Understanding Consumer Perception with Respect to Tea brand using PLS Algorithm
(Special Reference SAPAT INTL Ltd, Nagpur)

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ABSTRACT

The study regarding Consumer buying behavior is causal in nature and is aimed at evaluating the impact of marketing mix on minds of the consumer. General customer residing at Nagpur and Wardha constituted the population for the study. Simple Random sampling technique was used to identify responses for the study and a sample size of 396 respondents from Nagpur and 130 respondents from Wardha was taken to conduct the study. Self-designed questionnaire was used for evaluating Marketing mix for tea branding. The PLS algorithm estimates path models using latent variables. It examines the "structure" of interrelationships expressed in a series of equations, similar to a series of multiple regression equations. On conclusion the GoF index was **0.52079** meaning that the model had acceptable predictive relevance. We can find well researched relaunch of Sapat 2003 onwards as per the consumer perception for the success of the brand.

Introduction

Marketing is an important socio-economic activity with history of many centuries. It is an essential activity for the satisfaction of human wants and for also raising social welfare. Production is the base of marketing. It supplements production activities by distributing goods and services.

Customer is the most important person in the whole marketing process. He is the cause and purpose of all marketing activities. According to Prof. Drucker, the first function of marketing is to create a customer or market. All marketing activities are for meeting the needs of customers and for raising social welfare. Marketing itself is a "need-satisfying process". It facilitates physical distribution and creates four types of utilities viz., Form Place, Time and Possession.

The term marketing can be given narrow or broad interpretation. In the narrow sense, marketing is concerned with the flow of goods and services from producers to consumers / users. This interpretation is 'product-orientation' of marketing. In the broader sense, marketing essentially represents consumer-oriented activity. It is for meeting the needs of consumers and naturally production and marketing activities are to be planned as per the needs and expectations of consumers. Marketing is for demand creation and demand satisfaction. This interpretation of marketing is now accepted. The broader interpretation views marketing as a "Total Concept".

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Company Profile

The Sapat Group of companies founded in 1897, consists of diversified businesses in tea, pharmaceuticals, real estate to Information Technology. The group has a strong presence in India, as well as in North America. The first Sapat outlet was founded by RamashankarHaribhai Joshi in Nashik, way back in 1905. Today over 250 million cups of Sapat Chai are consumed every month.

The various Indian manufacturing units are located in and around Nashik, with its marketing office and IT facilities located at Mumbai. With innovation strategies over the last decade the company has grown five times touching a turnover of almost Rs100cr., making it the largest packet tea company in the Rs.500cr tea market of Maharashtra. Currently, Sapat has over 250 distributors in Maharashtra and plans to expand to other tea drinking states.

Sapat Company has presence in Maharashtra, large parts of MP, Chattisgarh and now they are setting up distribution in top cities. Parivar is the largest brand. Within Maharashtra in the leaf category the market share should be somewhere between 20-25%. And in the Dust tea category we have SapatChaha / Sapat Chai a popular dust. Dust tea is a very regional play, because the market and test varies from district to district. So in the districts in which it is very popular; its almost 80% market share kind of a product. Maharashtra is the largest Dust Tea market in the country.

Research Methodology

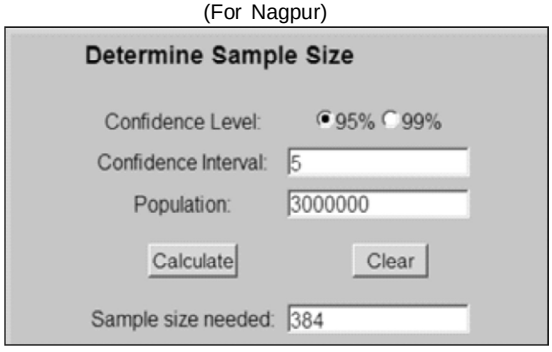
H1: Schemes and offer strategies of Sapat Tea have affected the consumer buying behavior.

H2: Co-promotion of product can help to increase the brand value for all its sub brands.

