

Sir Parashurambhau college

Pune - 30

**DEPARTMENT**

**OF**

**STATISTICS**

***PROJECT NAME :-***

***“THE STUDY OF  
PURCHASING  
BEHAVIOUR OF  
CONSUMER IN E-  
MARKET”***

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# Introduction

Now a days, online shopping trend are growing on last few years. This is form of electronic commerce which allows consumers to directly buy goods and services from a seller over the internet using a web browser or a mobile app. Consumers find a product of interest by visiting the website of the retailer directly or by searching among alternative vendors using a shopping search engine, which displays the same product's availability and pricing at different e-retailers.

In 2020-21 year final project, we decide to work on **purchasing behaviour of consumer in E-market**. Due to covid-19 pandemic, the scenario of online shopping in terms of consumer gets changed. Each customer is becoming more interactive, and though online reviews customers can influence other potential buyer's behaviours. Customer can get information about a product from reviews. Also, service plays important role in E-market. Subsequently, risk and trust are two important factors affecting people's behaviour in digital environments.

We have different types of consumers and their needs also different . So, we work on questionnaire in which we include factors such as age, native place , which online shopping platform consumer uses?, what do they mostly look for?, best online shopping platform, how often do they shop online?, factors motivating for shopping ,experience, advertisement ,payment method and some security questions. From this we will find approach of consumer in E- market.

So, we collect the data via google from mostly of students. Try to find consumer need and their moods in the online shopping .So, this is our project of final year.

# ACKNOWLEDGEMENT

We would like to express our special thanks of gratitude to my all teachers as well as our HOD. Mrs. Turkunde madam who gave us the golden opportunity to do this wonderful project on the topic **“THE STUDY OF PURCHASING BEHAVIOUR OF CONSUMER IN E-MARKET”**.

From this project we would come to know about so many new things like all statistical tools and how to apply them in this project .We also know how the statistics is useful to solve various problems & issues.

We are really thankful to teaching and non teaching staff of department . Secondly we thankful to our friends and parents who always supported during project completion.

# PREFACE

It gives us a great pleasure of introduce before you report the project entitled **“THE STUDY OF PURCHASING BEHAVIOUR OF CONSUMER IN E-MARKET”**

It was a really great experience while doing this project. We would like to inform the readers this project is part of curriculum for the students of T.Y.Bsc. Our contribution in this project is to collect and analysis the data.

We would like to express our deep gratitude towards the all of my teachers for valuable guidance for the successful completion of the project.

Finally we would like to thank those who directly and indirectly lead a hand of help and made this project a grand success.

# DECLARATION OF STUDENTS

We hereby declare that the project work entitled “THE STUDY OF PURCHASING BEHAVIOUR OF CONSUMER IN E-MARKET”

Is original work carried out by department of Statistics of S. P. College Pune . This project based on online shopping behaviour of consumers. This is real data (primary). This project has not been carried out previously by any person, so we selected this project for analysis.



# METHODOLOGY

As a group, we studied use of online shopping platforms for social and educational needs mostly of young generation. We found that, consumers are interested in buying products such as books, cell phones, clothing, footwear etc. on online shopping platforms rather than offline. Because of sells as well as service.

In order to meet the proposed objectives the methodology consists of the following:

- Firstly, we decide our objectives. So, we can make questionnaire on the basis of our objectives. Then, for the data collection we set the google form and send it to the various students.
- Almost, 250 peoples participate in this survey. The questionnaire has five sections
  - i) Native place of consumer
  - ii) On which online shopping platforms the shop, when they shop, motivating factors, mostly what they buy.
  - iii) Experience of online shopping before and after corona
  - iv) Payment method use for shopping, ratings and social media use for advertisement
  - v) Consumer confidence about payment information and personal information on online shopping platforms.
- Data is analyzed using statistical tools like chi-square test of independence ,one-way ANOVA ,Trend analysis using scattered Diagrams, Graphical representation of data , multiple linear regression model .
- Data is analyzed with the help of MS-Excel and R-Software.

