Research Article

Statistical Analysis of the Core Determinants Influencing the Consumers Brand Preference in Generalization of Bath Soaps

Jakkireddy Suresh Reddy*, Ramana KA and Mehul Bhandari

Department of Management Studies, Rajeev Gandhi Memorial College of Engineering and Technology, Jawaharlal Nehru Technological University Anantapur, Andhra Pradesh State, India

Abstract

The necessity of this study is to identify and analyze the determinants affecting consumer's preference of bath soaps. Among the factors education, age, income, price, advertisement, celebrity, quality, the factors education, income and product qualities are affecting consumer's brand preference of bath soaps. With one way ANOVA it had been found that the income factor is influencing the consumer's brand preference in which the calculated F-Value (2.66522)>F-Critical value (2.24640). With Two way ANOVA without replication it has been found that education factor influence the brand preference, where the calculated value for education, F-Value (3.7956)>F-Critical value (3.0069). The calculated F-Value for age factor, F-Value (1.4301)<F-Critical value (3.0069) and therefore the age factor doesn't influence the brand preference. The simple regression analysis between price and brand preference shows that there is weak relationship between price and brand preference. The correlation coefficient is 0.28. With multiple regression analysis it has been found that the two independent variables didn't add statistically significantly prediction for brand preference. The Z-test concludes that the product quality influences the brand preference. Consumers are more conscious product quality in brand preference. The marketers should look at target market consumer profile especially the education factor, income factor at the time of designing the commercials.

Keywords: Consumer brand preference; ANOVA without replication; Regression analysis; Explanatory factor analysis

Introduction

Soap is a product that many people take for granted but some prefer the brands based on some factors at which the marketer need to look at.

India is a vast country with a population of 1,039 million people. The household of penetration of soaps is 98%. People belonging to different income levels use different brands, that fall under different market segments but in general all the income levels use the soap resulting in the second largest category in India. The rural consumers constitute 71% of the population. The remote and rural demand is growing, with many brands launched in the market. And moreover the Toilet soap industry is one of the oldest Fast Moving Consumer Goods (FMCG) industry in India. The soap market is one of the highest penetrated category within FMCG sector reaching an estimated 96% urban and 88 % of rural markets. It is also the industry which is characterized by a high level of intense competition. The various competitors in this sector ranges from MNC's like Unilever, Henkel, P&G to local big companies like Wipro, Nirma and Godrej.

Within an array of products in various categories of soap markets HUL is the market leader in all category. There is paradigm shift taking place in the toilet soap market. The premium category and the popular category are the sectors which are experiencing high growth rate. The popular and economy segments account for about four-fifths of the entire market for soaps. The future growth of soap is in the premium category.

Many marketers are drawing different game plans to defend the competitors in the field.

The toilet soaps despite of their divergent brands are not well differentiated by the consumers. It is, therefore not clear if it is the brand loyalty or experimentation lured by the high volume media campaign, which sustain them. As a result of which the market had been fragmented. It is very clear that the toilet soap market once upon a time it is of only urban phenomenon but now it is penetrated even into rural markets also. The competition too had increased. The incremental demand flows from population increase and rise is in the consumption or usage practices impacted as it is by a greater concern for hygienic conditions. And moreover the increased sales revenues would also expand from up gradation of quality too.

The soap market can be divided into four price segments; premium, popular, discount and economy soaps. Approximately the premium soaps are estimated to have a market sales volume of nearly 90,000 tonnes. This conversion into a share of about 14 to 15% is roundabout as much as 30%.

Literature Review

Early research on intergenerational consumption patterns ranged from behavior product choice in financial planning and to brand preference prediction and shopping strategy congruence between mothers and daughters. Guest's longitudinal study covering twenty years recognized the lifetime dimension of brand loyalty learned during childhood (1964, 1955). These studies demonstrate that preference was repeated generationally but do not address why. Similar research connects product preference to early family socialization and shows that parental influence wanes with age and fluctuations in income.

This research has traditionally taken two routes and is often a

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*Corresponding author: Jakkireddy Suresh Reddy, Department of Management Studies, Rajeev Gandhi Memorial College of Engineering and Technology, Jawaharlal Nehru Technological University Anantapur, Andhra Pradesh State, India, Tel: +91 9866728854; E-mail: jakkireddysureshreddy@gmail.com

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combination of both. The first focuses on the importance of social agents; environmental and media factors in the social learning model and the second centers on children's developing psychology to process consumer information in the cognitive development approach. Brands used since childhood can become "friends" with whom relationships are fashioned early in our social lives.