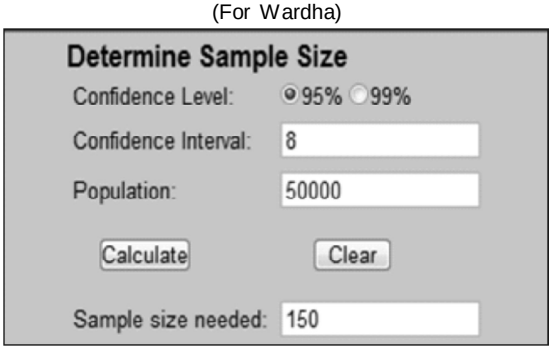
The study regarding Consumer buying behavior is causal in nature and is aimed at evaluating the impact of marketing mix on minds of the consumer. General customer residing at Nagpur and Wardha constituted the population for the study. Simple Random sampling technique was used to identify responses for the study and a sample size of 396 respondents from Nagpur and 130 respondents from Wardha was taken to conduct the study.

At confidence level of 95% and confidence interval of 5 with an approx population of 30,00,000 in Nagpur the sample size calculation comes to 384. Similarly, with wardha approx population fo 5,00,000 and 95% Confidence Level and confidence interval of 8 the sample size calculation comes to 150. Thus, it provides a satisfaction of 396 respondents from Nagpur and 130 from Wardha.

(For Nagpur)



(For Wardha)



Self-designed questionnaire was used for evaluating Marketing mix for tea branding. Data was collected on a Likert type scale, where 1 indicated minimum agreement and 5 indicated maximum agreement.

P'S of Marketing

When you are developing your marketing plan, there are many factors that need to be considered. So many, that it could be easy to miss an important element. And since all these elements are interlinked, overlooking one factor could mean that the decisions you make about the others are not fully informed. Keeping this in mind the following eight P's of marketing and corresponding factors affecting has been considered for research.

P's of Marketing	Significance	Factors considered
PRODUCT	The product can have both tangible and intangible aspects, and is the thing you offer to satisfy your customers' wants and needs.	Brand
		Quality
		Variety
		Packaging
		Region Of Tea Leaves
		Size Of The Grains
		Aroma
PRICE	The amount a customer pays for the product. The price is very important as it determines the company's profit and hence, survival. Adjusting the price has a profound impact on the marketing strategy	Lowest Price
		Cash Discount
		Same Quality But Low Price Than Competitors
		Value For Price Paid
PLACE	Refers to providing the product at a place which is convenient for consumers to access.	Store Is Conveiently Located
		Well Known Store
		Shelf Space Has High Visibility
		Product Display Is Very Attractive
		Store Environment

PROMOTION	All of the methods of communication that a marketer may use to provide information to different parties about the product.	Celebrity Endorser
		Tv Advertising
		Radio Advertising
		Bill Board
		Newspaper / Magazine Advertising
		Extra Quantity (10% Extra)
		Copromotion
		Free Gift
		Lucky Draws
		Cash Dsicount Coupons
PERCEPTION	Perception not only creates the experience; it allows us to act in response to these stimuli	Traditional
		Premium
		Healthy
		Attractve
		Popular
		New
		Unpopular
		Fresh
		Strong
PSYCHOLOGY	The habit of thinking in terms of the people inside and outside of your business who are responsible for every element of your sales and marketing strategy and activities.	Tea Tastes Good
		Social Belonginess
		Morning Stimulant
		Workplace Stimulant
		Boosts Metabolism
		Compulsive Habit
		Acts As De-Stresssor
POSITIONING	It is about how you are seen and thought about by your customers is the critical determinant of your success in a competitive marketplace.	Features And Benefits of Product
		Expectation of Brand Performance
		Brand Price Vs Competitor Price
		Promotional Strategies
		Consumer Perceptions
		Variety & Range
		Tag Line & Advertisement
		Visual Appeal & Packaging

Cronbach's Alpha reliability was computed using PASW 18 software to evaluate the reliability of the questionnaire. Cronbach's Alpha was also calculated after deleting each statement from questionnaire and values are as displayed in Table below. Since Smart PLS is suitable for non-normally distributed data the model testing method was adopted for this study. Both the measurement model and the structural models were evaluated simultaneously through Smart PLS.