# DATA COLLECTION

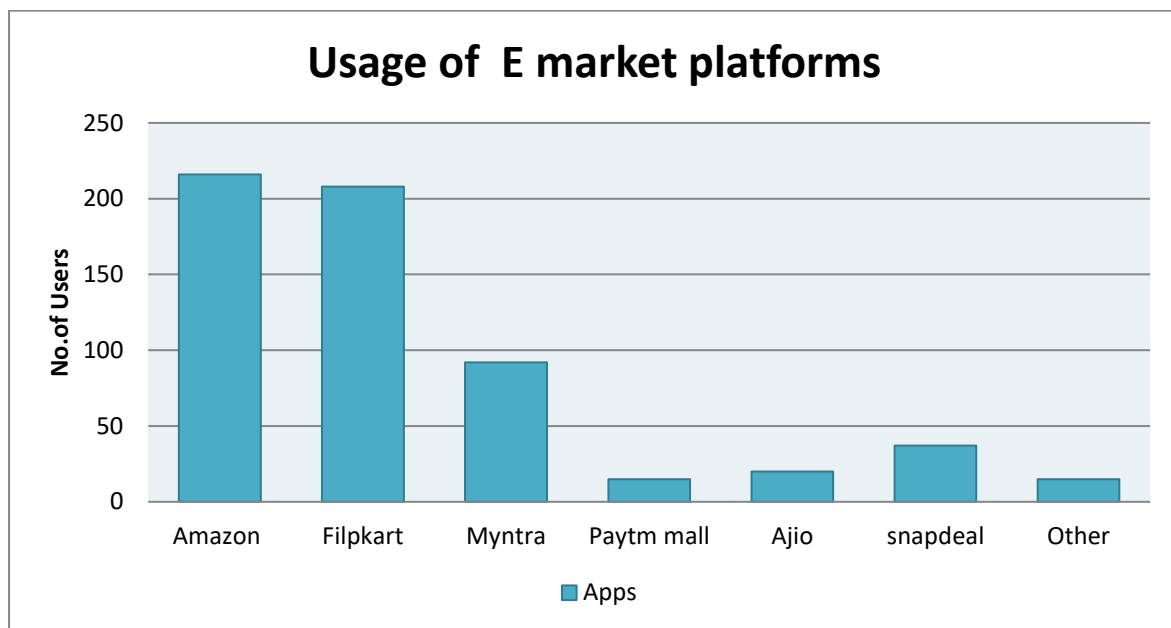
- For the final year project, we decided to work on primary data But , due to pandemic condition it is impossible to get information from people.
- So, we decide to collect data via google form. For that, we firstly work on questionnaire related to our topic **“The study of purchasing behavior of consumer in E-market”**.
- We work on various criteria related to this project and also our guiding teacher **Ms. Ulka Dudhal mam** helped us during the whole process.
- Firstly, we interact with only 20 peoples through google form and also receive their feedback on this questionnaire.
- After receiving their valuable remarks, we reset the google form. Then, we sent this form to various whatsapp group.
- All of them are very interested in our work and questionnaires. They answer our questions and give their valuable time for us. It was wonderful experience for collecting data for all of us.
- In this way, we collect primary data of various students through google form.

# Objectives

- ❖ To find mostly used as well as best online shopping platform for shopping in India.
- ❖ To draw graphical representation of social media for advertisement.
- ❖ To find most secured as well as mostly used payment method via graphical representation.
- ❖ To find the mostly buying products and which motivating factor behind buying something.
- ❖ To check effect of corona on online shopping platforms.
- ❖ To study the consumers moods of online shopping through graphical representation.
- ❖ To test the dependency between gender and buying products such as books, cell phones, electronics etc.
- ❖ To test the dependency between online shopping platform (amazon) and Inspiring factors such as discount, cashback, return etc.
- ❖ To fit logistic regression model between inspiring factors such as discount, cashback, return etc. and Amazon
- ❖ To test whether payment information and personal information confidentially varies or not .
- ❖ To find overall rating of online shopping platforms.

## **SHORTY VISUALIZATION OF OUR PROJECT WORK**

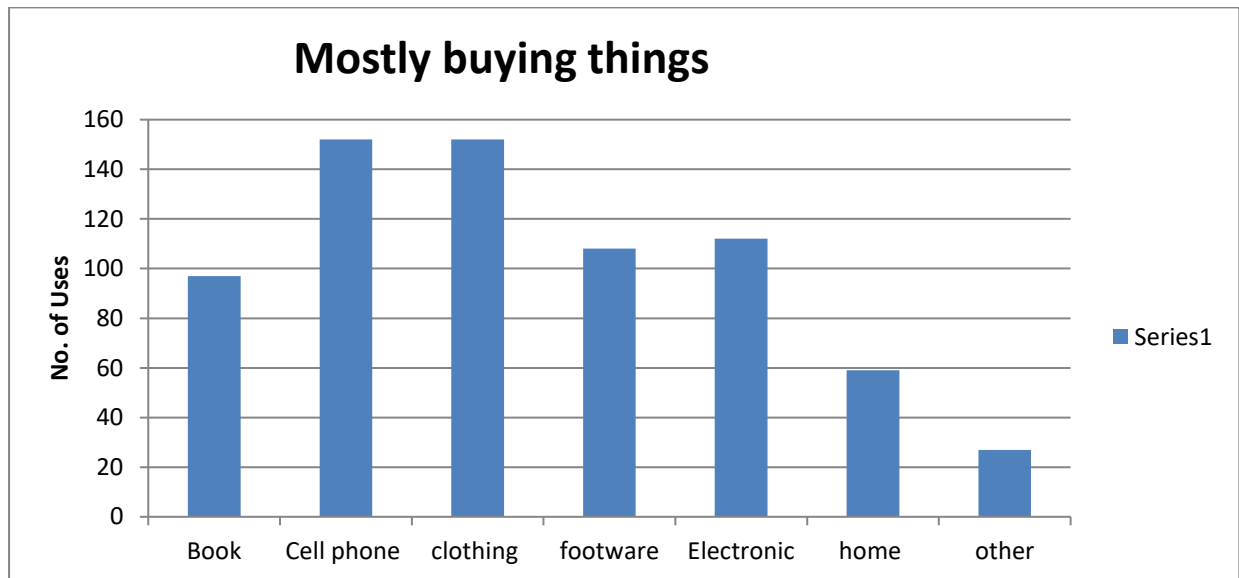
### **1) Which online shopping platform is mostly used ?**



### **Conclusion :**

We observed that , most of the users use Amazon and flipkart for online shopping .

