Measuring Brand Equity: Proposal for Conceptual and Methodological Improvements

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SUBMISSION TYPE: COMPETITIVE PAPER.

The submission is made under option 1.

ACKNOWLEDGEMENTS

The author would like to express his gratitude to GfK Marketing Services and IRI-Secodip for the data panels used in the present study. I would also like to thank Alain Jolibert for his many constructive comments and Valérie for her careful and critical reading of this article.

CONTENT AREA CODES: 10, 69, 45.
METHODOLOGICAL AREA CODES: 05, 18, 04.

ABSTRACT

This study proposes an individual measure of brand equity based on consumer preferences and choices. Starting from the valuation method developed by Park and Srinivasan, the author suggests both conceptual and methodological improvements. A survey-based experiment for 32 brands comparing laboratory data and panel data proves the better internal and external validity of the revised model. The corrected brand equity construct is fairly better correlated to other constructs related to brand strength, such as market share and distribution indices. Finally, the Logit model developed leads to a satisfactory prediction of choice shares, thus also demonstrating that the proposed approach has a fair predictive validity.

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1)- INTRODUCTION

A brand can be usefully defined as a visible attribute, physical and lasting, applied to an object to distinguish it. Today it would be impossible to launch a new product without attributing a name to it, nor without endowing the product with a personality of its own. Nevertheless, the refinement of the methods of measuring the role of the brand is only a recent concern of marketing research (Marketing Science Institute, 1988). Among the different methods tested, those that relate to a customer-based definition of brand equity dominate. The aim of the present article is to suggest a revision and improvement of the measurement of brand equity, developed initially by Park (1992) and later published by Park and Srinivasan (1994). This revision improves fairly the reliability of brand equity measurement and permits an individual measure of the construct.

First we review the theoretical foundations on which the work of Park and Srinivasan is based. Then we describe the differences between their conceptual and methodological approaches and our own. Lastly, we compare the results produced by each of these methods in a laboratory experiment in order to verify the soundness of the revisions we are proposing.

2)- CONSUMER-BASED METHODS

Until the end of the 1970s, researchers were most often interested in the total effect created by the product and the brand. They generally did not distinguish the effect of the brand from the effect of the product on the consumer. The fundamental article by Srinivasan (1979), which demonstrated that the brand had its own added value (utility) independent of that of the product, and the studies conducted by the Marketing Science Institute (Leuthesser, 1988), radically called into question this very approach. Henceforth it was accepted that the brand and the product are two distinct components of a single supply. This separation into two components lies at the origins of the concept of *brand equity*, which a group of experts (organized by the MSI [1988]), defined as "the ensemble of associations and behaviors (…) that permits branded products to achieve greater sales volumes and greater profit margins than they would have been able to achieve without the brand name."

Brand equity has the particularity of being a construct that is not directly observable. It is, therefore, only measurable vis-à-vis its demonstrable manifestations. As a result, researchers have recourse to two methods of measurement. The first, described as *indirect*, privileges two observable elements: the attention paid to the brand, which is measured by aided and unaided awareness scores (Alba et al., 1991) and the perception of its image (Biel, 1992; Krishnan, 1996), which is expressed in the strength, the valence, the uniqueness, and, more distantly, the congruence and relevance of the associations that the brand name arouses in the consumer's mind (Keller, 1993). The second method measures *directly* the consumer's preference among several

alternatives. Recourse to conjoint analysis allows one to disassociate the performance of the brand from the performance of the product's other attributes and thus to isolate the contribution of the brand within the elicitation of an overall preference expressed in the form of its utility.

A)- DIRECT MEASUREMENT METHODS OF BRAND EQUITY

The methods for measuring brand equity that are based on the measurement of the preference or of the choices of the consumer employ models derived from the Logit Probability Model (Swait, et al., 1993; Kamakura and Russel, 1993), or draw upon the statistical resources of conjoint analysis (Srinivasan, 1979; Park and Srinivasan, 1994). In reality, the theoretical justifications of these different approaches rests on the Consumer Behavior Model developed by Urban and Hauser (1980). This last model takes into consideration that the consumer evaluates the product based on its characteristics and according to external sources of information (advertisements, word of mouth, etc.). Since the consumer seeks to maximize his own individual utility function, the elicitation of a preference is built upon the assessment of the product and at the same time on the each individual's motivations for a purchase. In the end, the final choice is a function of consumer preference that is moderated by external variables, such as the budget allocated to the given purchase, or the product's price, or even its in-store availability. From these conceptual studies, one learns that the brand, considered as an extrinsic attribute of the product, exerts an impact as much on the evaluation of the product's objective characteristics as on the elicitation of preference and the formulation of choice. Brand equity can thus be assimilated into the portion of residual utility, which the objective evaluation of the product's attributes is unable to explain.

This conceptualization of brand equity conforms to the definitions adopted in numerous studies (Shocker and Weitz, 1988; Swait et al., 1993). In a operational way, Park and Srinivasan (1994) proposed to measure brand equity as the difference between two values of utility: the first measures the overall preference relative to a "branded product," while the second measures the objective evaluation of the product.

