A STUDY ON FACTORS IMPACTING CONSUMER PREFERENCE AND PURCHASE INTENTION: WITH SPECIAL REFERNCE TO BEVERAGE INDUSTRY

Dr. Virender Khanna
Head of Department, School of Business and Entrepreneurship, FDDI, Noida

ABSTRACT
Research Topic: *A study to understand the factors impacting the consumer preference and their evolving purchase intention for the numerous products available in highly dynamic beverage industry.*
Method: *Quantitative and qualitative analysis done based on the primary data collected through questionnaire and secondary data collected through literature review.*
Conclusion: *Various factors were identified which determine the marked shift in the focus of consumers towards milk and fruit based drinks such as branding, health benefits, price and calories. Based on the conjoint analysis we have come up with 2 innovative products which the consumers of tomorrow would prefer. Entering the market with such kind of new product would serve any company in good stead in this highly competitive and disruptive market.*

Keywords: Consumer preference, Purchase intention, Beverage industry, conjoint analysis

I. INTRODUCTION
The beverage industry in India comprises of non-alcoholic beverages like carbonated mineral waters, concentrated syrups, flavored juices and milk based drinks. These products have been well perceived by consumers round the globe and are overtaking the hot drinks beverage industry. In the event of rapid growth in soft drink industry, demand for these products is growing and creating new opportunities and challenges. The changing consumer demand and preferences emanates from the need to adopt new ways of maintaining the current customer base and amplify the potential target segment by focusing on newer customers. Due to the oligopolistic market structure in the soft drink market, it gives rise to intense competition with differentiation only possible by distribution. Because of rapidly changing marketing campaigns targeting diverse perceptual objectives of the consumer, it has become all the more important to look out for what the consumers need and the price they are willing to pay.
India, with 65% of its population under the age of 35, is an attractive market segment for the soft drink industry and with companies directing substantial investments in market research and advertising experimentation can help feel the pulse of the target segment. The Indian soft drink market's future growth engines stem from product differentiation and accurate positioning leveraging the past experiences of market leaders.
There are a plethora of drinks available in the market in India marketed by various national and international brands. Recently there has been a splurge in the available options and non-aerated drinks have now become a bigger threat to the aerated drinks market. The changing consumer buying preference can be attributed to various reasons. Since disposable income has increased manifolds, consumption frequency of drinks has been on the rise and so has the need of the consumers for new and innovative products.
Due to hectic schedules and unhealthy diet regimes consumers are looking for healthy but tasty options which can quench their cravings of soft carbonated beverages. This makes FMCG giants actually venture into this untapped market segment where need already exists, only the demand needs to be fulfilled. As per the statistics, obesity is the most prevalent illness. Due to this reason giants like PepsiCo have decided to reduce the sugar contents across their brand portfolios like cola flavors and juices. Some countries are also coming up with sugar tax to reduce the consumption of sugary drinks. If the government taxes products like sugary drinks they can control obesity and encourage healthy lifestyle. Mexico has already implemented sugary drinks tax; UK and Portugal are ready to introduce it, whereas in India it is still being debated. Under such circumstances beverage industry has been alerted and is venturing into non –carbonated, non- alcoholic, fruit based and milk based drinks as healthier alternatives.

II. REVIEW OF LITERATURE
Ubeja (2014) conducted a perceptual study to identify the factors influencing the complex consumer preference for carbonated and non-carbonated drinks in Indore, India. According to their research, there is a marked shift in the consumer preference from carbonated to non-carbonated, healthier alternatives. Hence, in order to help companies increase their awareness levels for their beverage in specific target markets of soft drink category, this research paper was written. For this they adopted a research methodology of factor analysis and identified

the main factors impacting the consumer preference as defined by the questionnaire survey, which was then further analyzed through the quantitative technique of ANOVA. Various independent variables were identified such as Price, Flavor, Social occasion / Time, Packaging, etc. whose relative importance was gauged via the Likert scale. The study concluded that the consumer preference based on these factors is gender agnostic. It also concluded that the most important factor determining purchase decision making are flavor and refreshment.

Role of beverage-attributes in preference for selecting a beverage:

Attributes of beverage are the most important for selecting a beverage. It is primarily defined by the sugar-content in the drink. The research paper "Strawberry-flavored yogurts and whey beverages: What is the sensory profile of the ideal product?" written by **D. R. Janiaski, T. C. Pimentel, A. G. Cruz and S. H. Prudencio** aimed to evaluate sensory profile and consumer's liking of strawberry-flavored yogurt in Brazil. It also determined the sensory attributes on consumer preferences and profile of the ideal product. Strawberry was chosen because it is the most widely used food/flavor in Brazil. The study focused on six attributes. The attributes were as follows:

Attribute	Criteria
Appearance	In case of Strawberry yogurt the intensity of pink color in the product
Brightness	Reflection of light on the sample
Particles	Presence of red points in the product
Aroma	aroma with reference to fermented milk products
Flavor	It was further divided into three categories a) Sweet b) Acid and c) Artificial and each of them was taken into consideration
Texture	It comprised of Viscosity and smoothness of mouth-coating

The sweet taste is a factor associated with presence of sugar. Acid taste was used as characteristic acid of fermented dairy product. Artificial flavor used to provide the artificial strawberry taste of dairy product. Viscosity was a factor to determine the fluidity of the beverage, as it is depicted by easiness of transfer of fluid from one place to another. So ultimately it will be defined by the thickness of the beverage. Smoothness of mouth-coating determines the smoothness in the flow of beverage inside mouth. Smoothness along with viscosity plays an important role in ascertaining the sensation of beverage in mouth. It is this sensation which governs the creation of respective perception of the beverage.

In our study since we are considering both aerated and non-aerated beverages, it was prudent to consider only the common factors. For instance we could not use factors like particles, as drinks like cola will not be having any. So we have clubbed such factors and considered them as one. In our study we have considered all above factors as taste. This was done to avoid complexity in our surveys. Taste on the whole would consider in itself the level of sweetness, flavor and the texture. Aroma is one factor which we will not be considering in our study because it is easier to compare aroma of juices but would be difficult to compare aroma of carbonated drinks among themselves or with other non-aerated beverages.

Role of brand and packaging:

In a research paper written by **Dr.Satnam Ubeja and Ranjana Patel** – "Consumer Preference Towards Soft Drinks: A Perceptual Study" the emphasis has been on profiling customers based on their choice of preferences by providing more meaningful ways to identify and understand the various customer segments and marketing strategies utilized in positioning and creating brand awareness.

Banumathy and Hemameena (2006), in their study on consumer brand preference with respect to soft drinks in India, arrived at conclusion that after globalization most of the consumers like the international brands such as Pepsi and Coca-cola. The consumers preferred a certain brand or a particular drink mainly because of its taste and refreshing ability. **Chia-Hsien Chu, (2000),** wrote an article investigating factors of marketing

communication characteristics which induce reminder buying behavior. This study has been performed in different stages. The stage 1 applies the predecessor, process and consequence approach to investigate the essential differences between reminder impulse buying and pure impulse buying. The findings of these study reveal that reminder impulse buying differs significantly from pure impulse buying on motivation, decision evaluation and buying goals. The stage 2 consequently probes how sales - promotion strategy affects reminder impulse buying with appeal of the product and traits of consumer as moderating factors.

Gluckman (1986) published a study finding the factors influencing consumption and preference for beverage. The independent factors which were identified included popularity and spread of brand name, price and quality. Packaging and appearance also played an important factor.

