

Predict online customer satisfaction level on the basis of e-commerce services and age group

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Abstract - The purpose of study is to develop an understanding the how many customer satisfied with the E-commerce services. So there are lots of scopes to an analyze user's data to find unknown facts of E-commerce. To achieve objective of this paper authors conduct a survey named Customer Satisfaction level in India. They collected a sample of 520 users in one month time duration via online medium (Google Forms). The major difference between online and traditional shopping is that in online shopping there is no touch, feel and trust. So the consumer gets afraid to pay first before receiving the product. In this paper authors try to find out relationship between type of services and satisfaction level in Indian consumer in E-commerce services. The result of experiment shows that P value of customers Ages and Satisfaction level is 0.5817 which is significant at 95% confidence and P value of customers Services and Satisfaction level is 0.5988. It tells that consumer satisfaction level according to the type of services.

Keywords - Survey, E-shopping, E-commerce, Frequency distribution, Test of independence, Data mining.

I. INTRODUCTION

E-commerce is the activity of buying or selling of products on online services or over the Internet. Electronic commerce draws on technologies such as mobile commerce, electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems.

The modern E-commerce system widely used good Recommendation system which will not only guide user to choose product at correct time but also it helps attracting the customer to do use digital marketing online effectively recommendation system save time and give new different experience to the customer, various approaches of recommendation in E-commerce is studied and based on that the analysis is done.

Over the years, digital marketing has grown in popularity mainly because of people find it very convenient and easy to use comfortably from their home and offices. The digital marketing stores are increasing day by day in numbers this is due to people have accepted this as a new lifestyle. This recent development in the lifestyle of the today's consumer is the demand of the hour with the moving time.

Advantages of e-commerce is Reducing transaction cost, Competitive pricing, Reducing time, 24/7 potential income, Faster buying procedure, as well as easy to find product, Lower Cost, and Easy to buy etc.

Now a days, customer are becoming more active and comfortable with digital marketing this could be various factor such as online transactions, researching products or services, booking their travel tickets online etc.

II. LITERATURE REVIEW

A. Related Work: Test of Independence Pearson's Chi-square test is used to test the independence between rows and columns in contingency table. There are three types of Chi-square test; test of independence, goodness of fit and homogeneity, but they uses the same formula. There are many advantages of this test like robustness, ease of computation etc. There are also certain limitations like sample size, difficulty in interpretation etc. There are many researchers who used chi-square to establish relationship between two variables on the basis of observed frequency.

B. Related Work: Consumer satisfaction level, services & E-commerce

E-commerce is emerging field now days where data mining is used. According to **AC Nielson and Absolute**

Data Report on Social media in India, 2011 in the survey, 77% of the respondents said that they do seek opinion of their friends on Social Networking Sites before purchasing product/service from this report I conclude that there is highest growth in India towards to use of E-commerce services. There are various benefits of E-commerce like purchasing, selling etc. [6]. There are various authors who provide country based study towards E-commerce user's attitude [7].

There are various Data mining techniques that are used by various researchers to provide personalized recommendation system to consumers to increase the online sale [8]. Some techniques are cluster analysis, Factor analysis, correlation etc [9][10][11].

III. DESCRIPTION OF ONLINE SURVEY

A. Data Collection

The data for fulfilling the objectives of the study have been collected from primary sources. The method used to collect data is questionnaire. The mode of filling this questionnaire is through Google Forms. The target audiences are E-commerce users who uses different services of E-commerce. There are various questions in the questionnaire regarding Indian customer attitude and their usage of E-commerce services. For this study only two questions are used.

1. Type of services used in E-commerce.
2. Satisfaction level after using services.
3. Customers age group.

TABLE I

FRQUENCY TABLE OF DEMOGRAPHICS OF RESPONDENT

| | | |
|-------------------------|------------|-----|
| Gender of Respondent | Male | 366 |
| | Female | 154 |
| Age Group of Respondent | 18-30 | 427 |
| | 31-45 | 80 |
| | 46-60 | 13 |
| | > 60 | 0 |
| Types of Services | E-Banking | 112 |
| | E-Billing | 95 |
| | E-shopping | 175 |
| | E-Ticket | 138 |
| Satisfaction Level | 0-25% | 1 |
| | 25-50% | 21 |

| | | |
|--|---------|-----|
| | 50-75% | 186 |
| | 75-100% | 312 |

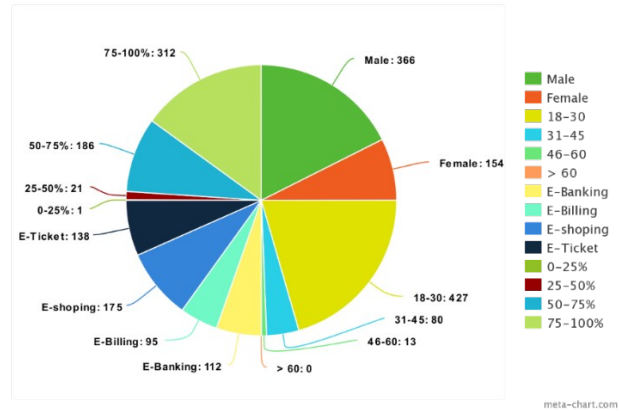


Fig 1: Pie Diagram to show frequency of demographics of respondent

The following findings were drawn from Fig 1:

1. The study is dominated to young users having contribution 80.1% whose age is between 18 to 30 years.
2. In study the male gender contribution is more 70.5% as compare to female having 29.5% contribution.
3. There are two main type of respondent who are contributed in survey are E-shopping and E-ticket having 76.8% and 61.2% contribution.
4. There are customer's satisfaction level of 75-100% customer is 57.8% and 25-50% is 37.1%.

