Original Research Paper

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"Super Market Consumer Perception Analysis Through Data Mining Techniques"

Computer Science

KEYWORDS: Data Mining, Market Basket Analysis, Supermarket, Consumer, Satisfaction.

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ABSTRACT

Market basket analysis is an important component of analytical system in retail organizations to determine the placement of goods, designing sales promotions for different segments of customers to improve customer satisfaction and hence the profit of the supermarket. These issues for a leading supermarket are addressed here using frequent item set mining. The frequent item sets are mined from the market basket database using the efficient Apriori algorithm and then the association rules are generated. The retail sector in India is witnessing a huge revamping exercise as traditional markets make way for new formats such as departmental store supermarkets and specialty stores. Retail is India's largest industry, accounting for over 10 per cent of the country's GDP and around eight per cent of the employment. Retail industry in India is at the crossroads. It has emerged as one of the most dynamic and fast paced industries with several players entering the market. Western-style malls have begun appearing in metros and second-rung cities alike introducing the Indian consumer to a shopping experience like never before. India's vast middle class and its almost untapped retail industry are key attractions for global retail giants wanting to enter newer markets. The organized retail sector is expected to grow stronger than GDP growth in the next five years driven by changing lifestyles, strong income growth, better products and shopping options, and favourable demographic patterns. A Study on Consumer Satisfaction towards Supermarkets with special reference to Sangli city is a modest attempt to understand the consumer perception towards retailing in the Sangli city region. The study intends to find out the relationship between demographic variables of the consumer and satisfaction of the consumers in different attributes of Supermarkets in Sangli city.

Introduction: Supermarket shopping is often categorised as a self-service retail environment. For supermarket retailers wanting to build relationships with their customers, being able to track their levels of 'satisfaction' with the key elements of the supermarket environment is extremely important.

From the retailer's perspective the aim is to minimise the reasons for complaints and dissatisfaction and the cost of a service recovery plan whilst establishing a track of direct feedback from customers about their reactions to those key elements. Satisfaction is a consumer's post-purchase evaluation of the overall service experience. It is an affective reaction in which the consumer's needs, desires and expectations during the course of the service experience have been met or exceeded. satisfaction in this sense could mean that a supermarket has just barely met the customer's expectations, not exceeded nor disappointed those expectations. The benefits of taking the customer's response beyond satisfaction at this level by exceeding expectations, is a competitive strategy many retailers aspire to achieve. Against this background this study was designed to investigate customers' satisfaction levels with a range of key elements, which contribute to the retail offer presented by Supermarkets in Sangli city. Factors of particular interest in a retail supermarket environment are friendliness of staff, cleanness of supermarket, and layout of supermarket.

Objectives of Study:
1) To study how internal layout and arrangement of items are made.
2) To study facilities provided by Super Markets.

Hypotheses:
Ho: There is no significant relationship between Buyer's income and making the purchasing decisions.

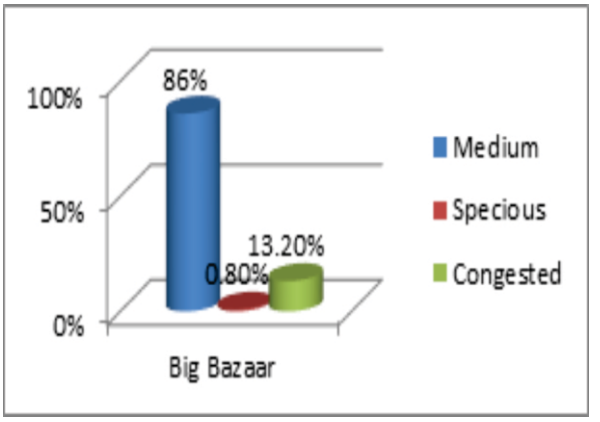
Methodology: This study is based on survey method. Non Probability Random sampling has been used in this study and survey consists of a sample of 250 respondents from the supermarkets, in Sangli city. The primary data collected by conducting the survey by framing of the questionnaires and filled by the consumers of the Supermarkets in Sangli. The secondary data were collected from various journals, magazines, newspapers, websites...etc. For analyzing the primary data the various tools and techniques were used in this study.They are as follows: MS- Excel analysis,

Chi-square Test is applied for Hypothesis testin

No. Of Respondents / Bazaar	Bazaars Layout			TOTAL
	Medium	Specious	Congested	
Big Bazaar	215 (86%)	2 (0.8%)	33 (13.2%)	250 (100%)

