

Paper Title: Brand Equity Estimation Model

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Brand Equity Estimation Model

Abstract

Although there is a consensus about brand equity importance, a uniformly accepted estimation model has not yet emerged. Most of the existent consumer-based brand equity models do not offer a monetary estimation of brand equity and many financial-based brand equity models do not observe consumers' perceptions. This research developed a model that permits the estimation of brand equity observing the consumers' purchase intentions and brand-switching probabilities, by applying the Markov Matrix. The model allows the estimation of the financial return of marketing actions, checking the contribution of each of the drivers in brand equity.

Introduction

Marketing professionals are still challenged to estimate the value of the brand. According to Keller (1998), there are different forms of presentation due to the different measurement purposes. As a result, many approaches have been proposed to estimate the brand equity (Shankar et al., 2008). However, among the researches in the marketing filed, a single and uniformly accepted theoretical basis on the brand value has not yet emerged (Raggio; Leone, 2007). Thus, although the corporate world recognizes it as an important marketing activity, the estimation of the brand value (Madden et al., 2006) and the quantification of the returns on marketing activities in financial terms is a major challenge for marketing and brand managers currently (Mizik; Jacobson, 2008).

The measurement of brand equity gets highlighted because it meets the desires of: (a) the accountants - as in setting the price of the brand to be sold / purchased or to include it in the balance sheet of the company (Feldwick, 1996) -; (b) the shareholders and financial analysts, through the verification of the financial performance and the association between brand equity and shareholder value - given the growing evidence on the relationship between brands and the return of the firm in the stock market, as pointed by Aaker and Jacobson (1994), Madden et al. (2006), Shankar et al. (2008), Mizik and Jacobson (2008) - (c) and it is also valid for marketers seeking to increase their organizational credibility and to obtain budgets for their departments and to better manage their brands.

Although there are already few models for financial measurement of the brand equity, they do not always observe the consumer perspective. It demonstrates a defective point on these models, since authors such as Ailawadi et al. (2003) and Tong and Hawley (2009) believe that the measurement of brand equity should start from estimates derived from consumer perspectives, and that any brand vision is to be a function of the value that is delivered to consumers. By contrast, most consumer-based brand equity (CBBE) models for estimating the brand equity focus on individual or aggregate

measures on the consumer perceptions, and, they usually do not present the monetary brand equity that the consumer perspective represents. Thus, the development of a model that provides a monetary measure of brand equity that emerges from the consumer perspective is relevant. In this context, the research question of this research arises: *How to estimate (monetarily) the brand equity based on the consumer?*

It is noteworthy that, in this study, it is recognized that there is already a growing literature on how to measure the customer or consumer-based brand equity and on the firm or financial-based brand equity (FBBE) (Ferjani et al., 2009; Keller, Lehmann, 2006). However, there are still scarce studies that integrate these perspectives, as can be seen in Table 1, which makes a comparison of brand equity studies.

Table 1 –Brand Equity’ Studies

Author(s)	Consumer perception	Monetary Value	Competition-monitoring	Brand-switch probability	Temporal Perspective	Detailed disclosure of the model	Presents the contribution of each of the drivers
Simon and Sullivan (1993)	No	Yes	No	No	Yes (past)	Yes	No
Park and Srinivasan (1994)	Yes	Yes - utility	Yes	No	No	Yes	No
Erdem and Swait (1998)	Yes	Yes - utility	Yes	Yes	No	Yes	No
Ailawadi et al. (2003)	No	Yes	Yes	No	No	Yes	No
Damodaran (2006)	No	Yes	No	No	Yes	Yes	No
Erdem et al. (2006)	Yes	Yes	Yes	No	No	Yes	Yes
Yoo and Donthu (2001)	Yes	No	Yes	No	No	Yes	Yes
Pappu et al. (2005)	Yes	No	Yes	No	No	Yes	Yes
Srinivasan et al. (2005)	Yes	Yes	Yes (with a product without brand)	No	No	Yes	Yes
Buil et al. (2008)	Yes	No	Yes	No	No	Yes	Yes
Tong and Hawley (2009)	Yes	No	Yes	No	No	Yes	Yes
Ferjani et al. (2009)	Yes	Yes	Yes (with a product without brand)	No	No	Yes	No
Model proposed in this article	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Although we recognize the existence of models developed by institutions and companies - such as Young & Rubicam (Y & R), Interbrand, Brand Finance, Brand Analytics, among others – that unify these two views on the brand equity – (Villanueva; Hanssens, 2007), we highlight that the calculation procedures of these institutions are not explicitly

disclosed – turning their detailed evaluation and replications impossible. Furthermore, we can say that, despite the substantial body of different brand equity models (Leone et al., 2006) in most models of brand equity, a sufficiently rigorous theoretical basis is missing (Raggio; Leone, 2007), and this theoretical basis is necessary to avoid arbitrariness (Burmman et al., 2009). One of the major problems of the existing CBBE models is the lack of theoretical foundation and consensus on the drivers of brand equity.

