The Application of Customer Equity Concepts in Cellular Phone: Antecedents, Constructs, and Consequences

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Abstract

Generally, higher brand equity ends up with higher market share and higher profitability. However, superior brand equity does not guarantee the success in the market. That is, consumer choice is closely related to brand equity but we need more than brand equity to explain this complex phenomenon. We adopt the customer equity concepts: value equity, brand equity, and retention equity. By incorporating value equity and retention equity into customer equity, it is possible to avoid the problems of using the brand equity only. In the paper, we apply this customer equity concepts to cellular phone and investigate the effects of antecedent variables such as exposure, knowledge, positive experience and negative experience on the components of customer equity. In addition, as surrogate measure of customer lifetime value, the weighted measure of purchase intention, consideration set inclusion, and next purchase is used as dependent variable. We estimate the effects of components of customer equity at the brand level and aggregate level using SURE model. Estimation results show that Apple has currently low market share but has high future potentials and Korean firms have currently high market share but has rather low future potentials.

Keywords : Customer Equity, Brand Equity, Value Equity, Retention Equity, Relationship, Cellular Phone, Antecedents, Constructs, Consequences, SURE

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Ⅰ. Introduction

BBrand equity concept has been extensively studied in academic areas and heavily used strategically in practical fields. Generally, higher brand equity ends up with higher market share and profitability. However, superior brand equity does not guarantee the success in the market. For example, Google is a powerful brand and a world leader in the search market share and is generating huge profit from contextual advertising due to search engine dominance. Since its search engine is free and its search capabilities are far superior than those competitors, Google has been expected to dominate the search market. But it has not been successful in Korea and China. Competitors such as Naver in Korea and Baidu in China have successfully defended their turfs against Google. Even with a lot of efforts by Google, this trend has not been reversed for the past several years and some experts predict that this trend will be continued in the long-run. How do we explain this phenomenon? What are the main reasons for the failure?

There could be many different reasons, explanations, or answers for this phenomenon. One can attribute the failure of Google in those markets to the current low brand power of Google. Since it is a late entrant in the market, most consumers do not have chances to be exposed to its service and to try its service. The second reason might be that many consumers may have tried Google service but were not happy with it compared with local search engines. Its search engine is superior in generating more detailed and extensive information but it is inferior in summarizing much simple and concise information. Probably, by using search engine, consumers want to save time and obtain more relevant information simultaneously. The third reason might be due to consumers' switching cost. Since consumers have become accustomed to search engine methods and results descriptions and satisfied with local search engines service, they are reluctant to change to or do not show any interests in using other services even with its advantages. The above reasons indicate that some value aspects and relationship aspects from the consumer perspective other than brand equity problems should be considered for low performance. Whether Google will be successful in the future depends on the other factors such as adaptation to the complex customer needs, consumer switching cost, and customization toward market as well as brand equity. That is, consumer choice is closely related to brand equity but we need more than brand equity to explain

complex phenomenon.

In cellular phone market, Samsung and LG are dominant players in Korea and world market and foreign players such as Motorola and Nokia have difficulties in competing in Korea market. With the success of i-pod and i-phone in world market, Apple introduced its i-phone to Korea market successfully. Previously, Apple had troubles in attacking Korea market for Mac computer and i-pod even though they were very successful in world markets. In terms of brand equity, Apple might have high brand loyalty due to its presence in the computer and music player and its success with i-phone. Or, the brand equity of Apple might be rather low since consumers have not used their phones but it is possible that once consumers have experiences, they are more likely to prefer. Furthermore, mass media has been covering a lot of positive or negative topics on Apple and contributing brand equity and consumers' perceptions for value and relationship positively. Will Apple be successful in competing in Korea market with its innovative smart phone? If so, how we explain this?

In order to investigate and answer these questions, as discussed in the above, we need to consider other equity concepts in addition to brand equity. That is, more efforts should be made toward the identification of other equities than brand equity and the investigation of the formation of equities and the examination of the effects should be made. We adopt the customer equity of Rust et al.(2000) for the components of customer equity: value equity, brand equity, and retention equity. By incorporating value equity and retention equity into customer equity, it is possible to avoid the problem of using the brand equities only. The basic idea behind this framework is very close to the one of Customer Relationship Management (CRM). CRM has been used extensively in practice for customizing customers' behaviors and classifying the customers into profitable groups. CRM emphasizes the calculation of lifetime value in order to customize customers' behaviors and classify the customers based on the use of extensive customer data(Rust et al. 2004a; Rust et al. 2004b; Rust et al. 2010). However, CRM practice is somewhat limited to the service-related data or retail-related to data which can be obtained through the direct customer contact using credit cards or frequent cards. The use of CRM has been rather rare in the product-related area due to the availability of data and the extensive requirements of data accumulation, The application of customer equity concepts in cellular phone as product not service is the main objective

of this paper. That is, when extensive actual data is not available, how do we apply customer equity model? For the analysis, we select cellular phone and make an attempt to apply the customer equity model for empirical test. We investigate the model both at the aggregate model and at the brand level in order to answer the questions such as "In the cellular phone market, does current market share pattern will be the same over time? How do we predict future choices of customers?" This investigation reveals the possible reasons for current high market share but future lower market share and current low market share but future higher market share, especially for Apple, Samsung, LG, and Motorola.

