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Modeling Perceived Quality: A Study on Two and Three Wheeler Battery Market of Kolkata and Hooghly District in West Bengal, India.

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Abstract:

Perceived quality of a brand, which is defined as the perception of the consumers about the overall quality of the brand with respect to its basic purpose, for which it is manufactured and its relative position among its competitors, plays an important role in the formation of brand equity. It is the perception of the consumers which provides the consumers a reason to buy and also motivates the channel members interested to supply them in the market. The demand of a particular product and / or service is also largely dependent on its perceived quality and thus producers are in eternal pursuit to create a better product for their consumers under the given constraints and marketers are also in continuous drive to create a favorable perception about their product, in the mind of the consumers. Researchers and marketing practitioners have identified several factors which play an important part in creating the perception about the quality of a particular brand of product and / or service. These factors are termed as quality dimensions of a brand, which is constituted by both product and service qualities. The following study is an attempt to identify the factors which creates perceived quality of a brand. The study was conducted on some well recognized non alkaline batteries which mainly cater to the two and three wheeler market of West Bengal. The study mainly identifies the important product and service quality dimensions for these batteries and also models the perception of consumers as a function of these factors. A comparative study is also presented to analyze the relative position of the brands.

Key words:
Brand; Brand Equity; Perspectives of Brand Equity; Consumer Based Brand equity; Brand Equity Dimensions;

Introduction:

In the present era of high speed communication and light speed advancements, the entire infrastructure is dependent on an uninterrupted supply of power and logistics. At the very heart of logistics lies a humble box, the automotive lead acid battery. Without the battery an entire chain of well oiled machine parts breaks down. This humble box is also the arena where a few companies are battling it out for the monopoly of the industry.

Now to create a win-win situation in the market for the battery manufacturers it becomes very essential that whether these companies are able to give adequate importance to the overall quality of a product. As in today's world of cut throat competition it becomes very essential to give respect to the various dimensions of

quality as mentioned in the theories. As these dimensions of quality only shape up the perception of an individual customer towards a particular brand which in turn will be beneficial for the company's growth only.

According to a research paper it was cited that "While most of the authors were of this opinion that product quality is complex and hard to define, but somewhere they did tend to agree upon the fact that quality is based on product attributes that are largely defined by the customer (Garvin 1 984a; Shetty 1987; Takeuchi and Quelch 1983). Garvin have provided us with a deeper understanding of the customers' perspective and their requirements as a necessary factor or a first step in defining product quality. According to Garvin (1984a), "Quality is not a single recognizable characteristic; rather it is multifaceted and appears in many different forms."" Consequently, he proposed eight facets or dimensions of product quality which can serve the purpose of a framework for strategic analysis.
Now by taking these theoretical aspects of David A. Garvin's – Dimensions of Quality, I started my research work in order to know that for a consumer who wants to buy a battery residing in urban area or in a metropolitan city; what will be their perception before buying a brand and will these same set of perceptions differ across various different geographical regions. It becomes very important to know that whether the 8 dimensions of quality are being taken into consideration by a respective set of consumers while buying or making a purchase across the various geographical regions in a particular district.

So, it becomes very important and essential to find out the impact of the components of product quality dimensions on the overall perception of the battery brands across various different geographical regions.

Research Gap:

RG1: Although the studies in the field of branding identifies the product quality dimensions of perceived quality, very few of them empirically justified its presence of these qualities as a component of creating perception of brands.

RG2: Perception about the product quality dimensions of perceived quality could significantly differ among cities, suburbs and rural sector, but none of the studies have tried to justify it empirically

RG3: Product quality dimensions of perceived quality are always been tested on brands of product categories which has conspicuous consumption. The validity of these dimensions are not checked on the brands which are although well known, not consumed directly or conspicuously

Research Objectives:

From the above mentioned research gaps the following research objectives have been constituted:

RO1: To empirically validate the theory of product quality dimensions of perceived quality

RO2: To examine empirically whether the perception related to product quality dimensions of perceived quality really differs across different geographical region

RO3: To examine whether the product quality dimensions of perceived quality has any impact on the brands which are not consumed directly or conspicuously

Research Hypothesis:

Based on the above mentioned Research Objectives the following hypothesis could be designed:

RH1: There would be significant impact of product quality dimensions of perceived quality in creating the perception of the brands

RH2: There will be significant difference about the perception related to product quality dimensions of perceived quality across geographical regions

RH3: Product quality dimensions of perceived quality will have significant impact on brands which are not conspicuously consumed

Research Methodology:

Selection of Product Category:

The product for my study was supposed to be important but not conspicuously consumed. For selection of the product categories opinions of several researchers were considered. It was hard to find out an important product category as well as important and well recognized brands of a product category which is not conspicuously consumed. Finally batteries used for the vehicles are chosen as the product category. This product category supports both of our requirements as they are important and at the same point of time they are also not conspicuously consumed. Thus batteries used in vehicles were decided to be the product category of our study.

