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Understanding the Omni-Channel Acceptance: Focused on TTF and UTAUT Models[☆]

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ABSTRACT

Recently, Omni Channel Services has been considered the most innovative business strategy. Omni-Channel sees a variety of channels from all channels viewpoints, organically combining each channel to provide a seamless experience for consumers. In other words, Omni-Channel is not simply a systematic integration of channels, but a means of delivering consistent services to consumers in all processes through a strategy to an organic connection. The aim of this study is to provide a comprehensive insight into the decision factors affecting the adoption of Omni-channel. For this purpose, an empirical analysis is conducted on the course of acceptance of the Omni-channel service based on the Unified Theory of Acceptance and Use of Technology (UTAUT) and Task-technology fit (TTF), an effective model frequently selected to describe the acceptance of service in the introduction phase of new information technology. As a result of the study, it was confirmed that the task characteristics and the technical characteristics had a positive effect on the task-technology fit, and the task-technology fit had a positive effect on the performance expectancy. In addition, task-technology fit, performance expectancy, and social influence have a positive effect on the intention to use the Omni-Channel. This study is intended to deliver an experimental meaning by proposing a strategical measure to understand the behaviorsand uses of consumers in the Omni-channel service environment and increase the customer satisfaction for the system.

rskeyword: Omni-Channel, Unified Theory of Acceptance and Use of Technology (UTAUT), Technology Acceptance Model (TAM),
Task-technology fit (TTF), Intention to Use

1. Introduction

The digital revolution achieved by the ICT development has significantly impacted on the consumption paradigm as well. Consumption activities are approaching in more extensive forms and meanings than before based on the digital platform. Due to the ICT development and the appearance of 'Digital Native', the value of consumption is chancing and the corporate strategies for consumptions and the consumer behavior are diversified [1, 2].

The online market that has been rapidly expanding from late 90s after the introduction of internet has been evolved to the consumer centric based on the advantages of digital environment enabling purchases available any time or place without any time or space limit. The purchase process that As grown more through the mobile due to extensive use of smartphones, the online market plays the leading role in the consumption paradigm with the advantage of instant. And as from search, payment and even share of purchase experience have become available through the mobile service, consumers have become "Smart Consumers' who search across online and offline markets using mobile or smart devices to purchase good quality products with desired reasonable prices [5].

Under this background, Omni-Channel service has recently been considered the most innovative business strategy. Today's developments of information technology and communication changes the purchase process of consumers beyond traditional physical or online stores [6, 7, 8].

Until recently, consumers have traded based on the Single-Channel followed by the Multi-Channel advanced

had been available only on single channel called as offline offered by a company has been diversified to a multichannel system combining offline and online by the creation of online market. And now, the product search led by consumers has become the basic phase of consumption while its growth is gradually accelerated as the mobile market has joined [3, 4].

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from the former. However, since the multi-channel requires a separated management of consumers for each channel and has side effects from competitions between channels, Omni-Channel that compensates such issues is emerging. The offline approach, in which the consumer purchases directly at the store, is limited in that the consumer accessibility is low and the purchase experience is not provided. Therefore, the appearance of online shopping, which obtains and consumes information of the product through digital media. Omni-Channel means looking at various channels from every channel viewpoint and organically combining each channel to provide seamless experience to consumers. In other words, the multiple channels, such as offline stores and online sites, are managed in a multi-channel system, as if consumers perceived a single brand in a cross channel. Omni-Channel is not merely a systemic integration of channels, but a means of delivering consistent services to consumers in all processes from strategy to process through organic connections. The Omni-channel strategy enables a common management on various channels of a brand while customers experience the same brand regardless when and where. In the Omni-channel environment, consumers put their orders online and receive the purchased products at certain stores or vice versa [3, 9].

The Omni-channel, therefore, draws attentions as a new flow that will change habits and behaviors of consumers. By introduction of the Omni-channel, an overall growth of the distribution market can be expected while from the perspective of consumer, positive effectincluding time and cost savings, increasing of conveniences are appeared. From the Omni-channel, the increase of user convenience felt by consumer can be expected as more reasonable and convenient experiences are offered to consumers than the existing multi-channel system. The features of Omni-channel offer such beneficial result better than the existing systems. Therefore, conveniences evaluated based on experiences can deliver positive effects to the consumer's use intention [10].