Given current scenarios, factors mentioned in above studies hold importance. The packaging of aerated drinks and non-aerated drinks differ vastly. While aerated drinks are sold in glass bottles and PET (Polyethylene terephthalate) bottles which are transparent, juices and dairy based drinks are sold in tetra-pack. The packaging of these tetra-pack are quite colorful. Also with many brands available in market for both aerated and non-aerated beverages, the impact of image of these brand and its awareness might also be deciding factor in case of selection of beverage. Based on these findings we incorporated brand and package as a factor in our study.

Calorie as factor

Jonathan Cantor and Andrew Brecks conducted a study "Correlates for Sweetened beverages purchased for kids at fast food restaurants" to determine the impact of sweetened beverages on the calorie intake of kids and adolescents at fast food restaurants. A survey was conducted on 425 participants to determine their purchase preferences and a logistic regression was done to calculate the predicted probability of purchase of sweetened beverages for a kid. The study revealed that approximately 60% of the beverages purchased for children at fast food restaurants were sweetened beverages. Nearly 49% of them were soda which were either purchased individually or were offered as combo packs along with the food. The consumption of other beverages like lemonade or hot chocolate was very minimal and accounted for only about 5%. The study showed that children on an average consumed 179 calories more by the intake of sweetened beverages. This calorie intake by means of sweetened beverages exceeds the average prescribed calorie intake of a single meal for kids which is about 120 calories. The study was repeated by display of a calorie chart at the restaurant to study the impact in purchasing decision of the consumers. But the display of charts showed very less impact on the purchase intention of the customers who continued to purchase sweetened beverages at the same intensity. Hence the study concludes the fact that calorie intake is not a major criteria which impacts the purchase decision of a beverage consumer.

Noshin Nikpartov in his study "Fruit drink consumption associated with overweight in women" took a sample of around 14000 women. Using cluster analysis the samples were categorised into distinct clusters based on their beverage intake pattern. He then conducted a logistic regression to analyse the association between calorie dominant beverage consumption patterns and the associated BMI. The results showed that the calorie intake of women with predominant "fruit drink" pattern was higher and hence were more obese compared to their counterparts. The study also showed that the above patterns were significant only with women and not with men as it was not able to draw any significant correlation between obese men and their calorie intake by means of fruit drink consumption.

In our survey we have taken calorie as one of the parameters which influence the choice of a fruit drink. As our survey includes both aerated (which tend to have a very high calorie content) and non-aerated drinks we wanted to see how this parameter affects the purchase intention of a consumer

III. OBJECTIVE

The main objective of the study is to *understand the factors impacting the consumer preference and their evolving purchase intention for the numerous products available in highly dynamic beverage industry.*

Factor Analysis

Factor analysis is a multivariate technique which helps in simplifying the analysis by finding the relationship amongst the various variables and reducing the number of variables in such a manner that the total variance is still explained to a large extent by the chosen set of factors. There is a common pattern in the variables that combine to form the factor and based on which the variance in the data can be explained. In consumer behaviour factor analysis is all the way more important since there are many variables and tracing a given behaviour to individual variable is difficult.

NULL HYPOTHESIS - Data is not fit for factor analysis.

ALTERNATIVE HYPOTHESIS- Data is suitable for factor analysis.

Based on the Literature Review and exploratory research, nine variables were identified for preference of milk based drinks and fruit based drinks as well, which were as follows:

Milk Based drinks **Fruit Based drinks**

1. Nutrition
2. Taste
3. Calorie
4. Price
5. Packaging
6. Brand
7. Filling
8. Level of processing
9. Advertising

1. Nutrition
2. Taste
3. Calorie
4. Price
5. Packaging
6. Brand
7. Viscosity
8. Filling
9. Advertising

In the factorization process of preference for milk based drinks, the KMO and Bartlett test gave the sig level of .000 which rejected the null hypothesis. Also the overall Measure of sampling adequacy value (MSA value) came out to be .517 which indicated that the data was suitable for factor analysis. Also a high value of Chi-square (170.879) indicated that our null hypothesis can be confidently rejected.

KMO and Bartlett's Test for Milk based drinks

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.517
Bartlett's Test of Sphericity	Approx. Chi-Square	170.879
	Df	36
	Sig.	.000

Figure 1

For fruit based drinks, the KMO and Bartlett test gave the significance level of .000 which rejected the null hypothesis. Also the overall Measure of sampling adequacy value (MSA value) came out to be .623 which indicated that the data was suitable for factor analysis. Also a high value of Chi- square (163.331) indicated that our null hypothesis can be confidently rejected.

KMO and Bartlett's Test for Fruit based drinks

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.623
Bartlett's Test of Sphericity	Approx. Chi-Square	163.331
	df	36
	Sig.	.000

Figure 2

After the initial test of KMO and Bartlett, the individual MSA values were checked for all the variables for both milk based and fruit based drinks. This was done by looking at the Anti-Image Correlation Matrices. The diagonal values gave the individual MSA values. High value of Individual MSA could mean

1. Correlation between this variable and some other variable is very strong (The other variable should also have same MSA)
2. This variable is suitable to get clubbed with more than 1 variable

MSA is correlation based. If the MSA value (diagonal) in the Anti-Image correlation Matrices is less than 0.5, than the values is removed **one by one** starting with the least value. After removing the variable having the least MSA value, the factorization process is repeated until there is no variable left which has a MSA value less than 0.5.

Anti-image Matrices

		Nutrition	Taste	Calorie	Price	Packaging	Brand	Filling	Additives	Advertising
Anti-image Covariance	Nutrition	.630	-.171	-.355	.140	-.063	.092	.007	.079	-.081
	Taste	-.171	.754	.130	-.278	-.035	-.017	.037	-.208	.003
	Calorie	-.355	.130	.683	-.090	.003	.011	-.035	-.011	.002
	Price	.140	-.278	-.090	.736	-.124	-.072	-.126	.136	.051
	Packaging	-.063	-.035	.003	-.124	.681	-.197	.144	-.078	.035
	Brand	.092	-.017	.011	-.072	-.197	.397	.055	-.008	-.296
	Filling	.007	.037	-.035	-.126	.144	.055	.894	-.159	-.119
	Additives	.079	-.208	-.011	.136	-.078	-.008	-.159	.891	.011
	Advertising	-.081	.003	.002	.051	.035	-.296	-.119	.011	.499
Anti-image Correlation	Nutrition	.421[a]	-.248	-.542	.205	-.097	.183	.009	.105	-.144
	Taste	-.248	.474[a]	.181	-.373	-.048	-.030	.045	-.254	.005
	Calorie	-.542	.181	.476[a]	-.127	.004	.020	-.045	-.014	.003
	Price	.205	-.373	-.127	.512[a]	-.175	-.134	-.155	.168	.084
	Packaging	-.097	-.048	.004	-.175	.675[a]	-.379	.184	-.100	.060
	Brand	.183	-.030	.020	-.134	-.379	.566[a]	.093	-.013	-.666
	Filling	.009	.045	-.045	-.155	.184	.093	.337[a]	-.178	-.178
	Additives	.105	-.254	-.014	.168	-.100	-.013	-.178	.391[a]	.017
	Advertising	-.144	.005	.003	.084	.060	-.666	-.178	.017	.529[a]

a. Measures of Sampling Adequacy(MSA)

Figure 3

Factorization for Milk Based Drinks

As can be seen from the Anti-Image correlation Matrices there are a number of variables which have MSA value less than 0.5. 4 variables – Nutrition, calorie, filling, level of processing were removed after multiple iterations of the factoring process. These variables will be considered as independent variables in seeing the preference for milk based drinks. After removing these 4 variables the KMO measure of sampling adequacy also improved to .608.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.608
Bartlett's Test of Sphericity	Approx. Chi-Square	110.244
	df	10
	Sig.	.000

Figure 4

After this step the communalities table was analysed to remove the variables unsuitable for factorization.

