LIVE PROJECTS IN BUSINESS ANALYTICS USING R

Edited and Co-authored by

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Live Projects- Business Analytics Using R

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Batch 2019-2021

Contents

Perception of Consumers on Digital Payment

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Introduction:

In this live assignment we collected the data from various source through Google forms and asked various information related “What are the consumer perception for digital payment”

Methodology:

The data which we collected is having only Categorical variables so we have used Chi-Square test in each question and we use chi-square when we does not have any numeric variable and have only categorical variables.

```
digi<-read.csv("Google form.csv")

#factoring
Profession = as.factor(c("Student", "Teacher" , "Employee" , "Business
Man" , "House wife"))
x <- factor(Profession, order= TRUE, levels= c("Student", "Teacher" ,
"Employee" , "Business Man" , "House wife"))
x

## [1] Student      Teacher      Employee     Business Man House wife
## Levels: Student < Teacher < Employee < Business Man < House wife

Paytm = as.factor(c("Rarely", "Ocassionally", "Always", "Never"))
y <- factor(Paytm, order= TRUE, levels=c("Rarely", "Ocassionally",
"Always", "Never"))
y
```

```
## [1] Rarely       Ocassionally Always       Never
## Levels: Rarely < Ocassionally < Always < Never

GPay = as.factor(c("Rarely", "Ocassionally", "Always", "Never"))
z <- factor(GPay, order= TRUE, levels=c("Rarely", "Ocassionally",
"Always", "Never"))
z

## [1] Rarely       Ocassionally Always       Never
## Levels: Rarely < Ocassionally < Always < Never

PayPal = as.factor(c("Rarely", "Ocassionally", "Always", "Never"))
a <- factor(PayPal, order= TRUE, levels=c("Rarely", "Ocassionally",
"Always", "Never"))
a

## [1] Rarely       Ocassionally Always       Never
## Levels: Rarely < Ocassionally < Always < Never

PhonePe = as.factor(c("Rarely", "Ocassionally", "Always", "Never"))
b <- factor(PhonePe, order= TRUE, levels=c("Rarely", "Ocassionally",
"Always", "Never"))
b

## [1] Rarely       Ocassionally Always       Never
## Levels: Rarely < Ocassionally < Always < Never

Bhim = as.factor(c("Rarely", "Ocassionally", "Always", "Never"))
c <- factor(Bhim, order= TRUE, levels=c("Rarely", "Ocassionally",
"Always", "Never"))
c

## [1] Rarely       Ocassionally Always       Never
## Levels: Rarely < Ocassionally < Always < Never

Bankapp = as.factor(c("Rarely", "Ocassionally", "Always", "Never"))
d <- factor(Bankapp, order= TRUE, levels=c("Rarely", "Ocassionally",
"Always", "Never"))
d

## [1] Rarely       Ocassionally Always       Never
## Levels: Rarely < Ocassionally < Always < Never

useofdigitaltransactions = as.factor(c("Fees", "Daily Use", "Shopping",
"Business Purpose"))
e <- factor(useofdigitaltransactions, order= TRUE, levels=c("Fees", "Daily
Use", "Shopping", "Business Purpose"))
e

## [1] Fees             Daily Use        Shopping         Business Purpose
## Levels: Fees < Daily Use < Shopping < Business Purpose

#Q1.Does profession affect the use of paytm app
#Chi-square test as both are categorical variables
#Null hypothesis: Profession does not affect the use of paytm
#Alternate hypothesis: Profession affect the use of paytm
chisq.test(digi$X3..Profession , digi$X.Paytm.)
```

```
## Warning in chisq.test(digi$X3..Profession, digi$X.Paytm.): Chi-squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  digi$X3..Profession and digi$X.Paytm.
## X-squared = 32.239, df = 16, p-value = 0.009308

# as the p-value is <0.05 so we will reject the null hypothesis
#hence profession affect the use of paytm app

#Q2.Does profession affect the use of GPay app
#Chi-square test as both are categorical variables
#Null hypothesis: Profession does not affect the use of GPay
#Alternate hypothesis: Profession affect the use of GPay
chisq.test(digi$X3..Profession , digi$X.GPay.)

## Warning in chisq.test(digi$X3..Profession, digi$X.GPay.): Chi-squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  digi$X3..Profession and digi$X.GPay.
## X-squared = 42.207, df = 12, p-value = 3.074e-05

# as the p-value came is <0.05 so we will reject the null hypothesis
#hence profession affect the use of GPay app

#Q3. #Does mode of payment has an impact on the increased demand of
digital payment in covid?
#chi-square test as both are categorical variables
#Null hypothesis: Mode of payment does not has impact on increased demand
#Alternate hypothesis: Mode of payment has impact on increased demand
chisq.test(digi$Mode.of.payment ,
digi$X10..Has.this.corona.virus.epidemic.increased.the.demand.of.digital.p
ayment.)

## Warning in chisq.test(digi$Mode.of.payment,
##
digi$X10..Has.this.corona.virus.epidemic.increased.the.demand.of.digital.p
ayment.):
## Chi-squared approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  digi$Mode.of.payment and
digi$X10..Has.this.corona.virus.epidemic.increased.the.demand.of.digital.p
ayment.
## X-squared = 44.128, df = 16, p-value = 0.0001886

# as the p-value came is<0.05 so we will reject the null hypothesis
#hence mode of payment increased the demand of digital payment
```

```
#Q4.Does Paytm make life easy than buying traditional method?
#Chi-square test as both are categorical variables
#Null hypothesis: Paytm does not make life easy than buying traditional
method
#Alternate hypothesis: Paytm make life easy than buying traditional method
chisq.test(digi$X.Paytm. ,
digi$Do.you.believe.mobile.wallets.are.useful.in.buying.products.than.the.
traditional.methods.)
```

```
## Warning in chisq.test(digi$X.Paytm.,
##
digi$Do.you.believe.mobile.wallets.are.useful.in.buying.products.than.the.
traditional.methods.):
## Chi-squared approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  digi$X.Paytm. and
digi$Do.you.believe.mobile.wallets.are.useful.in.buying.products.than.the.
traditional.methods.
## X-squared = 14.451, df = 16, p-value = 0.5651
```

```
# as the p-value came >0.05 so we will accept null hypothesis
#hence Paytm does not make life easy than buying traditional method

#Q5.Does Profession affect the use of PhonePe
#chi-square test as both categorical variables
#Null hypothesis: Profession does not affect the use of PhonePe
#Alternate hypothesis: Profession affect the use of PhonePe
chisq.test(digi$X3..Profession , digi$X.PhonePe.)
```

```
## Warning in chisq.test(digi$X3..Profession, digi$X.PhonePe.): Chi-
squared
## approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  digi$X3..Profession and digi$X.PhonePe.
## X-squared = 18.914, df = 12, p-value = 0.09061
```

```
# as p-value came>0.05 so we will accept the null hypothesis
#hence Profession does not affect the use of PhonePe

#Q6.Does Paytm user think digital transactions are secured?
#chi-square test as both are categorical variables
#Null hypothesis: Paytm user not think digital transactions are secured
#Alternate hypothesis: Paytm user think digital transactions are secured
chisq.test(digi$X.Paytm. ,
digi$X14..You.feel.transactions.done.digital.are.secured..)
```

```
## Warning in chisq.test(digi$X.Paytm.,
## digi$X14..You.feel.transactions.done.digital.are.secured..): Chi-
squared
## approximation may be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  digi$X.Paytm. and
digi$X14..You.feel.transactions.done.digital.are.secured..
## X-squared = 20.003, df = 16, p-value = 0.2201

# as p-value came<0.05 so will reject null hypothesis
#hence paytm user think digital transactions are secured

#Q7.Does profession affect in making decision that digital transaction
make life easy?
#Chi-square test as both are categorical variables
#Null hypothesis: Profession does not make digital transaction make life
easy
#Alternate hypothesis : Profession make digital transaction make life
easy
chisq.test(digi$X3..Profession ,
digi$X8..Digital.transaction.make.your.life.easy..)

## Warning in chisq.test(digi$X3..Profession,
## digi$X8..Digital.transaction.make.your.life.easy..): Chi-squared
approximation
## may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  digi$X3..Profession and
digi$X8..Digital.transaction.make.your.life.easy..
## X-squared = 42.093, df = 16, p-value = 0.0003822

# as p-value<0.05 so we will reject null hypothesis
#hence profession make digital transactions make life easy

#Q8.Does profession affect in making decision that using online wallets
offer a wider range of banking services and Payment options?
#Chi-square test as both are categorical variables
#Null hypothesis: Profession does not think that online wallets offer
wider range of variety
#Alternate hypothesis: Profession think that online wallets offer wide
range of variety
chisq.test(digi$X3..Profession ,
digi$X11..Do.you.think.that.using.online.wallets.can.offer.me.a.wider.rang
e.of.banking.services.and.Payment.options..)

## Warning in chisq.test(digi$X3..Profession,
##
digi$X11..Do.you.think.that.using.online.wallets.can.offer.me.a.wider.rang
e.of.banking.services.and.Payment.options..):
## Chi-squared approximation may be incorrect

##
##  Pearson's Chi-squared test
##
```

```
## data:  digi$X3..Profession and
digi$X11..Do.you.think.that.using.online.wallets.can.offer.me.a.wider.rang
e.of.banking.services.and.Payment.options..
## X-squared = 33.857, df = 16, p-value = 0.005678

# as p-value <0.05 so we will reject null hypothesis
#hence profession affect making decision that online wallet offer wider
range of variety

#Q9.Does profession affect in thinking digital transactions are secured?
#chi-square test as both are categorical variables
#Null hypothesis: Profession does not affect decision that digital
transactions are secured
#Alternate hypothesis: Profession affect the decision that digital
transactions are secured
chisq.test(digi$X3..Profession ,
digi$X14..You.feel.transactions.done.digital.are.secured..)

## Warning in chisq.test(digi$X3..Profession,
## digi$X14..You.feel.transactions.done.digital.are.secured..): Chi-
squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  digi$X3..Profession and
digi$X14..You.feel.transactions.done.digital.are.secured..
## X-squared = 23.562, df = 16, p-value = 0.09951

# as p-value >0.05 so we will accept null hypothesis
#hence profession does not affect decision that digital transactions are
secured

#Q10.Does GPay user think digital transactions are secured?
#chi-square test as both are categorical variables
#Null hypothesis: GPay user not think digital transactions are secured
#Alternate hypothesis: GPay user think digital transactions are secured
chisq.test(digi$X.GPay. ,
digi$X14..You.feel.transactions.done.digital.are.secured..)

## Warning in chisq.test(digi$X.GPay.,
## digi$X14..You.feel.transactions.done.digital.are.secured..): Chi-
squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  digi$X.GPay. and
digi$X14..You.feel.transactions.done.digital.are.secured..
## X-squared = 14.151, df = 12, p-value = 0.2912

# as p-value>0.05 so we will accept the null hypothesis
#hence GPay user not think digital transactions are secured
```

```
#Q11.Does profession affect in making decision that digital payment saves
time?
#Chi-square test as both are categorical variables
#Null hypothesis: Profession does not affect in making decision that
digital payment saves time
#Alternate hypothesis: Profession affect in making decision that digital
payment saves time
chisq.test(digi$X3..Profession ,
digi$X9..Digital.payment.enables.Time.Savings.)
```

```
## Warning in chisq.test(digi$X3..Profession,
## digi$X9..Digital.payment.enables.Time.Savings.): Chi-squared
approximation may
## be incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  digi$X3..Profession and
digi$X9..Digital.payment.enables.Time.Savings.
## X-squared = 36.11, df = 16, p-value = 0.002793
```

```
# as p-value >0.05 so we will accept the null hypothesis
# hence Profession does not affect in making decision that digital payment
saves time.
```

Conclusion:

Conclusion came at last is after analyzing few aspects from data and using Chi-Square test that Profession is independent variable and the other variables are dependent in respect to that.

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

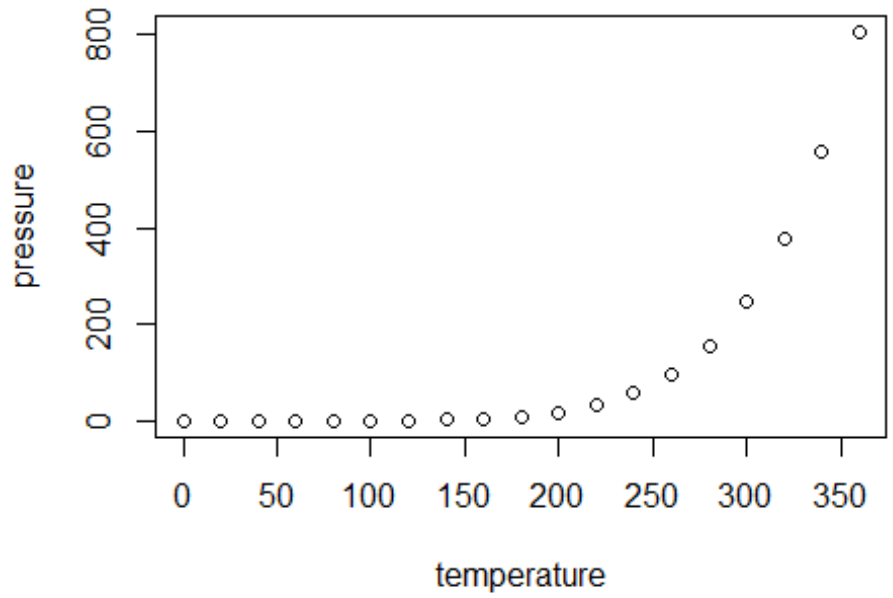
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Including Plots

You can also embed plots, for example:



Note that the echo = FALSE parameter was added to the code chunk to prevent printing of the R code that generated the plot.

Mobile & Consumer Study

Submitted By-
Aishwarya Ajith (PG19007)
Ayan Paul (PG19034)
Pallavi Choudhary (PG19085)

Introduction

Customer retention refers to the ability of a company or product to retain its customers over some specified period. Higher customer retention means customers of the product or business tend to returnto, continue to buy or in some

other way does not defect to another product or business, or to non-use entirely. The study we did ontopic customer retention on different brands of mobiles.

The study is aimed towards understanding the likelihood of a customer choice from the different brandsof mobile and also to know whether they are using the same brand or changing to another brand while buying next time. It will help us understand customer retention of ability of the concerned companies.

The various parameters we are using for testing are Name, Gender, Age, Profession, Income, Criteria of buying, Customer Rating across various attributes, how frequently a user has changed his devices.

Methodology

The study is based on the quantitative data and we are collecting the primary data from the people who are using smartphone and also people who are above age 15. The data we have gather is descriptive data because we are gathering data without any intervening.

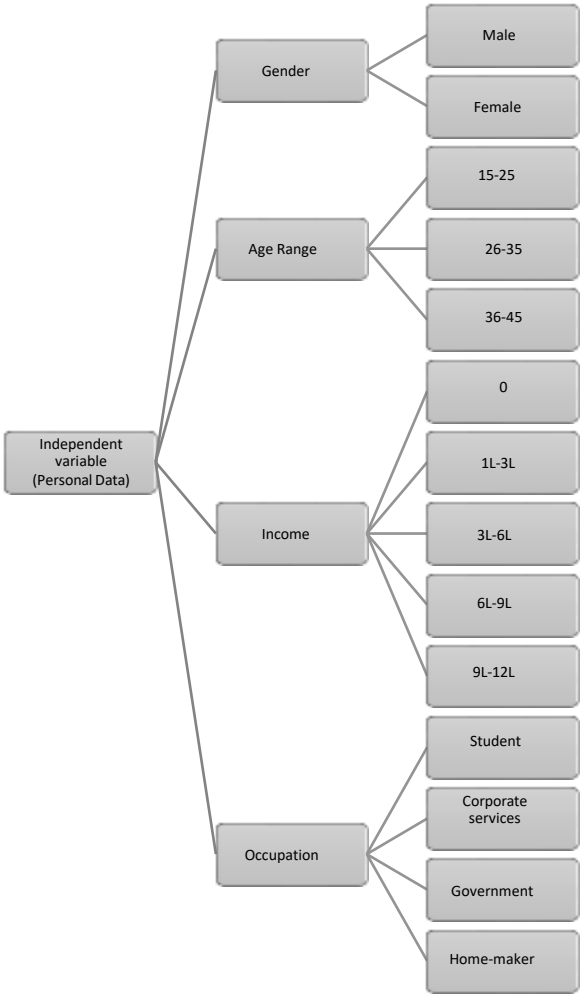
The methods we used for data collection is quantitative method. Survey was conducted by creating Google form to take the responses of the respondent. The questions we design in our google form aremultiple choice and Likert scale.

We created a form of two section. In first section we are having personal information of the respondent and in the second section we are having the questions which helps us to understand the smartphone preference of respondent and also the criteria of buying the smartphone.

The methods of analysis used in study is quantitative. The data is prepared before doing the analysis is by checking for the missing data and then removed the outliers. The software we use to analyse the data is R. The statistical test used in study is chi-square test because we are having both the categorical variables and we also used histogram for representing the distribution of data.

Analysis and Interpretation

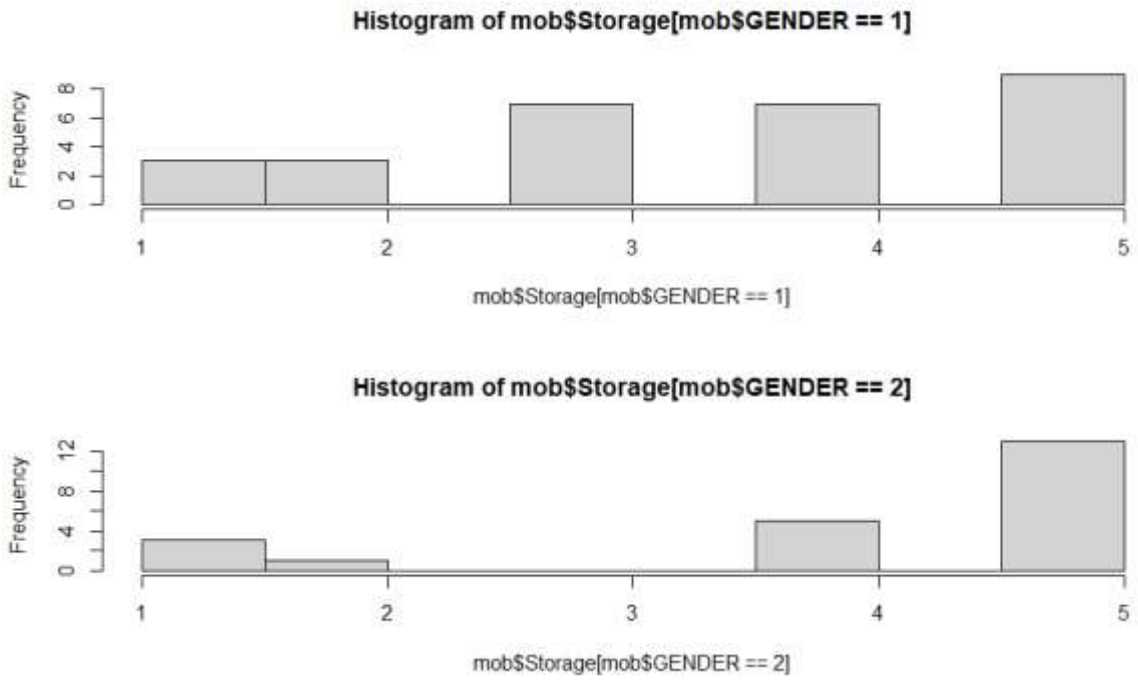
The analysis and interpretation have been done using Histogram Charts and Hypothesis testing (Chi- Square test). The Histogram charts depicts the level of agreeableness when two independent data are plotted against each other. The Hypothesis testing tests the influence of one independent variable on other by giving us a p-value on the basis of which we can assess the influence.



Independent variable (FACTORS)	LEVEL OF AGREEABLINESS
Storage Cost Battery Features Display OS	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree

GENDER

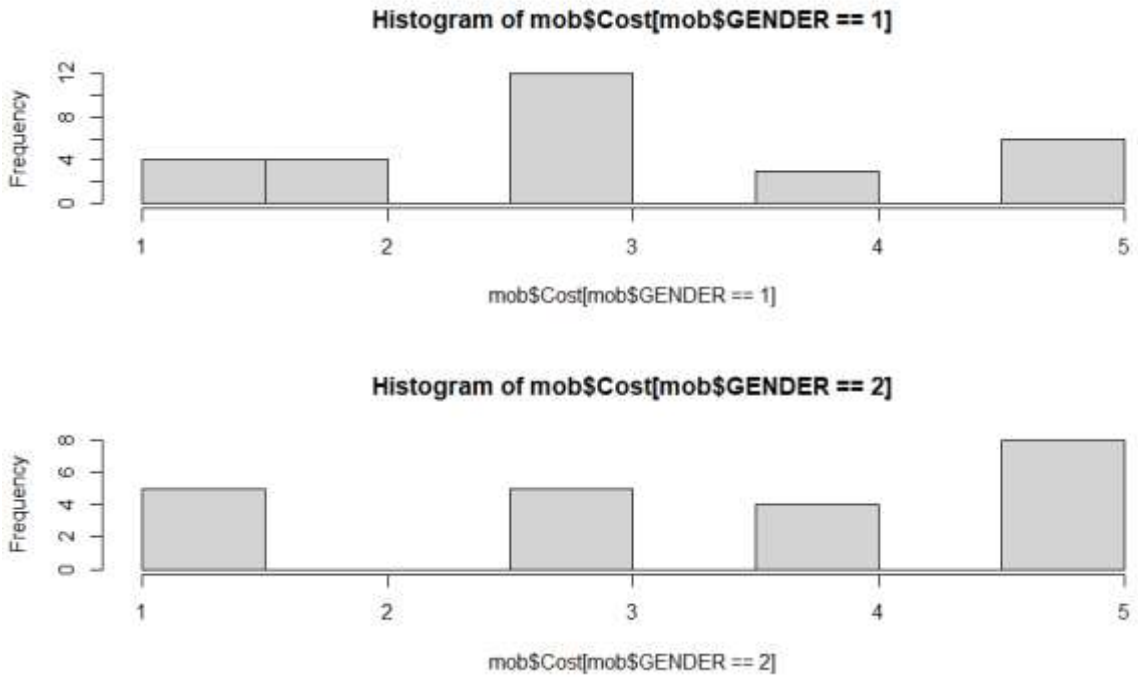
Storage



- Therefore, females, majority of them (8) Strongly Agree that storage is an important factorwhile switching into a new phone.
- In males, majority of them (10) Strongly Agree that storage is an important factor whileswitching into a new phone.

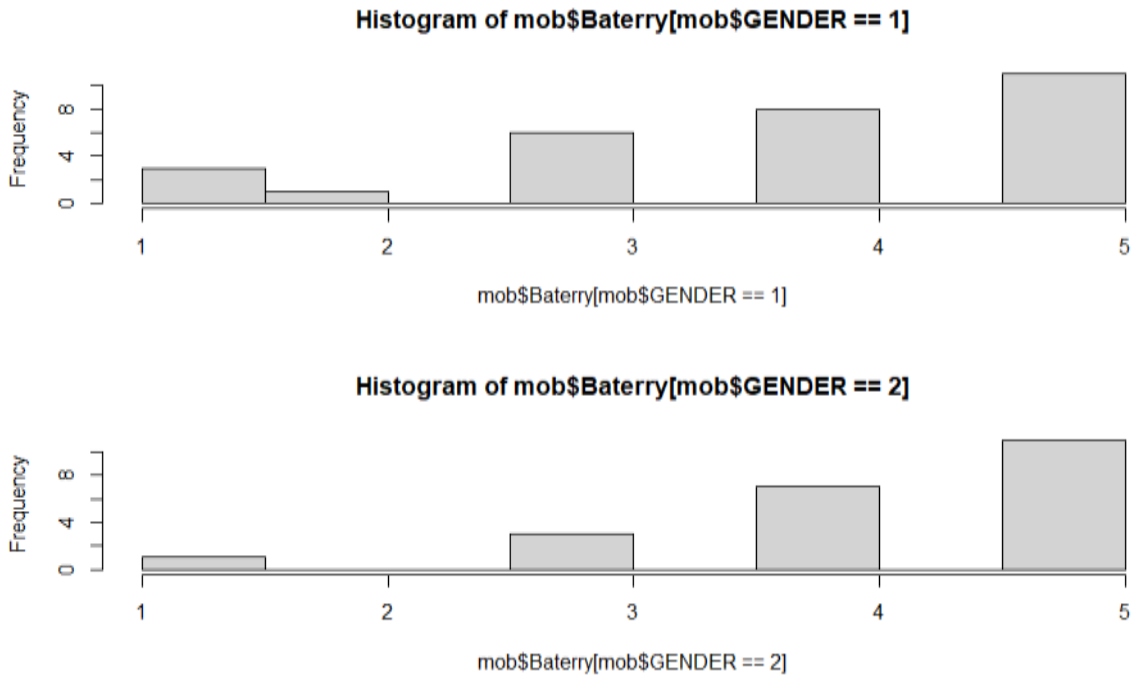
GENDER

Cost



- Therefore, in females, most of them (12) remained neutral that cost factor is important.
- In males, majority of them (8) Strongly Agreed that cost factor is important.

