

ESTIMATING SUBSCRIBERS' PERCEPTION OF BRAND EQUITY ON PURCHASE DECISION OF NIGERIAN MOBILE TELECOMMUNICATION SERVICES: AN ANALYTICAL HIERARCHY PROCESS APPROACH

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Abstract

For firms that compete by providing similar services, the need to enhance brand equity in order to attract and retain customers which are the major reasons for the existence of most private firms, like mobile telecommunication companies in Nigeria cannot be overemphasized. Thus, this study estimates subscribers' perceptions of brand equity of mobile telecom service providers in Nigeria. An analytic hierarchy process model was built, involving three stages of goal (determinants of purchase decision and satisfaction with telecom services through brand equity), the criteria were brand equity dimensions while the alternatives were the sub-criteria of each the brand equity dimensions. Using a cross-sectional survey design, primary data were collected from GSM subscribers of mobile telecom in Lagos state, Nigeria with the aid of a well-structured AHP-based questionnaire. This allowed for a pairwise comparison of each subscriber judgments of the influence of brand equity on the decision to patronise a service provider. Data collected were analysed and values were obtained for the consistency index and ratio, eigenvector, eigenvalue (λ_{Max}), priority weight, global ratings and ranks. The findings have practical implications on marketing and organisational strategies of the mobile telecommunication firms in particular and will positively strengthen the industry sustainable business performance at large.

Keywords: Analytic hierarchy process, brand equity, telecommunication, marketing strategies.

1. Introduction

The need for every firms' and telecommunication companies in particular to enhance both firm and product/service brands cannot be overemphasized. As brand equity is described as one of the most important assets of any firm after customers (Doyle, 2001). In addition, for firms that compete by providing similar services, the need to enhance brand equity in order to attract and retain customers who constitute the primordial reasons for are the major reasons for the existence of most private firms. In the context of service-based industry such as mobile telecommunication, it is particularly vital to manage brand. Thus, this study therefore estimate the influence subscribers' perception of brand equity on purchase decision and customers' satisfaction within the context of Nigerian mobile telecom service providers using the analytic hierarchy process (AHP) model.

The four major dimensions of brand equity (perceived quality, brand awareness, brand association and brand loyalty) were examined within the framework of an hierarchical model as well as pairwise comparison of the dimension and the alternative as they affect the subscribers purchase decision and satisfaction with mobile telecommunication network service providers' in Nigeria. The four dimensions are based on the operationalization of customer-based brand equity (Aaker, 1996).

Following the implementation of mobile number portability (MNP) in Nigeria 2013, three years down the line, subscribers are becoming more aware of the opportunities inherent in the option.

MNP avail the customers opportunities to switch/port network providers while retaining their known mobile number. Every change in the business environment opens some new opportunities and shuts down some old ones. MNP presents an opportunity for subscribers to maximize their choice of network provider. It therefore poses a unique challenge to service providers on better ways to retain a substantial number of subscribers on their networks. By extension, this makes the mobile telecommunication market to be more competitive and dynamic as the need to acquire new customers and retain the existing ones becomes a major issue for all competing firms. Therefore, there is a need now ever than before, to understand the brand from the perspective subscribers with a view to designing effective marketing programs to improve customer satisfaction.

The Analytic Hierarchy Process (AHP) developed by Saaty (1980), has proven to be widely a accepted multi-criteria decision tool, as it allows decision makers to model, analyse, weigh and priotise any complex problem such as brand equity. This, in a hierarchical structure, shows the relationships between goal, objectives (criteria), sub-objectives, and alternatives. Thus, a typical hierarchy consists of at least three levels: the goal, the criteria and the alternatives, which this study is conformed with.

AHP enables decision-makers to derive ratio scale priorities or weights as opposed to arbitrarily assigning them. Therefore, AHP does not only support decision makers by enabling them to structure complexity and carry out evaluation. It also allows them to incorporate both objective and subjective considerations in the decision making process (Forman, 1983). The AHP is used in the study to weights the criteria and the alternatives in the hierarchical model in order to prioritize the importance of brand equity dimensions to subscribers purchase decision.

