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A Study On The Effects Of O2O Service Characteristics on Extended Technology Acceptance Model, Emotional Response and Use Intention-Base on Single Household

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Abstract

The purpose of this study was to provide suggestions for establishing management strategy for single household. For the purpose the study reveals how the characteristics of location-based O2O service are accepted by a large group of single-person households, which leads to an extended technology acceptance model and internal response, figuring out the effect on use intention and predicting consumer behavior of single household. IBM SPSS Statistics 22.0 and IBM AMOS 22.0 statistical program were used by data

analysis to perform frequency analysis, exploratory factor analysis, reliability analysis, Correlation analysis, confirmatory factor analysis, structural equation model analysis. The fit of the structural model confirmed by the analysis was X^2=177.383(p=.000), df=111, Q=1.598, GFI=0.947, AGFI=0.927, RMR=0.017, NFI=0.964, TLI=0.983, CFI= 0.986, RMSEA=0.040. It is suitable for measurement mode. First, the O2O service characteristics showed a positive (+) effect on perceived ease of use. Second, the characteristics of O2O service showed a positive (+) effect on perceived usefulness. Third, the O2O service characteristics showed a positive (+) effect on the emotional response. Fourth, perceived ease of use showed a positive (+) effect on perceived usefulness. Fifth, perceived ease of use showed a positive (+) effect on use intention. Sixth, perceived usefulness showed a positive (+) effect on intention to use. Seventh, the emotional response showed statistically insignificant use intention.

Key Words : O2O Service, Technology Acceptance Model, Emotional Response, Use Intention, Single Household.

1 Introduction

The O2O service is one of the business models that are well-received around the world, and it is expanding its business by introducing O2O services to the medium and small-sized enterprises and start-up. The future of smartphone and Internet technology (IOT) is expected to change the offline commerce market to the O2O market [1] However, the research on O2O service is actively conducted in the US and China and overseas, but in Korea it is still lacked. In addition, most of the studies on technology acceptance models are repeated by adding various external factors such as the technology acceptance model (TAM2) proposed by Venkatesh & Davis [2] and the technology acceptance model (TAM3) proposed by Venkatesh & Attempts have been made to enhance the explanatory power of the model through verification. But, there is little research on the emotional of the user who actually accept the new technology actually accept the new technology. Recently, single household is

fastest growing which becomes a common living arrangement, and the consumer market scale for single household has been expanding. Various researches have been carried out for that, but the research about new technology acceptance was insufficient. Therefor the purpose of this study is to investigate and reveal the relationship between location-based O2O service characteristics, perceived ease of use, perceived usefulness, emotional response and use intention for single household, and to provide basic data for enterprise to establish operation strategy.

2 Literature Review

2.1 O2O Service

The O2O service also has a consensual concept of supporting offline commerce by attracting customers online. Also has a widespread concept that connecting from online to offline or from offline to online [3]. The O2O service can be further extended by the popularity of smart devices and the location based service that provides various information based on location using the near field communications technology called beacon. Based on the location of the beacon, customer location of smart device owner near. by could be fund, and then transmits the store information, message, coupon, etc., as well as provides the push notification. It is attracting attention as a major means of attracting potential customers' purchasing activities who are not willing to actively purchase. As the development of O2O service, it is expanding use in in various industries, in companies are constantly receiving attention as a means of increasing profits. For customers. With O2O service, customers not only can minimize their time and effort with one smartphone device, but also can enjoy maximum economic benefits as well as convenience in everyday life. defined O2O service as the attraction of on-line customers by using terminals such as smart phones, tablets and PCs, and said that the O2O service can buy goods or services online and receive goods or services from offline stores using the same authentication format as QR codes, just like the one in 2013.