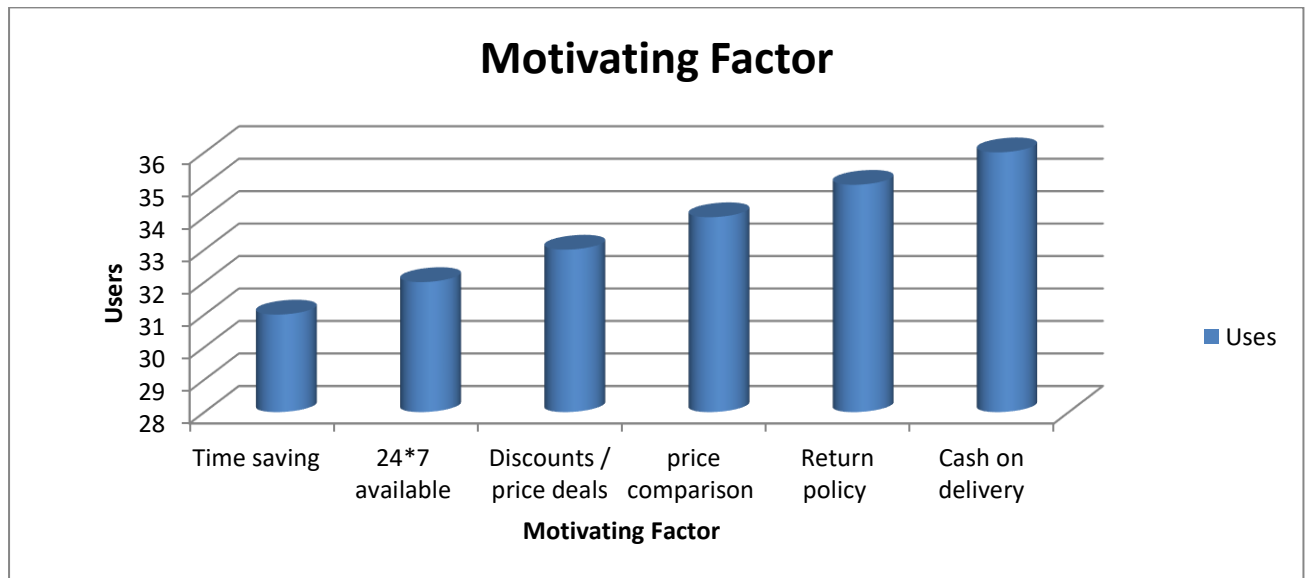
## 2)What consumers mostly looks for ?



### **Conclusion :**

We observed that , **maximum** users buying **cell phone / accessories and cloths** using online shopping platforms.

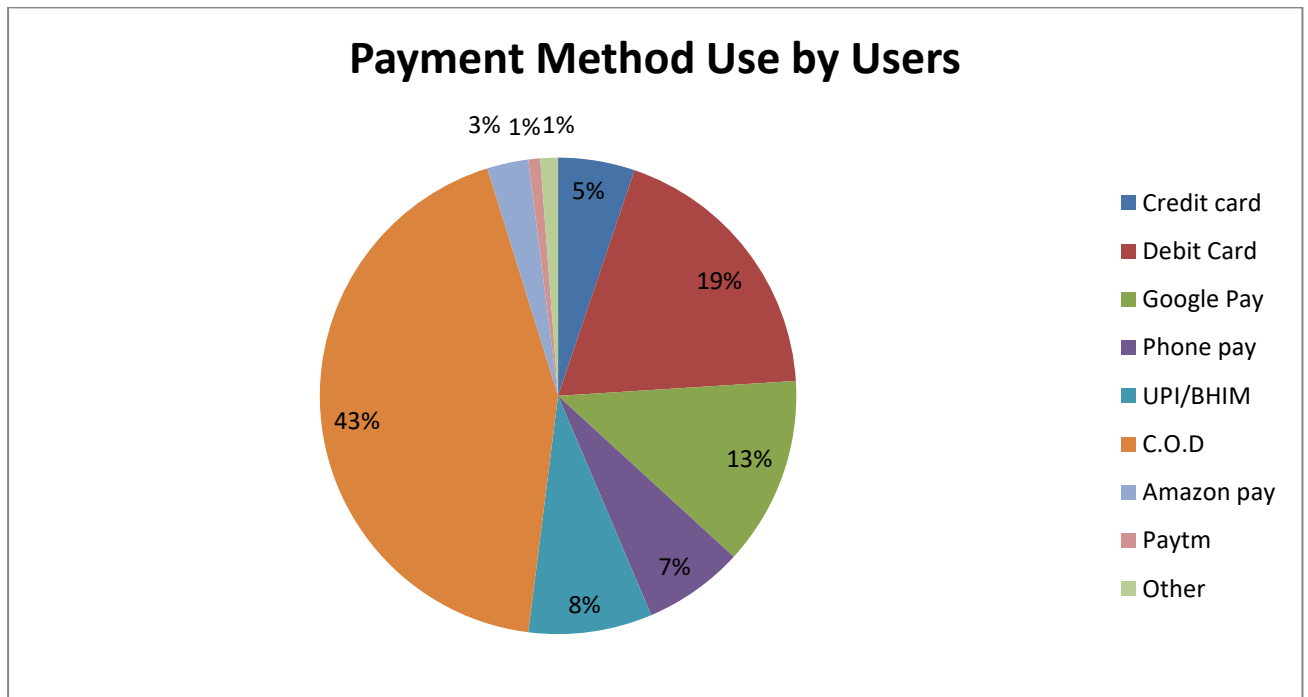
### 3)Motivating Factor :



