Effect of Customer Readiness on Technology-Based Self-Service Quality and Usage Intention

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Abstract: Background/Objectives: This study adopted the concept of customer readiness related with how much customers are ready to use new technologies as a variable related with whether one will accept TBSS service. Methods/Statistical analysis: The survey of this study was conducted to those who had ever used KIOSK, unmanned ticket-issuing machine. While 300 copies of the questionnaire were distributed, 247 were used. The frequency analysis of the data was done with the SPSS 22.0 version, and the structural equation model was tested with AMOS 21.0. Among the users, those who had not experienced TBSS were excluded. Findings: First, customer readiness has significant effect on four sub-dimensions of service quality. It means that, in using TBSS in airline ticketing service, the more a customer knows the role he or she plays, and the more the customer is confident of one's own ability, the more positively he or she perceives its service quality. Second, it was found that, while perceived usefulness, perceived ease of use, and perceived initiative have significant effect on usage intention, perceived cost reduction does not. It means that the more one feels that the self service is useful, and that he or she has finished the work quickly by using TBSS, the more one is willing to use it again. It also means that the more one feels that it is easy to buy the ticket and to use the machine the more one is willing to use it again. The more one feels that one can get the accurate information on the product one needs, the more one is willing to use it again. Improvements/Applications: Based on the findings, this research wants to provide some hints to companies in devising TBSS management strategies to efficiently design service quality and secure loyal customers by satisfying them.

Keywords: Customer Readiness, Technology-Based Self-Service, Service Quality, Usage Intention, Airline Service, Information Technology

I. INTRODUCTION

With the technology development and rise of wages, service companies increasingly tend to choose technology-based self service(TBSS). As products equipped with new technology have spread rapidly, the role of technology has increased in the relationship between customers and companies, and so has the demand for such products and services[1]. Products and services new technology is applied to allows consumers to perform services for themselves and provide them with benefits of convenience and diversity of information[2]. For companies, by making customers perform what their service providers should do for themselves, they can reduce the manpower doing such services, and reduce labor costs.

The impact of IT in the labor-intensive service industry is expressed as the form of TBSS. TBSS is all the means of technological access to allow customers to produce and use services by themselves instead of interacting with employees of those companies[3]. Such a concept of TBSS is used mixed with self service technology (SST) which are the same meaning[1]. Namely, it is the technology which excludes direct contact with company employees, and lets customers perform services by themselves through machine. So, it is different from the method where they receive services with the interaction with company employees. With the adoption of TBSS in which customers produce services by themselves, companies can eliminate labor costs in non-productive activities, and raise management efficiency[4,5].

But, are consumers really ready to accept TBSS in full scale?[1] And, the question of 'what characteristics of TBSS make consumers use TBSS?' began to be raised[6]. Customers can feel scared of such a technology[7]. That is, while the number of users of TBSS has increased with various benefits TBSS provide, there are also considerable numbers of consumers who do not accept the service or, even if they accept it, do not use it properly.

Therefore, it is necessary for the service company to set the strategic directions on how to design and promote TBSS[2]. In the perspective of the attitude on accepting TBSS, technology readiness index (TRI) can be defined as the tendency to accept and use new technology to perform aims in family life and workplace[8].

As a concept different from TRI, a concept called 'customer readiness' was introduced. Customer readiness means the condition where customers are ready to use an innovative technology[6]. Customer readiness can be conceptualized as role clarity, motivation, and ability. As TBSS requires customer participation in new type unlike traditional service provided by employees of the company, role clarity means that customers clearly understand their role. Motivation means the desire of customers to get rewards in relation to use TBSS. Ability is related with confidence in treating the technology required in using TBSS and completing the work[6].

Meanwhile, service quality has been measured with SERVQUAL, the scale to measure service quality developed by PZB[9]. But,

SERVQUAL applied to Internet environment has been pointed out as having problems in reliability and validity. And, there have not been sufficient empirical researches. SERVQUAL developer also accepted that five quality dimensions of SERVQUAL need to be revised in the process of interaction between technology and customers[10].

So, what attracts new attention as the scale of evaluation which can respond to the new service environment is the model reflecting outcome quality developed by Grönroos (1984)[11]. According to Grönroos, quality consists of two dimensions: technical quality and functional quality. Technical quality is outcome quality, that is, the quality considered as 'what'. Functional quality is related with how customers get the service, that is, the quality considered as 'how'. It is different from SEVQUAL which classifies service quality into five dimensions: reliability, responsiveness, empathy, assurance, and tangibles. This study wants to divide quality into two dimensions: outcome quality and process quality. In detail, this study wants to measure service quality by differentiating outcome quality as perceived usefulness and perceived cost reduction, and process quality as perceived ease of use and perceived initiative.