2.2 Extended Technology Acceptance Model

The concept of acceptance of technology is based on two belief variables: Perceived ease of use and Perceived usefulness, which are related to beliefs, attitudes, and intention to use of rational behavior theory in Davis [4] The results showed that the two belief variables determine the attitudes and behaviors of the users who accept information technology [5]. There have been comment that it did not materialize external factors that could affect the process of accepting technology. only perceived usefulness, perceived ease of use, attitude, behavioral intention, and behavior are reflected in the model. For this commence, the extended technology acceptance model (TAM2) including external factors that influenced the information technology acceptance process was proposed [6]. After that, Venkatesh & Bala [7] proposed a technology acceptance model (TAM3) by extending personal differences, system characteristics, social influence and facilitation conditions as predecessor variable to the technology acceptance model of Davis[4]. In the recent, due to the development of technology, various factors of information technology according to the preceding factors or objects have been added and extended to research, and these predecessor variable lead to the conclusion that they affect perceived usefulness and perceived ease of use which supported the results of previous studies. Therefore, in this study, the extended technology acceptance model with external variables called O2O service characteristics was constructed to perform the research.

2.3 Internal Reaction

Internal response is the stimulation of the service environment by the consumer and the service provider sharing the environment together and perceiving the physical environment. In other words, the inner reaction is psychological and mental reaction that consumers and service providers express from environmental stimuli. Among the theories related to internal reactions, Mehrabian and Russell [8] argue that there is an S-O-R theory of environmental psychology that Donovan and Rossiter [9] first introduced and studied.

Bitner applied the internal response to the study by applying the S-O-R theory (SOR theory: stimulus organism - response theory), and the S-O-R theory of environmental psychology is described as

follows. Stimulus means multidimensional environment such as music, color, lighting, scent, design, congestion, cleanliness, spatial arrangement, and the organism is an internal response from stimulus, including a variety of emotions or other evaluations of product selection, price, and quality through stimulus, Behavioral response means that access and avoidance behaviors such as product search level, store stay time, store visit, interaction with people, amount of expenditure are revealed [10]. Thus, environmental psychologists say that stimulus in the physical environment cause cognitive responses and emotional responses, and also have a great effect on consumer behavior. Mehrabian and Russell [8] proposed a PAD (pleasure, arousal, dominance) scale that measures three basic types of emotions as regulatory variables by using the S-O-R theory. argues that the emotional response of consumers is very appropriate for Mehrabian and Russell [8] PAD model. Recently, due to the development of information technology, the researches on the physical environment performed in the off - line store applied the existing S-O-R theory to the internet environment, and Mummalaneni studied internal responses with an emphasis on emotional responses. Therefor in this study, based on the reseach of Mehrabian and Russell [8], the internal responses of consumers of O2O service characteristics were classified into emotional responses (pleasure, arousal, and domination).

2.4 Use Intention

Two variables of the technology acceptance model, usefulness and ease of use are explanatory variables were predicting use intention, and many empirical studies have revealed it. In particular, use intention is the immediate determinant of act, which has a direct effect on the actual use [11]. The research has been conducted continuously. In generally, it is the concept of future action anticipated or planned by individual and it also can be defined as the probability or subjective possibility that beliefs or attitudes translated into action.

3 Methodology

3.1 Research Model and Hypotheses

The research model was the same as figure 1 and the hypothesis was as follows.

H1: O2O service characteristics will have a positive (+) effect on perceived ease of use.

H2: O2O service characteristics will have a positive (+) effect on perceived usefulness.

H3: The characteristics of the O2O service will have a positive (+) effect on the emotional response.

H4: Perceived ease of use will have a positive (+) effect on perceived usefulness.

H5: Perceived ease will have a positive (+) effect on use intention.

H6: Perceived usefulness will have a positive (+) effect on use intention.

H7: Emotional response will have a positive (+) effect on use intention.

3.2 Research Model

All the 7 hypotheses are showed in Figure 1.

