An Analytic Approach to Measure Consumers' Preference for FMCG Brands in India Through Choice Based Conjoint Analysis

Amrita Chatterjee[#1], Isita Lahiri[*2]
[#] Senior Research Fellow (UGC/NET/SRF), [*]Professor
Department of Business Administration, University of Kalyani, Nadia,West Bengal, India

Abstract: Here in this study conjoint analysis is used to know consumers' perception about FMCG brands in terms of Brand promotion, Hike in price, Brand switch, Quality of product, Word of mouth, Brand availability, Product line, Self image. In conjoint analysis every variable is presented with more than one underlying labels in front of the consumers. The researcher has used IBM-SPSS18 software to generate conjoint profile/ preference cards. Responses are directly collected with respect to the conjoint profile generated by the software.

***Keywords*- Choice Based Rank, Conjoint Analysis, FMCG Brands and Conjoint Profile.**

I. INTRODUCTION

Conjoint analysis is a very useful statistical technique in the discipline of Marketing Management. Data set of the Conjoint Analysis is preferences of the interviewed subjects. Important applications of conjoint analysis are:

- Designing a new product according to the requirements of the market.
- Gathering detail knowledge on the consumers' perception about a brand.

A snap shot of some important consideration for conjoint analysis:

- Factors and their values are defined by the researcher in advance „
- The various combinations of the factor values are being ranked by the interviewed persons
- With Conjoint Analysis it is possible to derive metric partial utilities from the ranking results „
- The summation of these partial utilities therefore results in metric total utilities.

Here we have used conjoint analysis to find out the factors which in cumulative way motivate the consumers to take final purchase decision on an FMCG brand.

II. LITERATURE REVIEW

From pilot survey, so many predictor variables are identified but we have considered only those predictor variables, which are supported by previous research works. Following predictor variables are used in this study:

Brand Promotion (BP):

Brand promotion includes all marketing activities, which spread and increase brand awareness and brand preference. Some important brand promotional activities are advertising, free sample distribution, endorsement etc (*McCarthy, 1960).* In this study all types of promotions related to FMCG brands are considered together. No means of promotions are separately discussed and considered.

Self-Image (SI):

Self-image is completely defined by the perception of a consumer about reflection of his or her inner self in front of others (Rogers, 1977). Here self image is taken into account with respect to FMCG brands.

Quality of the Product (QP):

The quality of the products is defined as a comprehensive evaluation of the goodness of the performance of goods or services (Kotler, 2003). Here the consumers consider quality of product in terms of perceived quality of an FMCG product. No laboratory test is conducted to know the quality of each product considered in this study.

Product Line (PL):

Product line refers to offering of several closely related products to the consumers. A product line can comprises of related products of different color, size, flavor etc. In simple terms, it is the variety of closely related products (Krishnamurthy, 2007). In this study product line is considered as its definition.

Brand Availability (BA):

In simple terms availability of brand means the brand should be available in retail stores, in departmental stores, in online stores whenever the consumer realizes a demand for it (Bayron, 2011). Here in this study brand availability means, availability of an FMCG brand in online stores and in offline stores, both the places.

Hike in Price (HP):

In ordinary usage, a price is the quantity of payment or compensation given by one party to another in return for one unit of goods or services (Schindler, 2012). Here in this study price is considered as the hike in present price of an FMCG brand compared to other substitute brands (identified from responses of consumers) and its effect on brand equity. **This study considers**

hike in price absolutely based on consumers' perception and their reaction about price hike of an FMCG brand. Here it is not at all considered from financial or economic aspects.

Word of Mouth (WOM):

Consumers' peers, family members' shares opinion or experience about a brand. This is called word of mouth, which sometimes regulate consumer's attitude towards a brand. The consumer may or may not be influenced by their opinion (Lang, 2013). This study has taken into account both, positive and negative word of mouth.