It should be noted that we recognize the existence of works that provide brand equity in monetary terms and that observe consumer perspective. However, they are based on aggregate measures of the consumer behavior, not allowing managers to relate the brand equity to its sources (Srinivasan et al., 2005). The proposition of this model will allow managers to estimate individual and aggregate measures (for each consumer studied), and it will allow us to determine the main drivers of brand equity based on the consumer and to investigate the relationship between investments in the drivers and their respective impact on brand equity - given that this is one of the main deficiencies of the existing measurement models of brand equity.

Measurement Models of Brand Equity

“As firms struggle to produce ever-higher profits in increasingly competitive environments, calls to justify their expenditures are growing” (Rust et al., 2004a, p. 85). However, it is still quite incipient the instrumentation that the companies use to measure the actual return over investment in marketing (Rust et al., 2004b). Indeed, many executives see marketing processes without the pure quantitative properties found in production and finances (Eliashberg, Lilien, 1993). Despite the understanding that marketing expenditures can impact on the demand, they also generate costs and, in general, in view of this trade-off, systematic information capable of supporting the decisions of managers are rarely available (Eliashberg, Lilien, 1993). Despite the understanding that the expenditures on marketing can impact on the demand, they also generate costs and, in general, given this trade-off, systematic information capable of supporting the decisions of managers are rarely available (Eliashberg, Lilien, 1993). In this context, the marketing models show themselves as an opportunity to assist in managers’ decision-making, to demonstrate the results generated by marketing and to increase the credibility of this area compared to other organizational departments and shareholders (Hanssens et al., 2009; Rust et al., 2004b; Srivastava et al., 1998; Sheth; Sisodia, 2002; Rust et al., 2004a; Mizik; Jacobson, 2009).

Thus, it is extremely important to develop models that allow that enable tracking brand metrics to evaluate how a brand is performing in the market (Ailawadi et al., 2003; Lehmann et al., 2008). It is noteworthy that we are aware of the existence of different propositions of brand equity models. However, it is emphasized that "the lack of consensus on

CBBE's way of measurement (Washburn; Plank, 2002) allows room for the development of more robust and parsimonious models" (Maffezzoli, 2010, p. 39) that take into account other theoretical and empirical deficiencies of the existing models.

In proposing a model of CBBE, this research is based on previous conceptual models of brand equity, such as the ones by Aaker (1991) and Keller (1993), which present cognitive psychology as a support to understanding the consumer. Other empirical researches used the same kind of background, such as the ones by Yoo and Donthu (2001), Pappu et al. (2005), Buil et al. (2008), etc. However, this proposal allows a theoretical and managerial advance towards CBBE empirical models proposed by scholars who, in general, only offer means of comparison, rankings (based on averages) or weights between the constructs relationships (Maffezzoli, 2010), as it also relies on the concept of value (utility), derived from the economic theory, as implemented by other measurement models of brand equity, such as the ones by Erdem and Swait (1998) and Erdem and Swait (2010). And it also includes a model of FBBE, the discounted cash flow.

The concept of utility is used in scenarios in which the researcher is interested in the consumer choice process. When the set of choices comprises two or more alternatives, such as different brands (brand choice model), the utility - attractiveness index, i.e., measurement which the individual seeks to maximize via his/her choice - serves as a rule for the consumer decision (Botelho, 2003). The multinomial logit model computes the probability of choosing one of these alternatives as a function of the attributes of all the alternatives available (Guadagni; Little, 1983). Thus, the utility concept applied to models of choice presupposes that the consumer shows a rational buying behavior and chooses the alternative that maximizes its utility (Botelho, 2003).

The brand choice models, in particular, are stochastic models of individual brand choice that focus on the brand to be chosen in a specific purchase occasion. Besides being stochastic, they allow the inclusion of decision variables (Guadagni; Little, 1983), with the consumer purchase or choice intention.

In the sphere of modeling in marketing, consumer choice is often studied using probabilistic models (Botelho, 2003). Among these types of models, there is the Markov Matrix, which are brand-switching matrices (from period t-1 to t) that observe the probabilities of choice (maintenance or switching) of consumers' brand (Gupta; Zeithaml, 2006).

Development of a Model for the Estimation of CBBE

This study proposes a model for the monetary evaluation of the brand equity based on consumer perspective. As a basis to this proposition, we believe that marketing can be seen as an investment (Rust et al, 2004b; Srivastava et al. 1998) which can improve the consumer perception and evaluation of the brands. The higher the brand awareness by consumers, the higher the quality perceived by consumers, the stronger and more consumers positive associations regarding the brand,

the greater the consumer loyalty to the brand, it is assumed that higher is the monetary value of this brand. Thus, the company will have greater return over its investment in brand construction and management.

Many of the academically recognized studies on CBBE offer theoretical models without empirical testing, such as the studies by Aaker (1996) and Keller (1993, 1998). Among the empirical studies, there is little consensus on the dimensions of CBBE. And several empirical studies of CBBE do not offer monetary estimates of the brand equity (eg., Yoo et al., 2000; Yoo and Donthu, 2001; Buil et al., 2008; Tong and Hawley, 2009; Maffezzoli, 2010). Other studies perform estimates of brand equity without taking into account the perception of the customers - Holbrook (1992), Simon and Sullivan (1993) and Ailawadi et al. (2003).

