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A DIFFERENCE BETWEEN JAPAN AND THE US IN THE CUSTOMER SATISFACTION MODEL FOR MOBILE UTILITARIAN INFORMATION SERVICES

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Abstract—Customer satisfaction and loyalty on mobile information services have been investigated in academic literature. However, there are not many researches on the factors with a specific focus on multiple utilitarian services on a cross-national basis. This research examines the antecedents of customer satisfaction and loyalty through a survey of young adult mobile users in Japan and US, respectively by modifying the American Customer Satisfaction Model (ACSM). The result showed that all of the paths in the estimated models for Japan and US were statistically significant except 3 non-significant paths for the both countries and one non-significant path from Perceived Expectation (PE) to Customer Satisfaction (CS) for US. Also, the estimated coefficients for two countries were very similar in general with a difference in the estimate on the above non-significant path of PE-CS. Since we investigated the antecedents of the common factors for two countries on Customer Satisfaction of multiple utilitarian services, our results may provide useful implications for global marketing in terms of user satisfaction and loyalty. **Keywords**- Mobile information services, Utilitarian service, ACSM, Customer satisfaction, Perceived expectation, SEM.

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I. Introduction

A mobile businesses, including handsets sales and service subscriptions, have proliferated all over the world. According to the estimates of The International Telecommunication Union (2011), there are about 6 billion mobile subscriptions, accounting for about 87% of the world population, with an increase of 26% from 2009. This market expansion is being driven by the demand of such developing countries as China and India. Due to this enormous growth, mobile services have gained keen attention from both researchers and practitioners.

In developed countries like North America, Europe, and Japan, competition within the wireless sector has intensified in recent years because of a saturated market, in which there is at least one cell phone subscription per person (penetration rate: 117.8%). For mobile network operators, reducing the 'churn' rate is an increasingly important concern because of inability to expand the market, owing to the extremely high handset penetration rates. Therefore, it is very important to

identify the factors relating to customer satisfaction and loyalty, and to investigate the antecedents of these factors. Oyeniyi and Abiodun (2009) expressed that many mobile service companies have been struggling to find effective ways to incite customer loyalty to their services since the cost of switching mobile information services is low.

So far, the greatest research emphasis has been on the single most frequently used mobile service—for example, short messaging services (SMS) or text messaging services. Deng et al. (2010) researched only text messaging, and Kuo et al. (2009) researched a value-added category of mobile services, both in China. Tureland Serenko (2006) investigated a category of 'mobile services', not multiple specific services. Therefore, little research exists on satisfaction/loyalty over multiple mobile information services. With respect to e-services via online, Falk et al. (2010) examined the dynamic influence of service quality and customer experience on satisfaction by means of nonlinear structural equation modelling. Their results showed that such dynamic relations, which have functional-utilitarian quality attributes, lose their capability to delight customers as the customer relationship matures. In contrast, hedonic quality attributes exhibit an increasing effect on satisfaction only for more experienced customers. In an analysis of Korean users, Kim and Hwang (2006) showed that mobile users of a lower maturity level are more likely to have hedonic tendencies than those of a higher maturity level, who exhibit more utilitarian tendencies. Our research focuses on utilitarian m-services via mobile device instead of utilitarian e-services. We place importance on specific measurable sources of *satisfaction* and on identifying the antecedents of *loyalty*. Loyalty antecedents may differ according to which services we examine. Further, we would like to look at a group of services that is used very frequently because customers would not answer correctly if they have never used them before and the mobile users might have a lower maturity level. Therefore, we focus on frequently used functional *utilitarian* services for more experienced customers, as explained in Falk et al. (2010), which are defined in section 2.

Further, cross-national analyses between developed countries would be important for generalizing results on a behaviours and attitudes between them. Shin (2009) has urged researchers to conduct cross-country studies in mobile services to determine how cross-country factors influence the diffusion of mobile communications. A few studies have explored people's motivations in using smart phones and the perceived value of this recent technology from a cross-cultural perspective (Shin, 2009). Similarly, Okazaki et al. (2006) compared mobile services cross-nationally, using a Technology Acceptance Model (TAM). For our cross-national analysis, our research focuses also on utilitarian m-services instead of hedonic m-services, because the latter may yield difficulties in achieving common results on satisfaction in cross-national analyses due to diversities of values between the two countries.

The results of the modified American Customer Satisfaction Model (ACSM) produced surprisingly similar descriptions of the perceptions and behaviours of mobile phone users in Japan and the United States, two countries with different cultures. On the other hand, the path from *Perceived Expectation* to *Customer Satisfaction* was statistically significant for the Japanese data, but not for the US data. This result may show that perceptions in different cultures are not always equal. The results can provide recommendations for practitioners and researchers as they examine the global mobile sector.