Brand Switching (BS):

Brand switching is the tendency to shift of preference from one brand to another brand of same product category (Nielson, 2013). Here in this study brand switch is considered in terms of FMCG brands only, a shift from one FMCG brand to another FMCG brand.

2.1 Objectives of the Study:

The objective behind this study is analysis of customers' response to know their attitude towards FMCG brands.

III. RESEARCH METHODOLOGY AND DATA

Simple random sampling method is followed in this research study. We have gone to each and every above mentioned spot during the time period of 2014 to 2016. In Kolkata every major location has a "More" which means the junction or most important landmark of a said location. We stood on the footpath of some 'mores' and approached most of the people passing by from 10am to 12pm indifferent days of the above said time period. So many people were passing by among them a very few were ready to respond and filling up the questionnaire. It is evident from the data collection procedure that selection of respondents was completely random and unbiased. Each and every resident of the sample area had equal chance to be selected as a respondent.

Selection of Profiles Efficiently: To reduce the consumers' task, we select profiles more efficiently. One of the most common experimental designs is known as an orthogonal fractional factorial design – an "orthogonal design" for short. Such designs are conceptually similar to the popular Sudoku puzzles. In an orthogonal design, the levels of the features are chosen such that, for each pair of features, say a and b, the high level a appears equally often in profiles that have a high level b as in profiles that have a low level of b, and vice versa. Such experimental designs are extremely efficient for estimating partworths for features. These designs do not come without a cost. They confound "interactions." With such designs we can only estimate "main effects" of each feature. This is equivalent to an assumption that the partworth
of having high levels of both a and b equals the partworth of a high level of a plus the partworth of a high level of b. If there were an interaction, the value of having high levels on both a and b might by synergistically more valuable than the value of having a high level of a and the value of having a high level of b. Orthogonal designs are not the only fractional factorial designs. Designs can be created in such a manner that require more profiles, but which also allow to estimate some interactions. Orthogonal designs are used for ratings and rankings tasks. Using Conjoint analysis is appropriate if the stimuli are realistic, the sample of consumers is representative, the consumer tasks are designed carefully, and the appropriate statistical methods are used to estimate partworths, conjoint analysis accurately represents how consumers will behave when faced with new products. The willingness to pay for the features is sufficiently accurate to make decisions on which features to include in a product. We can think of a set of conjoint analysis partworths as representing "virtual customers." We can use those partworths to build a market simulator. With the partworths and with a list of the competitive products that are now on the market, we can predict sales for every combination of features and price. We can also predict sales for a portfolio of products that we might launch on the market (Hauser, 2017).

Conjoint Utilities: Conjoint utilities or partworths are scaled to an arbitrary additive constant within each attribute and are interval data. The arbitrary origin of the scaling within each attribute results from dummy coding in the design matrix. We could add a constant to the partworths for all levels of an attribute or to all attribute levels in the study, and it would not change our interpretation of the findings. When using a specific kind of dummy coding called effects coding, utilities are scaled to sum to zero within each attribute. Other kinds of dummy coding arbitrarily set the part-worth of one level within each attribute to zero and estimate the remaining levels as contrasts with respect to zero. Whether we multiply all the part-worth utilities by a positive constant or add a constant to each level within a study, the interpretation is the same. Interval data do not support ratio operations. When using choice-based conjoint (CBC), the researcher can analyze the data by counting the number of times an attribute level was chosen relative to the number of times it was available for choice. In the absence of prohibitions, counts proportions are closely related to conjoint utilities.

Attribute Importance: Sometimes we want to characterize the relative importance of each attribute. We can do this by considering how much difference each attribute could make in the total utility of a product. That difference is the range in the attribute's utility values. We calculate percentages from relative ranges, obtaining a set of attribute importance values that add to 100 percent. Importance depends on the particular attribute levels chosen for the study. When calculating importance from Choice Based Conjoint data, partworth utilities resulting from latent class (with multiple segments)is a better measure, especially if there are attributes on which respondents disagree about preference order of the levels (Orme, 2010).