There has been a long standing interest from marketers to understand how consumers form their preferences toward a specific brand. Brand preference is closely related to brand choice that can facilitate consumer decision making and activate brand purchase. Knowing the pattern of consumer preferences across the population is a critical input for designing and developing innovative marketing strategies. It also uncovers the heterogeneity of consumer choices leading to efficient market segmentation strategies.

Most of the studies have shown marketing mix factors have a relationship on the purchasing behavior of the consumer. The proper alignment of the marketing mix is essential in achieving the consumers mind share for the brand. Gupta [1] indicates that marketing mix have a strong relationship with consumers buying patterns, brand choices and incidences of purchase. The impact of demographical factors also plays a significant role in consumers buying behavior. Age group is an attribute which has a direct impact on person's attitude towards a brand. Based on the maturity the preference for toilet soap or any other product may vary. The education level of a person also influence in the decision making process. A well educated person may analyze the ingredients in particular beauty soap but less educated person may not, due to lack of knowledge. Income level of a person has a direct impact on the purchasing of a product. When the income levels rises naturally people tend to buy more luxury/premium products. The income affects the type of goods that consumers are likely to buy [2-6].

Consumer preferences are varied and are more regionally specific. India is divided into four regions: North, East, West, and South. Consumers in the North prefer pink colored soaps, which have floral profiles. Here the fragrance preference is for more sophisticated profiles reflecting their lifestyles. Freshness soaps with lime and citrus note are also popular preferences as the climate in the North is very hot and citrus/lime scented soaps are seen to be refreshing. The East is not a big soap market; hence no particular preference skews. Consumers in the West exhibit preferences for strong, impactful fragrances and somewhat harsher profiles compared to the North. Preferences are more for the pink soaps with floral fragrances, primarily rose, which are positioned on the beauty platform. In the South, the skew is towards specific soap segments [7,8].

Objectives of the Study

To statistically analyze the core determinants influencing the consumer brand preference in generalization of bath soaps. It includes analyzing the core factors like education, age, income, price, advertisement, celebrity and product quality influencing the brand preference in generalization of bath soaps.

Scope and Limitations of the Study

The study was conducted in and around Nandyal town, Andhra Pradesh state, India.

It is believed that the findings in and around Nandyal town are fair representative of the other parts of the State and the lifestyle and other parameters are not much different from what exist in the area of survey [9].

Though the market has over hundred fifty toilet soap brands but only ten brands were chosen for the for the study of brand preference. Other limitations have been identified in this study are, the research work covers only the areas in and around Nandyal town, the sample size do not ensure representative and conclusive finding and finally, a more robust analysis is needed to reach a strong conclusion (Table 1).

Research Methodology and Hypothesis

The following research methodology was designed to study the determinants influencing consumer brand preference in generalization of bath soaps. This describes the education, age, income, price, advertisement, celebrity and product quality as independent variables and brand preference as dependent variable [10-15].

The present study was undertaken to study the brand preference towards toilet soaps. A descriptive research was carried out. A field survey was conducted in which a sample of 100 customer purchasing patterns of bath soaps were observed for about five months successively, (March to July, 2016) in and around Nandyal town of Kurnool district, the areas were selected conveniently. The consumers were selected randomly constituting sample size as 100. Likert scale was used in the questionnaire, where One time purchase of same brand=10, Two times purchase of same brand=20, Three times purchase of same brand=30, Four times purchase of same brand=40, Five times purchase of same brand=50 and Six times purchase of same brand=60. In the case of Simple Linear Regression and Multiple regression a sample of 100 customers were observed for a period of four months [16-20]. The consumers were served with a structured schedule as data collection tool. The retailers also were questioned to gain new insights on buying behavior and brand preference. The data collected was analyzed mainly thorough descriptive statistics, using ANOVA-Two factor without replication to analyze the influence of education and age factors on brand preference, One way ANOVA to analyze the impact of income factor on brand preference, Simple linear regression analysis to analyze the impact of price on brand preference and Multiple linear regression analysis was used to analyze the impact of advertisement and celebrity on brand preference [21-24].

Results, Discussion and Conclusion

Two Factor without replication used to analyze the influence of age and occupation on brand preference

ANOVA with two factors Age (A Factor) Education (B Factor) each with five levels.