Data Analysis and Interpretation:
Table No 1 – Respondents Opinion about Bazaars Layout

Graph No 1- Showing Respondents Opinions about Bazaars Layout

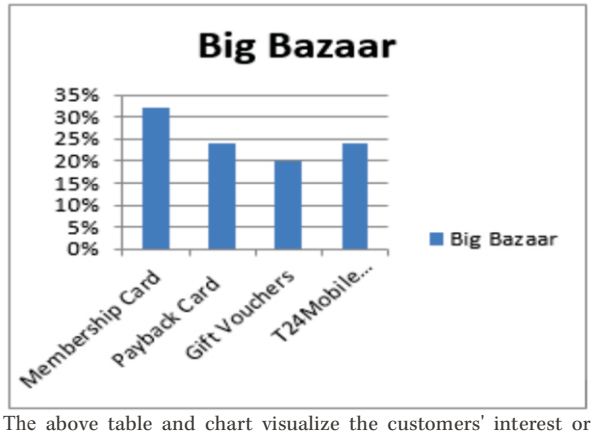


We studied respondents choices regarding the layout of the bazaar, which layout they prefer from the given options (Medium, Specious, Congested), and come up with following results. At Big Bazaar, 86% respondents found it as Medium size while 0.8% found it as specious. About 13.2% fells that Big Bazaar is congested layout.

Table No 2 – Facilities availed by the Respondents

No. Of Respondents / Facility Provided By Bazaars	Bazaar
	Big Bazaar
Membership Card	80(32%)
Payback Card	60(24%)
Gift Vouchers	50(20%)
T24Mobile currency offer	60(24%)
TOTAL	250(100%)

Graph No 2 – Showing Facilities availed by the Respondents



The above table and chart visualize the customers' interest or preference to the facility provided by the bazaar. The facilities considered were Membership Card, Payback Card, Gift Vouchers, T24 Mobile currency offer. From the above table and chart we can see that 32%, respondents interested in membership card. From the above table and chart we can see that 24%, respondents are using payback card. About 20% respondents are interested in gift vouchers and 24% respondents are using T24 Mobile recharge card. We can say that most of the respondents prefer to have Membership Card & payback card.

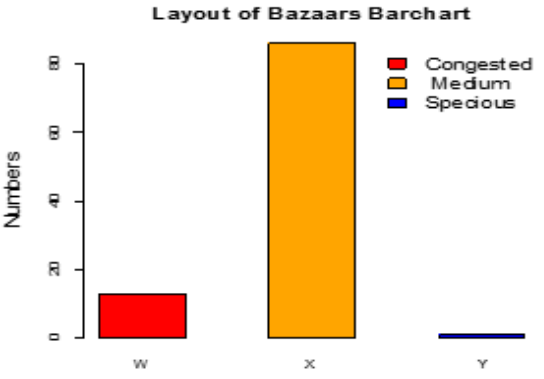
Data analyzed with the data mining tool R:

1. Inserting layout of bazaar data into R from .csv file and operation:

```
>  Layout2<-read.csv("D:\\Layout2.csv");
> Layout2;

X Medium Specious Congested TOTAL
1 Big Bazaar   86%   0.80%   13.20%  100%

> str(Layout2);
'data.frame':   1 obs. of  5 variables:
 $ X    : Factor w/ 1 level "Big Bazaar": 1
 $ Medium   : Factor w/ 1 level "86%": 1
 $ Specious : Factor w/ 1 level "0.80%": 1
 $ Congested: Factor w/ 1 level "13.20%": 1
 $ TOTAL    : Factor w/ 1 level "100%": 1

> summary(Layout2);
X    Medium   Specious  Congested  TOTAL
Big Bazaar:1   86%:1   0.80%:1   13.20%:1   100%:1

> data<- structure(list(W= c(13L), X= c(86L), Y= c(1L)),.Names=
c("W", "X", "Y"),class="data.frame",row.names= c(NA, 1L));

> attach(data);
> print(data);
W  X Y
1 13 86 1
```

Representation of data into R using graphs:

```
> colours <- c("red", "orange", "blue");
> barplot(as.matrix(data), main="Layout of Bazaars Barchart", ylab
= "Numbers", cex.lab = 1.5, cex.main = 1.4, beside=TRUE,
col=colours);
```



From above chart we conclude that here maximum respondents having found the Medium type of Layout of Bazaars.