Although, there are studies which sought to understand effect of brand equity on customer satisfaction, there has not been enough research applying operations research model such as AHP to do a pairwise comparison of the effects of brand equity dimensions on the subscribers` satisfaction with mobile telecommunication services especially in the Nigerian ever growing telecommunication market. Besides, most of these studies only focus on other markets and different methods of analysis while AHP will give better results in any complex human decision problem (see Saaty, 1996; Oyatoye, Adebisi & Amole, 2015a).

The results of this study provide stakeholders in the telecommunication industry better understanding of subscribers` view of brand equity dimensions and their contribution to subscribers purchase intention and satisfaction regarding mobile services. It is expected that managers will consider the research outcomes in formulating and implementing appropriate marketing and organisational strategies for retaining more subscribers and sustainable business development.

2. Literature Review

The need for research-driven customer perspective on organisational activities is growing, as long as customers are the only economic and social justification for business existences. Moreover, Drucker (1973) observed, that the sole purpose of every business is to ‘create customer’, not to lose the customer to other competitors.

The concept of brand equity gained wider usage in the 1980s among advertising practitioners (Barwise, 1993). Notable academic contributors throughout the 1990s were Aaker (1991), Srivastava and Shocker (1991), Kapferer (1992), and Keller (1993, 1998). However, a universally accepted

brand equity content and meaning (Vázquez, Río & Iglesias, 2002; Keller 2003) as well as measure are still scarce to come by (Washburn & Plank, 2002). Almost all conceptualisations of brand equity converge that the phenomena involves the value added to a product by consumers' associations and perceptions of a particular brand name (Winters, 1991, Chaudhuri, 1995).

Customer based equity plays a strategic role in determining customers' purchase decisions and is considered as the most important concept in business and academic research (Kim, Kim, Kim, Kim, & Kang, 2008). A positive customer-based equity can help firms in generating greater revenue, lowering the sourcing or manufacturing costs, and increasing profits as well as enhancing the firm's ability and charge more and premium prices, which can ultimately lead to the attainment of brand extensions (Keller, 1993).

According to Aaker (1991), brand equity is a multidimensional concept comprising perceived quality, brand loyalty, brand awareness, brand association and other propriety assets. He submitted that brand loyalty can be compared to the level of devotion a consumer has to a brand. On the other hand, brand awareness is the ability of a potential buyer to identify a brand among a product category. Perceived quality deals with the consumer's perception of the brands total quality or superiority. Brand association is anything that is connected to a consumer's memory regarding the brand. The other proprietary brand assets refer to patents, logos, registered trademarks and identities. The present study employs brand equity based on Aaker's (1991) model of four dimensions which were briefly reviewed in this section of the paper.

Perceived quality is defined as the customer's perception of the overall quality or superiority of a product or service with respect to its anticipated purpose, in relation to other alternative products or services (Zeithaml, 1988), on other hand, Aaker, (1991) defines perceived quality as the customer's perception of the overall quality or superiority of a product or service with respect to its intended purpose relative to alternatives products or services in the market. The consumer's opinion about the product's quality and its attributes with regard to its expected performance forms the measurement scale indicator of the brand quality perceived by individuals (Ramos & Franco, 2005) perceived quality lends value to a brand in several ways: high quality gives consumers a good reason to buy the brand and allows the brand to differentiate itself from its competitors, to charge a premium price, and to have a strong basis for the brand extension (Aaker, 1991).

In the submission of Aaker, (1991) and Keller, (1993), they observed that brand awareness is based on both brand recognition and recall. Aaker further expressed that the ability of the potential buyer to recognize and recall that a brand is a member of a certain product/service category is brand awareness. Moreover, consumers' ability to identify the brand under different conditions, as reflected by their brand recognition or recall performance was the interpretation of Kotler and Keller, (2006) of brand awareness.

Aaker (1991) defined brand association as anything related in memory to a brand. He argued that a brand association has a level of strength, and that the link to a brand (from the association) will be stronger when it is based on many experiences or exposures to communications, and when a network of other links supports it. Brand associations may reflect characteristics of the product. Product associations and organisational associations are taken as the two mostly discussed categories of brand association typology Chen's, (2001). The sub-criteria used in the hierarchical model of this paper cover both topologies.