Thus, this research proposes a model of CBBE that allows the monetary estimation of the brand equity based on consumer perspective aiming to help the managers. It is noted that this model focuses on service brands, but it allows an easy replication to other sort of brands. This choice is due to the fact that most of the models for measuring brand equity focus on product brands. A key element in the construction and development of this model is the recognition that brands are hardly alone in the market and that competition impacts on the choices of consumers (Rust et al., 2004b). Thus, the proposed model considers all competing brands existing in the market, incorporating the possibility of brand-switch by consumers.

In contexts in which customers repeatedly buy a product or use a service in the same category and in which they can partly or completely switch their purchases from one seller to another, over time, known as “always a share” (Jackson, 1985), it is important to consider not only the focal brand to determine its value, but also competing brands and the consumers probability of buying other brands. Thus, this model takes into account the competing brands is a central element in brand choice (Guadagni; Little, 1983), given that the competition among brands has a direct impact on the consumers purchase decision (Rust et al., 2004b). Within the “always a share” assumption, the Markov Switching Matrix is a way to modeling the brand-switch by including the perspective of multiple brands (Gupta; Zeithaml, 2006; Rust et al. 2004b). According to Markov Matrix, each consumer has a probability of keeping the current brand (or to continue to use his/her most used brand), that is, each consumer has a loyalty / retention probability and the brand-switch probability for each of the other brands in mind (Rust et al. 2004b). The consideration of the flow of customers from one competitor to another allows competitive effects to be modeled (Rust et al., 2004b), making the measurement of brand equity more complete and realistic.

Hence, it is proposed in this model the use of the Markov Switching Matrix to model the consumer’s possible maintenance, switching and returns between the different brands on the market. In this model, the consumer has the possibility to continue using the services of a particular brand in subsequent periods, or on the next occasion(s) of brand

choice (purchase). Thus, the Markov Matrix models the probability of the consumer to continue using the services of the brands in analysis and his/her probability of switching from one brand to another in the other evaluated periods. By using the Markov Matrix - previously passing the data through a logit-model – the model proposed in this study meets the considerations by Keller and Lehmann (2006) that, in describing the priorities of research on brand management, indicate the use of brand choice models for assessing the brand equity.

It is noted that several existing models for measuring brand equity - such as the ones by Simon and Sullivan (1993), Damodaran (2006) – do not observe competing brands. CBBE models under the indirect approach - Yoo and Donthu (2001) Pappu et al. (2005), Buil et al. (2008), Tong and Hawley (2009) – take into account consumers' opinion about brands on the market to determine the value of these brands from the consumer perspective. However, these models do not generate information on the monetary value of these brands. Another subject liable to improvement among the vast majority of models for measuring brand equity - both the ones based exclusively on the consumer and the exclusively monetary ones - is to ignore the temporal issue in the calculations (Shankar et al., 2008). Even models that attempt to unify the consumer perspective with the one of the firm or financial perspective in the evaluation of brand equity - such as Srinivasan et al. (2005) and Erdem et al. (2006) – have failed to supply this need.

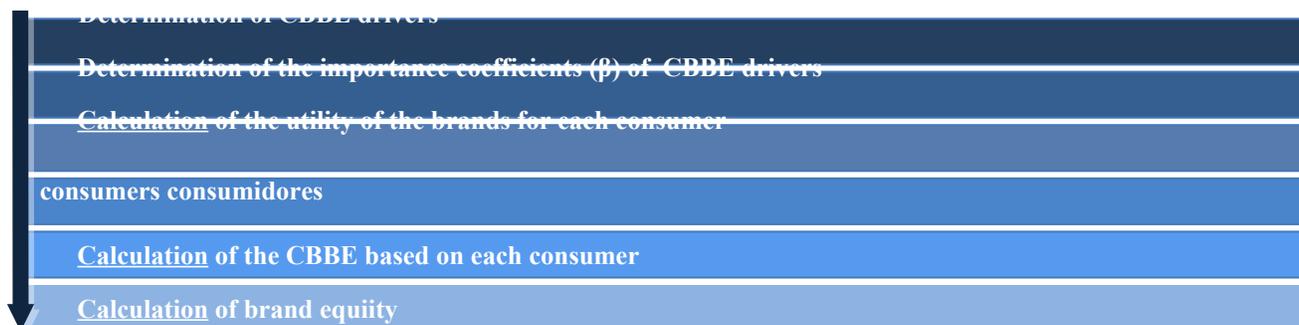
In the model proposed in this study, after the application of the Markov Matrix for each consumer observed over the determined choice periods, we applied a discounted cash flow model (DCF) adaptation, which is the main financial model for the estimation of the brand equity (Ambler, 2003), in order to estimate the monetary value of the brand equity. Thus, this proposal covers the “gaps” of previous models of brand equity, by bringing a monetary estimate of the CBBE, considering all the competing brands in the market, observing the consumer probability of brand choice - with the use of a logit model and of the Markov Matrix, taking into account the present period and close future time periods, via consumer current and future probabilities of choice (maintenance and switching) and the use of discounted cash flow. By using Markov Matrix to ascertain the future probabilities of choice of brands, the proposed model presents construction logic similar to Rust et al. (2004b) model, which approaches, however, the estimation of customer value.