RELIABILITY ANALYSIS		
FACTOR	NO OF ITEMS	CRONBACH APLHA
PRODUCT	9	0.724
PRICE	4	0.759
PLACE	5	0.834
PROMOTION	10	0.814
PACKAGING	6	0.864
POSITIONING	8	0.741
PSYCHOLOGY	7	0.742
PERCEPTION	9	0.795

The reliability coefficient value was highly significant i.e. 0.7 and above and depict high reliability of the questionnaire.

Conceptual Background

The constructs are related as given below :

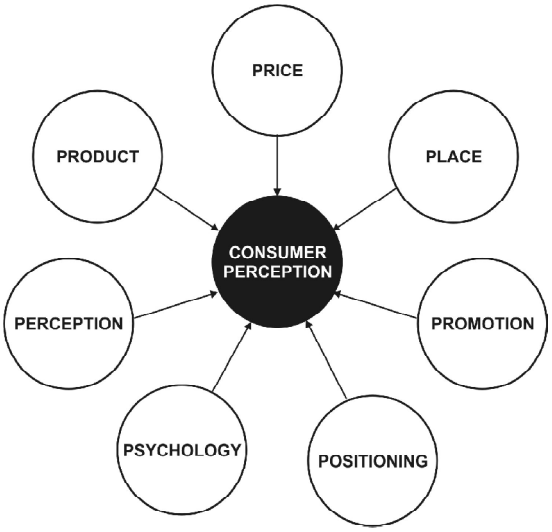


FIGURE 1 :
The Structural Model

About PLS Software

SmartPLS is a software application for the design of structural equation models (SEM) on a graphical user interface (GUI). These models can be measuredwith the method of partial least squares (PLS)-analysis. Hence, it is possible toimport data of manifest (indicator) variables in the model. To overcome these limitations of first-generation techniques, more and more authors started using structural equation modeling (SEM) as an alternative. Compared to regression-based approaches, which analyze only one layer of linkages between independent and dependent variables at the same time, SEM, as a second-generation technique, allows the simultaneous modeling of relationships among multiple independent and dependent constructs (Gefen, Straub, & Boudreau, 2000).

Additionally, SEM enables the researcher to construct unobservable variables measured by indicators (also called items, manifest variables, or observed measures) as well as to explicitly model measurement error for the observed variables (Chin, 1998a). Like any SEM, a PLS model consists of a structural part, which reflects the relationships between the latent variables, and a measurement component, which shows how the latent variables and their indicators are related; but it also has a third component, the weight relations, which are used to estimate case values for the latent variables

Tool used: Path Modelling Analysis

The relationships between the constructs were analyzed by using the Partial Least Squares (PLS) path-modeling algorithm. The PLS algorithm estimates path models using latent variables. PLS is a latent variable modeling technique that incorporates multiple dependent constructs and explicitly recognizes measurement error. Structural Equation Modeling. It is a family of statistical models that seek to explain the relationships among multiple variables. It examines the "structure" of interrelationships expressed in a series of equations, similar to a series of multiple regression equations. The equations depict all of the relationships among constructs (the dependent and independent variables) involved in the analysis.

Partial Least Squares (PLS) model was analyzed and interpreted in two stages. In the first stage measurement model was evaluated and in the second stage structural model was evaluated. The measurement model evaluates the relations between manifest variables (observed items) and latent variables (factors). The measurement model was tested through assessment of validity and reliability of the construct measures in the model. This ensured that only reliable and valid constructs' measures were used for assessing the nature of relationships in the overall model (Hulland, 1999). Structural model specifies relations between latent constructs. Estimating and analyzing the path coefficients between the constructs test the structural model. Path coefficients are indicators of the model's predictive ability.

Measurement Model

Tenenhaus et al. (2005) introduce three criteria to determine the overall quality of the model. Specifically, a path model can be assessed at three levels:

(1) The quality of the measurement model,

(2) The quality of the structural model, and

(3) Each structural regression equation used in the structural model.

The quality of the measurement model was tested by assessing the individual item and scale reliability followed by convergent and discriminant validity of constructs' measures. PLS algorithm was applied and the resultant relationships, coefficients and values of loadings are shown in Figure 2.