Despite recent interests increasing in the Omni-channel, the relevant studies are still in early stages focusing on concepts and case introductions of the Omni-channel [6, 11, 4, 10]. The aim of this study is to provide a comprehensive insight into the decision factors affecting the adoption of Omni-channel.

For this purpose, an empirical analysis is conducted on

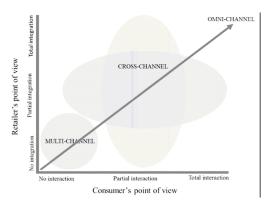
the course of acceptance of the Omni-channel service based on the Unified Theory of Acceptance and Use of Technology (UTAUT), an effective model frequently selected to describe the acceptance of service in the introduction phase of new information technology. This study is intended to deliver an experimental meaning by proposing a strategical measure to understand the behaviors and uses of consumers in the Omni-channel service environment and increase the customer satisfaction for the system.

2. Theoretical Background and Hypotheses

2.1 Understanding Omni-Channel

The Omni-channel is a word compound of Latin word 'Omini' meaning everything and 'Channel' meaning distribution routes to indicate the service that enables the search and purchase of a product crossing various channels of online, offline and mobile for consumers. Therefore, the service composes a shopping environment felt as if using the same store in any channel by combining features of each distribution channel. In other words, the Omni-channel refers the seamless provision of experiences unified for consumers by systematically combining each channel [4, 9].

In the digital commerce environment, distribution channels have been developed from the single channel to Multi-Channel, Cross-Channel and Omni-channel to respond to consumers' desire changes for distribution channels. The initial single channel was operated in a form of online or offline store contacted by consumers where the search and purchase are performed only in one space. Later, the multi-channel in which an offline store operates an internet channel as well as a mobile channel was established based on the introduction of smart phones and the development of wireless internet and provided options and conveniences based on various channels. However, as multiple channels were operated independently, the consistency of brand has been hindered and the distrust has been built. To improve for such issues, the system has been developed to be the Omni-channel achieving the strategic integration through the cross-channel in which multiple channels are operated as one system in single policy [3].



(Figure 1) Evolution of retailing: Different degrees of channel and touch-point interaction/integration

As shown above, the Omni-channel was started from the concept to establish a cooperative system for mutual winnings avoiding competitions for offline, online and mobile stores and to offer comfortable experience of purchase to consumers. Appearances of Showroomers who check products at offline stores and then actually purchase from online or other cheaper distribution channels, Reverse-Showroomers who acquire product information on offline and then purchase at offline stores as opposite to Showroomers and Omni-Shoppers who performs the showrooming as well as the reverse-showrooming have made companies to conduct the Omni-channel strategy to respond to changing consumption environments and behaviors[12]. According to the 2013 survey by Accenture, a global consulting firm, 63% of Americans did showrooming while 65% did reverse-showrooming. Also, as a result of 2015 KantaWorld panel's lifestyle survey for domestic consumers, 67% of all respondents were Omni Shoppers who buy products across the showroom and showroom routings. According to RSR Research in 2012, 84% of the key processes in the OmniChannel strategy are consistent customer experience, which ensures a consistent experience across all channels to meet the needs of consumers who want to receive the same service anytime and anywhere It is the most important thing of the Omni Channel.

Therefore, compared to the other distribution approaches, the characteristic of Omni-channel is that all purchase channels are integrated and connected. In other words, in the Omni-channel, the service of each purchase level of product, price, service, purchase and delivery should be uniformly provided in any environment of online or offline. The integration of channels enables consumer to have consistent experiences of consumptions in all processes of purchase. Therefore, establishing a consistent integration system to enable true consumption experiences through continuous communication with companies in a purchase process is the core of Omni-channel [10].

2.2 Task-Technology Fit

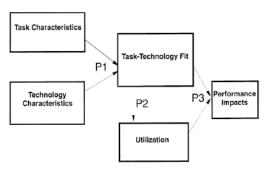
Task-Technology Fit (TTF) model is extensively used to evaluate the IT technology's impact to the performance. The TTF model suggests that the user will acceptance a new technology if it is good enough to execute the task efficiently. Therefore, the acceptance to a new information system will depend greatly on the users' tasks [13].