Ⅱ. Theoretical Backgrounds

1. Customer Equity Definition and Components

Blatterg and Deighton(1996) defined customer equity as the total of the discounted lifetime values of all of its customers. Rust et al.(2000) defined customer equity in terms of the total value of the customers of the firm and emphasized the inclusion of both customer's current profitability and net discounted contribution stream over time in the future, that is, future profitability. Customer equity can be decomposed into three components or drivers: value equity, brand equity, and retention equity. Rust(2002) described the process of influence of actionable sub-drivers to each of equity components or drivers, and the process of combining of three components as summary measure of customer equity. For this purpose, sub-drivers of each component are categorized. They assume that these sub-drivers are separated not overlapping. The sub-drivers is assumed to affect its own driver. They gave an example of restaurant for customer equity components. Value equity drivers include food quality, service quality, dining room atmosphere, price competitiveness, and speed of service. Brand equity drivers include advertising awareness, brand image, community citizenship, and sensitivity to minorities. Relationship equity drivers include frequent buyer cards, sense of community, knows my name, and knowledge of menu.

2. Brand Equity

Aaker(1991) defined brand equity as "a set of five categories of brand assets (liabilities) linked to a brand's name or symbol that add to (subtract from) the

value provided by a product or service." Brand equity is the construct that covers all of relevance, experience, perceptions. This concept includes holistically affectional aspects as well as rational aspects and shows differential effects for product or marketing responses by having knowledge on brand. In some cases, it includes the behavioral aspects such as brand loyalty. Aaker(1991) suggested that five brand equity constructs: brand awareness, brand perceived quality, brand associations, brand loyalty, and other proprietary brands assets, such as patents or trademarks. Young and Rubicam brand evaluation model includes differentiation, relevance, esteem, knowledge to measure brand power. Differentiation is the evaluation of difference of one brand with other competitor brands. Relevance is related to how relevant to the needs of customers. Esteem is the degree of respect for brand or the evaluation of the brand as best product. Knowledge is the evaluation of understanding the brand. Differentiation and relevance are combined into brand strength and esteem and knowledge are combined into brand stature. Dyson et al.(1996) suggested brand presence, relevance, performance, advantage as brand equity components in Bonding model for hierachical effects model. This model becomes the base of Brand Dynamics Pyramid of Millward Brown. Keller(2003) also proposed resonance pyramid model using four steps: identity stage that emphasizes salience, meaning stage that focus on the performance and image, response stage for evaluation and feelings, relationship stage for resonance. Walter(2002) at IPSOS proposed familiarity, uniqueness, relevance, popularity, and quality as components of brand equity. They related these brand equity components to brand health including brand loyalty, customer commitment, purchase intention, price sensitivity, market share, share trend, profitability trend.

Rust et al.(2000) suggested the three drivers of brand equity. For building brand equity, they used brand building activities; free samples, image advertising, and ethical corporate behavior affect brand awareness, attitude toward brand, brand ethics. The first driver of brand equity is brand awareness. The sub-drivers of brand awareness are each of the elements of an integrated marketing communication strategy, and word-of-mouth communications. The second driver is brand position. The sub-drivers of brand position are media creative strategy, media placement, brand name, packaging/merchandising, and site location. The third driver of brand equity is corporate citizenship and ethics. The key sub-

drivers are community event sponsorship, privacy policies, environmental policy, hiring, and work practices, and product and service guarantee.

3. Value Equity

Rust et al.(2000) define value equity as the consumer's overall assessment of the utility of a product or service based on the perceptions of what is given up for what is received. They suggest three key drivers of value equity: quality, price, and convenience. The sub-drivers of quality are physical product, service product, service delivery, and service environment. The sub-drivers of price are every-day low price, price discounts, complex pricing, and situational pricing. The sub-drivers of convenience are location, ease of use, and availability.

Three key drivers of value quality is very close to the rational aspects of Aaker(1996)'s brand equity definition and are not incorporated in the Keller (2003)'s definition directly.

4. Relationship(Retention) Equity

Retention equity is customers willingness to choose to do business with the company. That is the reason that retention equity is sometimes called relationship equity. In particular, retention programs and relationship building activities from the company will con tribute to the customers' choice of the firm's products or services.

Rust et al.(2000) emphasized that reten tion equity should maximize the likelihood that the customer returns for future purchases, maximize the size of the future purchases, and minimize the likelihood that the customer will purchase from a competitor. The main dri vers of retention equity is loyalty program such as frequent purchase/reward programs, special recognition and treatment programs, affinity(emotional connection) programs, community programs. Tolba and Hassan(2009) proposed mode that breaks down the customer based brand equity model into three dimen sions: knowledge equity(KE), attitudinal equity(AE), and relationship equity(RE). They proposed these three dimensions's influence on brand preference and brand purchase intention.

