A Study on Determinants Affecting the Consumer Perception Towards Purchase of Organic Food

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ABSTRACT

Organic market provides a choice of "healthy life" to consumers by providing healthy food. Organic food consumption has increased during the last few years as a consequence of its direct impact on consumer health, life style, and social convenience. The organic food is one of the major markets to show double-digit growth rates. It is very important to understand the reason behind such a tremendous growth which can be disclosed by this study. A study to identify what actually induces consumers to switch from conventional food to organic food is important. This paper investigates the perception and attitudes of the organic food consumers from Bengaluru. Consumer's perception towards organic food products was measured using sixteen items on five-point Likert scale. The statistical techniques implemented in the study are Principal Component Analysis, Cluster analysis and Decision Tree. The analysis indicates that the sixteen items can be broken down into three major components namely Health and Weight aspects, Sensory Appeal and Extrinsic value which further leads us to the major component that is driving the purchase intention of organic food. The cluster analysis will shed light on the consumer behaviour and then finally the decision tree emphasizes on the consumer buying patterns. This research can be incorporated to design effective marketing programs and strategies to influence the consumers positively. The retailers or marketers can emphasize on the major factor and attract the consumers towards purchasing their respective brand of organic products by building a certain perception in the minds of the consumers.

Keywords: organic food, consumer perception, purchase intention, marketing, determinants.

INTRODUCTION:

Globally, the organic wave seems to have swept across all things. From farm produce, to meat, to seafood, to dairy, 'going organic' is transitioning from being a fad to a way of life. A heightened sense of environmentalism along with widespread alarm at the prospect of ingesting pesticide residue or preservatives is prompting a shift to safer, more natural options. Consumers prefer organic food due to safety, human health, and environmental concern and also due to attributes like nutrition value, taste, freshness and appearance of organic food matters a lot for consumers. Many of the organic products farmers, processors, manufacturers and retailers have increased their offering of organic products due to the increased demand. Hence, due to the existence of a great deal of consumer interest, it is believed that organic industry will continues to evolve and eventually becomes the largest health market in the world. It is very important for the marketers as well as producers to understand what is the mindset of the consumers who are buying organic products so that they can effective strategies to retain them for long term.

This study aims to understand the preference of consumers in Bengaluru towards the purchase of organic food products. There are several factors which has an impact on the consumer buying behavior, so the study will investigate the attributes of the organic food and provide insights about organic buyers. The study is subject to Bengaluru only and does not involve or provide insights about the other organic food consumers in other cities.

LITERATURE REVIEW:

Previous studies have provided a general analysis of the major motivations that stand behind the organic food buying behaviour of consumers. (Mohamed, Cordelia, Mohd, & Hafezali, 2015) were able to reveal that that quality of products, environmental concern, health concern and lifestyle are the most commonly stated motives for purchasing organic foods. In Australia and other countries, there have been variation in people's understanding of organic agriculture and organic food, and differences in consumers' attitudes, motivations and behaviors within consumer groups and in different places was stated by (Cheng, 2016). The main reasons for choosing the organic products are concern for health and environment, while price and quality are the two factors that are commonly evaluated while buying the products and the challenge would be creating the brand image apart from providing value for the money which will majorly influence the consumer to make repeat purchases explored by (B & S, 2018). The perception and attitudes of the organic food consumers from the North-West Development Region of Romania was investigated by (Oroian, Safirescu, & Harun, 2017) which indicated health concerns, sensory appeal, sustainable consumption and weight concerns are the main reasons for consuming organic food products. The information revealed on organic food labels and perceived organic knowledge drive consumer trust and attitudes towards organic foods, which in turn together with subjective norm eventually influence subsequent purchase intentions was investigated by (Chih-Ching & Wang, 2015) which led to indicating that the increase in perceived knowledge cannot create positive attitudes towards organic foods. It is clearly seen that the consumers prefer to buy organic food products, but there are various factors impacting the preference including demographic characteristics of the consumers. But, the major factor for buying is their perception of organic food being healthy and safe, as well as nutritious and environment friendly revealed by (Sivathanu, 2015). A study carried out by (Goetzke, Nitzko, & Spiller, 2014) clarifies to what extent the consumption of organic and functional foods is characterized by a healthier lifestyle and a higher level of well-being. The results show that organic food consumption is influenced by an overall holistic healthy lifestyle including a healthy diet and sport, while functional food consumption is characterized by small adjustments to lifestyle to enhance health and to increase psychological well-being. (Paul & Rana, 2012) provides valuable insight into consumer behavior regarding organic food by examining the factors that influence consumers' intention to purchase organic food, within the Indian context. It suggests that retailers can develop effective marketing program and strategies to influence consumers by emphasizing on the health benefits and quality of organic food. (Pino, Peluso, & Guido, 2012) investigates the impact of ethical motivations, food safety and health-related concerns on purchasing intentions of habitual and less frequent consumers of organic food which revealed the ethical motivations affect the purchase intentions of regular consumers, whereas food safety concerns influence the purchase intentions of occasional consumers. (Mohamed, Chymis, & Shelaby, 2014) identified the motivations and barriers towards organic food consumption, as well as the willingness to pay for these products which identified health concern is the first motivation of organic food consumers for willing to pay an extra premium. (Shafie & Rennie, 2012) recognized that the Food safety, human health and environmental concern along with sensory attributes such as nutritive value, taste, freshness and appearance influence organic food consumer preferences. Consumers also associate organic food with natural process, care for the environment and animal welfare and the non-use of pesticides and fertilizers. (Dasari, Dr.K, & Prof.Rao, 2017) discovered the ten factors such as labels, health, concern, environment concern, brand advertising, safety, accessibility, affordability, freshness and store location that are influencing customers to buy organic food. Out of these, health, environment and safety are key factors that are found as primary influencers.