The rest of the paper is organized as follows. Section 2 describes the ACSM and the background of this study. Section 3 introduces research on a proposed conceptual model and the hypotheses. The next three sections outline the methodology and the statistical results. The last two sections present a summary of the findings, conclusions, and directions for future research.

II. Research Background on Adoption Models and the ACSM

A. Adoption Models for Information Technology and Information Systems

Mobile services are based on information technology and information systems (IT/IS). In IT/IS, theories are extensively developed in order to investigate and forecast the determinants of information technology (IT) adoption (Agarwal and Prasad, 1998, 1999). Among the developed theories, the technology acceptance model (TAM) has received extensive empirical support on the validations, applications, and replications of its power to forecast adoption behaviour for new technology (Davis, 1989). TAM includes beliefs about usefulness and ease of use as the primary determinants of IT/IS adoption in organizations; these determinants are derived from the Theory of Reasoned Action (TRA) model, which deals with consciously intended behaviour that includes the following factors: beliefs, attitude toward use, subjective norms, and

study of customer satisfaction/loyalty in order to provide insights for international marketing by revealing common intention to use (Fishbein and Ajzen, 1975, Ajzen and Fishbein, 1980). The TAM provides a basis for discovering the impact of external variables on internal perceptions (beliefs), attitudes, and intentions. Although TAM has been accepted as the most robust, parsimonious, and influential in explaining IT/IS adoption behaviour, improvements in its specificity and explanatory utility have been sought with the incorporation of additional factors or integration with other IT acceptance models, such as Rodgers' (1983) diffusion model (Hu et al., 1999; Mathieson, 1991). For example, Ajzen (1985, 1991) developed the theory of planned behaviour (TPB) by including external factors of perceived behavioural control, such as the skills, opportunities, and resources that are needed to use system influence behaviour. Further, Taylor and Todd (1995) established a decomposed TPB, (DTPB) by extending and integrating TAM and TPB for a more complete understanding of usage.

The literature reviewed so far includes adoption models on the acceptance of IT/IS, such as TAM, TPB, and DTPB. Though the adoption models have received fairly extensive attention from previous research, the literature reveals no rigorous effort to explore the factors of user satisfaction/loyalty, which are the focus of this paper. Consumers have already used considerable numbers of mobile services because of the diffusion of smart phones in developed countries. Therefore, it would be good timing for examining satisfaction/loyalty in the stage after its adoption and usage, and the ACSM is a suitable model for this purpose. We would first like to conduct cross-national analyses in order to discover common behaviour concerning satisfaction/loyalty between the two countries. For this purpose, we focus on utilitarian mobile services because they may produce more common results than hedonic services would. Further, the ACSM was originally created to examine satisfaction/loyalty in industries. Therefore, we also explore the suitability of the model for predicting satisfaction as a group of individual mobile services.

B. The American Customer Satisfaction Model

The ACSM was originally proposed by Fornell et al. (1996) for understanding the degree of customer satisfaction across industries. The American Customer Satisfaction Index (ACSI) itself has a function to measure the performance of corporations and industries and Cronin and Taylor's (1992) research empirically supports it. Karmakar et al. (2006), Zeithaml et al. (1996), and Bitner et al. (1994) have explained that consumer satisfaction can lead to loyal responses. Satisfied consumers are more likely to repurchase, to resist competitive offers, and to disseminate positive word-of-mouth advertising. Loyalty is defined by Oliver (1999) as 'a deeply held commitment to rebuy or patronize a preferred product/service consistently in the

future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potentiality to cause switching behaviour’.

Figure 1 shows the paths of the ACSM to clarify the antecedents of latent variables. The model, which includes *Expectations, Value, Quality, Voice of Customers, Cost, and Loyalty* in its framework, can be applied across industries.

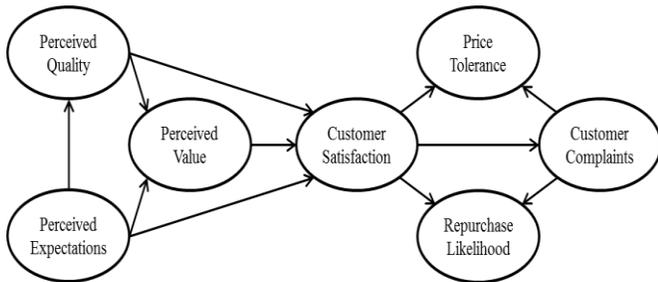


Figure 1. The American Customer Satisfaction Model (ACSM)