5. Customer Lifetime Value(CLV)

Brand choice, brand preference, brand purchase intention might be used to calculate CLV. However, for durable goods not service, it is not easy to calculate CLV since its calculation requires information about time period chosen

for analysis, the firm's discount rate, the firms' planning horizon, the customer's frequency of purchase in each period in the product category, the average contribution from a purchase of this brand, the customer's most re-cent brand chosen, the customer's estimated probabilities of choosing each brand on the next purchase(Rust et al. 2000).

Rust et al.(2000) suggested to use share of wallet using brand switching matrix. That is, from the recent brand chosen, and the estimated probabilities of choosing each brand next time, one can construct switching matrix that incorporates this information. That is, in order to calculate this, we need to find out the current choice and next choice. For deriving driver coefficients, they use logit regression coefficient for the drivers. They interpret intercept as inertia. This suggest that brand choice, customer lifetime value as customer equity.

Ⅲ. Hypothesis Development

We defined customer equity in terms of three components: value equity, brand equity, and retention equity. Instead of investigating the determinants of customer equity components, in this paper, we examine the effects of antecedent variables on each component of customer equity. For this purpose, we need to define antecedent variables. Theoretically, customer equity components represent accumulated effects of previous marketing activities and customers' perceptions or experiences on the brands or products. Here, it is important to remember that antecedents are not the same as sub-drivers that Rust et al.(2000) used. Their sub-drivers for each component are variables that comprise each component. For example, sub-drivers for value equity component are quality, price, and convenience variables. Value equity is a summary measure of the sub-drivers such as quality, price, and convenience variable. On the other hand, antecedents are the variables that influence value equity.

These antecedents are related to the consumer characteristics as well as marketing activities of the firms. Marketing activities such as advertising, PR, and more distribution channel affect consumers' exposure to the firm's products or brands. Exposures to these activities in terms of exposure might affect product evaluation of quality, a/s, price perception too. Also, this will affect brand equity by influencing on the brand awareness, changing brand image, enhancing brand trust, and increasing self-confidence in the brand. Exposure

can have an impact on the retention equity by reinforcing the relationship, having intimate feeling toward a product. Clearly, the exposure effects will be larger for brand equity than value equity and retention equity. Firm's product related knowledge and firm knowledge might positively influence on the three equity components, Since it is related to the knowledge on the firm's products and brands, it will enhance brand equity than value equity and retention equity. Positive and negative experience will affect equities positively for positive experience and negatively for negative experience. But, these antecedents will be much larger for retention equity than value equity and brand equity. Positive experience will be a big factor in customer satisfaction, repeat purchase or recommending products to other people. Negative experience will end up with customer dissatisfaction, choice of competitor's products, word of mouth of poor performance of products. In absolute terms, which one will have more effect on equities are not clear.

The followings are the hypothesis for the antecedents of components of customer equity.

<H1> Exposure influences value, brand, and retention equities positively.

<H2> Knowledge influences value, brand, and retention equities positively.

<H3> Positive Experience influences value, brand, and retention equities positively.

<H4> Negative Experience influences value, brand, and retention equities positively.

The followings are the hypothesis related to the effects of components of customer equity on future equity.

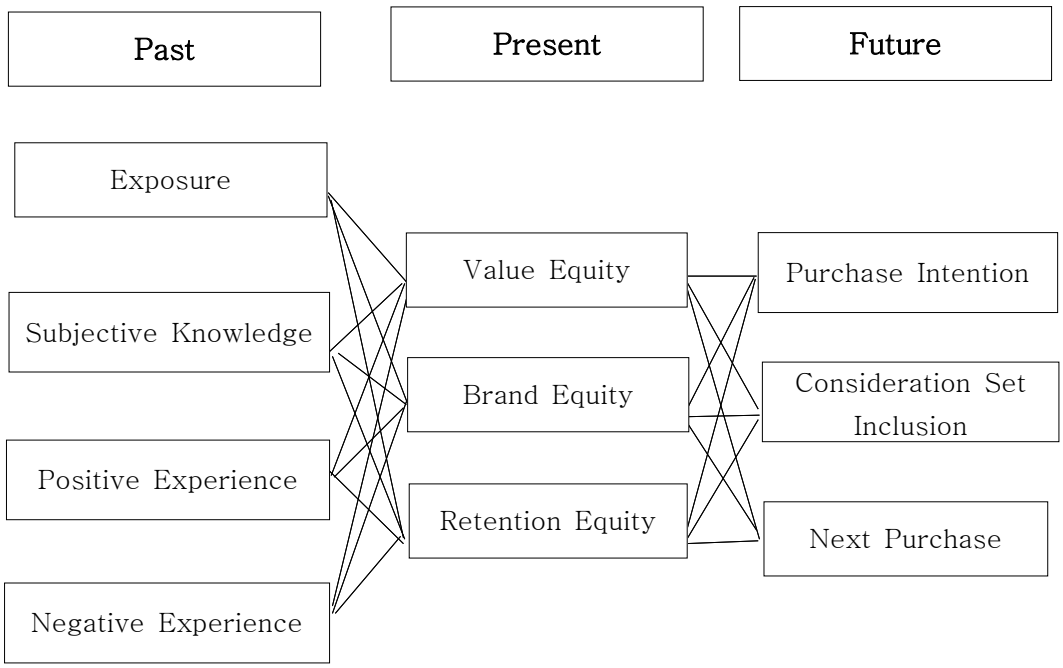
<H5> Value equity influences purchase intention (consideration set, next purchase) positively.