Selecting different brands of batteries:

Three brands of batteries were decided to be selected which are prominent to the users of both cities and villages. For choosing these three brands, a pool of battery brands were made by conducting a survey among 30 respondents where the respondents were asked to name the most familiar battery brands. Finally, based on the frequency of the mentioned brand names suggested by the respondents, three brands of batteries were chosen and the brands are Exide, Amaron and Amco batteries.

Measuring the impact of Product quality dimensions of perceived quality on the perception of brands:

To measure the impact of product quality dimensions of perceived quality in creating the overall perception of brands, a **questionnaire was prepared**. The list of the components, which constitute product quality dimensions were collected from the literature and research works of David A. Garvin and other researchers. Respondents were provided with this list and were asked to rate each of these attributes out of ten. Perceptions of the respondents asked to rate their overall perception about the battery brands on a similar ten point scale. In this stage, data were collected from three hundred respondents (one hundred for each brand of battery) and the respondents were geographically distributed from city to village. There were 3 questionnaires for three battery brands but the questions in all these questionnaires were same just with different brand names.

Ones the perceptions of the respondents were collected, a **normality test was conducted** on the dataset to find out whether the data is normally distributed or not. A **test of reliability** was also conducted and the **values of Cronbach's alpha** were checked to find out whether the data is reliable.

A **regression analysis was conducted**, where the overall perception about the brands were considered as a dependent variables and components which create the product quality dimensions of the brands were considered as an independent variables. Thus three separate regression analysis were conducted for three different brands of batteries. The values of adjusted R^2 were considered for the robustness of the models. Besides the values of condition index were also checked to find out the level of multi-collinearity associated with the model.

Finding the impact of all the components which create product quality dimensions across the different geographical regions were one of the objectives of this present research. To address this research objective, the **values of the standardized coefficients** were considered for each brand of batteries across different geographical location. As the values of the standardized coefficients are comparable, thus these comparative analyses addressed the research objective.

Limitations of the Study: In attempt to make the project authentic and reliable, every possible aspect of the topic was kept in mind. Nevertheless despite of the fact constrains were at play during the formulation of this project.

The main limitations are as follows:

1. Due to limitation of time only 300 general consumers, mechanics, retailers and dealers were surveyed through a questionnaire.
2. The main source of data for the study was primary data with the help of Self Administered Questionnaires (SAQs). Hence, bias can be an issue which might have crept in. The chance of biased response can't be eliminated though all necessary steps were taken to avoid the same.
3. The scope of the project is confined to Wellington Market, Chandannagore Market, Chinsurah Market, Sheoraphuli and Serampore Market, Chandni Chowk Market and Esplanade Chowringhee

North, Singur Market, Bandel Market, Mogra Market, Daluigachi-Singur and Nalikul Market, Tarakeshwar Market and Arambag Market.

4. Some people were hesitant to disclose the true facts and were not ready to come out openly.
5. There are different categories of automotive batteries present in our market but this project solely caters to the two wheeler battery market (Motorcycles) and in some areas of the study about the three wheeler (e-rickshaw) battery markets due to lack of the overall span of time.

Findings and Interpretations with the help of Statistical Measures:

Findings of the **normality test** shows that variables of all these brand of batteries follow normal distribution with 1% level of significance. Thus we can infer that the perception data is normally distributed. The **values of Cronbach's alpha** for three brands of batteries are as follows:

Table 1: Values of Cronbach's Alpha

Name of the Brand	Exide	Amaron	Amco
Cronbach's Alpha	0.736	0.792	0.886

Now Cronbach's alpha is a measure which is used to test the reliability, or internal consistency, of a set of scale or test items. Cronbach's alpha is a way which is used to measure the strength of the consistency.
The result of α coefficient of reliability ranges from 0 to 1 in providing the overall assessment of a measure's level of reliability.
Although the standard recommend for Cronbach's Alpha should be between 0.65 and 0.8 (or higher in many cases); α coefficients that are less than 0.5 are usually unacceptable. Thus from the values of Cronbach's alpha, it could be stated that the data satisfies the reliability condition for further analysis as all the values are above 0.65 as we can see from the results.