The Choice-based conjoint analysis (CBC) (also known as discrete-choice conjoint analysis) is the most common form of conjoint analysis. Choice-based conjoint requires the respondent to choose their most favourite full-profile concept. This choice activity is thought to simulate an actual buying situation, thereby assuming actual shopping behaviour. The significance and fondness for the attribute features and levels can be mathematically deduced from the trade-offs made when selecting one (or none) of the available choices. Choice-based conjoint designs are contingent on the number of features and levels. Often, that number is large and an experimental design is implemented to avoid respondent fatigue. The output of a Choice-based conjoint analysis provides excellent estimates of the importance of the features. Results can estimate the value of each level and the combinations that make-

up optimal products. Simulators report the preference and value of a selected package and the expected choice share (Qualtrics, 2017).

The analysis of Choice Based Conjoint data is more multifaceted than the analysis of data obtained from the other conjoint analysis techniques. Because we only observe first choice the judgment methods need to take that into account. Such methods include logit models, probit models, polyhedral methods, and support vector machines. Because each choice set provides only partial data, consumers often have to make choices from a large number of choice sets. Hierarchical Bayes and machine learning methods are now becoming the "gold standard" in terms of estimating partworths from Choice Based Conjoint data.

3.1 Determination of sample size*:*

Kolkata is a major city of India which is characterized by high volume of population. It is difficult for an individual to cover the entire population of Kolkata for the purpose of collection of data to overcome this problem we have decided to follow sampling procedure. We have used a statistical model to find out what should be our required size of sample to reflect the population characteristics (Bill Godden, 2004). If the sample size is more than 50,000 (infinite population) then the formula for determining adequate sample size is:

$SS= (Z^2 \times (p) \times (1- p))/C^2$

We have taken 500 respondents for our study which is satisfying these criteria quite clearly.

3.2 Sample Adequacy Test*:*

Table 1:KMO Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.943

KMO test result shows that the sample size is taken for this study is adequate with a significant value of 0.943. If the value of KMO test is more than 0.70 then it is considered to be adequate sample size for a study.

3.3 Data Collection:

In our study primary data is collected through one to one interview method. In this respect we have taken help of some predesigned questionnaire which reflect the attitude of consumers towards their preferred brands. Here in this study conjoint analysis is used to know consumers' perception about FMCG brands in terms of Brand promotion, Hike in price, Brand switch, Quality of product, Word of mouth, Brand availability, Product line, Self image. In conjoint analysis every variable is presented with more than one underlying labels in front of the consumers. The researcher has used IBM-SPSS18 software to generate conjoint profile/ preference cards.

3.4 Interpretation of Conjoint Analysis Output with Respect to FMCG Brands:

Table 2: Showing Correlations[a] in Conjoint Analysis		
	Value	Sig.
Pearson's R	0.661	0.000
Kendall's tau	0.436	0.001
a. Correlations between observed and estimated preferences		

The above Table shows two statistics Pearson's R and Kendall's tau which provide measures of the observed and estimated preferences. In this study both statistics are significant at 95% confidence interval.

Table 3: Recoded Values for Conjoint Analysis of FMCG Brands			
Original Value		Recoded Value	Value Label
Brand Promotion	1	1	Extensive
	2	2	Moderate
	3	3	Low
Hike in Price	1	1	Rs 10 per unit
	2	2	Rs 20 per unit
	3	3	Rs 30 per unit
Brand Switch	1	1	Frequent
	2	2	Never
	3	3	After a certain time
Quality of Product	1	1	Best in market
	2	2	Good
	3	3	Average
Word of Mouth	1	1	Has an effect
	2	2	Does not effect
Brand Availability	1	1	Online
	2	2	Offline
	3	3	Online and offline both
Product Line	1	1	Huge variety

	2	2	Some variety is there
	3	3	Single variety
Self Image	1	1	Maximum association
	2	2	Indifferent
	3	3	Minimum association
Recoded values are used in computations.			