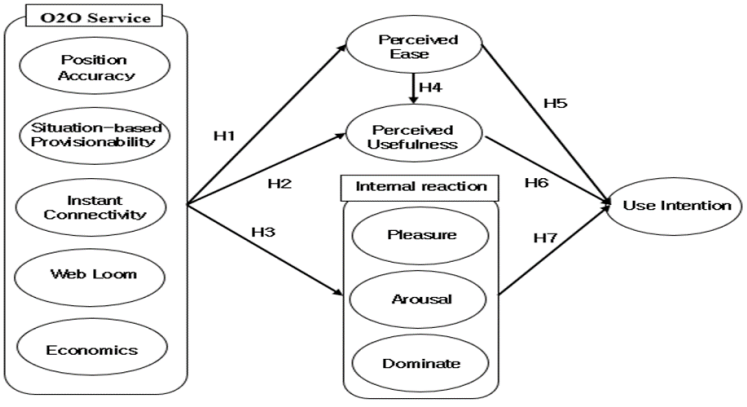

Figure 1: Research Model

3.3 Statistical Analysis

One person who has used syrup order service at least once and has been online using Google Drive. He has been living in Korea for about 60 days from June 1 to July 30, 2017. Among the 400 copies collected for men and women, 374 copies were used in the validation analysis of the research model, excluding the unfair questionnaires. Data were analyzed using frequency analysis, exploratory factor analysis, reliability analysis, correlation analysis, confirmatory factor analysis, second - order confirmatory factor analysis, and structural equation model analysis using IBM SPSS Statistics 22.0 and IBM AMOS 22.0 statistical programs.

4 Results

4.1 Demographic Characteristics

There were 189 (50.5%) male respondents slightly more than female respondents of 185 (49.4%). In the age group, 210 (56.1%) persons were in their 20s, took the largest percentage, followed by people in their 30s, 40s and 50s. The marriage status was the highest percentage with 307 (82.1%) unmarried, followed by married and other. 363 respondents (70.3%) graduated from college / university with the highest percentage, followed by college graduation, enrolled in college, high school graduate and the other. For monthly average income, less than one million won accounted for the largest percentage of 108 people (28.9%), followed by 201 million to 300million won, 301 to 400 million won, 101 to 200 thousand won, more than 500 million won, and other 401 to 500million won. There were 131(35%) respondents are students occupied the largest percentage, followed by white collar workers, professional workers, service workers, other self - employed workers, civil servant, educational personnel, faculty, blue collar workers, and technical worker. The frequency of use of the app was the highest with 103 people (27.5%) of the others, more than once a month, more than once a week, more than once two weeks, more than once a day, more than once three weeks.

4.2 Reliability and Validity Testing

The factor analysis result of location-based O2O service characteristics as followed. The KMO value was 0.945, which was suitable for factor analysis and Barlett's sphere sphericity test was 4152.929 ($p < 0.000$). The total variance explanatory power of these factors was 78.086% and the results are shown in Table 1. Besides, the Cronbach's α value for each of the derived factors was as follows: economy 0.883, instant inked 0.882, location accuracy 0.871, context-based provisioning 0.860, and web looming 0.797.

Table 1 Exploratory factor analysis result of location-based O2O service characteristics

Variable and factor		Factor load	Variance explanation power(%)	Eigenvalue	Confidence coefficient
Economics	4. Using syrup table service will can compare the prices online and buy the goods cheaply.	0.788	18.529	2.965	0.883
	3. Using syrup table service can use discount coupons and points as cash.	0.768			
	2. Using syrup table service can buy goods at a discounted price.	0.708			
	1. The price of the goods offered in the syrup table service are comparatively reasonable.	0.652			
Immediately Connectivity	2. The syrup table service can be used in anytime without any restrictions.	0.829	18.322	2.931	0.882
	3. The syrup table service can be used in anywhere without restrictions.	0.748			
	1. The syrup table service can be use on move freely	0.658			
	4. The syrup table service can be used immediately without any additional equipment	0.655			
Location Accuracy	1. syrup table service can exactly know where I am.	0.845	15.907	2.545	0.871
	2. syrup table order's location-based service will accurately tell the location of the nearby store	0.744			
	3. syrup table service will provide you with updated and up-to-date location information.	0.703			
Context-based provisioning	1. syrup table service can provide discount information and shopping information of my personal interest.	0.814	14.450	2.312	0.860
	3. syrup table service can provide useful information that I am interested in.	0.708			
	2. syrup table location-based service can provide discounts and shopping information around you	0.660			
looming	1. Using syrup table service, you are able to receive online orders instantly in stores without waiting.	0.771	10.878	1.740	0.797
	2. Using syrup table service, you are able to exchange and redeem online orders directly from offline stores.	0.758			

Total variance explanatory power: 78.086%
KMO measurement: 0.945
Bartlett Determination value: 4152.929(p-value: 0.000)

In order to measure perceived ease of use, four items were measured as one single factor, as shown in Table 2. The KMO value as a measure of the validity for factor analysis was 0.857 and the Bartlett's sphere sphericity test was 1055.215 ($p < 0.000$). The total variance explanatory power of the four variables was 80.205% and the Cronbach's α value was 0.918.