2. Inserting facility provided by the bazaar data into R from .csv file and operation:

```
> F<-read.csv("D:\\F.csv");
> F;

X Big.Bazaar
1  Membership Card   80(32%)
2  Payback Card     60(24%)
3  Gift Vouchers    50(20%)
4 T24Mobile currency offer    60(24%)
> str(F);
‘
data.frame':  4 obs. of  2 variables:
$ X       : Factor w/ 4 levels "Gift Vouchers",..: 2 3 1 4
$ Big.Bazaar: Factor w/ 3 levels "50(20%)","60(24%)",..: 3 2 1 2

> summary(F);
X      Big.Bazaar
Gift Vouchers             :1   50(20%):1
 Membership Card       :1   60(24%):2
 Payback Card             :1   80(32%):1

T24Mobile currency offer:1
> data<- structure(list(W=
c(32L),X=c(24L),Y=c(20L),Z=c(24L)),.Names= c("W", "X",
Y","Z"),class="data.frame",row.names= c(NA,1L));
> attach(data);

The following objects are masked from data (pos = 3):

W, X, Y, Z
The following objects are masked from data (pos = 4):

W, X, Y
> print(data);
W  X  Y  Z
1 32 24 20 24
> print(data);
W  X  Y  Z
1 32 24 20 24
```

Representation of data into R using graphs:

```
> barplot(as.matrix(data), main="Facility Provided by the
Bazaar",ylab = "No of respondents", cex.lab = 1.5, cex.main = 1.4,
beside=TRUE, col=colours);
```

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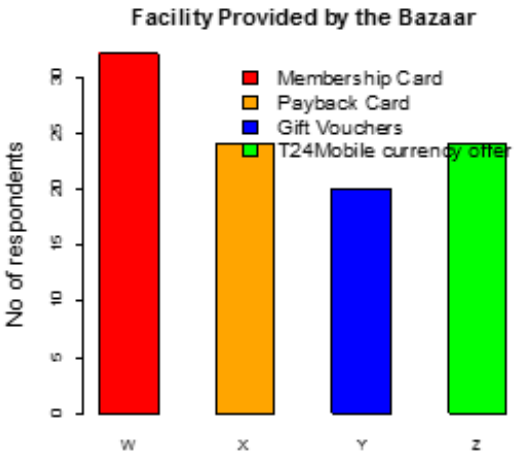
> legend("topright",c("Membership Card","Payback Card","Gift Vouchers","T24Mobile currency offer"),cex=1.3, bty="n", fill=colours);



From above chart we conclude that here maximum respondents are interested in Membership Card, Payback Card and Gift Vouchers Facility

Hypotheses Analysis and Results

OBSERVED FREQUENCY [Oij]:

Baz aar	Less than & Equall 25000	25001-50000	50001-75000	75001-100000	100001 & Above	TO TAL
Big Baza ar	132	56	37	16	09	250

EXPECTED FREQUENCY [Eij]:

Bazaar	Less than 25000	25000-50000	50000-75000	75000-100000	100000 & Above
Big Bazaar	114	65.3	37.5	22.5	10.8

CHI SQUARE TEST:-

$X^2 = \Sigma [(Oij - Eij)^2 / Eij]$

(Oij - Eij)=

18	-3.9	-0.5	-6.5	-1.8

$(Oij - Eij)^2$=

324	15.2	0.3	42.3	3.2

(Oij - Eij)2/Eij=

2.8	0.2	0	1.9	0.3

We have to find Degrees Of Freedom using following formula:

DF=5

The P-value is the probability that a chi-square(x2=5.7) statistic having 12 degrees of freedom is more extreme than 5(for 0.99).

Check probability value for degrees of freedom=5 at probability=0.99

Here X2=5<5.7(for alpha=0.99)

So accept H0 i. e. There is no significant relationship between income of respondents and their purchase decisions

Conclusion: Data Mining System is useful to study buying behave or of the customers in retail departmental stores. With this study researcher has concluded that there are certain buying habits of the customers. And according to these buying habits of customer, management may update their system of providing various types of services to their customers to delight the customers and to retain the customer with same business house.

References:

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[2] M. Hahsler, K. Hornik, "Building on the arules infrastructure for analyzing transaction data with R", in R. Decker, H.-J. Lenz (eds.), Advances in Data Analysis, pp. 449-456, Berlin: Springer, 2007.

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