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Technology Strategy and Competitiveness in Developing Nations: Exploratory Evidence from Nigerian Telecommunication Market

*Aminu Ahmad
Hartini Ahmad
Seember Nyager*

Crude Palm Oil Futures Automation and the Transmission of Information between Futures and its Underlying Spot Market

Noryati Ahmad

Segmenting the Fine Dining Restaurant Market via Consumers' Purchasing Orientation

*Salim Abdul Talib
Rahmat Hashim
Mukesh Kumar
Karuthan Chinna*

A Cross Cultural Examination of Brand Equity and its Constructs: A SEM Approach using Second Order Factor Analysis

Bilal Mustafa Khan

The Impact of Intranet on Managers and Their Work: An Empirical Study in the Malaysian Port Industry

*Norzaidi Mohd Daud
Chong Siong Choy
Intan Salwani Mohamed
Murali Raman*

Measuring Market Orientation in Higher Education: Student's Perspective with Cross-national Validation

*Boo Ho Voon
Nagarajah Lee
Firdaus Abdullah
Teay Shawyun*

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Bilal Mustafa Khan

ABSTRACT

The objective of this empirical study is to validate a multi dimensional consumer based brand equity model by employing structural equation modelling on a cross-cultural data set. Brand equity is conceptualised as a multidimensional construct of higher-level abstraction relative to its various dimensions consisting of brand awareness, perceived quality, brand associations and brand loyalty. In majority of the past researches, brand equity has been treated exclusively as a first-order factor. This can lead to serious problems in scale development and model specification. This paper employs a second order structured equation modelling (SEM) to build a relationship on the data collected, and the study concludes that all four dimensions of brand equity are positively correlated and significantly load on to a single factor which we term as brand equity.

Keywords: *Cross-Cultural, Brand Equity, Structured Equation Modelling, Second-Order Factor analysis.*

Introduction

Brand equity is one of the most popular and potentially important marketing concepts which have been extensively discussed both in academics and corporate world over the past decade. A significant reason for its new found popularity is mainly due to its strategic role and importance in gaining competitive advantage and in strategic management decisions. A quest to define and map the relationship between customers and brands produced the term “brand equity” in the branding echelons and academic literature. Brand equity, when precisely and dispassionately measured, is the apt metric for evaluating the long-run impact of marketing decisions (Simon and Sullivan, 1993). Brand equity as a set of assets and liabilities linked to a brand. These include the name and symbols that add to or subtract from the value provided by product or services to a firm and/or to that firms’ customer (Aaker, 2001).

Aaker (2001) argues that brand equity sources are brand loyalty, name, awareness, perceived quality, brand associations, and other proprietary assets. Srinivasan et al. (2001) clarify a measurement of brand equity by four sources; brand awareness, attribute perception biases, non-attribute preferences and brand availability. Brand equity can be measured from both consumer and financial perspectives. When brand equity is measured by using financial data, it is defined as financial based brand equity or better the value of the brand. In contrast, when studies are performed at the individual consumer level through consumer surveys, consumer based brand equity is discussed (Pappu et al. 2005; Yoo and Donthu 2001).

Positive customer based brand equity, results in greater revenue, lower costs, and higher profits; and it has direct implications for the firm's ability to command higher prices, customers' willingness to seek out new distribution channels, the effectiveness of marketing communications, and the success of brand extensions and licensing opportunities (Keller, 2003).

Although several authors have elaborated on the definition and content of brand equity, the numbers of studies which empirically test its proposed constructs are limited. One particular study by Yoo et al. (2000) attempts to empirically test and operationalize one of the well-known theoretical brand equity models developed by Aaker (1991). They developed a multidimensional, customer-based brand equity scale using Aaker's (1991) four theoretically defined dimensions. In an attempt to generalize the measurement of the brand equity model devised by Yoo et al. (2000), by re-testing the most popularly adopted brand equity dimensions, a study was conducted to determine concurrence of results in the case of a different product, country, sample profile and methodology.

A consumer-based brand equity scale is advantageous in several ways. First, it offers a means to test brand equity theories. Aaker (1991) opines that brand equity provides value to customers by enhancing their comprehension of information, confidence in the purchase decision, and satisfaction. Brand equity also provides value to the firm by enhancing good organization and effectiveness of marketing programs, prices and profits, brand extensions, trade leverage, and competitive advantage. In the same way, Keller (1993) proposes that enhancing brand equity results in the ability to command larger margins from consumers, elicits increased consumer information search, and enhances marketing communication effectiveness, opens up licensing avenues, and consumers' receptiveness to brand extensions. A brand equity measure would allow examination of the role of brand equity in Aaker's (1991) and Keller's (1993) models. Expressly, it may be used to determine the brand equity of existing brands, then to observe the relationship of brand equity to the resulting firm and consumer benefits.

Table 1: Dimensions and Determinants of Brand Equity

| Author | Description/ Dimensions |
|--|---|
| Farquhar (1989) | The added value with which a brand endows a product is Brand Equity. |
| Aaker (1991) | Brand Equity is a set of brand assets and liabilities linked to a brand, its name and symbol that add or subtract from the value provided to a firm and/or to that firm's customers. |
| Keller (1993); Simon and Sullivan (1993); Mahajan & Srivastava (1994). | Five dimensions of brand equity as brand loyalty, name awareness, perceived quality, brand associations, and other proprietary brands assets (ex. distribution system). |
| Feldwick (1996a) | Depending on the context brand equity can assume three different meanings |
| Kotler et al. (1996) | Brand Equity is the value of a brand, based on the extent to which it has high brand loyalty, name awareness, perceived quality, strong brand associations, and other assets such as patents, trademarks, and channel relationships |
| Aaker (1996) | An upgraded model based on his previous work on Brand equity and proposed a ten dimensional brand equity model. |
| Baldinger and Rubinson (1997) | Customer attitudes can be measured with some level of validity and that brands (large or small) do show a decrease of strength when observed over a long period of time |
| Cook (1997) | Due to long-term product and company lifecycles there is no substantial impact of advertising on brand equity |
| Farr and Hollis (1997) | Advertising campaigns add to the development of brand equity over a period of time |
| Chen (2001) | Model where he tried to identify the types of association and the relationship between brand equity and brand associations |
| Park and Srinivasan (1994) | The method calls for gathering consumer's attitudes and opinions in order to come down to various factors contributing to the brand equity. |
| Agarwal and Rao (1996) | Developed a 11 point scale to measure consumer based brand equity |