The methods for measuring brand equity that are based on conjoint analysis offer three types of advantages. Under certain conditions, they allow one to obtain an individual measure of brand equity, and not only aggregate-level or segment-level measures of brand equity (Kamakura and Russell, 1993). Second, they clearly distinguish the utility attached to the product from the utility attached to the brand (Park and Srinivasan, 1994). Third, their application leads to an isolation of the impact of the brand, according to whether this impact exerts on the perception of the product's characteristics (halo effect or inferential effect) or on the overall preference (heuristic effect).

B)- THE USE OF CONJOINT ANALYSIS FOR MEASURING BRAND EQUITY

At first sight, the use of conjoint analysis for measuring the value of brand equity seems to be the most appropriate solution (Green and Srinivasan, 1990). Nevertheless, to treat the brand as an attribute, as if for any other characteristic of the product, raises two concerns.

Taking into account the interaction effect between the brand and the other attributes requires a statistical procedure of estimation that is weighty and cumbersome (Rangaswamy et al., 1993). Moreover, the manipulation of this variable in "Full profile" or "Trade off" experimental designs leads to unrealistic product profiles, all of which tarnish the external validity of the experiment (Green and Srinivasan, 1978).

MEASURING THE SPECIFIC IMPACT OF THE BRAND

To compensate for such a potential distortion factor, Srinivasan (1979) recommends not to introduce the brand as a variable in the experimental design. The author defines the brand equity, named "brand-specific effect" (V_{ij}), as "the component of a brand overall preference (B_{ij}') that is not explained by the multiattribute model (B_{ij})". Srinivasan demonstrates that taking into account this effect that results from the brand improves significantly the predictive validity of the conjoint analysis model. This reworked formulation of overall preference is attractive. However, the methodology used calls for three remarks. First, Srinivasan (1979) considers that the estimation of the preference discrepancy that the brand accounts for does not depend on the individuals questioned for the experiment; this is in order to avoid the construct from becoming tautological. While the precaution taken by the author may be justified in methodological terms, it contradicts the principle of an individual measurement of the brand equity. Second observation: the effect particular to the brand (V_{ij}), considered as one-dimensional, aggregates in fact two distinct influences, namely the impact on the evaluation of attributes and the impact on the overall preference (Park, 1992). Finally, this last construct does not measure solely the impact of the brand. In its current formulation it also encompasses the errors of measurement that are due just as much to the adoption of a particular multiattribute preference model as to the arbitrary choice of product evaluation criteria (Mazis et al., 1975).

BREAKING DOWN BRAND IMPACT INTO TWO ELEMENTS

Park, for his part, measures brand equity by proceeding with a calculation of the "difference between an individual consumer's overall brand preference and his or her multiattributed preference based on objectively measured attribute level". The originality of this formulation, later adopted by Park and Srinivasan (1994), consists in the breakdown of overall brand equity into two components, indicated by a_{ij} and n_{ij}. The former (a_{ij}), commonly called the "halo effect" (Wilkie et Pessemier, 1973; Holbrook and Huber, 1979; Alba et al., 1991), measures the distortion that the perception of the brand name creates on the evaluation of the product's characteristics. The latter (n_{ij}) accounts for the residual effect of the brand on overall preference commonly referred to as the "heuristic effect" (Wyer and Srull, 1986; Alba and Marmorstein, 1987). In this case, the consumer relies on the brand, which he considers as an anchoring and adjustment criterion (Tversky and Kahneman, 1974) to estimate the overall quality of the product, bypassing the evaluation of its characteristics in finer detail. Based on these considerations, Park and Srinivasan propose the following important equation:

(1) $$e_{ij} = a_{ij} + n_{ij}$$

where: e_{ij}: brand equity of the brand j for individual i
a_{ij}: attribute-based component of brand equity e_{ij}
nij : nonattribute-based component of brand equity $e_{ij:}$

This method has the advantage of measuring separately the two contributions of the brand to the development of a consumer attitude toward the product. Park and Srinivasan proceed then to a series of verifications in order to check the robustness and the validity of their hypothesis. By means of a 'test-retest' procedure, they are able to confirm the stability of the two components of brand equity.

3)- PROPOSAL FOR A CONCEPTUAL AND METHODOLOGICAL REVISION

In spite of its usefulness, the method and the experimental design call for two qualifications that are precisely the two improvements we call for in this article.

A)- DEFINITIONS AND MATHEMATICAL FORMULAS

We recall that Park and Srinivasan (1994) define brand equity as "difference between an individual consumer's overall brand preference and his or her multiattributed preference based on objectively measured attribute levels." Use of the term "objective" qualifies the situation in which the consumer evaluates the product without knowing the brand. Inversely, the term "subjective" indicates the situation in which the consumer avails himself of supplemental information that the brand provides. Although misleading – the information procured from the brand is not uniquely subjective – we adopt this convention of usage for the discussion that follows. This definition does not sufficiently distinguish the concept from the construct to which it is indebted. As a result, the difference of utility is not entirely imputable to the brand: part is attributable to the error of measurement that is particular to the method of calculation employed. In fact, there are two reasons why — beyond all considerations related to the brand itself — preference based on objective evaluation of the product's attributes may not be directly linked to the overall preference. The consumer can evaluate favorably all attributes of a product and then prefer another (Tversky and Kahneman, 1998), simply due to the incoherency and the irrationality of his choices (Feldman and Lynch, 1988). The brand-specific effect thus involves a first type of error (random error). Next, the multiattributed preference is calculated by means of an additive partworth utility function: the arbitrary choice of the model, the nature and number of the retained attributes, or even the disregard of their independence can lead to a systematic error of methodological importance. This might explain the discrepancy that exists when preference is measured by an overall or an analytic approach (Mazis et al., 1975).