Empirical Modeling of the perception of the battery brands:

To find out the impact of the components of product quality dimensions on the overall perception of the battery brands, a **regression analysis** was conducted for each brand of batteries. Here the overall perceptions of the consumers about the brands were considered as the dependent variables and the components of the product quality dimensions were considered as the independent variable. Thus for this particular study:

OPB = f (components of product quality dimensions)
= f (Per, Ftr, CWS, Rel, Dur, Ser, FNF)

Where; [OPB = Overall perception of brand, Per = Performance, Ftr = Features, CWS = Conformance with Specification, Rel = Reliability, Dur = Durability, Ser = Serviceability, FNF = Fit and Finish]

Table 2: Findings of Regression Analysis

Name of the Brand	Adjusted R^2	Value of Condition Index
Exide	0.717*	9.110
Amaron	0.694*	7.301
Amco	0.661*	7.251

*means 95% level of confidence

**99%level of confidence

Adjusted R-Square gives the percentage of variation explained by only those independent variables that, in reality, affect the dependent variable. Now the reason why we have used adjusted R- Square because in simple R-Square there is a limitation which is that if I increase variables which are independent but at the same time if it is useless then the result which will come that might be useless with very minimum significance. So this is where adjusted R-Square overcomes this issue by adding a penalty if we try to add variables which are independent and at the same time does not make any improvement. So over here if useless predictors are added then the value will decrease or else if we add useful variables which are actually related then the value of adjusted R-Square will increase definitely.

Thus from the findings we can see that the values of Adjusted R^2s are high and the models can explain 66.1% variability of the dependent variable in case of Amco batteries which means that 66.1% of the Overall Perception of the brand is dependent on the factors that we have chosen ,69.4% variability of the dependent variable in case of Amaron batteries which means that 69.4% of the Overall Perception of the brand is dependent on the factors that we have chosen , and 71.7% variability of the dependent variable in case of Exide batteries which means that 71.7% of the Overall Perception of the brand is dependent on the factors that we have chosen as the independent variables. If the **values of Condition indexes** are greater than 15 then it indicates a possible problem with collinearity; and if the value is greater than 30 then there is a serious problem. However the values over here in the result are also found within the limit which signifies that the models do not have high problem of multi-Co linearity.

Empirical Modeling of the perception of the battery brands on the basis of Village and City Consumers:

Two separate regression analysis were conducted where the same relationship was tested but this time it was on the basis of geographical regions. In the first case perception data of the consumers residing at the village was assembled and then a similar regression analysis was conducted on the data. The findings are as follows:

Table 3: Findings of Regression Analysis (Consumers residing at village)

Name of the Brand	Adjusted R^2	Value of Condition Index
Exide	0.698*	7.953
Amaron	0.875*	6.115
Amco	0.770**	8.222

*means 95% level of confidence

**99%level of confidence

Another similar regression analysis was conducted on the basis of the perception of data of the consumers residing in the city market. The findings are as follows:

Table 4:Findings of Regression Analysis (Consumers residing at city)

Name of the Brand	Adjusted R^2	Value of Condition Index
Exide	0.829**	4.087
Amaron	0.764*	9.878
Amco	0.870*	6.667

*means 95% level of confidence

**99%level of confidence

Now if we compare the Adjusted R-Square value of Exide for both cities and village then we can clearly see that the value of adjusted R-Square of Exide for City is 0.829 with 99% level of confidence which means that 82.9% of the overall perception of the brand is dependent on the factors that we have chosen and we can say this with 99% level of confidence and in the rural market it is coming down to 0.698 with 95% level of confidence which means that 69.8% of the overall perception of the brand is dependent on the factors that we have chosen and we can say this with 95% level of confidence.

Now the question comes like why such disparity between the rural market and the urban market. The reasons are like this that the consumers in rural market are focused more on the Quality and after sales services with minimum pricing as the rural market people are normally very much price conscious. As for them brand doesn't matter much; they just simply want performance.