Continued

Table 1: Cont'd

| Author | Description/ Dimensions |
|------------------------|--|
| Yoo and Donthu (2001) | Developed a multidimensional consumer based brand equity scale which was based on the work of Aaker |
| Pappu, et al., (2005) | Brand Equity is the attachment that a customer has to a brand |
| Zeithaml (1988) | Perceived quality is defined as consumer's subjective evaluation of overall excellence of a product. |
| Netemeyer et.al.(2004) | Developed scales to empirically validate Brand equity model. |

Secondly, the measure would be more useful for testing consumer-based brand equity theories than other previous measures have been. A consumer-based brand equity study needs a measure that assesses an individual customer's brand equity. However, some of the previous measures are intended to measure brand equity of collective products at the industry or firm level (e.g., Simon and Sullivan, 1993; Mahajan & Srivastava, 1994). Others measure an individual customer's brand equity (e.g., Rangaswamy et al., 1993; Swait et al., 1993; Park and Srinivasan, 1994; Cobb-Walgren et al., 1995), but the psychometric properties have not been reported or fully analyzed. Therefore, prior measures may not be suitable to studies that examine consumer-based brand equity phenomena.

Many scale and instrument development relied exclusively on an emic approach, in which a scale is first developed in one culture, then validated or simulated in other cultures (Netemeyer et al., 2004; Durvasula et al., 1993). In this study the data has been collected in India and UAE from a variety of nationalities.

The term 'Brand Equity' came to light in 1980s and was defined as "The added value with which a brand endows a product." (Farquhar, 1989). This Definition looks rather simple at first glance but it formed the basis for all the future studies. Aaker (1991) gave one of the most comprehensive definitions of Brand Equity as "A set of brand assets and liabilities linked to a brand, its name and symbol that add or subtract from the value provided to a firm and/or to that firm's customers."

The model incorporates five dimensions of brand equity as brand loyalty, name awareness, perceived quality, brand associations, and other proprietary brands assets (ex. distribution system). The performance of the brand on these dimensions determines the brand equity. The definitions of brand equity given by Farquhar and Aaker were subsequently validated by the definitions of Keller (1993); Simon and Sullivan (1993); Mahajan et al. (1994).

In 1996, some scholars criticized the above mentioned definitions on the ground of being too simplistic. Feldwick (1996a) argued that depending on the context brand equity can assume three different meanings. At a given time brand equity can be used to refer to brand description, brand strength, and brand value. Thus Brand equity is a fuzzy concept and lacks measurability and application in the business environment.

Supporting the conclusions of Farquhar and Aaker, Kotler et al. (1996) defined brand equity as “The value of a brand, based on the extent to which it has high brand loyalty, name awareness, perceived quality, strong brand associations, and other assets such as patents, trademarks, and channel relationships.” The concept got further strength from the works of Agarwal et al. (1996), who tried to validate the various measures of brand equity. Aaker (1996) came up with an upgraded model based on his previous work on Brand equity and proposed a ten dimensional brand equity model.

The lack of tangibility and clear definition for brand equity as pointed out by Feldwick (1996b) was further supported by Ehrenberg (1997a). He was of the view that high brand equity is the result of large sales and advertising budget, since consumers in his opinion more often than not preferred the larger brand names. However, his assertion was contradicted by Baldinger and Rubinson (1997), who conducted a research which showed that customer attitudes can be measured with some level of validity and that brands (large or small) do show a decrease of strength when observed over a long period of time.

According to Ehrenberg (1997b) who debated against brand equity, it is very difficult to maintain differentiation based on brand and that too in case of competitive brands because in his views a unique brand as well as a successful advertising can and is imitated by the competition. Thus, it becomes very difficult for a brand to maintain sustainable differentiation over a period of time. As per Cook (1997) due to long-term product and company lifecycles there is no substantial impact of advertising on brand equity. Advertising campaigns add to the development of brand equity over a period of time (Farr and Hollis, 1997). The attitude consumer’s form regarding a brand leads to the image the brand takes in their mind. The brand attitude contributes to the brand image and would lead to brand equity. Faircloth, Capella and Alford (2001) developed a stage model supporting the argument. It was Chen (2001) who tried to develop a model where he tried to identify the types of association and the relationship between brand equity and brand associations. He classified the brand association into product association and organizational association. He tried to basically study the impact of brand association on brand equity.

Consumer Based Brand Equity

The chief proponent of Consumer based brand equity is Keller (1993). He defines customer-based brand equity as the degree of difference between the effect of

brand knowledge on consumer response to the marketing of a brand. Keller proposed an indirect approach to measure the level of brand awareness using techniques such as aided and unaided memory measures. Next using branded and unbranded products he tried to determine the effect of brand knowledge on consumer response, thereby leading to a measurement tool.

Park and Srinivasan (1994) developed a survey-based method of measurement. This method calls for gathering consumer's attitudes and opinions in order to come down to various factors contributing to the brand equity. Lassar et al. (1995) developed a 17 point scale which tries to measure brand equity across performance, value, social image, trustworthiness, and commitment. Agarwal and Rao (1996) came up with an 11 point scale to measure consumer based brand equity. These measures of brand equity are as shown in the Figure 4.

Finally, Yoo and Donthu (2001) developed a multidimensional consumer based brand equity scale which was based on the work of Aaker. The scale measures brand equity across brand awareness, brand associations, brand perceived quality and brand loyalty. The scale developed by Yoo and Donthu (2001) was validated by Washburn and Plank (2002) and supported there scale to be a major step towards development of a reliable scale to measure Brand Equity.