Previous studies on brand equity, in particular, mainly arising from the financial perspective - for example, Holbrook (1992), Simon and Sullivan (1993), Damodaran (2006) and Ailawadi et al. (2003) - and the direct approach of CBBE - for example, Rangaswamy et al. (1993) - , do not allow managers to diagnose what the key drivers of brand equity are. Thus, it is essential to observe the brand equity based on the consumer under the indirect approach, in order to verify what the main sources of brand equity are. Thus, this study argues that CBBE drivers impel the choice probability (maintenance or switching) of the brand by consumers, which, in turn, impels the brand utility and, hence, the Markov

Matrix, which impels the margin of company's contribution and discounted cash flows, impacting the brand equity for each consumer and the monetary brand equity (in the market). The steps of the model are shown in Figure 1.

For the definition of the main drivers of brand equity, a survey was performed in the major marketing journals based on the impact factor verified by Web of Knowledge - Journal of Marketing, Journal of Marketing Research, Journal of the Academy of Marketing Science, Journal of International Marketing and Journal of Consumer Research - and two brand-specific journals: Journal of Brand Management and Journal Product & brand Management, searching for articles that show scales on consumer-based brand equity. In this survey, we observed from the first available online publications of these journals to articles published in March 2012. We found 33 articles that present empirical studies with CBBE scales. We found 33 articles that present empirical studies with CBBE scales. Among the empirical studies, we identified more than 40 dimensions relating to the brand equity based on consumer perspective. The most frequent dimensions are: brand loyalty, brand awareness, perceived quality and associations to the brand. Most of the articles found on CBBE follow the Aaker's (1991, 1996) model or, at least, refer to the study of this author. The result of this survey is supported by other studies, such as the one by Tong and Hawley (2009), pointing to the study by Aaker (1991, 1996) as the model most commonly cited. Hence, in this article, we considered the following drivers of CBBE: brand awareness, perceived quality, brand loyalty, perceived value, brand personality and organizational associations.

Figure 1 - Stages of the proposed CBBE Estimation Model



In order to develop the brand equity estimating model, we used a multivariate statistical method with discrete dependent variable, the logistic regression, a regression model of qualitative choice. Given the potential common problems of data multicollinearity, which would cause a possible decrease in the number of variables incorporated in this type of regression, first we applied the Principal Components Factor Analysis to the data collected from this research. The resulting factorial scores for each respondent in the analysis comprised the explanatory variables for the logit regression. The values of the dependent variables are proportions that correspond to the declared probabilities of choice, informed by the respondents in the survey questions.

In order to determine the drivers' coefficients of importance, it was necessary to sum the multiplications of multinomial logit regression coefficients of each of the factors generated in the principal component analysis by the factorial loads resulting from the principal component analysis of each variable, according to Equation 1, of Importance:

$$\text{Importance} = \sum_{c=1}^C (A_{cx} \gamma_c) \dots\dots\dots(1)$$

Where C is the set of principal components retained, A_{cx} is the factorial coefficient, resulting from the principal component analysis, which relates brand equity driver x to the factor c , and γ_c is the logit regression coefficient corresponding to the factor c (Rust et al., 2004b; Keiserman et al., 2008). The relative importance of each of the drivers of brand equity was calculated in Equation 2:

$$\text{Relative Importance} = \left[\frac{\sum_{c=1}^C (A_{cx} \gamma_c)}{\sum_{x^* \in S_d} \sum_{c=1}^C (A_{cx^*} \gamma_c)} \right] x100 \dots\dots\dots(2)$$

The relative importance of each of the drivers is used for calculating the utility of each brand for each respondent (Rust et al. 2004b; Keiserman et al. 2008). In such a way, via brand equity drivers indicated above and the probability of choice (maintenance or switching) of brand for each consumer, we calculate the individual level of utility that leads the brand-switching matrix at the individual level (relative to consumer, for each choice period). The utility is the value that the customer attributes to a particular brand (Yamamoto, 2006), where the impact of the drivers is the value provided by the brand awareness, perceived quality, brand loyalty, perceived value, brand personality and organizational associations, and the “inertia is the value attributed by the knowledge and comfort of keeping the brand previously consumed” (Yamamoto, Spider, 2006, p. 2). Thus, the calculation of the utility of each mark for each consumer will be verified by the following Equation 3:

$$U_{ijk} = \beta_{0k} LAST_{ijk} + X_{ik} \beta_{1k} + \varepsilon_i \dots\dots\dots(3)$$

In this equation, U_{ijk} is the utility of the brand k for the individual i , who most recently bought the brand j (Rust et al., 2004b), $LAST_{ijk}$ is a dummy variable, equal to 1 (one), if the brand which utility is being measured is the brand that the individual recently purchased, i.e., $j = k$. If the brand that the individual recently purchased is not equal to the brand which utility is being verified, then the dummy variable is equal to 0 (zero). X_{ik} is the column-vector composed of consumers evaluation on brand equity drivers. θ_k is the logistic regression coefficient corresponding to inertia. 1_k is the column-vector of logit regression coefficients corresponding to the drivers of brand equity and ε_i is a random error term which is assumed

to have an extreme value, as standard in logit models (Rust et al., 2004b; Keiserman et al. 2008). Therefore, this study incorporates the concepts of brands in a model of choice (choice modeling) in order to demonstrate the influence of brands on consumer choice via its value (utility) (Keller, Lehmann, 2006).