<H6> Brand equity influences purchase intention (consideration set, next purchase) positively.

<H7> Retention equity influences purchase intention (consideration set, next purchase) positively.

Aaker and Day(1974) investigated the impact of advertising on market share and showed that advertising impacted on market share indirectly through awareness and attitudes. We can interpret advertising as antecedent for past efforts, awareness and attitudes as equity components for present results, and market share for future choice. This

dynamic model captures the proposed model framework.



<Figure 1> Proposed Model Framework

IV. Empirical Analysis

1. Measuring Variables

For antecedent variables, we use exposure, subjective knowledge, positive experience, and negative experience. First, degree of exposure is measured and named as "exposure". Exposure consists of multiple indicators including advertising exposure, PR exposure, observation of other people's use. Advertising exposure is measured whether they saw newspaper, magazine, TV, internet etc. advertising. PR exposure is measured whether they saw articles or program on newspaper, TV etc. Observation of other people's use is measured whether they saw the other people use. All of these items are measured yes/no question across brands.

Subject Knowledge has two indicators.

The first indicator is called as firm knowledge. If respondents have a knowledge on the firms, they are asked to mark as yes/no. The second indicator is the knowledge on the cellular phone brands that the firms produce. This item is measured also yes/no question across brands.

Previous experiences consist of positive experience and negative experience. positive experience is the combination measure of positive experience on the firms's other electronic products as well as cellular phone, positive word of mouth as whether they heard the positive opinion on the product use, past positive experience. Negative experience is the combination measure of negative experience on the firms's other electronic products as well as cellular phone, negative word of mouth as whether they heard the negative opinion on the product use, past negative experience. All of these measures are yes/no answer across brands.

Customer equity components consist of value equity, brand equity, and retention equity. Because it is difficult to measure these equities directly using one item per each equity, we use multiple items of perceived quality, unique design, higher perceived price, and after service for value equity. There are several possibilities for measuring brand equity. Here, we use simple average value of brand familiarity, brand preference, brand trust, unique image, and feeling of self-respect. All the items for value equity and brand equity are measured using 5-point Likert scales across brands. These value and brand equity resemble those of Rust et al. (2000). However, for retention equity, we can not apply those of Rust et al. (2000) since their measures are created for service rather than product. The basic ideas behind retention equity are the willingness to have a relationship with the firm's products. In addition, retention equity is not possible without using the product previously. Therefore, we include the current use of product. Also, customers have satisfactory expectation level. Furthermore, customers have a feeling for attachment. These four measures reflect the future relationship with firm. All of these measures are yes/no answers across brands.

The consequences of customer equity might include future choice. In order to incorporate future choice, intention measure and behavioral measures are used. Intention measure is purchase intention and it is measured as 5-point Likert scale. Behavioral measures include whether consumer will include those brands into consideration set and whether consumer will choose in the next purchase. The former could have multiple choices and the latter has one

choice. <Table 1> summarize the operationalization of variables.

2. Characteristics of Samples

We conducted survey for college students at three universities in Seoul between November and December in 2009. Total 242 students answered questionnaires and 170 samples are used for the analysis. The reason that difference of 72 students in collecting sample and analysis sample is due to the fact that those 72 students do not answer all the questions that are required for testing our hypothesis. Respondent profiles for the analysis sample are male 80, female 92, Age is 160 samples of aged in the 20s, 10 samples over 20 years old. We selected six brands in the questionnaire: Samsung, LG, Motorola, Apple, HTC, and SonyErickson. However, we excluded HTC and SonyErickson since these two brands capture very minimal market share and most respondents do not have exposure, knowledge, or prior experiences on the related electronics products for these two brands. All the related questions except demographic variables for the analysis are asked at the brand levels.

<Table 1> Summary of Operationalization of Variables

Past	Present	Future
Degree of Exposure – Adversiting Exposure – PR Exposure – Observation of Other Pepole Use	Value Equity – Perceived Quality – Design – Perceived Price – After Service	Purchase Intention
Subject Knowledge – Firm Knowledge – Product Knowledge	Brand Equity – Familiarity – Preference – Trust – Image – Self-respect	Consideration Set Inclusion
Positive Experience – Other Product Experience – Positive WOM – Past Positive Experience	Retention Equity – current own – Attachment – Satisfactory Expectation Level – most-wanted-to-own	Next Purchase
Negative Experience – Other Product Experience – Positive WOM – Past Positive Experience		

That is, each question comprises the same question for four companies. If respondents answer multiple selection when they were asked to choose one, they were eliminated in the analysis sample. Total number of respondents are 170 and since each respondent answered for four companies, 680 samples are used for the analysis. Therefore, it is possible for us to test hypothesis at the aggregate level and obtain meaningful implications at the brand level. In the following, we test hypothesis at the aggregate level and conduct further analysis at the brand level.