A Conceptual Framework for Measuring Consumer Based Brand Equity

In the previous section we reflected upon the various models that have been developed to measure the brand equity. Different authors have defined and developed models to measure the consumer based brand equity. In the current study we have chosen the model given by Aaker (1991) that takes into consideration the consumer based dimension of Brand Equity construct.

As evident in the above figure the consumer based brand equity consists of four dimensions. Next we try to review these dimensions and thereby develop research questions which have been separately answered in the subsequent sections.

Brand Loyalty: Brand loyalty is defined by Aaker (1991) as "the affection that a customer has towards a brand. Aaker (1996) argues that brand loyalty is the core of brand equity as it provides barrier to entry, a basis for price premium, gives time to respond to competitor action, as well as safeguard against price competition.

Research Q1: Whether Brand loyalty has a positive influence on brand equity?

Perceived Quality: Perceived quality is defined as consumer's subjective evaluation of overall excellence of a product (Zeithaml, 1988). Aaker (1996) suggest that perceived quality is one of key dimensions to measure brand equity. A report by Total Research (quoted in Aaker, 1996) Suggests that it is related with price premiums, price elasticity, brand usage and stock return.

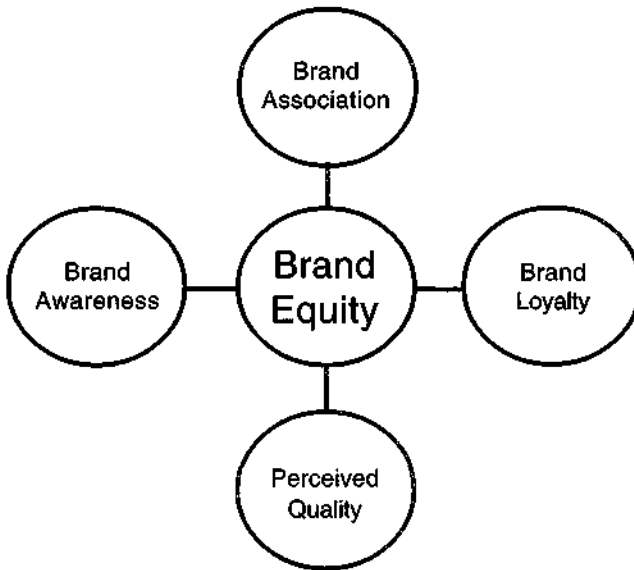


Figure 1 : Modified Aaker's Model

Source: (Aaker, David A. (1991). *Managing Brand Equity*, New York: The Free Press)

Research Q2. Whether Perceived quality has a significant influence on brand equity?

Brand Awareness: Brand awareness deals with the strength of a brand's presence in consumer's mind. Aaker (1991) defines brand awareness as "the ability of potential buyers to identify and recall that a brand is a member of a certain product category." Keller (2003) proposes that brand awareness consists of brand recognition and recall. Whereas brand recognition is defined as the ability of consumers to correctly identify that he/she has heard of the brand before, brand recall deals with consumer's ability to retrieve the brand from memory when given certain cues related to product category, needs, and purchase or usage situation (Keller, 2003)

Research Q3. Whether Brand awareness has a significant influence on brand equity?

Brand Associations: Aaker defines brand associations as "anything linked in memory to a brand (Aaker, 1991). Brand associations are understood to contain the meaning of the brand for consumers (Keller, 1993). Strong and positive brand associations contribute toward brand equity. Aaker (1991) opines that brand association creates value for customers as well as marketers because

brand associations help consumer decipher information quickly, differentiate an offering, provide reason to buy and a basis for extension.

Research Q4. Whether Brand association has a significant direct effect on brand equity?

Research Q5. Whether Brand equity can be conceptualised as a multidimensional construct of higher-level abstraction relative to its various dimensions?

Second Order Factor Approach: A Perspective

EFA seeks to uncover the underlying structure of a relatively large set of variables. A researcher's prior assumption is that any indicator or item may be associated with any factor. When there is no past theory factor loadings are used to decide the factor structure of the data (Hair et al., 2003). In contrast, structural equation modelling (SEM) seeks to determine whether the number of factors and the loadings of measured (i.e. indicators/item) variables on them match to what is likely on the basis of pre-established theory. A researcher's a priori assumption is that each factor (the number and labels of which may be specified a priori) is associated with a specified subset of indicator variables (Kim and Mueller, 1994). The type of SEM done by Millan and Esteban (2004) are called first-order factor models. In this type of SEM model, the researcher specifies just one level of factors (the first order) that are correlated. But this approach presumes that the factors, although correlated, are separate constructs. What if, supposing that the researcher had a construct such as Brand Equity with several facets or dimensions? It would be essential to see if the dimensions are correlated, and more than that, what is actually needed is a means of signifying the structural relationships between the dimensions and the constructs.

This is consummated through the specification of a second-order factor model which posits that the first-order factors estimated are in reality sub-dimensions of a broader and more encompassing second-order factor (Hair et al., 2003) which, in this case, is Brand equity. This second-order factor is entirely latent and unobservable. There are two exclusive characteristics of the second-order model: first, the second-order factor becomes the exogenous construct, whereas the first-order factors are endogenous; second, there are no indicators of the second-order factor.

Need for a Second Order Factor to evaluate Brand Equity

More importantly, brand equity in the contemporary literature has been exclusively treated as a first-order factor. Treating brand equity as such ignores the fact that it is a construct of higher-level abstraction in relation to its various dimensions. We feel it is highly imperative to differentiate overall brand equity from specific factors of brand. Brand equity is a multidimensional construct and therefore

each of these dimension have specific content domain and can behave independently and failing to treat this distinction may lead to serious problems in measurement development and model specification. Edwards and Bagozzi (2000) opine that for measuring a general construct ξ (in our case Brand Equity) with scale items (y_j) that indicate specific facets η_j distorts the relationship between the general construct (ξ) and those measures (y_j).