Now in the rural market it was found out during the survey that the after sales services and when it comes to providing facilities to the battery shops. It is performing not as good as it was supposed to be, like it is taking a minimum of 21-25 days in after sales services and that also without providing any replacement batteries and not to forget the pricing is on pretty much higher side. Now this becomes the major factors which are forcing the customers to shift their preference from Exide to other brands in the rural market like Amaron and Amco. As these competitor brands are focusing on these weak areas of Exide and trying to provide a better after sales services with minimum pricing charged and with better decorations of the shops in giving banners, posters and Point of Purchase sales products. Whereas Exide is failing to provide a better after-sales services in spite of knowing that Amaron does take only 1 week maximum in the repairment of damaged batteries and Amco taking only 5-6 days.

In case of Amaron, we can clearly see that in the rural market the value of adjusted R-Square is 0.875 with 95% level of confidence and in the urban market it is 0.764 with 95% level of confidence. This clearly shows that Amaron is preferred more in the rural areas as compared to it in the urban areas. The major reason being that the price is on a lower side as compared to Exide and it gives a better after sales services and that also with replacement batteries; so that the customers doesn't get affected when their batteries are getting damaged or faulty. Across the market be it rural or urban they does provide better facilities in terms of decorations of the shops with banners, posters and point of purchase sales products to attract both customers and new shop keepers to take up the dealership of Amaron.

One of the biggest advantage of Amaron is that it works under the "Mechanics-Model" which means that the company collaborates with the local mechanics in a city or town for the promotion of their products like they conducts one day workshop with all the mechanics in a particular city/ town where they get to know about the benefits of the products and other related things and in return these mechanics does a word of mouth promotion for the companies in the rural markets. Exide in this case works under the "Dealership-Model" that is their business is mainly focused in tapping the dealers and they does workshop and promotional activities with these particular set of Exide dealers only. So speaking of promotion, Amaron does it far better than Exide and any other companies in the rural market because the rural customers doesn't give much attention to the advertisements and promotions as most of them are not that much literate. So they hear and do exactly what their local mechanics says. For example if a mechanics in a rural market says a

particular customer to go and buy Amaron batteries; the customer without thinking much will buy the same battery in spite of what the shop keeper says. Such powerful are these mechanics in the rural market; as the rural customers believe their local mechanics far more than anyone. This is where Amaron is having a better competitive advantage in the rural market than any other brands as they have correctly tapped the mechanics and the local mechanic stores in the rural market. This is the reason why Amaron is having such a high repute in the rural markets and at this moment they come with a far better quality and after sales services than that of Exide.

For Amco, we can clearly see that in the rural market the value of adjusted R-Square is 0.770 with 99% level of confidence and in the urban market it is 0.870 with 95% level of confidence. This clearly shows that in the rural markets it is in a better position than that of Exide, this is because according to the findings of the survey in the year 2019 if we have to talk about quality then Amco is coming with best of quality when batteries are concerned. It is quite evident that if the batteries are coming with high degree of quality then the chances of getting damaged and faulty is also on a lesser scale. This is the reason why maximum customers those who are buying Amco batteries are happy customers as they are not facing any problems and the price is also quite reasonable. Based on this aspect of High Quality products with high quality packaging; Amco is building their customer base across the markets and this is the reason why they are the most preferred brand after Amaron in the market of rural Hooghly District.

Now if we have to speak about the urban market, then the adjusted value of R-Square for Exide is 0.829 with 99% level of confidence. For Amaron it is 0.764 with 95% level of confidence and for Amco it is 0.870 with 95% level of confidence. It is quite evident that Amco is building their customer base on the basis of their quality products and customers do know that. That is the reason why customers prefer Amco so much across the markets. For Exide the value of adjusted R-Square is highest which means that the components which create product quality dimensions of battery brands can significantly explain the overall perception of the battery brand- Exide. As Exide does give a better after sales services and it is doing quite good in terms of providing facilities to the dealers in the urban market. More over the brand repute of Exide does work in the minds of the urban customers as it is one of the oldest and most popular battery brands in India with International presence. However, speaking of Amaron it is also on a quite higher side in terms of creating an overall perception of the brand in the minds of the customers.

Form the findings mentioned above this could be inferred that the consumers of both the villages and the cities perceive that the components which create product quality dimensions of battery brands can significantly explain the overall perception of the battery brands.