The ACSM was applied to mobile information services for the first time with customers in Canada (Turel and Serenko, 2006). The authors showed that ACSM can explain customer satisfaction/loyalty to a certain extent—that is, that all of the paths in Figure 1 are statistically significant except the following: from *Perceived Expectation* to *Perceived Value*; from *Perceived Expectation* to *Customer Satisfaction*; from *Customer Complaints* to *Price Tolerance*; from *Customer Complaints* to *Repurchase Likelihood*. Practitioners are concerned with the relationship between repurchase likelihood (loyalty) and price tolerance (or switching cost) and with forecasting the results of manipulating each one. Therefore, confirming statistically significant paths from *Customer Satisfaction* to the two constructs (*Repurchase Likelihood* or *Price Tolerance*) is essential. In academics, the confirmation of independence between the two constructs is important. Turel et al. (2006) found that the correlation between the two constructs was 0.21 ($p < 0.01$, $N = 204$) and was considered to be low. Further, Turel et al. (2006) conducted a cross-national study to acquire an understanding of customers in Canada, Finland, Israel, and Singapore. They obtained similar findings with the same significant paths. Then, Yol et al. (2006) obtained a medium correlation of 0.45 ($p < 0.01$, $N = 1,253$) in a similar setting in the US. Oyeniya and Abiodun (2009) showed a significant causal relationship from *Switching Cost* to *Customer Loyalty* and from *Switching Barriers* to *Customer Loyalty* in their regression model. They reported that *Switching Barriers* as well as *Switching Cost* would have an effect on *Customer Retention (Customer Loyalty)* in the mobile phone market. *Switching Cost* and *Price Tolerance* both are concerned with how far customers will go to avoid switching mobile phone carriers in response to arise in the price of usage fees. Therefore, although the above literature indicates independence between *Customer Loyalty* and *Switching Cost*, such independence is still considered to be

controversial; thus, it is meaningful to confirm this aspect with different samples. The proposed ACSM for mobile services includes the construct of satisfaction with individual mobile services in generic overall satisfaction, according to the ACSM. Therefore, the proposed model is an attempt to fill in the gap concerning the satisfaction model on a group of individual mobile services.

C. Three Effective Dimensions of Mobile Information Services in Japan and the US

A clear judgment on satisfaction requires a certain level of knowledge of products/services. In addition, results may differ according to the services or countries. Therefore, we propose a cross-national analysis of customer satisfaction/loyalty between Japan and the US in a modified ACSM framework, focusing on *functional utilitarian* services that can be similar between the two countries. Hence, we have to decide which *functional utilitarian* services we should use. Ghyas et al. (2011) constructed a method for comparing consumer demand for mobile information services in two countries with different cultures—that is, Japan and the US. They attempted to gain an understanding of the cross-national needs structure through a comparison of use intentions between the US and Japan. With respect to the use intention of mobile information services from both locations, they extracted the following four factors: (1) information intensiveness, (2) entertainment, (3) low penetration service, and (4) communication service. Factor 1 refers to services that require a high degree of *information*, such as making a reservation or stock trading. Factor 2 represents services with *entertainment* characteristics, such as ring tones. Factor 3 represents services with *low penetration* characteristics in which the use ratio is low, such as a TV phone. Factor 4 represents services having *communication tool* characteristics, such as SMS, e-mail, and MMS—that is, e-mail with pictures. At the end, three of the factors, excluding low penetration services, are considered to be effective factors in both countries.

This study uses the American Customer Satisfaction Model framework for *functional utilitarian* services for cell-phone users. In this study, the controversial construct of price tolerance (or switching cost) is included. However, the construct of *Customer Complaints* is not included because complaints may depend largely on demographics, and we investigated only young adult subjects.

III. Proposed Conceptual Model

A. Overview of the model

We analyze our data by adapting the ACSM, based on the result of Turel and Serenko (2006) and the argument of Oyeniya and Abiodun (2009). Therefore, we set up a model

without the *Customer Complaints* construct and with a path from *Price Tolerance (Switching Cost)* to *Repurchase Likelihood (Customer Loyalty)* as illustrated in Figure 1.

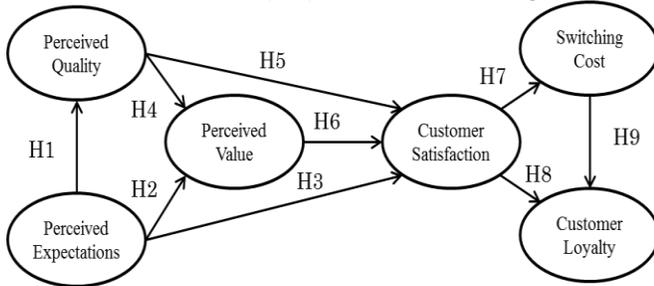


Figure 2. Base Model (ACSM)

The uniqueness of our study lies in the fact that we include multiple *functional utilitarian* information services in *Customer Satisfaction* as provided by a mobile service provider. Thus, our total satisfaction refers to the cumulative satisfaction of individual *functional utilitarian* information services. Therefore, we have the following alternative hypotheses on latent variables, which are based on the model explained in Figure 2 and are measured by various services in the *utilitarian* dimension, for our satisfaction model.