DEFINITION AND MEASUREMENT OF BRAND EQUITY

By considering the brand as a type of information likely to alter the objective preference that the consumer brings to a product, we propose the following definition for brand equity:

D_1 – *Brand equity is the difference between the subjective preference and the objective preference vis-à-vis the product.*

Our definition tries to separate the concept from its measurement in a way that is more distinct than that adopted by Park and Srinivasan (1994): independently of any experimental method, brand equity is compared to the preference share that derives from the knowledge and perception of the brand by the consumer. To calculate this preference share, we question the consumer twice using a similar procedure; only the variable brand is successively "manipulated", being first hidden then revealed (Olson, 1977). Let us adopt the following mathematical conventions:

$u(s)_{ij}$: overall preference (utility) when the brand j is revealed to individual i.
$u(o)_{ij}$: overall preference (utility) when the brand j is hidden from individual i.
$v(s)_{ij}$: preference (utility) based on subjectively measured attribute levels (brand j is revealed)
$v(o)_{ij}$: preference (utility) based on objectively measured attribute levels (brand j is hidden)

The mathematical equation of brand equity (e_{ij}) that derives from our definition D_1 is thus the following:

(2) $$e_{ij} = u(s)_{ij} - u(o)_{ij}$$

while Park and Srinivasan (1994) calculate the value of this same construct with the equation:

(3) $$e_{ij} = u(s)_{ij} - v(o)_{ij}$$

The result for each couple (i, j) is a difference $\xi(o)_{ij}$ which is expressed thusly:

(4) $$\xi(o)_{ij} = \mathbf{(2) - (3)} = u(o)_{ij} - v(o)_{ij}$$

This difference is equal to the overall utility share (or preference share) of the individual i for the brand j that the multiattribute model cannot explain and corresponds to the error described above (cf. p. 7).

DEFINITION AND MEASUREMENT OF ATTRIBUTE-BASED BRAND EQUITY

In order to judge the quality of a product, the consumer relies to varying degrees on the extrinsic cues of the product (Olson, 1972) — of which the brand is one (Asam and Bucklin, 1973; Makens, 1965; Friedman and Dipple, 1978) — in order to deduce the performance of the product's intrinsic cues. Furthermore, the familiarity and the brand manufacturer's reputation alter the objective evaluation of the product's characteristics, a distortion better known as the "halo effect" (Wilkie and Pessemier, 1973; Bettman, 1979; Murphy, et al., 1993). Therefore, our definition of brand equity based on product attributes finds its justification; this definition confirms moreover the one developed by Park and Srinivasan (1994):

D_2 –*Attribute-based Brand Equity is the difference between a preference based on the subjective evaluation of the product's attributes and a preference based on the objective evaluation of the same attributes.*

Attribute-based brand equity is measured by the difference of subjective and objective utilities obtained by the application of the multiattribute model. To sustain comparability with Park and Srinivasan (1994), we use an additive partworth utility model. Theoretically, other multiattribute models might prove themselves more applicable. Nevertheless, the choice of a particular model has no effect on the value of brand equity; only the relative contribution of its two components may be affected. If we designate by a_{ij} the attribute-based brand equity, by s_{ijp} and o_{ijp} the subjective and objective evaluation respectively of the attribute p of brand j by the individual i, and by $v(s)_{ij}$ and $v(o)_{ij}$ the subjective and objective utilities issued from the multiattribute model, we arrive at the following equation:

(5) $$a_{ij} = v(s)_{ij} - v(o)_{ij} = \sum_{p=1}^{q} f_{ip}(s_{ijp}) - \sum_{p=1}^{q} f_{ip}(o_{ijp})$$

DEFINITION AND MEASUREMENT OF NONATTRIBUTE-BASED BRAND EQUITY

The perceived value of a product rests also on considerations that are extraneous to the product's intrinsic characteristics. In particular, the constituent elements of the brand reputation contribute to a considerable share of the overall preference (Keller, 1993). This preference share that is not determined by the characteristics of the product is called the "Brand Specific Effect" (Srinivasan, 1979) or "Nonattribute-based Brand Equity" (Park and Srinivasan, 1994), and we define it in the following terms:

D_3 - *Nonattribute-based brand equity is the difference between a subjectively overall preference and a preference based on the subjective evaluation of the product's attributes.*

By analogy with our reasoning for brand equity measurement, we subtract the error value (related to the application of the multiattribute model) from the calculation of the difference between the two utilities. Thus, by employing the same mathematical conventions (cf. p. 7), the construct of nonattribute-based brand equity, n_{ij}, is measured according to the following equation:

(6) $$n_{ij} = \left[u(s)_{ij} - v(s)_{ij}\right] - \xi(s)_{ij}$$

The mathematical expression of the construct is here different from that of Park and Srinivasan (1994). This difference is, once again, due to the subtraction of a term of random (or individual) error. Since we question each individual twice using a similar procedure, we can estimate that, for each subject i, the term $\xi(s)_{ij}$, calculated when the brand is known, has a value close to that calculated when the brand-name is hidden ($\xi(o)_{ij}$). Strictly speaking, $\xi(s)_{ij}$, and $\xi(o)_{ij}$ do not have the same value. Part of the error term measures the coherence of an individual's responses which can vary during the course of a single interview, notably due to boredom or fatigue. However, the assumption that these two constructs are equal allows

one to calculate its value by means of utilities u (o)ij and v (o)ij, thus separating out the effect of the brand, which is precisely what we are seeking to isolate. This provides the following formula:

(7) $$\xi(o)_{ij} = \xi(s)_{ij} = \left[u(o)_{ij} - v(o)_{ij}\right]$$

THE PRINCIPAL EQUATION OF BRAND EQUITY

Brand equity is thus the sum of attribute-based brand equity and nonattribute-based brand equity. Although our definitions of two of these three constructs may be different from those of Park and Srinivasan, the subtraction of the same error term from the value of these constructs does not change the formulation of the equation but permits us to calculate a more accurate value for two of these three components (cf. equation #8).

(8)

$$e_{ij} = u(s)_{ij} - u(o)_{ij} = u(s)_{ij} - \left[v(o)_{ij} + \xi(o)_{ij}\right]$$ considering (2) et (4)

$$e_{ij} = \left[u(s)_{ij} - v(s)_{ij}\right] + \left[v(s)_{ij} - v(o)_{ij}\right] - \xi(o)_{ij}$$ adding then subtracting $v(s)_{ij}$

$$e_{ij} = \left[u(s)_{ij} - v(s)_{ij} - \xi(s)_{ij}\right] + \left[v(s)_{ij} - v(o)_{ij}\right]$$ considering (7)

$$e_{ij} = n_{ij} + a_{ij}$$

Overall brand equity of brand j (e_j) is obtained by calculating the average of the values e_{ij} that mathematically weight the quantities bought (q_i) by each individual during a reference period. Thus the contribution of each individual to the equity of the brand is proportionate to his consumption of the product. In our experiment no measurement was taken of the quantities bought nor of the frequency of purchases. This is why we calculate a non-weighted average on the total sample for each brand j.

MARKET SHARE PREMIUM DUE TO BRAND EQUITY

Our procedure being thus far similar to that of Park and Srinivasan (1994), we now recapitulate briefly our steps taken. Though the equity of a store brand is used as a reference, it can be replaced by a fictional brand or by any other brand name used as a "benchmark". The statistical method that we use necessitates only the utilization of a reference brand whose brand equity is as negligible as possible. We use the following definition:

D_4 - *The Market Share Premium that the brand accounts for is the difference between the current market share of the brand and that which the same product would obtain if sold at its current price as a store brand.*

This definition leads to the following equation (10):

(9) $$\Delta\, MKS_j = MKS(a)_j - MKS(d)_j$$

Δ MKS_j: market share premium accounted for by the brand j

$MKS(a)_j$: estimated current market share of the manufacturer's brand j
$MKS(d)_j$: market share of the same product sold as a store brand.

The first step is the calculation of the quantity $MKS(a)_j$. Let Pr_{ij} stand for the probability of the subject i to chose the brand j. The average of Pr_{ij} that weights the purchased quantity q_i expresses the market share of the brand j. Pr_{ij} is calculated with the help of a Logit model that estimates the purchase probability of a product in relation to its overall utility. The general term of Pr_{ij} thus becomes:

(10)
$$Pr_{ij} = \frac{\exp\{\beta \,.\, u(s)_{ij}\}}{\sum_{j=1}^{n} \exp\{\beta \,.\, u(s)_{ij}\}} = \frac{\exp\{\beta \,.\, [u(o)_{ij} + e_{ij}]\}}{\sum_{j=1}^{n} \exp\{\beta \,.\, [u(o)_{ij} + e_{ij}]\}}$$

in which ß is a parameter whose value maximizes the following maximum likelihood function L (Silk and Urban, 1978):

(11)
$$L = \prod_{i=1}^{N} \prod_{j=1}^{n} (Pr_{ij})^{\delta_{ij}}$$

δ_{ij}: value equals to 1 if the individual i has indeed purchased the brand j during the reference period; otherwise, the value is 0.

By replacing e_{ij} with e_{id} in the equation #10, we calculate $Pr(d)_{ij}$, or, put another way, the probability for the individual i to chose the product j, if the latter has a brand equity value equal to that of the store brand d. The market share MKS(d)j is then equal to the average of the $Pr(d)_{ij}$ weighted by the quantities bought q_i. We thus now have the two terms of the equation #09, in order to calculate the differential of the market share attributable to the brand j.

B)- EXPERIMENTAL DESIGN

We choose a repeated-measures experimental design: each subject evaluates two times the same product whose brand name is first hidden then revealed. Contrary to Park and Srinivasan (1994), who question two groups of individuals (one of consumers, the other of experts), we question just one single group sample. The two authors, in their experiment, believe that dentists, as experts, are not influenced by the brand and that they are able to evaluate objectively the qualities of toothpaste and mouthwash. One can criticize this assumption (Brucks, 1985) and maintain that the professional, too, is under the influence of the brand. In short, whichever population may be questioned, it seems difficult to isolate the specific influence of the brand without resorting to a repeated-measures experiment and manipulating brand as a successively hidden then revealed cue. We also emphasize that the methodological choice of the two authors forces them to calculate a difference between utilities at an aggregate level; the two measurements are dealing effectively with different populations. In sum, the experimental method that we are applying, beyond the fact that it guarantees a better control over the possible factors of distortion, has the merit of providing an individual measurement of brand equity.