The utilities of each brand for every consumer, individually, are the basis for calculating the choice probabilities of the brand by the consumer and, consequently, are the basis for the preparation of Markov Matrices of individual switching. The total utility provided to the client by a given brand is obtained by the sum of inertia and impact of the drivers of CBBE: brand awareness, perceived quality, brand loyalty, perceived value, brand personality and organizational associations.

The utility at the individual level leads to a probability of choice (purchase) of the customer (Yamamoto; Spider, 2006). The choice probabilities of each respondent i for each brand, to brand k , consistent with the multinomial logit model, are modeled according to Equation 4:

$P_{ijk^*} = \text{Pr} [\text{individual } i \text{ chooses brand } k^*, \text{ given that brand } j \text{ was the most recently used}] =$

$$\frac{\exp(U_{ijk^*})}{\sum_k \exp(U_{ijk})} \dots\dots\dots (4)$$

Each cell of Markov Matrix means the probability, calculated from Equation 4, of the respective utility. For each consumer observed, all his/her probabilities of purchase in a future period of all brands evaluated are gathered together in a switching matrix (Yamamoto, Spider, 2006).

In order to calculate the brand equity, each consumer i has an associated switching matrix $J \times J$, where J is the number of brands, with switching probabilities P_{ijk} (see Formula 4), indicating the probability in which the consumer i chooses brand k in his/her next choice, conditional on the choice of the current brand j (current brand or the most used brand). “This matrix is a Markov Switching Matrix, therefore, in order to allow the calculation of the probabilities in the times of successive purchase, just raise it to $t-1$, where t is the time” (Yamamoto, Spider, 2006, p. 40). We may observe the Markov Switching Matrix as M_i , where A_i is the line vector $1 \times j$, with elements of the probabilities of choice for the consumer i current transaction. B_{it} is the line vector $1 \times j$, in which the elements of B_{it} are the probabilities in which the consumer i buys brand j in purchase t . The probability that the consumer i will choose the brand j in the purchase t is calculated by the repeated multiplication of Markov Matrix (Equation 5):

$$B_{it} = A_i M_i^t \dots\dots\dots (5)$$

It is important to mention that, many models of CBBE focus on calculating the current value of a brand, without taking future prospects into account. The purpose of this study is to develop a model that consider the consumers’ probabilities of choice of a brand, in a near future to determine the monetary brand equity, using discounted cash flow.

Thus, in this model we propose an adaptation of the calculation of discounted cash flow, in order to investigate, specifically, the CBBE (derived from a direct survey on the consumer), in which we suggest that the brand equity (BE) of each brand based on the opinion of each consumer can be computed for brand j , via Equation 6:

$$BE_{ij} = \sum_{t=0}^{T_{ij}} (1 + d_j)^{-t/f_i} v_{ijt} \pi_{ijt} B_{ijt} \dots\dots\dots (6)$$

In this formula, T_{ij} is the number of expected consumer purchases i in time horizon j . For brand j , d_j is the discount rate of the firm j , f_i is the purchase average of consumer i per period (eg., three purchases per year), v_{ijt} is the expected volume of purchase of brand j by consumer i for period t , and π_{ijt} is the expected contribution margin per unit sold by the company j to the consumer i in period t . The discount rate d_j (or the opportunity cost of capital) of each of the companies was estimated by calculating their weighted average cost of capital (WACC).

We used as v_{ijt} the current and future average monthly expenditure stated by respondents in the survey. The value of future spending was predicted for 6 months from now. We adopted for this model the time horizon of five years, following the recommendation of Rust et al. (2004b). Given the difficulty of verifying the effective decision of choice after the time specified as future, we assumed that the amount of purchase is exogenous, as in the study by Rust et al. (2004b).

In possession of the individual brand equity (BE) (of each brand based on the opinion of each consumer), we can calculate the value of the company's brand j via Equation 7:

$$BE_j = \text{average}(BE_{ij}) \times \text{POP} \dots\dots\dots (7)$$

Where the brand equity (BE_j) of the company j is verified by multiplying the average of the brand equity (BE_{ij}) j for each individual by the total number of population (POP). Given that in this model we deal with different individuals and with various periods of choice, first we compute the brand equities for each subject separately, and then we perform the averaging.