B. Hypotheses Formulation

If service needs structures differ between two countries, mobile companies need to vary their international marketing strategies and tactics in the countries by adjusting for the differences. By understanding the commonalities in consumer satisfaction/loyalty with respect to a variety of mobile utilitarian information services, mobile companies will have a better chance of success. Therefore, we would like to confirm the results of Turel and Serenko (2006) in focusing on *utilitarian* services on a cross-national basis. The following hypotheses are presented:

- H1. *Perceived Expectations* positively influences *Perceived Quality* for Japan and the US.
- H2. *Perceived Expectations* positively influences *Perceived Value* for Japan and the US.
- H3. *Perceived Expectations* negatively influences *Customer Satisfaction* of total *utilitarian* services for Japan and the US.
- H4. *Perceived Quality* positively influences *Perceived Value* for Japan and the US.
- H5. *Perceived Quality* positively influences *Customer Satisfaction* of total *utilitarian* services for Japan and the US.
- H6. *Perceived Value* positively influences *Customer Satisfaction* of total *utilitarian* services for Japan and the US.
- H7. *Customer Satisfaction* with total *utilitarian* services positively influences *Switching Cost* for Japan and the US.

H8. *Customer Satisfaction* with total *utilitarian* services positively influences *Customer Loyalty* for Japan and the US.

H9. *Switching Cost* positively influences *Customer Loyalty* for Japan and the US.

IV. Methodology

A. Data Collection

When a cross-national analysis is conducted, specific wording or location has to be taken into consideration (Okazaki et al., 2006). Two surveys were conducted in Japan, including responses from 214 mobile phone users at a university in Ibaraki and 66 at a university in Tokyo, and one survey in the US with 532 responses. An online questionnaire was distributed by the following procedure. In the US, the survey was conducted from 14 – 28 October 2009 with students and faculty at a university in California. In Japan, a survey was conducted from 5 – 16 November 2009 at a university in Ibaraki, and from 13 – 19 November 2009 at a university in Tokyo. In Japan, data were collected only from students at the two universities. There were 494 valid responses for the university in California and 229 for the two universities in Japan. Table 1 shows descriptive statistics that indicate remarkably similar ratings by gender, age, and usage experience, so demographic differences are considered to be small.

In order to conduct cross-national analyses on the same sample size between Japan and the US, we randomly sampled 229 subjects from the US data. This equivalence in the sample size enabled us to develop more appropriate cross-national analyses than would using a different sample size. Using the data set, we constructed our satisfaction/loyalty model in an SEM framework.

B. Analyzed Utilitarian Services

In order to obtain reasonable answers, we set the same standard as did Turel and Serenko (2006): all subjects should have more than six months' experience. Based on this standard, we removed subjects whose usage experience was under six months. Turel and Serenko (2006) also implied that if the subjects had enough experience (more than four months) in using a mobile phone, a sample of young adults could be adequate as research subjects. Similarly, Okazaki et al. (2006) surveyed young people in their research to compare mobile services cross-nationally with the Technology Acceptance Model (TAM). Therefore, we used students aged 25 years old and younger as subjects.

Table 1. Demographics of Respondents

		Japan		USA	
	Category	(N = 242)	%	(N = 494)	%
Gender	Male	162	66.9	342	70.1
	Female	80	33.1	146	29.9
Age	Under 20	40	16.5	74	15.0
	20 – 25	160	66.1	364	73.7
	Over 25	12	5.0	56	11.3
(Q1)	Not answered	30	12.4		
	Less than 6 months	N/A	N/A	4	0.8
	6 – 11 months	1	0.4	4	0.8
	12 – 23 months	4	1.7	9	1.8
	24 – 35 months	6	2.5	16	3.2
	3 – 5 years	57	23.6	84	17.0
	5 – 10 years	158	65.3	351	71.1
	10 and more years	16	6.6	26	5.3

(Note) Q1: How many years have passed since you first started to use a cell phone?