4)- EMPIRICAL RESULTS

We can reasonably judge that the theoretical and methodological justification developed above assures us that our measurement procedure possesses a satisfactory internal validity; its trait validity and criterion validity do not require elaborate discussion. On the other hand, it is worth comparing the external validity of our method with that of Park and Srinivasan (1994), and this is precisely the subject of our experiment. We then illustrate the operational value of our procedure.

A)- THE EXPERIMENTAL METHOD

A sample group of 180 individuals is gathered for the purpose of tasting consumer products and evaluating durable goods. The recruitment criteria consider the usual sociodemographics. The experiment concerns 8 product categories: 4 durable goods (washing machine, personal computer, television, credit card) and 4 consumer goods (instant coffee, champagne, dark chocolate, and ice cream). We choose for each product 4 brands directly comparable in terms of their performance, function, and price. Their awareness, their share of voice, their numerical and weighted total distribution values confirm their broad distribution scope on the market. In addition, we include a store brand (Carrefour) among the ice cream products. For each product category, we identify beforehand a list of determinant attributes. We adopt the dual questionnaire method, known for its simplicity and reliability (Alpert, 1971). Since its implementation entails too many choice criteria (Alpert, 1980), we shorten the initial list by assuring that the attributes are independent of each other (Beckwith and Lehman, 1975). The final list thus contains 3 to 5 choice criteria per product category.

THE QUESTIONNAIRE

The questionnaire administered by computer has a structure close to that employed by Park and Srinivasan (1994).

The first section determines the partworth function of each individual questioned using a self-explicated approach (Green and Srinivasan, 1990) that consists of two steps: the importance ratings for all attributes is preceded by desirability ratings (1 to 10) for the different levels of each categorical attribute (the most and least preferred levels for each attribute anchor the poles of the evaluation scale). Desirability for the "continuous" attributes, such as price, is expressed with the help of a linear vector model (Green and Srinivasan, 1978). In order to measure the relative importance of each attribute, the respondent chooses first a critical attribute. Its determination proceeds from comparisons between pairs of different proposals (Srinivasan, 1988): for a given attribute, each proposal substitutes the lowest-judged level for the highest-rated level. The critical attribute, resulting from the proposal that is kept, is given the grade 10. The other attributes are then evaluated on a scale from 1 to 10 by utilizing the critical attribute as an anchor.

The second and third sections of the questionnaire correspond to the various stages of product evaluation, with the brand first being concealed and then revealed. These second

and third parts are broken into two steps: first, an attribute perception rating is given for all attributes on a 1 to 10 scale, with the exception of those with discrete levels and the price (given their objective nature), and then an overall perception rating is assigned which is based on the method known as "Dollar-metric procedure" (Pessemier et al., 1971). Following Park and Srinivasan (1994), we choose a simplified procedure owing to the excessive number of paired comparisons required by the complete method (48) (see Park and Srinivasan, 1994).

The reasons for an individual choosing a brand as the "most valued" is the subject of an open question left to the respondent. Finally, a concluding section gathers information on the respondent's most recently purchased brands (or those already owned), in order to calibrate our probabilistic model.

THE EXPERIMENTAL MATERIALS

The experimental materials vary according to the products and the experimental phase. For the food products and during the blind phase, the individuals taste the product and study the list of their ingredients. The durable goods are evaluated by presenting photographs of the products and by naming several of their principal characteristics. The brand is of course hidden from view during the "blind test" phases of the experiment.

B)- RESULTS

The method of calculating brand equity e_{ij}, as we have defined it, isolates an error term $\xi(o)_{ij}$. The estimate of its size and importance allows us to answer two fundamental questions, namely, does the additive multiattribute model permit one to predict with some certainty the brand that the consumer will choose, and second, is the predictive validity guaranteed for any product? If we demonstrate that the value of $\xi(o)_{ij}$ is not negligible with respect to the value of e_{ij}, we justify the validity of our revision to the formulas developed by Park and Srinivasan (1994).

THE OCCURRENCE OF ERROR

Appendix 1 summarizes the values of e_{ij} calculated according to equations #2 and 3. The difference between the results achieved by the two methods of calculation is equal to the error term $\xi(o)_{ij}$. The ratio Ω_{ij} below expresses this error term in proportion to the absolute value of e_{ij}:

(14)
$$\Omega_{ij} = \left| \frac{\xi(o)_{ij}}{e_{ij}} \right|$$

The examination of the values of $\xi(o)_{ij}$ shows that our proposed modifications to the Park and Srinivasan measurement are significant. The ratio is either positive or negative: according to the brands, the utility calculated with a multiattribute model either increases or diminishes the preferences declared by the subjects. The heightened value of variances

reveals that the error term strongly varies from one subject to the next. The share of the random error (particular to each subject) wins out over that of the systematic error (shared among the subjects). In fact, the measurement error would have a minimal impact if its value were identical for all brands within a product category, since the variable e_{ij}, whose sum on j is equal to 0, is only determined with an exact constant. This condition turns out not to be fulfilled: the quantity $\xi(o)_{ij}$ varies, for example, between –259.06 (Vedette) and 367.95 (Whirlpool) in the washing machine category. In conclusion, these preliminary results seem to justify the improved modifications we are proposing. The internal validity of our measurement seems better than that of Park and Srinivasan (1994), since it neutralizes a significant proportion of variance. It remains, however, to demonstrate the external validity—both convergent and predictive—of our revised method.