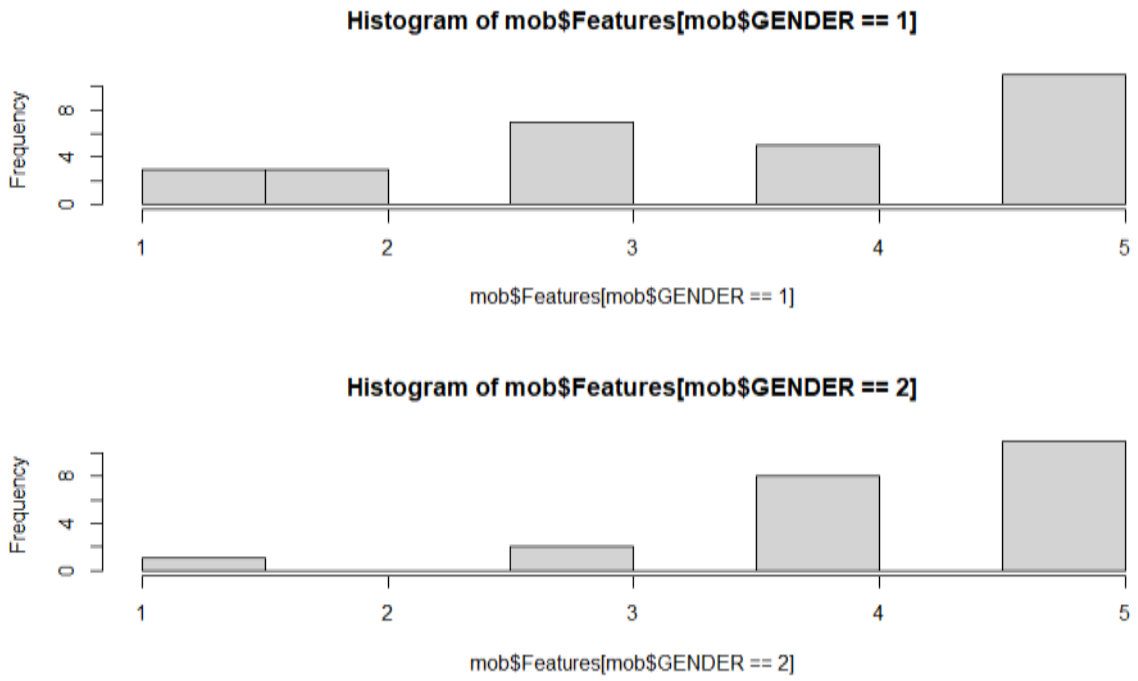
Battery life



- Here both males and females, strongly agreed (10) on the significance of

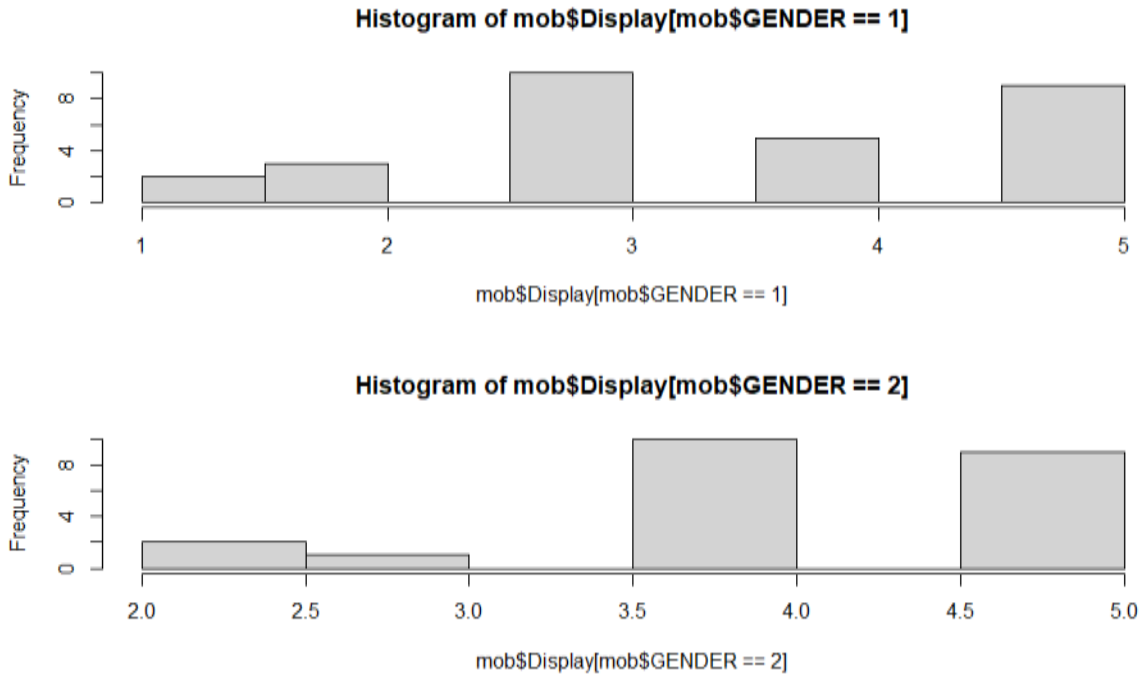
battery life.

Features



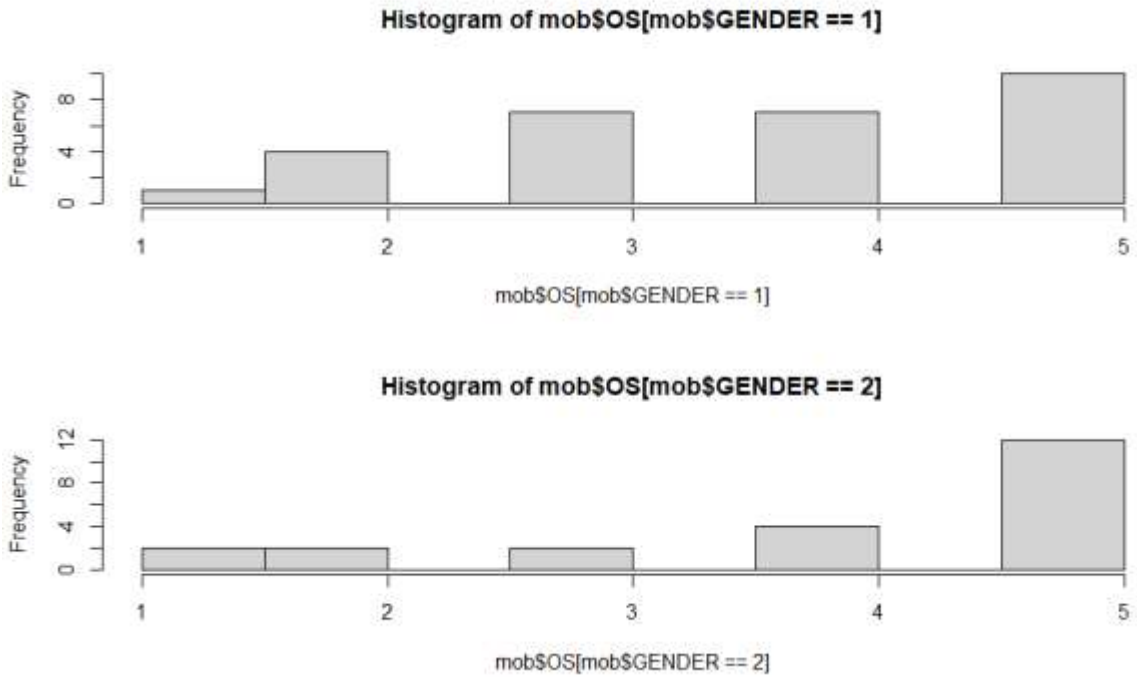
- Both male and female, Strongly Agree on the significance of Features.

Display



- Females tend to stay Neutral whereas males Agree.

OS



- Both the gender Strongly Agree that OS is an important factor.

1. Does gender influence on how much they value storage factor?

   Null hypothesis (H0): Gender does not influence on how much they value storage factor.

   Alternate Hypothesis (H1): Gender does influence on how much they value storage factor

   X-squared = 11.475, df = 8, p-value = 0.1762

   Here, P- value > 0.05

   Therefore, we accept H0. Gender does not influence on how much they value storage factor.

2. Does gender influence on how much they value cost factor?

   Null hypothesis (H0): Gender does not influence on how much they value cost factor.

   Alternate Hypothesis (H1): Gender does influence on how much they value cost factor

   X-squared = 12.251, df = 8, p-value = 0.1404

   Here, P-value > 0.05

   Therefore, we accept the H0. Gender does not influence on how much they value cost factor.

3. Does gender influence on how much they value battery life?

   Null hypothesis (H0): Gender does not influence on how much they value battery life.

   Alternate Hypothesis (H1): Gender does influence on how much they value battery life.

   X-squared = 3.4553, df = 8, p-value = 0.9026

   Here, P-value > 0.05

   Therefore, we accept the H0. Gender does not influence on how much they value battery life.

4. Does gender influence on how much they value features?

   Null hypothesis (H0): Gender does not influence on how much they value features.

   Alternate Hypothesis (H1): Gender does influence on how much they value features.

X-squared = 8.0312, df = 8, p-value = 0.4304

Here, P-value > 0.05

Therefore, we accept the H0. Gender does not influence on how much they value features.

5. Does gender influence on how much they value display?

   Null hypothesis (H0): Gender does not influence on how much they value Display.

   Alternate Hypothesis (H1): Gender does influence on how much they value Display.

   X-squared = 12.75, df = 8, p-value = 0.1207

   Here, P-value > 0.05

   Therefore, we accept the H0. Gender does not influence on how much they value Display.

6. Does gender influence on how much they value OS?

   Null hypothesis (H0): Gender does not influence on how much they value OS.

   Alternate Hypothesis (H1): Gender does influence on how much they value OS.

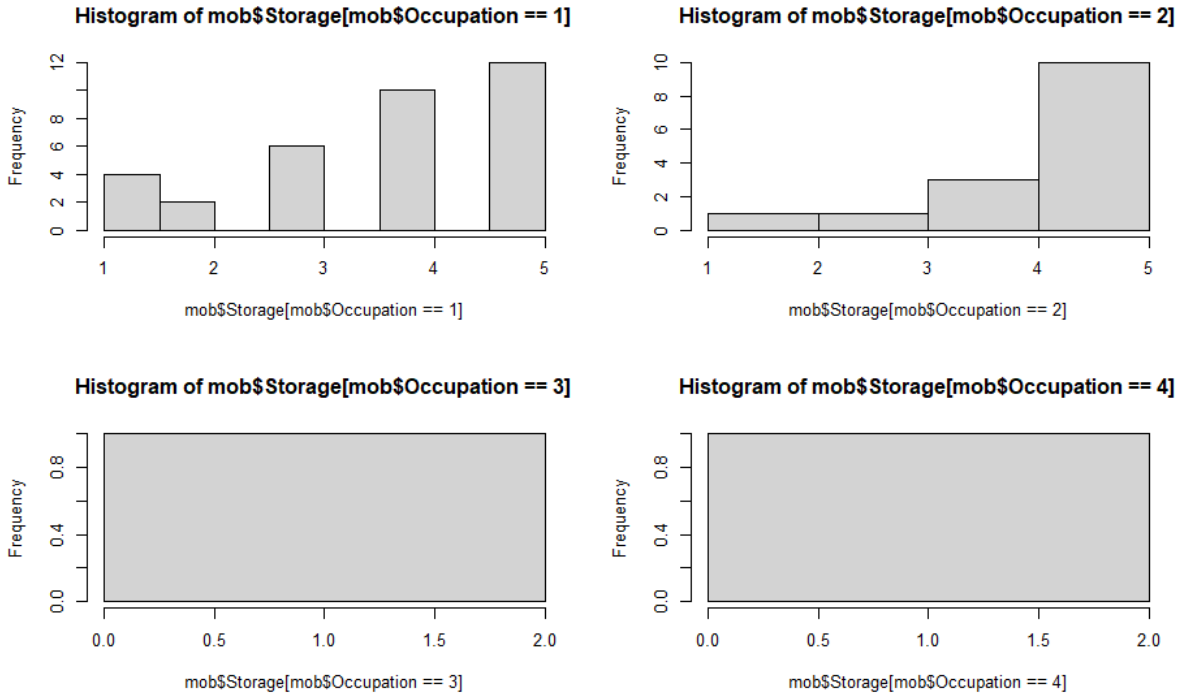
   X-squared = 7.3478, df = 8, p-value = 0.499

   Here, P-value > 0.05

   Therefore, we accept the H0. Gender does not influence on how much they value OS.

OCCUPATION

Storage



Majority of the Students as well as the one working in Corporate Services strongly agree to storage being an important criterion whereas Government Employees and Home-makers disagree to storage being an important criterion.

Does Occupation influence how much they value storage factor?

Null hypothesis (H0): Occupation does not influence how much they value storage factor.

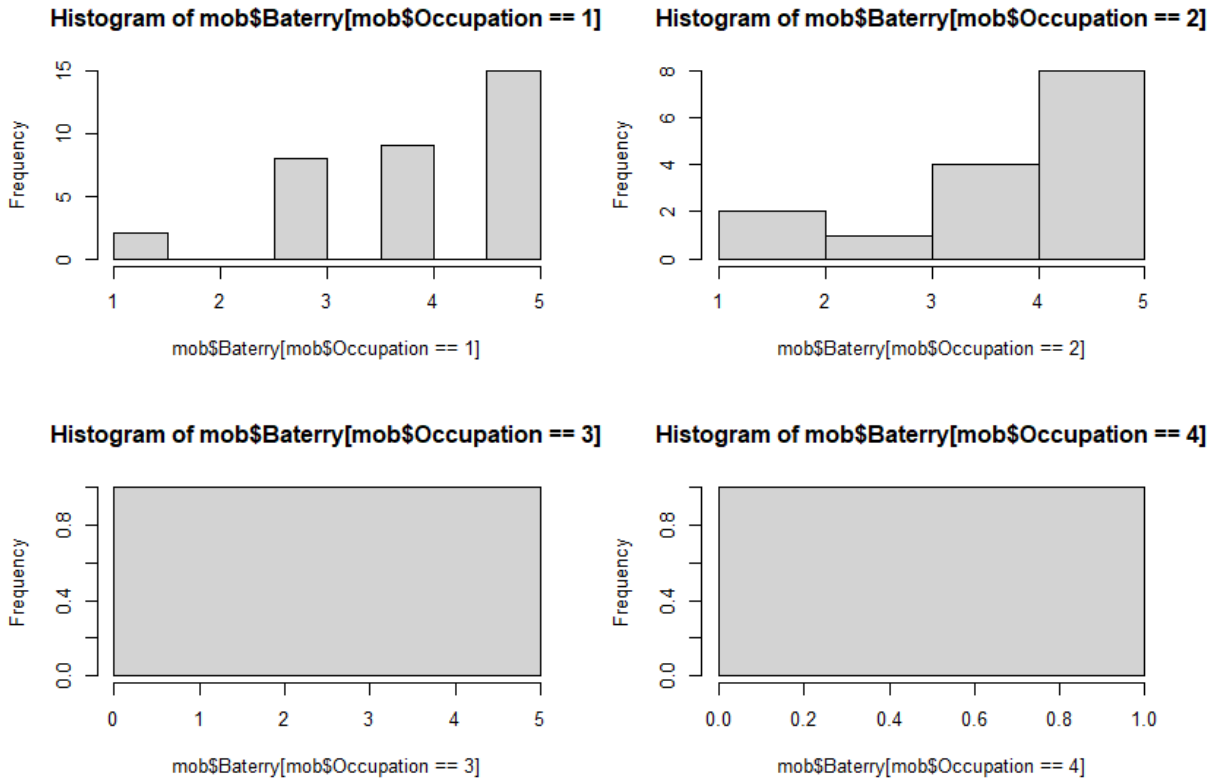
Alternate Hypothesis (H1): Occupation does influence how much they value storage factor.

X-squared = 37.146, df = 16, p-value = 0.002

Here, P-value < 0.05

Therefore, we reject the H0. Occupation does influence how much they value storage factor.

Battery



Majority of the Students as well as the one working in Corporate Services strongly agree to battery being an important criterion whereas Government Employees strongly agree and Home-makers disagree to battery being an important criterion.

Does Occupation influence how much they value battery life?

Null hypothesis (H0): Occupation does not influence how much they value Battery life.

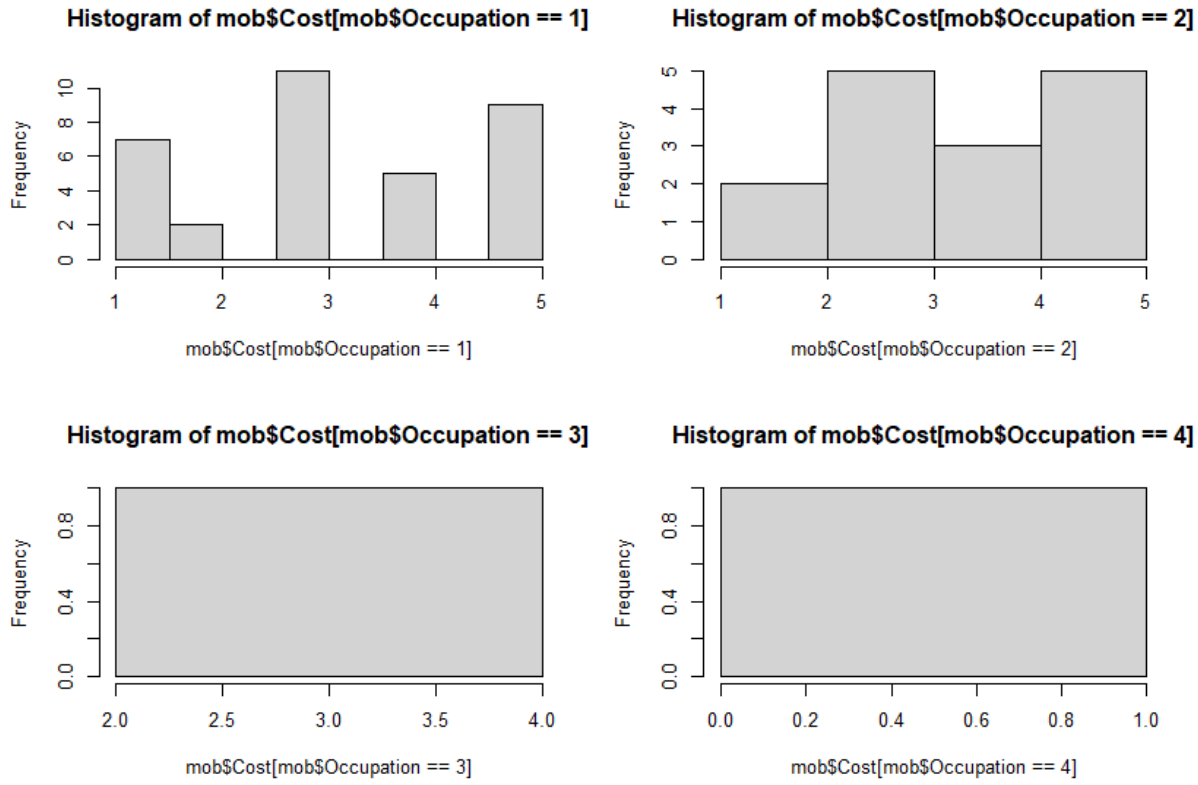
Alternate Hypothesis (H1): Occupation does influence how much they value Battery life.

X-squared = 21.622, df = 16, p-value = 0.1558

Here, P-value > 0.05

Therefore, we accept H0. Occupation does not influence how much they value Battery life.

Cost



Majority of the Students are neutral for cost. The one working in Corporate Services may strongly agree as well as disagree to cost being an important criterion. Government Employees agree and Home- makers strongly disagree to cost being an important criterion.

Does Occupation influence how much they value Cost factor?

Null hypothesis (H0): Occupation does not influence how much

they value Cost factor.

Alternate Hypothesis(H1): Occupation does influence how much

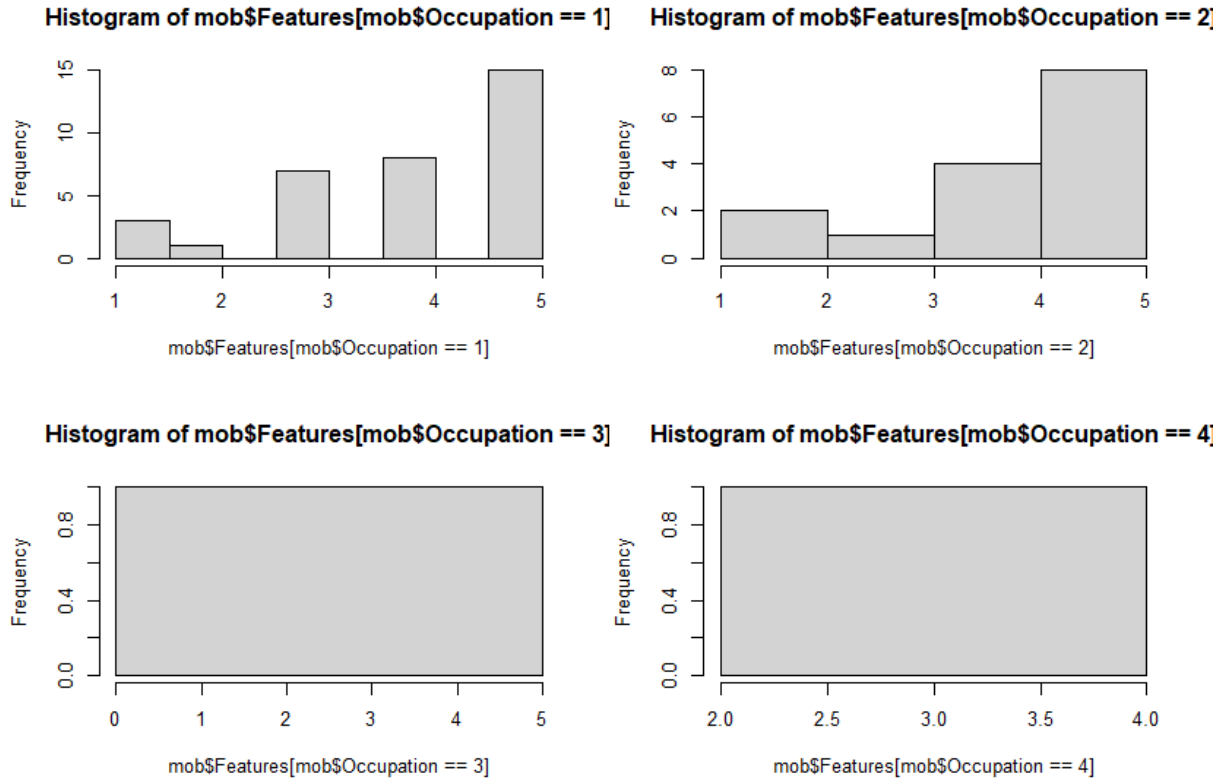
they value Cost factor.

X-squared = 20.647, df = 16, p-value = 0.1925

Here, P-value > 0.05

Therefore, we accept the H0. Occupation does not influence how much they value Cost factor.

Features



Majority of the Students as well as the one working in Corporate Services strongly agree features being an important criterion. Government Employees agree and Home-makers also agree to features being an important criterion.

Does Occupation influence how much they value Features?

Null hypothesis (H0): Occupation does not influence how much they value Features.

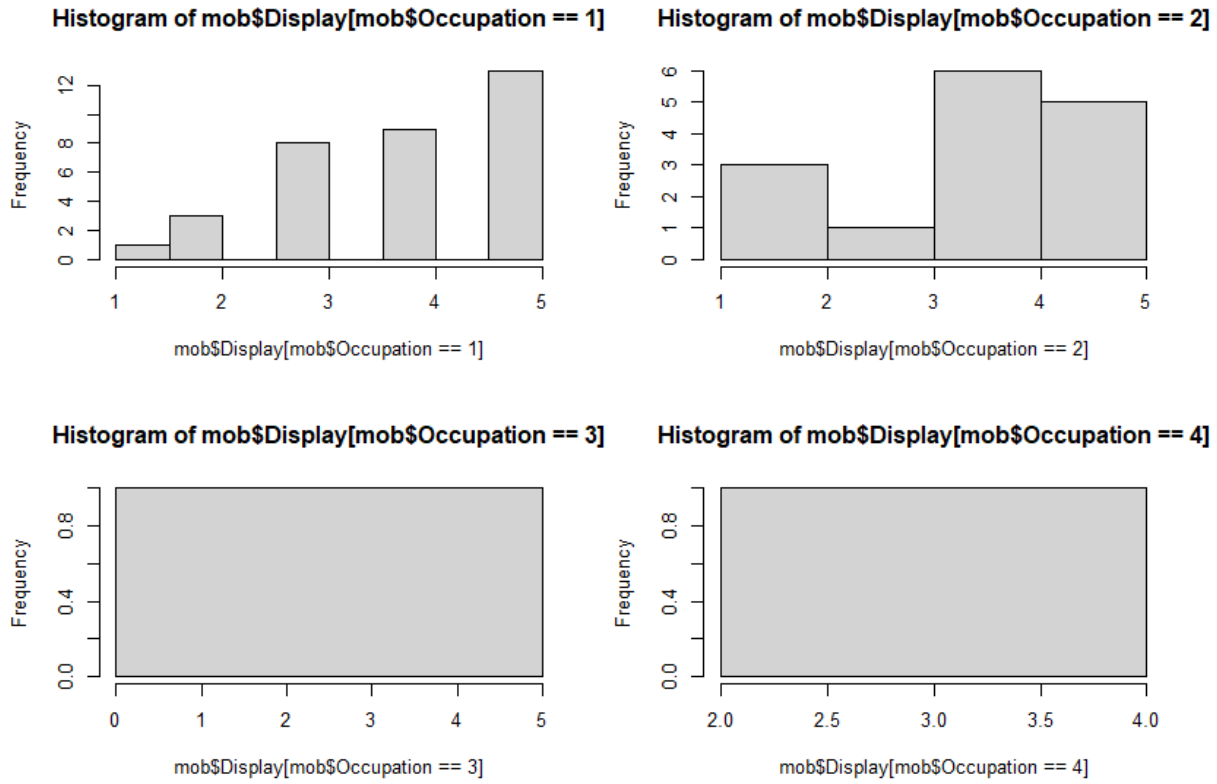
Alternate Hypothesis (H1): Occupation does influence how much they value Features.

X-squared = 26.2, df = 16, p-value = 0.05127

Here, P-value ≥ 0.05.

Therefore, we accept H0. Occupation does not influence how much they value Features.

Display



Majority of the Students strongly agree Display is important as well as the one working in Corporate Services agree display being an important criterion. Government Employees strongly agree and Home- makers also agree to display being an important criterion.

Does Occupation influence how much they value Display?

Null hypothesis (H0): Occupation does not influence how much they value Display.

