

A Study on Two Wheeler Purchasing decision using Data Mining Techniques

^[1] Dr.M.Kannan, S.Suryanarayanan

^[1] Assistant Professor, Department of Computer Science and Applications SCSVMV University, Enathur,Kanchipuram.

^[2] M.Phil Research Scholar, Department of Computer Science and Applications SCSVMV University, Enathur,Kanchipuram.

Abstract: Consumers in present day situations, look for personalized travelling support like own vehicle for either personal or official. They will prefer to have own two wheeler vehicles with affordable price and low maintenance charges, in this case, motorbike and scooters are the preferred mode of travelling by them. But at the same time, the buying preference of end users to buy either motor bike or scooter are influenced by many factors like culture, social status, image, price and economy, durability, maintenance and life style related aspects and so on. In addition to that the role of personal and behavior aspects also influence them to prefer product either as motor bike or scooter and particular brand on them. In order to study these aspects, through obtaining market relevant data with the help of primary sources and filter the important decision aspects, SPSS 19 tool and WEKA tool was deployed and aim to identify the buying decision pattern among the end users. In addition to that, the study also addressed to categorize the decision process and the attributes involve in the decision process among the end users through classification analysis like cluster. The outcome of study reveals the buying decision pattern among the end users, its category and as well as role of influences.

Keywords- Consumers, Motor Bike or Scooter, Buying Decision, Attributes

I. INTRODUCTION

Business is purely dependent on consumer and success is based on consumer satisfaction and decision to purchase their preferable products and brands. Also decision process and time of decision differ based on the type of product or service, availability and trust on brand categories. In this aspect, two wheeler buying is the specialty buying situation in every end users purchase decision which involves series of buying decision process. Since the two wheeler product and its related services fall under durable category and also invoke price related instruments, the buying decision process of end users involve various aspects in their buying decision process. In addition to that, the purpose of buying two wheeler by any category of end users irrespective of their age, gender, occupation, income status, personality difference, usage expectation can be broadly into two categories namely official or personal. Based on the purpose along with their personal and social background, the preference of product either scooter or bike, type of product like style, colour, model, design, appearance and outlook, looking for benefits like comfortable, safety, mileage, add on service, maintenance aspects differ among the end users. In this aspect, the purchase decisions of end users who buy two wheelers involve scientific and non compensatory buying decisions and situation.

It is observed from many studies that the role of various factors on buying decision of two wheelers and its level of importance have been identified and tested but majority of the studies did not attempt effectively to classify the end users groups based on the factors influencing their buying decisions, by keeping this aspects as the major gap of study, the present study has been attempted in order to identify the important factors towards the purchase decision of two wheelers by end users and classify the end users based on those factors as major categories.

This paper is an extension of the previous work [1]. In addition to that, the present study employed data mining as the critical tool for analyzing the influence of important factors towards purchase decision of two wheelers.

II. LITERATURE REVIEW

Nutan Sharma & Rajesh Mehrotra [2016] conducted a study from 100 consumers from Jaipur city to understand buying behavior with respect to two wheeler vehicles such as Hero Moto Corp, Honda, TVS and Bajaj brands. The result reveals that purchase decision is depend upon the factors such as attributes of the product, cost, loan facility and brand identity.

K. P Najeemudeen, & N. Panchanatham [2016] conducted a study from 681 consumers in Malappuram district of Kerala to understand the significant sources which influencing two wheeler purchasing decision.

Naziya K.Pathan and Mirza Moiz Baig [2015], conducted a study to determine purchasing of frequent item set from sales transaction database. Apriori algorithm is applied to interpret the results. The result shows that customer who buys a shampoo buys a conditioner.

Haastrup Adeleye Victor et. al [2014] compared online analytical processing with data mining to understand customer behavior. They discussed about stages in data mining and compared three algorithms such as neural networks, association rule and decision tree to interpret the results.

G. Mahalakshmi [2014], conducted a study to determine the level of satisfaction of using TVs XL two wheeler in Theni district. Size of the sample is 240 respondents and it is obtained through Proportionate random sampling method. The result shows that TVs XL is preferred among the respondents due to their riding comfort and respondents are satisfied with their services.