When the measures are reflective indicators of various facets that are determined by the general construct, the following measurement model should follow.

$$y_i = \Lambda_{ij} (\Gamma_j \xi + \zeta_j) + \varepsilon_i \quad (\text{Eq. 1})$$

in which y_i are indicators of brand equity constructs η_j (i.e. $y_i = \Lambda_{ij} \eta_j + \varepsilon_i$) and η_j are determined by the general construct ξ (i.e. $\eta_j = \Gamma_j \xi + \zeta_j$) where Λ_{ij} indicates the effect of η_j on y_i and Λ_{ij} captures the effect of ξ on η_j . However, when the general construct is directly measured with items that tap into specific facets of the construct, this relationship is mistakenly specified as a direct reflective model such that

$$x_i = \Lambda_i \xi + \delta_i \quad (\text{Eq. 2})$$

where the indicator y_i as determined by an endogenous variable in the path diagram (Fig 2) was specified as x_i , indicator of the exogenous variable and Λ_i becomes the direct link between the general construct ξ and the facet indicator (x_i).

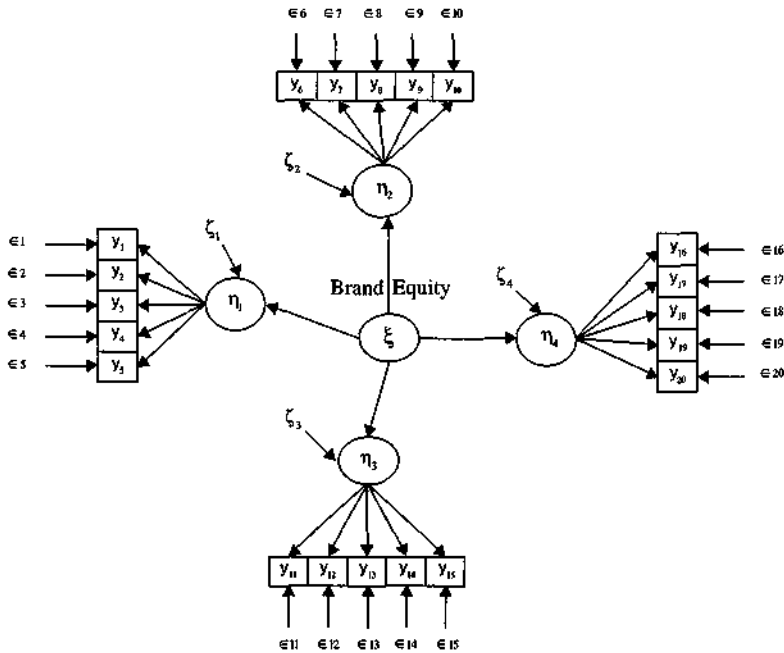


Figure 2: Modelling Brand Equity: Second-Order Factor Approach

To avoid specification problems, Gerbing and Anderson (1988) recommended shifting the level of analysis to reflect different levels of abstraction in model specification by embedding the one-dimensional scale (measures of each dimension) within a high-order factor structure. Using the same line of reasoning, it is argued that brand equity is a multifaceted construct should be modelled as a second-order factor to reflect the true relationship.

Second-order factors are generally viewed as latent variables of higher abstraction that can explain co-variations observed among a construct's various dimensions. Such a view of second-order factor implies a causal flow from the general construct to first-level factors. Jarvis *et al.* (2003) convincingly demonstrated that actual model specification for a particular construct depends on the nature of the relationship between the construct (a second-order factor) and its dimensions and the relationship between specific dimensions (first-order factors) and their respective measures. Given the various possibilities of specification, the nature of the relationship between the second-order factor (e.g. brand equity) and first-order factors (dimensions of brand equity) as well as their measures must be thoroughly examined in order to model the relationship correctly.

Formative measures differ from reflective measures in that the former do not represent reflections or manifestations of a construct, but are essential components of the construct of interest. Thus, Diamantopoulos and Winklhofer (2001) argued that, in scale development content, specification and indicator selection are extremely important for constructs involving formative indicators. Because 'omitting an indicator is omitting a part of the construct' (Bollen & Lennox 1991), the measures may fail to provide a complete picture of the construct if indicator specification leaves out some formative measures. Bollen and Lennox (1991) suggested that, with formative measures, we need a census of indicators, not a sample. Apparently, to investigate the relationship between overall brand equity and its dimensions we first need a thoroughly developed scale of brand equity that contains as many essential measures as possible.

In the present research we attempt to develop a multidimensional brand equity scale and provide an alternative measurement model of brand equity. Therefore the main objective of this research is to extend previous research through accomplishing the following objectives:

1. Develop and test a multidimensional scale of brand equity using data from different nationalities.
2. Formulate an alternative measurement model in which brand equity is specified as a construct of higher abstraction, a second-order factor
3. Empirically test the alternative measurement model and assess the very nature of the relationship of overall brand equity to its various dimensions.

It has long been recognised that brand equity is a multidimensional construct and each dimension may vary independently (Mayer *et al.* 1995; Singh &

Sirdeshmukh 2000). The theory on unidimensionality requires that the set of measurement items contained in a scale must all measure just one thing in common. An important implication of unidimensionality theory is that if various facets of a construct mean different dimensions, then ‘each dimension should be treated separately with its own set of effect indicators’ (Bollen & Lennox, 1991). Accordingly, in our measurement model, facet measures are specified as reflective measures of facet constructs. Because each dimension deals with a single aspect of the multifaceted construct, the general construct cannot be adequately represented unless all the essential dimensions are included in the measures of a multidimensional scale. Since Brand Equity may arise from different dimensions of a brand and based on our hypothesis the following model is proposed for the study where the previously defined four factors collectively load on a single factor called “Brand Equity”.