3. OLS vs. SURE Model

If there exist several alternatives and their own dependent variables and independent variables are observed, we have two choices for the estimation. The first one is that assuming independence among alternatives, we use ordinary least square(OLS) regression for each alternative separately. The second one is that we use seemingly unrelated regression equations(SURE) model. It assumes dependence among alternatives. Instead of applying separate regression for each alternative, it estimates several regression equations simultaneously assuming that error terms are assumed to be correlated across the equations. Equation-by-equation using OLS produces consistent estimates but generally not as efficient as the SURE method, which uses feasible generalized least squares with a specific form of the variance-covariance matrix(Zeller 1962; Amemiya 1985). If error terms are un-correlated across the equations, OLS results are the same as SURE results. The equation (1) shows the SURE coe-fficient.

$$\hat{\beta} = (X'(\hat{\Sigma} \otimes I_T)X)^{-1} X'(\widehat{\Sigma^{-1}} \otimes I_T)y$$

(equation 1)

The variations that can not be explained by the included independent variables are be incorporated in the error terms. For each alternative, residuals are calculated and these residuals across alternatives are combined to calculate variance-covariance matrix across alternatives. This procedure requires for each alternative and error terms across alternatives For interpretation, the variance-covariance matrix in equation 1 can be reduced down to the correlation matrix. This correlation matrix describes the degree of relationship among alternatives after controlling all the independent variables.

4. Analysis at the Aggregate Level

The following table shows the mean and standard deviation of the items that we use in the empirical analysis at the aggregate level. Variables are drivers and items are sub-drivers for customer equity constructs.

4.1. The Effects of Antecedent Variables

Degree of exposure, subjective knowledge, positive experience, and negative experience might affect components of customer equity differently. In order to test the <hypothesis 1> thru <hypothesis 4> for the effects of antecedent variables, we estimate data using OLS.

As hypothesized, exposure, knowledge, and positive experience affect equities positively and negative experience affects equities negatively at the 10% significance level except exposure to brand equity. Therefore, we can not reject hypothesis <H1> thru <H4>.

Positive experience is proven to be the most important contributor to value, brand, and retention equity if we compared standardized coefficients. Knowledge is the second most important contributor and Negative experience is the third important contributor for brand equity and retention equity. Exposure is the least contributor to equities in absolute terms.

In terms of absolute standardized coefficients values, for the value equity the orders are positive experience, negative experience, knowledge, and exposure order. However, for brand equity order is changed into positive experience, knowledge, negative experience, and exposure order. For retention equity, the order is the same as in brand equity but the positive experience bigger and knowledge smaller than brand equity.

<Table 2> Mean and Standard Deviation of Items

Variables	items	Mean	Std.
exposure	saw ad. at newspaper, TV, internet etc.	0.81	0.39
	saw program, article at newspaper, tv	0.76	0.43
	saw other people use	0.73	0.45
knowledge	well aware of the firm	0.69	0.46
	well aware of the cellular phone the firm produces	0.63	0.48

Variables	items	Mean	Std.
positive experience	positive experience on mp3/pc electronic products	0.36	0.48
	heard positive comments on use experience	0.59	0.49
	had positive experience for past use	0.28	0.45
negative experience	negative experience on mp3/pc electronic products	0.16	0.37
	heard negative comments on use experience	0.44	0.50
	had negative experience for past use	0.18	0.39
value equity	high quality	3.91	1.00
	unique design	3.74	0.99
	premium price	3.98	0.97
	better A/S	3.67	1.18
brand equity	Familiarity	3.92	1.13
	Preferences	3.78	1.12
	Trust	3.83	1.05
	image	3.54	1.06
	self-confidence	3.45	1.11
retention equity	attachment	0.33	0.47
	current own	0.25	0.43
	satisfactory expectation level	0.45	0.50
	most-wanted	0.25	0.43

<Table 3> Ordinary Regression Analysis(H1 thru H4)

Dep. Var.	Indep. Var.	Coeff.	Std. Err.	Std. Coeff.	t	pr.	R^2
Value Equity	(intercept)	3.31	0.06		57.57	0.00	0.32
	exposure	0.18	0.08	0.09	2.20	0.03	
	knowledge	0.15	0.07	0.09	2.14	0.03	
	pos_experience	0.91	0.07	0.46	12.29	0.00	
	neg_experience	−0.33	0.08	−0.14	−4.19	0.00	
Brand Equity	(intercept)	3.00	0.07		44.29	0.00	0.37
	exposure	0.12	0.10	0.05	1.21	0.23	
	knowledge	0.37	0.08	0.18	4.58	0.00	
	pos_experience	1.13	0.09	0.47	13.01	0.00	
	neg_experience	−0.35	0.09	−0.12	−3.69	0.00	
Retention Equity	(intercept)	0.03	0.02		1.12	0.26	0.44
	exposure	0.06	0.03	0.07	1.88	0.06	
	knowledge	0.10	0.03	0.13	3.64	0.00	
	pos_experience	0.50	0.03	0.55	16.33	0.00	
	neg_experience	−0.11	0.03	−0.10	−3.19	0.00	

We investigate the effects of customer equity components on purchase intention, consideration set inclusion, and next choice. Since purchase intention is measured using 5−point Likert scale, we use OLS.