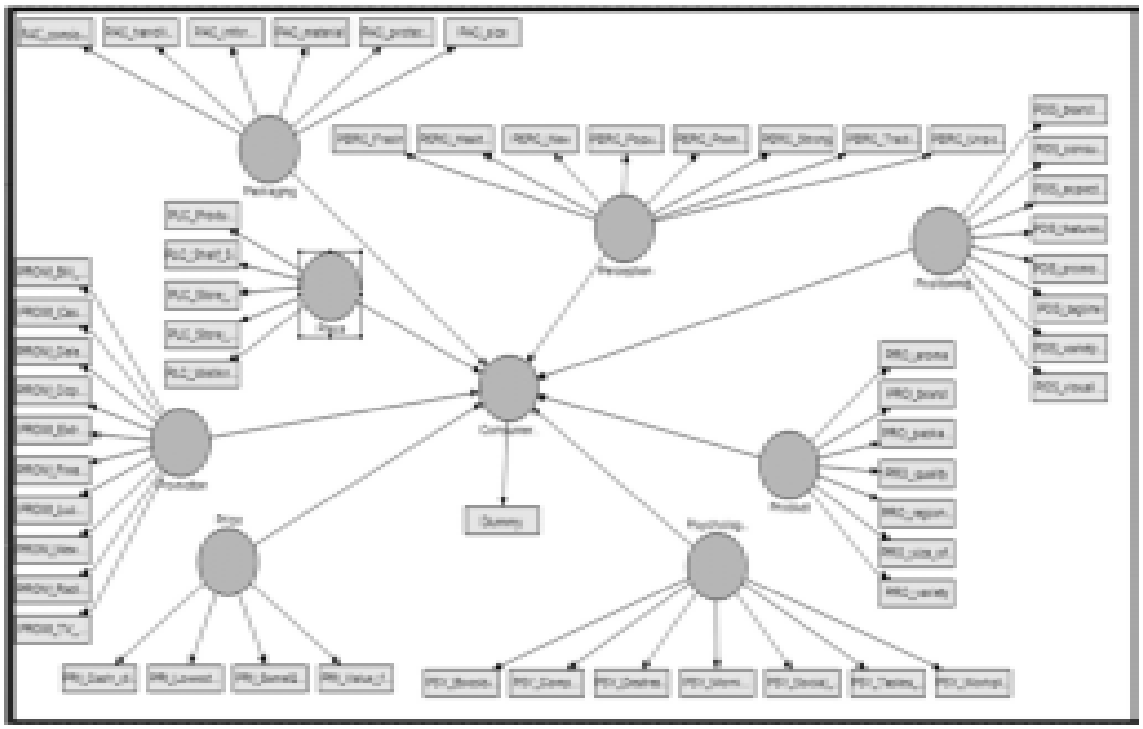


Figure 2: Initial Path Model

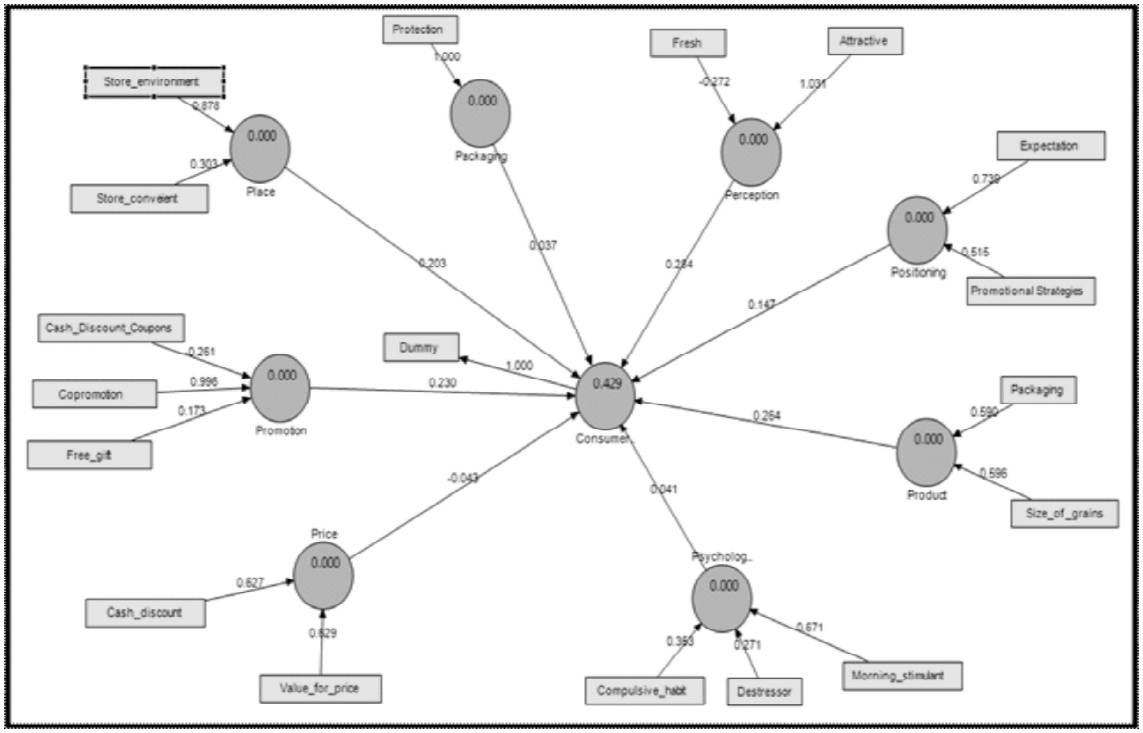


Figure 3 : Bootstrapping to find the Major Factors

Validity assessment is the most controversial issues in formative measurement (Diamantopoulos et al., 2008) because there are limitations of the applicability of statistical procedures (Hardin et al., 2008).

The estimation of this validity is performed by the Partial Least Square (PLS) approach with a bootstrapping method to calculate item weights (or PLS scores or outer weights), and t-values of each formative indicator whether are significant. Similarly, indicator relationship with construct antecedents and consequence are also analysed by using PLS with outer item coefficients for first-order formative indicators, and inner path coefficients for second-order formative construct whether the right signs and adequate t statistics have. Item weight (outer weight) and t-statistics of each item weight should be significant for testing indicator reliability of the formative constructs. PLS algorithm was performed to evaluate item weight and, bootstrapping was performed to evaluate t-statistics. When the size of the resulting empirical t-value is above 1.96, we can assume that the path coefficient is significantly different from 0 at a significance level of 5 percent (a = 0.05; two-sided test). The critical t-values for significance levels of 1 percent (a = 0.01; two-sided test) and 10 percent (a = 0.10; two sided test) probability of error are 2.57 and 1.65, respectively.

With these dropouts the resultant as well as final model for further investigations is presented in Figure: 4. In PLS, loadings of respective factors on their respective latent constructs are examined to assess the reliability of the factors (Hulland, 1999). Since the final model was decided after dropping out insignificant factors having factor loadings of less than 0.1, the model was analyzed by using Smart Pls.2.0 software.

According to **Cohen (1988),** *R^2 values for endogenous latent* variables *are assessed as follows:*

- **0.26- Substantial**
- **0.13- Moderate**
- **0.02**- **Weak**

Also path coefficients range greater than 0.1 is acceptable (**Lohmoller, 1989**)