CONVERGENT VALIDITY

To ensure the convergent validity of our method, we correlate our measurement of brand equity to other indicators of the brand strength. For that we turn to two types of indicators, the market share (Aaker, 1991) and the distribution rates (Keller, 1993). Each of these is in turn measured by two variables: the market share in volume (MS vol.) and the market share in value (MS val.), and by the percentage of numerical total distribution (ND) and the percentage of weighted total distribution (WD). Indeed, the brands with a heightened equity occupy a privileged position: their market shares and their indices of distribution are generally superior to the average (Aaker, 1992; Kamakura et Russell, 1993). In order to compare the values of brand equity among the products, we render each independent variable (e_{ij}) as a percentage of the average price in its product category, we then express the independent and dependent variables in mean-centered form. The results of table 1 reveal that, across all products and whatever the method of measurement employed, the correlations between the value of brand equity and the other indicators of the brand effectiveness are not significant, excepting the positive relationship between our measurement of brand equity and the market share value ($\rho = 0{,}41$; $p < 0{,}05$). It is true that certain values of the independent variables are low (around 3% to 5%), in particular in the cases of instant coffee and champagne, whether because the market is especially “atomized” (instant coffee), or because the producers opt for a selective distribution policy (champagne).

Table 1

Correlated coefficients for the values of brand equity, market shares and indices of numerical total distribution and weighted total distribution [(a)]

	Park and Srinivasan (1994)				Revised Method			
	MS. Vol.	**MS Val.**	**ND**	**WD**	**MS. Vol.**	**MS Val.**	**ND**	**WD**
Product categories								
Consumer goods	.52 (n.s)	.34 (n.s)	-.02 (n.s)	-.02 (n.s)	.19 (n.s)	.06 (n.s)	.04 (n.s)	.04 (n.s)
Durable goods	.58 (n.s)	.65 (n.s)	.43 (n.s)	.33 (n.s)	**.67 (*)**	**.72 (**)**	**.62 (*)**	**.78 (**)**
Total products	.37 (n.s)	.31 (n.s)	.06 (n.s)	.08 (n.s)	.34 (n.s)	**.41 (*)**	.13 (n.s)	.28 (n.s)

Key : (a) The most revealing values are in bold face type and followed by an asterisk indicating the threshold of significance.

(*) $p < 0,05$.

(**) $p < 0,01$.

However, concerning the durable goods, our measurement of brand equity is positively correlated with each independent variable, while these same correlations do not reveal themselves significant in the model of Park and Srinivasan. An analysis of variance confirms that the classification as durable goods exerts a moderating effect on the correlation between the brand equity and the market share (in value only), and this is the case no matter what the method of measurement used ($F= 9.96$; $p= .013$). In sum, without wanting to generalize for all the products, we can conclude that our measurement of brand equity is slightly more strongly correlated to other indicators of the brand strength than is the case for Park and Srinivasan (1994). Its convergent validity is thus improved.

PREDICTIVE VALIDITY

In order to show that our construct of brand equity correctly reflects the current value of the brand on the market, we compare three data for the ice cream category (cf. table 2), namely the market share issued from the panel, the market share calculated according to the last brand purchased, and finally the market share obtained by the Logit model (cf. equation #10). We add to this the calculation of the market share premium accounted for by the brand (cf. equation #9).

Table 2

Comparison of values of market share (real, declared and calculated)

Ice cream brands	Real MS	Declared MS	Calculated MS $MKS(a)_j$	Benchmark MS $MKS(d)_j$	Market share differential explained by the brand ΔMKS_j	
(N=198 subjects)	**(1)**	**(2)**	**(3)**	**(4)**	**(4) - (3)**	As a % of **(3)**
Instants choisis (Miko)	13.20	11.96	15.72	14.04	1.68	10.68
Exquise (Gervais)	14.30	14.31	14.30	10.89	3.41	23.84
Côte d'Or (Motta)	20.10	25.67	18.17	12.87	5.30	29.17
Store brand (Carrefour)	22.50	16.07	20.07	—	—	
Other brands / No bands	29.90	31.99	31.72	—	—	
Total	**100.00**	**100.00**	**100.00**			

Key : (1) Source : Iri-Secodip retail panel data 1997.
(2) Based on the last brand purchased.
(3) Calculated by the Logit Model (equations 11 and 12).
(4) Benchmark market share of branded product that would have resulted if branded product had obtained the same equity as the store brand (Carrefour)

We noticed here that the calculated market share $MKS(a)_j$ is more strongly correlated to the panel market share ($r^2 = .95$, $p = .01$) than to the market share calculated according to the last brand purchased ($r^2 = .85$, $p = .07$). There is just one "anomaly" here, the Carrefour brand whose declared market share (16.07) is lower than the panel market share (22.50), which is itself close to the calculated market share (20.07). This is no doubt explained by the reluctance of the subjects to express overtly their preference for a store brand. We note also that the market share of the "other brands" is correctly registered by the model (31.72 versus 29.90 of the real market share), which reflects a good estimate of the value of the parameter α included in the Logit model. Lastly, we would like to emphasize that the market share of each brand is all the more inflated since the differential of the market share attributed to the brand is itself inflated. There exists in the ice cream market a significant relationship between the value of brand equity and the market share of the product ($r^2 = .82$); nonetheless, the number of brands is too insufficient to calculate a threshold of significance ($p = .40$). In conclusion, the predictive model, calibrated on our revised method, seems to offer good external validity. Its capacity for predicting the market share is, in this example, better than a calculation based on the brand purchased last.