Perceived usefulness is the basic concept of Technology Acceptance Model (TAM), and is defined as the degree to which one believes that using a specific technology will improve work performance. It is the degree of belief that using a specific technology will give useful satisfaction[12]. That is, perceived usefulness does not measure the degree to which a new technology contributes to aims or performance of an organization, but is subjective attitude of user. It can be said to be perceived evaluation of user on effectiveness of a technology.

Perceive cost reduction is the total amount of time and money one can save from using TBSS. In economics, cost includes what one perceives as cost of time, search and mental energy as well as monetary cost. In general, the reason of preferring TBSS lies in savings in money and time[13].

Perceived ease of use can be defined as the degree to which one believes that using a specific system will reduce physical and mental efforts. It is the degree of belief that one need not put much efforts in using a specific technology[12]. In general, if a system is easy to use, it will reduce the degree it requires its users to put, by which the possibility of accepting and using it will increase[14].

Perceived initiative is what a consumer perceives that he or she controls over service process or service outcome. Such a sense of control is an important factor in evaluating TBSS quality. Subjective belief that one controls over the service is important as much as whether one really controls it[2]. Someone who has strong sense of control is confident of his or her ability tends to be more active in using TBSS[15].

This study adopted the concept of customer readiness related with how much customers are ready to use a new technology as a variable related with whether one will accept TBSS service. This study chose the customer readiness which can be used to measure whether one will accept TBSS service as the antecedent of TBSS quality which should be considered in advance of evaluating TBSS service. Only when customer accepts something, its quality can be evaluated, and the related service can be used again. Accordingly, in the

relationship between customer readiness and TBSS quality, this study set the following hypothesis.

H 1: Customer readiness will have significant positive (+) effect on service quality

H 2: Service quality will have significant positive (+) effect on usage intention.

In the aviation industry where the proportion of human resources is great, unmanned check-in service can emerge as a big merit which is cost-effective by reducing manpower. This study wants to examine the effect of customer readiness to TBSS service quality and usage intention. Based on the findings of the analysis, this research wants to provide some hints to companies in devising TBSS management strategies to efficiently design service quality and secure loyal customers by satisfying them.

II. MATERIALS AND METHODS

The survey of this study was conducted to those who had ever used KIOSK, unmanned ticket-issuing machine. While 300 copies of the questionnaire were distributed, 287 were collected. Among those collected, the questionnaire on which respondents did not answer questions seriously, or leave many questions unanswered was excluded. Finally, 247 copies were used for the test of the research model.

The answers to the questions were measured with 5-point Likert scale. The sample was selected with convenience sampling. The frequency analysis of the data was done with the SPSS 22.0 version, and the structural equation model was tested with AMOS 21.0. Among the users, those who had not experienced TBSS were excluded from the analysis.

III. RESULTS AND DISCUSSION

3.1. General Characteristics

Table 1 shows that respondents consist of more females than males, and those in the 20s and 30s took up over 80% of them, which means that younger generations tend to have less resistance to technology-based service. In the education levels of respondents, the number of college students and graduates were larger than that of those with any other education level. Thus, the main customers of TBSS are university students and graduates in their 20s and 30s.

Table 1: General Characteristics

Distinction		Frequency	Percentage
Gender	Female	139	56.3
	Male	108	43.7
Age	20-29	151	60.2
	30-39	63	25.5
	40-49	24	9.7
	50 and above	9	3.6
Education	2-year college graduates	28	11
	Undergraduate school	121	49.0
	Graduates	98	39.7
Frequency	1-2	29	11.7

of use	3-4	149	60.3
	5-6	50	20.2
	7 and over	19	7.7
Total		247	100

3.2. Reliability and Validity of Variables

This study set the relationship among variables based on previous researches, and did confirmatory factor analysis (CFA) to test whether the relationship among variables is reliable and valid. If $\chi 2$(chi-square) satisfies significance probability p>0.05, the data of population is considered as fit. If goodness of fit is strictly applied, RMR should be less than 0.05, GFI, NFI, CFI more than 0.9, and AGFI more than 0.8[16].Standardized factor loading values connecting measured items and related factors are all above 0.5, and AVE (average variance extracted), the amount of variance that is captured by a construct in relation to the amount of variance due to measurement error, is also over 0.50, and all t values satisfy the criteria.