<Table 4> OLS results: Purchase Intention as Dependent Variable (H5 thru H7)

Dep. Var	Indep.Var.	Coeff.	Std. Err.	Std. coeff.	t	Pr.	R^2
Purchase Intention	Intercept	−0.29	0.21		−1.40	0.16	0.50
	Value Equity	0.22	0.07	0.12	2.96	0.00	
	Brand Equity	0.79	0.06	0.54	12.36	0.00	
	Retention Equity	0.42	0.13	0.11	3.10	0.00	

In cellular phone, brand equity is the most important contributor to the future purchase intention. However, intention does not necessarily indicate the real choice. There were several criticisms using the intention measure for predicting consumer choice. Rather, we might use other measures such as consideration set inclusion or when you make next choice, which one you are likely to choose one. Since these variables are measured using yes/no question, we use logistic regression models.

<Table 5> Logistic Regression: Consideration Set and Next Purchase as Dependent Var.

Dep. Var.	Indep. Var.	Coeff.	S.E.	Wals	Pr.	Exp(B)	Cox−SnellR^2
Consideration Set Inclusion	Value Equity	0.63	0.22	8.22	0.00	1.88	0.32 (75%hit)
	Brand Equity	0.37	0.19	3.76	0.05	1.45	
	Retention Equity	3.26	0.39	71.39	0.00	26.08	
	Intercept	−5.56	0.75	54.85	0.00	0.00	
Next Purchase	Value Equity	0.71	0.28	6.54	0.01	2.04	0.36 (83%hit)
	Brand Equity	0.11	0.24	0.19	0.66	1.11	
	Retention Equity	5.07	0.51	98.96	0.00	158.96	
	Intercept	−6.65	1.01	43.17	0.00	0.00	

As expected, purchase intention results are not the same as behavioral results. Behavioral measures such as inclusion in the choice set and next purchase reduce the effects of brand equity significantly. In both the inclusion in the choice set and next purchase, brand equity becomes the least important variable. Furthermore, brand equity is not statistically significant at 10% significance level. Regression results show that hypothesis (H5 thru H7) are accepted except for brand equity on next purchase. The orders of the effects of customer equity components on consideration set inclusion and next purchase are retention equity, value equity, and brand equity respectively. That does not mean that brand equity is not important in consideration set inclusion or next purchase. Since value, brand, retention equities are correlated each other (0.74 between value and brand, 0.54 between value and retention, 0.61 between brand and retention). There exists some multi-collinearity problems. Even with multi-collinearity problems, it is clear that brand equity might be very important contributor to intention not behavior comparatively. Hit ratios for logistic regressions are 75% and 83% respectively. This indicates the importance or pre- diction capabilities of equities on future behaviors. In terms of R2, purchase intention is higher than behavioral dependent variables. This indicates the difficulties of predicting future behaviors than future intentions.

The question arises how we calculate the importance of each components of customer equity. If the purpose of measuring is intention, the brand equity has more importance weight. If the purpose of measuring is behavior in choice situation, the brand equity has less important weight.

5. Analysis at the Brand Level

For aggregate level analysis, we assumed that brands are the same for the degree of effects. At the aggregate level, the whole results might be dependent upon the included brands. If there are other brands are included or one or two brands are excluded, results could be different. <Table 6> shows the average values of relevant variables.

<Table 6> Average Values of Variables

Variables	Samsung	LG	Motorola	Apple
Degree of Exposure	0.94	0.89	0.80	0.44
Subject Knowledge	0.89	0.78	0.54	0.44
Positive Experience	0.78	0.39	0.17	0.29
Negative Experience	0.21	0.40	0.32	0.10
Value Equity	4.37	3.76	3.35	3.81
Brand Equity	4.32	3.68	3.14	3.69
Retention Equity	0.61	0.30	0.13	0.24
Purchase Intention	4.11	3.27	2.83	4.10
Consideration Set	0.62	0.21	0.21	0.47
Next Purchase	0.55	0.12	0.09	0.24
Current Market Share	0.54	0.38	0.08	0.01

For Samsung, they have most higher values on the all the aspects. That explains higher current market share. However, for LG, they have the second market share, but purchase intention, consideration set, next purchase drops respectively. Apple's market share was very low but it has potential since their purchase intention is almost the same as Samsung, and consideration set and next purchase is also second. This indicates that even though Apple does not have current power, they have some potential for the future. In the paper, we calculated retention measure using combined measure of current use, attachment, most-wanted, satisfactory expectation level. However, this measure is not exact retention measure since retention is interpreted as repeated purchase. That is, current use is the necessary condition for retention measure. In this regard, alternative measure of retention equity should be somewhat multiplicative measure rather than additive measure. The retention equity could be close to current market share*retention equity.