This model also aims to estimate the monetary return of changes in consumers' evaluation on each of the drivers of brand equity. Thus, it attempts to project the Return on Investment (ROI) related to the brand equity and its drivers, allowing the marketing department to estimate projections and to evaluate the financial impact of its investments / expenditures. The return on investment is verified by measuring the changes in brand equity generated by improvements in the evaluation of drivers by consumers in relation to their investments. An expenditure, however, will only be considered as a profitable investment if the return on investment exceeds the cost of capital. Thus, it is important to verify the ROI by using Equation 8:

$$ROI = (\Delta BE - E) / E \dots\dots\dots (8)$$

Where E is the expenditure discounted by the cost of capital and ΔBE is the improvement in the brand equity generated by this expenditure. The discount of capital cost is only carried out in cases in which the expenses occurs over time - biweekly, monthly, ... In these cases, the “installments” of investment should be discounted at present value, in order to consider the value of money over time.

Data

For the definition of the industry to perform this study, first we carried out a survey on secondary data, trying to find areas of activities that provide sufficient data to carry out the model. It is also necessary to note that such a model is useful for dealing with brands that has the same name of the organizations. In addition, for the definition of the research field of study, we sought markets that met the prerequisites suggested for the application of Markov model: (a) industry with product / service that has a high probability of having been consumed by respondents in the past year, (b) industry with finite and well-defined brands (for the Markov Matrix to be treatable) and whose brands were known to the general public (to minimize the problem of lack of opinion or ignorance by the respondents), (c) the industry market data (information on market share, quantity and frequency of consumption of the major brands) at national level and, preferably, also at regional level. Also, the following data are necessary: total number of customers in the market and the respective number of customers of each brand, discount rates of the companies and average contribution of customers of each company, for the application of the financial model (discounted cash flow).

The Brazilian telecommunications industry meets all these requirements and it also has great competitive brands and major investments in marketing. The cell phone industry has a very broad consumption product, finite and known players / brands and it has a lot of consumption and performance data of the companies working in it, being released by the National Telecommunications Agency (Anatel) and Teleco. Most of the companies have their shares traded on the São Paulo Stock Exchange (BOVESPA), providing their reports and financial statements.

For the calculation of the value of the individual brand (for each consumer), it was necessary to obtain the discount rate of each company (d_i), estimated by calculating their weighted average cost of capital (WACC), based on data obtained in the Standardized Financial Statements (SFS). It was also necessary to have the operators contribution margins collected from Teleco (2013b), opting for EBITDA - earnings before interest, taxes, depreciation and amortization - to be used in the calculation of the brand equity as it is a measure of the contribution margin widely accepted in the company valuation models.

The questionnaire used in the survey took, by making the necessary adaptations to the field of study, issues related to brand awareness and perceived quality based on Buil et al.'s (2008) scale, while the dimension of loyalty presented the

scale by Zeithaml et al. (1996) as a basis. The questions about brand personality, perceived value and organizational associations are based, mainly, on the studies by Aaker (1996), Buil et al. (2008) and Pappu et al. (2005). Besides these questions, other six questions relating to inertia were included, and they were developed from the studies by Han et al. (2011), as well as from studies by Keiserman et al. (2008) and Yamamoto (2006), who performed their researches in the cellular phone industry in the states of Rio Grande do Sul and São Paulo, Brazil. Furthermore, to calculate the monetary brand equity, it was necessary to use part of the scale by Rust et al. (2004b), by taking the questions about market share, brand choice probability (maintenance or switching), size and frequency of the purchase. In order to verify the content validity of the data collection instrument, the questionnaire has been evaluated by a specialist in the sector and by three experts in the marketing area. Two pre-tests and a field pilot trial were performed.

In this research, we used the non-probability sampling technique by quota, observing patterns of gender, age and education from the 2010 Census related to the city of Porto Alegre - RS. Six hundred questionnaires were applied. Each respondent answered questions about the brand that (most) uses and about the other brands of mobile phones services of the state of Rio Grande do Sul. After data collection, they were examined with the use of techniques for the identification of missing values, outliers and tests of assumptions of the multivariate analysis (normality, homoscedasticity and multicollinearity). The sample was calibrated in order to respect the age profile of the population of the state of Rio Grande do Sul, and to ensure that the average of the declared choice probabilities (p_{*ij}) of each of the operators was equivalent to the operator actual market share.

Results

The study variables were submitted to Principal Component Analysis with Varimax rotation. We found seven factors with factorial loads with values equal or greater than to 0.50 in all factors. The commonalities of all variables are greater than 0.78. The seven factors extracted explain cumulatively 86.18% of the total variance. In cases in which more than one variable composed a factor, the variables belong to the same driver of brand equity or to inertia. Thus, the factors can be easily interpreted according to the theoretical approach used (see Table 2).

Table 2 – Principal Components Regression

Factors	Factors Interpretation	Cronbach's alpha	Logit Coefficient	<i>p</i>
1	Perceived Quality	0.957	0.51	.0000
2	Brand Loyalty	0.953	0.63	.0000
3	Brand Awareness	0.910	0.95	.0000
4	Brand Personality	0.894	0.33	.0048

5	Organizational Associations	0.950	0.48	.0000
6	Perceived Value	0.948	0.39	.0001
7	Inertia	0.888	-1.27	.4087

Log-likelihood: -433.8205 / Qui-square (7 degrees of freedom): 653.77620 p=.00000

All these factors have Cronbach's Alpha above 0.7. The Bartlett Test of Sphericity demonstrated that the correlations are generally significant at 0.000. The measure of sampling adequacy has an index of 0.976, which indicates the adequacy of the Factor Analysis.