### **Conclusion :**

We observed that , **cash on delivery** is **best motivating factor** for online shopping .

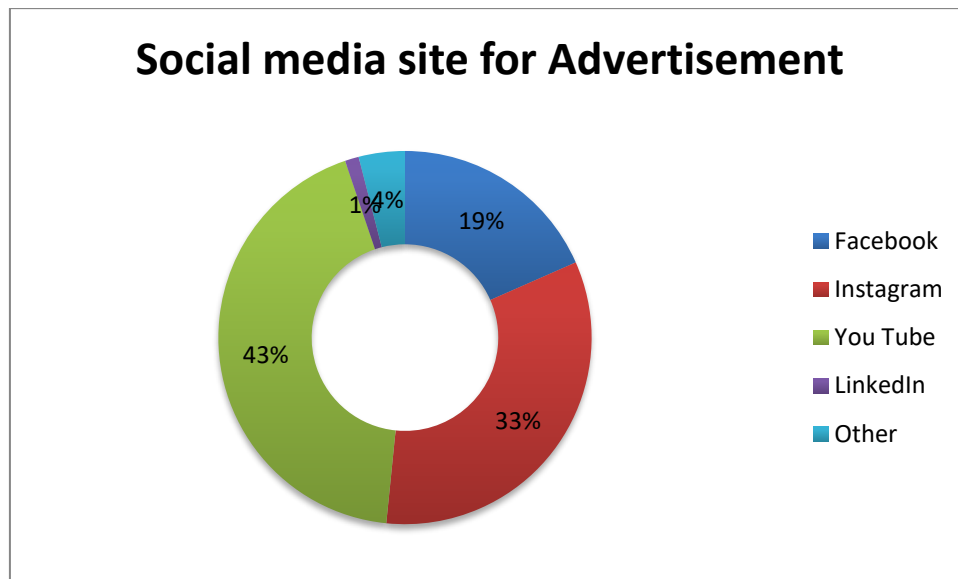
#### 4)Payment Method:



#### **Conclusion :**

We observed that , **43%** users use **cash on delivery** for online shopping .

## 5) Social media site for Advertisement:

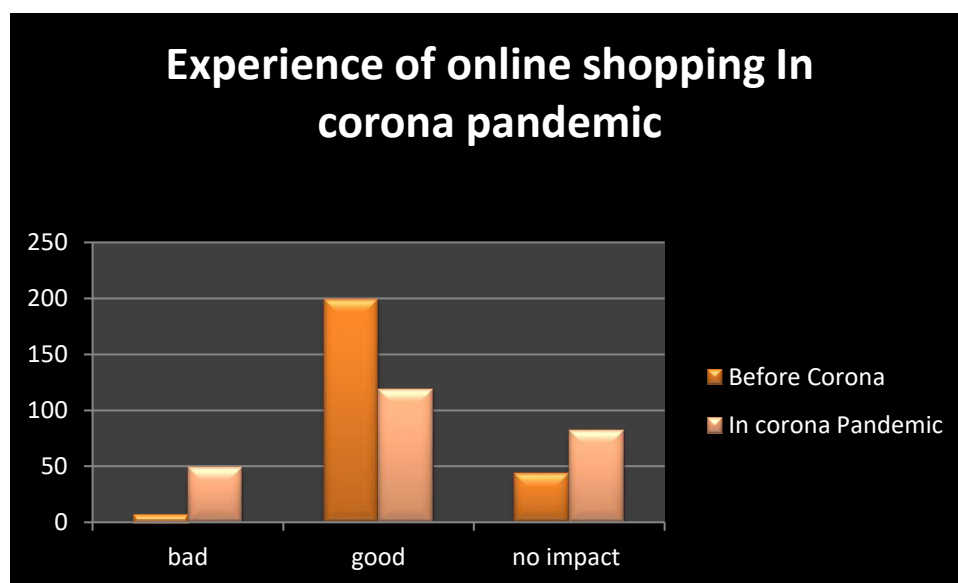


### Conclusion :

We observed that , 108 out of 250 users says that **You Tube** is mostly showing advertisement about online shopping .



## 6) Experience of online shopping before corona and in corona pandemic .



### **Conclusion :**

According to users experience of online shopping is not good during the corona pandemic.