For this research, mobile phone users were required to have used or experienced the services since the factors of customer satisfaction and loyalty were to be investigated. Therefore, people who use mobile information services frequently were chosen for this research. We screened non-frequently used services by the following process:

- First, we asked, 'How often do you use the following mobile information service through your carrier?' Users answered according to the following 5-point Likert-type scale: 1. Never, 2. Rarely, 3. Neutral, 4. Often, 5. Very often. We summed up all points for each mobile information service, calculated the average of numbers, and selected services that recorded more than two points. In this way, we acquired reasonable mobile information services with frequent usage.
- In the next step, we chose a category of 'utilitarian' services out of the three service categories researched by Ghyas et al. (2011), who studied the cultural and technological differences in mobile information services between Japan and the US. Those categories were information intensiveness, entertainment, and communication service. The entertainment factor can be considered as a *hedonic* category. Therefore, we chose information intensiveness and communication as belonging in the *utilitarian* service category. Among them, the following frequently used services were chosen: mobile Internet, SMS, and voice services, first for Japan and the USA, and then

MMS, e-mail, and GPS were also included and voice services was excluded for USA.

By this process, we defined mobile Internet, SMS, and voice services as *utilitarian* services on our cross-national analysis. Then, we considered MMS, e-mail, and GPS as utilitarian services for the improvement of USA case.

C. Measurement Scales

We used the measurement scale of total *Customer Satisfaction* for specific *utilitarian services*, instead of using *Customer Satisfaction* for a category of 'mobile services' that would include all types of utilitarian service. All of the scales except *Customer Satisfaction* were obtained from Turel and Serenko (2006) to measure the following latent variables: *Perceived Expectations*, *Perceived Quality*, *Perceived Value*, *Customer Loyalty*, *Switching Cost* (or *Price Tolerance*).

For the 'satisfaction' construct, we used three *utilitarian* services—mobile Internet, SMS, and voice services—to analyse Japan and the USA. To obtain measurements of individual satisfaction, we asked, 'Are you satisfied with the following services of your carrier? Please allocate 1–10 points on the basis of your satisfaction rate for target services in the following table (one for each, respectively). If you find services you do not use, please check 'I don't use'. The 10-point Likert-type scales were anchored by very dissatisfied/very satisfied dimensions for the 3 services. Further, we set up a path from *Switching Cost* to *Customer Retention* (*Customer Loyalty*) based on the results of Oyeniya and Abiodun (2009).

Table 2. CR, AVE, and SIC for each construct for Japan

Constructs	CR	AVE	Constructs					
			1	2	3	4	5	6
1.Perceived Value	0.667	0.501	0.501					
2.Perceived Quality	0.866	0.764	0.484	0.764				
3.Perceived Expectation	0.828	0.618		0.194	0.618			
4.Customer Loyalty	0.746	0.670				0.670		
5.Switching Cost	0.610	0.457				0.105	0.457	
6.Customer Satisfaction	0.256	0.104	0.126	0.216	0.000	0.090	0.036	0.104

(Note) The values of AVE are on the diagonal and SIC are on the off-diagonal.

Table3. CR, AVE, and SIC for each construct for USA

Constructs	CR	AVE	Constructs					
			1	2	3	4	5	6
1.Perceived Value	0.758	0.613	0.613					
2.Perceived Quality	0.864	0.761	0.536	0.761				
3.Perceived Expectation	0.906	0.762		0.221	0.762			
4.Customer Loyalty	0.623	0.453				0.453	0.001	
5.Switching Cost	0.531	0.364					0.364	
6.Customer Satisfaction	0.307	0.139	0.193	0.318	0.110	0.001	0.005	0.139

(Note) The values of AVE are on the diagonal and SIC are on the off-diagonal.

In order to check the properties of the measurement scales, we conducted confirmatory factor analysis (CFA) to assess reliability, convergent validity, and discriminant validity. In order to assess the reliability of all the measurement scales, we calculated composite reliabilities (CR) for reliability and internal consistency and average variance extracted (AVE) for construct convergence for each construct by using the formula proposed by Fornell and Lacker (1981). The recommended value of CR is suggested as 0.7 by Hulland (1999). A marginal but acceptable AVE value is 0.4 or higher that has been reported and used in marketing literature (Green et al., 1995; Menguc and Auh, 2006; Cadogan et al., 2008). In addition, we calculated the

AVE that exceeds the squared intercorrelations (SIC) of the construct with other constructs in the model in order to ensure discriminant validity (Fornell and Larcker 1981). The results on CR, AVE, for SIC for each construct for Japan are shown in Table 2 and for the USA in Table 3.

For Japan, the lowest AVE and the lowest CR are 0.256 and 0.104 for Customer Satisfaction, respectively. Except these values, the others exceed their cut-off values. If all of AVE values were above 0.4 and two-thirds were above 0.5, then they are marginally accepted according to the literature (Fraering and Minor, 2006). We may be able to conclude that the reliability for Japan was obtained except for individual satisfaction.