Communalities (milk based)

	Initial	Extraction
Taste	1.000	.655
Price	1.000	.652
Packaging	1.000	.501
Brand	1.000	.841
Advertising	1.000	.761

Figure 5

Since all the variable in the communalities table had an Extraction value greater than 0.5, no variable was removed further from the factorization process.

There were 2 factors that were formed for the remaining 5 variables and in totality they explained 68.231% of the variance. This was explained by the Total Variance Explained table. Till the Eigen value is greater than 1, all the variables belong to atleast one of the factor. Therefore in the case of Milk based drinks 2 factor were formed.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.230	44.594	44.594	2.230	44.594	44.594
2	1.182	23.637	68.231	1.182	23.637	68.231
3	.699	13.984	82.215			
4	.620	12.400	94.615			
5	.269	5.385	100.000			

Figure 6

This fact is also explained by the Scree Plot. The number of factors will be equal to the number of dots above the horizontal line at Eigen value =1

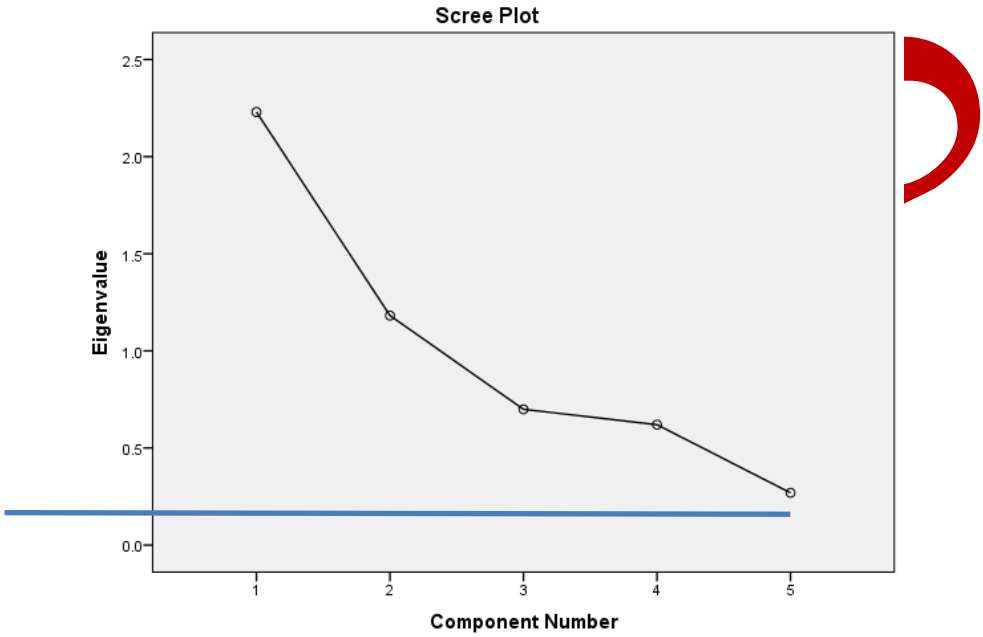


Figure 7

The next step was to check the factor loading. Factor loading is done to check the correlation of a variable with a factor. Factor analysis runs an algorithm in an iterative manner to ensure that majority of the variables come closer to the rotated factors and it becomes easier to visually diagnose which variables belong to which factor. We have used varimax rotation for this purpose. The rotated component Matrices will help in identifying the correlation while the component score coefficient matrix will provide the weights.

Rotated Component Matrix[a]

	Component	
	1	2
Taste	.029	.809
Price	.153	.793
Packaging	.591	.390
Brand	.903	.160
Advertising	.870	-.063

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser

a. Rotation converged in 3 iterations.

Figure 8

Component Score Coefficient Matrix

	Component 1	Component 2
Taste	-.126	.593
Price	-.055	.559
Packaging	.260	.184
Brand	.474	-.041
Advertising	.495	-.200

Extraction Method: Principal Component
a. 2 components extracted.

Component Score Coefficient Matrix

	Component 1	Component 2
Taste		.593
Price		.559
Packaging	.260	
Brand	.474	
Advertising	.495	
	1.228	1.152

Component Score Coefficient Matrix

	Component 1	Component 2
Taste		.515
Price		.485
Packaging	.212	
Brand	.386	
Advertising	.403	
	1.000	1.000

Figure 9

Based on the above analysis **2 factors** were determined by SPSS i.e. Marketing and Value which were a function of the following independent attributes.

MARKETING

Attribute	Component Score coefficient
Packaging	0.212
Brand	0.386
Advertising	0.403

VALUE

Attribute	Component Score coefficient
Taste	0.515
Price	0.485

But, as per our understanding Taste and Price though are quantitatively correlated and have a good loading factor, qualitatively these both attributes cannot be combined together to form any factor. Hence, we rejected this factor and continued to consider them as independent variables.

Ultimately, as per our analysis there is **1 factor and 6 independent variables** which influence the purchase intention for milk based drinks which are enumerated as follows:

1. Marketing
2. Taste
3. Price
4. Nutrition
5. Calorie
6. Filling

Level of Processing

Factorization for Fruit Based Drinks

A similar process as above was followed for Fruit based drinks. In the fruit category there were no variables in the Anti-Image Matrices which had individual MSA less than 0.5 and also no variable which had an extraction value less than 0.5 in the communalities table.

Anti-image Matrices

		Nutrition	Taste	Calorie	Price	Packaging	Brand	Viscosity	Filling	Advertising
Anti-image Covariance	Nutrition	.675	-.090	-.337	.053	-.102	.025	-.091	-.112	-.020
	Taste	-.090	.789	-.040	-.244	-.008	-.077	-.113	.088	.032
	Calorie	-.337	-.040	.729	.083	-.019	.020	.028	.065	.013
	Price	.053	-.244	.083	.748	-.102	-.079	.013	.102	.012
	Packaging	-.102	-.008	-.019	-.102	.614	-.233	-.057	-.075	.030
	Brand	.025	-.077	.020	-.079	-.233	.433	.044	-.044	-.282
	Viscosity	-.091	-.113	.028	.013	-.057	.044	.916	-.139	.042
	Filling	-.112	.088	.065	.102	-.075	-.044	-.139	.888	-.022
	Advertising	-.020	.032	.013	.012	.030	-.282	.042	-.022	.612
Anti-image Correlation	Nutrition	.552[a]	-.124	-.480	.075	-.158	.047	-.116	-.144	-.032
	Taste	-.124	.649[a]	-.053	-.318	-.011	-.132	-.133	.105	.046
	Calorie	-.480	-.053	.526[a]	.112	-.028	.036	.034	.081	.020
	Price	.075	-.318	.112	.687[a]	-.150	-.139	.016	.125	.018
	Packaging	-.158	-.011	-.028	-.150	.702[a]	-.452	-.076	-.102	.048
	Brand	.047	-.132	.036	-.139	-.452	.618[a]	.070	-.071	-.548
	Viscosity	-.116	-.133	.034	.016	-.076	.070	.574[a]	-.154	.056
	Filling	-.144	.105	.081	.125	-.102	-.071	-.154	.579[a]	-.029
	Advertising	-.032	.046	.020	.018	.048	-.548	.056	-.029	.633[a]

a. Measures of Sampling Adequacy(MSA)