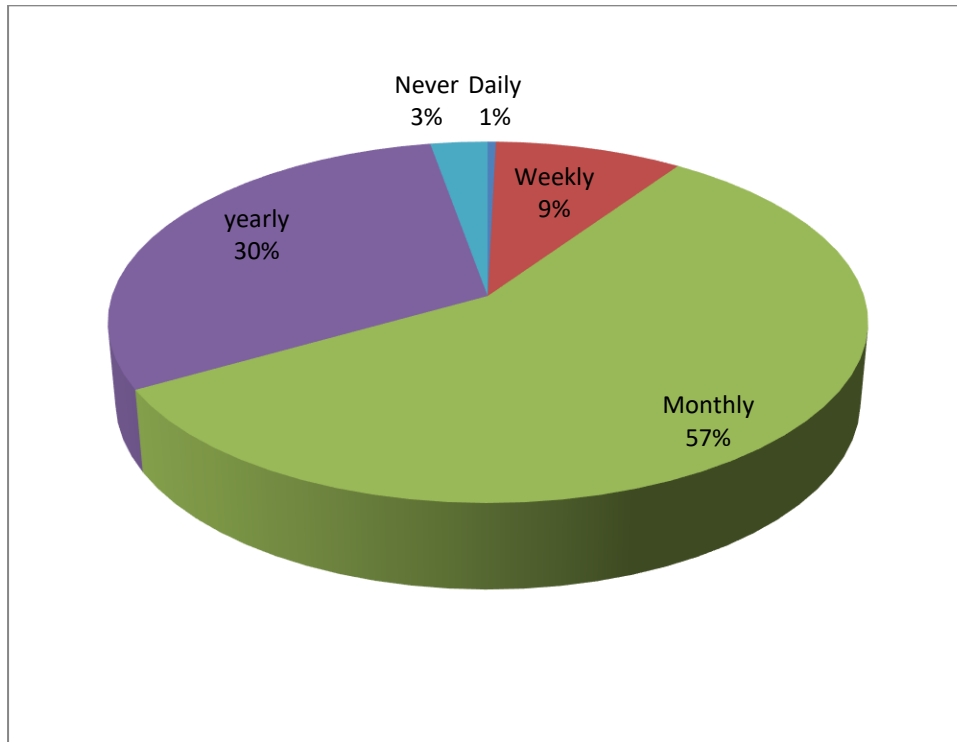
7) According to users, which app is best for online shopping platform ?



**Conclusion :**

We observed that , Amazon is best and favourite of users for online shopping .

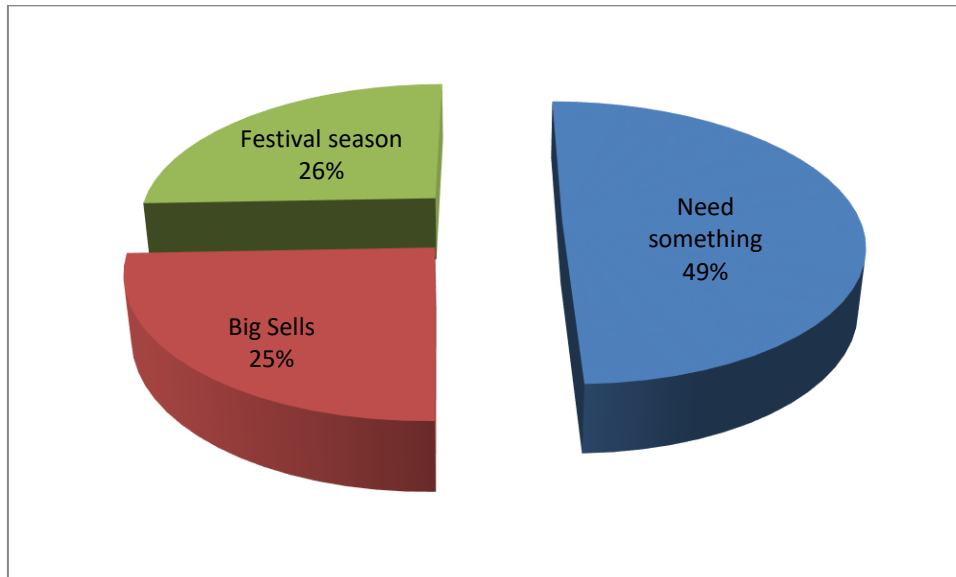
## 8) How often do you online shop ?



### Conclusion :

We observed that , **57%** users buying the product once in the **month**.