Here, for the USA, the lowest values of AVE are 0.364 for Switching Cost and 0.139 for Customer Satisfaction, respectively. The lowest values of CR are 0.531 for Switching Cost and 0.307 for Customer Satisfaction. Except these values, the others exceeded the cut-off values. For USA, the reliability for Switching Cost as well as Customer Satisfaction was not obtained. We may be able to conclude that the reliability for the USA was marginally acceptable except for satisfaction and switching cost. We will come back to this problem after employing for hypothesis testing and research model validation.

V. Analysed Results

Our study examines the ACSM for mobile information services in a causal framework under a structural equation model (SEM) by using statistical software, AMOS version 17.0. SEM is a statistical approach for understanding social and natural phenomena by identifying a causal relationship between observation variables and latent variables that cannot be observed directly.

We set up three models by using a stepwise process to delete the paths that had non-significant effects. Model 1 is based on the model illustrated in Figure 2. Model 2 was constructed by deleting the non-significant path from *Customer Satisfaction* to *Switching Cost* from model 1. Model 3 was constructed by deleting the non-significant path from *Perceived Expectations* to *Perceived Value* from model 2. Table 4 shows the value of the model selection criterion of GFI, AGFI, RMSEA, CFI, AIC, and BCC for each model (for each criterion, refer to Tabachnick et al. (2007), Joreskog et al. (1989), Bentler (1990), Akaike (1989), Browne et al. (1989), and Steiger (2007), respectively). The parsimony fit index—that is, AIC and BCC—are known as ‘information criterion indices’. These statistics are generally used when comparing non-nested or non-hierarchical models, which are estimated with the same data and indices, to the research. The model with the

smallest ‘information criterion indices’ is the most parsimonious and the best model.

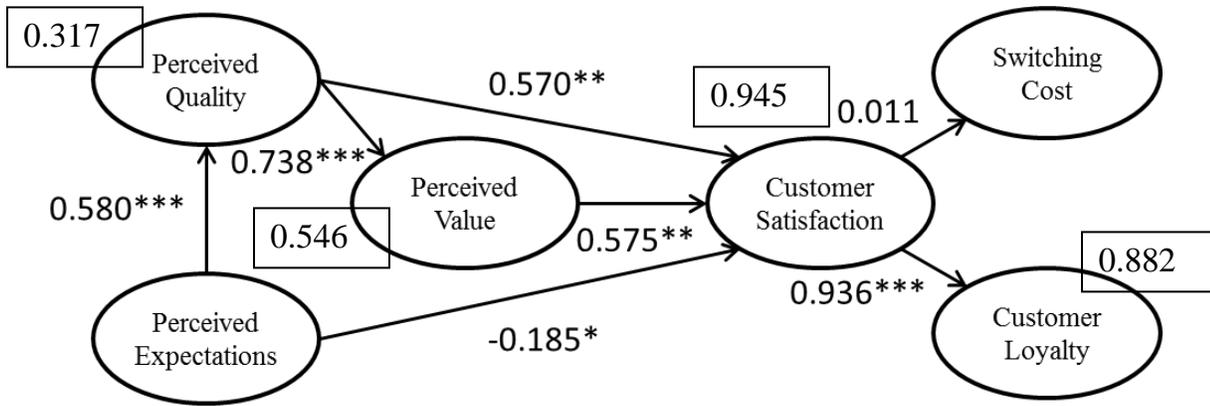
The results in Table 4 show that Model 3 has the smallest AIC value of 430.8 as the information criteria with the most significant estimated coefficients, so it was selected as the best model. The values of the goodness-of-fit (GFI) and adjusted goodness-of-fit indexes (AGF) were 0.915 and 0.873, which exceeded or were nearly equal to 0.9 and are traditionally in the acceptable range, respectively. RMSEA is 0.049, which is less than 0.05, and is considered a good fit (Tsang et al., 2004).

Model 3 for Japan is illustrated in Figure 3 and that for the US in Figure 4. All of the coefficients of measurement variables which explain latent variables have become significant at 10% or less, except for the path from *Customer Satisfaction* to *Switching Cost* for both countries and that from *Perceived Expectations* to *Perceived Value* for the US. Therefore, measurement variables generally explain the latent variables well. This study reproduces the results by Turel et al. (2006) in terms of non-significance on the path from *Perceived Expectations* to *Perceived Value* for the both countries and the path from *Perceived Expectations* to *Customer Satisfaction* for the US. The latter path was statistically significant for Japan, which shows a different result by country. No causal relationship between *Switching Cost* and *Customer Loyalty* was confirmed. These results show that the models for the two countries were structurally similar in general.