Figure 2 shows the path diagram for the second-order factor model. This model consists of a structural equation and a measurement equation and the dimensions of parameters are denoted in parentheses:

Symbolically the structural equation links the four brand equity factors η to the latent factor “Brand Equity” ξ .

$$\text{Structural Equation: } \underset{(4 \times 1)}{\eta} = \underset{(4 \times 1)}{\Gamma} \underset{(1 \times 1)}{\xi} + \underset{(4 \times 1)}{\zeta} \quad (\text{Eq. 3})$$

$$\text{Measurement Equation: } \underset{(20 \times 1)}{y} = \underset{(20 \times 4)}{\Lambda_y} \underset{(4 \times 1)}{\eta} + \underset{(20 \times 1)}{\varepsilon} \quad (\text{Eq. 4})$$

The measurement equation links the observed indicators y to their respective hypothesized brand equity factors η . First order factor loadings are given by Λ_y , while second-order factor loadings are given by Γ . First-order factor loadings represent the structural coefficients (λ_y) linking the brand equity factors (η_i) to their respective hypothesized measurement indicators (y_i). Second-order factor loadings represent the structural coefficients (γ_i) linking the brand equity factors (η_i) to the overall “Brand Equity” factor ξ . The vectors ζ and ε represent the error variables in each equation.

Research Methodology

The process that produced the scale in this study involves a sequence of steps consistent with conventional guidelines for scale development (Churchill, 1979; Anderson and Gerbing, 1988).

Item Generation and Purification

After a thorough review of the literature and on the basis of the previously established definitions a pool of 45 items were generated. These items were taken from empirically tested scales from authors such as Yoo et al. (2000), Yoo and Donthu (2001, 2002), Washburn and Plank (2002), Netemeyer et al. (2004), Pappu et al. (2005) and Buil et. al. (2008). Content validity was established by evaluating the items for conformity to the theoretical definitions and for redundancy. After screening of items independently a total of 25 items were retained for psychometric assessment.

Principal components analysis with varimax rotation was performed to identify the factors of brand equity. Factor analysis is intended to classify a set of variables in terms of a smaller number of theoretical variables or to explore underlying dimensions (Kim and Mueller, 1978).

In the next step, internal consistency analysis was used for achieving reliability in the scale based on exploratory factor analysis. Cronbach's α , a traditional technique for assessing reliabilities for each factor (Carmines and Zeller, 1979) was used. For internal consistency, it was determined that reliabilities should not be below 0.6 (Churchill, 1979). After the testing of instrument the researchers were left with 20 items distributed equally along the four dimensions of brand equity.

Data Collection

For the purpose of this study a sample of 1186 respondents were chosen. The sample consisted of undergraduate as well as post graduate students of different nationalities in India and UAE . Some researchers have argued that the use of student subjects in measurement/scale development research threatens the external validity and generalizability of findings due to the non-representativeness and distinctive characteristics of the population (e.g., Burnett and Dunne, 1986; Wells, 1993).

However, the use of students as respondents in academic research is acceptable and even desirable in many cases mostly when they constitute the major consumer segment for the selected product (Yoo et al., 2000). More importantly, students are deemed acceptable for theory testing research in which the multivariate relationships among constructs, not the univariate differences (i.e., mean score comparisons) between samples, are being investigated (Calder et al., 1981). Furthermore, in a cross-cultural study, well-matched (i.e., maximally homogeneous within and between cultures) samples are more useful than representative samples because they allow more exact theoretical predictions and reduce the confounding effects of other factors (Hofstede, 1991). Thus, a structured questionnaire was developed to collect data pertaining to the various facets of brand equity. In total 791 questionnaires were deemed to be useable for

the final data analysis, which is well above the critical sample size of 200 for developing structural equation models (Hair et al., 2003).

The respondent students provided evaluations on 20 attributes across the entire spectrum of ways in which they might interact with and evaluate the brand. On the survey instrument, respondents were asked to rate *Pepsi-Cola* on a seven-point scale of agreement-disagreement, rather than the five-point response scale employed by Yoo et al. (2000). The reason for using an interval scale is that it permits the researchers to use a variety of statistical techniques which can be applied to nominal and ordinal scale data in addition to the arithmetic mean, standard deviation, product-moment correlations, and other statistics commonly used in marketing research (Malhotra, 2004).