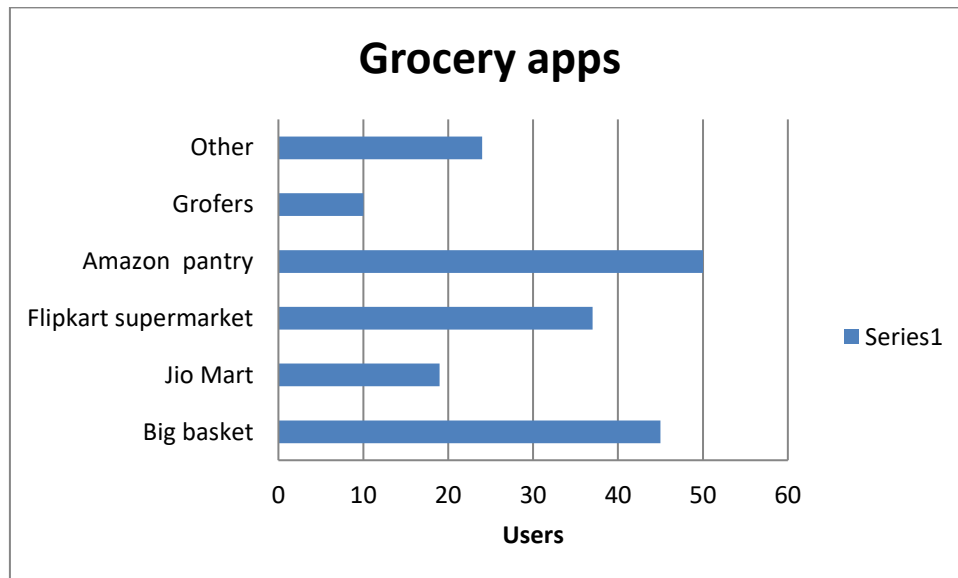
### 9)When you buy online :



### **Conclusion :**

We observed that , many users buy online **when they need something.**

## 10)Best Grocery Platform :



## Conclusion :

We observed that , **Amazon pantry** is best grocery app in India.

## Chi Square test for independent of Attributes

### To test :

$H_0$ : A and B are independent V/s  $H_1$ : A and B are not independent.

Where,

A: Category

B: Gender

Contingency Table :

	Books	Cell phone	Clothing	Footwear	Electronic	Home appliances	other	Total
female	27	41	52	25	25	23	9	202
male	68	108	95	82	86	34	19	492
Total	95	149	147	107	111	57	28	694

### Calculation in Excel:

	Books	Cell phone	Clothing	Footwear	Electronic	Home appliances	other	Total	
female	27	41	52	25	25	23	9	202	0.291066
male	68	108	95	82	86	34	19	492	0.708934
Total	95	149	147	107	111	57	28	694	

27.65	43.368876	42.7867	31.14409	32.308357	16.5907781	8.15
67.35	105.63112	104.213	75.85591	78.691643	40.4092219	19.9

Under  $H_0$  ,

$$X^2_{\text{cal}} = 0.09941 \quad (\text{From Ms-Exel})$$

$$X^2_{\text{tab}} = 12.59157 \quad (\text{From statistical table})$$

Hence ,

$$X^2_{\text{cal}} = 0.09941 < X^2_{\text{tab}} = 12.59157$$

Then we **accept  $H_0$**  at 5% l.o.s.

### Testing part using R software

```
>Category=c("Books","cell_phone","Clothing","Footwear","Electronic","Home_appliances","Other")
```

```
> Female=c(27,41,52,25,25,23,9)
```

```
> Male=c(68,108,95,82,86,34,19)
```

```
>
```

```
> chisq.test(Category,Female,Male)
```

Pearson's Chi-squared test

data: Category and Female

X-squared = 35, df = 30, p-value = 0.2426

Alpha =0.05

Hence,

P value is greater than the alpha

Then we **accept  $H_0$**  at 5 % l.o.s.

**Conclusion :**

We conclude that , category and gender are independent form each other . i.e. Gender does not affect on shopping behaviour of people.



## ❖ Chi Square test for independency between amazon and inspiring factors

The chi-square test of independency is specifically used in our project to test the dependency between all the significant inspiring factors and Amazon. Using this test we will be able to predict with more accuracy.

### Chi Square Test:

$H_0$ : Inspiring factors are independent for testing Amazon V/s

$H_1$ : Inspiring factors are dependent for testing Amazon.

For R-code we define some terms as,

A=inspiring factor

Y= No. of peoples which feels that factor is good.

N=No. of peoples which doesn't feel that factor is good.

### R code For Chi Square test :

```
>User
```

```
  Factors
```

```
A  Discount Cashback Safety.Security Delivery_Speed  
Return_policy
```

Y	105	113	120	122	114
N	145	137	130	128	136

```
> chisq.test(User)
```

## Pearson's Chi-squared test

data: User

X-squared = 2.88, df = 4, p-value = 0.0372

Alpha = 0.05

We have,

p-value = 0.0372 < 0.05 =  $\alpha$

p-value is less than the alpha .

Then we **Reject  $H_0$**  at 5 % l.o.s.

### **Conclusion :**

We conclude that, this inspiring factors are dependable while shopping for amazon.

## LOGISTIC REGRESSION MODEL

In Statistics, the logistic model is used to model the probability of a certain class or event existing such as yes/no, pass/fail, win/lose or many more like this. Here, we have online shopping platforms and their inspiring factors such as discount, cashback, safety, delivery speed, return. We fit model for amazon for which consumer believes that inspiring factors are satisfy their requirements or not. Logistic regression is a statistical model that in its basic form uses a logistic function to model a binary dependent variable.