For both data, the following five paths out of six were statistically significant at the level of 10% or less: (H1) from *Perceived Expectations* to *Perceived Quality*; (H4) from *Perceived Quality* to *Perceived Value*; (H5) from *Perceived Quality* to *Customer Satisfaction*; (H6) from *Perceived Value* to *Customer Satisfaction*; (H8) from *Customer Satisfaction* to *Customer Loyalty*. The path from *Customer Satisfaction* to *Switching Cost* (H7) was not statistically significant for either the Japanese or US data.

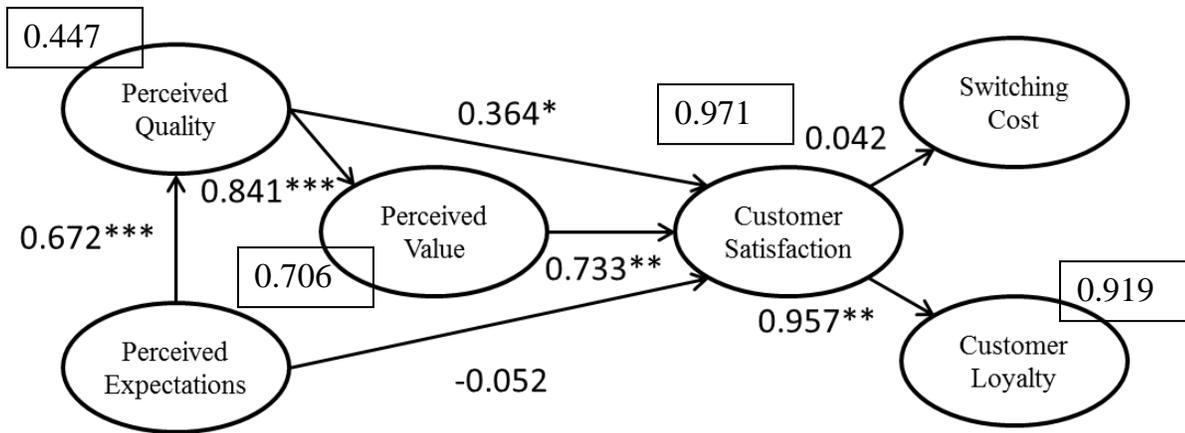
Table 4. Values of Model Selection Criteria for Each Model

	GFI	AGFI	RMSEA	CFI	AIC	BCC
Model 1	0.918	0.873	0.049	0.939	432.1	442.5
Model 2	0.917	0.874	0.049	0.939	431.0	441.1
Model 3	0.915	0.873	0.049	0.938	430.8	440.7



(Note: significance level *** p< 0.001, ** p<0.05, * p<0.1; the number in a rectangular is R-squared)

Figure 3. Path Analysis on Model 3 for Japan



(Note: *** p< 0.001, ** p<0.05, * p<0.1; the number in a rectangular is R-squared)

Figure 4. Path Analysis on Model 3 for the USA

Table.5 Standardized Estimated Values on Model 3

Dependent Variable	Independent Variable	Estimate	
		Japan	USA
Perceived Quality	Perceived Expectations	0.580 ***	0.672 ***
Perceived Value	Perceived Quality	0.738 ***	0.841 ***
Customer Satisfaction	Perceived Value	0.575 **	0.733 **
Customer Satisfaction	Perceived Expectations	-0.185 *	-0.052
Customer Satisfaction	Perceived Quality	0.570 **	0.364 *
Customer Loyalty	Customer Satisfaction	0.936 ***	0.957 **
Switching Cost	Customer Satisfaction	0.011	0.042

*** p< 0.001, ** p<0.05, * p<0.1

For the US data only, the path from *Perceived Expectations* to *Customer Satisfaction*(H3) was not statistically significant at the 10% level. Therefore, our results indicate that the path from *Perceived Expectations* to *Customer Satisfaction* may be different by country with different cultures and according to services. The following two hypotheses were not included in the best model, which was model 3: (H2) from *Perceived Expectations* to *Perceived Value* and (H9) *Switching Cost* to *Customer Loyalty*.

VI. Results on Modified Satisfaction Construct for USA

In the previous sections, the construct of *Switching Cost* and *Customer Satisfaction* was not reliable. In order to improve the reliability, we used five utilitarian mobile services of MMS, e-mail, and GPS as well as mobile

internet and SMS. The Cronbach Alpha of *Customer Satisfaction* was 0.859. As in section 4.4, the results on CR, AVE, for SIC for each construct for Japan are shown in Table 6.

Here, for the USA, the lowest AVE is 0.407 for *Customer Satisfaction* and the lowest CR is 0.627 for *Customer Loyalty*. Except these values, the others exceeded the cut-off values. We may be able to conclude that the reliability for the USA was marginally acceptable. Thus, the measurement model was considered satisfactory with the evidence of adequate reliability, convergent validity and discriminant validity.