The task-technology fit is defined to a level where the information system's capacity is identical to the required conditions of tasks to perform and means the issue of how much the technology can adequately support the information required for an individual's task performance [14, 15]. Goodhue & Thompson (1995) [13] argues that the task-technology fit determines the performance of utilization in the use environment of IT technology when presenting the task-technology fit model. They argued that the new technology could be applied if there was a suitability for the task, and called it task-technology fit. This task-technology fit affects predisposing variables of use and productivity. The above researchers comment that if an information technology is sufficient to support a task performance, the evaluation by the user should be positive and the user actively uses the information technology.

TTF model explains acceptance using four constructs - task characteristics, technology characteristics, task technology fi, and use. The task characteristics and technology characteristics determine the task technology fi which leads to the acceptance and use of the information technology. TTF has been widely used and combined with other models suchas TAM to explain user acceptance of an information technology [14].

Therefore, the task-technology fit model has been

considered as a core model to describe the user's performance in researches on the information technology acceptance and use [16, 17, 18, 19, 20].



(Figure 2) Task-Technology Fit Model

Klopping & McKinney (2004) [21] confirms, in their study on the e-commerce acceptance, that the task-technology fit positively effects to the the perceived usefulness, the perceived ease of use and the intention to use. Larsen et al. (2009) [22] verify that the task-technology fit has effects to the perceived usefulness and the utilization while the utilization and the user satisfaction positively impact to the continuance intention in their study on the mobile banking continuance. Zhou et al (2010) [23] shows that the task-technology fit delivers positive effects on the mobile banking acceptance and the performance expectation in the study on the mobile banking acceptance. Chang (2010) [24] verifies that the task-technology fit positively effects to the intention to use by mediating the perceived usefulness in the study on the acceptance of mobile auction service. Lin & Wang (2012) [25] verifies that the task-technology fit positively effects to the confirmation and the perceived usefulness in the study on the e-learning continuation intention. Therefore, the following hypotheses can be established. Oliveira et al. (2014) [20] found that technology characteristics and task technology fit had a positive effect on behavioral intentions in the study of adoption of mobile banking. Therefore, this study established hypotheses as follows:

- H1. Task characteristics will have a positive effect on Task-Technology Fit.
- H2. Technology characteristics will have a positive effect

- on Task-Technology Fit.
- H3. Task-Technology Fit will have a positive effect on Performance Expectancy.
- H4. Task-Technology Fit will have a positive effect on Intention to Use.

2.3 UTAUT

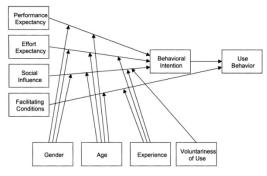
UTAUT model integrates the theories applied to describe the acceptance course of new information technology including Theory of Theory of Planned Behaviour (TPB), Reasoned Action (TRA), Technology Acceptance Model (TAM), Decomposed TAM and TPB (D-AM/TPB), Model of PC Utilization (MCPU), Motivation Model (MM), Innovation Diffusion Theory (IDT) and Social Cognitive Theory (SCT) [26].

A representative theory describing the acceptance process of a new technology, TAM model [27] has been predicted the technology acceptance behaviors that connect the recognized usefulness and convenience to the intention of selection based on TRA. However, TAM has been remarked to describe the process of selection and use of technology with excessively simplified relations between factors and to exclude the characteristics of user while only emphasizing the technological characteristics in the process of technology acceptance.

Therefore, UTAUT model secures the simplicity of factors and reinforces its description power in predicting the action of ICT acceptance by integrating various technological acceptance related factors into 4 factors of performance expectancy, effect expectancy, social influence and facilitation condition[26].

The performance expectancy, a composition factor of UTAUT model is defined to a level believed to reinforce the outcome of work performance through the use of ICT and has drawn from concepts of perceived usefulness, extrinsic motivation, job-fit and relative advantage. And the effort expectancy is defined to a level believed not to invest any additional efforts in using of the information technology and has been drawn from concepts of perceived ease of use) and complexity. The social influence is defined to a level that the use of information technology is believed to be recognized positively by important people and has been drawn from

concepts of subjective norm, social factors and image. Lastly, the facilitation condition is defined to a level that organizational and technological infra supporting the use of information technology are well established and has been drawn from concepts of perceived behavioral control, facilitating conditions and compatibility [28, 29].