SMC (squared multiple correlations) of an item is recommended to be 0.4. The items which did not satisfy this criterion were excluded from the analysis. Under the category 'customer readiness' the question, "By procuring airline ticket by KIOSK, my trip will be more convenient"(.299) was excluded. In the category of 'perceived ease of use', the question, "It is easy to procure airline ticket through KIOSK" (.309) was excluded. And, in the category of perceived cost reduction, the question, "If I procure airline ticket through the unmanned reservation ticketing system, I can get discount benefit" (.245) was also excluded.

To identify convergent validity more accurately, this study conducted reliability analysis using construct reliability. If construct reliability is over 0.7, it is accepted as sufficient. Construct reliabilities of all factors identified by confirmatory factor analysis and shown in Table 2 are over 0.9[16].

As shown in table 2 confirmatory factor analysis showed that $\chi 2$ value is 344.985 (df=132) which is statistically significant, leading us to see that the model does not seem to be good in fit. But, given that $\chi 2$ value is sensitive to the number of samples [17], various goodness-of-fit indices should be considered to judge goodness of it of the model. Goodness-of-fit indices of the model were $\chi2=344.985$, degree of freedom =132, p=0.000, GFI=0.871, AGFI=0.856, RMR=0.037, and RMSEA=0.067. Comparing with indices used for criteria of evaluating a model, the above indices are satisfactory for goodness of fit of the model. Through these, convergent validities of measured items were identified[17].

Table 2: Confirmatory factor analysis for the measurement model

Factor	ITEM	AVE	Std. factor loading	t Value	SMC
Customer readiness	**CR 1**	0.546	.887	---	.779
	CR 2		.807	13.118**	.710
	CR 3		.826	12.472**	.624
	CR 4		.748	11.113**	.578
Perceived usefulness	PU 1	0.657	.714	---	.669
	PU 2		.812	12.798**	.711
	PU 3		.798	11.708**	.612
Perceived cost reduction	PCR 1	0.623	.771	---	.668
	PCR 2		.814	13.004**	.679
	PCR 3		.830	11.467**	.752
Perceived ease of use	PEU 1	0.578	.765	---	.608
	PEU 2		.780	18.923**	.689
	PEU 3		.835	16.332**	.812
Perceived initiative	PI 1	0.663	.834	17.778**	.788
	PI 2		.765	12.768**	.743
	PI 3		.667	11.998**	.678
	PI 4		.557	---	.665
Usage intention	UI 1	0.672	.715	---	.715
	UI 2		.705	11.301**	.689
	UI 3		.743	10.234**	.566
	UI 4		.671	11.278**	.687
$\chi2=344.985$, degree of freedom =132, p=0.000, GFI=0.871, AGFI=0.856, RMR=0.037, and RMSEA=0.067.**:P<.01					

Discriminant validity means that when we measure different concepts, correlations among variables belonging to different concepts should be low. In this study, to secure discriminant validity, average variance extracted (AVE) was used to identify whether shared variance among observation variables to measure a specific latent variable is larger than shared variance with other latent variable. Accordingly, to analyze discriminant validity of the measurement model, this study compared AVE values and correlation coefficients of research units. If the AVE value between two factors is larger than correlation coefficient squared of each factor, that is, coefficient of determination (R-squared), discriminant validity between two factors can be secured.

Thus, as Table 3 suggests, discriminant validity was secured. That is, reliability, convergent validity, and discriminant validity were proved.

Table 3: Correlation Matrix

	A	B	C	D	E	F
Customer readiness: A	**.738**					
Perceived usefulness: B	.342	**.810**				
Perceived cost reduction: C	.405	.521	**.789**			
Perceived ease of use: D	.407	.235	.341	**.760**		
Perceived initiative: E	.409	.312	.489	.541	**.814**	
Usage intention: F	.345	.354	.554	.521	.433	**.819**

all correlations are significant at p<0.01(2-tailed), diagonal value: square root AVE

3.3. Analyzing Structural Equation Model

To test the mutual effects of variables suggested in the model, this study used the structural equation model which is useful in testing and evaluating correlations among constructive concepts through covariance structure analysis. The findings of analyzing the structural equation model resulted in a model which has the characteristics of $\chi2=709.182$, df=312, $\chi2$/df=2.273, p=0.000, GFI=0.881, AGFI=0.858, RMR=0.029, and RMSEA=0.037. Compared with indicators used as general criteria for evaluation, this model satisfies the criteria for a model, and is judged to be good fit. Tests of hypotheses are shown in Table 4.