RESEARCH METHODOLOGY:

The research design adapted for the study is Descriptive and Analytical research. The sampling technique used is Simple Random sampling and the sample size is 216. A structured questionnaire was used to collect the data from the respondents. The questionnaire consisted of some demographic questions and 16 attributes of organic food which were ranked by the respondents on a five-point Likert scale.

STUDY METHODS AND DATA ANALYSIS:

The statistical techniques implemented in the study are Principal Component Analysis, Cluster Analysis and Decision Tree. The 16 attributes were factor-analysed, using Principal Component Analysis (PCA) which is a dimension reduction technique that transforms a number of (possibly) correlated variables into a (smaller) number of correlated variables called principal components. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity were used to determine the fitness of the data. Values of 0.6 or above

from the KMO measures indicates whether the data is adequate to perform PCA. Bartlett's Test of Sphericity is the test for null hypothesis to check whether the correlation matrix has an identity matrix. The most common and reliable criterion is the use of eigenvalues in extracting factors. In this research, all factors with eigenvalues greater than 1 were retained because they were considered significant, and all factors with less than 1 were discarded. A cluster analysis was conducted in order to isolate different groups within the sample and examine their common features. The two-step method of cluster analysis has been implemented, which uses 16 attributes as its inputs. Furthermore, a Decision tree has been implemented in the study which is technique used to split the sample into two or more homogeneous sets based on most significant splitter/differentiator in input variables. So, it will identify the most significant variable and its value that gives best homogeneous sets of population.

FINDINGS:

Consumers Purchase intention towards organic food products.

Principal factor analysis was conducted to assess the dimensionality of the 16 items. The Kaiser–Meyer–Olkin (KMO) overall measure of sampling was 0.832, which is good or "Meritorious" on Kaiser's (1974) classification of measure values indicating that data is fit for performing the principal component analysis. Also, you can see that Bartlett's test of sphericity is statistically significant (i.e. $p < .05$). This significance value is located in the "Sig." row, stated as ".000", which actually means $p < .0005$.

Table: 1

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.832
Bartlett's Test of Sphericity	Approx. Chi-Square	3146.936
	df	120
	Sig.	.000

Table: 2

KMO Measure	Meaning
KMO ≥ 9	Marvelous
0.8 ≤ KMO < 0.9	Meritorious
0.7 ≤ KMO < 0.8	Middling
0.6 ≤ KMO < 0.7	Mediocre
0.5 ≤ KMO < 0.6	Miserable
KMO < 0.5	Unacceptable

After performing the above tests and validating that the data is fit for further analysis, we perform PCA on the data which will give the below results:

Table: 3

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.658	41.614	41.614	6.658	41.614	41.614	4.556	28.474	28.474
2	2.980	18.622	60.236	2.980	18.622	60.236	3.796	23.722	52.197
3	1.597	9.982	70.218	1.597	9.982	70.218	2.883	18.021	70.218
4	.954	5.963	76.181						
5	.762	4.764	80.945						
6	.611	3.816	84.761						
7	.528	3.301	88.063						
8	.442	2.761	90.824						
9	.345	2.158	92.982						
10	.304	1.900	94.882						
11	.253	1.583	96.465						
12	.214	1.338	97.803						
13	.153	.959	98.762						
14	.107	.671	99.433						
15	.079	.494	99.927						
16	.012	.073	100.000						

Extraction Method: Principal Component Analysis.

In order to interpret the above results, we should be clear with the concept of eigen values. An eigenvalue is a measure of the variance that is accounted by a component. An eigenvalue of one represents the variance of one variable, so with 16 variables there are a total of 16 eigenvalues of variance. So, we can observe from the "Total" column (under Initial Eigen Values) that the first component is explaining the greatest amount of total variance, with each subsequent component accounting for relatively less of the total variance.