Figure 10

Communalities

	Initial	Extraction
Nutrition	1.000	.745
Taste	1.000	.674
Calorie	1.000	.784
Price	1.000	.658
Packaging	1.000	.598
Brand	1.000	.806
Viscosity	1.000	.745
Filling	1.000	.691
Advertising	1.000	.668

Figure 12

All the 9 variables in Fruit based drinks category were suitable for factorization. Based on the total Variance explained table, there were 4 components which had an Eigen value greater than 1 and together they explained 70.774% variability in data.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.387	26.526	26.526	2.387	26.526	26.526
2	1.672	18.581	45.107	1.672	18.581	45.107
3	1.239	13.770	58.877	1.239	13.770	58.877
4	1.071	11.897	70.774	1.071	11.897	70.774
5	.710	7.886	78.660			
6	.639	7.100	85.761			
7	.532	5.914	91.675			
8	.461	5.121	96.796			
9	.288	3.204	100.000			

Figure 13

The same was evident from the Scree plot as well where there were 4 dots above the horizontal line at Eigen value=1.

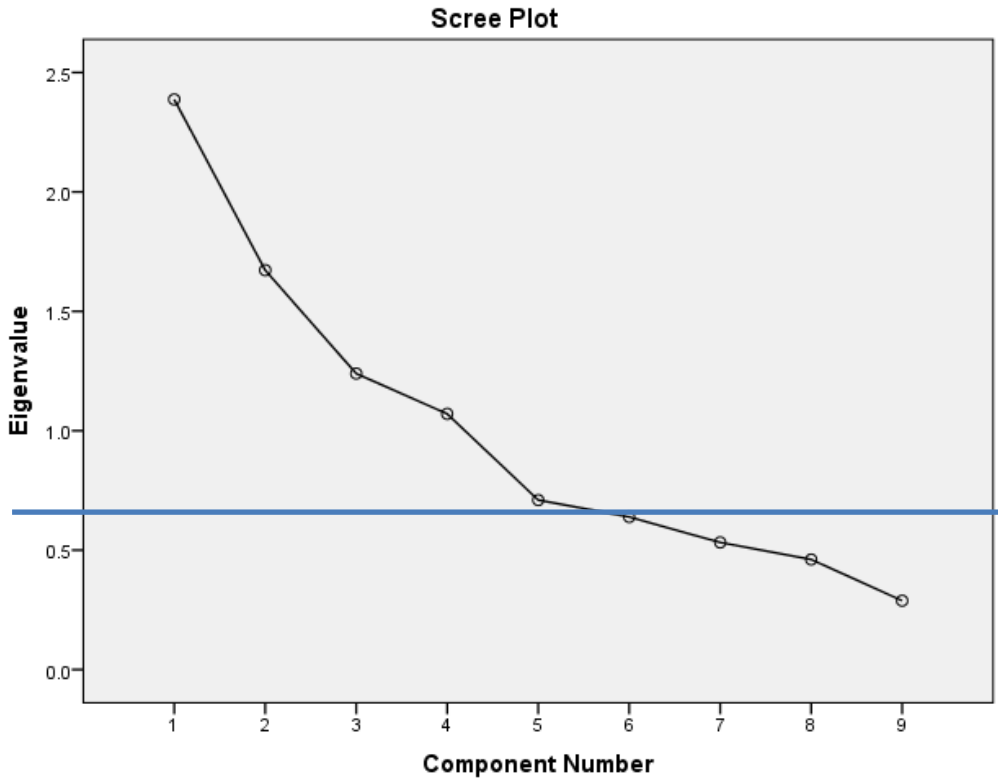


Figure 14

The correlation of the 9 variables with the 4 factors was observed via the rotated component matrix table which aided us in identifying the membership of a particular variable in a particular factor and the corresponding weights of each individual variable responsible for the creation of factors, were taken from the component score coefficient matrix.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
Nutrition	.102	.829	.032	.214
Taste	.102	.171	.792	.087
Calorie	-.046	.880	-.020	-.085
Price	.268	-.196	.738	-.055
Packaging	.678	.160	.261	.210
Brand	.870	-.027	.220	.002
Viscosity	-.165	.078	.232	.811
Filling	.313	.037	-.380	.669
Advertising	.810	-.031	-.024	-.108

Extraction Method: Principal Component Analysis.
a. Rotation converged in 5 iterations.

Figure 15

Component Score Coefficient Matrix

	Component			
	1	2	3	4
Nutrition	.028	.519	-.003	.064
Taste	-.084	.091	.555	.050
Calorie	-.023	.594	-.019	-.189
Price	.023	-.134	.493	-.032
Packaging	.296	.068	.077	.119
Brand	.416	-.029	.017	-.045
Viscosity	-.172	-.060	.200	.691
Filling	.186	-.064	-.323	.544
Advertising	.431	-.013	-.151	-.135

Extraction Method: Principal Component Analysis.
a. 4 components extracted.

Component Score Coefficient Matrix

	Component			
	1	2	3	4
Nutrition		.519		
Taste			.555	
Calorie		.594		
Price			.493	
Packaging	.296			
Brand	.416			
Viscosity				.691
Filling				.544
Advertising	.431			
	1.143	1.113	1.048	1.236

Component Score Coefficient Matrix

	Component			
	1	2	3	4
Nutrition		.466		
Taste			.530	
Calorie		.534		
Price			.470	
Packaging	.259			
Brand	.364			
Viscosity				.560
Filling				.440
Advertising	.377			
	1.000	1.000	1.000	1.000

Figure 16

Based on the above analysis **4 factors** influence the purchase intention for fruit based drinks –

MARKETING

Attribute	Component Score coefficient
Packaging	0.259
Brand	0.364
Advertising	0.377

VALUE

Attribute	Component Score coefficient
Taste	0.530
Price	0.470

HEALTH

Attribute	Component Score coefficient
Nutrition	0.466
Calorie	0.534

TEXTURE

Attribute	Component Score coefficient
Viscosity	0.560
Filling	0.440

But, as per our understanding Taste and Price though are quantitatively correlated and have a good loading factor, qualitatively these both attributes cannot be combined together to form any factor. Hence, we rejected this factor and continued to consider them as independent variables.

CONJOINT ANALYSIS

Conjoint analysis is a very popular market evaluation method. It is used in developing new specifications or reposition specifications of existing products. Based on responses, consumer preferences and utility values can be determined through analysis-of-variance calculations. Also, weights attached to each of the factors can also be determined. It is based on the premise that consumers determine the total value of the entire product based on the individual value provided by each attribute of the said product. In conjoint analysis, value is measured in terms of "Utility" i.e. a subjective judgement of preference as perceived by each individual.