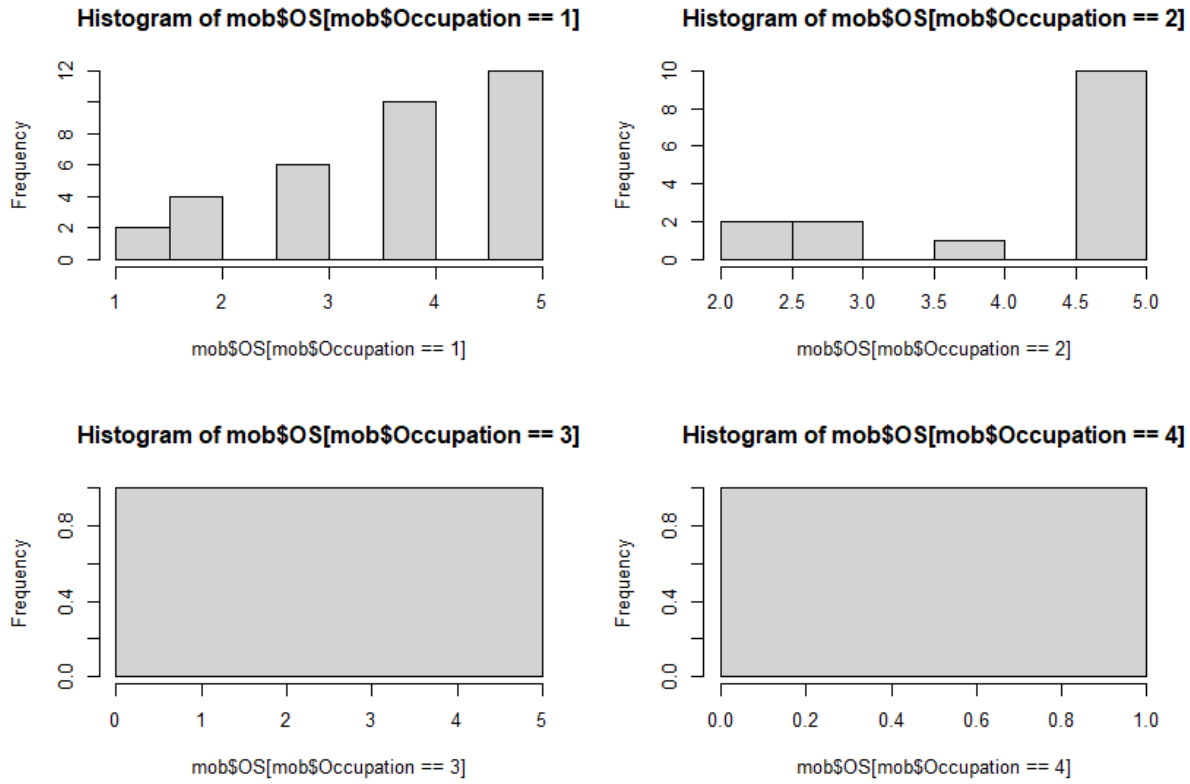
Alternate Hypothesis (H1): Occupation does influence how much they value Display.

X-squared = 12.659, df = 16, p-value = 0.6975

Here, P-value > 0.05.

Therefore, we accept H0. Occupation does not influence how much they value Display.

OS



Majority of the Students strongly agree OS is important as well as the ones working in Corporate Services strongly agree OS being an important criterion. Government Employees strongly agree and Home-makers strongly disagree to OS being an important criterion.

Does Occupation influence how much they value OS?

Null hypothesis (H0): Occupation does not influence how much they value OS.

Alternate Hypothesis (H1): Occupation does influence how much they value OS.

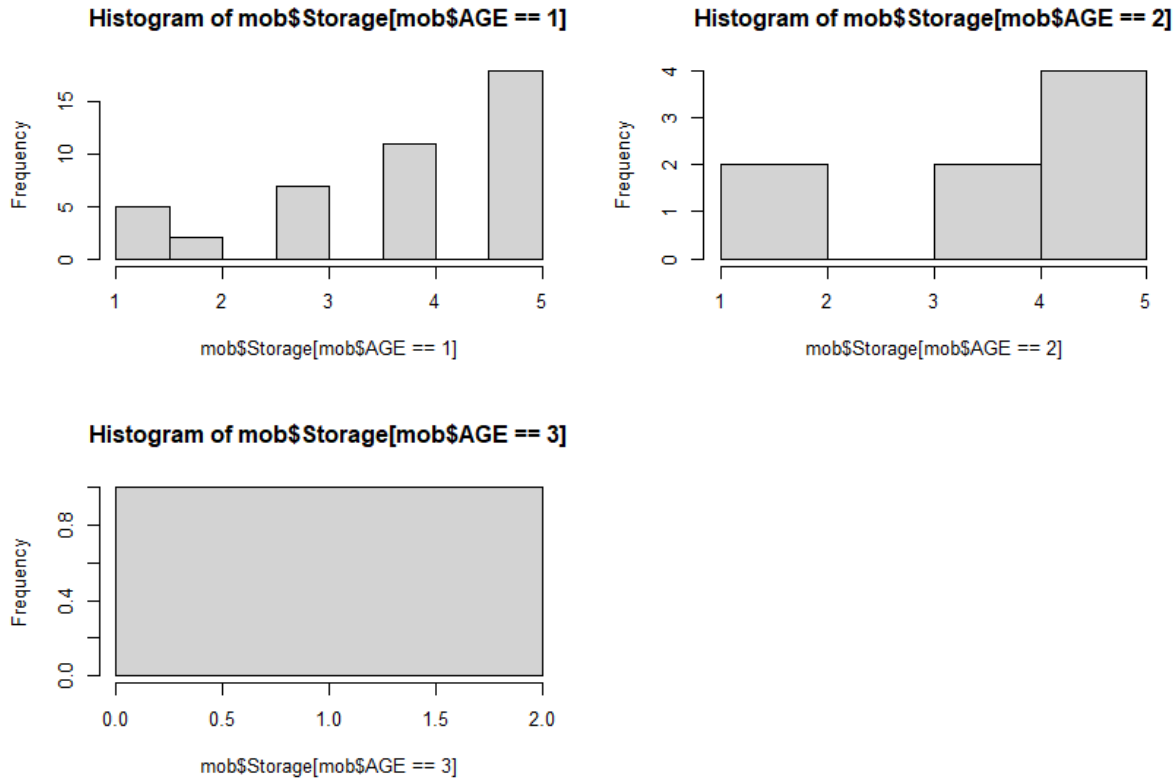
X-squared = 30.334, df = 16, p-value = 0.01635

Here, P-value < 0.05.

Therefore, we reject H0. Occupation does influence how much they value OS.

AGE

Storage



Age Group (15-25): Strongly Agree ; Age group (26-35): Strongly Agree ;

Age group (36-45): Disagree

Does Age influence how much they value storage factor?

Null hypothesis (H0): Age does not influence how much they value storage factor.

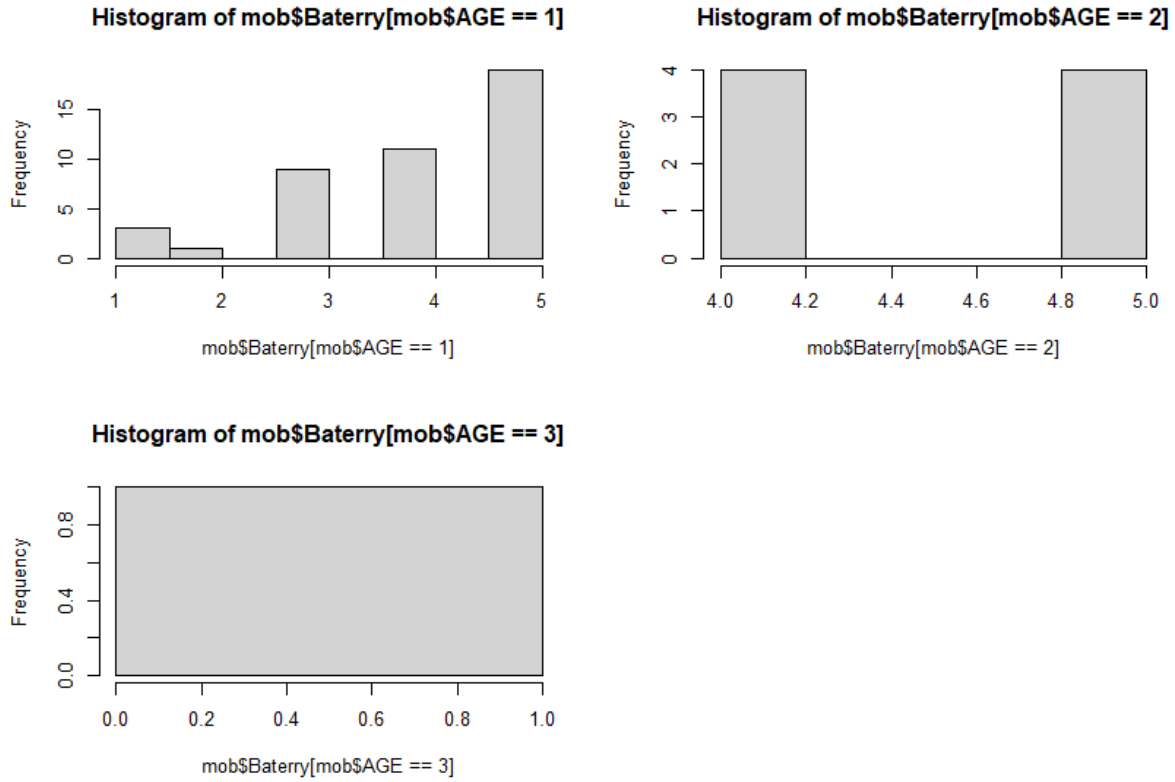
Alternate Hypothesis(H1): Age does influence how much they value storage factor.

X-squared = 14.214, df = 8, p-value = 0.07635

Here, P-value > 0.05.

Therefore, we accept H0. Age does not influence how much they value storage factor.

Battery



Age Group (15-25): Strongly Agree ; Age group (26-35): Agree-Strongly Agree ; Age group (36-45): Strongly Disagree

Does Age influence how much they value Battery life?

Null hypothesis (H0): Age does not influence how much they value Battery life.

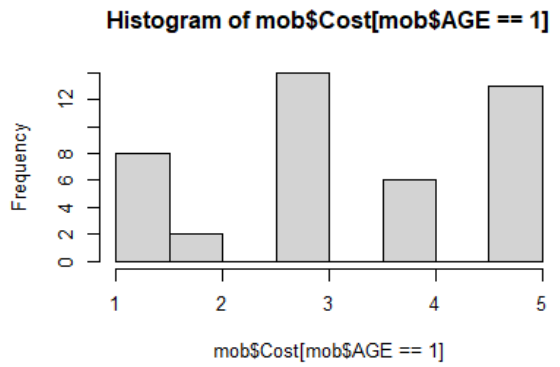
Alternate Hypothesis (H1): Age does influence how much they value Battery life.

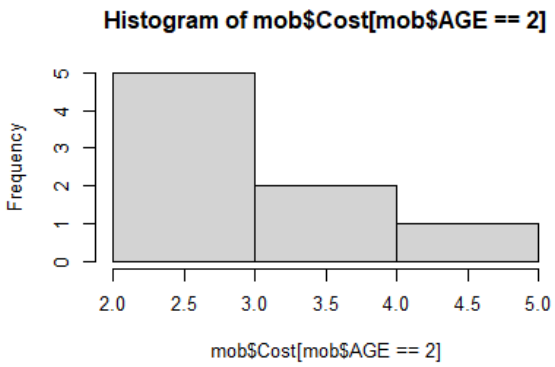
X-squared = 16.005, df = 8, p-value = 0.04231

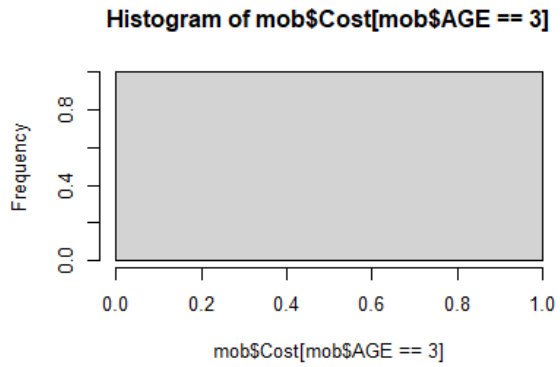
Here, P-value < 0.05.

Therefore, we reject H0. Age does influence how much they value Battery life.

Cost







Age Group (15-25): Neutral; Age group (26-35): Disagree-Neutral; Age group (36-45): Strongly Disagree

Does Age influence how much they value Cost factor?

Null hypothesis (H0): Age does not influence how much they value Cost factor.

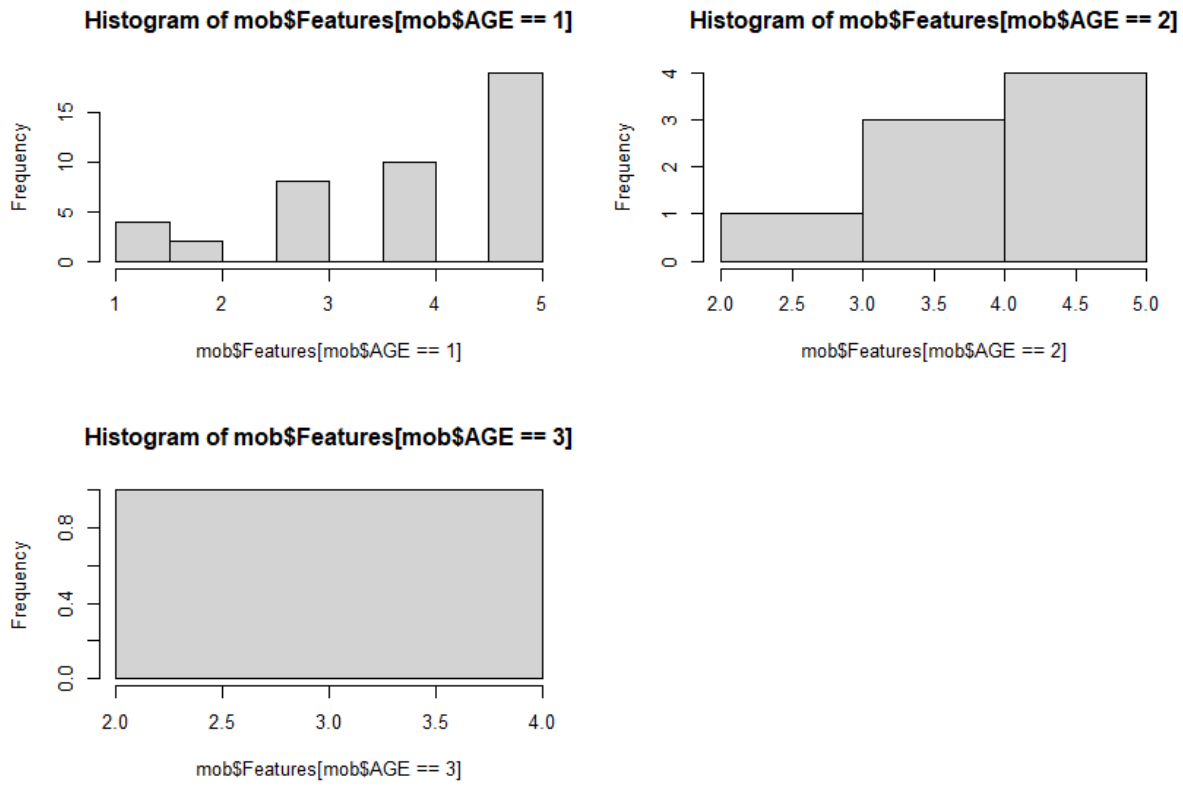
Alternate Hypothesis (H1): Age does influence how much they value Cost factor.

X-squared = 11.224, df = 8, p-value = 0.1893

Here, P-value > 0.05.

Therefore, we accept H0. Age does not influence how much they value Cost factor.

Features



Age Group (15-25): Strongly Agree; Age group (26-35): Strongly

Agree; Age group (36-45): Agree

Does Age influence how much they value Features?

Null hypothesis (H0): Age does not influence how much they value Features.

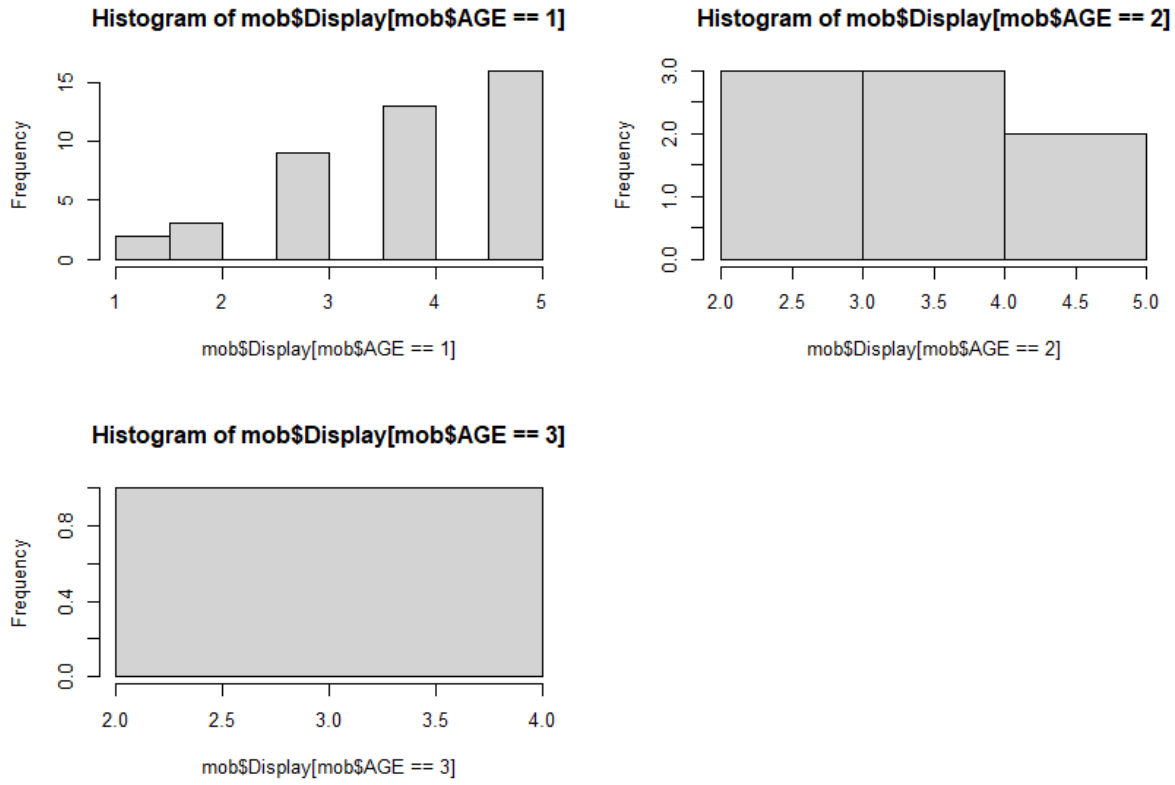
Alternate Hypothesis (H1): Age does influence how much they value Features.

X-squared = 8.2984, df = 8, p-value = 0.4049

Here, P-value > 0.05.

Therefore, we accept H0. Age does not influence how much they value Features.

Display



Age Group (15-25): Strongly Agree; Age group (26-35): Disagree-Strongly Agree; Age group (36-45):Agree

Does Age influence how much they value Display?

Null hypothesis (H0): Age does not influence how much they value Display.

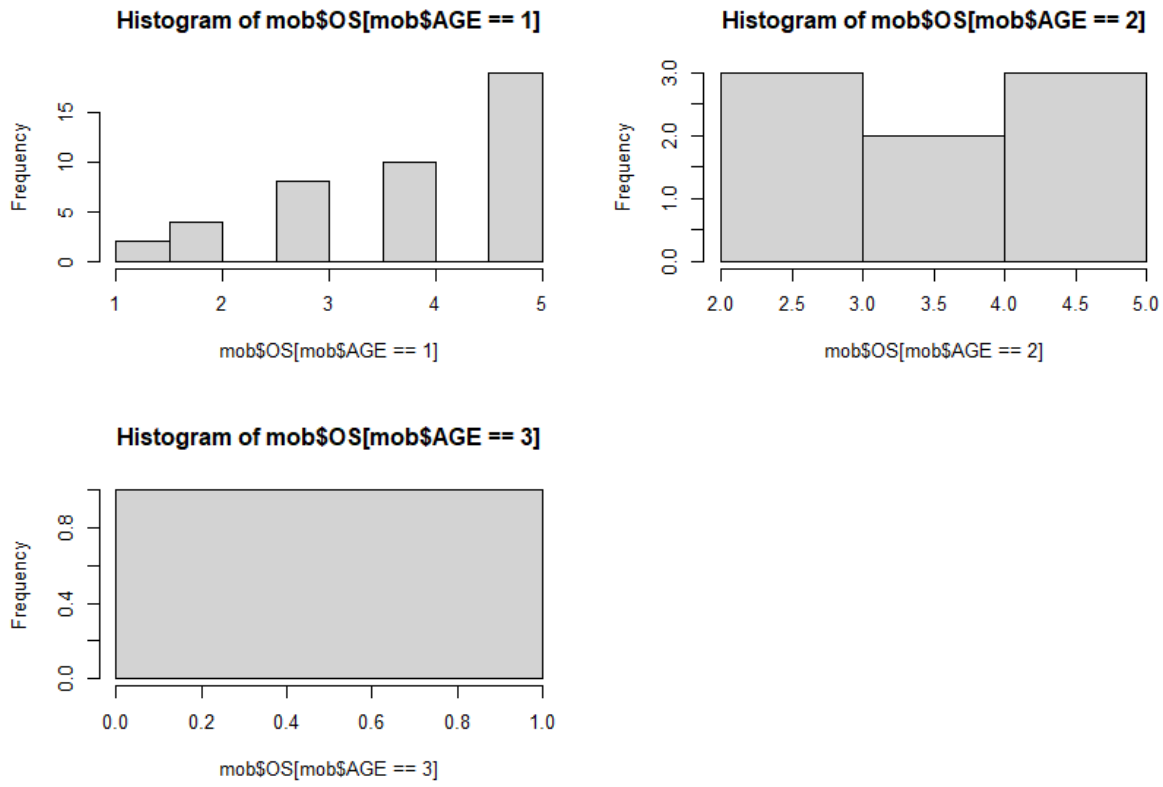
Alternate Hypothesis (H1): Age does influence how much they value Display.

X-squared = 7.0913, df = 8, p-value = 0.5268

Here, P-value > 0.05.

Therefore, we accept H0. Age does not influence how much they value Display.

OS



Age Group (15-25): Strongly Agree; Age group (26-35): Disagree-Strongly Agree; Age group (36-45):Strongly Disagree

Does Age influence how much they value OS?

Null hypothesis (H0): Age does not influence how much they value OS.

Alternate Hypothesis (H1): Age does influence how much they value OS.

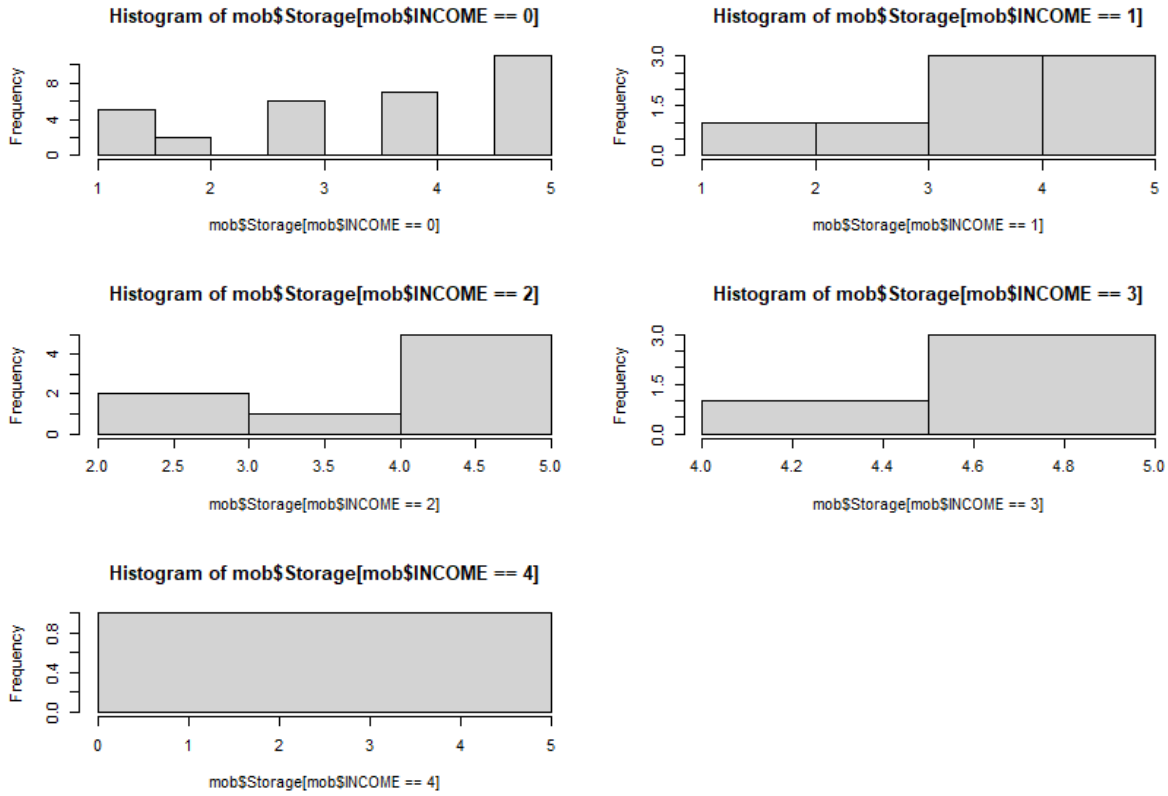
X-squared = 18.572, df = 8, p-value = 0.01732

Here, P-value < 0.05.

Therefore, we reject H0. Age does influence how much they value OS.

INCOME-LEVEL

Storage



Income Levels	Level of Agreeableness
0	Strongly Agree
1L-3L	Agree-Strongly Agree
3L-6L	Strongly Agree
6L-9L	Strongly Agree
9L-12L	Strongly Agree

Does Income level influence how much they value storage factor?

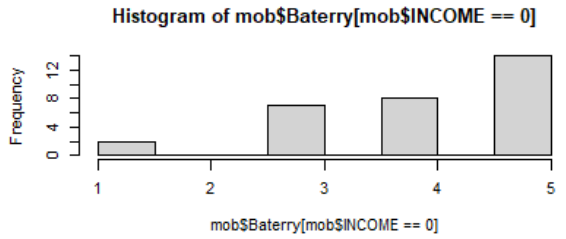
> *Null hypothesis (H0):* Income level does not influence how much they value storage factor.
>
> *Alternate Hypothesis (H1):* Income level does influence how much they value storage factor.