The next task was to **compare and contrast the relative importance of the components which create the overall perception of battery brands.** For achieving this conclusion a comparative analysis of the standardized coefficients was done. The findings are as follows:

Table 5: Comparative Analysis of the Standardized Coefficients in Rural Market

Brands → / Attributes ↓	Exide	Amco	Amaron
Performance	**0.446****	**0.123***	**0.204***
Features	-0.044	0.422	0.635
Conformance with Specification	**0.034***	**0.220***	0.138
Reliability	**-0.813****	**0.243***	**0.411***
Durability	**0.287***	0.099	0.128
Serviceability	**-0.214***	**0.169***	**0.329***
Fit and Finish	**-0.111***	**0.324***	**0.213***

Table 6: Comparative Analysis of the Standardized Coefficients in City Market

Brands ↓ / Attributes →	Exide	Amco	Amaron
Performance	**0.197****	**0.111***	**0.204***
Features	**0.365***	-0.212	**0.444***
Conformance with Specification	**0.290***	**0.326***	**0.467***
Reliability	**0.581***	**-0.368****	**0.411***
Durability	0.09	**0.123***	**0.756***
Serviceability	**-0.714***	**0.322***	**0.523***
Fit and Finish	**-0.104****	**0.666***	**0.158***

Thus from the above mentioned tables significant difference could be found among the standardized variables between the users of villages and the cities.

It has been observed that both the users of city village and city markets perceive that Performance of all the battery brands is positively significant. Be it urban market or rural market; customers will never ever compromise with the performance part as they want more of the performance in less price which can be termed as maximum utilisation. So if a battery is giving better performance then they will prefer that only above everything else. That is why this is one of the most important feature or aspect in creating a perception especially in the rural markets as rural customers give this aspect the most importance.

Although Features of all the brands are found to be insignificant to the village users, it is found positively significant in city market consumers for both Exide and Amaron. This is because urban customers prefer features and attributes and that funkiness in their products which will look attractive but the case is completely different in case of rural markets as they do not give much importance to these extra features and attributes they just simple want better performance at the minimum price possible. Let us take an another product example to understand this, like for CPU in computers urban customers want more ram and graphics card and that great look with better finish but for rural customers they would just want a CPU which would serve their purpose. That shows that Features as an aspect does not hold much importance for rural customers but it does hold an importance for the urban customers.

While Conformance to specification is found to be positively significant for Exide and Amco in village market, it is found positively significant for all the brands in city market. It is the degree to which a product's design and operating characteristics meet established standards. So it is quite obvious that what is being promised by various companies as a part of promotion and advertisement for a particular product that is of high quality as per the quality standards otherwise it would become deception. That is why this is a very important aspect in creating that trust factor with a particular brand.

Reliability is found to be significant for all the brands in both village and city market with some variation. While the village market perceives this variable having a negative impact on Exide battery brand, the city market finds this variable to be positively significant for all the battery brands, except Amco. This attribute is found to have a negatively significant impact on Amco, in the perception of the city users. Rural customers are having a negative impact because from the survey it was evident that Exide batteries are getting damaged and coming with faultiness way before than any other brands. Like after using the battery for one and half year there voltages are fluctuating and other problems are occurring up and now when it comes to after sales services they are taking minimum of 20-25 days for repairing and that also without providing and replacement batteries which Amaron does give to their customers so that the customers doesn't get affected. Now due to all these reasons customers are having a negative impact when the reliability factor comes for Exide as a brand.

Durability, another variable which create the product quality dimension of the brands, is found to have no significant impact on the battery brands except Exide, in the village market. Contrary findings have been observed in the city market where Amco and Amaron are found to possess significant impact with respect to durability. Moreover, the impact of this variable is found insignificant in building the overall concept of Exide batteries.

Exide is the only brand to possess negatively significant impact of Serviceability in both the village and city market while the other two brands are found to have positively significant impact of this variable in both the village and city market. This is because as Exide in terms of after sales services it is taking minimum 7-9 days in the urban markets and in the sub- urban areas it is taking 10-15 days and in the rural markets it are taking 20-25 days and that also without giving any replacement batteries. That is why when the word Serviceability comes; Exide is not doing so well across the markets hence having a negative impact.

Similar case is observed in case of Fit and Finish attribute while it is found to have a positively significant impact on building the overall perception of Amaron and Amco; it is found to possess a negative impact in building the perception of Exide in both the village and city market.

Thus from the above observations, it could be stated that findings related to the standardized variables of product quality dimensions of battery brands have significantly underlined the difference of perception between village and city users. This finding also states the regions of improvement for all the battery brands with respect to different markets.

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