We have used conjoint analysis here to gauge consumer preferences and simulate these in the real world. By conjoint analysis we obtain data about consumer preferences about various attributes which have been selected to give the consumer "choices" to rank. The options people have while buying products isn't always the best in every attribute in their minds and therefore conjoint analysis provides a true level of "utility" to each attribute.

$$y_{ijk} = \mu + \beta_{1i} + \beta_{2j} + \beta_{3k} + \varepsilon_{ijk}$$

where, y_{ijk} is the preference/price assigned by conjoint analysis participants for each profile.
μ = Grand mean of all preferences
β is the factor or variable we are doing conjoint analysis on, epsilon is the error.

$$\sum \beta_{1=} \sum \beta_{2=} \sum \beta_{3=0}$$

Therefore, sum of all utilities of any factor is zero.
The error function is to judge the difference between estimated and actual values.
The choice based conjoint method we are going to use is by far the most common form of conjoint analysis and is so popular because it models a consumer in real-life.
We have run this model on both of our market entry problems in the fruit juice segment and the milk drinks segment.
Fruit-Based Drinks Segment
Based on the above mentioned literature review, we had identified various attributes which would impact the preference / purchase intention of each individual. These attributes were combined into 3 factors namely Marketing, Health, Texture and 2 independent variables of Price and Taste. Since this is a technique to develop a new product in the market it was essential for us to create different levels representing the possible values of attributes. The value of the product would be then determined by the respondents by combining the different levels of multiple attributes making up the desired product.
The factor of Marketing is a function of 3 independent variables of Packaging, Brand and Advertising. As per our Factor Analysis, brand is a significant variable impacting the creation of this factor. Hence, we chose BRAND to represent the factor of Marketing. 3 levels for that have been identified by us as shown in the following table.
The factor of Health is a function of 2 independent variables Nutrition and calorie and both have significant contribution impacting the creation of this factor. Hence, we chose 3 different levels combining both nutrients and calorie amount as shown in below mentioned table.
Different levels of texture and taste have been determined by trying to come up with innovative options which are currently not available in the market freely.
This being an attempt to create a new product, we believed that determining price for us as well as the consumer without adequate information on the processing and raw material cost would not be appropriate. Hence, we refrained from using this particular independent variable of Price in our analysis.

Final variables and their levels used in Conjoint Analysis

Brand	**Texture**	**Taste**	**Health**
Pepsi	Pulpy	Melon	Added Nutrients Low Calorie
Coca Cola	Fluid	Sitaphal	No added nutrients
Paper Boat	Powder	Carrot & Beetroot	Added nutrients High Calorie

For accurately conducting the conjoint analysis experiment, we entered these levels in SPSS orthogonal design tab to generate combinations of levels in attributes we can ask.
As our data in the fruits segment has 4 factors with 3 levels in each the following is the data table:

Levels\Factors	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
Level 1	11	12	13	14
Level 2	21	22	23	24
Level 3	31	32	33	34

Where the number represents the subscript of β.
Also the other variables to be determined are mu and epsilon (the grand mean and error function respectively)
Number of equations we need: Total number of Levels - Number of attributes + 1
Here it comes out to be 12- 4+1= 9
These number of factors ensure orthogonality and balanced design (each level comes equal number of times)
Here we are not estimating the equation standard error as we have to have 16 cards for doing conjoint analysis and that would have created a cumbersome survey questionnaire.

Following is the Experimenter's List:

Card List

	Card ID	Brand and ads	Filling and viscosity	Flavours	Health
1	1	PepsiCo	Pulpy	Carrot+Beetroot	added Vitamins+ Minerals without Cal
2	2	Coke	Fluid	Carrot+Beetroot	added Vitamins+ Minerals with Cal
3	3	Coke	Powder	Sitaphal	added Vitamins+ Minerals without Cal
4	4	PepsiCo	Powder	Melon	added Vitamins+ Minerals with Cal
5	5	PaperBoat	Pulpy	Sitaphal	added Vitamins+ Minerals with Cal
6	6	Coke	Pulpy	Melon	No Vitamins and Minerals
7	7	PaperBoat	Powder	Carrot+Beetroot	No Vitamins and Minerals
8	8	PepsiCo	Fluid	Sitaphal	No Vitamins and Minerals
9	9	PaperBoat	Fluid	Melon	added Vitamins+ Minerals without Cal

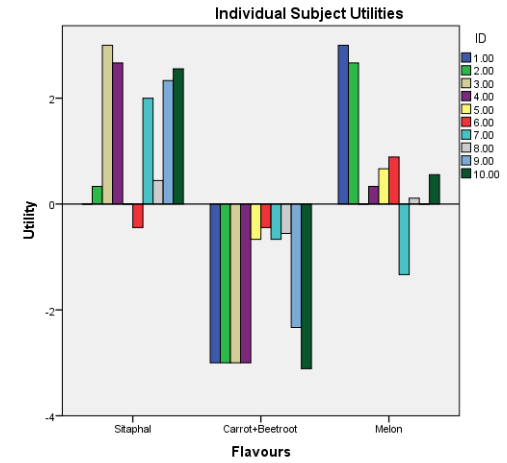
After getting all the responses, we ran the following code in SPSS to get the utility charts below

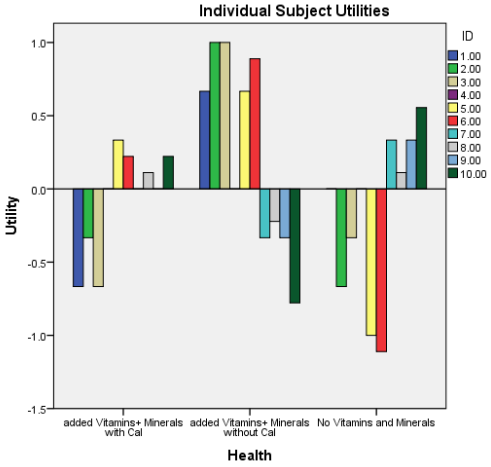
```
* Encoding: UTF-8.
cd "C:\Users\Pritish\Desktop\CONJOINT"

CONJOINT PLAN='ORTHO3.sav'
/DATA='Respondent2.sav'
/SCORE=Score1 TO Score9
/SUBJECT= ID
/FACTORS = BrandLoyalty Texture Flavour Health (DISCRETE)
/PLOT= ALL
/UTILITY='ConjointAnalysis2.sav'
/PRINT=ALL
```

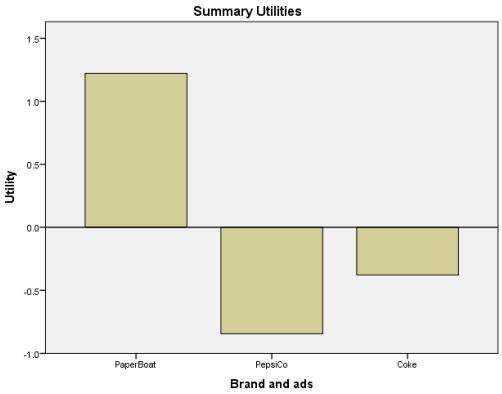
Texture represents **filling+viscosity** factor used.

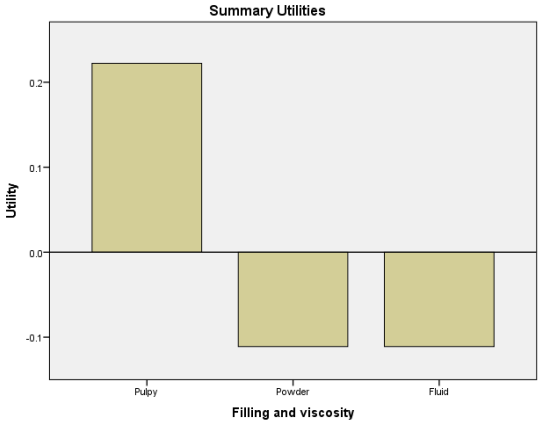
As we can see in the code, all factors are treated as discrete for calculating the utilities.