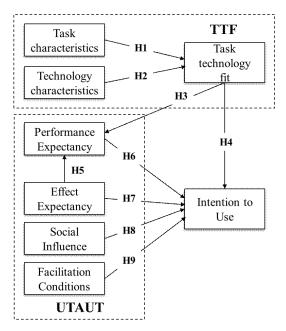
(Figure 3) UTAUT Model

Therefore, the performance expectancy, the effort expectance, the social influence and the facilitation condition, the composition factors of UTAUT model have been qualified to have influence as the precedence factors to predict behavioral intentions of users in the environment where voluntary uses of new technology or service occur [26, 30]. Hong et al. (2011) [34] considered UTAUT as an important theory in the context of IS adoption and used it to conceptualize a model for studying agile IS adoption. Zhou et al. (2010) [23] proposed a mobile banking adoption model by integrating the task technology fit (TTF) model and the unified theory of acceptance and usage of technology (UTAUT) model. They found that performance expectancy, social inequality, and facilitating conditions had a significant effecton the adoption of mobile banking and that task technology fi t had a significant effect on performance expectancy. Oliveira et al. (2014) [20] found that initial trust and performance expectancy had a positive effect on behavioral intentions in the study of adoption of mobile banking. Therefore, this study established hypotheses as follows:

H5. Effect expectancy will have a positive performance expectancy.

- H6. Effect expectancy will have a positive performance intention to use.
- H7. Performance Expectancy will have a positive performance intention to use.
- H8. Social Influence will have a positive performance intention to use.
- H9. Facilitation Conditions will have a positive performance intention to use.

Based on the above hypotheses, study model in this study has been suggested as shown in Figure 4.



(Figure 4) Research Model

3. Research Method

3.1 Sample

In order to verify the proposed hypothesis, this study surveyed customers who are aware of Omni Channel among online and offline shopping users and collected a total of 300 cases. In this way, we removed 22 cases that were missing or inadequate among the collected cases and used the final 278 cases for analysis.

3.2 Measure

To ensure the content validity of the measurement tool, this study used the measurement items verified in the existing literature by revising and supplementing them according to the purpose of this study. First, the sub-dimensions of task-technology fit model, which consist of task characteristics, technology characteristics, and task-technology fit, were constructed into 4 items each in reference to the studies by Goodhue & Tompson (1995) [13], Larsen et al. (2009) [22], and Zhou et al. (2010) [23], and were measured using 7-point Likert scale (Strongly disagree ~ Strongly agree). Also, the sub-dimensions of UTAUT model, which consist of effort expectancy, performance expectancy, social influence, and facilitation conditions, were constructed into 4 items each in reference to the studies by Venkatesh et al. (2003) [27], Zhou et al. (2010) [23], Oliveira et al. (2014) [20], and were measured using 7-point Likert scale. Intention to use was constructed into 4 items in reference to the studies by Davis (1989) [27] and Venkatesh et al. (2003) [28], and were measured using 7-point Likert scale. Table 2 summarizes the measured items and references of this study.

3.3 Analysis method

For the analysis method and measurement tool of structural equation models, this study analyzed the results and verified the hypothesis using Amos 24.0. For the analysis of the structural equation model, the measurement model was estimated first, and then it was analyzed using the two-step approach that estimates the structural model.

4. Analysis and Results

4.1 Measurement Model

This study conducted confirmatory factor analysis to ensure the content validity of the measurement tool. As a result of confirmatory factor analysis of modified measurement model, 2 = 959.901 (p = .000), 2/df = 2.202, RMSEA = .066, IFI = .931, TLI = .920, CFI = .930, indicating that measurement model was fit.Next, for

(Table 1) Sample Characteristics

Category and Items		Sample	Ratio
		Size	(%)
Gender	Male	117	42.1
	Female	161	57.9
	Less than 20	30	10.8
	20~29	65	23.4
Age	30~39	89	32.0
	40~49	61	21.9
	more than 50	33	11.9
	Less than 6 month	28	10.1
Use period	6 ~ 12 month	53	19.1
	12 ~ 18 month	59	21.2
	18 ~ 24 month	73	26.3
	more than 24 month	65	23.4

measurement items, reliability and validity test were conducted. For reliability, construct reliability should appear above 0.7, and average variance extract should be above 0.5. Additionally, for validity, two latent variables' AVE1 and AVE2 should bigger than squared value of its correlation. As a result of analysis, reliability and validity were verified. As described above, the verification results of the measurement model of this study are summarized and shown in Table 2.