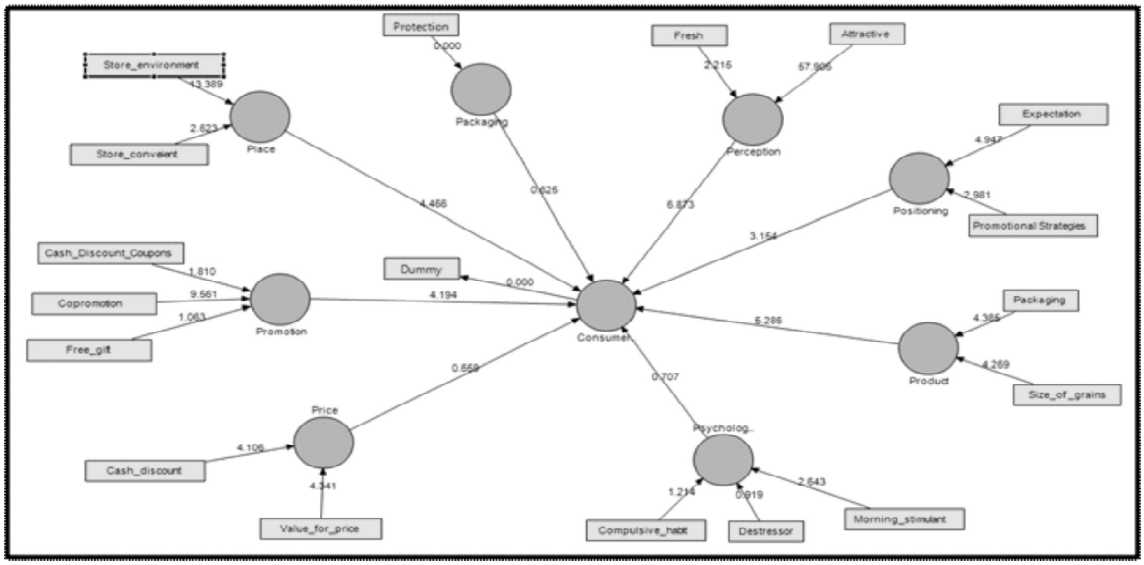


Figure 4 : Final Model

In addition to Cronbach's (1951) alpha, reliability of each variable was assessed through Fornell and Larcker's (1981) measure of composite reliability. This measure is preferred over Cronbach's alpha because it offers a better estimate of variance shared by the respective indicators and because it uses the item loadings obtained within the nomological network (Hair et al., 2006).

Convergent validity has three approaches:

- Factor loadings: Composite reliability should be **0.7 or higher** to indicate adequate convergence or internal consistency (Gefen et al., 2000).
- Variance extracted: AVE should **exceed 0.5** to suggest adequate convergent validity (Bagozzi & Yi, 1988).
- Reliability: Cronbach alpha values should be **0.7 or higher** to indicate adequate convergence or internal consistency. (Nunnally, 1978)

TABLE 1: AVE and Composite Reliability

	AVE	Composite Reliability	Cronbach Alpha
Consumer Perception	1.0000	1.0000	1.0000

All three approaches of Convergent validity are being met.

Convergent Validity

Convergent validity refers to the degree of agreement in two or more measures of the same construct (Camines and Zeller, 1979). Evidence of convergent validity was assessed by inspection of variance extracted for each factor (Fornell and Larcker, 1981). The convergent validity is established, if the variance-extracted value exceeds 0.10. The table is presented below with beta value and t-value

Factor	Sub-Factor	Beta Value	t- value
Place	Store Environment	0.878	13.974
	Store Convenient	0.303	2.711
Promotion	Cash Discount coupons	-0.261	1.935
	Copromotion	0. 896	10.041
	Free gift	0.173	1.12
Price	Cash Discount	0.627	4.119
	Value for Price	0.629	4.357
Packaging	Protection	1	0
Perception	Fresh	-0.272	2.121
	Attractive	1.031	51.612
Positioning	Exception	0.739	4.72
	Promotional Strategies	0.515	2.8
Product	Packaging	0.59	4.115
	Size of grains	0.596	4.078
Psychology	Compulsive habit	0.353	1.282
	Destressor	0.271	0.966
	Morning Stimulant	0.671	2.924
Consumer	Place	0.203	4.849
Perception	Promotion	0.23	4.346
	Price	-0.043	0.692
	Packaging	0.037	0.654
	Perception	0.284	6.784
	Positioning	0.147	3.416
	Product	0.264	5.531
	Psychology	0.041	0.744

The above table shows the sub factors which affect significantly for the corresponding factor elements as the variance extracted value (Beta Value) is greater than 0.10 and the t-value at 10% Level of significance the specific t- values are greater than 1.65 and hence all the sub factors significantly influence each factor.

Among all the marketing mix as per the consumer perception are Perception, Product, Place and Promotion. There is negative value for Price which shows that as price increases consumer perception of product decreases.