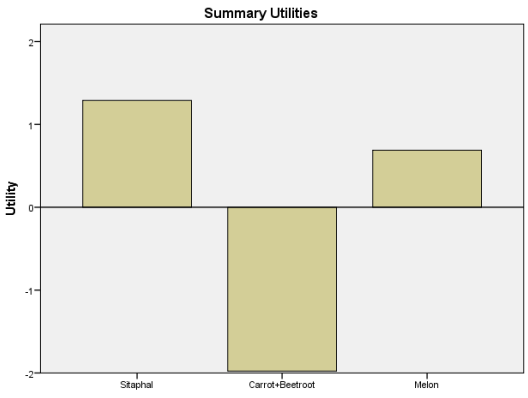
The results obtained are:

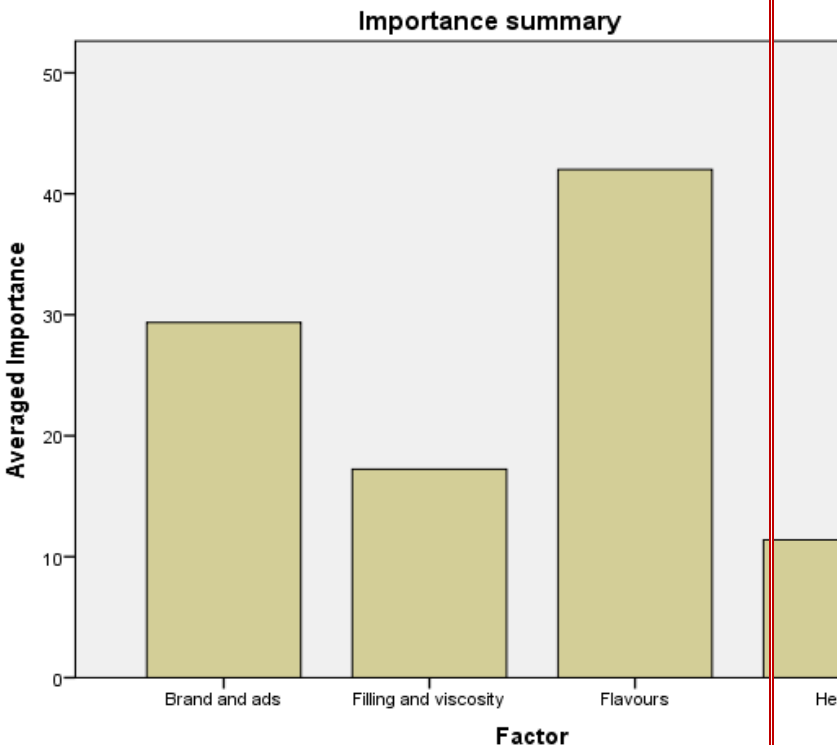












Correlations[a]

	Value	Sig.
Pearson's R	1.000	
Kendall's tau	1.000	0.000

Correlations between observed and estimated preferences

Importance Values

BrandLoyalty	29.357
Texture	17.242
Flavour	42.003
Health	11.397

Averaged Importance Score

The Kendall Tau is at a significance of 0.000. Hence we are pretty confident the model fits the estimated preferences.

As we can see from the graphs and the tables, flavor is the most important characteristic determining consumer preferences as it contributes to 42% of the consumers' decision. This factor is followed closely by Brand Loyalty which contributes just below 30% of the decision making. Rests of the factors are pretty low and minimally vary consumer decision making.

In these factors, from the utility charts we see that utility of brand loyalty is higher for PaperBoat than for Coca Cola or PepsiCo which suggests shifting customer loyalty to niche brands.

For flavours, most people prefer the Sitaphal prefer over melon and they absolutely dislike the carrot and beetroot flavour (considered more healthy than the other two)

In case of texture, people want pulpy texture more as it looks to be a symbol of genuineness of the drink, while the other two were not desired.

In Health factor, people wished low calorie product which is a shift caused by health consciousness amongst consumers.

Therefore, the suggested product should have the following properties as from the conjoint:

Paperboat brand

Sitaphal Flavor

Pulpy Texture

Added Nutrients and Low Calories

Milk-Based Drinks Segment

As mentioned above, we conducted a factor analysis to determine the different independent attributes which impact the purchase intention of our new age consumer. Per this we determined that factors of Marketing and independent variables of Flavor, Price, Nutrition, Calorie, Level of processing and Filling nature of drink are important attributes impacting the purchase intention. Hence, we identified various levels of these attributes in our Conjoint Analysis in an attempt to create an entirely new offering in this lucrative market.

The factor of Marketing is a function of Packaging, Brand and Advertising. To represent levels of this factor we have used a consumer tangible variable of Brand and determined 3 levels as shown in the below mentioned table.

As per multiple regressions level of processing is a significant variable impacting our dependent variable of purchase intention. Hence, 2 levels have been identified as shown in the below mentioned table.

Further, we have identified 3 levels each for Calories as well as Flavor to complete our conjoint analysis.

As stated above, since this is an attempt to create a new product, it would be inappropriate for us as well as the respondent to determine the price without having adequate information about the cost of processing and raw material used in our new product. Hence, we have refrained from utilising this variable in our conjoint analysis.

Final variables and their levels used in Conjoint Analysis

Brand	Flavor	Processing	Calories
Amul	Ginger	Natural Pulpy	Whole milk
Mother Dairy	Mango	Processed Flavor	Toned milk
Nestle	Banana		Skimmed milk

For accurately conducting the conjoint analysis experiment, we entered these levels in SPSS orthogonal design tab to generate combinations of levels in attributes we can ask.

As our data in the milk segment has 3 factors with 3 levels in and one factor with two levels, the following is the data table:

Levels\Factors	Factor 1	Factor 2	Factor 3	Factor 4
Level 1	11	12	13	14
Level 2	21	22	23	24
Level 3	31	32	33	NULL

Where the number represents the subscript of β.
Also the other variables to be determined are mu and epsilon (the grand mean and error function respectively)
Number of equations we need: Total number of Levels - Number of attributes + 1
Here it comes out to be 11- 4+1= 8
These numbers of factors ensure orthogonality and balanced design (each level comes equal number of times)
Here we are also estimating the equation standard error as we have 9 cards for doing conjoint analysis and the extra degree of freedom can be used to determine the error function.
Following is the Experimenter's List:

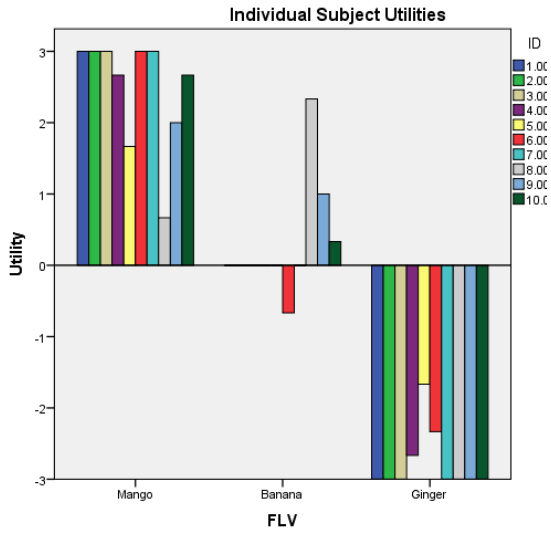
Card List

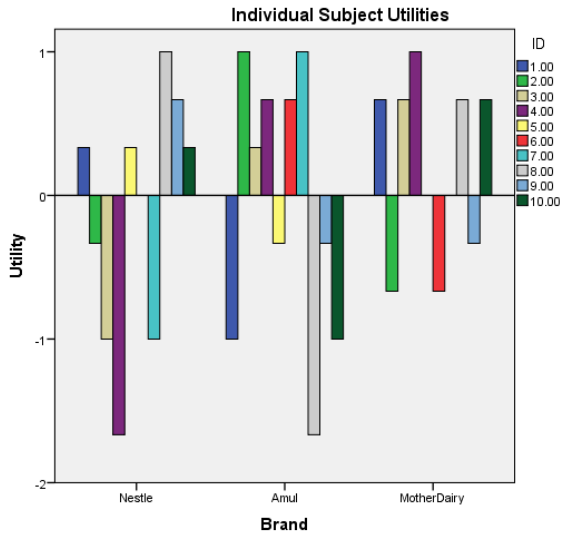
	Card ID	FLV	Brand	Processing	Calories
1	1	Ginger	Amul	Natural Pulpy	Whole Milk
2	2	Mango	MotherDairy	Natural Pulpy	Toned Milk
3	3	Mango	Nestle	Natural Pulpy	Whole Milk
4	4	Mango	Amul	Processed Fluidy	Skimmed Milk
5	5	Banana	Amul	Natural Pulpy	Toned Milk
6	6	Ginger	MotherDairy	Natural Pulpy	Skimmed Milk
7	7	Banana	Nestle	Natural Pulpy	Skimmed Milk
8	8	Banana	MotherDairy	Processed Fluidy	Whole Milk
9	9	Ginger	Nestle	Processed Fluidy	Toned Milk

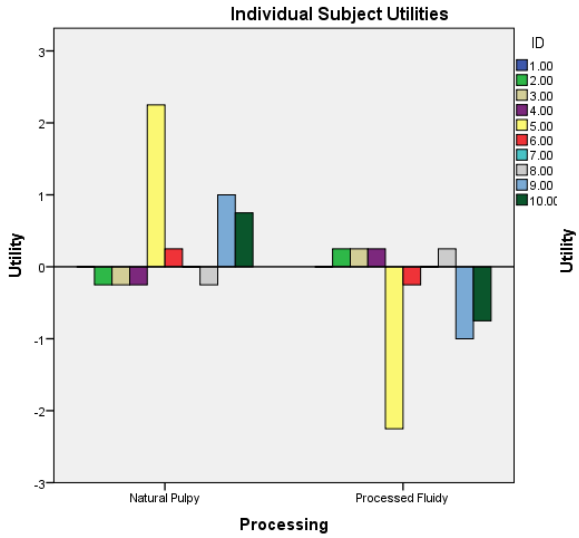
#FLV is the acronym of Flavour
After getting all the responses, we ran the following code in SPSS to get the utility charts below

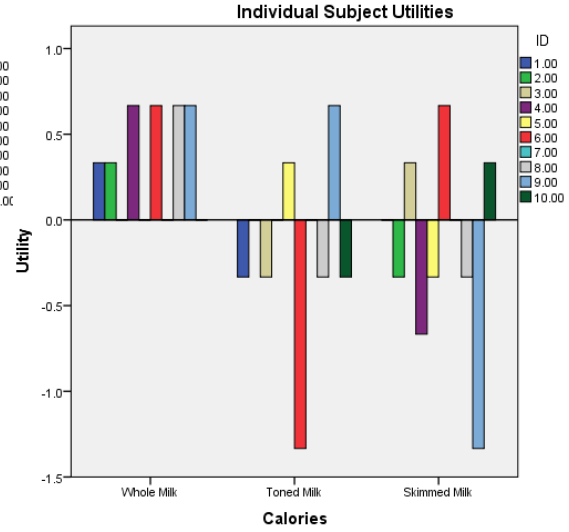
```
cd "C:\Users\Pritish\Desktop\CONJOINT"

CONJOINT PLAN='Milk Real.sav'
/DATA='Respondent.sav'
/SCORE=Score1 TO Score9
/SUBJECT= ID
/FACTORS = Flavours Brand Processing Calories (DISCRETE)
/PLOT= ALL
/UTILITY='ConjointAnalysis.sav'
/PRINT=ALL
```

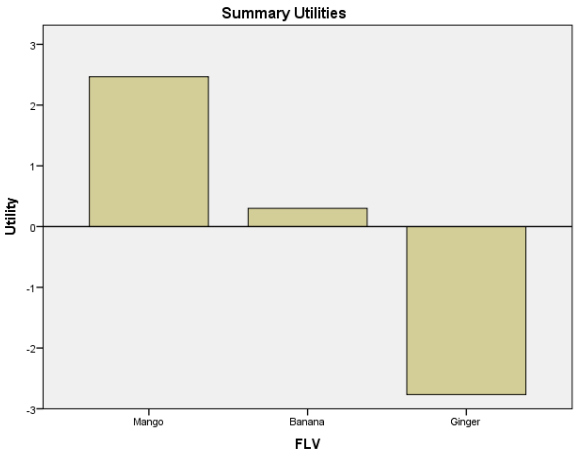
As we can see in the code, all factors are treated as discrete for calculating the utilities.
The results obtained are:

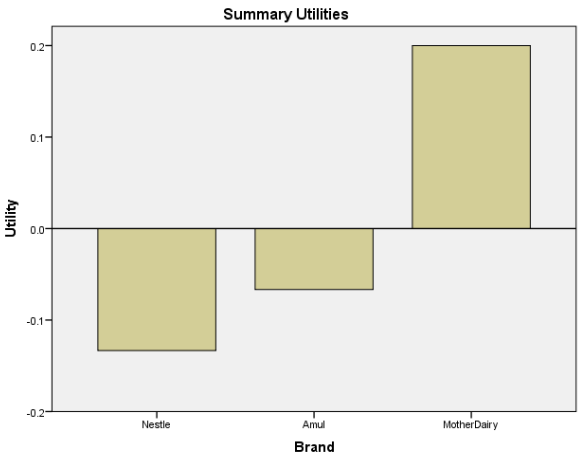

Individual Subject Utilities
ID
Utility
Mango
Banana
Ginger
FLV


Individual Subject Utilities
ID
Utility
Nestle
Amul
MotherDairy
Brand


Individual Subject Utilities
ID
Utility
Natural Pulpy
Processed Fluidy
Processing


Individual Subject Utilities
ID
Utility
Whole Milk
Toned Milk
Skimmed Milk
Calories


Summary Utilities
Utility
Mango
Banana
Ginger
FLV


Summary Utilities
Utility
Nestle
Amul
MotherDairy
Brand

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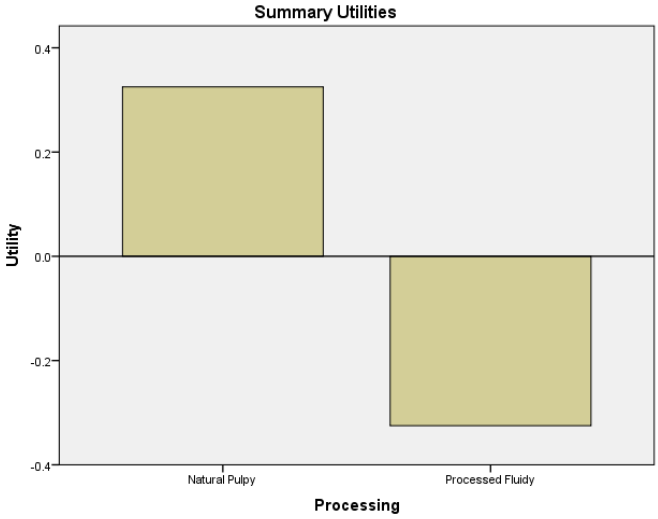