Faiz Ahmed Shaikh [2012] identified the consumer buying behavior towards choice of manufacturing companies, popular saleable models, customer needs, and the market demands in different locations of Ahmednagar. 60 respondents were selected based on non-probability convenient sampling method.

Dr. K. Mallikarjuna reddy examined consumer buying behavior towards two-wheeler bikes in Hyderabad and Secunderabad. Data was collected from 100 respondents through structured questionnaire. Four factors such as cultural, social, personal and psychological are taken to analyze and interpret the results

Malar Mathi et. al [2013], examined a study from 128 respondents to understand customer buying behavior towards Hero Moto Corporation in Erode. The result highlights that customer's are satisfied with Hero moto products. Some of the respondents polled that style and color are comfort areas for the Hero brands. Also it shows that customer needs improvement in technology aspects.

Upasana Sharma and Rohit Bhardwaj [2014] discussed about different data mining techniques such as association, classification, clustering, prediction and decision trees with examples. They concluded that personal information is precious.

Dr.P. Isakki alias devi [2015] explores that companies can extract hidden information of the customers from large databases by using data mining techniques. Customer data is collected, managed and analyzed. Customer data management helps an organization to identify valuable customers. Customer analytics can be helpful to discover new patters and trends in their data and accurately predict customer behavior. With the help of customer data organizations can understand how to attract new customers, improve customer retention and enhance marketing campaign performance.

III. STATEMENT OF THE STUDY PROBLEM

Buying decision of end users is influenced by both material and psychological factors. It is also affected by behavior expectation and its outcomes among the end users. The time and energy spend by end users to arrive the purchase decision on any product or services depends upon the product and brand characteristics and its final add on value deliver to the end users along with its importance on the consumption pattern of users. In this aspect, two wheelers are the imperative product category which occupies major role in the commuting system of end users in present day market economy in terms of its possession value of ownership, status, convenience and economy. In addition to that, the growing size of market, availability of range of products with latest features and extension brands leads to complex buying decisions among the end users. In this context, it is necessary to understand the buying decisions employed by end users while the time of buying two wheelers either bike or scooter. It is also necessary to learn and understand the importance influencing factors on the purchase decision of end users in terms of academic and market relevance. Since the underlying factors differ among the end users category in terms of its influence and outcome a comprehensive data mining technique needed to be applied to consolidate the role of important factors on the buying decision of end users during the time of purchase of two wheelers.

IV. SCOPE OF THE STUDY

The study on the purchase decision of two wheelers among the end users was carried out by considering limited location of Kanchipuram. The study employed the collection of primary sources of information from the end users related to the purchase decision of two wheelers during the time of purchase. The study also described the socio economic background of end users in the study location. It also addressed the preference of purchase, source of influence, preference of brand, mode of payment related to the end user categories. The studies covered the important aspects underlying the purchase decision of two wheelers among the end users and also categorize their background relevant to the identified important aspects of purchase decision.

V. OBJECTIVES OF THE STUDY

The objectives of the study are

- To understand the significant difference between selected demographic characteristics and reasons to choose the particular vehicle.

- To identify the primary reasons to choose the particular company for their buying decisions using data mining techniques.
- To identify the primary reasons to choose the particular vehicle using data mining techniques.

VI. Hypotheses

- No significant difference between gender and type of bike prefers to buy at 5% level of significance.
- No significant difference between age of the respondents and type of bike prefers to buy at 5% level of significance.
- No significant difference between educational status and type of bike prefers to buy at 5% level of significance.
- No significant difference between marital status and type of bike prefers to buy at 5% level of significance.
- No significant difference between working status of spouse and type of bike prefers to buy at 5% level of significance.
- No significant difference between number of dependents and type of bike prefers to buy at 5% level of significance.
- No significant difference between occupation and type of bike prefers to buy at 5% level of significance.
- No significant difference between monthly income and type of bike prefers to buy at 5% level of significance.