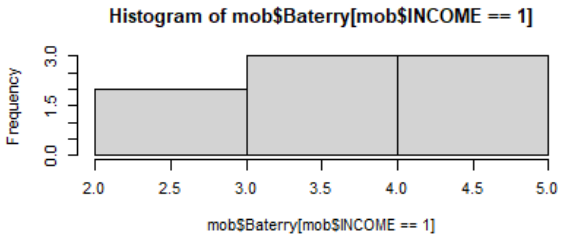
X-squared = 14.717, df = 16, p-value = 0.5454

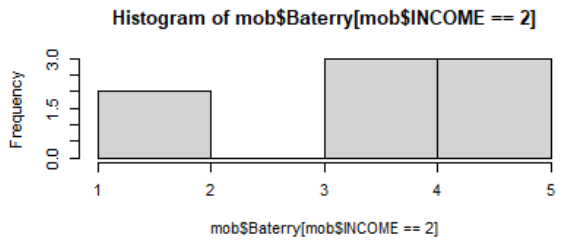
Here, P-value > 0.05

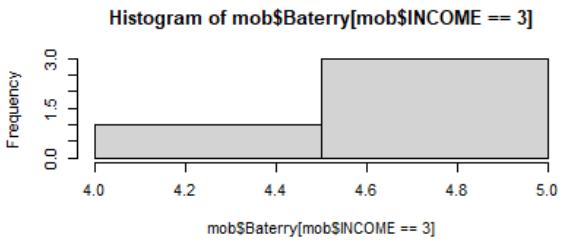
Therefore, we accept H0. Income level does not influence how much they value storage factor.

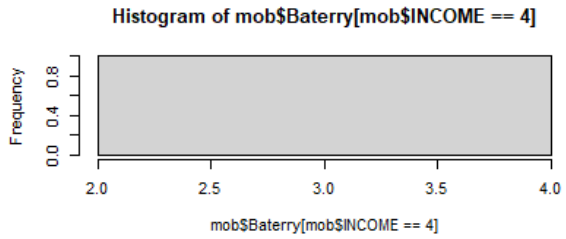
Battery











Income Levels	Level of Agreeableness
0	Strongly Agree
1L-3L	Neutral-Strongly Agree
3L-6L	Neutral-Strongly Agree
6L-9L	Agree-Strongly Agree
9L-12L	Agree

Does Income level influence how much they value Battery life?

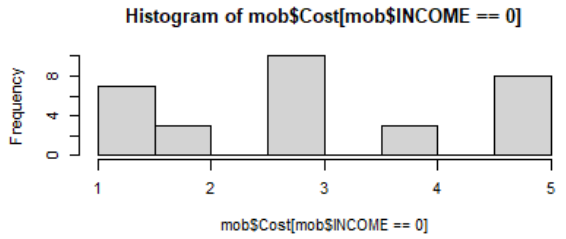
> *Null hypothesis (H0):* Income level does not influence how much they value Battery life.
>
> *Alternate Hypothesis (H1):* Income does influence how much they value Battery life.

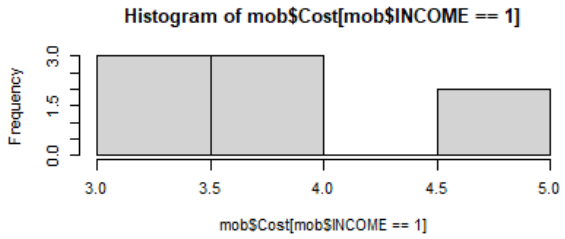
X-squared = 18.602, df = 16, p-value = 0.2898

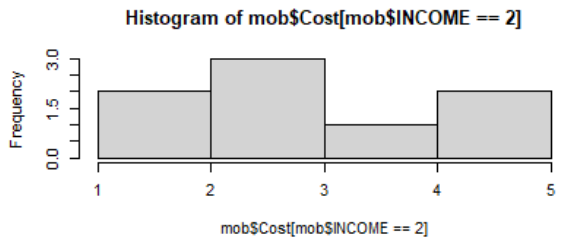
Here, P-value > 0.05.

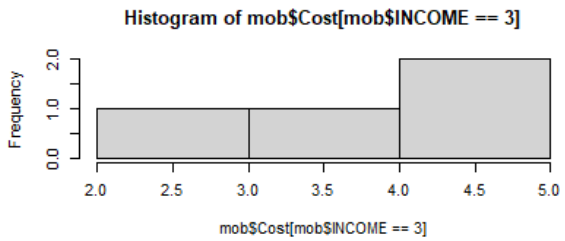
Therefore, we accept H0. Income level does not influence how much they value Battery life.

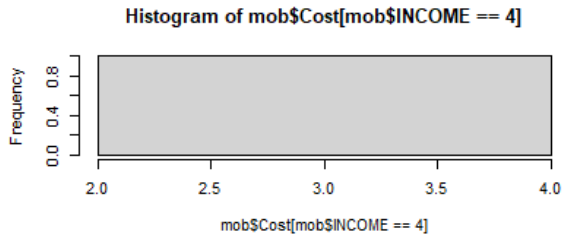
Cost











Income Levels	Level of Agreeableness
0	Neutral
1L-3L	Neutral-Agree
3L-6L	Neutral
6L-9L	Agree-Strongly Agree
9L-12L	Agree

Does Income level influence how much they value cost factor?

Null hypothesis (H0): Income level does not influence how much they value cost factor.

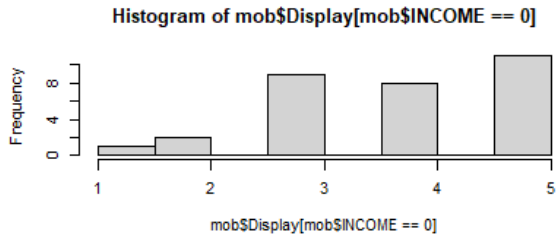
Alternate Hypothesis (H1): Income does influence how much they value cost factor.

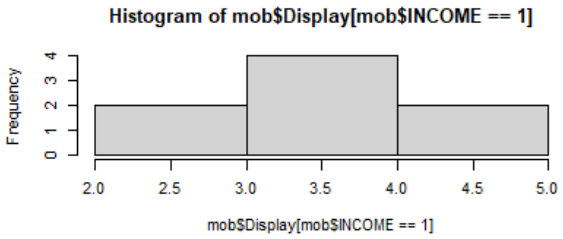
X-squared = 13.588, df = 16, p-value = 0.6294

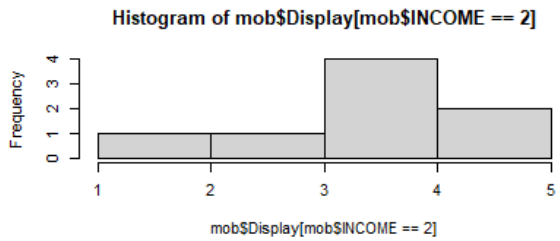
Here, P-value > 0.05.

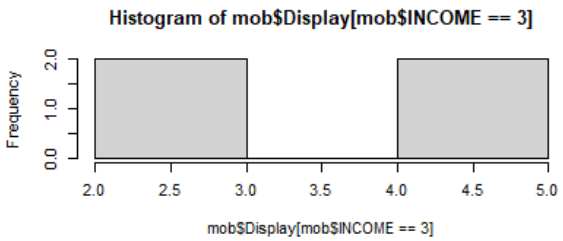
Therefore, we accept the H0. Income level does not influence how much they value cost factor.

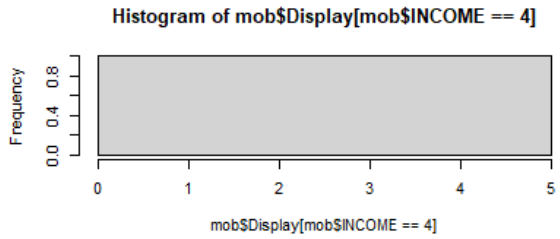
Display











Income Levels	Level of Agreeableness
0	Strongly Agree
1L-3L	Neutral-Agree
3L-6L	Neutral
6L-9L	Agree-Strongly Agree
9L-12L	Agree

Does Income-level influence how much they value Display?

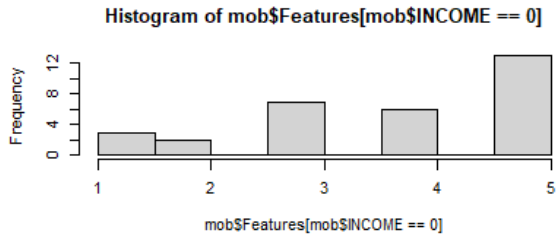
> *Null hypothesis (H0):* Income-level does not influence how much they value Display.
>
> *Alternate Hypothesis (H1):* Income-level does influence how much they value Display.

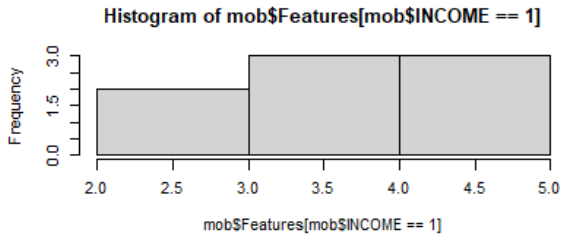
X-squared = 18.317, df = 16, p-value = 0.3057

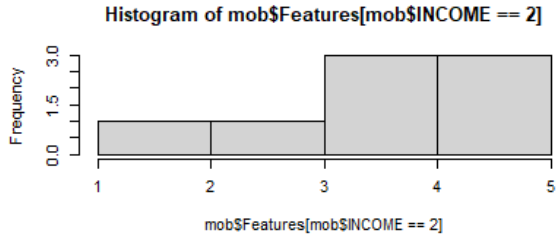
Here, P-value > 0.05.

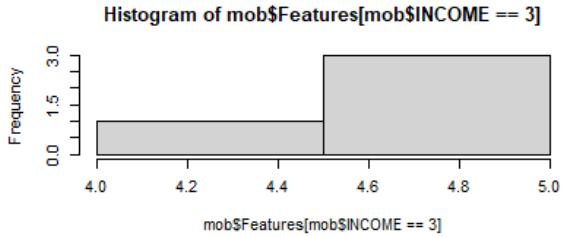
Therefore, we accept H0. Income-level does not influence how much they value Display.

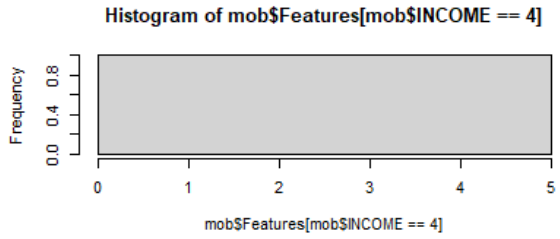
Features











Income Levels	Level of Agreeableness
0	Strongly Agree
1L-3L	Neutral- Strongly Agree
3L-6L	Neutral- Strongly Agree
6L-9L	Strongly Agree
9L-12L	Strongly Agree

Does Income-level influence how much they value features?

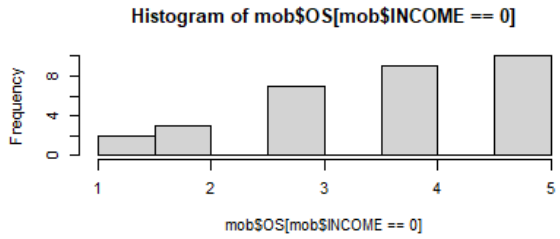
> *Null hypothesis (H0):* Income-level does not influence how much they value features.
>
> *Alternate Hypothesis (H1):* Income-level does influence how much they value features.

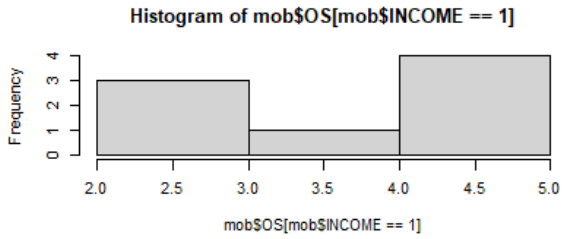
X-squared = 7.7848, df = 16, p-value = 0.955

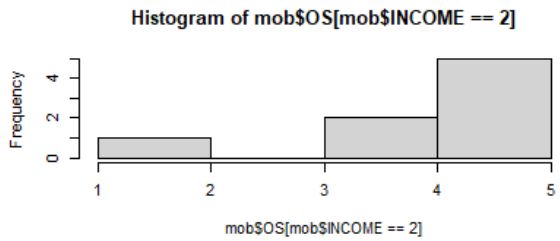
Here, P-value > 0.05.

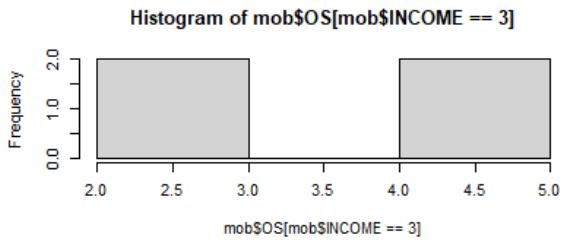
Therefore, we accept H0. Income-level does not influence how much they value features.

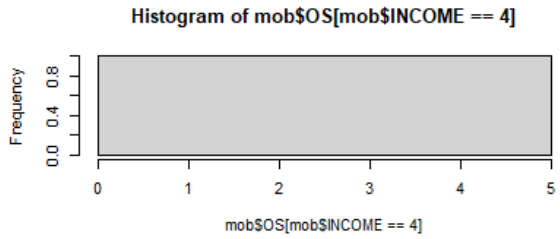
OS











Income Levels	Level of Agreeableness
0	Strongly Agree
1L-3L	Strongly Agree
3L-6L	Strongly Agree
6L-9L	Equally Disagree &Strongly Agree
9L-12L	Strongly Agree

Does Income-level influence how much they value OS?

Null hypothesis (H0): Income-level does not influence how much they value OS.

Alternate Hypothesis (H1): Income-level does influence how much they value OS.

X-squared = 15.187, df = 16, p-value = 0.511

Here, P-value > 0.05.

Therefore, we accept H0. Income-level does not influence how much they value OS.

CUSTOMER RETENTION

	Apple	Motorola	OnePlus	Oppo	RealMe	Samsung	Vivo	Xiaomi	
	2	1	0	0	0	0	1	0	0
Apple	0	4	0	2	0	0	1	0	0
Asus	0	0	0	0	0	0	1	0	0
Motorola	0	0	2	0	0	0	1	0	1
OnePlus	0	0	0	0	0	0	0	0	1
Oppo	0	0	0	0	1	0	0	0	0
RealMe	0	0	0	0	0	1	0	0	0
Samsung	0	4	0	3	0	0	6	0	4
Vivo	0	0	0	1	0	0	1	2	0
Xiaomi	1	0	0	3	0	2	4	2	0

- Current Apple users:
  4 people had old and new phone as Apple, while other 4 had old as Samsung and current apple
- Current Motorola users:
  2 people have Motorola as old and current phone.
- Current One plus users
  None had same brand before, 9 in total shifted to one plus from brands like Apple (2), Samsung (3), Vivo (1) and Xiaomi (3)
- Current Oppo users:
  1 person - stayed with the same brand
- Current Realme users
  1 person stayed with the same brand, 2 of them shifted from Xiaomi to Realme
- Current Samsung users
  6 of them stayed with the same brand
  9 shifted from other brands to Samsung
- Current vivo users
  2 of the remained
  2 of them shifted from Xiaomi
- Current Xiaomi users
  4 from Samsung ,1 from Motorola, 1 from OnePlus

Company	Retention Rate (%)
Samsung	76.923
Apple	85.47
Vivo	96.153
RealMe	96.153
OnePlus	0
Oppo	48.07
Xiaomi	0

Conclusion

Based on the responses obtained from our survey and after applying the testing and interpretations, we could come up with a general idea regarding the extent to which people value each of the factors like storage, cost, battery life, display, Operating system and other factors respectively while switching over to a new phone. Upon testing the dependence of these factors on gender, occupation, age and income levels of the respondents, various conclusions were drawn.

For gender, it was interpreted that for factors like storage, battery life, features and operating system, majority of both the genders strongly agreed of their significance while for factors like cost and display, majority of the females stayed neutral and majority of men strongly agreed of their significance. Upon testing, it was concluded that gender does not have any influence on to what extent they value each of these factors.

For occupations, it was interpreted that most of the students considered all the above factors except for cost as significant for a new phone. As for working population, most of them placed little less significance on display and considered all other factors as very important. Upon testing, it was concluded that occupation does have an influence on how much they value factors like storage, features and the type of OS, while it does not have any influence on how much they value other factors like battery life and cost.

For age groups, it was interpreted on the basis of two categories, up to age 25 (group1) and beyond 25(group 2). Majority of both groups combined highly valued storage, battery life and features. Cost factor was seen as less significant by most of the two groups. As for OS, group 1 highly valued it while group 2 placed less significance on it. Upon testing, it was concluded that the ages of the respondents do influence on the value they had placed on battery life and OS, while for other factors it does not influence.

For income levels, majority of the no income groups stayed neutral while people with income agreed on its importance. For all other factors, majority of income groups more or less agreed on its significance. Upon testing it was concluded that the income level has no influence on how much they value each of these factors.

The second part of the project dealt with market retention rate calculation for each brand based on their old and current phone details collected. Upon calculation of the retention rates from the acquired data, it was concluded that Vivo and RealMe had maximum retention rates with 96%. Samsung was ranked second with 77% and Apple was ranked third with 85.4% retention rates respectively.

Student's Perception about E-Learning

Submitted By-
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Introduction

E-Learning is a learning system based on formalised teaching but with the help of electronic resources. While teaching can be based in or out of the classrooms, the use of computers and the Internet forms the major component of E-learning.

E-learning can also be termed as a network enabled transfer of skills and knowledge, and the delivery of education is made to a large number of recipients at the same or different times.

With the advancement in technology there are tools provided to make E-Learning possible. So this survey will help us to know what students make of the idea of E-learning as they are the target and main beneficiaries of this technology enabled learning.

We also wanted to find out students opinion on E-learning which can be a substitute to traditional teaching methods.

Research Topic

Student's Perception about E-Learning.

Research Objective

- To find out how various factors like age, gender, economic condition, demographic etc. affects the process of E-learning.
- To find out whether E-learning is actually making difference in the learning process for students.
- To find out various challenges students face in E-learning.
- To find out whether E-learning can replace traditional teaching methods.

Research Methodology

We have done Quantitative research by collecting data through Google forms. Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.

Survey Research is the most fundamental tool for all quantitative outcome research methodologies and studies. Surveys used to ask questions to a sample of respondents, using various types such as online polls, online surveys, paper questionnaires, web-intercept surveys, etc.

We have tested various hypothesis in regards to our topic to get a collective outcome which satisfies our problem to its maximum potential.

Findings:

Results of Hypothesis:

- **# Question1: Does age has effect on Usefulness of E-learning?**

# Null Hypothesis Ho: Age does not affect on usefulness of E-learning.
# Alternate Hypothesis HA: Age has effect on usefullness of E-learning.
chisq.test(age,conclusion)

```
Pearson's Chi-squared test

data:  age and conclusion
X-squared = 9.8626, df = 6, p-value = 0.1306
```

Conclusion: As p value > 0.05, So we failed to reject Null Hypothesis.
Hence, age does not affect on usefulness of E-learning

- **# Question2: Does gender has an effect on usefulness of E-learning ?**

Ho: Gender does not have effect on usefulness of E-learning.
HA: Gender has effect on usefulness of E-learning.

chisq.test(gender,conclusion)

```
Pearson's Chi-squared test

data:  gender and conclusion
X-squared = 3.1097, df = 2, p-value = 0.2112
```

Conclusion: As p-value > 0.05, failed to reject Null Hypothesis.
Hence, Gender does not have effect on usefulness of E-learning.

- **#Question3: Does education level affect usefullness of E-learning?**

#Ho: Education does not affect usefulness of E-learning.

#HA: Education has effect on usefulness of E-learning.

chisq.test(education,conclusion)

```
Pearson's Chi-squared test

data:  education and conclusion
X-squared = 6.6727, df = 6, p-value = 0.3522
```

Conclusion: As p-value > 0.05, failed to reject Null Hypothesis.

Hence, Education does not affect usefulness of E-learning.

- **# Question4: Does usage of internet has effect on usefulness of E-learning?**

Ho: Usage of internet does not effect usefulness of E-learning?

HA: Usage of internet has effect on usefulness of E-learning?

chisq.test(Internet_Usage,conclusion)

```
Pearson's Chi-squared test

data:  Internet_Usage and conclusion
X-squared = 7.6605, df = 2, p-value = 0.0217
```

Conclusion: As p-value < 0.05, reject Null Hypothesis.

Hence, Usage of internet affect usefulness of E-learning?

- **#Question5: Does knowledge of E-learning has effect on usefulness of e-learning?**

Ho: Knowledge of E-learning does not affect on usefulness of E-learning?

HA: Knowledge of E-learning has effect on usefulness of E-learning?

chisq.test(elearn_knowledge,conclusion)

```
Pearson's Chi-squared test

data:  elearn_knowledge and conclusion
X-squared = 13.636, df = 2, p-value = 0.001094
```

Conclusion: As p-value < 0.05, reject Null Hypothesis.

Hence, Knowledge of E-learning has effect on usefulness of E-learning?

- **# Question6: Does interest in knowledge of E-learning has an effect on usefulness of E-learning?**

Ho: Interest in knowledge of e-learning does not effect on usefulness of E-learning.

HA: Interest in knowledge of e-learning has effect on usefulness of E-learning.

chisq.test(elearn_knowledge,conclusion)

```
Pearson's Chi-squared test
```

```
data:  elearn_knowledge and conclusion
X-squared = 13.636, df = 2, p-value = 0.001094
```

Conclusion: As p-value < 0.05, reject Null Hypothesis.
Hence, Interest in knowledge of e-learning has effect on usefulness of E-learning.

- **#Questions7: Does having availability of e-learning in institute affect usefulness of e-learning?**

Ho: Having availability of e-learning in institute does not affect usefulness of e-learning?
HA: Having availability of e-learning in institute affect usefulness of e-learning?

chisq.test(institute_availability,conclusion)

```
Pearson's Chi-squared test

data:  institute_availability and conclusion
X-squared = 1.8241, df = 2, p-value = 0.4017
```

Conclusion: As p-value >0.05, failed to reject Null hypothesis.
Hence, Having availability of e-learning in institute does not affect usefulness of e-learning?

- **#Question8: Does using E-learning platforms has an effect on usefulness of e-learning?**

# Ho: Using E-learning platforms does not affect usefulness of e-learning.
# HA: Using E-learning platforms affect usefulness of e-learning.
chisq.test(usage_elearn,conclusion)

```
Pearson's Chi-squared test

data:  usage_elearn and conclusion
X-squared = 5.0463, df = 2, p-value = 0.08021
```

Conclusion: As p-value > 0.05, failed to reject Null hypothesis.
Hence, Using E-learning platforms does not affect usefulness of e-learning.

- **# Question9: Does advantages of e-learning affect usefulness of e-learning?**

Ho: Advantages of e-learning does not affect usefulness of e-learning.
HA: Advantages of e-learning affect usefulness of e-learning.

```
str(elearn)
advantages <- as.numeric(advantage1) +
as.numeric(advantage2)+as.numeric(advantage3)+as.numeric(advantage4)+as.numeric(advantage5)
advantages
anv1 <- aov(advantages ~ conclusion)
summary(anv1)
```

```
> summary(anv1)
             Df Sum Sq Mean Sq F value   Pr(>F)
conclusion    2  913.7   456.9   31.01 5.08e-12 ***
Residuals   152 2239.4    14.7
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Conclusion: As p-value <0.05, reject Null Hypothesis.
Hence, Advantages of e-learning affect usefulness of e-learning.

- **# Question10: Does disadvantages of e-learning affect usefulness of e-learning?**

```
# Ho: Disadvantages of e-learning does not affect usefulness of e-learning.
# HA: Disdvantages of e-learning affect usefulness of e-learning.
disadvantages <-
as.numeric(disadvantage1)+as.numeric(disadvantage2)+as.numeric(disadvantage3)+as.num
eric(disadvantage4)
disadvantages
anv2 <- aov(disadvantages~conclusion)
summary(anv2)
```

```
> summary(anv2)
             Df Sum Sq Mean Sq F value  Pr(>F)
conclusion    2  107.2   53.61   6.528 0.00191 **
Residuals   152 1248.3    8.21
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
```

Conclusion: As p-value < 0.05, reject Null Hypothesis.
Hence, Disdvantages of e-learning affect usefulness of e-learning.

Conclusion of Research:

As it has been proved using hypothesis that age, gender, education, availability of institutional facility and using E-learning platforms does not affect the usefulness of E-Learning.

While, **usage of internet**, **knowledge of E-learning, interest in knowledge of E-learning, advantages of E-learning and its disadvantages** has an effect on the usefulness of e-learning.

Hence Students’ perception of E-learning is derived mainly from the advantages and disadvantages of the E-learning platform.

Impact of Covid-19 on Digital Entertainment Industry

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Introduction

The COVID-19 pandemic has changed the way people consume media and entertainment. Due to strict national lockdowns around the world people have been forced to stay at home, changing consumer behaviour on a large scale. As movie theatres, museums, events, and other external entertainment consumption models have been banned, social lives have moved online, and entertainment consumption has increased significantly for online gaming and over-the-top (OTT) services.

Traditional media services such as television and newspapers have also been side-lined as drastic cuts in ad spends of large companies have severely dented revenues of traditional media giants. Even government advertising has taken a hit post the pandemic. To a large extent viewership has been limited to consumers looking for live news updates about the coronavirus.

In contrast, services like Hotstar, Amazon Prime and Netflix in India have seen an 82.63% increase in time spent. Similarly, YouTube has seen a 20.5 percent surge in subscribers in the country. It garnered over 300 billion views in the first quarter of 2020 and has been growing at a rate of 13 percent since the fourth quarter of 2019.

It is expected that the psychological hangover from the virus could affect behaviour as well. Consumers might take more time to embrace previous norms of external consumption once again, especially in areas that have been the worst affected by this crisis.

To reiterate this notion, it is useful to point out how online ticketing services whose revenues were concentrated on outdoor events, have been adapting to the new normal. BookMyShow, for example, launched Live From HQ, which is a new series focused on bringing live entertainment into people's homes.

Further, according to KPMG the projected 'digital billion' trajectory of India is set to accelerate significantly by virtue of the lockdown. This is not just due to the addition of new users but also because of the increasing comfort and confidence of existing digital citizenry.
Now, the most important aspect to consider, of the post-COVID scenario is the competition between existing players and newer arrivals. While on one hand some people expect the pandemic to benefit the OTT sector as a whole, there is an another argument which states that key content gaps due to halted production, depressed advertising spend due to the closure of many advertisers' businesses and significant economic uncertainty facing consumers, will result in a more hostile environment for new and nascent services.
Two aspects of this challenge are as follows.

One, in the arena of OTT streaming services, content is king. This means that platforms must consistently provide high quality programming at a high volume. Services must deliver enough compelling original or exclusive content along with sufficient breadth so that subscribers can find something to watch every time they log in.

And two, once COVID-19 restrictions are eased and previous models of outdoor entertainment resume functioning, consumers might look to thin their stack of OTT services. Services therefore must focus on as much customer retention as possible, such as long term offers, future promises of high-profile content and intuitive algorithms to engage consumers. This will be crucial in the long-term survival of newer platforms.

The post-COVID scenario for the media and entertainment industry is expected to be that of increased digital integration into everyday life with short-term and long-term impact on consumer behaviour. The psychosocial fallout of the pandemic is yet to be ascertained, however, it is not without reason to assume that previous models of entertainment such as crowded events, gatherings, movie theatres, concerts are likely to be avoided until trust in such interactions is restored. Meanwhile, the stage is being set for a new battle of dominance amongst streaming services, gaming platforms and other forms of at-home entertainment services.

Research Methodology

In this live project, we have used **MIXED TYPE OF RESEARCH** which means that a combination of both Qualitative and Quantitative research.

Mixed research- research that involves the mixing of quantitative and qualitative methods or paradigm characteristics. Nature of data is mixture of variables, words, and images.

Also, we have done the **Causal research** which aims at establishing cause and effect relationship among variable.

Collection Of Data

For this research we have collected primary data from the public to get the real results.

We have collected data with the help of **GOOGLE FORMS** which were circulated among our friends and colleagues.

Analysis Of Data

We are analysing the data with the help of the **HYPOTHESIS TESTING in R PROGRAMMING.**

We have done the following tests on the variables in our data:

1. T.test
2. Chi square test
3. Anova

We have done the testing on the variables based on the levels and whether they are numerical or categorical.

Analysis And Interpretation

For the Analysis and Interpretation, we have done hypothesis testing based on the various questions. The analysis will be as follows:

For that purpose, we have done factoring first, for that we have run the following codes in R.