Therefore, if you examine the first component, you will find that it explains 6.658 eigenvalues of variance (the "Total" column), which is 6.658/16 x 100 = 41.614% of the total variance, as reported in the "% of Variance" column. Each successive percentage of variance explained is calculated in the same way with the cumulative percentage recorded in the "Cumulative %" column.

The eigenvalue-one criterion (also referred to as the Kaiser criterion (Kaiser, 1960)) is one of the most popular methods for establishing how many components to retain in a principal components analysis and it is the default option in SPSS Statistics. An eigenvalue less than one indicates that the component explains less variance and hence should not be retained. Hence, we are retaining the first three components only.

Additionally, a scree plot was also used to determine the optimal number of components for the study. It is a line plot of the eigenvalues of factors or principal components in an analysis. The scree plot is used to determine the number of factors to retain in an exploratory factor analysis or principal components to keep in a principal component analysis. The components to retain are those before the (last) inflection point on the graph. The inflection point is meant to represent the point where the graph begins to level out and subsequent components add little to the total variance.

Once the number of components is clearly determined, we can proceed with the PCA. Varimax rotation method is used, in order to maximize the differences between the components extracted and to maintain correlation within the components.

The "Rotated Component Matrix" (Table.4) shows the three components and distinguishes the attributes based on its common variance. We can clearly see the pattern and name each component based on the common nature of the group.
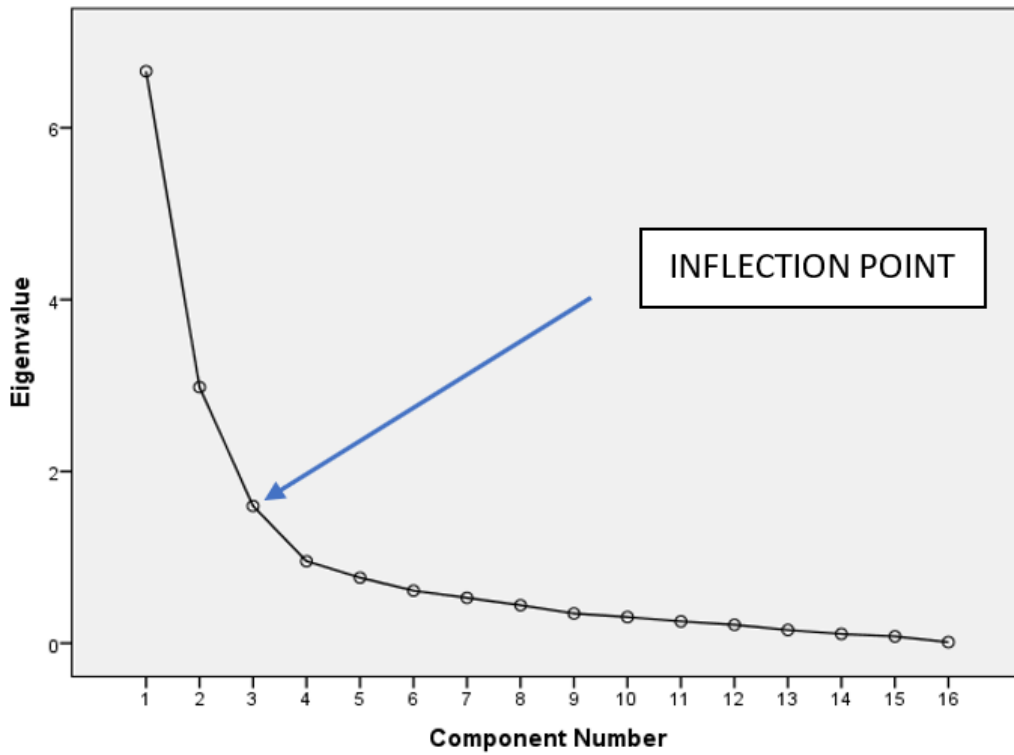
Figure: 1

Scree Plot

Table: 4

Rotated Component Matrix^a

	Component		
	1	2	3
NUTRITIONS	.908		
CHEMICAL_FREE	.889		
FIBERS	.826		
VITAMINS	.790		
NATURAL_ING	.749		
HEALTHY	.633		
LOW_FAT	.556		
TEXTURE		.885	
SMELL		.861	
TASTE		.834	
PREMIUM		.735	
FASHIONABLE		.726	
INFO_PKG			.830
ATTRACT_PKG			.722
CONSUMP_INFO			.719
RECYCLABLE			.615

Component 1:
The first component has been named as "Health and Weight aspects", as it consists of all the attributes regarding the health awareness. We can observe that people tend to buy organic food because it is healthy, has natural ingredients, chemical free, low fat, rich in vitamins, fibres and nutrition.

Component 2:
The second component has been named as "Sensory Appeal", as it consists of attributes like texture, smell, taste which are basic functions of sensory organs. Also, it has listed the fashionable and premium attribute which means the consumers intend to buy product based on its appeal i.e. whether it is fashionable/trendy to use the specific brand of organic product and also whether possessing the product gives them the premium title.