VII.METHODOLOGY

In order to conduct the study, questionnaire was prepared and pretested. Data is collected from private company selling Yamaha brands vehicles located in Kanchipuram town. Obtained sample size is 192. Convenience sampling technique is adopted to collect the data.

WEKA and SPSS 19 tools are used to enter and interpret the results. Descriptive table, Chi-Square test, classification and clustering techniques are used.

VIII. RESULTS & DISCUSSION

a. Hypotheses Validation

Taken hypotheses are tested at 5% level of significance and the results are presented in table 1.

Table 1:Validation of Hypotheses

Hypotheses	Method	p-value	Result
Gender and type of bike prefers to buy	Chi-Square	.001	Rejected
Age and type of bike prefers to buy	Chi-Square	.001	Rejected
Education Status and type of bike prefers to buy	Chi-Square	.006	Accepted
Marital status and type of bike prefers to buy	Chi-Square	.002	Rejected
Working status of spouse and type of bike prefers to buy	Chi-Square	.001	Rejected
Number of dependents and type of bike prefers to buy	Chi-Square	.001	Rejected
Occupation and type of bike prefers to buy	Chi-Square	.001	Rejected
Monthly income and type of bike prefers to buy	Chi-Square	.006	Accepted

b. Analyzing reasons

Consumer buying reasons in a particular company and their preference category such as motor bike and scooter are calculated based upon mean value and mean ranking method and results are presented in table 2 and 3.

Table 2: Reasons to Choose Particular Company and Type of Bike - Motor Bike

Reasons	Mean	Mean Rank
Company image	3.42	II
Affordable Price	2.87	VIII
Exchange offers	3.3	III
Infrastructure	3.11	VI
Service and support	3.63	I
Word of mouth	2.7	X
Finance/Loan arrangement	2.83	IX
Insurance	3.1	VII
Availability	3.28	IV
Loyalty	3.17	V

Source: Primary data

Table 3: Reasons to choose particular company and type of bike - Scooters

Reasons	Mean	Mean Rank
Company image	3.53	I
Affordable Price	3.44	III
Exchange offers	3	VII
Infrastructure	3.18	V
Service and support	3.5	II
Word of mouth	2.03	X
Finance/ Loan arrangement	2.96	VIII
Insurance	3.17	VI
Availability	2.92	IX
Loyalty	3.42	IV

Source: Primary data

From the table 2, 3.63 is the highest mean rank, the reason seems to be service and support and which it is aligning with data mining facts. In general, motor bike riders are mostly men and they used more frequently for long rides, in particular, students, company representatives, private employees etc., service and support is most important compared to other factors. From the table 3, the highest mean seems to be 3.53, which proves that the company has stabilized its brand in all sort of vehicle genres, company image holds the most key factor. The last factor seems to be word of mouth which holds the mean value of 2.03.

8.3 Reasons to Buy Particular Vehicle based on Nature of Vehicle
Table 4: Reasons to Buy Particular Vehicle based on Nature of Vehicle-Motor Bike

Reasons	Mean	Mean Rank
Brand image	3.46	II
Price	3.31	V
Mileage	3.66	I
Pickup	3.27	VI
Speed	3.43	III
Less maintenance	3.11	VIII

Durability	3.02	IX
Style	3.12	VII
Color	2.85	X
Luggage space and seat comfort	2.37	XII
Resale value	2.80	XI
Outlook	3.36	IV

Source: Primary data

Table 5: Reasons to Buy Particular Vehicle based on Nature of Vehicle-Scooters

Reasons	Mean	Mean Rank
Brand image	3.36	IV
Price	3.54	II
Mileage	3.46	III
Pickup	2.74	X
Speed	3.08	VI
Less maintenance	3.32	V
Durability	2.96	VII
Style	2.90	VIII
Color	2.51	XII
Luggage space and seat comfort	4.31	I
Resale value	2.74	XI
Outlook	2.86	IX

Source: Primary data

From the table 4, for the particular selected vehicle and the reason goes to mileage, this will be predominant intention to choose the particular category. From the table 5, the highest factor is 4.31 which goes for luggage space and seat comfort and it is correlates with user preferences which once again proven are true. If we analyze still further, middle aged men, female and working women's requires riding comfort and more space for luggage zones for which they select for scooters.