By this process, we could improve the reliability of *Customer Construction* for the USA by defining mobile utilitarian services as Internet, SMS, MMS, e-mail, and GPS and still the results on the pass were not much different.

Table 6. CR, AVE, and SIC for Each Construct with Modified Customer Satisfaction for USA

Constructs	CR	AVE	Constructs						
			1	2	3	4	5	6	
1. Perceived Value	0.761	0.617	AVE and SIC						
2. Perceived Quality	0.864	0.760	0.617						
3. Perceived Expectation	0.906	0.762	0.536	0.760					
4. Customer Loyalty	0.627	0.458		0.221	0.762				
5. Switching Cost	0.765	0.681				0.458			
6. Customer Satisfaction	0.770	0.407				0.001	0.681		
			0.193	0.318	0.110	0.001	0.005	0.407	

(Note) The values of AVE are on the diagonal and SIC are on the off-diagonal.

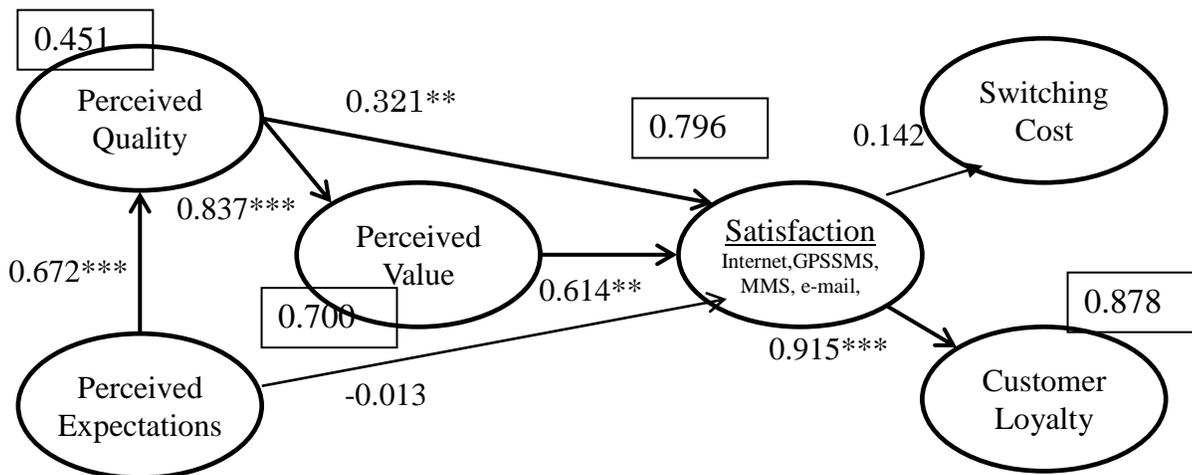


Figure 5. Path Analysis on Model 3 with Modified Customer Satisfaction for the USA

VII. Conclusions and Future Research

This study applied the modified ACSM to total satisfaction with three mobile *utilitarian* services for Japan and US wireless carriers. The results for the US data supported six paths with the following exceptions: from *Perceived Expectations to Perceived Value*; from *Perceived Expectations to Customer Satisfaction*; from *Customer Satisfaction to Switching Cost*; and from *Switching Cost to Customer Loyalty*. These results were in agreement with those of Turel et al. (2006). Meanwhile, for the Japanese data, a negative significant path from *Perceived Expectations to Customer Satisfaction* was also shown. This difference may arise from the fact that we measured *Customer Satisfaction* by specific *utilitarian* services. For future research, hedonic services should also be considered in *Customer Satisfaction*. A comparison of the estimated coefficients between Japan and the US shows that the proposed model fits the data well for both countries.

In summary, measuring *Customer Satisfaction* according to the use of *utilitarian* services produced a remarkably high positive association with customer loyalty, confirming that the measurement of satisfaction with *utilitarian* services was adequate. These results can be used by wireless operators and regulators.

VIII. Limitations

Our research has some limitations with regard to the generalizability of its findings because we used a convenient sample of young adults. For future research, there may be an opportunity to employ randomized surveys, but it would be difficult to do so at present because the market of mobile services is dramatically changing, and we cannot obtain a definitive list of the population. Because of this difficulty, focusing on young adults—that is, essentially, the innovative generation—is considered a better choice. Further, increasing the number of areas and/or adjustments by different technological infrastructures, regulations, or cultural dimensions may be necessary. However, doing so might also prove difficult because regulations and the rate of development differ from country to country. Solving these issues by adopting related demographics might be done by a meta-analysis that uses a variety of data sets in a Bayesian approach, but using such a method remains in the future.

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