Component 3:
The third component has been named as "Extrinsic Value", which means external qualities of the product. It comprises of attributes such as product label offering information (nutritional aspects) on package, attractive packaging, consumption information of food on the package and also whether the packages are recyclable or not.

Attitude towards Organic Products across Clusters of Consumers:
Cluster analysis is performed to classify groups that are relatively homogeneous within themselves and heterogeneous within themselves and heterogeneous between each other on the basis of a defined set of variables. These groups are called clusters.

In our study, we have applied Two-step cluster analysis which is an exploratory tool designed to reveal natural groupings within a dataset that would otherwise not be apparent. This allowed for the identification of three clusters of organic food consumers. The cluster quality is indicated as fair according to the measure of cohesion and separation which is sufficient.

Figure 2: Showing the Cluster analysis Summary
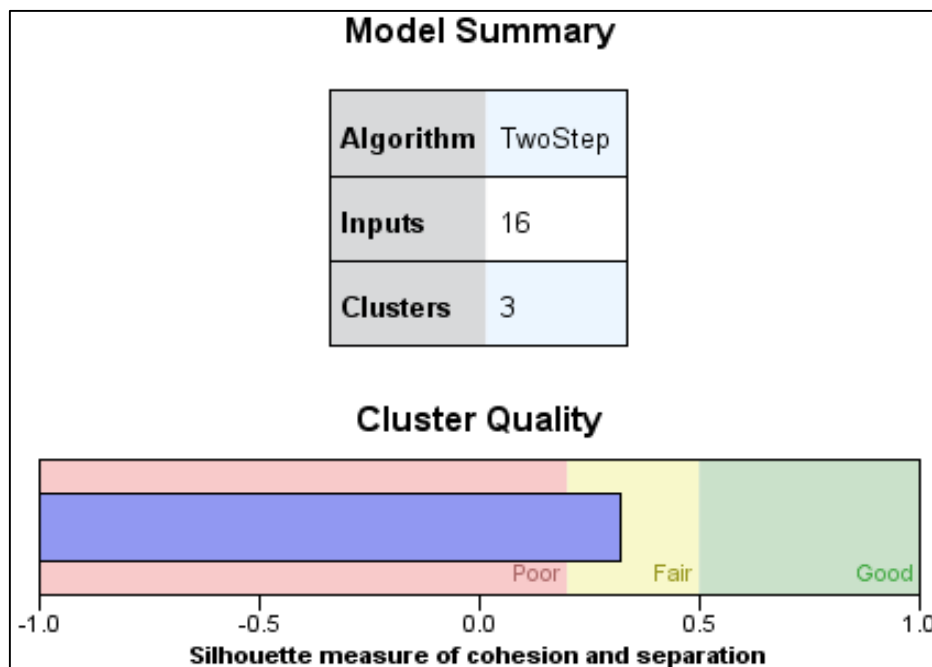
The cluster sizes are shown through pie chart given below (Figure 3). We can observe that the cluster one constitutes of largest sample i.e. 39.8% which has 86 respondents, followed by cluster two with 32.4% which has 70 respondents and lastly the smallest of all is the cluster three with 27.8% which has 60 respondents. It is also shown that the ratio of largest cluster to smallest cluster is 1:43.