8.4 Classification Techniques:

Classification techniques such as Naïve Bayes and J48 algorithm are applied to classify the datasets. Here preference of vehicle is taken as class label.

Naïve Bayes Classification

Correctly Classified Instances	183	95.3125 %
Incorrectly Classified Instances	9	4.6875 %

J-48

Correctly Classified Instances	178	92.7083 %
Incorrectly Classified Instances	14	7.2917 %

From the results of Naïve Bayes and J48 algorithm, based on correctly classified instance and incorrectly classified instance, the result shows that Naïve Bayes algorithm produced more correctly classified instance as 95.3125 %, also incorrectly classified instance as 4.6875 % when compared to J48 algorithm. This dataset is more suitable for Naïve Bayes algorithm.

8.5 Clustering Technique : K-means

8.5.1 Reasons to Choose Particular Company based on K-means

The below table 6 shows the outcome of K-means clustering technique. Here reasons are clustered to identify why the consumers prefer to buy their vehicle in a particular company.

	Cluster	
	1	2
Company Image	3	4
Affordable Price	3	3
Exchange offers	3	4
Infrastructure	3	3
Service and support	4	4
Word of mouth	3	2
Finance/loan arrangement	4	3
Insurance	3	3
Availability	3	3
Loyalty	2	4

Source: Primary data

From the table 6 entire results are clustered into two clusters, table 6, in cluster 1, the highest reason of 4 goes to service support and finance/loan arrangement which indicates that both the reasons are in same plane, and if we still analyze further, these two reasons are done by dealers, hence these reasons can be named as dealership rapport. If we analyze second cluster, there are four reasons such as company image, exchange offers, service support and loyalty which share the same plane which has highest mean of 4. The first two reasons company image and exchange offers are the strength of the vehicle and brand, next two reasons such as service support and loyalty are the strength of the dealers, it can be named as dealership rapport-vehicle strength, so we can conclude that both are important and both are two sides of a coin for stable business.

8.5.2 Reasons to Choose Particular Vehicle based on K-means

The below table 7 shows the outcome of K-means clustering technique. Here reasons are clustered to identify why the consumers prefer to buy the particular vehicle such as motor bike or scooter.

	Cluster	
	1	2
Brand image	4	3
Price	4	3
Mileage	4	3
Pickup	3	3
Speed	3	3
Less maintenance	3	3
Durability	3	2
Style	3	2
Color	3	2

Luggage space and seat comfort	3	3
Resale value	3	2
Outlook	4	2

Source: Primary data

From the table 7 entire results are clustered into two clusters, table 7, in cluster 1, the highest reason of 4 goes to brand image, price, mileage and outlook which indicates that these reasons are in same plane, and if we still analyze further, these four reasons are related to consumer perception on a particular brand, hence these reasons can be named as brand identity. If we analyze second cluster, there are seven reasons such as brand image, price, mileage, pick up, speed, less maintenance and luggage space and seat comfort which share the same plane which has highest mean of 3, hence this cluster can be named as user friendliness.

IX. CONCLUSION

The buying decision related studies are the continuum in nature, since the consumption is the part and parcel of every individual's survival. But the mode and type of consumption employed by the end users in their day to day practices differ according to the need and desire. In addition to that, the availability of product class and family envisages the end users to choose the product for their consumption by considering the value delivery and its maximum satisfaction and it leads to perplex on their buying decision by considering both rational and emotional factors. In this aspect, the two wheeler buying decisions in present day situations are more on emotional compare to rational even though the price plays an important decision role. The study addressed the role of different purchase related factors on the buying decision of end users during the time of buying two wheelers either bike or scooter. It also considered the purpose of buying and its influence on every factor on their buying decision. The outcome study observed the buying decision are influenced by major factors related to product, price and performance and which is also classified cluster among the end users through comprehensive data mining technique.

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