The Table shows the recorded values for every variable are considered at the time of conjoint analysis. Here it is worth mentioning that in case of shampoo/ detergent/ tea a unit is considered as 100 ml/ 100 g/ 100 g respectively.

Table 4: Showing Model Description in Conjoint Analysis for FMCG Data

	N of Levels	Relation to Ranks or Scores
Brand Promotion	3	Discrete
Hike in Price	3	Discrete
Brand Switch	3	Discrete
Quality of Product	3	Discrete
Word of Mouth	2	Discrete
Brand Availability	3	Discrete
Product Line	3	Discrete
Self Image	3	Discrete
All factors are orthogonal.		

The above Table shows that the data type is discrete in nature so it is a non parametric data where predictors Brand Promotion, Hike in Price, Brand Switch, Quality of Product, Brand Availability, Product Line, Self Image have three levels and predictor Word of Mouth has two levels.

Table 5: Showing Utilities are Derived from Conjoint Analysis of FMCG Data

		Utility Estimate	Std. Error
Brand Promotion	Extensive	-1.105	1.084
	Moderate	1.671	1.084
	Low	-0.567	1.084
Hike in Price	Rs 10 per unit	-1.063	1.084
	Rs 20 per unit	1.635	1.084
	Rs 30 per unit	-0.572	1.084
Brand Switch	Frequent	0.423	1.084
	Never	-0.820	1.084
	After a certain time	0.397	1.084
Quality of Product	Best in market	0.531	1.084
	Good	1.041	1.084
	Average	-1.572	1.084
Word of Mouth	Has an effect	0.503	0.813
	Does not effect	-0.503	0.813
Brand Availability	Offline	0.019	1.084
	Online and offline both	0.178	1.084
	Only online	-0.197	1.084
Product Line	Huge variety	0.296	1.084
	Some variety is there	0.100	1.084
	Single variety	-0.396	1.084
Self Image	Indifferent	-0.398	1.084
	Minimum association	-0.305	1.084
	Maximum association	0.703	1.084
(Constant)		13.832	0.813

The Table represents the relative utility scores for each factor levels; higher utility scores indicate greater preference. With the help of individual utility values total utility of some of the combinations of preferences are calculated:

1. Total Utility = Constant + Moderate Brand Promotion + Price Hike of Rs. 20 per pack + After a certain time Brand Switch + Good Quality of Product + Effective Word of Mouth + Brand Availability online and off line both + Huge variety in Product Line + Maximum association with Self Image

= 13.832 + 1.671 + 1.635 + 0.397 + 1.041 + 0.503 + 0.178 + 0.296 +0.703

= 20.256

2. Total Utility = Constant + Extensive Brand Promotion + Price Hike of Rs. 30 per pack + Frequent Brand Switch + Best in the market in terms of Quality of Product + Ineffective Word of Mouth + Brand Availability off line only + Some variety in Product Line is there + Maximum association with Self Image

= 13.832 - 1.105 - 0.572 + 0.423 + 0.531 - 0.503 + 0.019 + 0.100 - 0.305

= 12.420

3. Total Utility = Constant + Low Brand Promotion + Price Hike of Rs. 10 per pack + Never Brand Switch is done + Average Quality of Product + Ineffective Word of Mouth + Brand Availability online only + Single variety in Product Line + Indifferent about Self Image

= 13.832 - 0.567 - 1.063 - 0.820 - 1.572 - 0.503 - 0.396 - 0.398

= 8.513

Table 6: Importance Values of Different Variables in Brand Equity Construction

Brand availability	22.197
Product line	21.572
Word of mouth	9.938
Brand Promotion	20.898
Self image	8.052
Hike in Price	3.001
Quality of Product	5.534
Brand Switch	8.807
Averaged importance score	

In the Table relative importance of all the contributing variables are shown where brand availability, product line and brand promotion are very important. Among these three variables brand availability is most important according to the consumers.