Figure 3: Showing the Cluster Sizes

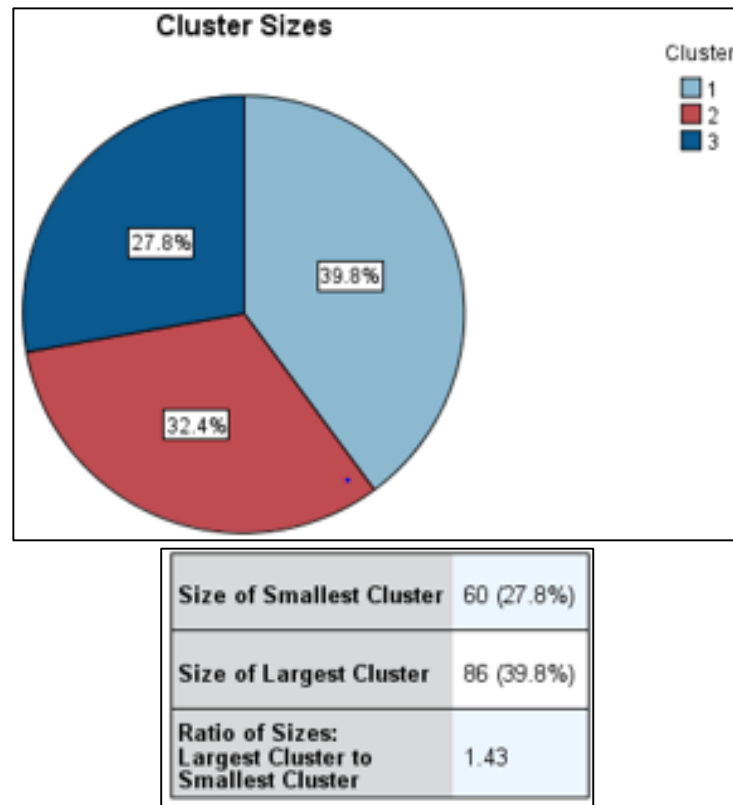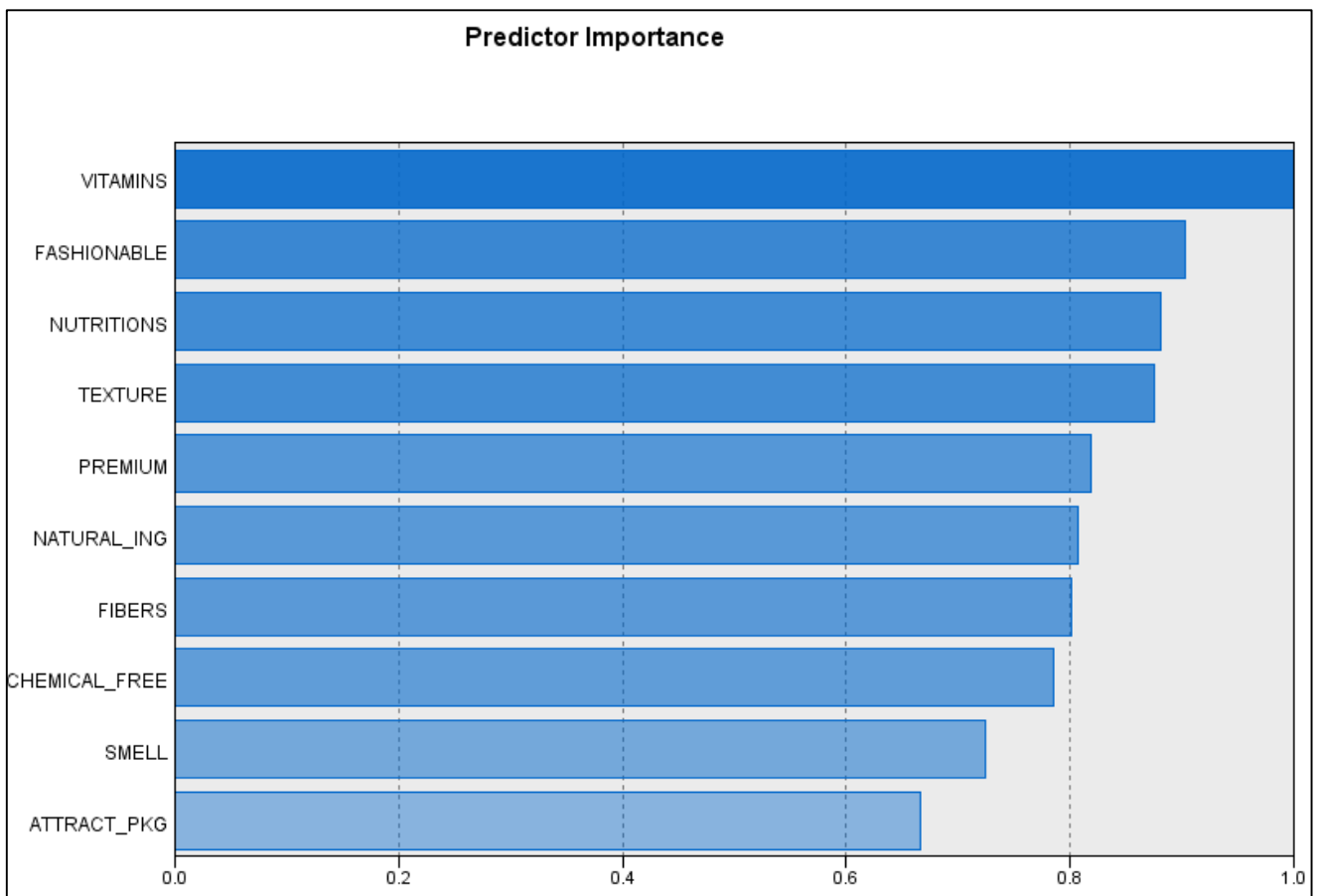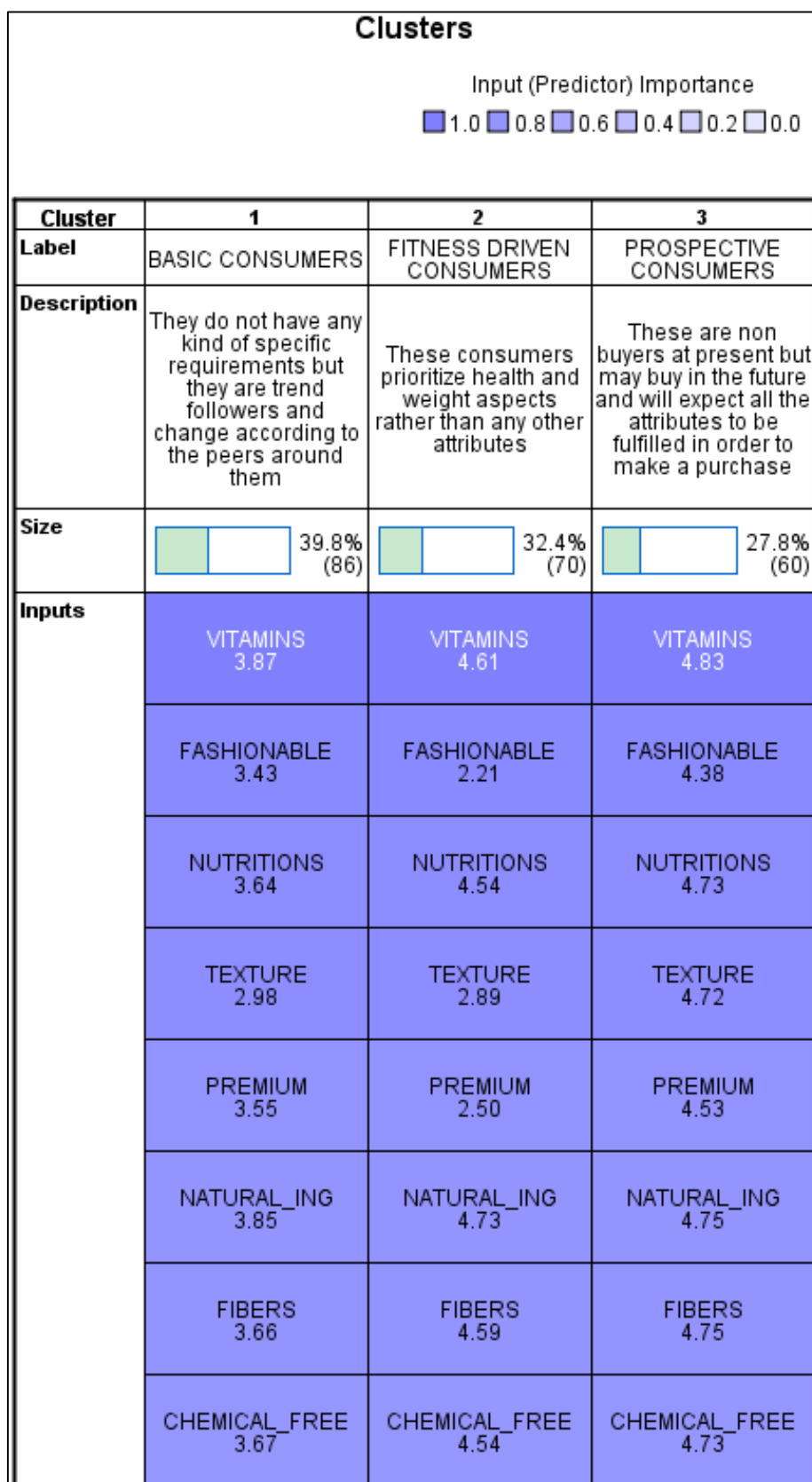|	
Size of Smallest Cluster	60 (27.8%)
Size of Largest Cluster	86 (39.8%)
Ratio of Sizes: Largest Cluster to Smallest Cluster	1.43