In the analysis at the brand level, we do not estimate the past-present relationship. That is, we do not report the effects of antecedents on components of customer equities. In order to investigate the effects of four antecedent

variables on equity components, we use regression analysis. In the <Table 7>, we report standardized regression results since it involves 12 regressions for four firms and three dependent variables.

<Table 7> Standardized Regression Results (12 regressions)

Brand	Dep.Var.|Indep.Var.	exposure	knowledge	pos_experience	neg_experience	R^2
Samsung	Value Equity	0.06	0.03	0.13	−0.13	0.05
Samsung	Brand Equity	−0.11	0.11	0.39	−0.17	0.14
Samsung	Retention Equity	−0.08	0.05	0.29	−0.07	0.20
LG	Value Equity	−0.10	0.17	0.29	−0.06	0.30
LG	Brand Equity	−0.07	0.25	0.35	−0.10	0.20
LG	Retention Equity	0.06	0.15	0.48	−0.08	0.23
Motorola	Value Equity	0.23	0.03	0.28	−0.18	0.18
Motorola	Brand Equity	0.19	0.14	0.25	−0.09	0.38
Motorola	Retention Equity	0.04	0.07	0.42	−0.10	0.09
Apple	value Equity	0.26	0.06	0.34	−0.04	0.33
Apple	Brand Equity	0.23	0.18	0.35	0.01	0.20
Apple	Retention Equity	0.22	0.28	0.32	−0.02	0.44

When the standardized coefficient is close to 0.13, probability value is close to 0.1 and close to 0.15, probability value is 0.05, and if coefficient is close to 0.18, probability is 0.01. Exposure effects on equities are different across brands. For Samsung and LG, exposure does not influence equities. But for Motorola and Apple, exposure contributes positively in most cases. Knowledge influences equities positively but differently across brands. For LG and Apple, For Samsung and Motorola, only brand equity is affected by knowledge. But, value equity and retention equity are not affected by knowledge. Positive

experience of all the brand contributes to the equity positively at the 0.01 significance level. On the other hand, negative experience contribute to the equities negatively in the most cases. Especially, for Samsung and Motorola affects equities significantly.

In order to estimate the effects of components of customer equity on the purchase intention, consideration set inclusion, and next choice at the brand level, we need to estimate 12 OLS equations separately. If we can reduce three dependent variables into one dependent variable, four OLS equations are needed. Furthermore, we can estimate only one SURE equation rather than four OLS equations incorporating correlation among error terms. In the error terms, there are some correlations between firms that cannot be somewhat ignored.

The main problem of reducing three dependent variables into one variable is the scales that three dependent variables use. Since purchase intention is measured as 5-point Likert scale and both consideration set inclusion and next choice are measured as yes/no scales. To resolve scales difference, we use standardized values. The following table shows the mean of standardized values of relevant values at the brand level.

<Table 8> Standardized Mean Values for Variables

Variables	Samsung	LG	Motorola	Apple
Degree of Exposure	0.51	0.37	0.11	−0.99
Subject Knowledge	0.54	0.27	−0.29	−0.53
Positive Experience	1.03	−0.05	−0.67	−0.32
Negative Experience	−0.16	0.48	0.21	−0.53
Value Equity	0.78	−0.09	−0.67	−0.02
Brand Equity	0.71	−0.03	−0.66	−0.02
Retention Equity	0.90	−0.06	−0.59	−0.24
Purchase Intention	0.42	−0.24	−0.59	0.42
Consideration Set	0.51	−0.35	−0.34	0.19
Next Purchase	0.69	−0.29	−0.36	−0.03
Current Market Share	0.67	0.29	−0.40	−0.56
CLV surrogate	0.54	−0.30	−0.43	0.19

What are the consumer equity measures close to customer lifetime value? Here, we calculate the customer lifetime value since it is not sufficient enough to assess it. Weighted measure of purchase intention, consideration set inclusion, and next purchase might be surrogate measure of CLV. For weighed measures, standardized measures of each variables can be added. Based on the given information, even though Samsung and LG are dominant current market share leader, they are more likely to be attacked by Apple and Motorola in the future. Compared with current market share, CLV surrogate goes down for Samsung and LG, and CLV surrogate measures increase for Apple and Motorola. In particular, the introduction of Apple affects more LG than Samsung. We can infer that he major reason that LG and Motorola suffer in terms of CLV is due to previous negative experience. The following table, SURE results are reported for standardized values.