Hypothesis in Two Way ANOVA

$H_01=\mu_{A1}=\mu_{A2}=\mu_{A3}=\mu_{A4}=\mu_{A5}$

H_{11}=Not all means are equal.

$H_02=\mu_{B1}=\mu_{B2}=\mu_{B3}=\mu_{B4}=\mu_{B5}$

Preferred Soap Brand	(%)100
Lux	15
Dove	25
Santoor	12
Liril	12
Dettol	14
Lifebuoy	10
Cinthol	10
Medimix	2

Table 1: Classification based on preferred Soap brands of the 100-consumers.

$H_1 2$=Not all means are equal.

Education and Age Factors influencing the Brand Preference

Education and Age are the two factors. Age factor is of five levels. Education is of six levels including others.

A sample of 100 customers purchasing patterns of bath soaps were observed for about five months successively [2]. Likert scale was used in the questionnaire, where One time purchase of same brand=10, Two times purchase of same (Tables 2-4).

Statistical conclusion

Since the calculated F value for the rows 3.795699>3.006917 F crit, the null hypothesis is rejected.

Therefore the education factor influences the brand preference. And the calculated F value for the columns 1.430108<3.006917 F crit, the null hypothesis is accepted.

Therefore the age factor does not influence the brand preference.

One way ANOVA - income factor on brand preference of different bath soaps

Likert scale was used in the questionnaire, where One time purchase of same brand=10, Two times purchase of same brand=20, Three times purchase of same brand=30, Four times purchase of same brand=40, Five times purchase of same brand=50, Six times purchase of same brand=60 and seven times purchase of same brand=70 (Table 5).

Hypothesis,

$H_0 3=\mu_1=\mu_2=\mu_3=\mu_4=\mu_5$

$H_1 3$=Not all means are equal.

	Up to 20	21-30	31-40	41-50	>50
No Formal Education	20	40	50	50	20
Higher Secondary	30	10	20	40	30
Graduation	10	30	60	30	60
Post Graduation	60	40	60	50	40
Professional	60	40	60	60	60

Table 2: Education and Age Factors influencing the Brand Preference.

Summary	Count	Sum	Average	Variance
No Formal Education	5	180	36	230
Higher Secondary	5	130	26	130
Graduation	5	190	38	470
Post Graduation	5	250	50	100
Professional	5	280	56	80
Up to 20	5	180	36	530
21-30	5	160	32	170
31-40	5	250	50	300
41-50	5	230	46	130
Above 50	5	210	42	320

Table 3: Education and Age Factors influencing the Brand Preference.

Source of variation	SS	df	MS	F	P-value	F crit
Rows	2824	4	706	3.795	0.02	3.006
Columns	1064	4	266	1.430	0.27	3.006
Error	2976	16	186			
Total	6864	24				

Table 4: Education and Age Factors influencing the Brand Preference.

Summary

Statistical conclusion

Since the calculated F value 2.665228>2.246408 F crit, the null hypothesis is rejected. Therefore there is a significant statistical difference, concluding that the income factor influences the brand preference (Tables 6 and 7).

Simple linear regression

A sample of 100 customers were used in collecting the following data. Does the Price variable affects the Brand preference (Tables 8-12).

Wretched (Less than 1200 Rs.)	Poor Cls (1200-2400 Rs.)	Lower CI (2400-4000 Rs.)	Middle CI (4000-12000 Rs.)	Upper cls (12000-48000 Rs.)	Rich Class (48000-240000 Rs.)	Super Rich (240000-& above)
60	20	40	70	50	70	70
30	60	40	60	50	70	50
20	60	60	70	40	20	60
10	60	40	60	10	60	40
30	10	20	50	70	30	70
40	40	50	60	50	10	50
70	50	40	50	40	40	40
50	60	50	60	70	50	50
40	20	40	70	70	40	70
30	40	40	60	30	60	60

Table 5: One Way ANOVA - Income factor on Brand Preference of different bath soaps.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	4117.14	6	686.19	2.665	0.022	2.246
Within Groups	16220	63	257.46			
Total	20337.1	69				

Table 6: ANOVA.

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	4117.14	6	686.19	2.665	0.022	2.246
Within Groups	16220	63	257.46			
Total	20337.1	69				

Table 7: ANOVA.

Price (Rs) of 125 g Soap	No. of customers purchased
14	4
20	19
25	30
29	23
40	10
42	4
48	10

Table 8: Simple Linear Regression: A sample of 100 Customers were used in collecting the following data. Does the Price variable affects the Brand preference.