Figure 4: Showing the important predictors of clusters

The above bar chart (Figure 4) reveals the top predictors of purchasing organic food. The top three predictors are Vitamins, Fashionable and Nutrition. In total there were ten predictors that the model deemed important.

Figure 5: Showing the clusters with the weightage of attributes

	Clusters		
		Input (Predictor) Importance	
		■1.0 ■0.8 ■0.6 ■0.4 ■0.2 □0.0	
Cluster	1	2	3
Label	BASIC CONSUMERS	FITNESS DRIVEN CONSUMERS	PROSPECTIVE CONSUMERS
Description	They do not have any kind of specific requirements but they are trend followers and change according to the peers around them	These consumers prioritize health and weight aspects rather than any other attributes	These are non buyers at present but may buy in the future and will expect all the attributes to be fulfilled in order to make a purchase
Size	39.8% (86)	32.4% (70)	27.8% (60)
Inputs	VITAMINS 3.87	VITAMINS 4.61	VITAMINS 4.83
	FASHIONABLE 3.43	FASHIONABLE 2.21	FASHIONABLE 4.38
	NUTRITIONS 3.64	NUTRITIONS 4.54	NUTRITIONS 4.73
	TEXTURE 2.98	TEXTURE 2.89	TEXTURE 4.72
	PREMIUM 3.55	PREMIUM 2.50	PREMIUM 4.53
	NATURAL_ING 3.85	NATURAL_ING 4.73	NATURAL_ING 4.75
	FIBERS 3.66	FIBERS 4.59	FIBERS 4.75
	CHEMICAL_FREE 3.67	CHEMICAL_FREE 4.54	CHEMICAL_FREE 4.73