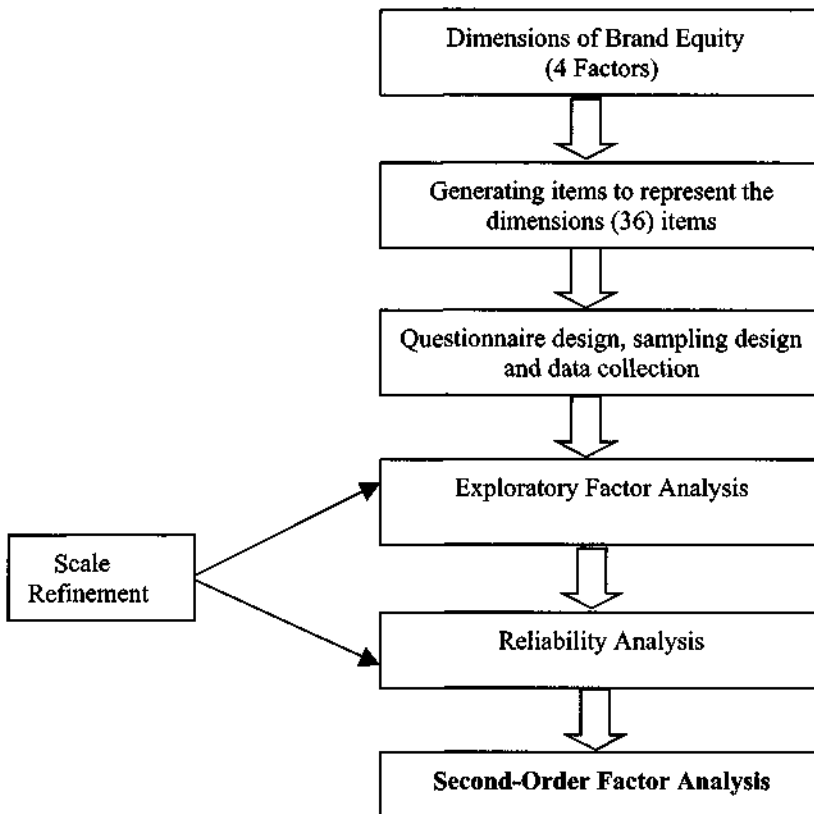


Figure 3: A Snapshot View of the Entire Research Process

Data Analysis

The design of the study assured independent and random responses. However, the 20 variables (items) were tested according to their distributional characteristics. Exploratory data analysis was performed to weed out outliers and was examined in particular for normality and kurtosis. None of the variable was found to have significant departure from normality or pronounced kurtosis, and therefore all 20 variables were found suitable for use.

The scale was refined initially through an iterative process of EFA and reliability analysis. A total of 4 factors emerged after the refinement round. EFA was done by using SPSS Statistics 17.0. The principal component analysis was employed for extraction and Varimax method with Kaiser normalization was used for rotation. The rotation converged in 21 iterations. The Bartlett's test of sphericity was significant and the Kaiser Meyer Olkin (KMO) measure of sample adequacy was found to be 0.923. Researchers argue that for this measure, a value greater than 0.5 is desirable (Malhotra, 2004). Therefore it is concluded that factor analysis can be employed on the data for analyzing the correlation matrix.

Reliability analysis was done again using SPSS and all the items had a reliability (Chronbach's α) greater than 0.6. While conducting an exploratory factor analysis (Table 3), factors with Chronbach's α greater than 0.6 are considered to have good internal consistency (Hair et al., 2003; Malhotra, 2004). The reliability values are given in Table 2.

Table 2: Reliability Coefficients

| F1 Brand Awareness | | Reliability Cronbachs (α) |
|------------------------------|--|--|
| (AWR1) | I can easily identify Brand X among other Brands | 0.823 0.871 |
| (AWR2) | I know what X looks like | |
| (AWR3) | I have heard of Brand X before? | 0.803 |
| (AWR4) | When I think of _____ product, Brand X comes to my mind. | 0.811 0.834 |
| (AWR5) | When it comes to purchasing _____ product, Brand X comes to my mind first. | |
| F2 Brand Associations | | |
| (ASSOC1) | I have clear idea of the kind of people who uses brand X. | 0.843 |
| (ASSOC2) | Brand X is associated with excitement. | 0.831 |
| (ASSOC3) | Brand X is associated with sophistication. | 0.701 |
| (ASSOC4) | Brand X is associated with strength | 0.822 |
| (ASSOC5) | Brand X comes from a company with a good reputation. | 0.856 |

Continued

Table 2: Cont'd

| F3 Brand loyalty | | |
|-----------------------------|--|-------|
| (BLOY1) | I would not buy other brands, if X is available at the store | 0.726 |
| (BLOY2) | I would like to buy another product of the same brand next time. | 0.641 |
| (BLOY3) | X would be my first choice | 0.827 |
| (BLOY4) | It is very likely that I will buy the Brand X next time I buy the given product. | 0.871 |
| (BLOY5) | With brand X I obtain what I look for in a product. | 0.703 |
| F4 Perceived quality | | |
| (PQUAL1) | X is of high quality | 0.694 |
| (PQUAL2) | The likely quality of X is extremely high | 0.713 |
| (PQUAL3) | The likelihood that X is reliable is very high | 0.711 |
| (PQUAL4) | X must be of very good quality | 0.748 |
| (PQUAL5) | The price of Brand X reflects its quality | 0.894 |

Table 3: Factors Loading from EFA

| Interpretation of the Factors | | | |
|------------------------------------|------------------------|---------|--|
| Factor | (% Variance Explained) | Loading | Brand equity attribute |
| F1 Brand awareness (21%) | | | |
| (AWR1) | | 0.736 | I can easily identify Brand X among other Brands |
| (AWR2) | | 0.747 | I know what X looks like |
| (AWR3) | | 0.812 | I have heard of Brand X before? |
| (AWR4) | | 0.798 | When I think of _____ product, Brand X comes to my mind. |
| (AWR5) | | 0.713 | When it comes to purchasing _____ product, Brand X comes to my mind first. |
| F2 Brand associations (19%) | | | |
| (ASSOC1) | | 0.843 | I have clear idea of the kind of people who uses brand X. |
| (ASSOC2) | | 0.779 | Brand X is associated with excitement. |
| (ASSOC3) | | 0.614 | Brand X is associated with sophistication. |
| (ASSOC4) | | 0.675 | Brand X is associated with strength |
| (ASSOC5) | | 0.812 | Brand X comes from a company with a good reputation. |

Continued

Table 3: Cont'd

| Factor | Interpretation of the Factors | | |
|-----------|--------------------------------|---------|--|
| | (% Variance Explained) | Loading | Brand equity attribute |
| F3 | Brand loyalty (17%) | | |
| (BLOY1) | | 0.753 | I would not buy other brands, if X is available at the store |
| (BLOY2) | | 0.692 | I would like to buy another product of the same brand next time. |
| (BLOY3) | | 0.649 | X would be my first choice |
| (BLOY4) | | 0.755 | It is very likely that I will buy the Brand X next time I buy the given product. |
| (BLOY5) | | 0.812 | With brand X I obtain what I look for in a product. |
| F4 | Perceived quality (14%) | | |
| (PQUAL1) | | 0.762 | X is of high quality |
| (PQUAL2) | | 0.684 | The likely quality of X is extremely high |
| (PQUAL3) | | 0.713 | The likelihood that X is reliable is very high |
| (PQUAL4) | | 0.736 | X must be of very good quality |
| (PQUAL5) | | 0.769 | The price of Brand X reflects its quality |

Model Estimation

In keeping with practice and to make the model more parsimonious, the factor loading of the first item in each construct was fixed to 1.00 and the variance of the second order factor was fixed to 1.00. No adverse estimates were observed such as non-significant error variances for constructs or standardized coefficients exceeding or very close to 1.0. Later the goodness-of-fit for the overall model was checked. Numerous indices are now commonly available for determining the global fit of a model.