Another means of verifying the predictive validity of our model is to compare for each subject and for the ice cream product two types of responses: the brand chosen at the time of the last purchase and that predicted by the model, hypothesizing that the brand chosen is that which obtains the highest choice probability (Pr_{ij}). The Logit model correctly predicts the brand bought for 125 of 198 subjects (63.1% of the sample). This percentage is significantly higher ($z = 8.01$, $p = .00$) than that obtained by a purely random drawing (23.2%). This score is comparable to that which Park calculates (1992) for toothpaste (69%) but it is 10 points higher than that produced by Park for mouthwash (53%). We should emphasize finally that this adjustment index is in reality probably diminished by the

undervaluation of the choices that fall to the Carrefour brand. The accuracy of our model is thus satisfactory, a fact which is confirmed by the more formal calculation of entropy indexes (Hauser, 1978). Let Z stand for the total uncertainty or the prior entropy index of the system (Z = .66), and let EI stand for the expected information or the reduction of the entropy by the model (EI = .57). Hauser (1978) defines an index G of the model's usefulness as the share of total uncertainty removed or "explained" by the model ($\frac{EI}{Z}$). In this example, G is equal to .86, which signifies that the model explains 86% of the a priori uncertainty of the choice.

MEASUREMENT OF BRAND EQUITY AND MARKET SEGMENTATION

There remains to examine the interest of such a model in practice. To do this, we will discuss the results of a benefit segmentation (Green et al., 1985) to illustrate the interest of an individual brand equity measurement.

Table 3 presents the results of a typological analysis carried out on the normalized rating of importance accorded to each choice criterion in the field of ice cream. We retain an optimal solution according to four distinct segments, which corroborates the results of discriminate analysis (Wilk's Lambda = .09; p = .00). Each segment can be characterized by specific consumers expectations. Segment I stresses the absence of artificial coloring, while segment II privileges the attribution of true taste to original ingredients. Segments III and IV look for a product with no artificial coloring, but the first cites the creaminess of the product while the second insists even more on the true taste of the authentic ingredients.

Table 4

Results of a benefit segmentation: importance ratings of choice criteria and brand equity values (in monetary units) for each benefit segment in the ice cream market.

N = 198 subjects	Benefit Segments [1]							
	I		II		III		IV	
Benefit Segments Size (%)	**40,4**		**20,7**		**16,2**		**22,7**	
Expected Benefits:	**Avg.**	**σ**	**Avg**	**σ**	**Avg**	**σ**	**Avg**	**σ**
A price of 15 FF instead of 20 FF	-1.18	1.17	.20	1.43	.66	1.24	.57	1.21
The absence of artificial colouring	1.48	1.19	-1.31	1.59	1.59	1.49	1.99	1.06
L'aspect 100% naturel des ingrédients	.89	1.26	-.37	1.60	-.32	1.63	.99	1.11
The true taste of authentic ingredients	.23	1.12	2.19	1.34	-.85	1.63	1.26	1.04
The creaminess of the ice cream	-.16	1.07	-.12	1.12	1.52	1.44	-.63	1.37
The absence of residual water cristals	-1.26	1.05	-.59	1.53	-2.60	1.16	-4.18	1.19
Brand Equity (in monetary units):	**Avg.**	**σ**	**Avg**	**σ**	**Avg**	**σ**	**Avg**	**σ**
Instants Choisis (Miko)	.31	5.15	.07	5.12	1.31	4.99	-.01	4.66
Exquise (Gervais)	1.21	4.90	.82	5.30	.56	5.10	.02	4.46
Carte d'Or (Motta)	.94	4.98	2.51	5.41	1.61	4.80	2.43	4.75
Store brand (Carrefour)	-2.45	5.32	-3.40	5.75	-3.48	5.19	-2.44	4.81

Key : (1) The most revealing differences are underlined.

We notice that brand equity of the 4 brands evaluated differ considerably from segment to segment. Motta, whose market share is the highest (cf. Table 2) is also the brand the most appreciated by 3 of the 4 segments (nearly 60% of the sample). Only the brand Miko presents comparable brand equity, but this only for segment III. Gervais, for its part, is the brand with the strongest equity for segment I. The store brand Carrefour is little appreciated for all of the segments.

The results are remarkable; the measurement of the equity of the four brands is consistent with the perception of each product's brand image. Thus, the difference in the each product's perception ratings between the two phases of study (the brand name being first hidden and then revealed) shows that Motta has the best perception rating for each criterion. It is therefore not surprising that this brand currently enjoys the highest brand equity across a great number of segments. Another example: Miko, perceived as creamy (diff. =.34, p = .01), impressed more segment III than segment I. Even though these two groups both sought a product without artificial coloring, the consumers of segment III distinguish themselves by the importance that they place on the creaminess of the product. In conclusion, there seems to be a connection between the market share of a brand, its brand

equity value, and the perception of its image. This relationship observed at the aggregate level is also true at the level of each market segment.