SMELL 2.85	SMELL 2.84	SMELL 4.52
ATTRACT_PKG 3.44	ATTRACT_PKG 2.99	ATTRACT_PKG 4.67
RECYCLABLE 3.37	RECYCLABLE 3.26	RECYCLABLE 4.52
INFO_PKG 3.69	INFO_PKG 3.61	INFO_PKG 4.75
HEALTHY 4.09	HEALTHY 4.59	HEALTHY 4.75
TASTE 3.42	TASTE 3.41	TASTE 4.73
LOW_FAT 3.90	LOW_FAT 4.21	LOW_FAT 4.57
CONSUMP_INFO 3.70	CONSUMP_INFO 4.03	CONSUMP_INFO 4.63

Cluster 1:
This cluster is named as Basic consumers. It has the largest cluster size as proven through pie chart and the above tabular chart. This consumer group has the general characteristics when it comes to purchase of organic food. They might be the new users who are not only looking for the "Health and Weight aspects" while purchasing organic food but they also are considering the packaging of the organic food as they are not the experienced users and tend to focus on the trend and depend on their peers to make a decision.

Cluster 2:
This cluster is named as Fitness driven consumers. It is the second largest group. The main priority for the consumer is the "Health and Weight aspects" as they agree mainly concerned with this component while they care less about the taste, texture, smell and packaging aspects. We can say that these are the people who are into regular fitness activities such as yoga, gym or walking etc and might also be very conscious about the food intake and turn towards organic food to maintain a healthy lifestyle.

Cluster 3:
This cluster is named as Prospective consumers. It is the smallest among the other groups. We can see from the tabular cluster analysis that these people strongly agree with all the attributes which shows that these people are actually non-consumers of organic food and do not have much knowledge about the purchase of organic food but they tend to purchase it in the future studis will try to look out for maximum attributes from the organic food. The decision tree starts with the root node, which simply shows the distribution of the outcome field, which we can see from the chart as Organic product purchase.

The Yes indicates people who purchase organic food and No indicates the people who do not purchase organic food.

The data is then split based on statistical significance by the predictor with the strongest relationship with the target field, Taste in this case. We can see that there are two "buckets" (nodes) that the taste has been split into, one shows >Agree which indicates strongly agree which comprises of 68 consumers and <= Agree indicates the people who do not strongly agree with the taste attribute which comprises of 148 consumers.

