and the correlation between variables is statistically significant.

There were four factors with more than one eigenvalue, and the cumulative percentage was 59.781%. In addition, Cronbach's α was over 0.70. Therefore, the reliabilities of the scales are generally satisfactory. The results of the factor analysis are shown in Table 3. The research hypothesis was statistically verified using AMOS 22.0 through path analysis of the research model, as shown in Table 4. Table 4 shows the path analysis results of the study model for the purchasers of smart devices. All regression coefficients are within the statistically significant range (p-value < 0.05). From perceived usefulness to customer satisfaction, the standardized regression weight is 0.5. From perceived ease of use to customer satisfaction, the standardized regression weight is 0.314. From customer satisfaction to repurchase, the standardized regression weight is 0.506.

The results show that satisfaction with smart devices is correlated with perceived usefulness and perceived ease of use (Table 5). In addition, the results support the hypothesis

TABLE 3. Factor and reliability analysis results

Latent variable	Observation variables	Symbols	Factors	Cronbach's α
Perceived of usefulness	Quick work with smart devices	V13	0.694	0.904
	Business efficiency through smart devices	V4	0.783	
	Accurate delivery of information through smart devices	V3	0.913	
	Improving the quality of life through smart devices	V2	0.893	
	Perception of value through smart device utilization	V1	0.781	
Intention to repurchase	Repurchase considering product image of smart device	V11	0.649	0.810
	Repurchase the products of the same company as the smart device customer is currently using	V20	0.772	
	Recommended for people who are currently using smart devices	V23	0.731	
	Repurchase considering the brand value of smart devices	V22	0.673	
Customer satisfaction	The variety of experiences that smart devices offer	V12	0.754	0.832
	Overall satisfaction with smart devices	V14	0.834	
	Satisfied with the useful value that smart devices offer for price	V15	0.611	
	Satisfied with the variety of information and convenience provided by smart devices	V19	0.662	
Perceived ease of use	Easy to install and use	V21	0.662	0.761
	Operation smart devices for various purposes	V7	0.904	
	Easily manipulate smart devices with help from nearby	V6	0.659	

*Extraction methods: maximum likelihood, Rotation method: Oblimin with Kaiser normalization

that satisfaction with a smart device has a positive influence on the intention to repurchase. The path model analysis also shows that satisfaction is an important mediating parameter in this research model.

The results for the innovative customer group and non-innovative customer group are shown in Table 6. The standardized regression weight from perceived usefulness to customer satisfaction was 0.482, 0.65, the value from perceived ease of use to customer satisfaction was -0.004, 0.405 and the value from customer satisfaction to repurchase was 0.795, 0.595. All standardized regression weights of the factors were statistically significant (p-value < 0.05) except perceived ease of use in innovative group.

The coefficients of the path models of the innovative customer group and the non-innovative customer group are compared in Table 6. In other words, this study shows that customer's innovative tendency has a limit to the decisive impact on the intention to repurchase of smart devices.

6. **Conclusions.** Many researchers have argued that highly innovative customers show positive behaviors, active behaviors, and exploratory buying tendencies, along with technological efforts on new ideas and products [2,3]. However, this research shows that

TABLE 4. Statistical analysis between factors

			Standardized regression weight	Regression weight			
				Estimate	S.E.	C.R.	p-value
Perceived of usefulness	→	Customer satisfaction	0.5	0.559	0.133	4.203	***
Perceived ease of use	→	Customer satisfaction	0.314	0.326	0.115	2.831	0.005
Customer satisfaction	→	Intention to repurchase	0.506	0.589	0.149	3.954	***
Perceived of usefulness	→	V13	0.694	1			
	→	V4	0.783	1.109	0.135	8.194	***
	→	V3	0.913	1.267	0.137	9.283	***
	→	V2	0.893	1.199	0.133	8.99	***
	→	V1	0.781	1.107	0.137	8.056	***
Intention to repurchase	→	V11	0.649	1			
	→	V20	0.772	1.065	0.158	6.74	***
	→	V23	0.731	0.993	0.157	6.315	***
	→	V22	0.673	1			
Customer satisfaction	→	V12	0.754	0.952	0.131	7.295	***
	→	V14	0.834	1.065	0.142	7.515	***
	→	V15	0.611	0.851	0.144	5.918	***
	→	V19	0.662	0.825	0.128	6.463	***
	→	V21	0.744	1.01	0.164	6.148	***
Perceived ease of use	→	V7	0.662	1			
	→	V6	0.904	1.208	0.177	6.839	***
	→	V5	0.659	0.949	0.156	6.093	***

TABLE 5. Results of the research hypothesis

Research hypothesis		Results
Hypothesis 1 (H1)	The perceived usefulness of a smart device has a positive impact on customer satisfaction.	Supported
Hypothesis 2 (H2)	A smart devices' perceived ease of use has a positive impact on customer satisfaction.	Supported
Hypothesis 3 (H3)	Customer satisfaction with a smart device has a positive effect on the repurchase intention of the product.	Supported

customer's innovative tendency has a limit to the decisive impact on the intention to repurchase of smart devices. In other words, it is difficult to suggest that innovation has a great impact on repurchasing smart devices. Therefore, companies should actively develop and promote diverse and convenient functions and services for smart devices to increase customers' intention to repurchase. It is also necessary for marketing strategies to emphasize that smart devices can be operated easily and intuitively. These activities should increase the satisfaction with smart devices and brand value, which in turn will increase the continuous use of smart devices and new products.

This paper has limitations in the generalization of research conclusions due to limitations of survey population (limited number of respondents and age groups). Therefore, it is necessary to secure various populations and to improve them.

TABLE 6. Standardized regression weight results divided by two consumer groups

			Innovative customer group		Non-innovative customer group	
			Standardized regression weight	p-value	Standardized regression weight	p-value
Perceived of usefulness	→	Customer satisfaction	0.482	0.03	0.65	***
Perceived ease of use	→	Customer satisfaction	−0.004	0.833	0.405	0.005
Customer satisfaction	→	Intention to repurchase	0.795	0.001	0.595	0.018

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