```
getwd()

## [1] "C:/Users/HP-PC/Documents/R"

setwd("C:/Users/HP-PC/Documents/R")
ott = read.csv("OTT PLATFORMS.CSV")

# FACTORING


profession = as.factor(c("Student","Employed","Self Employed","Other"))
a = factor(profession, order = TRUE, levels = c("Student","Employed","Self Employed","Other"))
a

## [1] Student       Employed      Self Employed Other
## Levels: Student < Employed < Self Employed < Other

comfortable_with_binge_watching = as.factor(c("Highly
Satisfied","Satisfied","Neutral","Dissatisfied","Highly Dissatisfied"))
b = factor(comfortable_with_binge_watching, order = TRUE, levels = c("Highly
Satisfied","Satisfied","Neutral","Dissatisfied","Highly Dissatisfied"))
b
```

```
## [1] Highly Satisfied    Satisfied          Neutral
## [4] Dissatisfied        Highly Dissatisfied
## 5 Levels: Highly Satisfied < Satisfied < Neutral < ... < Highly Dissatisfied

platform = as.factor(c("Netflix","Amazon","Zee5","Hotstar","TVF","Other"))
c = factor(platform, order = TRUE, levels = c("Netflix","Amazon","Zee5","Hotstar","TVF","Other"))
c

## [1] Netflix Amazon  Zee5    Hotstar TVF     Other
## Levels: Netflix < Amazon < Zee5 < Hotstar < TVF < Other

pocket_friendly = as.factor(c("Agree","Neutral","Disagree"))
d = factor(pocket_friendly, order = TRUE, levels = c("Agree","Neutral","Disagree"))
d

## [1] Agree    Neutral  Disagree
## Levels: Agree < Neutral < Disagree

comfortable_with_digital_platform = as.factor(c("Agree","Neutral","Disagree"))
e = factor(comfortable_with_digital_platform, order = TRUE, levels =
c("Agree","Neutral","Disagree"))
e

## [1] Agree    Neutral  Disagree
## Levels: Agree < Neutral < Disagree

comfortable_with_theatres = as.factor(c("Agree","Neutral","Disagree"))
f = factor(comfortable_with_theatres, order = TRUE, levels = c("Agree","Neutral","Disagree"))
f

## [1] Agree    Neutral  Disagree
## Levels: Agree < Neutral < Disagree

streaming_device = as.factor(c("Laptop","Smart_Television","Mobile","Other"))
g = factor(streaming_device, order = TRUE, levels =
c("Laptop","Smart_Television","Mobile","Other"))
g

## [1] Laptop          Smart_Television Mobile          Other
## Levels: Laptop < Smart_Television < Mobile < Other

reaction_to_online_streaming = as.factor(c("Very Happy","Happy","Neutral","Sad","Very Sad"))
h = factor(reaction_to_online_streaming, order = TRUE, levels = c("Very
Happy","Happy","Neutral","Sad","Very Sad"))
h

## [1] Very Happy Happy      Neutral    Sad        Very Sad
## Levels: Very Happy < Happy < Neutral < Sad < Very Sad

future_preference = as.factor(c("OTT","Theatre","Both"))
i = factor(future_preference, order = TRUE, levels = c("OTT","Theatre","Both"))
i

## [1] OTT     Theatre Both
## Levels: OTT < Theatre < Both

more_user_friendly = as.factor(c("Highly Agree","Agree","Neutral","Disagree","Highly Disagree"))
j = factor(more_user_friendly, order = TRUE, levels = c("Highly
```

```
Agree","Agree","Neutral","Disagree","Highly Disagree"))
j
```

```
## [1] Highly Agree    Agree          Neutral        Disagree
## [5] Highly Disagree
## Levels: Highly Agree < Agree < Neutral < Disagree < Highly Disagree
```

```
child_friendly = as.factor(c("Highly Agree","Agree","Neutral","Disagree","Highly Disagree"))
k = factor(child_friendly, order = TRUE, levels = c("Highly
Agree","Agree","Neutral","Disagree","Highly Disagree"))
k
```

```
## [1] Highly Agree    Agree          Neutral        Disagree
## [5] Highly Disagree
## Levels: Highly Agree < Agree < Neutral < Disagree < Highly Disagree
```

```
aware_of_parental_controls = as.factor(c("Yes","No","Maybe"))
l = factor(aware_of_parental_controls, order = TRUE, levels = c("Yes","No","Maybe"))
l
```

```
## [1] Yes   No    Maybe
## Levels: Yes < No < Maybe
```

```
satisfy_with_parental_controls = as.factor(c("Yes","No"))
m = factor(satisfy_with_parental_controls, order = TRUE, levels = c("Yes","No"))
m
```

```
## [1] Yes No
## Levels: Yes < No
```

```
harm = as.factor(c("Yes","No"))
n = factor(harm, order = TRUE, levels = c("Yes","No"))
n
```

```
## [1] Yes No
## Levels: Yes < No
```

```
# Q1 = Does age affect the comfortableness of binge watching?

# we will do annova test because there is 1 numeric and 1 categorical variable with more than 2
levels
# Null Hypothesis = No, age does not affect the comfortableness of binge watching
# Alternate Hypothesis = Yes, age affect the comfortableness of binge watching

anova1 = aov(ott$Age~ott$Are.you.comfortable.with.binge.watching.)
summary(anova1)
```

```
##                                        Df Sum Sq Mean Sq F value Pr(>F)
## ott$Are.you.comfortable.with.binge.watching.   1     24   24.46   0.212  0.647
## Residuals                                    102  11794  115.63
```

```
# p value > 0.05, We accept null hypothesis
# Hence, age does not affect the comfortableness of binge watching
```

```
# Q2 = Does profession influence the platform people use to watch the shows?

# we will do chi square test because both are categorical variables with more than 2 levels
# Null Hypothesis = No, there is no influence of profession on platforms
# Alternate Hypothesis = Yes, profession influence the platforms

chisq.test(ott$Profession,ott$Which.Platform.do.you.use.to.Binge.watch..)

## Warning in chisq.test(ott$Profession,
## ott$Which.Platform.do.you.use.to.Binge.watch..): Chi-squared approximation may
## be incorrect

##
##  Pearson's Chi-squared test
##
## data:  ott$Profession and ott$Which.Platform.do.you.use.to.Binge.watch..
## X-squared = 11.808, df = 15, p-value = 0.6935

# p value > 0.05, we accept null hypothesis
# Hence, there is no influence of profession on platforms



# Q3 = Does age effect the comfortableness of people with releasing movie online?


# we will use anova because there is one numeric and one categorical variable with more than 2
levels
# Null hypothesis = No, age does not effect the comfortableness of people with releasing movie online
# Alternate hypothesis = Yes, age has an effect on the comfortableness of people with releasing movie
online

anova2 = aov(ott$Age~ott$What.would.you.prefer...Releasing.Movie.on.the.digital.platform.)
summary(anova2)

##                                                Df Sum Sq
## ott$What.would.you.prefer...Releasing.Movie.on.the.digital.platform.   1    220
## Residuals                                     102  11599
##                                                Mean Sq
## ott$What.would.you.prefer...Releasing.Movie.on.the.digital.platform.   219.7
## Residuals                                        113.7
##                                                F value
## ott$What.would.you.prefer...Releasing.Movie.on.the.digital.platform.   1.932
## Residuals
##                                                Pr(>F)
## ott$What.would.you.prefer...Releasing.Movie.on.the.digital.platform.  0.168
## Residuals

# p value > 0.05, we accept null hypothesis
# Hence, age does not effect the comfortableness of people with releasing movie online



# Q4 = Does profession effect the awareness of the child locks?
```

```
# we will do chisquare test because both are categorical variables with more than 2 levels
# Null hypothesis = No, profession does not effect the awareness of the child locks
# Alternate hypothesis = Yes, profession has an effect on the awareness of the child locks

chisq.test(ott$Profession,ott$Are.you.aware.of.the.measures.and.the.parental.control.measures.on.these.platforms..)

## Warning in chisq.test(ott$Profession,
## ott$Are.you.aware.of.the.measures.and.the.parental.control.measures.on.these.platforms..):
## Chi-squared approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  ott$Profession and
ott$Are.you.aware.of.the.measures.and.the.parental.control.measures.on.these.platforms..
## X-squared = 5.5473, df = 6, p-value = 0.4758

# p value > 0.05, we accept null hypothesis
# Hence, profession does not effect the awareness of the child locks



# Q5 = Does age effect the harmfulness of these platforms?


# we will do t test because one is numeric and one is categorical with 2 levels
# Null hypothesis = No, age does not effect the harmfulness of these platforms
# Alternate hypothesis = Yes, age has an effect on the harmfulness of these platforms

t.test(ott$Age~ott$Do.you.think.it.will.harm.you..)

##
##  Welch Two Sample t-test
##
## data:  ott$Age by ott$Do.you.think.it.will.harm.you..
## t = -0.93623, df = 100.25, p-value = 0.3514
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -6.145263  2.204787
## sample estimates:
## mean in group 1 mean in group 2
##        23.08333        25.05357

# p value > 0.05, we accept null hypothesis
# Hence, age does not effect the harmfulness of these platforms



# Q6 = Does age and profession affect the continuation of people watching on these platforms?


# we will use anova test because there is one numeric and one categorical variable with more than 2 variables
# Null hypothesis = No, age and profession does not affect the continuation of people watching on these platforms
# Alternate hypothesis = Yes, age and profession has an affect the continuation of people watching on
```

```
these platforms

anova3 = aov(ott$Age~ott$Profession,subset = ott$After.this.pandemic.ends..what.will.you.prefer..
%in% 1)
summary(anova3)

##               Df Sum Sq Mean Sq F value   Pr(>F)
## ott$Profession  1   1101  1100.8    22.9 4.99e-05 ***
## Residuals      28   1346    48.1
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

# p value < 0.05, we reject null hypothesis
# Hence, age and profession has an affect on the continuation of people watching on these platforms



# Q7 = Does age effect the child friendliness of these platforms?


# we will use annova because there is one numeric and one categorical variable with more than 2
levels
# Null hypothesis = No, age does not effect the child friendliness of these platforms
# Alternate hypothesis = Yes, age has an effect on the child friendliness of these platforms

anova4 = aov(ott$Age~ott$Do.you.think.these.platforms.are.child.friendly.)
summary(anova4)

##                                              Df Sum Sq Mean Sq F value
## ott$Do.you.think.these.platforms.are.child.friendly.   1    292   291.6   2.581
## Residuals                                    102  11527   113.0
##                                             Pr(>F)
## ott$Do.you.think.these.platforms.are.child.friendly.  0.111
## Residuals

# p value > 0.05, we accept null hypothesis
# Hence, age does not effect the child friendliness of these platforms



# Q8 = Does age affect the satisfaction with the locks and the parental controls provided in these
platforms ?


# we will do t test because there is one numeric and one categorical variable with 2 levels
# Null hypothesis = No, age does not affect the satisfaction with the locks and the parental controls
provided in these platforms
# Alternate hypothesis = Yes, age has an affect on the satisfaction with the locks and the parental
controls provided in these platforms

t.test(ott$Age~ott$Are.you.satisfied.with.the.measures.and.locks.provided.)

##
##  Welch Two Sample t-test
##
## data:  ott$Age by ott$Are.you.satisfied.with.the.measures.and.locks.provided.
## t = -0.24002, df = 101.99, p-value = 0.8108
```

```
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -4.671494  3.662960
## sample estimates:
## mean in group 1 mean in group 2
##        23.87755        24.38182

# p value > 0.05, we accept null hypothesis
# Hence, age does not affect the satisfaction with the locks and the parental controls provided in these platforms



# Q9 = Does age and the pocket friendliness affect their watching shows on Netflix?


# we will do anova test because there is one numeric and one categorical variable with more than 2 levels
# Null hypotheis = No, age and the pocket friendliness does not affect their watching shows on Netflix
# Alternate hypothesis = Yes, age and the pocket friendliness has an affect on their watching shows on Netflix

anova5 = aov(ott$Age~ott$Do.you.think.its.more.pocket.friendly.., subset =
ott$Which.Platform.do.you.use.to.Binge.watch.. %in% 1)
summary(anova5)

##                                      Df Sum Sq Mean Sq F value Pr(>F)
## ott$Do.you.think.its.more.pocket.friendly..  1   30.5   30.52   0.432  0.522
## Residuals                           14  989.2   70.66

# p value > 0.05, we accept null hypothesis
# Hence, age and the pocket friendliness does not affect their watching shows on Netflix



# Q10 = Does age affect the platform people use to watch?


# we will do anova because there is one numeric and one categorical with more than 2 levels
# Null hypothesis = No, age does not affect the platform people use to watch
# Alternate hypothesis = Yes, age has an affect on the platform people use to watch

anova6 = aov(ott$Age~ott$Which.Platform.do.you.use.to.Binge.watch..)
summary(anova6)

##                                        Df Sum Sq Mean Sq F value
## ott$Which.Platform.do.you.use.to.Binge.watch..   1     61   60.66   0.526
## Residuals                              102  11758  115.28
##                                       Pr(>F)
## ott$Which.Platform.do.you.use.to.Binge.watch..   0.47
## Residuals

# p value > 0.05, we accept null hypothesis
# Hence, age does not affect the platform people use to watch
```

Conclusion

To conclude we can say that the post-COVID scenario for the media and entertainment industry is expected to be that of increased digital integration into everyday life with short-term and long-term impact on consumer behaviour. The psychosocial fallout of the pandemic is yet to be ascertained, however, it is not without reason to assume that previous models of entertainment such as crowded events, gatherings, movie theatres, concerts are likely to be avoided until trust in such interactions is restored. Meanwhile, the stage is being set for a new battle of dominance amongst streaming services, gaming platforms and other forms of at-home entertainment services.

Relationship Between Sleep Patterns and Productivity

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Abstract

This study has been evoked, with the simple idea of enhancing Human Genius and Productivity, for those who wish to tap into their most optimum capacity for better performance. A comprehensive field of study has been generated by gathering Primary Data as a Source of evidence to conclude upon.

The main purpose of gathering this initial primary evidence is to determine whether various variables have a direct positive result on the productivity of the individual with respect to their work requirements and overall performance. Studies have proven to show that sleep does have several underlying dependent variables ranging from Mental Health to Immunity, as well as Muscle Building.

People who can effectively control their sleep cycle essentially command the power to structure their life best required to face the external situations. As a result of enhanced understanding of their own physical and mental faculties which are very much capable of being controlled by them, one can be elevated to enable room for Holistic Growth and Development.

Also, This specific research is focused to eliminate any amount of unrequited nocturnal awakenings and its correlation to productivity levels, to recommend to our diverse population if it is ill-advised against their best interests. As many people suffering from

regular sleep loss are not fully aware of it, and many do not realize that they are victims of lack of sleep and continue to remain blind to what it will cost.

Essentially, it formulates such a pertinent part of our lives that mismanagement causing sleep deprivation, which can be associated with shortening span of attention, slower motor functions, higher reaction time, memory loss, extended periods of information processing, and decision-making also leading to Degenerative diseases such as Dementia, Alzheimer in advanced stages. With more of instability portrayed in the matters of sleep, individuals demonstrate poorer performance despite their best efforts and they may claim indifference or ignorance towards the outcomes of their decreased performance levels.

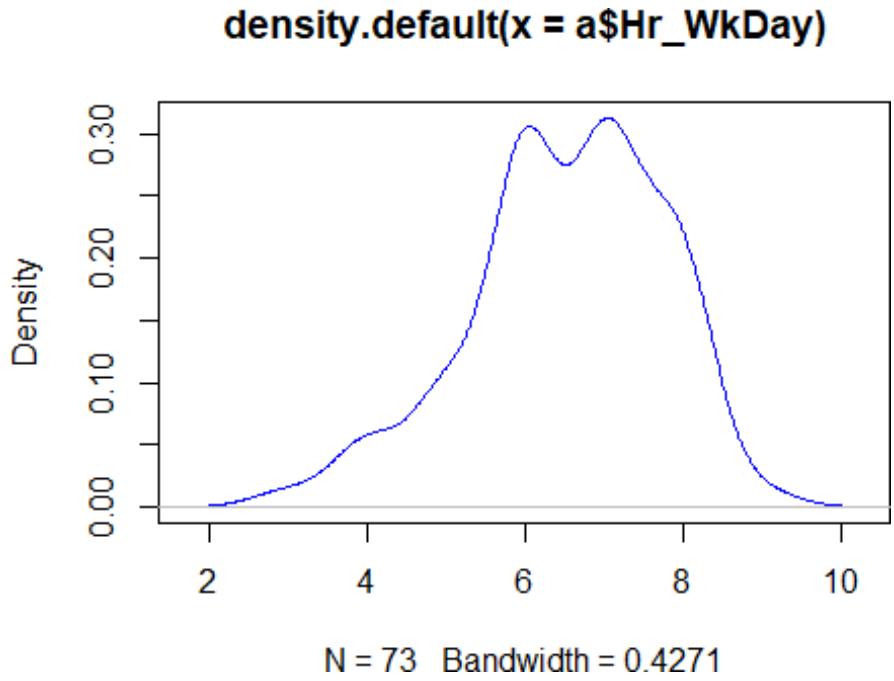
On the other hand, more than required sleep invokes lethargy and laziness and as a result, also tends to negatively impact productivity. Thus we aim to optimize a state which can be achieved by just the right amount of sleep requirements and consistent sleep cycles sustained.

Through our work, we aim to create *Recommendation Models* which are going to be classified as per the requirements of the majority seeking the “Greater Good” as well as individual recommendations models which can be tailored to suit individual productivity requirements.

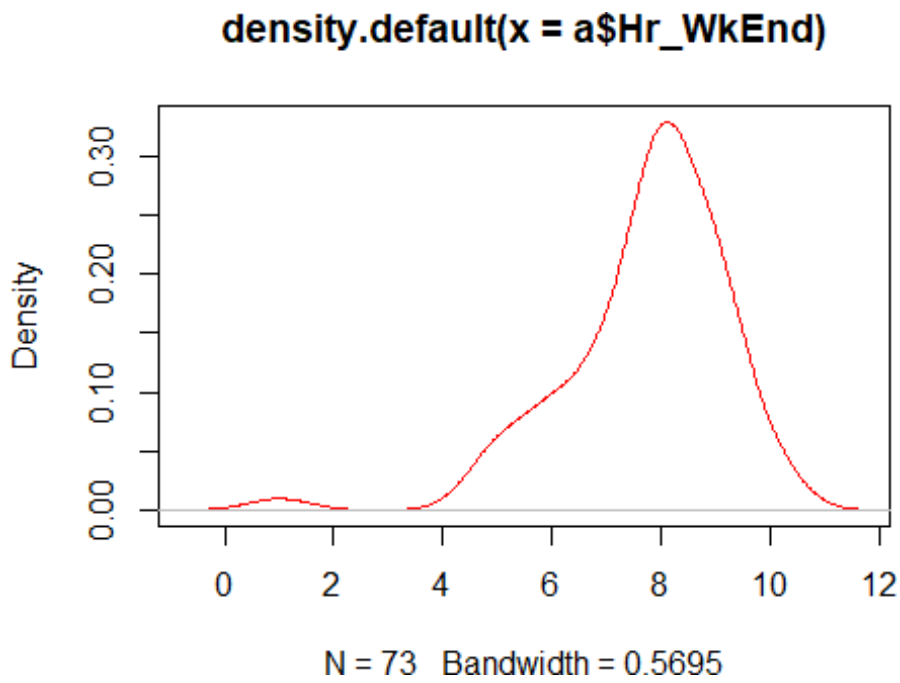
This study is aimed at the collection of data to determine the relationship, between Sleep Patterns and the productive capabilities of an individual and develop a prescriptive model to optimize sleep patterns based on required levels of productivity based on various controllable personal characteristics.

Analysis and Interpretation of Primary Data Using R

```
a=read.csv("SleepData_Analysis.csv")
a=a[1:73,]
str(a)

## 'data.frame':        73 obs. of  11 variables:
##  $ Gender      : int  1 2 1 2 2 1 2 2 1 1 ...
##  $ AgeGroup    : chr  "1" "1" "1" "1" ...
##  $ Profession : int  4 3 3 3 3 2 3 3 3 3 ...
##  $ Hr_WkDay    : num  4 6 7 7 5 5 6 6 6 5 ...
##  $ Q_WkDay     : int  4 4 3 2 5 4 3 3 3 3 ...
##  $ Hr_WkEnd    : int  5 8 9 10 7 6 8 8 5 5 ...
##  $ Q_WkEnd     : int  4 4 2 5 5 4 4 5 5 3 ...
##  $ ActivityLVL: int  2 3 3 3 2 3 2 2 2 2 ...
##  $ Wrkout      : int  3 3 3 3 3 3 4 3 3 4 ...
##  $ Problem     : int  4 4 4 3 3 4 3 4 4 4 ...
##  $ Decision    : int  3 4 4 4 3 1 4 3 4 4 ...