IV. CONCLUSIONS:

Here three different utility scores are calculated but in case of 1st utility score the value is highest and it is expected that whatever combination is taken it will not be greater than 20 because in case of 1st utility calculation all positive and highest values are taken into consideration. So it can be said that **moderate Brand Promotion, Price Hike of Rs. 20 per pack, after a certain time Brand Switch, good Quality of Product, effective Word of Mouth, Brand Availability online and off line both, huge variety in Product Line, maximum association with Self Image** is the best combination to achieve **maximum Brand Equity** of an FMCG brand**.** On the other hand in case of 3rd utility score the value is lowest and it is expected that whatever combination is taken it will not be less than 8.513 because in case of 3rd utility calculation all negative and smallest values are taken into consideration. So it can be said that **Low Brand Promotion, Price Hike of Rs. 10 per pack, never Brand Switch is done, average Quality of Product, ineffective Word of Mouth, Brand Availability online only, single variety in Product Line, indifferent about Self Image** is the combination which will incur **minimum Brand Equity** for an FMCG brand.

REFERENCES

1) David A. Aaker, Managing Brand Equity ;New York, NY: The Free Press, 1991
2) Ahmed I. Moolla1, 2. a. (2012). Empirical Evaluation of a Model That Measures the Brand. Soc Sci .
3) Back KJ, Parks SC 2003. A brand loyalty model is involving cognitive, affective, and cognitive brand loyalty and customer satisfaction. Journal of Hospitality and Tourism Research, 27(4): 419-435.
4) Chaudhuri A, Hoibrook MB 2002. The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. Journal of Marketing, 65(2): 141-149.
5) American Marketing Association. (2004). *Definition of Marketing.* https://www.ama.org/AboutAMA/Pages/Definition-of-Marketing.aspx. Retrieved September 18, 2014, from www.ama.org:
6) American Marketing Association. (2011, June 29). *https://www.ama.org/search/pages/results.aspx?k=brand*. Retrieved September 18, 2014, from www.ama.org: https://www.ama.org/search/pages/results.aspx?k=brand
7) Bruno Schivinski, D. D. (2014, May). *THE CONSUMER-BASED BRAND EQUITY*. Retrieved January 3, 2015, from GUT FME Working Paper Series: ftp://ftp.repec.org/opt/ReDIF/RePEc/gdk/wpaper/WP_GUTFME_A_22_SchivinskiDabrowski.pdf
8) Colorado State University. (1993-2017). *Generalizability.* Retrieved January 31, 2015, from colostate.edu https://writing.colostate.edu/guides/page.cfm?pageid=1373&guideid=65.