### **Formula:**

$$\pi(x) = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}$$

$\pi(X) = 1$  = Probability of success      &       $\pi(X) = 0$  = Probability of failure

We viewed the data and assigned variables to all the 5 factors such as A, B, C, D and E. Then, we used the following command to fit the Logistic Regression Model and the significant factors

```
>model=glm(y ~ A+B+C+D+E, family=binomial (link="logit"), data=mdata)
```

Where,

A= discount,

B= cashback,

C= safety/security,

D= delivery speed,

E= return policy

### **Summary of model:**

We used the following command to find the summary of the model and the significant inspiring factors for Amazon

```
>summary(model)
```

### **OUTPUT:**

```
> model=glm(formula=Amazon~A+B+C+D+E,family=binomial(link="logit"),data=mdata)
```

```
> model
```

```
Call: glm(formula = Amazon ~ A + B + C + D + E, family = binomial(link = "logit"),
  data = mdata)
```

Coefficients:

(Intercept)	A	B	C	D	E
-1.0997	0.9381	0.9613	0.4984	0.9333	0.1595

Degrees of Freedom: 249 Total (i.e. Null); 244 Residual

Null Deviance: 338.1

Residual Deviance: 277.6 AIC: 289.6

```
> summary(model)
```

Call:

```
glm(formula = Amazon ~ A + B + C + D + E, family = binomial(link = "logit"),
  data = mdata)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-2.1603	-0.9349	0.4185	0.8633	1.6656

Coefficients:

	Estimate	Std. Error	z value	Pr(> z )
(Intercept)	-1.0997	0.2492	-4.413	1.02e-05 ***
A	0.9381	0.3317	2.828	0.00468 **
B	0.9613	0.3090	3.111	0.00187 **
C	0.4984	0.3512	1.419	0.15586
D	0.9333	0.3036	3.074	0.00211 **
E	0.1595	0.3731	0.428	0.66895

---  
Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 338.06 on 249 degrees of freedom

Residual deviance: 277.65 on 244 degrees of freedom

AIC: 289.65

Number of Fisher Scoring iterations: 4

From this output we got 3 significant factors, which play important role in increase the customers of Amazon which are

A= discount,

B= cashback

D= delivery speed

Now we use this formula,

$$\pi(x) = \frac{e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}{1 + e^{\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_n x_n}}$$

Where  $\beta_0$  is value of intercept and  $\beta_1, \beta_2, \beta_3$  are the values of slope parameters of all the 3 significant factors.

$\beta_0 = -1.0997$  and  $\beta_1 = 0.00468$ ,  $\beta_2 = 0.00187$ ,  $\beta_3 = 0.00211$

$$\pi(x) = \left( e^{(-1.0997 + 0.00468 A + 0.00187 B + 0.00211 D)} \right) /$$

$$1 + \left( e^{(-1.0997 + 0.00468 A + 0.00187 B + 0.00211 D)} \right)$$

### **Case 1)**

1) Observation no.131

A=1, B=1, D=1

$$\pi(\mathbf{x})=\mathbf{0.671572}$$

2) Observation no.249

A=0, B =0, D=1

$$\pi(\mathbf{x})=\mathbf{0.6671884}$$

From above regression model we conclude that, when users choose amazon then they think about this inspiring factors.

### **Case 2)**

1) Observation no.246

A=0 , B= 0, D=0

$$\pi(\mathbf{x})=\mathbf{0.2487}$$

From above regression model we conclude that, when users choose amazon then they not think about this inspiring factors.

### **Conclusion:**

1. This logistic regression model predicts correctly.
  2. When users buy something on Amazon then they feels discount, cashback and delivery speed are the significant factor of this platform.
  3. When Amazon will focus on other inspiring factors then no. of consumers will be increases.
- ◆ Similarly, we can fit logistic regression model for other online shopping platforms to test their significant factors.

## **One-Way Anova test for equality of mean**

**To test :**

H0 : A and B have equal mean V/s H1 : A and B have unequal mean

Where ,

A : confidence of customer about anonymity of payment information

B : confidence of customer about anonymity of personal information

**Information table :**

Rating	Confidence_Pay_info	Confidence_per_info
1	19	18
2	14	25
3	74	85
4	88	73
5	55	49

**Code in R:**

```
Rating=c(1,2,3,4,5)
```

```
Rating
```

```
Payment_information=c(19,14,74,88,55)
```

```
Payment_information
```

```
Personal_info=c(18,25,85,73,49)
```

```
Personal_info
```

```
S= stack(list("Rating"=Rating,"Payment_ information " =Payment_ information,"Personal_info"=Personal_info))
```