Table 2 Exploratory factor analysis result of perceived ease of use

Variable and factor		Factor load	Variance explanation power(%)	Eigenvalue	Confidence coefficient
Perceived ease of use	3. Getting information by using syrup table service is convenient.	0.907	80.205	3.208	0.918
	1. Using syrup table service is easy	0.898			
	4. Using syrup table service is generally convenient	0.891			
	2. syrup table service is easy to learn .	0.887			

Total variance explanatory power: 80.205%

KMO measurement: 0.857

Bartlett Determination value: 1055.215(p-value : 0.000)

The result of factor analysis on perceived usefulness, four variables were measured as single factors, as showed in Table 3. The KMO value as a measure of the validity for the factor analysis was 0.844, and Bartlett's sphere sphericity test was 1589.241 ($p < 0.000$). The total variance explanatory power of the four variables was 75.854% and the Cronbach's α value was 0.892.

Table 3. Exploratory factor analysis result of perceived usefulness

Variable and factor		Factor load	Variance explanation power(%)	Eigenvalue	Confidence coefficient
Perceived usefulness	4. The syrup table service is generally useful.	0.891	75.854	3.034	0.892
	1. The information getting through the syrup table service is useful.	0.877			
	3. The information getting through the syrup table service is useful in everyday life.	0.868			
	2. The information getting through the syrup table service is useful for business.	0.847			

Total variance explanatory power: 75.854%
KMO measurement: 0.844
Bartlett Determination value: 1859.241(p-value: 0.000)

The factor analysis result of emotional response as followed: the KMO value was 0.783, which was suitable for factor analysis

and Barlett's sphere sphericity test was 1831.999 (p <0.000). The total explanatory power of these factors was 82.582% as showed in Table 4. Besides the Cronbach's α values for each derived factors were 0.906 for disenchantment 0.875 for pleasure, and 0.786 for dominance.

Table 4. Exploratory factor analysis result of emotional response

Variable and factor		Factor load	Variance explanation power(%)	Eigenvalue	Confidence coefficient
Dishallucination	1.I feel nervous by Syrup table service.	0.902	32.865	2.629	0.906
	2. I feel stimulate by Syrup table service.	0.873			
	3. I feel excite by Syrup table service.	0.857			
Pleasure	1. I feel pleasant by Syrup table service.	0.904	30.057	2.405	0.875
	2. I feel happy by Syrup table service.	0.901			
	3.I feel contented by Syrup table service.	0.877			
Dominion	1. I feel under the control by Syrup table service.	0.893	19.660	1.573	0.786
	2. I feel an influence by Syrup table service.	0.746			

Total variance explanatory power: 82.582%
KMO measurement: 0.783
Bartlett Determination value: 1831.999(p-value:0.000)

The result of factor analysis in use intention as showed in Table 5, five variables as measurement items were derived as one single factor. The KMO value as a measure of validity for the factor analysis was 0.750 and the Bartlett's sphere sphericity test was 732.894 (p <0.000). The total variance explanatory power of the three variables was 84.197% and the Cronbach's α value was 0.906.

Table 5. Exploratory Factor Analysis result of use intention

Variable and factor		Factor load	variance explanation power(%)	Eigenvalue	confidence coefficient
Use intention	2. I am likely to buy goods through this Starbucks siren order service	0.931	84.197	2.526	0.906
	1. I am willing to buy the goods through this Starbucks siren order service.	0.914			
	3. I think using Starbucks siren order service to buy goods is a good choice.	0.908			

Total variance explanatory power: 84.197%
KMO measurement: 0.750
Bartlett Determination value: 732.894(p-value: 0.000)

4.3 Confirmatory Factor Analysis

In this study, validity was verified through confirmatory factor analysis. The results of confirmatory factor analysis for each construct concept are shown in Table 6. Internal consistency of each research unit was examined and confirmatory factor analysis was performed for each latent factor. In order to test the fit of the items for the optimal state, we used X^2, df, Q, GFI, AGFI, RMR, NFI, TLI, CFI and RESEA and confirmed the path coefficient, standard error and C.R. using the maximum likelihood method. The fit of each factor is considered to be sufficient to analyze the structural model.