The attachment of customers/subscribers to brand of product or service was submitted as brand loyalty (Aaker, 1991). Two different levels of loyalty thus identified: behavioural and cognitive loyalty (Keller, 1998). Behavioural loyalty manifest by a number of repeated purchases by customers` (Keller, 1998), or commitment to re-buy the brand as a primary choice (Oliver, 1999). Cognitive loyalty refers to the consumers` intention to buy the brand as the first choice (Keller, 1998; Yoo & Donthu, 2001). Another indicator of loyalty is the customer`s willingness to pay higher price for a brand in comparison with another brand offering similar benefits (Aaker, 1996; Chaudhuri & Holbrook, 2001; Srinivasan, Anderson & Ponnnavolu, 2002).

AHP estimation of brand equity influence on customer purchase decision and satisfaction is imperative since it is not always straightforward to assess customer-based brand equity owing to largely intangible and complex concept embedded, whereas other methods may not accurately capture the relative importance of the factors, as the AHP does combines tangible and intangible or qualitative and quantitative factors which may be difficult for a customer to contrast all the service offerings of various telecom firms in the market. As far as researchers are aware, limited or no empirical research is available to date using AHP in estimating the complex purchasing decision problem in which the study therefore seek to fill the gap.

The need for AHP in this study can further be justified by the submission of Saaty, (1980) as a flexible and easy to understand way of analyzing complicated problems such as brands of telecommunication firms providing similar services. It is a multiple criteria decision-making technique that allows subjective as well as objective factors to be considered in decision making process (see figure 1). It allows the active participation of decision-makers (subscribers) who are the essence of existence of most telecommunication firms, in reaching agreement, and gives managers a rational basis upon which the decisions can be made on satisfying subscribers for mutual benefits. AHP is based on the following three principles: decomposition, comparative judgment, and synthesis of priorities. To actualise the three principles stated, Taylor III (2006) proposed seven step procedure presented below to be used in this study as the summary of the mathematical steps for arriving at the AHP decision:

- (i) Develop a pairwise comparison matrix for each decision alternative, and for each criterion.
- (ii) Synthesization.
 - (a) sum the values in each column of the pairwise comparison matrices.
 - (b) Divide each value in each column of the pairwise comparison matrices by the corresponding column-sum, these are normalized matrices.
 - (c) Average the values in each row of the normalized matrices, these are the preferences vectors.
 - (d) Combine the vectors of preferences from each criterion (from step iic) into one preference one preference matrix that shows the preference of each area, for each criterion.
- (iii) Develop a pairwise comparison matrix for the criteria.
- (iv) Compute the normalized matrix by dividing each value in each column of the matrix by the corresponding column sum.
- (v) Develop the preference vector by computing the row averages for the normalized matrix.
- (vi) Compute an overall score for each decision alternative by multiplying the criteria preference vector (from step v) by the criteria matrix (from step iid).

(vii) Rank the decision alternatives, based on the magnitude of their scores computed in step 6.

3. Research Methods

Based on the quantitative research methodology, this study employs a cross sectional survey design. It identifies brand equity dimensions already exposed in the literature. Since all the major players (MTN, Airtel, Glomobile and Etislat) in the Nigerian mobile telecommunication compete by providing similar services in same market to subscribers, especially in major cities like Lagos, Nigeria. The goal in the hierarchical model is the determinants of subscribers' purchase decision and satisfaction while the four brand equity dimensions are the criteria, with sub-criteria used as the alternatives (see figure 1; Saaty, 2000). The pairwise comparison method of AHP is used to determine the weight of each criterion. Data for the study were collected from students, staff (academics and non-teaching) and people operating businesses across the two Universities (University of Lagos, Akoka and Lagos State University, Ojo) in Lagos state, Nigeria. The choice of these two campuses is premised on the need to afford researchers, the opportunity of meeting large number of subscribers' of different socio-demographic characteristics (literacy level, income and age) at a time that are using mobile telecommunication services (have experience of services of GSM service providers in Nigeria). The choice of students is based on an assumption that is largely realistic, which recognizes an average University student as GSM services users and sensitive to the trends in the industry. The choice of Universities in Lagos is further premised on meeting all classes of people from different income groups, cultural and religious backgrounds which is a good representation of the Nigerian society. These categories of respondents are qualified as experts to assess brands of GSM service providers because of their experience over time in using the services as customer of one, two or three of the GSM SIMs of service provider-owing to the use multiple SIM/portability (Oyatoye, Adebisi & Amole, 2015b). The population of the study was defined as the totality of all mobile telecommunication subscribers in two Universities consisting of students, staff (academics and non-teaching) and people operating businesses as at January 2016. All mobile telecommunication subscribers/customers of the selected Universities formed the population of the study; since the population of the subscribers is large, Cochran (1963) developed the model to determine the sample for proportions in large populations:

$$n_0 = \frac{Z^2 * p * (1 - p)}{e^2}$$

Where: n_0 = sample size, Z = the abscissa of the normal curve that cuts off an area α at the tails (e.g., 1.96 for a 95 percent confidence level), e = the acceptable sampling error, p = the estimated proportion of an attribute that is present in the population, and $q = 1 - p$. Therefore, the subscribers sample size for the study at 95% confidence level and 1% precision is denoted by; $Z = 1.96$, $p = (0.5 \text{ maximum variability assumed})$ since actual variability in the proportion is not known), $q = 0.5$; $e = 0.05$. Hence, the sample size for the study is computed as follows;

$$n_0 = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 384.16$$

The sample size for this study as determined through Cochran formulae is 384 subscribers across two Universities in Lagos. In order to guide against incomplete entries/low response rate which

is the main disadvantage of questionnaire as an instrument of data collection. The authors administered 200 copies each, in each of the selected Universities. A non-probabilistic sampling technique (convenience sampling) was used to select 400 subscribers from the study population. Data collected was analysed with Expert Choice software.

The AHP methodology steps are as follows;

- (i) The main goal or objective is clearly defined. In this study, AHP will be used to estimate the determinants of subscribers' purchase decision and satisfaction.
- (ii) After the construction of objective, the criteria used to satisfy the overall goal are identified: these are; perceived quality, brand awareness, brand association, and brand loyalty. For specifying a suitable solution, the alternatives were identified at third level in a hierarchical structure (see figure 1).
- (iii) Elements of the problem were paired with respect to their common relative impact on a

property and then compared. Therefore, pairwise comparisons were constructed.

Eigenvalue method is used to estimate the weights of decision elements (brand equity dimensions). Furthermore, consistency of the judgment is checked. In order to verify that the consistency index (CI) is adequate, Saaty (2000) suggested what is called consistency ratio (CR) which is determined by the ratio between the consistency index and random consistency index (RI). The decision rule is to consider a matrix consistent if the result of the ratio is less than 10%. The random index value is fixed and is based on the number of evaluated criteria as shown in Table 3.1

Table 3.1: Random Consistency Index (**RI**)

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49

- (v) Moving downward through the hierarchy, hierarchical structure is used to combine the weight vectors and arrive at global and local relative priorities of each element.