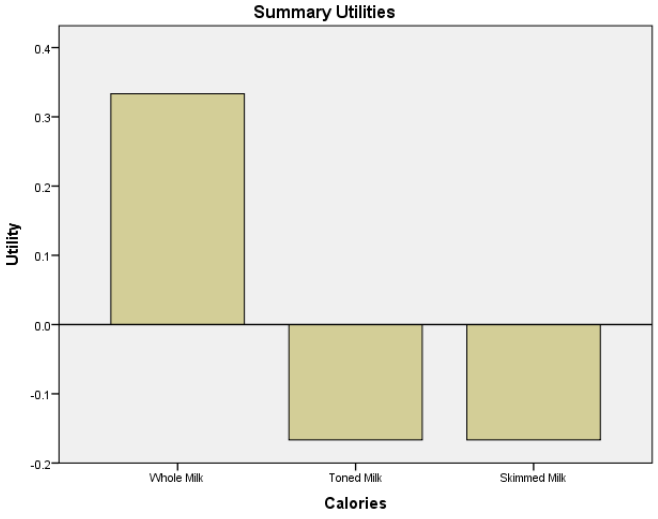

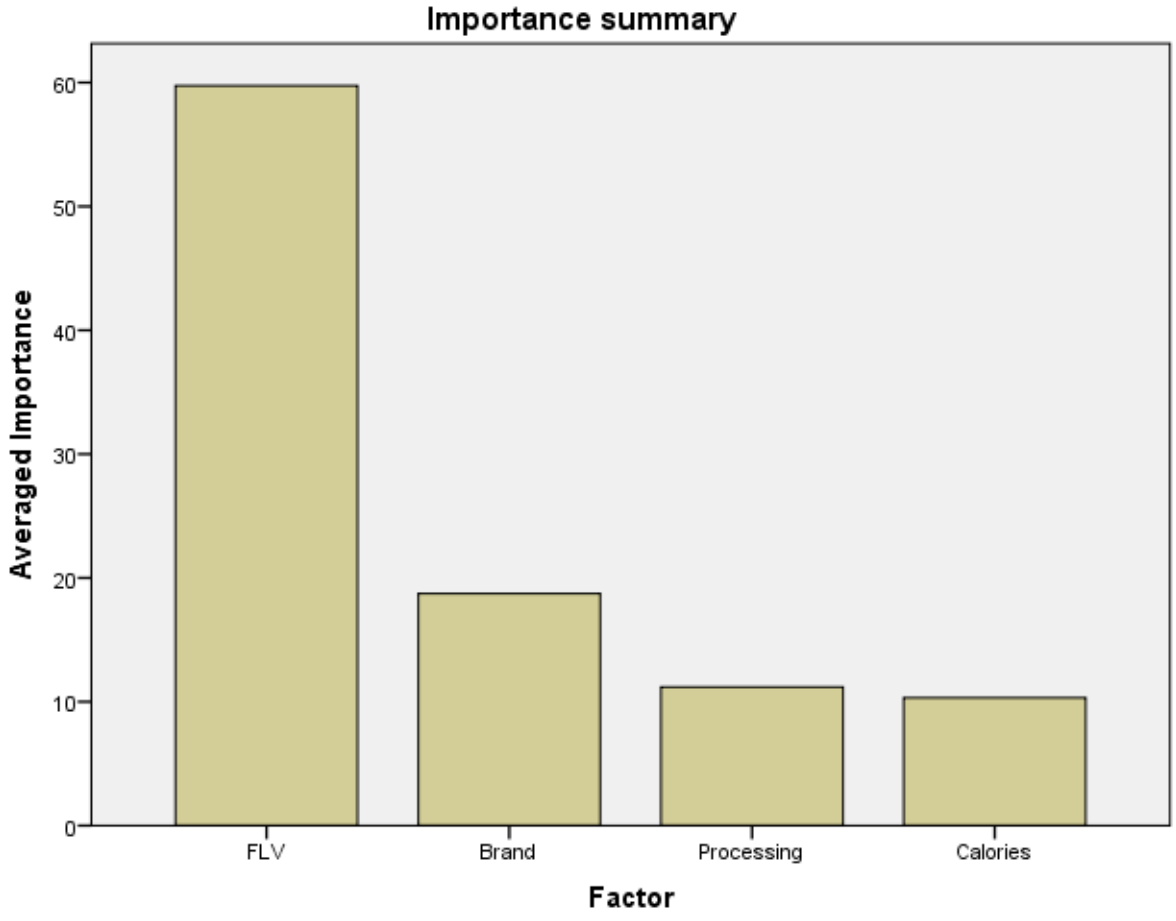

Correlations[a]

	Value	Sig.
Pearson's R	1.000	0.000
Kendall's tau	0.930	0.000

a. Correlations between observed and estimated preferences

Importance Values

Flavours	59.742
Brand	18.729
Processing	11.200
Calories	10.329

Averaged Importance Score

As we can see, both Pearson's R and Kendall's tau point towards a very high correlation pointing at the strength of the model. Also the significance is 0.00 making it valid and applicable.
As we can see from the graphs and the tables, flavour is the most important characteristic determining consumer preferences as it contributes to almost 60% of the consumers' decision. This factor is followed closely by Brand which contributes just below 19% of the decision making. Rest of the factors are pretty low and minimally vary consumer decision making.
In these factors, from the utility charts we see that utility of brand loyalty is higher for Mother Dairy than for AMUL or Nestle which suggests shifting customer loyalty from the good old brands to newer ones.
For flavours, most people prefer the Mango prefer over Banana and they absolutely dislike the ginger flavour which might suggest the ginger flavour might be preferred only by a very small segment and is not preferred by the whole segment as a whole.
In case of level of processing, people wanted natural processing with pulpy texture and disliked artificially processed added flavours which tend to be more fluidic.
In Health factor, people surprisingly preferred whole milk to toned and skimmed milk suggesting perception of its health benefits (beyond the scope of the conjoint analysis) offset by more calories.
Business Implications
Therefore, the suggested product in milk based drink should have the following properties as from the conjoint:
New Product Milk Category
Mother Dairy brand
Mango Flavor
Naturally Processed with a Pulpy Texture
Whole Milk
The suggested product in fruit based drink should have the following properties as from the conjoint:
New Product Fruit Category
Paperboat brand
Sitaphal Flavor
Pulpy Texture
Added Nutrients and Low Calories

CONCLUSION

The study aimed at shifting focus of consumers towards fruit based and milk based beverages. Initially we proceeded with literature reviews and secondary research where we were able to define the required factors which included price, calories, branding, packaging and nutritional content. Next the factor analysis helped us to combine the variables which were explaining the variability in the data in a cohesive manner. This led to the formation of 1 factor marketing having 3 variables and 6 independent variables which explained the total variability in data to explain purchase intention of milk based drinks. The same process was followed for fruit based drinks and it led to the formation of 4 factors which explained the variability in data for purchase intention of fruit based drinks.
After the factor formation the clustering process was done on both sets of data i.e. milk based and fruit based and the most important criteria (factor/variable) for purchase intention was found for each of the clusters of both fruit based and milk based drinks. The criteria were different for different clusters of milk based drinks but were same for all clusters of fruit based drinks.
In conjoint analysis we did a choice based conjoint analysis with discrete factors for both the fruit and milk based drinks. But, one change we did away which is present in most conjoint analysis is that we didn't include price as an attribute because it was a new product and it is difficult to gauge the price especially without any production and cost metrics. The conjoint analysis threw up interesting results with fruit based drinks being preferred with lower calories but milk based drinks people actually preferred higher calories as calories in milk is synonymous with its nutritional value.

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