#Computing Various scores from the acquired data
Prod_Scr=(a$Problem+a$Decision)/2  #Productivity  score
Act_Scr=(a$ActivityLVL+a$Wrkout) #Activity Score
Slp_Scr=(a$Hr_WkDay*a$Q_WkDay+a$Q_WkEnd*a$Hr_WkEnd)/(a$Q_WkDay+a$Q_WkEnd)
#Sleep  Score

#Data Visualisation
plot(density(a$Hr_WkDay), col='blue')
```

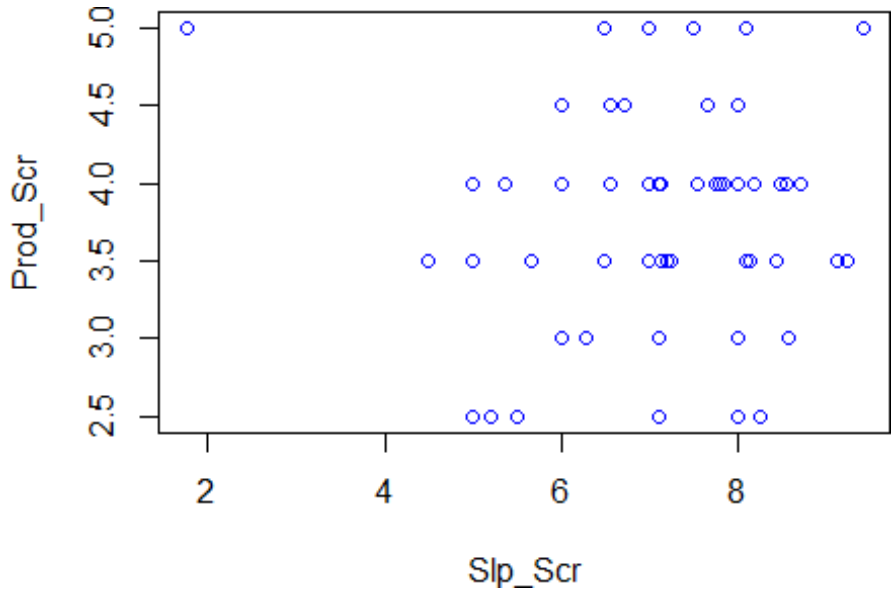


```
#Data Visualisation
plot(density(a$Hr_WkEnd), col='Red') #normal  distribution
```

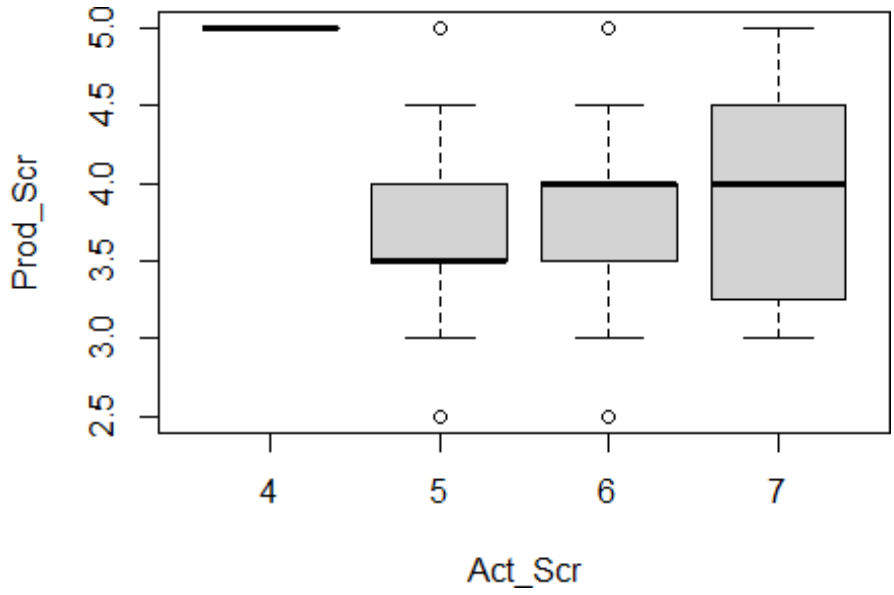



```
#Ho: There is no significant difference between the mean sleep hours betwe
en  genders
t.test(a$Hr_WkDay~as.factor(a$Gender))

##
##   Welch Two Sample t-test
##
##  data:   a$Hr_WkDay by as.factor(a$Gender)
## t  = 0.16387, df = 70.197, p-value = 0.8703
##  alternative hypothesis: true difference in means  is not equal to 0
## 95 percent confidence interval:
##   -0.5138773   0.6058833
## sample estimates:
## mean in group 1 mean in group 2
##            6.558824            6.512821

#As p>0.05, we accept null hypothesis
#We conclude that here is no significant difference between the mean sleep
hours between genders

#Ho: There is no significant difference between the mean sleep hours betwe
en  genders
t.test(a$Hr_WkEnd~as.factor(a$Gender))

##
##   Welch Two Sample t-test
##
```

```
## data:  a$Hr_WkEnd by as.factor(a$Gender)
## t = -0.58055, df = 70.916, p-value = 0.5634
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.8996328  0.4939013
## sample estimates:
## mean in group 1 mean in group 2
##        7.617647        7.820513

#Ho: There is no significant difference between the mean sleep hours betwe
en  genders
#As p<0.05, we reject null hypothesis
#We conclude that there is a difference in the means  of sleep hours betwee
n  genders

#Ho: There is no significant association between sleep and productivity
chisq.test(Slp_Scr,Prod_Scr)

## Warning in chisq.test(Slp_Scr, Prod_Scr): Chi-squared approximation may
be
## incorrect

##
##  Pearson's Chi-squared test
##
## data:  Slp_Scr and Prod_Scr
## X-squared = 207.49, df = 175, p-value = 0.04701

#As p<0.05, we reject Null hypothesis
#We conclude that there is significant association between sleep and produ
ctivity

plot(Prod_Scr~Slp_Scr,col="Blue")
```




```
#Ho: There is no significant difference between various levels of activity
and productivity
chisq.test(Act_Scr,Prod_Scr)

## Warning in chisq.test(Act_Scr, Prod_Scr): Chi-squared approximation may
be
## incorrect

##
##   Pearson's Chi-squared test
##
##  data:   Act_Scr and Prod_Scr
## X-squared = 29.896, df = 15, p-value = 0.0123

#AS p<0.05, we reject null hypothesis
#We conclude that there is a difference between various levels of activity
and productivity


boxplot(Prod_Scr~Act_Scr)
```




```
scatter.smooth(Slp_Scr,Prod_Scr)
```

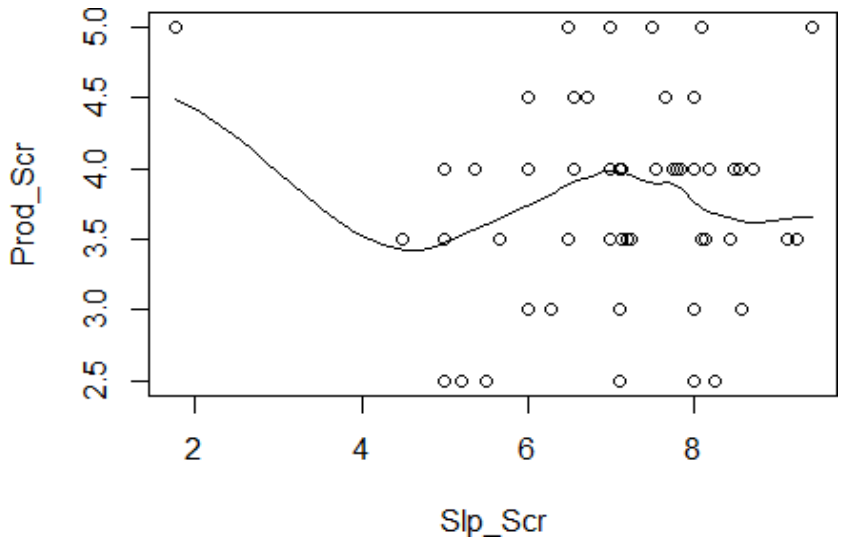


Figure 1

```
scatter.smooth(Act_Scr,Prod_Scr)
```

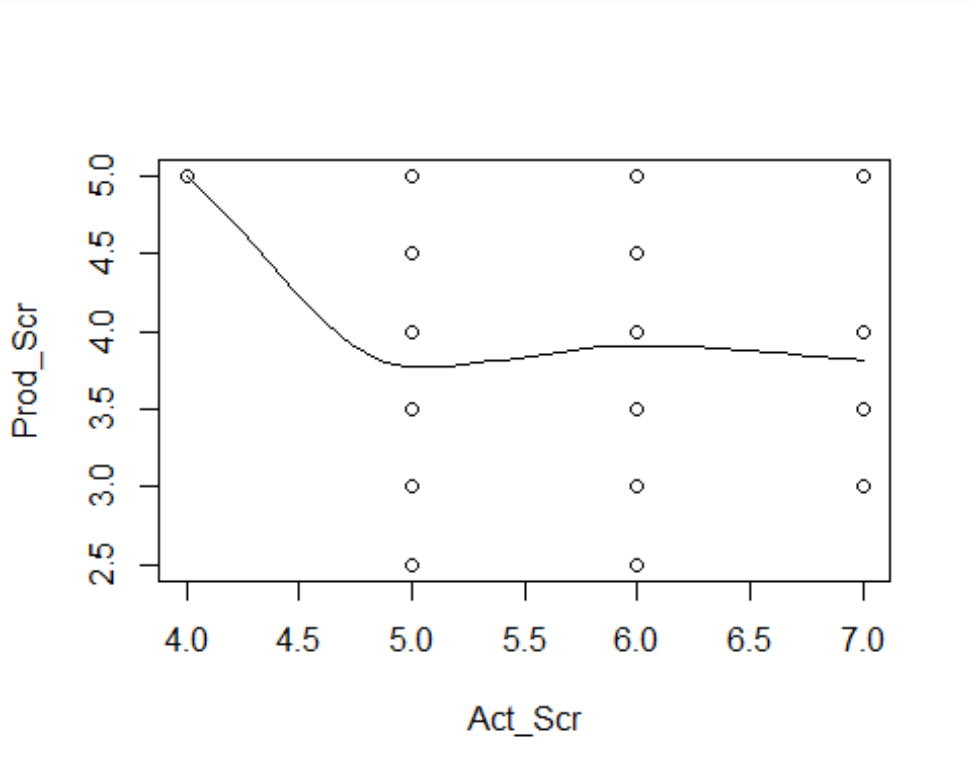


Figure 2

Conclusion

Upon computation of various analysis, we conclude that productivity is affected by their respective quantity and quality of sleep and their activity levels which consists of workouts as well. Based on the primary data collated it was observed that there exists a significant association between the determined "Sleep Score" and "Productivity Levels". Figure 1 depicts the output of a regression model which takes into account the sleep score as an independent variable to predict the productivity levels as was actually obtained from the survey. Similarly, it was also discovered that there exists significant association between the determined activity score and the productivity levels. The model output of which is depicted in Figure 2.

From Figure 1 it was determined that in order to achieve higher levels of productivity our analysis recommends a sleep duration between *six to eight hours* consistently during weekdays and weekends.

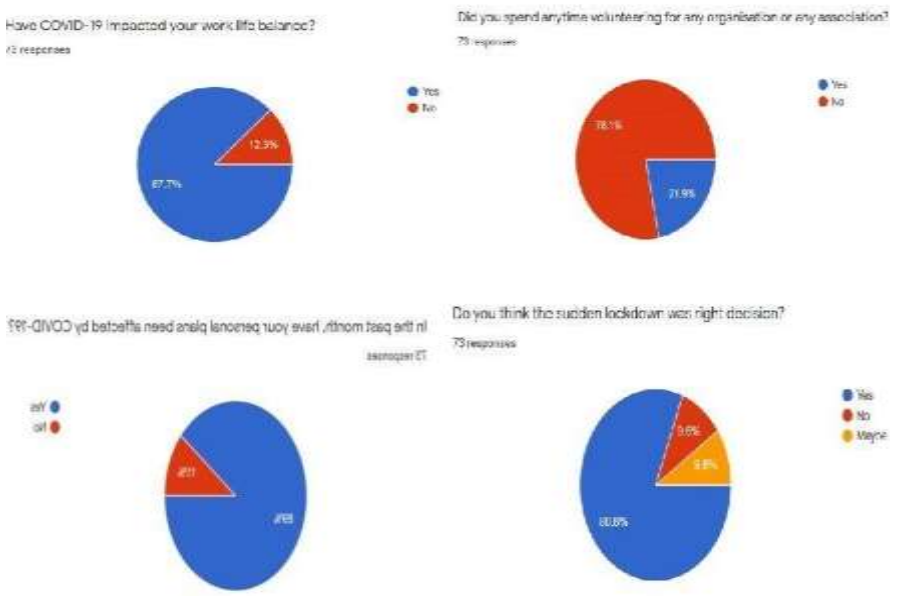
Further research is needed to make Recommendation Model capable of giving a prescription to individuals based on controllable characteristics such as Sleep Duration, Levels of Physical Exertion that can be extrapolated to include the masses for the *"Greater Good".*

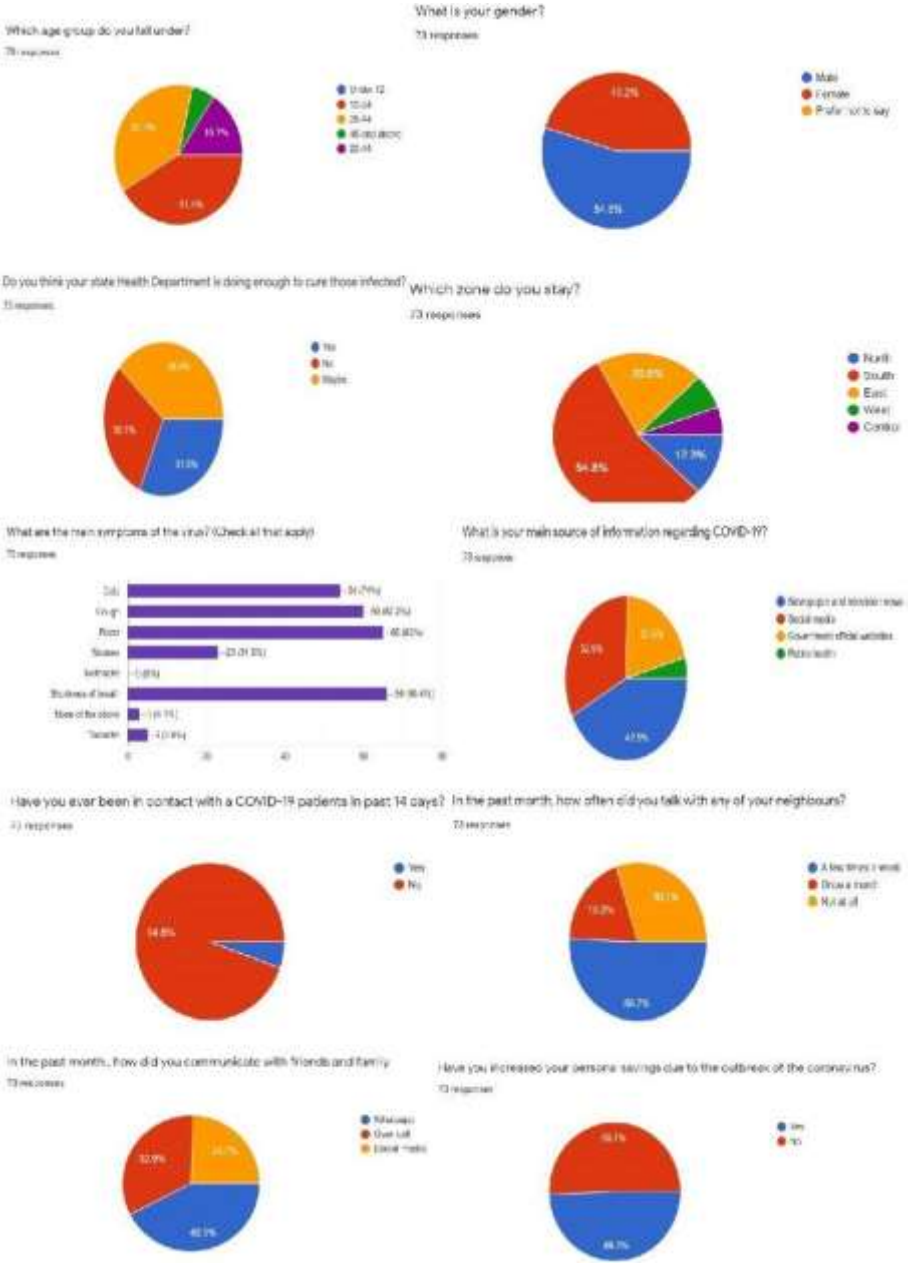
COVID-19 Awareness

Submitted By-
Devi Prasad
Gaurav Maurya
Nikunj Marda

Introduction

Coronaviruses are a large family of viruses which may cause illness in animals or humans. This new virus and disease were unknown before the outbreak began in Wuhan, China, in December 2019. COVID-19 is now a pandemic affecting many countries globally. Most common symptoms of COVID- 19 are fever, dry cough, and tiredness. Other symptoms that are less common and may affect some patients include aches and pains, nasal congestion, headache, conjunctivitis, sore throat, diarrhoea, loss of taste or smell or a rash on skin or discoloration of fingers or toes. These symptoms are usually mild and begin gradually. Some people become infected but only have very mild symptoms. People can catch COVID-19 from others who have the virus. The disease spreads primarily from person to person through small droplets from the nose or mouth, which are expelled when a person with COVID- 19 coughs, sneezes, or speaks. Based on the information we have prepared a questionnaire here we have asked multiple questions regarding awareness of coronavirus.




What is your gender?
Male
Female
Which zone do you stay?
North
South
East
West
Central
What is your main source of information regarding COVID-19?
Have you ever been in contact with a COVID-19 patients in past 14 days?
Yes
No
In the past month, how often did you talk with any of your neighbours?
In the past month, how did you communicate with friends and family
Have you increased your personal savings due to the outbreak of the coronavirus?

Based on the output we have made certain **hypothesis** using R studio.

Before answering questions we have made certain **assumptions** which are as follows:-

- AGE as a factor

```
AGE = as.factor(c("under 12","12 to 24","25 to 44","45 and above"))
AGE
Z=factor(AGE,order=TRUE,levels = c("under 12","12 to 24","25 to 44","45 and above") )
Z
```

- SEX as a factor

```
SEX = as.factor(c("Male","Female"))
SEX
x=factor(SEX,order=TRUE,levels = c("Male","Female") )
x
```

- SAVINGS as a factor

```
SAVINGS = as.factor(c("yes", "no"))
SAVINGS
a=factor(SAVINGS,order=TRUE,levels = c("yes", "no") )
a
```

- ZONE as a factor

```
,
ZONE = as.factor(c("north","south","east","west","central"))
ZONE
y=factor(ZONE,order=TRUE,levels = c("north","south","east","west","central") )
y
```

After making assumptions here are some questions answered below:-

(We have taken the confidence interval as 0.95)

1. Is Aarogya setu app helpful?

```
chisq.test(crd$Is.Aarogya.setu.app.helpful,crd$What.is.your.gender)
```

Output- *There is no relationship between the usefulness of Arogya setu app and gender as p is more than 0.05*

```
        Pearson's Chi-squared test with Yates' continuity correction

data:  crd$Is.Aarogya.setu.app.helpful and crd$What.is.your.gender
X-squared = 0.97037, df = 1, p-value = 0.3246
```

2. Have you increased your personal savings due to the outbreak of the coronavirus?

```
chisq.test(crd$Have.you.increased.your.personal.savings.due.to.the.outbreak.of.the.coronavirus,crd$What.is.your.gender)
```

Output- *There is no relationship between the increase in savings and gender as p is more than 0.05*

```
        Pearson's Chi-squared test with Yates' continuity correction

data:  crd$Have.you.increased.your.personal.savings.due.to.the.outbreak.of.the.coronavirus and crd$What.i
s.your.gender
X-squared = 0.13254, df = 1, p-value = 0.7158
```

3. Did you spend anytime volunteering for any organisation or any association?

```
chisq.test(crd$Did.you.spend.anytime.volunteering.for.any.organisation.or.any.association,crd$What.is.your.gender)
```

Output- *There is no relationship between the time spent in volunteering and gender as p is more than 0.05*

```
        Pearson's Chi-squared test with Yates' continuity correction

data:  crd$Did.you.spend.anytime.volunteering.for.any.organisation.or.any.association and crd$What.is.you
r.gender
X-squared = 0.023058, df = 1, p-value = 0.8793
```

4. Do you think the sudden lockdown was right decision?

```
69 chisq.test(crd$Do.you.think.the.sudden.lockdown.was.right.decision,crd$which.zone.do.you.stay)
70
71
```

Output- *There is no relationship between the sudden lockdown and the zone where you stay as p is more than 0.05*

```
        Pearson's Chi-squared test

data:  crd$Do.you.think.the.sudden.lockdown.was.right.decision and crd$which.zone.do.you.stay
X-squared = 14.951, df = 8, p-value = 0.06011
```

5. Do you think your state Health Department is doing enough to cure those infected?

```
64
65 # health department
66 chisq.test(crd$Do.you.think.your.state..Health.Department.is.doing.enough.to.cure.those.infected,crd$
67
68
69
70
```

Output- *There is no relationship between the health department role and the zone where people stay.*

```
        Pearson's Chi-squared test

data:  crd$Do.you.think.your.state..Health.Department.is.doing.enough.to.cure.those.infected and crd$whic
h.zone.do.you.stay
X-squared = 10.247, df = 8, p-value = 0.2481
```

From the above we can conclude that there are many things that are impacted due to outbreak of coronavirus but not all of them are related to each other as seen from the above available output.

Impact of Vegetarianism on Millennials and Gen Z

Submitted By-
Dharshini M
M Anusha
Alstrin Cyrus

```
getwd()
```

```
## [1] "C:/Users/Anusha/Documents/R 4th trimester"
```

```
setwd("C:/Users/Anusha/Documents/R 4th trimester")
Impact<-read.csv("Impact of Vegetarianism on Millennials and Gen Z.csv")
View(Impact)
#IMPACT OF VEGETARIANISM ON MILLENNIALS AND GEN Z

# INTRODUCTION:

# The main  aim of this survey is to understand the impact of
vegetarianism in the different age groups.
# This survey was answered by 85 people  where the majority were
millennials and Gen Z.
# We have taken various factors which helped us derive answers based on
this survey.
# The results of the survey are then compiled and interpreted in R.



# 1) Does region influence availability of vegan food?
# Ho: region does not influence availability of vegan food
# H1: region does influence availability of vegan food

region<-
aov(Impact$Region~Impact$Question8..Hw.easy.do.you.find.buying.vegan.food.
.)
summary(region)
```

```
##                                                                 Df Sum Sq
Mean Sq
## Impact$Question8..Hw.easy.do.you.find.buying.vegan.food..  1   0.22
0.224
## Residuals                                                 83  32.95
0.397
##                                                                 F value
Pr(>F)
## Impact$Question8..Hw.easy.do.you.find.buying.vegan.food..   0.564
0.455
## Residuals
```

```
# With 95% confidence interval and p- value being 0.455 which is Greater
than 0.05 so we accept null hypothesis.
# Therefore based on our survey region does not influence availability of
vegan food.

# 2) Does cultural upbringing affect diet?
# H0: Cultural upbringing does not affect diet
# H1:  Cultural upbringing does affect diet

chisq.test(Impact$Question4.What.s.your.diet.,
Impact$Question6.Culture.upbringing)
```

```
## Warning in chisq.test(Impact$Question4.What.s.your.diet.,
## Impact$Question6.Culture.upbringing): Chi-squared approximation may be
incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  Impact$Question4.What.s.your.diet. and
Impact$Question6.Culture.upbringing
## X-squared = 28.688, df = 16, p-value = 0.02613
```

```
# With 95% confidence interval and p- value being 0.026 which is lesser
than 0.05 so we do not accept null hypothesis.
# Therefore based on our survey Cultural upbringing does affect a person's
diet.

# 3) Does eating meat often relate with animal welfare?
# H0: eating meat often does not relate with animal welfare
# H1: eating meat often does relate with animal welfare

chisq.test(Impact$Question5..ow..Often.do.you.eat.meat.,
Impact$Question6.Animal.welfare)
```

```
## Warning in chisq.test(Impact$Question5..ow..Often.do.you.eat.meat.,
## Impact$Question6.Animal.welfare): Chi-squared approximation may be
incorrect
```

```
##
##  Pearson's Chi-squared test
##
## data:  Impact$Question5..ow..Often.do.you.eat.meat. and
```

```
Impact$Question6.Animal.welfare
## X-squared = 37.838, df = 16, p-value = 0.001596

# With 95% confidence interval and p- value being 0.001596 which is lesser
than 0.05 so we do not accept null hypothesis.
# Therefore based on our survey eating meat often relate with animal
welfare.

# 4) Do people speak to others about taking vegan diet based on their
environmental concerns?
# H0: people do not speak to others about taking vegan diet based on their
environmental concerns
# H1: people speak to others about taking vegan diet based on their
environmental concerns

chisq.test(Impact$Question7.How.often.do.you.speak.to.others.about.taking.
a.vegan.diet., Impact$Question6.Environmental.concerns)

## Warning in
##
chisq.test(Impact$Question7.How.often.do.you.speak.to.others.about.taking.
a.vegan.diet., :
## Chi-squared approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:
Impact$Question7.How.often.do.you.speak.to.others.about.taking.a.vegan.die
t. and Impact$Question6.Environmental.concerns
## X-squared = 12.644, df = 16, p-value = 0.6986

# With 95% confidence interval and p- value being 0.6986 which is greater
than 0.05 so we accept null hypothesis.
# Therefore based on our survey people do not speak to others about taking
vegan diet based on their environmental concerns.

# 5) Does Region affect the restaurant supply of vegan food ?
# H0: region does not affect restaurant supply of vegan food
# H1: region does affect restaurant supply of vegan food

chisq.test(Impact$Region,Impact$Question9.Restaurants.supply.sufficient.am
ount.of.vegan.food)

## Warning in chisq.test(Impact$Region,
## Impact$Question9.Restaurants.supply.sufficient.amount.of.vegan.food):
Chi-
## squared approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  Impact$Region and
Impact$Question9.Restaurants.supply.sufficient.amount.of.vegan.food
## X-squared = 8.6879, df = 8, p-value = 0.3693
```

```
# With 95% confidence interval and p- value being 0.3693 which is greater
than 0.05 so we accept null hypothesis.
# Therefore based on our survey region does not affect restaurant supply
of vegan food.

# 6) Does age affect people's thought on veganism being a healthier
option?
# H0: Age does not affect people's thought on veganism being a healthier
option
# H1: Age does affect people's thought on veganism being a healthier
option

Veganism<-
aov(Impact$Age~Impact$Question9.vegetarianism.is.a.healthier.option)
summary(Veganism)

##                                                   Df Sum Sq Mean Sq
F value
## Impact$Question9.vegetarianism.is.a.healthier.option  1    0.1   0.073
0.007
## Residuals                                           83  900.8  10.852
##                                                   Pr(>F)
## Impact$Question9.vegetarianism.is.a.healthier.option  0.935
## Residuals

# Since p- value being 0.935 which is greater than 0.05 so we accept null
hypothesis.
# Therefore based on our survey Age does not affect people's thought on
veganism being a healthier option.

# 7) Does diet have an influence on individual's  allergies ?
# H0: diet does not have an influence on individual's  allergies
# H1: diet has an influence on individual's  allergies

chisq.test(Impact$Question4.What.s.your.diet.,Impact$Question6.Allergies)

## Warning in chisq.test(Impact$Question4.What.s.your.diet.,
## Impact$Question6.Allergies): Chi-squared approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  Impact$Question4.What.s.your.diet. and
Impact$Question6.Allergies
## X-squared = 30.831, df = 16, p-value = 0.01414

# With 95% confidence interval and p- value being 0.01414 which is lesser
than 0.05 so we do not accept null hypothesis.
# Therefore based on our survey diet has an influence on individual's
allergies.