5)- CONCLUSION

The contribution of our research consists in the improved reliability and improved in validity of the measurement of brand equity in relation to that proposed by Park and Srinivasan (1994). Our approach offers two refinements. We demonstrate that Park and Srinivasan's calculation of differences of utilities includes an error term that is inherent to their method. Our experimental results attest that the value of the error term is hardly insignificant, thus underscoring the better internal validity of our method of measurement. In addition, we gather our data from a single sample, which has two advantages: a better control of the distortion factors (errors which are necessarily introduced by the use of two different samples), and the possibility to calculate an *individual* measurement (non-aggregate) of brand equity. Certainly, the application of an experimental method that uses repeated measurements is not exempt from criticism (e.g. fatigue, boredom or an heightened sensitivity of the subjects). At least the use of computers for gathering the subjects' data diminishes the risk of change in the interviewing procedures.

Two verifications illustrate the fairly better convergent validity and predictive validity of our measurement. First, our construct of brand equity is slightly more strongly correlated to other indicators of the brand strength, such as the market share, the numerical total distribution or the weighted total distribution. In addition, the predictive model developed according to our method permits a good estimation of the choice shares; its goodness of fit to the data verified according to Hauser's indicators, is satisfactory. It is true that our choice model relies on the consideration of only the last purchase; for this reason it would be useful to repeat our measurements based on a history of purchases over a period of time (using, for example, consumer panel data). While this type of experimental procedure would be complex to execute and the results obtained would not be guaranteed (Bucklin and Srinivasan, 1991), it would nonetheless present undeniable advantages, especially within the context of the research presented above, and would no doubt inspire further research in this direction.

Appendix 1

Value of brand equity e_{ij} and demonstration of the error term $\xi(O)_{ij}$

Brands	Park and Srinivasan (1994)	Revised Method	Difference between the two methods		
	e_{ij} $=[u(s)_{ij}-v(o)_{ij}]$ **(I)** Avg.	e_{ij} $=[u(s)_{ij}-u(o)_{ij}]$ **(II)** Avg.	$\xi(o)_{ij}$ $=[u(o)_{ij}-v(o)_{ij}]$ **(III)** Avg.	σ	Ω_{ij} [(a)] **(V)**[(a)] Avg.
Dark chocolate bars					
Noir de Noir (Côte d'Or)	.50	.06	.44	4.77	1.16
Excellence (Lindt)	.05	.16	- .12	4.93	1.03
Grands Chocolats (Nestlé)	- .12	- .01	- .11	5.33	.98
1848 (Poulain)	- .43	- .21	- .22	4.03	.97
Brut Champagne					
Alfred de Rothschild	1.14	- .63	1.78	16.01	2.11
Veuve Clicquot Ponsardin	4.38	5.51	- 1.13	15.88	2.11
Lanson	- 7.10	- 6.38	- 0.72	16.58	1.05
Taittinger	1.57	1.50	.07	15.75	1.58
Instant Coffee					
Carte Noire	- 1.19	.35	- 1.54	4.90	.89
Maxwell Qualité Filtre	5.11	.00	5.11	6.62	.99
Alta Rica (Nescafé)	- 2.40	- .15	- 2.25	4.35	.98
Nectar (Jacques Vabre)	- 1.51	- .20	- 1.31	4.73	.99
Ice cream					
Instants Choisis (Miko)	.39	.34	.05	4.58	.96
Exquise (Gervais)	.79	.69	.10	4.20	.99
Carte d'Or (Motta)	1.14	1.63	- .49	4.26	.83
Carrefour	- 2.31	- 2.66	.35	3.37	.92
Credit card					
American Express	53.52	25.28	28.24	110.47	2.60
Diner's Club	- 81.64	- 76.22	- 5.41	120.11	2.39
Eurocard / Mastercard	- 4.57	1.89	- 6.45	124.16	2.49
Visa International	32.69	49.06	- 16.37	113.71	3.05
Personal Computer					
Compaq Presario	235.33	- 150.16	385.49	889.24	1.78
Hewlett Packard Pavilion	- 582.96	352.70	- 935.66	1226.61	3.13
IBM Aptiva	691.67	164.94	526.73	1066.00	2.21
Packard Bell	- 344.04	- 367.48	23.44	1028.54	2.40
Washing machine					
Arthur Martin	- 74.69	.20	- 74.89	355.53	1.76
Brandt	- 56.33	- 22.33	- 34.00	298.62	2.46
Vedette	394.28	26.33	367.95	260.07	1.15
Whirpool	- 263.26	- 4.20	- 259.06	396.69	3.09
Television					
Philips	- 55.19	70.14	- 125.33	479.73	2.89
Radiola	- 90.57	- 178.63	88.06	404.50	2.99
Sony	216.59	134.99	81.60	408.42	3.43
Thomson	- 70.83	- 26.50	- 44.33	380.57	3.49

Key : (a) Calculation based on equation (14) taking the brand equity of the first column as reference.

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