4.2 Structural model

As measurement model's fitness, and reliability and validity of measurement items were verified, structural model analysis were conducted. As a result of structural model's fitness test, 2 = 277.476 (p = .000), 2/df = 1.586 was above threshold 3, and RMSEA = .048 was below standard of 0.08. Moreover, GFI = .904, CFI = .978, IFI = .979, TLI = .974 all of indices appeared above recommended value of 0.9 and therefore, the structural model' goodness of fit of the research model was verified.

4.3 Hypotheses Test

After structural model's fitness was confirmed, research hypotheses were tested. As a result, first, task characteristics (β = .702, C.R. = 11.170, p = .000) and technology characteristics (β = .119, C.R. = 2.380, p = .017) had

positive effect on task-technology fit, therefore, H1 and H2 were supported. Second, task-technology fit had positive effect on performance expectancy (β = .423, C.R. = 9.827, p=.000) and intention to use (β = .185, C.R. = 3.071, p = .002), therefore, H3 and H4 were supported. Third, effort expectancy had positive effect on performance expectancy (β = .216, C.R. = 4.035, p = .000), therefore, H5 was supported. Lastly, performance expectancy (β = .228, C.R. = 2.644, p = .008) and social influence (β = .283, C.R. = 2.799, p = .005) had positive effect on intention to use, therefore, H6 and H8 were supported. On the other hand, effort expectancy (β = .145, C.R. = 1.821, p = .069) and facilitation conditions (β = .056, C.R. = .749, p = .454) did not had positive effect on intention to use, therefore, H7 and H9 were not supported. The results of this study are summarized as Table 4.

(Table 2) onfirmatory factor analysis base on reliability

Measurement Item		Std. Loading	Std. Error	C.R.	Construct Reliability	
	TA1	.889				
Task characteristics	TA2	.922	.041	23.445		
	TA3	.899	.046	22.202	.925	
	TA4	.780	.055	16.753		
	TC1	.905				
Technology	TC2	.920	.038	25.141	0.47	
characteristics	TC3	.925	.037	25.535	.947	
	TC4	.899	.039	23.683		
	TTF1	.902			.922	
Task-technology fit	TTF2	.882	.045	21.946		
	TTF3	.885	.044	22.146		
	TTF4	.843	.047	19.907		
	PE1	.826				
Performance	PE2	.859	.059	17.386	046	
Expectancy	PE3	.858	.061	17.357	.946	
	PE4	.899	.062	18.669		
Effort Expectancy	EE1	.812				
	EE2	.763	.084	12.964	0.56	
	EE3	.713	.071	12.017	.856	
	EE4	.679	.068	11.365		
Social	SI1	.805			.881	

Measurement Item		Std. Loading	Std. Error	C.R.	Construct Reliability
	SI2	.739	.069	12.514	
Influence	SI3	.667	.070	11.141	
	SI4	.726	.073	12.264	
	FC1	.764			
Facilitation	FC2	.783	.080	13.477	.893
Conditions	FC3	.893	.074	15.560	.093
	FC4	.836	.077	14.535	
	IU1	.882			
Intention to Use	IU2	.873	.052	19.878	.932
intention to Use	IU3	.850	.053	18.923	.932
	IU4	.818	.053	17.653	

(Table 3) Correlations between Constructs and Validity

	1	2	3	4	5	6	7	8
1	.756**							
2	.208	.817**						
3	.475	.172	.747**					
4	.371	.256	.504	.796**				
5	.181	.130	.469	.317	.599**			
6	.310	.097	.464	.432	.367	.651**		
7	.359	.175	.415	.279	.211	.411	.676**	
8	.236	.042	.424	.381	.325	.401	.278	.775**

^{*}squared value of correlation (Ø2)

(Table 4) Hypotheses Test Results

Н	Estimate ()	C.R. (t)	Results
H1	.702	11.170***	Supported
H2	.119	2.380*	Supported
Н3	.423	9.827***	Supported
H4	.186	3.071**	Supported
H5	.216	4.035***	Supported
Н6	.228	2.644*	Supported
H7	.145	1.821	Not Supported
H8	.283	2.799*	Supported
Н9	.056	.749	Not Supported

^{*:} p < 0.05, **: p < 0.01, ***: p < 0.001

^{**}AVE(Average Variance Extract)

¹ = Task characteristics, 2 = Technology characteristics, 3 = Task-technology fit, 4 = Performance Expectancy, 5 = Effort Expectancy, 6 = Social Influence, 7 = Facilitation Conditions, 8 = Intention to Use

5. Conclusions and Further Research Works

In recent years, consumers' purchasing activities expand in form and implication based on the digital platform. Omni-Channel emerging in response to these changes is attracting attention as a new trend to change consumers' habits and behaviors. Therefore, this study was intended to suggest strategic plans for the acceptance and spread of Omni-Channel service by empirically analyzing the factors influencing the acceptance of Omni-Channel service.