# 8) Does expensive vegan products have an influence on diet?
# H0: expensive vegan products do not have an influence on diet
# H1:expensive vegan products have an influence on diet
```

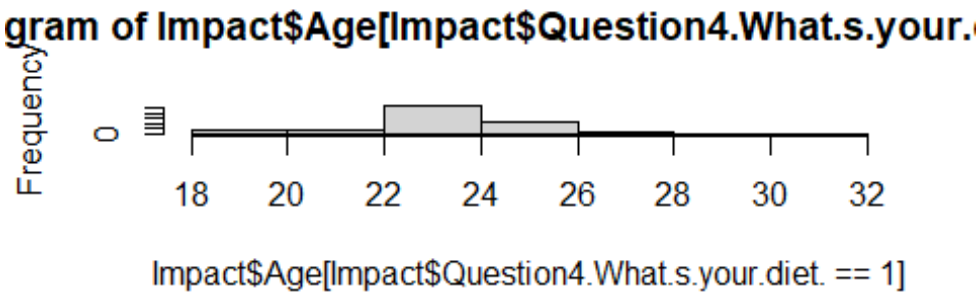
```
expense<-
aov(Impact$Question4.What.s.your.diet.~Impact$Question9.Vegan.products.are
.expensive.than.other.products.)
summary(expense)
```

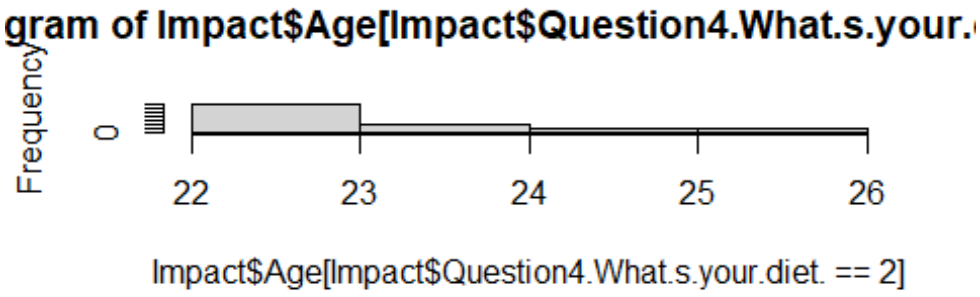
```
##                                                                    Df
Sum Sq
## Impact$Question9.Vegan.products.are.expensive.than.other.products.  1
1.50
## Residuals                                                          83
99.49
##                                                                    Mean
Sq
## Impact$Question9.Vegan.products.are.expensive.than.other.products.
1.499
## Residuals
1.199
##                                                                    F
value
## Impact$Question9.Vegan.products.are.expensive.than.other.products.
1.251
## Residuals
##
Pr(>F)
## Impact$Question9.Vegan.products.are.expensive.than.other.products.
0.267
## Residuals
```

```
#Since p- value being 0.267 which is greater than 0.05 so we accept null
hypothesis.
# Therefore based on our survey expensive vegan products do not have an
influence on diet.

# 9) Does age affect diet?
# H0:Age does not affect diet
# H1:Age affects diet

diet<-aov(Impact$Age~Impact$Question4.What.s.your.diet.)
summary(diet)
```

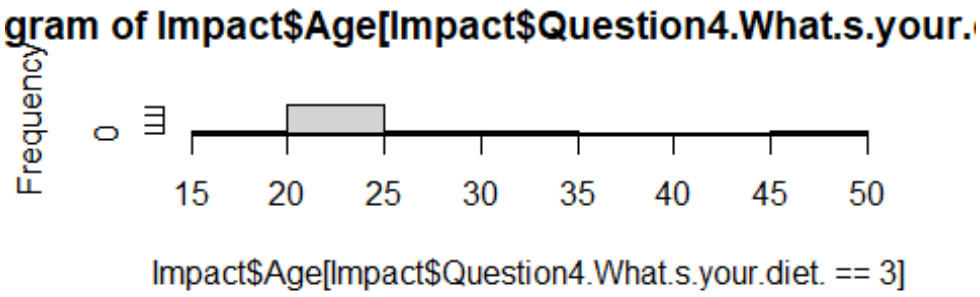
```
##                                   Df Sum Sq Mean Sq F value Pr(>F)
## Impact$Question4.What.s.your.diet.  1    4.7   4.742   0.439  0.509
## Residuals                          83  896.1  10.796
```

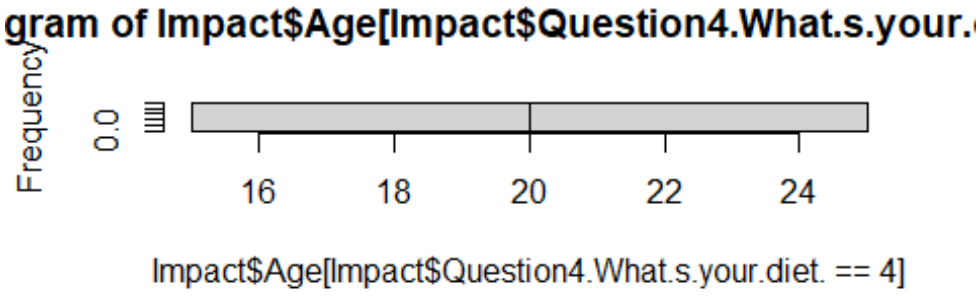
```
# With 95% confidence interval and p- value being 0.509 which is Greater
than 0.05 so we accept null hypothesis.
# Therefore based on our survey age does not affect diet.

# Histogram for age and diet:
par(mfrow=c(2,1))
hist(Impact$Age[Impact$Question4.What.s.your.diet.==1])
hist(Impact$Age[Impact$Question4.What.s.your.diet.==2])
```





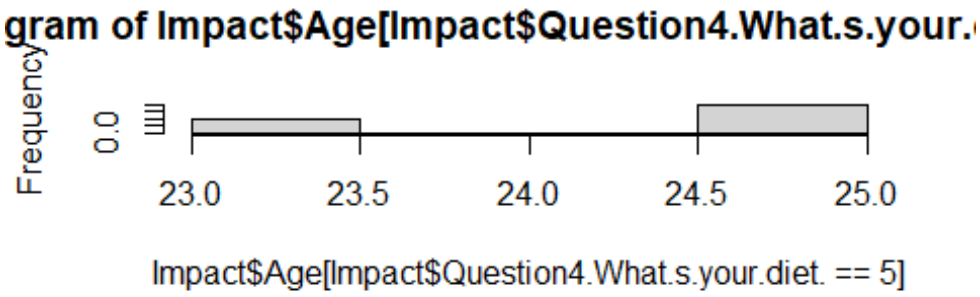

```
hist(Impact$Age[Impact$Question4.What.s.your.diet.==3])
hist(Impact$Age[Impact$Question4.What.s.your.diet.==4])
```






```
hist(Impact$Age[Impact$Question4.What.s.your.diet.==5])


# CONCLUSION:
```

```
# From the sample group that has taken this survey,
# we have concluded that there might be an increased knowledge on
vegetarianism among millennials and gen Z.
# But still the people following vegetarianism in this category is
relatively low.
# Since this survey is taken only for a small sample group the results may
not be accurate on a larger scale.
```



Impact of Knowledge Management on IT Employees

Submitted By-
Doel Bhattacharya
Kaushik Jyoti Talukdar

Introduction:

This study emphasizes the impact of Knowledge Management on IT employees. In this research we have incorporated quantitative analysis by performing various hypothesis testing in order to understand the impact of various attributes such as virtual platform experience, liberty to access details from said department, senior leadership support, constructive feedback, customer service, new learning, business strategy, knowledge transfer and self-upskilling on knowledge management for IT employees.

Challenges:

- Improper selection of knowledge management tool
- Technical problems
- Lack of experience for conducting knowledge transfer session
- Lack of Senior leadership support

Importance:

Process of knowledge transfer at different level of analysis are

- Individual level: Human resource is agent of learning.
- Network level: Structural position of firm relative to other network members.

Business strategy factors that drive knowledge management are competitor knowledge advantage, learning cycles and rate of dynamic learning and competitor learning cycles

Methodology:

Quantitative analysis has been done by conducting various hypothesis testing. Data collection has been done by making use of questionnaire survey from 62 IT employees with the help of google form survey.

Hypothesis Testing:

- Annova Test (One numeric, one categorical for more than two levels)
- Chi Square Test: Test of independence (Two Categorical variables)

Interpretation and Output:

```
setwd("C:/Users/kaush/OneDrive/Documents/R")
km<-read.csv("Knowledge_management.csv")

str(km)

## 'data.frame':    62 obs. of  21 variables:
##  $ Age                 : int  35 23 27 26 31 25 25 31 32 34 ...
##  $ Exp                 : int  1 4 5 5 2 4 2 4 4 4 ...
##  $ Gender               : chr  "Male" "Male" "Female" "Male" ...
##  $ Kmdep                : chr  "Yes" "Yes" "Yes" "Yes" ...
##  $ Decisionmaking        : chr  "Agree" "Strongly Agree" "Agree" "Agree" ...
##  $ libertytoaccess       : chr  "Agree" "Agree" "Disagree" "Strongly Agree" ...
##  $ Virtualplatformexp    : chr  "Satisfied" "Satisfied" "Satisfied" "Dissatisfied" ...
##  $ Seniorleadershipsupport: chr  "Agree" "Strongly Agree" "Agree" "Strongly Agree" ...
##  $ Constructivefeedback   : chr  "Neutral" "Strongly Agree" "Neutral" "Agree" ...
##  $ Customerservice       : chr  "Neutral" "Strongly Agree" "Disagree" "Strongly Agree" ...
##  $ Newlearning           : chr  "Agree" "Agree" "Agree" "Strongly Agree" ...
##  $ budgetallocation      : int  30 50 30 15 30 15 50 30 30 70 ...
##  $ Businessstrategy      : chr  "Agree" "Agree" "Agree" "Strongly Agree" ...
##  $ Knowledgetransfer     : chr  "Agree" "Agree" "Agree" "Agree" ...
##  $ Customerfocus         : chr  "Agree" "Agree" "Agree" "Strongly Agree" ...
##  $ Selfupskilling        : chr  "Disagree" "Agree" "Neutral" "Strongly Agree" ...
##  $ Improperselection     : chr  "Agree" "Agree" "Agree" "Disagree" ...
##  $ Technicalproblem      : chr  "Strongly Agree" "Strongly Agree" "Agree" "Agree" ...
##  $ productivity          : chr  "Strongly Agree" "Strongly Agree" "Strongly Agree" "Strongly Agree"
...
##  $ KMservice             : chr  "Strongly Agree" "Strongly Agree" "Strongly Agree" "Strongly Agree
" ...
##  $ overallproductivity   : chr  "Strongly Agree" "Agree" "Strongly Agree" "Strongly Agree" ...

summary(km)

##       Age             Exp           Gender             Kmdep
##  Min.   :20.00   Min.   :1.000   Length:62          Length:62
##  1st Qu.:22.25   1st Qu.:2.000   Class :character   Class :character
##  Median :27.00   Median :4.000   Mode  :character   Mode  :character
##  Mean   :27.15   Mean   :3.403
##  3rd Qu.:31.00   3rd Qu.:4.000
##  Max.   :35.00   Max.   :5.000
##  Decisionmaking     libertytoaccess    Virtualplatformexp
##  Length:62          Length:62          Length:62
##  Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character
##
```

```
##
##
##  Seniorleadershipsupport Constructivefeedback Customerservice
##  Length:62               Length:62            Length:62
##  Class :character        Class :character     Class :character
##  Mode  :character        Mode  :character     Mode  :character
##
##
##
##  Newlearning        budgetallocation Businessstrategy   Knowledgetransfer
##  Length:62          Min.   :15.00    Length:62          Length:62
##  Class :character   1st Qu.:15.00    Class :character   Class :character
##  Mode  :character   Median :30.00    Mode  :character   Mode  :character
##                     Mean   :38.15
##                     3rd Qu.:50.00
##                     Max.   :90.00
##  Customerfocus      Selfupskilling     Improperselection  Technicalproblem
##  Length:62          Length:62          Length:62          Length:62
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##
##
##
##  productivity       KMservice          overallproductivity
##  Length:62          Length:62          Length:62
##  Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character
##
##
##
```

```
Gender = as.factor(c("Male","Female"))
Gender
```

```
## [1] Male   Female
## Levels: Female Male
```

```
x=factor(Gender,order=TRUE,levels = c("Male","Female") )
x
```

```
## [1] Male   Female
## Levels: Male < Female
```

```
Virtualplatformexp = as.factor(c("Extremely dissatisfied","Dissatisfied","Neutral","Satisfied","Very Satisfied"))
Virtualplatformexp
```

```
## [1] Extremely dissatisfied Dissatisfied           Neutral
## [4] Satisfied              Very Satisfied
## 5 Levels: Dissatisfied Extremely dissatisfied Neutral ... Very Satisfied
```

```
y=factor(Virtualplatformexp,order=TRUE,levels = c("Extremely dissatisfied","Dissatisfied","Neutral","Satisfied","Very Satisfied"))
y
```

```
## [1] Extremely dissatisfied Dissatisfied          Neutral
## [4] Satisfied              Very Satisfied
## 5 Levels: Extremely dissatisfied < Dissatisfied < Neutral < ... < Very Satisfied

Knowledgetransfer = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly Agree"
))
Knowledgetransfer

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree

z=factor(Knowledgetransfer,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral","Agre
e","Strongly Agree"))
z

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

overallproductivity = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly Agree"
))
overallproductivity

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree

a=factor(overallproductivity,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral","Agre
e","Strongly Agree"))
a

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

Customerfocus = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly Agree"))
Customerfocus

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree

b=factor(Customerfocus,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral","Agree","
Strongly Agree"))
b

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

Businessstrategy = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly Agree"))
Businessstrategy

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree
```

```
c=factor(Businessstrategy,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral","Agree"
,"Strongly Agree"))
c

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

Seniorleadershipsupport = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly A
gree"))
Seniorleadershipsupport

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree

d=factor(Seniorleadershipsupport,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral",
"Agree","Strongly Agree"))
d

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

Selfupskilling = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly Agree"))
Selfupskilling

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree

e=factor(Selfupskilling,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral","Agree","S
trongly Agree"))
e

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

Constructivefeedback = as.factor(c("Strongly Disagree","Disagree","Neutral","Agree","Strongly Agr
ee"))
Constructivefeedback

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## Levels: Agree Disagree Neutral Strongly Agree Strongly Disagree

f=factor(Constructivefeedback,order=TRUE,levels = c("Strongly Disagree","Disagree","Neutral","A
gree","Strongly Agree"))
f

## [1] Strongly Disagree Disagree          Neutral          Agree
## [5] Strongly Agree
## 5 Levels: Strongly Disagree < Disagree < Neutral < ... < Strongly Agree

#1.
#Does number of years of experience in present organization influences knowledge transfer for knowl
edge management.
```

```
#Null hypothesis: number of years of experience in present organization has no influence on knowled
ge transfer
#Alternate hypothesis: number of years of experience in present organization has influence on knowle
dge transfer
#As in this case we have more than two levels in categorical variable i.e.Knowledge transfer so we us
e Anova Test
#Anova test(One numerical, one categorical for more than two levels)
anv<- aov(km$Exp~km$Knowledgetransfer)
summary(anv)

##                    Df Sum Sq Mean Sq F value Pr(>F)
## km$Knowledgetransfer  3   0.92  0.3059   0.211  0.888
## Residuals            58  84.00  1.4483

#p>0.05 so we accept null hypothesis which explains number of years of experience in present organi
zation has no influence on knowledge transfer



#2.
#Does number of years of experience in present organization influences better productivity in the org
anization
#Null hypothesis:number of years of experience in present organization has no significant influence o
n better productivity in the organization
#Alternate hypothesis:number of years of experience in present organization has significant influence
on better productivity in the organization
#Anova test(One numerical, one categorical for more than two levels)
anv1<- aov(km$Exp~km$overallproductivity)
summary(anv1)

##                       Df Sum Sq Mean Sq F value Pr(>F)
## km$overallproductivity  3   0.40  0.1346   0.092  0.964
## Residuals              58  84.52  1.4572

#p>0.05 so we accept null hypothesis which explains number of years of experience in present organi
zation has no significant influence on better productivity in the organization




#3.
#Does business strategy has association with customer focus strategy for knowledge management of a
n organization
#Null hypothesis:business strategy has no significant association with customer focus strategy for kno
wledge management of an organization
#Alternate hypothesis:business strategy has significant association with customer focus strategy for k
nowledge management of an organization
#Chi Square Test
chisq.test(km$Businessstrategy, km$Customerfocus)

## Warning in chisq.test(km$Businessstrategy, km$Customerfocus): Chi-squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
```

```
## data:  km$Businessstrategy and km$Customerfocus
## X-squared = 46.505, df = 9, p-value = 4.851e-07

#p < 0.05 so we accept alternate hypothesis which explains business strategy has significant associati
on with customer focus strategy for knowledge management of an organization



#4.
#Does number of years of experience in an organization affects senior leadership support for knowled
ge management
#Null hypothesis:number of years of experience in an organization has no significant affect senior lea
dership support for knowledge management
#Alternate hypothesis:number of years of experience in an organization has significant affect senior l
eadership support for knowledge management

#Anova test(One numerical, one categorical for more than two levels)
anv2<- aov(km$Exp~km$Seniorleadershipsupport)
summary(anv2)

##                             Df Sum Sq Mean Sq F value Pr(>F)
## km$Seniorleadershipsupport  3   0.70  0.2329    0.16  0.923
## Residuals                  58  84.22  1.4521

#p>0.05 so we accept null hypothesis which explains number of years of experience in an organizatio
n has no significant affect senior leadership support for knowledge management



#5.
#Does number of years of experience influences the active utilization of self upskilling as a tool for kn
owledge management
#Null hypothesis:number of years of experience has no influence on the active utilization of self upskil
ling as a tool for knowledge management
#Alternate hypothesis:number of years of experience has influence on the active utilization of self ups
killing as a tool for knowledge management
#Anova test(One numerical, one categorical for more than two levels)
anv3<- aov(km$Exp~km$Selfupskilling)
summary(anv3)

##                  Df Sum Sq Mean Sq F value Pr(>F)
## km$Selfupskilling  3   1.79  0.5974   0.417  0.742
## Residuals         58  83.13  1.4332

#p>0.05 so we accept null hypothesis which explains number of years of experience has no influence
on the active utilisation of self upskilling as a tool for knowledge management



#6.
#Is constructive feedback has better association with customer oriented service for driving engageme
nt in the organization
#Null Hypothesis:constructive feedback has no better association with customer oriented service for d
riving engagement in the organization
#Alternate Hypothesis: constructive feedback has better association with customer oriented service fo
r driving engagement in the organization
```

```
#Chi Square Test
chisq.test(km$Constructivefeedback, km$Customerservice)

## Warning in chisq.test(km$Constructivefeedback, km$Customerservice): Chi-squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  km$Constructivefeedback and km$Customerservice
## X-squared = 47.736, df = 12, p-value = 3.475e-06

#p<0.05 we reject null hypothesis and accept alternate hypothesis which explains constructive feedba
ck is better than customer oriented service for driving engagement in the organization



#7.
#Does age of an employee affect productivity of an organisation
#Null Hypothesis:age of an employee has no significant affect on productivity of an organisation
#Alternate Hypothesis:age of an employee has significant affect on productivity of an organisation
#Anova test(One numerical, one categorical for more than two levels)
anv4<- aov(km$Age~km$overallproductivity)
summary(anv4)

##                        Df Sum Sq Mean Sq F value Pr(>F)
## km$overallproductivity  3     59   19.66   0.827  0.484
## Residuals              58   1379   23.77

#p>0.05 so we accept null hypothesis which explains age of an employee has no significant affect on
productivity of an organisation

#8.
#Does budget allocation influences using virtual platform experience
#Null Hypothesis:budget allocation has no significant influence on virtual platform experience
#Alternate Hypothesis:budget allocation has significant influence on virtual platform experience
#Anova test(One numerical, one categorical for more than two levels)
anv5<- aov(km$budgetallocation~km$Virtualplatformexp)
summary(anv5)

##                       Df Sum Sq Mean Sq F value Pr(>F)
## km$Virtualplatformexp  3   2031   677.2   1.323  0.276
## Residuals             58  29680   511.7

#p>0.05 so we accept null hypothesis which explains budget allocation has no significant influence o
n virtual platform experience



#9.
#Does senior leadership influences budget allocation for knowledge management
#Null Hypothesis:senior leadership has no significant influence on budget allocation for knowledge m
anagement
#Alternate Hypothesis:senior leadership has significant influence on budget allocation for knowledge
management
anv6<- aov(km$budgetallocation~km$Seniorleadershipsupport)
summary(anv6)
```

```
##                          Df Sum Sq Mean Sq F value Pr(>F)
## km$Seniorleadershipsupport  3   1930   643.4   1.253  0.299
## Residuals                  58  29782   513.5
```

#p>0.05 so we accept null hypothesis which explains senior leadership has no significant influence o n budget allocation for knowledge management

#10.
#Does Number of years of experience affect Constructive Feedback for Knowledge management?
#Null Hypothesis:Number of years of experience has no affect on Constructive Feedback for Knowled ge management
#Alternate Hypothesis:Number of years of experience affect Constructive Feedback for Knowledge m anagement

```
anv7<- aov(km$Exp~km$Constructivefeedback)
summary(anv7)
```

```
##                          Df Sum Sq Mean Sq F value Pr(>F)
## km$Constructivefeedback  4   3.59  0.8969   0.629  0.644
## Residuals                57  81.33  1.4269
```

#p>0.05 so we accept null hypothesis which explains Number of years of experience has no affect on Constructive Feedback for Knowledge management

R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00
```

Conclusion:

- Number of years of experience in present organization has no influence on knowledge transfer for knowledge management.
- Number of years of experience in present organization has no significant influence on better productivity in the organization
- Business strategy has significant association with customer focus strategy for knowledge management of an organization

- Number of years of experience in an organization has no significant affect senior leadership support for knowledge management
- Number of years of experience has no influence on the active utilization of self-upskilling as a tool for knowledge management
- Constructive feedback is better than customer oriented service for driving engagement in the organization.
- Age of an employee has no significant affect on productivity of an organization
- Budget allocation has no significant influence on virtual platform experience
- Senior leadership has no significant influence on budget allocation for knowledge management
- Number of years of experience has no affect on Constructive Feedback for Knowledge management

Customers View on Changing Trends of Mobile Operators

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Introduction:

Mobile Phone Operators:

A mobile phone operator, wireless provider, mobile telecommunications company that provides wireless Internet GS or carrier is services for mobile device users. The operator gives a SIM card to the customer who inserts it into the mobile device to gain access to the service. There are two types of mobile operators:

- A mobile network operator (MNO) which owns the underlying network and spectrum assets required to run the services.
- A mobile virtual network operator (MVNO) which buys wholesale service from an MNO and sells on to its own customers.

The Role of Mobile Operators:

Mobile operators have the capabilities, the experience and the track record to provide fast and secure authentication. For more than two decades, mobile operators have been authenticating consumers' devices on their networks, securely providing voice calls, messaging, Internet access and other services, while safeguarding consumers' privacy and personal data.

Telecom Companies in India:

- **BSNL:** The Bharat Sanchar Nigam Limited, country's largest cellular service operator was set up in the year 2000. It is a state- owned telecom company with its headquarters located in New Delhi. BSNL is also the largest land line telephone establishment in India.

- **AIRTEL**: Also known as Bharti Airtel Limited was started in July 1995, with its head office based in New Delhi. Airtel runs its operations in as many as 19 countries across the world and is also ranked fifth as telecom service provider globally. As of April 2011, figures show that Airtel has over 164.61 million users which make it the biggest mobile service operator in India. Its service includes both 2G and 3G facilities.
- **RELIANCE JIO**: Also known as Jio was set up in 2016, with its head office in Navi Mumbai. Reliance Communications as of now has more than 128 million users all across the world.
- **VODAFONE:** Vodafone was founded in 1994 with its head office at Mumbai. Vodafone provides services to 23 telecom circles across India. Idea was started in 1995, with its head office in Mumbai. It also provides 3G services to its subscribers. And later they Merged.
- **TELENOR**: This Company is a joint venture between Telenor Group and Unitech Group and was started in 2009.

Dual Sims:

Dual SIM refers to mobile phones that support use of multiple SIM cards. Dual SIM phones are mainstream in many countries where phones are normally sold unlocked. Dual SIMs are popular for separating personal and business calls in locations where lower prices apply to calls between clients of the same provider, where a single network may lack comprehensive coverage, and for travel across national and regional borders.

Minimum Balance:

The telecom companies, backed by TRAI, have made it mandatory to keep a minimum balance of at least Rs 35 to prevent SIM deactivation. To put it simply, you will not only be required to maintain a minimum balance in your bank account but also in your phone's main balance. Of course, the minimum balance recharge will have to be maintained only by prepaid users.

Problem of the Study:

The mobile operators have pulled up warning subscribers of certain plans that their SIM cards would be deactivated if they do not recharge their pre-paid accounts with a fixed minimum balance. So, this makes the users to recharge with a larger amount than usual which is creating problem to many users. Mobile Operators like Airtel, Vodafone Idea have introduced this minimum balance which is indirectly making the users to switch to other networks.

Scope of the Study:

The main aim of the study is to establish a platform to examine the customer preferences for the selected mobile networks.

Principle Objectives of the Study:

- To find the association between occupation and kind of mobile phone used.
- To find the association between gender and method of recharge.
- To find the association between gender and the knowledge about the minimum balance.
- To find the association between gender and satisfaction levels of an individual.

Methodology of the Study:

Chi Square Test: Chi Square Test is a less that involves the use of parameters test the statistical significance of the observation under study. I was denoted by (x 2) and was discovered by "Helvert". In 1876 and was developed by "Karl Pearson". In 1900.The task ofthe Chi square test is to test the statistical significance of the observed relationship with respect to the expected relationship. The chi square statistic is used by the researcher for determining whether or not a relationship exists. The researcher should know that the greater the difference between the observed and expected cell frequency, the larger the value of the chi square statistic in the chi square test. There are varieties of the chi square tests that are used by the researcher. They are cross tabulation, chi square test for the goodness of fit, likelihood ratio test, chi square tests etc.

Definition: The square of normal variate is known as a chi- square variate with 1 degree of freedom. Thus, if $X \sim N(u, \sigma^2)$, then

$Z = ((x-\mu)/\sigma) \sim N(0, 1)$

$Z^2 = ((x-\mu)/\sigma)^2$ is the chi square variate with 1 degrees of freedom.

$X^2 = \Sigma^n i=1 = ((xi-\mu i)/\sigma)^2$ is the Chi-square variate with n degrees of freedom.

In the chi Square test, the null hypothesis is assumed as there not being an association between the two variables that are observed in the study. The chi square test is calculated by evaluating the cell frequencies that involve the expected frequencies in those types of cases when there is no association between the variables. he comparison between the expected frequency and the actual observed frequency is then made in this test.

Calculating of Expected Values:

The computation of the expected frequency square test is calculated as the product of the total number of observations in the row and the column, which is divided by the total size of the sample.

Application of Chi-Square (χ^2) Test:

Chi-Square distribution has number of applications some of which are enumerated below:

- Chi-Square test for goodness of fit.
- Chi-Square for independence of attribute.
- To test if population has specified value of variance (σ^2)

Chi-Square for Goodness of Fit:

- Null Hypothesis: In Chi-Square goodness of fit test, the null hypothesis

assumes that there is no significant difference between the observed and the expected value.

- Alternative Hypothesis: In Chi-Square goodness of fit test, the alternative hypothesis assumes that there is a significant difference between the observed and the expected value.