Table 6. Confirmatory Factor Analysis

Factor	$\chi 2$	df	P	Q	GFI	AGFI	RMR	NFI	TLI	CFI	RMSEA
O2O service	204.886	92	0.000	2.227	0.937	0.906	0.024	0.951	0.964	0.972	0.057
Perceived ease of use	1.920	2	0.383	0.960	0.997	0.987	0.004	0.998	1.000	1.000	0.000
Perceived usefulness	1.056	2	0.590	0.528	0.999	0.993	0.004	0.999	1.003	1.000	0.000
Emotion response	35.249	13	0.001	2.711	0.978	0.938	0.029	0.981	0.974	0.988	0.068
Use intention	-	-	-	-	1.000	-	-	1.000	-	1.000	-

4.4 Correlation Analysis

Pearson correlation analysis was performed before hypothesis testing. The result as showed in Table7, O2O service, perceived ease of use, perceived usefulness, emotional response, and use intention have a correlation with significant level $p<0.01$ There is a significant level of correlation.

Table 7 Correlation Analysis between Factors

Factor	Average	Std.Dev	Correlation between Factors				
			O2O service	Perceived ease of use	Perceived usefulness	Emotion response	Use intention
O2O service	3.7633	0.65519	1				
Perceived ease of use	3.7366	0.75511	0.769***	1			
Perceived usefulness	3.6965	0.72036	0.743***	0.762***	1		
Emotion response	3.1628	0.62945	0.140***	0.141***	0.161***	1	
Use intention	3.5793	0.82020	0.645***	0.656***	0.684***	0.178***	1

***p<0 .01

4.5 Evaluation of the Research Model and Hypothesis Testing

Based on the results of the confirmatory factor analysis, AMOS 22.0 was used to analyze the structural model as shown in Figure 2. The fit of the analysis was X^2=177.383(p=0.000), df=111, Q=1.598, GFI=0.947, AGFI=0.927, RMR=0.017, NFI=0.964, TLI=0.983, CFI=0.986, RMSEA=0.040, indicating that all the fit is reasonable.

SMC is equivalent to R2, which is the decision coefficient in regression analysis. Perceived ease of use by O2O service was 74.1%, Perceived usefulness by O2O service and perceived ease of use was 75.5%, emotional response by O2O service was 0.25%, use intention by O2O service, perceived ease of use, perceived usefulness, and emotional response was explained for 57.8%.

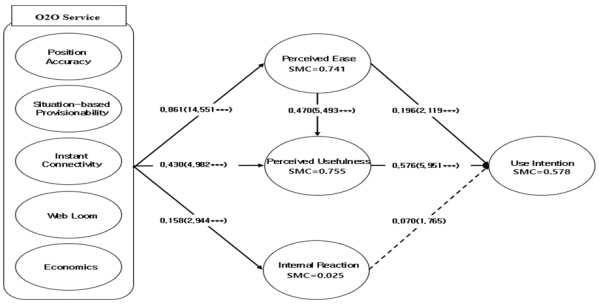

Figure 2: Results of Testing the Research Model

Table 8 Results of research model path coefficient and hypothesis test

Path(Hypothesis)				Standardized Estimate	standard error	C.R.	Result
H1		⇒	Perceived ease of use	0.861	0.066	14.551***	Accept
H2	O2O service	⇒	Perceived usefulness	0.430	0.098	4.982***	Accept
H3		⇒	Emotion response	0.158	0.053	2.944***	Accept
H4	Perceived ease of use	⇒	Perceived usefulness	0.470	0.088	5.493***	Accept
H5	Perceived ease of use	⇒		0.196	0.104	2.119**	Accept
H6	Perceived usefulness	⇒	Use intention	0.576	0.106	5.951***	Accept
H7	Emotion response	⇒		0.070	0.050	1.765	Reject

***p< .01

H1, O2O service has a positive effect on perceived ease of use with path coefficient of 0.861 and t value of 14.551 ($p < 0.01$).