The factorial scores generated on the Principal Component Analysis were used as independent variables for holding the Multinomial Logit Regression. The model was calibrated by the respective weight of each operator. The previously calibrated future choice probabilities (maintenance or switching) of operator brands declared by respondents, served as dependent variables in this regression. Table 2 shows the logit coefficients resulting from Multinomial Logit Regression.

The six factors related to drivers of brand equity showed positive sign, demonstrating the positive impact on the probabilities of consumer choice. These results were expected, because they show that the drivers of the brand equity positively impact the choice probabilities and, therefore, the brand utility and, potentially, its value.

Then, the Multinomial Logit Regression provided regression coefficients for each of these factors extracted. The coefficient calculation of each of the original variables results from the sum of the multiplications of factorial loads of the respective variables by the regression coefficients of the respective factors (Table 2).

In possession of the coefficients, we could estimate the utilities of brands, according to Equation 3. After performing the calculation of the utility of each of the mobile service brands studied for each of the 579 respondents, we could estimate the probability of choice (for maintenance or switching) of the brand for each consumer (see Equation 4). Based on the probabilities of choices of each brand for each consumer, we could build a Markov Switching Matrix for each individual of the sample for each of the observed periods. In possession of the Markov Switching Matrices of each respondent, we could estimate the value of the individual brand (from the perspective of each individual consumer), according to Equation 6. Finally, by multiplying the average value of brands of the respondents by the population, we could estimate the brand equity of each mobile operator observed in this study (see Equation 7).

Figure 2 - Estimated value of the four brands tested

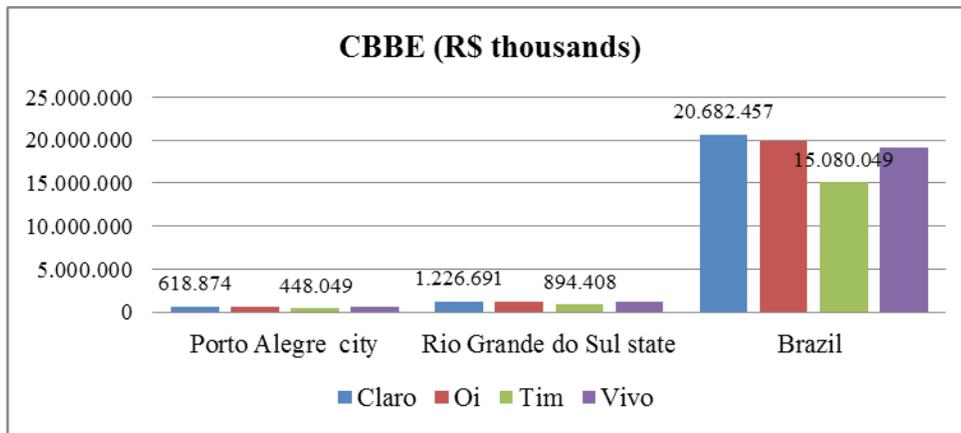


Figure 2 shows the estimated brand equity of four operators of the 51 area code market (Porto Alegre) and the projection for the market in Rio Grande do Sul, as well as in Brazil. It is important to emphasize the best performance of the brand called Claro and the worst performance of the brand called Tim (their brand equities were highlighted in Figure 2).

With this model, it is expected that a company can improve its brand equity with specific investments that seek improvements in the consumers' perceptions and opinions about the drivers of brand equity. Figure 3 shows the variation percentage in the value of brands, when an improvement of 1% in consumer evaluation on each of the drivers of brand equity occurred (assuming that the evaluation of the other brand drivers and of the other brands remained the same).

Figure 3 - Percentage of improvement in brand equity due to 1% improvement in consumers' evaluation of each driver

Improvement of 1% of the consumer evaluation	CBBE Improvement			
	Claro	Oi	Tim	Vivo
Brand Awareness	0.36	0.38	0.42	0.30
Perceived Quality	0.32	0.33	0.35	0.27
Brand loyalty	0.19	0.17	0.18	0.02
Perceived Value	0.29	0.31	0.33	0.24
Brand Personality	0.20	0.21	0.23	0.17
Brand Awareness	0.31	0.32	0.35	0.26

In Figure 3, we can see that a 1% improvement in consumers' evaluation on the brand awareness driver would result in an improvement in the order of 0.36% in Claro's brand equity. In monetary terms, the increase was of R\$ 4,435.25 (thousand). Figure 3 shows that brand awareness and perceived quality drivers are the ones who would bring higher return for the brands equity evaluated.