Regression Statistics	
Multiple R	0.28544
R Square	0.08148
Adjusted R Square	-0.1022
Standard Error	10.4410
Observations	7

Table 9: Summary Output.

Statistical conclusion

The correlation coefficient is 0.28, which signifies that there is weak relationship between the Price and Brand preference. The regression line doesn't fit the data properly. The significance F Value 0.5349>0.05, concludes that there is no statistical significance of the independent variable price. Even most of the residual outputs are negative showing that there is wide deviation between the actual and predicted values.

Multiple regression analysis

Samples of 100 customers were chosen and their purchasing patterns were recorded for a period of four months as below (Tables 13-15).

Statistical conclusion

The correlation coefficient 0.755 signifies that the relation between the independent variables and dependent variable is weak.

	df	SS	MS	F	Significance F
Regression	1	48.350	48.3504	0.4435	0.5349
Residual	5	545.078	109.016		
Total	6	593.429			

Table 10: ANOVA.

	Coefficients	Standard Error	t Stat	P-value
Intercept	21.3456	11.312	1.887	0.1178
Price (Rs) of 125 g Saop	-0.2267	0.3404	-0.666	0.5349

Table 11: ANOVA.

Observation	Predicted No. of customers purchased	Residuals
1	18.1719	-14.1719
2	16.8117	2.1883
3	15.6783	14.3217
4	14.7715	8.2285
5	12.2779	-2.2779
6	11.8245	-7.8245
7	10.4643	-0.4643

Table 12: Residual Output.

No. of Customers purchased a specific brand	No. of times the Ad repeated in a period of four months	No. of times the same celebrity endorsed the brand during the four months
10	58	42
8	63	63
10	32	28
14	52	50
20	86	80
15	79	68
15	88	59
8	21	16

Table 13: Multiple Regression Analysis-A sample of 100 customers were chosen & their purchasing patterns were recorded for a period of four months as below.

Regression Statistics	
Multiple R	0.75543
R Square	0.57068
Adjusted R Square	0.39895
Standard Error	3.26301
Observations	8

Table 14: Summary Output.

The coefficient of determination 0.57, i.e., the independent variables Advertising and Celebrity explains only 0.57 of variability of dependent variable, no. of customers purchased. Unstandardized coefficients indicate how much the dependent variable varies with an independent variable, when all other independent variables are held constant. In this case the unstandardized coefficient No. of times the Ad repeated in a period of four months I equal to 0.075, this means that for every repetition of the Ad, there is an increase of no. of customers purchased by 0.0751, means very less influence of the no. of times the Ad repeated over the brand preference. And this is similar case with the other unstandardized coefficient celebrity. The two independent variables didn't add statistically significantly to the prediction.

Z-Test used to find whether the quality factor influences the brand preference of the customers

A sample of 100 was taken and divided them into 10 groups of ten each. The collected data is tabulated (Tables 16 and 17).

Hypothesis,

H0; $\mu=10$,

H1; $\mu \neq 10$,

Significance Level (α)=0.05,

Mean of 100 Customers in case of all customers prefer the same brand=10 (μ),

Where μ=Population mean=10,

Population standard deviation=Not known,

$$\text{Standard error of mean} = \frac{\text{sample standard deviation}}{\text{Sqrt. of sample size}}$$

=0.233

Sample Mean=6.1,

Sample standard deviation=2.33.

$$Z = \frac{\text{Sample mean} - \text{Population mean}}{\text{Standard error of mean}}$$

=-16.7381.

	Coefficients	Standard Error	t Stat	P-value
Intercept	4.664	3.253	1.434	0.211
No. of times the Ad repeated	0.075	0.131	0.574	0.591
No. of times the same celebrity endorsed	0.066	0.151	0.436	0.681

Table 15: Summary Output.

Group	No. of customers preferring the same brand because of Good quality
1	6
2	5
3	9
4	4
5	3
6	5
7	4
8	7
9	10
10	8

Table 16: Z-Test used to find whether the quality factor influences the brand preference of the customers.

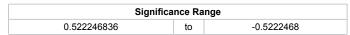| Significance Range		
0.522246836	to	-0.5222468

Table 17: Significance Range.

Statistical conclusion

Since the z score -16.738<0.522 and -16.738<-0.5222, the Null Hypothesis is rejected and therefore there is statistical significance between Quality and Brand preference. And we can conclude that product quality affects the brand preference.

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