9) Delbeke, L. V. (2017). *Multidimensional Scaling.* Retrieved July 24, 2017, from http://www.uni-bonn.de.htm: http://www.uni-bonn.de/mathpsyc/doc/delbeke/delbeke.htm
10) franke.nau.edu. (2017). *Regression.doc*. Retrieved July 21, 2017, from franke.nau.edu: franke.nau.edu/facstaff/jerrell-m/BA201/.../Multiple%20Linear%20Regression.doc
11) Godden, B. (2004). *samplesizeformula.pdf.* Retrieved 2013, from http://williamgodden.com: http://williamgodden.com/samplesizeformula.pdf
12) Hauser, J. R. (2017). *Note on Conjoint Analysis.* Retrieved July 25, 2017, from http://www.mit.edu: http://www.mit.edu/~hauser/Papers/NoteonConjointAnalysis.pdf
13) IBEF. (2010). *FMCG Industry in India*. Retrieved December 6, 2017, from https://www.ibef.org: https://www.ibef.org/industry/fmcg-presentation
14) Jain, P. (2011, July 25). *FMCG INDUSTRY*. Retrieved August 2013, 6, from www.slideshare.net: https://www.slideshare.net/prateek2nov/fmcg-industry-8685985
15) Keller, D. R. (2004). *BRANDS AND BRANDING:RESEARCH FINDINGS AND FUTURE PRIORITIES.* Retrieved August 20, 2013, from https://pdfs.semanticscholar.org: https://pdfs.semanticscholar.org/2e00/4c4b77b22d881e29ccb99cc1d290155ed8e3.pdf
16) Miller, K. M. (2011). *How Should Consumers' Willingness to Pay be Measured? An Empirical Comparison of State-of-the-Art Approaches*. Retrieved January 24, 2014, from https://en.wikipedia.org: https://en.wikipedia.org/wiki/Willingness_to_pay
17) Musa, R. (2005). *A proposed model of satisfaction-attitudinal loyalty-behavioural loyalty chain: exploring the moderating effect of trust*. Retrieved April 25, 2014, from www.scholar.google.co.in: http//scholar.google.co.in/scholaqr?q=brand+loyalty+musa+2500+newzilan+conference&hl=en&as_sdt=07scholart
18) Mordkoff, T. (2000). *Assumption(s) of Normality*. Retrieved july 12, 2014, from psychology.uiowa.edu: http://www2.psychology.uiowa.edu/faculty/mordkoff/GradStats/part%201/I.07%20normal.pdf
19) Nielsen. (2013, 11 12). *HOW LOYAL ARE YOUR CUSTOMERS?* Retrieved January 3, 2014, from http://www.nielsen.com: http://www.nielsen.com/content/dam/nielsenglobal/eu/nielseninsights/pdfs/Nielsen%20Global%20Report%20of%20Loyalty%20Sentiment%20November%202013.pdf
20) Notelaers, G., & Brussels. (2000). *MULTIDIMENSIONAL SCALING. EXPERIMENTING WITH PROXSCAL.National Institute Research of Working Conditions*. Retrieved July 24, 2017, from multivariatestatsjl.readthedocs.io/en/latest/cmds.html: multivariatestatsjl.readthedocs.io/en/latest/cmds.html
21) Orme, B. (2010). Interpreting the Results of Conjoint Analysis. In W. Madison, *Getting Started with Conjoint Analysis: Strategies for Product Design and Pricing Research* (pp. 77-89). Research Publishers LLC.
22) Qualtrics. (2017). *A Brief Explanation of.* Retrieved July 25, 2017, from https://www.qualtrics.com: https://www.qualtrics.com/wp-content/uploads/2012/09/ConjointAnalysisExp.pdf
23) Smith, J. E. (2010). *What is FMCG All About.* Retrieved January 5, 2014, from What is FMCG All About? From <http: //enzinearticles.com>
24) Somma, M. D. (2015, January 27). *https://18-different-types-of-brand.* Retrieved March 3, 2016, from www.brandingstrategyinsider.com: www.brandingstrategyinsider.com/2015/01/18-different-types-of-brand.html#.We4q5Y-Cx0s
25) Statista. (2011, January 1). *size-of-the-indian-fmcg-market*. Retrieved August 12, 2013, from statista.com: ttps://www.statista.com/statistics/419280/size-of-the-indian-fmcg-market/
26) Tinman. (2008, September). *Functional Dependencies and Normalization* . Retrieved July 26, 2017, from http://tinman.cs.gsu.edu: http://tinman.cs.gsu.edu/~raj/4710/sp08/fd-theory.pdf
27) Uebersax, J. (2017). *19 - Correlation and Regression.doc - John Uebersax*. Retrieved July 20, 2017, from www.john-uebersax.com: www.john-uebersax.com/stat312/19%20-%20Correlation%20and%20Regression.doc
28) William, R. (2016). *https://www.google.co.in/?gfe_rd=cr&ei=DEtwWZWLKKjy8AfvzZPIBQ&gws_rd=ssl#q=test+of+hypothesis+pdf.* Retrieved July 20, 2017, from https://www3.nd.edu/~rwilliam/stats1/x24.pdf: https://www3.nd.edu/~rwilliam/stats1/x24.pdf