The results of this study are as follows: First, the characteristics of task and technology have a positive influence on task-technology fit. The characteristics of business and technology determine business skill elements, leading to adoption and use of information system [14]. Therefore, it can be understood that the introduction of Omni-Channel service into new information system is highly dependent on the consumer's task and technology environment.

Second, task-technology fit has a positive influence on performance expectations and intention of use. In other words, if the Omni-Channel is sufficient to support purchase behaviors in the Omni-Channel service environment, the consumer positively evaluates and actively uses the Omni-Channel service [22].

Third, the effort expectation has a positive influence on performance expectation, but it does not influence the intention of use. In addition, performance expectation and social influences have a positive influence on an intention of use, but have no significant influence on the promotion conditions. In previous studies, technology acceptance, performance expectations, effort expectations, and social influences have been verified as factors that strengthen the attitude and intention of information technology use [29, 32]. However, the influence of perceived usefulness on the intention of service behavior tends to be maintained or strengthened over time, while the influence of perceived ease is reduced or indirectly predicted by the perceived usefulness. In other words, if the ability to use the information technology is already available, ease of use and facilitating conditions are no longer an important factor in determining

the intention of information technology use [33].

In this study, we verified validity of the study model by empirically verifying the factors influencing the intention of Omni-Channel service use. Recently, Omni-Channel is attracting attention as a new trend to change consumer's habits and behaviors, but there are not many studies conducted on the acceptance of Omni-Channel as a new information technology. This study is meaningful in that it empirically analyzed Omni-Channel acceptance process by applying the UTAUT and TFTwhich have been adopted as a useful model to explain the acceptance of service in the introduction stage of information technology. As a result of this study, it was found that the user has higher task-technology fit and performance expectation in Omni-Channel use environment, and that the more they recognized the social influence to be greater the more they accepted the Omni-Channel service. Therefore, this study is meaningful in terms of practicality in that it suggested strategic directions for successful settlement and spread of Omni-Channel service by identifying determinants influencing acceptance of Omni-Channel Service.

To identify the determinants that influence the acceptance of the Omni-Channel service, we examined the previous studies and suggested task and technology-related factors as determinants and verified them empirically. However, if we consider additional factors based on various Omni-Channel use environment contexts, such as enjoyment, price value and habits, it will service as an opportunity for us to have a broader understanding of the acceptance and use Omni-Channel environment.

This study also allows room for future research. OmniChannel may have a different user experience, which may result in differences in service perception. The UTAUT and TTF models will be useful tools for understanding the future adoption of new information technologies as well as the Omni-Channel.

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Appendix. Measurement items.

Task characteristics

- 1. Use the service anytime, anywhere
- 2. Buy products anytime, anywhere
- 3. Check your purchase status (order, shipping) in real time
- 4. Check shopping information (discount, coupon) in real time

Technology characteristics

- 1. Providing ubiquitous service
- 2. Provide real-time purchasing status (order, shipping)
- 3. Offer shopping information (discount, coupon) in real time
- 4. Provide real-time security services

Task-technology fit

- 1. Suitable for purchasing products
- 2. Provides enough functionality to purchase the product
- 3. Satisfy shopping needs
- 4. Fit well with shopping style

Performance Expectancy

- 1. Useful for shopping
- 2. Help with shopping
- 3. Make product purchase fast
- 4. Get shopping information quickly

Effort Expectancy

- 1. Easy to use
- 2. Easy to learn how to use
- 3. Easy to use skillfully
- 4. Easy to understand functionality provided

Social Influence

- 1. My friends recommend me to use the service
- 2. My friends want me to use the service
- 3. My friends help me use the service
- 4. Using services based on recommendations of my friends

Facilitation Conditions

- 1. We have equipment necessary to use the service
- 2. Have the necessary knowledge to use the service
- 3. Use additional services to use the service
- 4. Solve problems with help of friends when using service

Intention to Use

- 1. Intended to use the service
- 2. Positive thinking about using the service
- 3. Efforts to use services
- 4. Plan to use services in the future

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