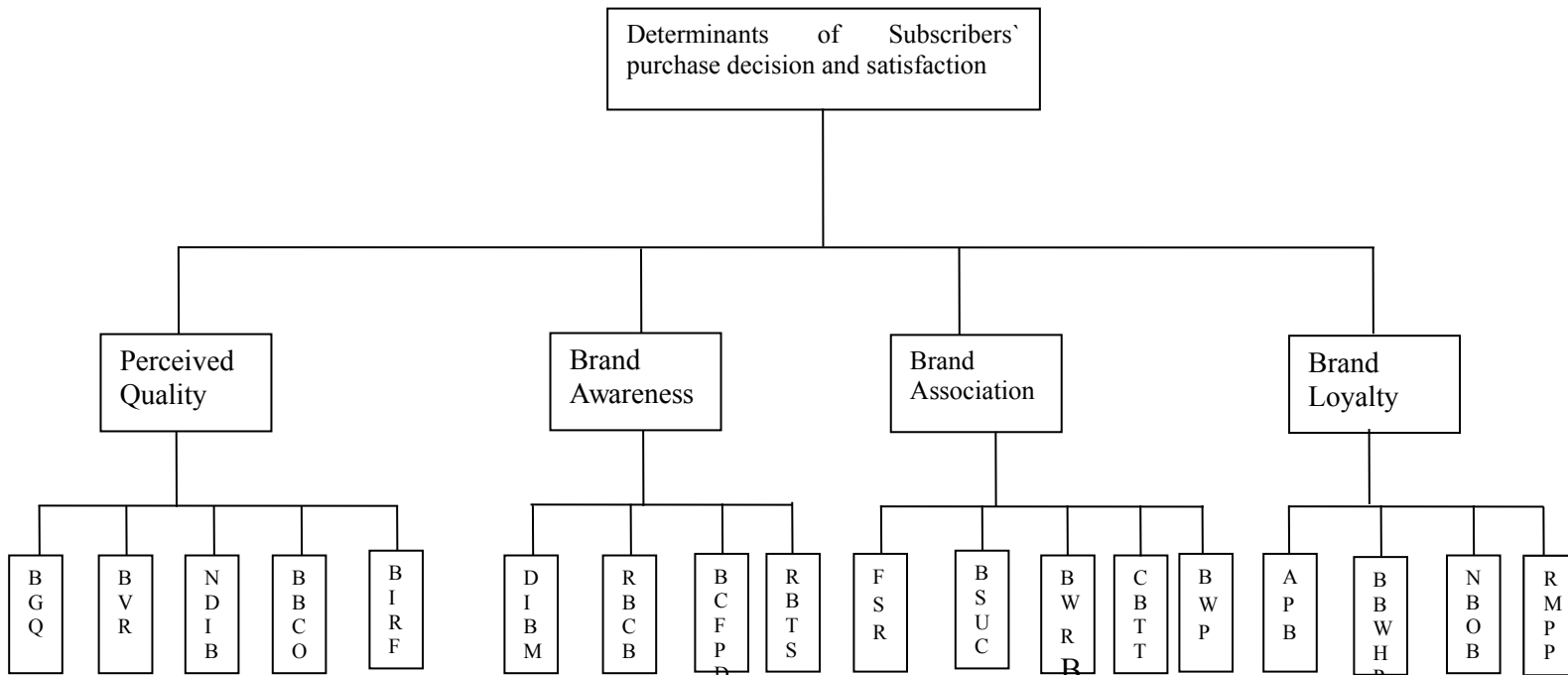


Figure 1: Proposed hierarchical model for Brand equity perception on purchase decision in the Nigeria mobile telecommunication

Source: AHP model developed by Researchers as advanced from literature, (2016)

Keys;

BGQ = Brand is of good quality

BVR = Brand is very reliable

NDIB = No difficulty in finding information about the brand

BBCO = Brand is better as compared to other brand(s)

BIRF = Brand is risk free

DIBM = Difficulty in imagining a brand in mind

RBCB = Recognition of brand among competing brands

BCFPD = Brand comes up first in my mind when I need to make a purchase decision

RBTS = Remember a brand whenever you need telecom services

FSR = Firm is socially responsible.

BSUC = Brand is safe to use/consume

BWRFB = Brand is well regarded by my friends.

CBTT = Firm brand is very trustworthy in all transactions

BWP = Brand is well priced.

APB = I will always patronize the brand

BBWHP = I will definitely buy this brand even when its price is higher than competitors

NBOB = I will not buy other brands, when this brand have network problem.