First, the hypothesis that consumer readiness will have significant positive (+) effect on service quality was tested. It was found that customer readiness significantly affects four sub-dimensions of TBSS service quality; perceived usefulness, perceived ease of use, perceived initiative and perceived cost reduction. Thus, hypothesis 1 was adopted. Second, the hypothesis that TBSS service quality will have significant positive (+) effect on usage intention. It was found that, while perceived usefulness, perceived ease of use, and perceived control have significant positive (+) effect on usage intention, perceived cost reduction does not. Accordingly, hypotheses 2-1, 2-3, and 2-4were adopted, but hypothesis 2-2 was rejected.

Table 4: Structure model path analysis

H	Path	Estimate	S.E	C.R	p value
1-1	Customer readiness →Perceived usefulness	.177	.022	2.275**	.001
1-2	Customer readiness →Perceived cost reduction	.369	.028	3.228**	.000
1-3	Customer readiness → Perceived ease of use	.217	.022	2.821**	.000
1-4	Customer readiness →Perceived initiative	.401	.027	3.992**	.000
2-1	Perceived usefulness → Usage intention	.114	.041	2.012**	.002
2-2	Perceived cost reduction →Usage intention	.066	.021	1.362	.221
2-3	Perceived ease of use →Usage intention	.267	.032	2.887**	.000
2-4	Perceived initiative →Usage intention	.234	.033	2.557**	.000

**:=t-statistic ($\geqq$ 1.96) sig. level of p<0.05

IV. CONCLUSION

This study intended to identify the effect of consumer readiness on service quality of TBSS and usage intention. Among various areas TBSS is applied, this study chose the airline TBSS which has shown the most spectacular growth. In the theoretical examination of TBSS, this study divided quality of it into outcome quality and process quality. Specifically, outcome quality was measured as perceived usefulness and perceived cost reduction, and process quality as perceived ease of use and perceived initiative. The data was under path analysis through covariance structural analysis. The results of empirical analysis are as follows.

First, it was found that customer readiness has significant effect on four sub-dimensions of TBSS service quality; perceived usefulness, perceived ease of use, perceived initiative and perceived cost reduction. It means that, in using TBSS in airline ticketing service, the more a customer knows the role he or she plays, and the more the customer is confident of one's own ability, the more positively he or she perceives its service quality.

That is, to improve TBSS service quality, airlines need to pay attention to customer readiness in using TBSS service in addition to providing TBSS. Airline ticketing system operated by TBSS needs step-by-step process.

So, there should be explanation and guide on each step to help TBSS users to relieve anxiety. And, to improve customer readiness to TBSS, it seems important for airlines to publicize it. The companies need to help customers to perceive that it is easy to use TBSS by positioning guides beside the TBSS machine. The screen design and information guide should be more user-friendly. And, it is necessary for airlines to find out customers who are highly ready for new technology by checking their records of using it, and, to secure them as loyal customers, to inform them of update of new technology and recommend them to use it.

Second, it was found that, while perceived usefulness, perceived ease of use, and perceived initiative have significant positive (+) effect on usage intention, perceived cost reduction does not. It means that the more one feels that the self service is useful, and that he or she has finished the work quickly by using TBSS, the more one is willing to use it again. It also means that the more one feels that it is easy to buy the ticket and to use the machine, the more one is willing to use it again. The more one feels that one can get the accurate information on the product one needs, the more one is willing to use it again.

On the other hand, perceived cost reduction was found not to have effect on the willing to use it again. It appears that time and cost reduction by using TBSS is not satisfactory to customers. In fact, when customers face difficulty in choosing products they want and cannot understand directions on the screen, they seek help from employees of the airline. But, the number of such employees is very small to respond properly to such questions.

The quality of self service is to efficiently provide information customer wants to get. And, like the case of man-to-man service, such service also needs to respond to additional questions from customers raised while they use the service. So, it is necessary to give detailed answers to the questions customers frequently ask at the reservation and check-in counter and items regarding benefits given to customers and those customers must know in boarding an airplane. That is, the self service program should include various things, and be continuously updated.

This study was done to help airlines to maintain their customers and secure more loyal customers by using unmanned ticketing service system provided for the convenience of customers. While this study measured customer readiness as a single dimension, it needs to be divided sub-dimensions. TBSS is given for other kinds of service besides ticketing. It is expected that various researches on airline TBSS in the future will realize more diverse IT-based service in air service area.

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