```
S
```

```
class(S)
```

```
names(S)
```

```
Alpha=0.05
```

```
ANOVA=oneway.test(values~ind,data=S,var.equal=TRUE)
```

```
ANOVA
```

```
Under Ho,
```

```
One-way analysis of means
```

```
data: values and ind
```

```
F = 5.7258, num df = 2, denom df = 12, p-value = 0.01795
```

```
Since,
```

```
P value < Alpha,
```

```
We reject Ho at 5% l.o.s
```

## **Conclusion :**

Therefore we concluded that, A and B have unequal mean.

Hence , payment information and personal information is confidentially varies at each rating (level).



## ◆ Overall rating of E-markets are:

Amazon 4;

Flipkart 4;

Myntra 3;

Snapdeal 3;

Ajio 3;

Paytm mall 2;

Other 2 .

but there is very less data, for last 3, as thoses apps have limited user.

We use median insteade of mean to compute average rating.

# Interpretation

- 1) Clearly, Amazon and flipkart are mostly used online shopping platforms. Also, the reach of Myntra also slowly increases. But, other shopping platform such as ajio, snapdeal, paytm mall etc. failed to establish their market.
- 2) Consumers mostly buy their cell phone / accessories and cloths from e-market due to interesting offers as well as sells on many festive occasion. Buyers also looking for footwear, electronic and books.
- 3) Cash on delivery is the best motivating factor of online shopping platform, because of that factor consumer feel safe while e-shopping. Also, return policy of product inspire consumer to buy online.
- 4) Cash on delivery is mostly used payment method while shopping product online. Also, consumers also feel safe while using debit card.
- 5) Youtube is mostly showing advertisement of e-market. In lockdown, people spend most of their time on Youtube. So, that also helps in expanding e-market through advertisement.
- 6) From survey we noticed that, after corona pandemic users of online shopping platforms slightly decreases.

- 7) Because of service, sells, interesting offers and many more reasons consumers feels that Amazon is best and favourite of users for online shopping and flipkart is second choice of buyers.
- 8) Consumers mostly shop once in the month from e-market. Also, there is one group of people who buys once in a year when they need something.
- 9) Consumers feels that amazon pantry and big basket are best for buying grocery from online shopping platforms in India.
- 10) category and gender are independent form each other . i.e. users are free to buy any thing that they want , there is no restriction of gender .
- 11) Amazon and inspiring factors such as discount, cashback etc. are depends on each other so after fitting logistic regression model we observe that discount, cashback and delivery speed are significant for amazon. So amazon have to work on other factors for increasing consumer number . Similarly we can go for other shopping platforms.
- 12) Payment method and personal information is confidentially varies at each rating (level).
- 13) Overall rating of amazon & flipkart is 4 due to their good services and many more factors as we discuss in our project. Also their is myntra which have 3 overall rating.

Questionnaire used to collect primary data.

# The study of purchasing behaviour of consumer in E- Market

Hello,

We are the students of TyBsc statistics from SP college,pune. We are conducting a survey on "online shopping". We request you to fill this google form.

Thank You !

1) Name \*

Your answer

2) Age \*

Your answer

3) Gender \*

- Male
- Female
- Other

4) Native Place \*

- Urban
- Semi-Urban
- Rural

5) Have you ever shopped online ? \*

- Yes
- No

6) Which of the following online shopping platform do you use ? \*

- Amazon
- Filpkart
- Myntra
- Snapdeal
- Paytm Mall
- Ajio
- Other

7) What do you mostly look for ? \*

- Book
- Electronics
- Cell Phone / Accessories
- Clothing
- Footwear
- Home Appliances
- Other

8) According to you which is the best online shopping platform in India ? \*

Your answer

9) How often do you shop online ? \*

- Daily
- Weekly
- Monthly
- Yearly
- Never

10) When do you prefer to buy online ? \*

- Big Sells
- At Festival Season

- When you need something

11) Which factors motivate you to shop online ? \*

- Time Saving & Convenient
- 24\*7 Available
- Discounts/ price deals
- Easy Price Comparison
- Cash On Delivery
- 15 / 30 days return policy

12) Experience of online shopping before corona \*

- Good
- Bad
- No Impact

13) Experience of online shopping during corona pandemic \*

- Good
- Bad
- No Impact

14) Have you ever shopped online for grocery ? \*

- Yes
- No

15) According to you which is best grocery platform ?

- BigBasket
- Grofers
- JioMart
- Amazon pantry
- Flipkart supermarket
- ZopNow
- Other

16) Mostly on which social media site you get advertisement about online shopping \*

- Facebook
- YouTube
- Twitter

- Instagram
- LinkedIn
- Other

17) According to you which apps are good for following factors. \*

	Amazon	Flipkart	Myntra	Paytm	Ajio	Snapdeal	Other
• Discount							
• Cashback							
• Safety/Security							
• Delivery Speed							
• Return policy							
• Discount							
• Cashback							
• Safety/Security							
• Delivery Speed							
• Return policy							

18) Which payment method do you use most often, When you buy products online ? \*

- Credit Card
- Debit Card
- Google Pay
- Phone Pay
- UPI /BHIM
- Cash On Delivery
- Amazon Pay
- Paytm
- Other

19) How confident are you that your payment information is kept secured, When you buy products online ? \*

Not At All confident

- 1
- 2
- 3
- 4
- 5

20) How confident are you that your personal information is kept confidential, When you buy products online ? \*

Not At All Confident

- 1
- 2
- 3
- 4
- 5

Extremely Confident

21) Rate the following shopping apps(only that you use)

	1	2	3	4	5
Amazon					
Filpkart					
Myntra					
Snapdeal					
Ajio					
Paytm Mall					
Other					



THANK  
YOU