RMPP = Recommend my mobile service provider to other people

References

- Aaker, D. A., (1991). *Managing brand equity capitalizing on the value of a brand name*. New York: Free Press.
- Aaker, D. A. (1996). Measuring brand equity across products and markets. *California Management Review*. 38(Spring), 102 - 120.
- Barwise, P. (1993). Brand equity: Snark or Boojum? *International Journal of Marketing Research* 10(March), 93 - 104.
- Chaudhuri, A. (1995). Brand Equity or Double Jeopardy? *Journal of Product & Brand Management*, 4(1), 26-32.
- Chaudhuri, A. & Holbrook, M. B. (2001). The chain of effects from brand trust and brand effect to brand performance: The role of brand loyalty. *Journal of Marketing*, 65(April), 81-93.
- Chen, A. C. H. (2001). Using free association to examine the relationship between the characteristics of brand associations and brand equity. *Journal of Product & Brand Management*, 10(7), 439 - 451.
- Cochran, W. G. (1963). *Sampling Techniques*, 2nd Ed., New York: John Wiley and Sons, Inc.
- Doyle, P., (2001). Shareholder-value-based brand strategies, *Journal of Brand Management*, 9(1), 20 - 30.
- Drucker, P. F. (1973). *Management: Tasks, Responsibilities, Practices*, Harper and Row, New York.
- Forman, E. H. (1983). The Analytic Hierarchy Process as a Decision Support System, *Proceedings of the IEEE Computer Society*.
- Kapferer, J. N. (1992). *Strategic brand management*. New York and London: Kogan Page.
- Keller, K. L. (2003). *Strategic Brand Management*. 2nd edition. Upper Saddle River, NJ: Prentice Hall.
- Keller, K. L. (1998). *Strategic brand management: Building, measuring and managing brand equity*. Upper Saddle River NJ: Prentice Hall

- Keller, K. L. (1993). Conceptualizing, measuring, and managing customer-based brand equity. *The Journal of Marketing*, 57(1), 1 - 22.
- Kim, K. H., Kim, K. S., Kim, D. Y., Kim, J. H., & Kang, S. H. (2008). Brand equity in hospital marketing. *Journal of business research*, 61(1), 75 - 82.
- Kotler, P., & Keller, K.L., (2006). *Marketing management*. Pearson Education, Inc., Upper Saddle River, New Jersey.
- Oliver, R. L. (1999). Whence customer loyalty? *Journal of Marketing*, 63, 33 - 44.
- Oyatoye, E. O., Adebisi, S. O. & Amole, B. B. (2015a). Evaluating subscribers' preference for service attributes of mobile telecommunication in Nigeria using analytical hierarchy process (AHP), *International Journal of Analytical Hierarchy Process*, 7(2), 171 - 187.
- Oyatoye E. O., Adebisi S. O & Amole, B. B. (2015b). Modeling Switching Behaviour of Nigeria Global System for Mobile Communication Multiple SIMs Subscribers' Using Markov Chain Analysis, *IUP Journal of Operations Management*, 14(1), 7-31.
- Ramos, A. F. & Franco, S.J., (2005). The impact of marketing communication and price promotion on brand equity. *Brand Management*, 12(6), 431- 444.
- Saaty, T. L., (1980). *The Analytic Hierarchy Process*, New York: McGraw-Hill.
- Saaty, T. L. (2000). *Fundamentals of Decision Making and Priority Theory with Analytical Hierarchy Process*. Pittsburgh, PA: RWS Publications.
- Srivastava, R. K. & Shocker, A. D. (1991). *Brand equity: A perspective on its meaning and measurement*. Cambridge Mass: Marketing Science Institute.
- Srinivasan, S. S., Anderson, R. & Ponnavaolu, K. (2002). Customer loyalty in E-Commerce: An exploration of its antecedents and consequences, *Journal of Retailing*, 78 (1). 41 - 50.
- Taylor III, B. W. (2006). *Introduction to management science*, Ninth Edition, Pearson Education, Inc., Upper Saddle River, New Jersey
- Vázquez, R., Río A. B., & Iglesias, V. (2002). Consumer-based brand equity: development and validation of a measurement instrument. *Journal of Marketing Management*, 18(1-2), 27 - 48.
- Washburn, J. H. & Plank, R.E. (2002). Measuring brand equity: an evaluation of a consumer-

based brand equity scale. *Journal of Marketing Theory and Practice*, 10(1), 46 - 62.

Winters, L. C. (1991). Brand Equity Measures: Some Recent Advances. *Marketing Research*, 3, 70 - 73.

Yoo, B. & Donthu, N. (2001). Developing and validating a multidimensional consumer-based brand equity scale. *Journal of Business Research* 52(1), 1 - 14.

Zeithaml, V.A., (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2-22.