In Partial Least Squares (PLS) method, structural model and hypothesis were tested by computing path coefficients (â). Because PLS does not require a normally distributed data it is evaluated with R-squared calculation for dependent latent variables (Cohen, 1988). R-Squared value in PLS provides to determine how well the model fits the hypothesized relationship is the squared multiple correlations (R2) for each dependent construct in the model. The R2 measures a construct's percent variation that is explained by the model (Wixom & Watson, 2001).

The relationship between Consumer Perception and Product was significant with = 0.264 and t = 5.531 (table value is 1.65 at 10%) indicating that the Product has direct positive significant influence on the Consumer Perception. The Product changes in direct proportion to Consumer Perception with a coefficient of 0.264. This clearly indicates that a 100 points change in Product will bring 26.4 points change in the Consumer Perception.

The relationship between Consumer Perception and Perception, Place, Promotion, Positioning was significant with = 0.284, 0.203, 0.23, 0.147 respectively and t = 6.784, 4.849, 4.346, 3.416 respectively (table value is 1.65 at 10%) indicating that all above factors has direct positive significant influence on the Consumer Perception. All the above factors changes in direct proportion to Consumer Perception. This clearly indicates that a 100 points change in Perception, Place, Promotion, and Positioning will bring 28.4, 20.3, 23.0, 14.7 respectively points change in the Consumer Perception.

Summary

In all the eight factors not all sub factors are significant. Those sub factors which significant for each factor are summarized below.

Out of the eight paths used to connect the measures in the structural model, five paths was supporting the hypothesis that P's of marketing mix has a direct positive influence on the Consumer Perception of the tea Brand. This clearly indicates that Marketing Mix had an influence on Consumer Perception. However three path coefficients between Price, Packaging and Psychology and Consumer Perception less significantly support the hypothesis. So it clearly shows that they have very little impact on Consumer Perception.

Factor	**Sub-Factor**
Place	Store Environment
	Store Convenient
Promotion	Cash Discount coupons
	Co-promotion
	Free gift
Price	Cash Discount
	Value for Price
Packaging	Protection
Perception	Fresh
	Attractive
Positioning	Exception
	Promotional Strategies
Product	Packaging
	Size of grains
Psychology	Compulsive habit
	De-stressor
	Morning Stimulant

Model Evaluation

Goodness-of-Fit (GoF) (Tenenhaus et al., 2005) was employed to judge the overall fit of the model, Gof, which is the geometric mean of the average communality and the average R2, represents an index for validating the PLS model globally, as looking for a compromise between the performance of the measurement and the structural model, respectively. GoF is normed between 0 and 1, where a higher value represents better path model estimations.

Assessing the Goodness of FIT

- Global validation of PLS models use these cut-off values (**Wetzels et al. 2009**):
- $GoF_{small} = 0.10$
- $GoF_{medium} = 0.25$
- $GoF_{large} = 0.36.$
- Allows to conclude that the model used has better explaining power in comparison with the baseline model

MARKETING MIX	COMMUNALITY
Packaging	1.000
Perception	0.465
Place	0.598
Positioning	0.619
Price	0.634
Product	0.710
Promotion	0.490
Psychological Factors	0.541
AVERAGE	**0.632**
	R Square
Consumer Perception	**0.429**

$$GOF = \sqrt{\overline{R}^2 \text{ x } \text{Average Communality}}$$

For this model the GoF index was **0.52079** meaning that the model had acceptable predictive relevance.

Conclusion

With respect to the marketing mix from a consumer perception we find packaging as a significant criterion for product characteristics followed by size of tea grains. As per their perception they find Sapat tea to be fresh and attractive which shows that making traditional products contemporary can revive the sales of the tea brand. With respect to promotions Cash discount coupons, co-promotion and free gifts have been well received by the consumers. Sapat has also been positioned by promotional strategies and expectation of the brand which again gained ground for increasing the sales of Sapat. We can find development of loyal customer base where people Sapat for being a morning stimulant, compulsive habit and destressor. For price factor people were now getting their value for price paid because of the innovation in product variety and packaging. We can find well researched relaunch of Sapat 2003 onwards as per the consumer perception for the success of the brand.

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