Breckler (1990) advises investigating multiple fit criteria rather than relying on a single measure (statistics). The most commonly reported fit index is the chi-square (χ^2) relative to the degrees of freedom (df). Goodness-of-fit measures the association of the actual or observed correlation matrix with that predicted from the proposed model. The commonly reported test statistics, summarised in Table 4 and described below, enable evaluation of model fit at both the measurement level and full structural model. Test for goodness of fit indicated an acceptable level (Kline, 2005; Hair et al., 2003). Structured Equation Modelling was done with both with AMOS 16.0.1 and LISREL 8.7 to calculate various indices of fit.

Table 4: Structural Equation Parameters and their Estimates

| Parameter | Estimate | t-value | Parameter | Estimate | t-value |
|-----------------|-------------|---------|-----------------|-------------|---------|
| $\lambda_{1,1}$ | <u>1.00</u> | N/A | $\lambda_{1,3}$ | <u>1.00</u> | N/A |
| $\lambda_{2,1}$ | 1.12 | 12.11 | $\lambda_{2,3}$ | 0.95 | 12.82 |
| $\lambda_{3,1}$ | 0.86 | 8.29 | $\lambda_{3,3}$ | 0.91 | 11.35 |
| $\lambda_{4,1}$ | 0.82 | 9.57 | $\lambda_{4,3}$ | 0.88 | 8.90 |
| $\lambda_{5,1}$ | 0.87 | 12.30 | $\lambda_{5,3}$ | 0.91 | 8.33 |
| $\lambda_{1,2}$ | <u>1.00</u> | N/A | $\lambda_{1,4}$ | <u>1.00</u> | N/A |
| $\lambda_{2,2}$ | 1.18 | 14.87 | $\lambda_{2,4}$ | 0.98 | 9.73 |
| $\lambda_{3,2}$ | 0.99 | 16.64 | $\lambda_{3,4}$ | 0.94 | 8.70 |
| $\lambda_{4,2}$ | 0.74 | 9.12 | $\lambda_{4,4}$ | 0.91 | 7.94 |
| $\lambda_{5,2}$ | 0.73 | 12.01 | $\lambda_{5,4}$ | 0.98 | 10.3 |
| y_1 | 0.82 | 9.43 | y_3 | 0.65 | 9.14 |
| y_2 | 0.76 | 8.63 | y_4 | 0.68 | 8.74 |

Note: Underlined estimates indicate those parameters that have been constrained to equal 1 in order to fix the scale of the latent variables. t-values are absolute values.

Table 5: Measurement Analysis: Composite Reliability and Average Variance extracted

| Factor | Composite Reliability | Average Variance Explained |
|--------------------|-----------------------|----------------------------|
| Brand awareness | 0.812 | 0.813 |
| Brand associations | 0.826 | 0.802 |
| Brand loyalty | 0.784 | 0.796 |
| Perceived quality | 0.797 | 0.719 |

Discussion and Summary of Results

The study started with the development of a scale to measure brand equity. In assessing the reliability of scale items Cronbach's α was calculated for item and total correlation. An exploratory factor was performed and by using principal components analysis with varimax rotation. Results suggest that the scales were highly reliable and that the corresponding items of each scale clustered into a single factor with noteworthy factor loadings. In all cases the variance exceeded 70 per cent.

The items loaded (standardised loadings) well on to their respective constructs and were significant with values above 0.5, suggestive of the convergent validity of each factor. Composite reliability and average variance extracted indices were also well beyond the minimum recommended standard of 0.6 (Bagozzi and Yi, 1988). Discriminant validity was also established as none of the confidence intervals around the correlation estimate between any two factors contained a value of one.

The most commonly reported test statistic is the chi-squared goodness of fit test. Its degrees of freedoms are calculated by subtracting the number of parameters in the just-identified model against that of the overidentified model. As such, this test assesses the adequacy of the overidentified model in relation to the just identified model. If significant, it implies that the overidentified model is significantly different from the just-identified model. Moreover, a significant result suggests that the model would have been a better fit to the data should it contain more of the additional parameters available in the just-identified alternative. Conversely, a non-significant result implies that the overidentified model conveys just as much information as the just-identified model (Kline, 2005). Thus, the goal is to find a non-significant goodness of fit result.

The chi-squared goodness of fit test is affected by sample size, with larger samples finding significant differences more often than warranted and smaller samples finding nonsignificant differences more often than warranted (Arbuckle & Wothke, 1999; Kline, 2005; Ullman, 2006). For this reason, the normed chi-squared test, which divides the goodness of fit chi-squared test by its degrees of freedom, tends to be the second most commonly reported statistic. A normed chi-squared test result of 3 or less is non-significant, suggesting that the overidentified model conveys the same information as the just-identified model (Arbuckle 2007; Kline, 2005).

The goodness of fit index (GFI) is a marker of the proportion of covariances explained by the model's constructed covariance matrix. The GFI ranges from 0 to 1, with high scores reflecting a good fit to the data (Arbuckle 2007; Byrne, 2001; Kline, 2005). Similarly, the adjusted goodness of fit index (AGFI) adjusts the GFI to account for model complexity. It is interpreted in the same way as the GFI (Arbuckle 2007; Byrne, 2001; Kline, 2005; Ullman, 2006).

The standardized root mean squared residual (SRMR) also compares the observed covariance matrix against that constructed through the model, where the greater the residual differences between both matrices, the higher the SRMR scores (Arbuckle 2007; Byrne, 2001; Kline, 2005; Ullman, 2006). Thus, the objective in this case, is to have a SRMR score approaching zero (Byrne, 2001; Ullman, 2006).