Further, the <= Agree is split into two nodes which indicates that the people who do not prefer the taste as the strongest attribute for the purchase of organic food prefer the Natural ingredients as the main attribute for the purchase. The >Agree node under natural ingredients consists of 53 consumers.
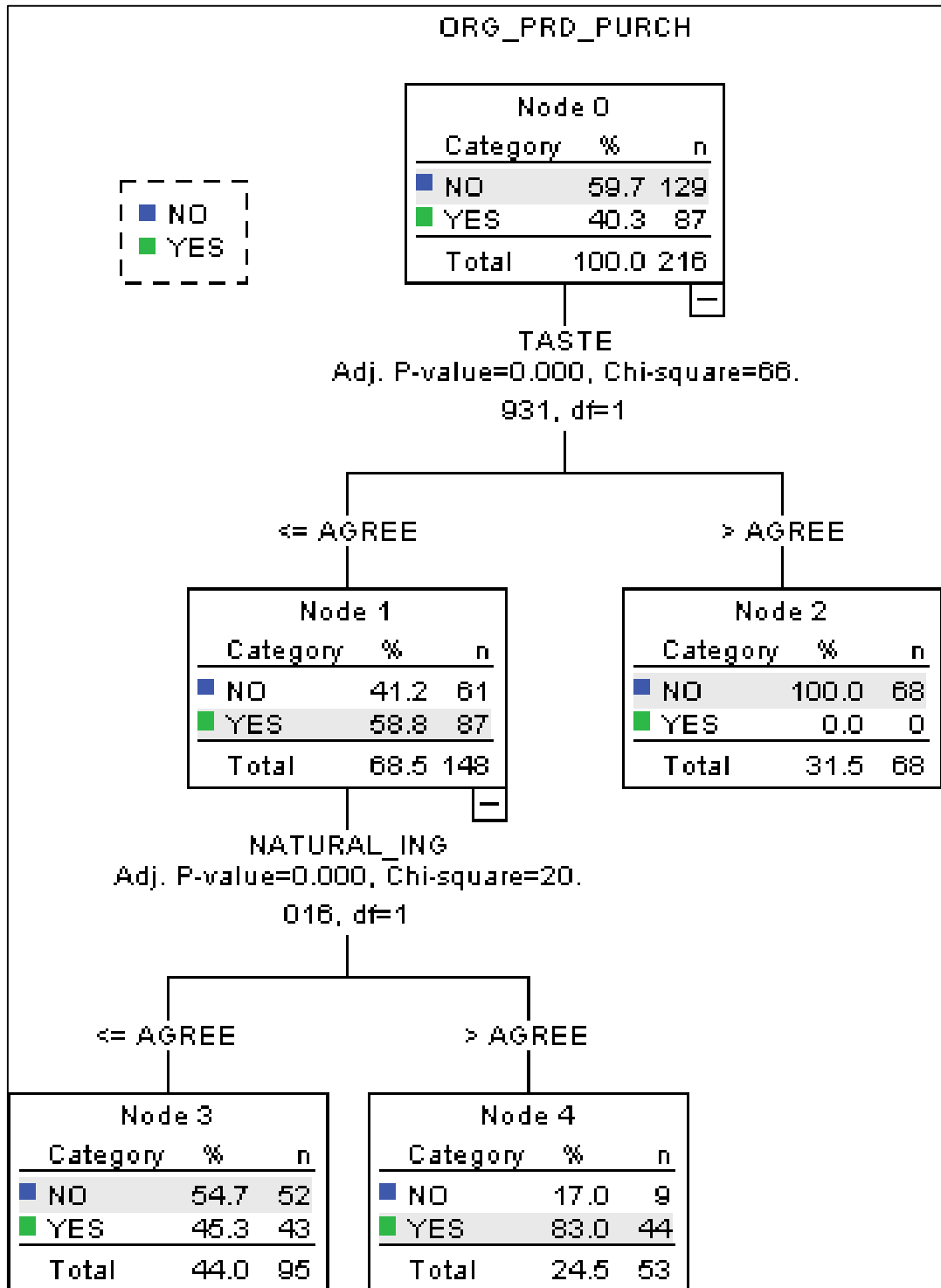
Figure 6: Showing Decision Tree

Table: 5

Classification

Observed	Predicted		
	NO	YES	Percent Correct
NO	120	9	93.0%
YES	43	44	50.6%
Overall Percentage	75.5%	24.5%	75.9%

Growing Method: CHAID
Dependent Variable: ORG_PRD_PURCH

The classification table helps us to check the accuracy of the decision tree by comparing the observed values and the predicted values. The method used for predicting the values is called "CHAID" which stands for Chi-square interaction detection. The above table shows the observed values, predicted values and the accuracy percentage. The decision tree has predicted the number of respondents who purchase organic food as 'Yes' and number of respondents who do not purchase as 'No'.

We can read the classification table in both ways i.e. horizontally and vertically. I have interpreted the above table horizontally in this study.

Total out of entire sample:

75.5% is classified as No. ((120+43) /216)

24.5% is classified as Yes. ((9+44) /216)

✓ The accuracy of predicting No is 93%. (120/ (120+9))

✓ The accuracy of predicting Yes is 50.6%. (44/ (43+44))

✓ Overall accuracy predicted by the model is 75.9% which is good. ((120+44) /216)

There are 129 (120+9) items classified into class No:

• 120 of these items are correctly classified into class No.

• 9 of these items are wrongly classified into class Yes.

There are 87 (43+44) items classified into class Yes:

• 43 of these items are correctly classified into class No.

• 44 of these items are wrongly classified into class Yes.

CONCLUSION:

The results indicated that "Health and Weight aspects" component of the factor analysis has a high importance in the buying decision process of the organic food products. This is due to the consumers being more informed about food quality and its effects on their health condition which are underlined clearly in the findings. The next component is the "Sensory appeal" which states that people do give importance for the taste, texture and smell but it is given relatively less importance than the health aspects and lastly the "Extrinsic Value" which is given less importance when it comes to the purchase of organic food.

The cluster analysis was used to form sub divisions of the consumers based on their common attitudes which led to formation of three clusters, which were named as Basic consumers, Fitness driven consumers and lastly the Perceptive consumers. Even if the factors that determine the organic food consumption were the same for all the three groups, there were statistically significant differences regarding the importance of the factors among the analysed clusters.

The decision tree was able to identify the taste as the significant differentiator which revealed that the consumers are not into organic products because of its taste but they provide the importance for the natural ingredients.

Lastly, we can conclude that for organic food marketers or retailers, it is important to know the profile of their consumers and their preferences to develop and adapt their products to the market based on the needs of each group of consumers. Also, the consumers who are not likely the buyers at present need to be focused on by building a perception in their mind about the merits of the organic food and how it will have an impact on their lifestyle.

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