Based on the results relating to variations in the brand equity caused by improvements in consumers evaluations, and in possession of the information about expenditures (investments) made by the companies, we can calculate the Return on Investment related to the brand equities and their drivers, using Equation 8. Table 3 shows the (illustrative) example of

investment in efforts to increase the quality perceived by consumers. An investment of R\$ 3 million to a 1% improvement in the consumers evaluation on perceived quality of the brand Oi in Rio Grande do Sul, would possibly give it the opportunity of a positive variation of 31% in brand equity. In contrast, the same expenditure value for the brand Tim, would generate a 5% return.

Table 3 - Return over investments for improvements in Perceived Quality

Variations \$ in BE (increase of 1%)		
Brands	(thousand)	ROI=(Δ BE-E)/E
Claro	R\$ 3,883.45	29%
Oi	R\$3,936.94	31%
Tim	R\$3,160.38	5%
Vivo	R\$3,114.72	4%

Based on information from the proposed model, we can still perform other (illustrative) analyses on the investments for the improvement of the drivers and, hence, of the brand equity (as shown in Table 4). The company called Claro, by investing, for example, R\$ 2 million in loyalty programs, would potentially get an improvement of a 0.01 score in the evaluation of their consumers, which would result in an improvement of 19% in brand equity, an impact of R\$ 2,323.27 (thousand) on the monetary value of their brand and projected ROI of 16%.

Table 4 - Return over the projected investments (market of Rio Grande do Sul)

Company	Area of investment	Investment (thousand)	Improvement in the evaluation	% of improvement in Brand equity	Increase (R\$ thousand) in Brand equity	Projected ROI
Claro	Loyalty Program	R\$ 2,000.00	0.01	0.19%	R\$ 2,323.27	16%
Tim	Quality improvement	R\$ 3,000.00	0.01	0.35%	R\$ 3,160.38	5%
Vivo	Institutional publicity	R\$ 2,500.00	0.01	0.26%	R\$ 2,956.03	18%

Final Considerations

This study offers a model that unifies different perspectives of brand equity, observing the perspective of the consumer and proposing a monetary estimate for one of the main intangible assets of the companies – the brand -, supporting relevant information for managers' decision-making. This model promotes the quantification of financial accounting results, supplying one of the major challenges in the marketing department: having tools for measuring the return of marketing actions from a monetary point of view (Mizik; Jacobson, 2008).

Among the major managerial contributions, the current research provides the following contributions:

- a) It provides a model for estimating the CBBE;
- b) It provides a model that measures the main drivers of brand equity;
- c) It estimates, in monetary terms, the brand equity based on the consumer perspective;
- d) It allows us to verify strategic and tactics alternatives to increase brand equity;
- e) It can be used as a monitoring system to better manage the brand equity over time, allowing the target setting on the performance of the different drivers of brand equity and its consequent control;
- f) It enables the monitoring of the performance of the brand with regard to its competitors.

The current study also contributes with the theoretical development of the brand equity's thematic - assisting in the search for its solidification – and the marketing productivity field of study. The proposed model shows improvements compared to the traditional scales of CBBE:

- a) It differentiates the dimension of brand awareness from the different visions of brand associations;
- b) It incorporates different types of brand associations, as suggested in the studies by Aaker (1991, 1996), Yoo and Donthu (2001), Washburn and Plank (2002) and Tong and Hawley (2009), dismembering the visions of brand associations in three brand equity drivers: perceived value (associations to the product), organizational associations and brand personality;
- c) It extends the number of dimensions and items – according to the indications by Yoo and Donthu (2001), Washburn and Plank (2002), Pappu et al. (2005) and Buil et al. (2008) - and it tests them empirically;
- d) It can be used in the field of services and products;
- e) It can measure the brand equity of a product or the brand equity of the company, and
- f) It was applied on a sample of real consumers instead of students, as performed in previous studies (Yoo et al., 2000; Yoo; Donthu, 2001; Pappu et al. 2005; Atilgan et al., 2005).

A possible limitation of the study is the use of probabilities reported by consumers on the future use of the brands as a proxy for utilities (Yamamoto; Spider, 2006). If it was possible to verify the effective purchase decisions of consumers in a given time as the future, there could be an improvement of the model. Although the model is stochastic, because it is based on the Markov Matrix, it also assumes exogeneity in relation to some of its parameters, such as volume, purchase frequency and market share. Thus, it is expected that further researches will seek to model the purchase volume and market share over time.

Due to the simplicity of exposition of the model, this research aimed precisely for scenarios in which the company has just one brand, thus disregarding potential cross-selling between different brands of the company (Rust et al., 2004b). We suggest that future studies could test the proposed model in scenarios in which the companies have different brands. Moreover, the proposed model does not take into account the possibility of new entrants in the market. Although this fact is

not commonplace in the market observed, this aspect may be the target of new propositions of estimation models of brand equity.

In this study, we observed brands of services provided to consumers. We also encourage the performance of evaluations of brand equity of tangible assets by using the proposed model, as well as the replication of the study in different scenarios. It is suggested that the construct of inertia must further explored due to the results obtained. We believe that future studies may use other criteria for the projection of the results (eg. income, education, etc) or perform the data collection in different regions.

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