IV. HYPOTHESIS DESIGN

H01: There is no significant relationship between category of age group and satisfaction level opted by Indian consumer in E-commerce.

Ha: There is significant relationship between category of age group and satisfaction level opted by Indian consumer in E-commerce.

H02: There is no significant relationship between category of E-commerce services and satisfaction level opted by Indian consumer in E-commerce.

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V. EXPERIMENT DESIGN

There are four steps in experiment design.

1) Data selection: In the first step of data selection authors only collect responses who use e-commerce services there are 520 samples collected for two predefined questions about Age group, Service type and Satisfaction level.

| Age Group | Satisfaction level | | | |
|-----------|--------------------|-----------|-----------|---------|
| | 0-25% | 25-50% | 50-75% | 75-100% |
| 15-30 | 0.8211538 | 17.244231 | 152.73462 | 256.2 |
| 31-45 | 0.1538462 | 3.230769 | 28.61538 | 48 |
| 46-60 | 0.025 | 0.525 | 4.65 | 7.8 |

2) Data collection method: Online survey through Google forms is used to collect data from major parts of India.

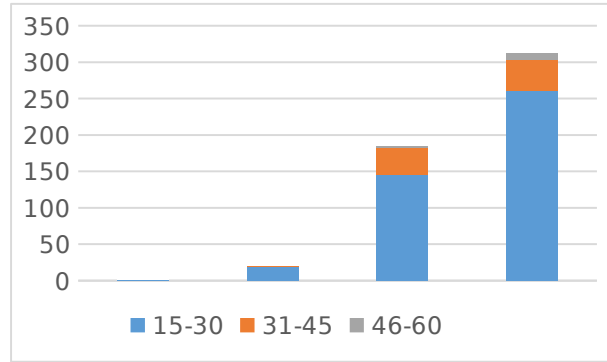
3) Tool used for study: In this study authors used 'R' open source tool for analysis.

4) Techniques used for study: Since we have data in categorical form we use test Pearson's Chi-square test to check dependency between defined variables which also validate null hypothesis.

VI. FINDINGS FROM EXPERIMENT CONDUCTED

Authors used chi-square test of independence to find relationship between type of age group and satisfaction level opted by consumer in Indian context.

| Age Group | Satisfaction level | | | |
|-----------|--------------------|--------|--------|---------|
| | 0-25% | 25-50% | 50-75% | 75-100% |
| 15-30 | 1 | 19 | 146 | 261 |
| 31-45 | 0 | 2 | 36 | 42 |
| 46-60 | 0 | 0 | 4 | 9 |



Pearson's Chi-squared test data: tab

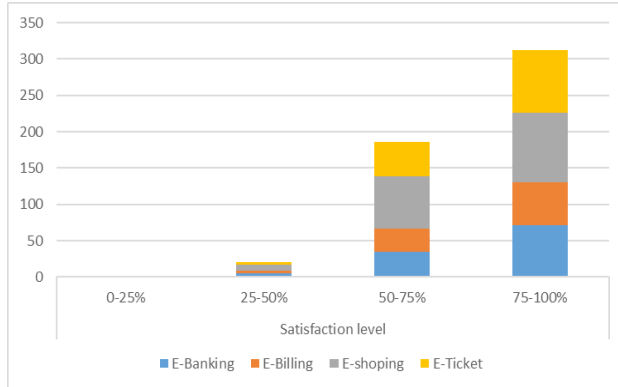
X-squared = 4.7085, df = 6, p-value = 0.5817

In this experiment we see that chi-square value is 47.085 at 6 degree of freedom. Also the p value is 0.5817 which is greater than 0.05 hence accept null hypothesis. So there is a no significant relationship between types of age group and satisfaction level opted

| Service types | Satisfaction level | | | |
|---------------|--------------------|--------|--------|---------|
| | 0-25% | 25-50% | 50-75% | 75-100% |
| E-Banking | 1 | 5 | 35 | 71 |
| E-Billing | 0 | 4 | 32 | 59 |
| E-shopping | 0 | 8 | 71 | 96 |
| E-Ticket | 0 | 4 | 48 | 86 |

by Indian consumer in E-commerce. This results tell us that there is no dependency between age group and satisfaction level of Indian e-consumer.

| Service types | Satisfaction level | | | |
|---------------|--------------------|----------|----------|---------|
| | 0-25% | 25-50% | 50-75% | 75-100% |
| E-Banking | 0.2153846 | 4.523077 | 40.06154 | 67.2 |
| E-Billing | 0.1826923 | 3.836538 | 33.98077 | 57 |
| E-shopping | 0.3365385 | 7.067308 | 62.59615 | 105 |
| E-Ticket | 0.2653446 | 5.573077 | 49.36154 | 82.8 |



Pearson's Chi-squared test data: tab

X-squared = 7.3681, df = 9, p-value = 0.5988

In this experiment we see that chi-square value is 73.681 at 9 degree of freedom. Also the p value is 0.5988 which is greater than 0.05 hence accept null hypothesis. So there is a no significant relationship between types of services and satisfaction level opted by Indian consumer in E-commerce. This results tell us that there is no dependency between service types and satisfaction level of Indian e-consumer.

VII. CONCLUSION

The results of study clearly show that there is no significant relationship between type of age group, types of services and satisfaction level by Indian consumer in E-commerce at 95% confidence.

From the data it has been observed that young people whose age is between 18 to 28 years more participated in survey and the two most popular services are E-shopping and E-ticket.

The objective of study to test dependency between age group, types of services and satisfaction level is achieved.

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