<Table 9> Dependent variables are CLV Surrogate(Use of Standardized Values)

Brand	Independent var.	Coef.	Std. Err.	z	P>|z|	R2
Samsung	Value Equity	0.01	0.12	0.08	0.94	0.37
	Brand Equity	0.39	0.10	3.77	0.00	
	Retention Equity	1.15	0.18	6.41	0.00	
	Intercept	−1.89	0.51	−3.75	0.00	
LG	Value Equity	0.08	0.08	1.10	0.27	0.48
	Brand Equity	0.15	0.07	2.19	0.03	
	Retention Equity	1.12	0.12	9.12	0.00	
	Intercept	−1.49	0.23	−6.61	0.00	
Motorola	Value Equity	0.18	0.06	2.76	0.01	0.64
	Brand Equity	0.24	0.05	4.74	0.00	
	Retention Equity	1.37	0.16	8.29	0.00	
	Intercept	−1.95	0.19	−10.16	0.00	
Apple	Value Equity	0.26	0.07	3.53	0.00	0.59
	Brand Equity	0.12	0.06	1.87	0.06	
	Retention Equity	1.37	0.17	8.25	0.00	
	Intercept	−1.57	0.20	−7.95	0.00	

	e_Samsung	e_LG	e_Motorola	e_Apple
e_Samsung	1.00			
e_LG	0.00	1.00		
e_Motorola	−0.16	0.02	1.00	
e_Apple	−0.31	−0.16	0.07	1.00

For each brand, the effects of equities on CLV surrogate measure are not the same. Retention equity is the most important contributor for all brands. The orders of effects size are retention equity, brand equity, and value equity except Apple. For Samsung, the value equity is not statistically significant at 5% confidence level.

The correlation of error terms shows the competitive maps even after considering three components of customer equity. If we do not assume this, then this is separate regression analysis. In the error terms, all the terms are competitors. Especially, Samsung as a leader is affected by other competitors. But, LG and Motorola are not competitors each other. Apple affect both LG and Motorola too.

V. Conclusions and Limitations

Higher brand equity is expected to generate higher market share or profitability in most cases. Brand equity is critical to the consumer choices and it has sustainable power over time. However, high brand equity may not lead to sustainable market share or profitability. Since typical definition of brand equity is somewhat inclusive, meaning that brand equity concepts include attitudinal, affectional, and even behavioral aspects, it is difficult to explain this phenomenon. This kind of definition is criticized for explaining everything but difficult to apply it to practical situations. Consumer choice is closely related to brand equity but it needs more than brand equity to explain complex phenomenon. We adopt the Rust et al.(2000)'s customer equity concepts: value equity, brand equity, and retention equity. By incorporating value equity and retention equity into customer equity, it is possible to avoid the problem of using the brand equities only for explaining consumer choices over time. Customer equity model has been used in the service-related area

not product-related area due to availability of extensive data. In the paper, we apply this customer equity concepts to product-related area using cellular phone when extensive data base is not available.

According to the Rust et al.(2000)'s model, increasing customer equity requires the increasing the component drivers of customer equity and increasing component drivers needs increasing sub-drivers respectively. However, their model did not consider the effects of the past marketing activities of the firms. Firms marketing activities might affect equities in some ways and should be considered for equities to influence customers' future intention and behaviors. There are many different ways to define antecedents and consequences of customer equity. Antecedents should reflect the past experiences, product knowledge, exposure to marketing activities of the firm. These perceptions of the degree of marketing activities and customers' evaluation in terms of experience, knowledge, positive and negative experiences are imbedded in the equity terms. It could be attributes-based objective view, brand-based subjective view, benefits from relationship in the form of value, brand, and retention equity. Consequences of customer equity are revealed in terms of intention measure such as purchase intention in the future and behavioral measures such as repeat purchase or choice among alternatives. In this paper, we developed surrogate CLV measures combining standardized values of purchase intention and behavioral measures. While investigating the effects, we considered the competitive relations using SURE model.

Theoretically, it is necessary to develop customer equity theory for product-related categories. Previous research studies proposed customer equity theory ignoring the differences between products and services. Applying the customer equity model to the product-related categories are not the same as service-related categories. It is recommended to elaborate sub-dimensions of customer equity more carefully.

Strategic or managerial implications are rather clear. The main focus of previous research studies was on the service-related customer equity not product-related customer equity. Even for the product-related firms, it is necessary to identify the drivers and sub-drivers of customer equity. Clearly, it is not easy to calculate customer lifetime value but it is crucial to identify the drivers and sub-drivers to enhance future purchase intention and behaviors. In practice, attributes of marketing activities, brand building activities, relationship building activi-

ties are important in the customer satisfaction and loyalty. Firms should develop the main framework for the customer equity and start to measure customer equity dynamically considering the past, present, and future. Here, we applied the customer equity approach to the cellular phone but it could be extended to another product categories too. Frequently purchased goods as well as durable goods should be covered too.

This research have several limitations. First, the results might be different since there are several ways to define equities. In particular, retention equity for service and product might be far different. Here, retention equity is defined as the combination measure of current use, attachment, satisfactory expectation level, the most-wanted-to-own. Since all the measures reflect customers' willingness to have relationship with the offerings, it closely resemble measures of loyalty. In the future research, several aspects should be considered. First, it is critical to define retention equity more elaborately. Second, we used surrogate CLV using combined measures of intention and behaviors. This measure should be checked against real CLV data. Third, since the purpose of customer equity is to classify customers into pyramids(Zeithaml et al. 2001), analysis at the individual level should be made. Fourth, the other product categories should be examined. Fifth, instead of using OLS or SURE, structural equation modeling should be considered too.

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