The normed fit index (NFI), the non-normed fit index (NNFI) [also known as the Tucker-Lewis index] and the comparative fit index (CFI) compare the fitted model to a 'null', or independence, model where all manifest variables are assumed to be uncorrelated. These three test statistics thus consider whether the model is a significant improvement over the null model. High scores indicate a significant improvement over an independence model, whilst low scores indicate no difference from an independence model (Arbuckle 2007; Byrne, 2001; Kline, 2005). Of the three test statistics, the CFI is less affected by sample size, whilst the NNFI adjusts the index for model complexity (Byrne, 2001; Kline, 2005).

The root mean square error of approximation (RMSEA) examines model fit, adjusted for model complexity with lower values indicating better model fit (Arbuckle 2007; Byrne, 2001). AMOS also provides 90% confidence intervals and probability values for RMSEA, providing further evidence of model fit adequacy. The tighter the confidence intervals around the RMSEA value, the greater the confidence in adequacy of model fit. RMSEA confidence intervals

A Cross Cultural Examination of Brand Equity and its Constructs

are exaggerated by sample size and degree of model complication and thus needed to be considered with caution. Probability values between 0.05-0.08 suggest adequacy of model fit (Byrne, 2001).

Table 6: Goodness of Fit Indices

| Test Statistics | Critical value | Interpretation | Structural Model |
|---|------------------------------|--|------------------|
| <i>Chi-squared Tests</i> | | | |
| 1. Normed chi-squared test | Chi-squared/df ≤ 2 | Good fit to the just-identified model. | 1.87 |
| <i>Incremental Measures</i> | | | |
| 1. Bentler-Bonnet Non-Normed Fit Index (BBNFI) | $0 \leq \text{BBNFI} \leq 1$ | Comparative Index between proposed and null models | 0.83 |
| <i>Test Statistics Using Covariance Matrix</i> | | | |
| 1. Goodness of fit index (GFI) | $0.9 < \text{GFI} < 1$ | Assessing the proportion of the variability in the sample covariance matrix explained by the model; GFI > 0.9 suggests a goodfit | 0.940 |
| 2. Adjusted goodness of fit index (AGFI) | $0.9 < \text{AGFI} < 1$ | Good fit to the just-identified model. | 0.926 |
| 3. Standardized root mean squared residual (SRMR) | $0 < \text{SRMR} < 0.05$ | Good model fit. | 0.023 |
| <i>Comparisons with Independence Models</i> | | | |
| 1. Normed fit index (NFI) | $0.9 < \text{NFI} < 1$ | Not parsimony adjusted; normed; NFI > 0.9 suggests a good fit | 0.933 |
| 2. Non-normed fit index (NNFI) [the Tucker-Lewis Index] | $0.9 < \text{NNFI} < 1$ | Percent improvement over null model | 0.929 |
| 3. Comparative fit index (CFI) | $0.9 < \text{CFI} < 1$ | Assuming non-central chi square distribution; assessing the improvement of the hypothesized model relative to the independence model. About 0.90 or higher suggests a good fit | 0.961 |
| Root mean square error of approximation (RMSEA) | $0 < \text{RMSEA} < .08$ | Good model fit. | 0.061 |

Note. AGFI = Adjusted Goodness-of-Fit-Index, CFI = Comparative Fit Index, GFI = Goodness-of-Fit Index, NFI = Normed Fit Index, NNFI = Non-normed Fit Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual.

a *NFI* may not reach 1.0 even if the specified model is correct, especially in smaller samples (Bentler, 1990).

b As *NNFI* is not normed, values can sometimes be outside the 0-1 range.

c *NNFI* and *CFI* values of .97 seem to be more realistic than the often reported cut-off criterion of .95 for a good model fit.

Irrespective of the results of the test statistics chosen, it is possible to have a model that is statistically acceptable (because the tests indicate a good fit), but has a poor fit in different parts of the model, little predictive power, or poor theoretical value. It is thus common practice to report a number of test statistics, with the greater the number of tests supporting the model's fit, the greater the confidence with the chosen model (Kline, 2005). It is also advisable to assess whether model relationships are in the expected direction (Bollen & Lennox, 1991).

Directions for Future Research

As this study has been carried out in India and UAE on a single brand (Pepsi), the same instrument could be administered across different countries, cultures, product categories and brands to generalize the findings. Rosenthal and Rosnow (1984) advise that a study needs to be replicated at least fifteen times before results can be generalized, signifying that additional work on the on this model is necessary to generalise the findings. It is suggested therefore, that in future research, some moderating variables such as mood, motivation or involvement may be considered, which may be able to explain any differences that may eventually prop up.

In addition, it should be highlighted that this model did not test whether an underlying structure with two or more second-order factors may also provide an acceptable fit. Breckler (1990) argues that "If a model is found to provide a good global fit, it is very likely that many other models will also provide a good (if not better) fit to the data. It can be difficult to construct even a small number of such alternative models, especially when many of them are not easily derived from substantive theory." One of the limitations is the one that is common to all second-order factor studies is that second-order factor is more like a "black-box" concept (Narayan et al., 2008). As we chose to deal with the higher order factor as "Brand Equity" based on evidences from literature is by no means the only possible way of defining it. It could well have been, "Brand Power or Brand Strength" and could have been substituted for the "Brand Equity" or any other related second order factor or construct. There is no known way of conclusively proving this aspect one way or the other. However, regardless of the categorization used the message behind naming these four factors should be the same.

From a managerial perspective, the results of this study suggest that the Brand Equity should perhaps be viewed as a whole rather than in isolation. That is, managers cannot be selective in implementing certain dimensions such as increasing awareness levels through mass media advertising and in ignoring others since all the subcomponents serve as building blocks of brand equity. The findings of this study indicate and substantiate that the four first order factors load substantially onto the second order factor and hence the results provide an initial empirical evidence of the importance of implementing brand equity measures holistically rather than on a piecemeal basis.

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