H2, O2O service has a positive effect perceived usefulness with path coefficient of 0.430 and t value of 4.982 ($p < 0.01$).

H3, O2O service has a positive effect on the emotional response with a path coefficient of 0.158 and a t value of 2.944 ($p < 0.01$).

H4, perceived ease of use has a positive effect on perceived usefulness, with a path coefficient of 0.470 and a t value of 5.493 ($p < 0.01$).

H5, perceived ease of use has a positive effect on use intention, with a path coefficient of 0.196 and a t value of 2.119 ($p < 0.01$).

H6, perceived usefulness has a positive effect on the use intention, with a path coefficient of 0.576 and a t value of 5.951 ($p < 0.01$).

H7, emotional response was found to be statistically insignificant, with a path coefficient of 0.070 and a t value of 1.765.

The fit of the structural model confirmed by the analysis was $X^2 = 1154.818$ ($p = 0.000$), df = 461, GFI = 0.857, AGFI = 0.825, RMR = 0.055, NFI = 0.903, TLI = 0 .939, RMSEA = 0.060, Normed $X^2 = 2.505$.

1. The O2O service characteristics showed a positive (+) effect on perceived ease of use.

2. The characteristics of O2O service showed a positive (+) effect on perceived usefulness.

3. The O2O service characteristics showed a positive (+) effect on the emotional response.

5 Conclusion

The purpose of this study is to provide basic data for establishing policy for single household which is growing fast in the consumer market by identifying the relationship between location - based O2O service characteristics, perceived ease of use, perceived usefulness, emotional response and use intention. The results of the study are summarized as follows:

1. The O2O service characteristics showed a positive (+) effect on perceived ease of use.
2. The characteristics of O2O service showed a positive (+) effect on perceived usefulness.
3. The O2O service characteristics showed a positive (+) effect on emotion response.
4. perceived ease of use showed a positive (+) effect on perceived usefulness.
5. perceived ease of use showed a positive (+) effect on use intention.
6. perceived usefulness showed a positive (+) effect on use intention
7. emotion response was not statistically significant in the use intention.

The implications of above study results are as follows: First, the O2O service characteristics are fit to the theoretical model by applying the technology acceptance model and the emotion response. Thus, it can say that the study laid the groundwork for academic access in the rapidly changing technology environments. Second, the study provided basic data that could be used for various follow - up studies on single households such as O2O service, new technology acceptance, and research on consumption behavior.

Third, the location-based O2O service characteristics have a greater impact on the perceived ease of use than the perceived usefulness. As the results showed, usefulness, it is convenient to use for location-based O2O service, but the usefulness of daily life and work can be relatively insufficient. Therefore, it is necessary to develop customized O2O service for single household of daily life and usefulness of work.

Fourth, O2O service has a significant effect on emotional reaction. Therefore, it is necessary for companies to create an O2O service environment so that single household can invite the desire to use emotional response while using O2O service.

Finally, perceived ease of use and perceived usefulness have a significant effect on use intention, it is necessary to develop useful apps for single household.

In spite of above suggestions, the survey results show that the proportion of 20s and 30s is high, there are more probabilistic methods required in future studies. characteristics of location-based O2O service are accepted by a large group of single households, which leads to an extended technology acceptance model and internal response, reporter was performed.

The fit of the structural model confirmed by the analysis was X^2 = 1154.818 (p = .000), df = 461, GFI = 0.857, AGFI = 0.825, RMR = 0.055, NFI = 0.903, TLI = 0.939, RMSEA = 0.060, Normed X^2 = 2.505. From above results:

1. The O2O service characteristics showed a positive (+) effect on perceived ease of use.
2. The characteristics of O2O service showed a positive (+) effect on perceived usefulness.
3. The O2O service characteristics showed a positive (+) effect on the emotional response.

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