Compute the value of Chi-Square goodness of fit test using the following formula:

$\chi^2 = \Sigma i \Sigma j((Oij-Eij)/Eij)^2$ where

O_{ij} = observed value E_{ij} =

Expected value

Inference: Compare the table value of chi square for (n-1) degrees of freedom at certain level i.e. 5% or 1%.

- If (χ^2) calculated value is < (χ^2) tab value then it is said to be the distribution is good fit for the data.
- If (χ^2) calculated value is > (χ^2) tab value then it is said to be the distribution is good fit for the data.

Hypothetical Testing:

Table-1

Sex of the respondent Vs Age of respondent

		Age of the Respondent				Total
		0-15	**16-25**	**26-49**	**50 and above**	
Sex of the Respondent	**Female**	0	47	41	14	**102**
	Male	1	58	53	19	**131**
Total		**1**	**105**	**94**	**33**	**233**

- **Null Hypothesis**: There is no association between sex of the respondent and age of the respondent.
- **Alternative Hypothesis**: There is an association between sex of the respondent and age of the respondent.

Chi-Square Test

	Value	Degrees of freedom	Asymp. Sig.(2-sided)
Pearson Chi-Square	0.846	3	0.839
Likelihood Ratio	1.219	3	0.749
Linear- Linear Association	0.013	1	0.911
No of Valid Cases	233		

Inference: Hence the null hypothesis is accepted i.e., there is no association between sex of the respondent and age of the respondent.

Table-2

Qualification of respondent Vs Kind of Mobile

		Kind of Mobile		Total
		Basic	Smart	
Qualification of the Respondent	**Less than or equal to SSC**	20	15	**35**
	Inter	15	34	**49**
	Graduation	6	102	**108**
	PG	5	13	**18**
	Others	9	14	**23**
Total		**55**	**178**	**233**

- **Null Hypothesis**: There is no association between qualification of the respondent and kind of mobile.
- **Alternative Hypothesis**: There is an association between qualification of the respondent and kind of mobile.

Chi-Square Test

	Value	Degrees of freedom	Asymp. Sig.(2-sided)
Pearson Chi-Square	45.924	4	0.000
Likelihood Ratio	48.090	4	0.000

Linear- Linear Association	6.982	1	0.008
No of Valid Cases	233		

Inference: Hence alternative hypothesis is accepted i.e. there is an association between qualification of the respondent and kind of mobile.

Table-3

No. of Sims Vs Kind of Mobile

		Kind of Mobile		Total
		Basic	Smart	
No. of Sims	**1**	44	98	**142**
	2	11	79	**90**
	3	0	1	**1**
Total		**55**	**178**	**233**

- **Null Hypothesis**: There is no association between no. of Sims and kind of mobile.
- **Alternative Hypothesis**: There is an association between no. of Sims and kind of mobile.

Chi-Square Test

	Value	Degrees of freedom	Asymp. Sig.(2-sided)
Pearson Chi-Square	11.065	2	0.004
Likelihood Ratio	12.030	2	0.002
Linear- Linear Association	10.995	1	0.001
No of Valid Cases	233		

Inference: Hence alternative hypothesis is accepted i.e. there is an association between no. of Sims and kind of mobile.

Table-4

Sex of the respondent Vs Minimum Balance

		Minimum Balance		Total
		Yes	No	
Sex of the Respondent	**Female**	16	3	**19**
	Male	19	1	**20**
Total		**35**	**4**	**39**

- **Null Hypothesis**: There is no association between sex of the respondent and minimum balance.
- **Alternative Hypothesis**: There is an association between sex of the respondent and minimum balance.

Chi-Square Test

	Value	Degrees of freedom	Assymp. (2-sided)	Exact Sig.(2-sided)	Exact Sig.(1-sided)
Pearson Chi-Square	1.232	1	0.267		
Continuity Correction	0.339	1	0.560		
Likelihood Ratio	1.278	1	0.258		
Fisher's Exact Test				0.342	0.283
Linear- Linear Association	1.201	1	0.273		
No of Valid Cases	39				

Inference: Hence null hypothesis is accepted i.e. there is no association between sex of respondent and minimum balance.

Table-5

Occupation Vs Method of Recharge

		Method of Recharge		Total
		Outlet	Online	
Occupation	**Employed**	36	68	**104**
	Unemployed	48	81	**129**
Total		**84**	**149**	**233**

- **Null Hypothesis**: There is no association between occupation and method of recharge.
- **Alternative Hypothesis**: There is an association between occupation and method of recharge.

Chi-Square Test

	Value	Degrees of freedom	Assymp. (2-sided)	Exact Sig.(2-sided)	Exact Sig.(1-sided)
Pearson Chi-Square	0.168	1	0.682		
Continuity Correction	0.074	1	0.785		
Likelihood Ratio	0.168	1	0.682		
Fisher's Exact Test				0.784	0.393
Linear- Linear Association	0.167	1	0.683		
No of Valid Cases	233				

Inference: Hence null hypothesis is accepted i.e. there is no association I occupation and method of recharge.

Table-6

Sex of Respondent Vs Minimum Balance Enquiry

		Minimum Balance Enquiry						Total
		0	**Family**	**Friends**	**Op**	**Relatives**	**Others**	
Sex of the Respondent	**Female**	15	28	19	31	1	6	**100**
	Male	19	15	24	57	6	10	**131**
Total		**34**	**43**	**43**	**88**	**7**	**16**	**231**

- **Null Hypothesis:** There is no association between sex of the respondent and minimum balance enquiry.
- **Alternative Hypothesis**: There is an association between sex of the respondent and minimum balance enquiry.

Chi-Square Test

	Value	**Degrees of freedom**	**Asymp. Sig.(2-sided)**
Pearson Chi-Square	13.315	5	0.021
Likelihood Ratio	13.645	5	0.018
Linear- Linear Association	5.350	1	0.021
No of Valid Cases	233		

Inference: Hence alternative hypothesis is accepted i.e. there is no association between sex of respondents and association between sex of respondents and minimum balance.

Table-7

Employment Vs Satisfaction

		Age of the Respondent				Total
		0-15	**16-25**	**26-49**	**50 and above**	
Sex of the Respondent	**Female**	0	47	41	14	**102**
	Male	1	58	53	19	**131**
Total		**1**	**105**	**94**	**33**	**233**

- **Null Hypothesis**: There is no association between employment and satisfaction.
- **Alternative Hypothesis**: There is an association between employment and satisfaction.

Chi-Square Test

	Value	**Degrees of freedom**	**Asymp. Sig.(2-sided)**
Pearson Chi-Square	2.319	2	0.314
Likelihood Ratio	2.343	2	0.310
Linear- Linear Association	1.048	1	0.306
No of Valid Cases	231		

Inference: Hence null hypothesis is accepted i.e. there is no association between employment and satisfaction.

Table-8

Minimum Balance Vs Satisfaction

		Satisfaction			Total
		Yes	**No**	**No Choice**	
Minimum Balance	**No**	39	21	18	**78**
	Yes	102	29	22	**153**
Total		**141**	**50**	**40**	**231**

- **Null Hypothesis**: There is no association between minimum balance and satisfaction.
- **Alternative Hypothesis**: There is an association between minimum balance and satisfaction.

Chi-Square Test

	Value	**Degrees of freedom**	**Asymp. Sig.(2-sided)**
Pearson Chi-Square	6.124	2	0.047
Likelihood Ratio	6.058	2	0.048
Linear- Linear Association	5.587	1	0.018
No of Valid Cases	231		

Inference: Hence alternative hypothesis is accepted i.e. there is no association between minimum balance and satisfaction.

Table-9

Minimum Balance Vs Continuation with the Network

		Continue				Total
		No	**Yes**	**2**	**4**	
Minimum Balance	**No**	6	72	0	0	**78**
	Yes	13	140	1	1	**155**
Total		**19**	**212**	**1**	**1**	**233**

- **Null Hypothesis**: There is no association between minimum balance and continuation with the network.
- **Alternative Hypothesis**: There is an association between minimum balance and continuation with the network.

Chi-Square Test

	Value	**Degrees of freedom**	**Asymp. Sig.(2-sided)**
Pearson Chi-Square	1.060	3	0.787
Likelihood Ratio	1.684	3	0.641
Linear- Linear Association	0.153	1	0.696
No of Valid Cases	233		

Inference: Hence null hypothesis is accepted i.e. there is no association between minimum balance and continuation with the network**.**

Interpretation and Conclusion:

- It is observed that in the study area, out of 102 females there are 47 respondents between 16-25, 41 respondents between 26 49 and 14 respondents above 40. Whereas out of 131 males there is 1 respondent between 0-15, 58 respondents between 16-25, 53 respondents between 26-49 and 19 respondents above 50. It is revealed that male respondents are more than the female respondents.
- It is observed that in the study area, out of 55 basic mobile users, there are 20 respondents in SSC, 15 respondents in INTER, 6 respondents in GRADUATION, 5 respondents in PG and 9 other respondents.

Whereas out of 178 smart mobile users, there are 15 respondents in SSC, 34 respondents in INTER, 102 respondents in GRADUATION and 14 other respondents. It is revealed that there are more smart mobile users than basic mobile users.

- It is observed that in the study area, out of 55 basic mobile users, there are 44 respondents using 1 Sim, 11 respondents using 2 Sims. Whereas out of 178 smart mobile users, there are 98 respondents using 1 sim, 79 respondents using 2 Sims. It is revealed that there are more smart mobile users than basic mobile users.
- It is observed that in the study area, out of 19 females, there are 16 respondents who know minimum balance and 3 doesn't know. Whereas out of 20 males, there are 19 respondents who know minimum balance and 1 doesn't know. It is revealed that males are more than female respondents.
- It is observed that in the study area, out of 84 outlets, there are 36 employees and 48 non-employees. Whereas out of 149 online there are 68 employees and 81 non-employees. It is revealed that more online methods are preferred than outlets.
- It is observed that in the study area, out of 100 females, there are 28 families, 19 friends, 31 operators, 1 relative and 6 others. Whereas out of 131 males, there are 15 families, 24 friends. 57 operators. 6 relatives, 10 others. It is revealed that more male respondents are enquiring than females.
- It is observed that in the study area, out of 103 employees, there are 68 respondents who are satisfied, 18 who are not satisfied and 17 respondents have no choice. Whereas out of 128 non-employees, there are 73 respondents who are satisfied, 32 who are not satisfied and 23 have no choice. It is revealed that more non-employees are enquiring than employees.
- It is observed in the study area, that out of 78 minimum balances (who don't know) response, 39 respondents satisfied, 21 respondents are not satisfied and 18 respondents has no choice. Whereas out of 153 minimum balance (who knows) response, 102 respondents satisfied, 29 respondents are not satisfied and 22 respondents has no choice. It is revealed there are more respondents who know minimum balance than who doesn't know.
- It is observed in the study area, that out of 78 minimum balance (who doesn't know) response, 6 respondents don't want to continue and 72 respondents want to continue. Whereas out of 155 minimum balance (who knows) response, 13 respondents don't want to continue and 140 respondents want to continue. It is revealed there are more respondents who know minimum balance than who doesn't know.

WFH analysis- A Research on Work from Home Culture Adopted During the Pandemic and its Various Results

Submitted by-
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Introduction:

In the current situation, there have been many changes in the work and study culture. From going to the office, school, college daily, we have adapted to working from our homes. Be it a student, a teacher, an engineer, or any other profession we can think of, the base location of the work has changed. No one thought we would be having exams from home via online platforms, nor did we think that we would be having meetings, internships, jobs from home in different platforms like Google Meet, Cisco Webex meetings, and so on. Before the COVID-19 situation came, most of us were not even aware of these platforms, many did not even exist. But now, the entire circumstances have changed.

We have conducted a short study on the effects of this shift from office/school/college to home on productivity, time management, work life balance, and several other aspects to find out what opinion people of different age groups, gender, occupation, etc. have about this shift.

Methodology:

For the purpose of this study, our method is qualitative data which we have taken through questionnaire. We have received 20 responses by this questionnaire, for which we have done hypothesis testing through R programming to find out the relation between several aspects of our study.

Hypothesis testing:

We have conducted the hypothesis testing, to find out the answers for the following questions:

1. Does the residence of a person affect his preference of work place?
2. Does gender have effect on the preference of work place?
3. Does profession of a person affect engagement problem faced by people?
4. Does residence of a person affect difficulties faced related to network?
5. Does profession of person affect interruption problem?
6. Does preference of job affect the choice of starting a new job from WFH?

The complete hypothesis testing and its output is done as follows:

```
data = read.csv("WFH data.csv")
View(data)

#Converting characters into factors for hypothesis testing
gender = as.factor(c('Male','female','prefer not to say'))
profession = as.factor(c("student","employed"))
residence = as.factor(c('urban','semi-urban','rural area'))
preference = as.factor(c("work from home","in-office","hybrid(combin
ation of both)"))
engagement = as.factor(c('full engagement','somewhat engagement','ne
utral','somewhat disengaged','completely disengaged'))
time_management = as.factor(c("fully efficient","somewhat efficient"
,"equally efficient","less efficient","inefficient"))
network_problems = as.factor(c("completely agree","somewhat agree","
no difference","somewhat disagree","completely disagree"))
interruptions = as.factor(c("completely agree","somewhat agree","no
difference","somewhat disagree","completely disagree"))
new_job = as.factor(c("completely agree","somewhat agree","no differ
ence","somewhat disagree","completely disagree"))

#question1 is preference of work affected by residence of a person?
#null hypothesis: residential area does not affect preference of wor
k place
#alternative hypothesis: residential area has a significant influenc
e on preference of workplace
#test used: chi-square test, as both the variables are catagorical.

chisq.test(data$Area.of.residency,data$Preference)

## Warning in chisq.test(data$Area.of.residency, data$Preference): C
hi-squared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  data$Area.of.residency and data$Preference
## X-squared = 4.7308, df = 4, p-value = 0.3161

#since the p-value>0.05, we accept null hypothesis, that is preferen
ce of work place is not affected by residential area of a person
```

```r
#question2 Does gender affect preference of work place?
#null hypothesis = gender does not affect preference of work place
#alternative hypothesis = gender influences preference of work place
#test used: Chi-square test, as both variables are categorical

chisq.test(data$Gender,data$Preference)
```

```
## Warning in chisq.test(data$Gender, data$Preference): Chi-squared
approximation
## may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  data$Gender and data$Preference
## X-squared = 0.71966, df = 4, p-value = 0.9489
```

```r
#p-value is greater than 0.05, there null hypothesis is accepted tha
t is, gender does not affect preference of work place

#question3 does profession affect engagement felt at work place?
#null hypothesis = profession does not affect engagement
#alternative hypothesis = profession has influence over engagement f
elt
#test used: Chi-square test, as both the variables are categorical

chisq.test(data$Profession,data$Engagement)
```

```
## Warning in chisq.test(data$Profession, data$Engagement): Chi-squa
red
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  data$Profession and data$Engagement
## X-squared = 7.5556, df = 4, p-value = 0.1093
```

```r
#p-value is greater than 0.05, so we accept the null hypothesis that
is, being a student or employee does not affect engagement felt

#question4a does residence influence network problem faced?
#null hypothesis = residential area does not affect network problem
faced
#alternative hypothesis = residential area affects network problems
faced
#test used: Chi-square test, as both the variables are categorical

chisq.test(data$Area.of.residency,data$Network.problem.connectivity.
issues)
```

```
## Warning in chisq.test(data$Area.of.residency,
## data$Network.problem.connectivity.issues): Chi-squared approximat
ion may be
## incorrect

##
##  Pearson's Chi-squared test
##
## data:  data$Area.of.residency and data$Network.problem.connectivi
ty.issues
## X-squared = 5.4514, df = 8, p-value = 0.7084

#p-value is greater than 0/05, we accept null hypothesis

#question5 does profession of a person influence interruption proble
m?
#null hypothesis = profession does not affect interruptions faced
#alternative hypothesis = profession affects interruptions faced
#test used: Chi-square test, as both the variables are categorical

chisq.test(data$Profession,data$Interruptions)

## Warning in chisq.test(data$Profession, data$Interruptions): Chi-s
quared
## approximation may be incorrect

##
##  Pearson's Chi-squared test
##
## data:  data$Profession and data$Interruptions
## X-squared = 12.178, df = 4, p-value = 0.01608

#p-value is less than 0.05, so we reject the null hypothesis that me
ans,  profession of a person affects interruption problem faced

#question6 does preference of job affect choice of starting a new jo
b from WFH?
#null hypothesis preference of job does not affect choice of startin
g a new job from WFH
#alternative hypothesis preference of job affects choice of starting
a new job from WFH
#test used: Chi-square test, as both the variables are categorical

chisq.test(data$Preference,data$New.Job)

## Warning in chisq.test(data$Preference, data$New.Job): Chi-squared
approximation
## may be incorrect

##
##  Pearson's Chi-squared test
##
```

```
## data:  data$Preference and data$New.Job
## X-squared = 9.6593, df = 8, p-value = 0.2898

#p-value is greater than 0.05, so we accept the null hypothesis, tha
t is preference of job does not affect choice of starting a new job
from WFH
```

Interpretation

From the above analysis, we can interpret the following:

- For our sample of population, living in an urban, semi-urban or rural area, being a student or employed person, being male or female, all these do not really have an effect on the various problems faced by them in relation to the shift from office to home. Everyone faces the same problem.
- Also, preferring work from home, in-office or hybrid culture does not influence people's thoughts on whether it is a good idea to start a new job from home.
- Living in any type of residential area does not influence people's preference of work environment.
- The type of profession, student or employed, has some effect on the problem of interruptions during their work/study.

Conclusion

To conclude, there are several problems and changes that occur due to work from home culture. Though, our sample size is comparatively quite small, so we cannot give a firm conclusion, but according to our views, most people, irrespective of their gender, age, residence, profession face these similar problems when working or studying from home.

A Survey on Customers Satisfaction at McDonalds

Submitted By-
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Introduction:

McDonald's Corporation is an American Fast Food Company founded in 1940 as a Restaurant operated by Richard and Maurice McDonald, in San Bernardino, California, United States. But Due to Covid19, Restaurants have to think about safety of their Customers in this pandemic. So, this survey will help us to know Customer Satisfaction at McDonalds.

Research Topic:

"Customer Satisfaction at McDonalds."

Research Objective:

- To find out how many customers are satisfied Regarding cleanliness of the Restaurant.
- Does Gender effect Dine in or Take away
- Does Marital Status effect the Variety of items
- Does Income of the customers effect the price of the Restaurant
- Does Income Effect the service of the Restaurant

Hypothesis:

Based On Cleanliness:

- **Null Hypothesis H0:** There is no significant effect of cleanliness with use sanitizer.
- **Alternative Hypothesis H1**: There is significant effect of cleanliness with usage of sanitizer.

Based On Gender and service:

- **Null Hypothesis H0:** There is no significant effect of gender with service effectiveness.
- **Alternative Hypothesis H1:** There is significant effect of gender with service effectiveness.

Based On Marital Status and Variety of food:

- **Null Hypothesis H0:** There is no significant effect of marital status with variety of the food chosen.
- **Alternative Hypothesis H1:** There is significant effect of marital status with variety of the food chosen.

Based On Income and Price:

- **Null Hypothesis H0:** There is no significant effect of income with price of the food.
- **Alternative Hypothesis H1:** There is significant effect of income with price of the food.

Based On Income and Service:

- **Null Hypothesis H0:** There is no significant effect of income group with the service provided of the food.
- **Alternative Hypothesis H1:** There is significant effect of income group with the service provided of the food.

Methodology:

Research Design:

The Research Design followed for this research study is descriptive research design, where we find a solution to an existing problem. The descriptive research is used to depict the present of the business condition.

Method of Data Collection:

- The data needed for the research study was collected by primary data.
- The method used for collection data was survey questionnaire.

Sampling Design:

Sample Size: The Respondents collected are 105 is the sample size.

Sample Method: A method of sampling we used is **Convenience Sampling**. The main advantage of this type of sampling is the availability and the quickness with which data can be gathered.

Data Analysis:

Question 1:

People who are strongly agree, disagree, etc regarding cleanliness of the restaurant and usage of the sanitizer During COVID19?

#Null Hypothesis H0: There is no significant effect of cleanliness with use sanitizer.

#Alternative Hypothesis H1: There is significant effect of cleanliness with usage of sanitizer.

```
chisq.test(mc$The.Restaurant.is.clean.and.sanitized,mc$Each.Table.contains.the.bottle.of.sanitizer)

        Pearson's Chi-squared test

data:  mc$The.Restaurant.is.clean.and.sanitized and mc$Each.Table.contains.the.bottle.of.sanitizer
X-squared = 38.108, df = 9, p-value = 1.667e-05
```

Therefore, p-value = 1.667e-05 i.e. p-value < 0.05 so we fail to accept the Null Hypothesis.

There is significant effect of cleanliness with usage of sanitizer.

Question 2:

Does Gender effect the Service?

#Null Hypothesis Testing H0: There is no significant effect of gender with service effectiveness.

#Alternative Hypothesis H1: There is significant effect of gender with service effectiveness**.**

```
chisq.test(mc$Your.Gender, mc$X17..The.service.is.excellent)

        Pearson's Chi-squared test

data:  mc$Your.Gender and mc$X17..The.service.is.excellent
X-squared = 1.5562, df = 3, p-value = 0.6694
```

#Therefore p-value = 0.6694 i.e., p-value > 0.05. so, we accept Null Hypothesis

#Thus, There is no significant effect of gender with service effectiveness.

Question 3:

Does Marital Status effect the Variety of Items in Restaurant?

#Null Hypothesis H0: There is no significant effect of marital status with variety of the food chosen.

#Alternative Hypothesis H1: There is significant effect of marital status with variety of the food chosen.

```
chisq.test(mc$Marital.Status,
mc$The.restaurant.has.good.variety.of.items)

        Pearson's Chi-squared test

data:  mc$Marital.Status and
mc$The.restaurant.has.good.variety.of.items
X-squared = 2.423, df = 3, p-value = 0.4894
```

Therefore, p-value = 0.4894 i.e. p-value >0.05 so,we accept the Null Hypothesis.

There is no significant effect of marital status with variety of the food chosen.

Question 4:

Does income effect the choice of food selection based on price?

#Null Hypothesis H0: There is no significant effect of income with price of the food.

#Alternative Hypothesis H1: There is significant effect of income with price of the food.

```
anova1 = aov(mc$Income~mc$Price.are.competitive)
> summary.aov(anova1)
                          Df    Sum Sq   Mean Sq F value Pr(>F)
mc$Price.are.competitive   1 9.811e+09 9.811e+09   0.407  0.527
Residuals                 45 1.085e+12 2.412e+10
```

Therefore p-value = 0.527, i.e. p>0.05, so we accept Null Hypothesis

Thus, there is no significant effect of income of people with availing food selection based on price.

Question 5:

Does income effect the service?

#Null Hypothesis H0: There is no significant effect of income group with the service provided of the food.

#Alternative Hypothesis H1: There is significant effect of income group with the service provided of the food.

```
anova1 = aov(mc$Income~mc$The.food.order.was.correct.and.complete)
> summary.aov(anova1)
                                             Df    Sum Sq   Mean Sq F value Pr(>F)
mc$The.food.order.was.correct.and.complete  1 5.353e+09 5.353e+09   0.221  0.641
Residuals                                   45 1.090e+12 2.422e+10
```

#Therefore, p-value = 0.641, i.e. p>0.05, so we accept Null Hypothesis.

#Thus, there is no significant effect of income group with the service provided of the food.

Conclusion:

COVID19 situation has totally changed the way we dine and hang out. Looking on the data we can have a fairly rough picture on how consumers are being cautious and critical about the practices and experience offered by the Restaurant. Perception of Gender is not biased on the Gender of the customer, as traditional women very critical with the service offered and men hardly bothered. But pertaining to current situation both the sexes seem to care about the service. From the Analysis we have conducted there is marital status has no clear significance on the variety of food in the restaurant. People irrespective of their relationship status/ narital status are contented with thw variety of food in MacD despite being a QSR restaurant. Income has no effect on the price. Very evidently it's clear the price of MacD has been positioned in such a way that people find it very affordable.

A Survey on Customers Preferences on Dinning Out in Restaurants During Covid-19

Submitted By-
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Introduction:

The Indian restaurant industry is rapidly transforming before our eyes, and restaurants will have to think their daily operations to suit these post COVID-19 demands of their customers. While demand will return rapidly as millions of Indians were craving their favorites dishes it is as crucial to make necessary changes to restore consumer confidence and trust by rapidly evolving the restaurant's approach in usage of technology. So this Survey will help us to know what customers prefer on Dinning out in restaurants.

Research Topic:

Customers Preferences on Dinning Out in Restaurants During COVID-19.

Research Objective

- To find out how various factors like age, gender, Team Outing and education affects the preference of Dinning out in restaurants.
- To find out whether age has impact on Health and Hygiene of dinning out in restaurants.
- To find out the challenges that does gender has affect on Dinning preferences.

- To find out whether education impacts Digitization on Dinning out in Restaurants.

Hypothesis:

Based on Health and Hygiene:

- **Null Hypothesis Ho:** There is no significance difference between Age and Health and Hygiene in Customer preference.
- **Alternative Hypothesis H1:** There is significance difference between Age and Health and Hygiene in Customer preference.

Based on Dinning Preference:

- **Null Hypothesis Ho:** There is no significance difference between Income and Dinning Preference in Restaurants.
- **Alternative Hypothesis H1:** There is significance difference between Income and Dinning Preference in Restaurants.

Based on Digitization:

- **Null Hypothesis Ho:** There is no significance difference between Education and Digitization in Restaurants.
- **Alternative Hypothesis H1:** There is no significance difference between Education Digitization in Restaurants.

Methodology:

Research Design:

The research design followed for this research study is descriptive research design, where we find a solution to an existing problem. The descriptive research is used to depict the present of the business condition.

Method Of Data Collection:

- The data needed for the research study were collected by primary data.
- The method used for collecting data was survey questionnaire.

Sampling Design:

Sample size: The respondents collected are 110 is the sample size.

Sample method: A method of sampling we used is CONVENIENCE SAMPLING. The main advantage of this type of sampling are the availability and the quickness with which data can be gathered.

Data Analysis:

Question 1:

Does age affect on dinning out in restaurants during COVID?

#Null Hypothesis Ho: Age affect on dinning out in restaurants during COVID. #Alternative Hypothesis H1: Age doesn't affect on dinning out in restaurants during COVID.

```
aj=aov(re$Age~re$Are.you.willing.to.dine.out.during.COVID.)
summary(aj)
 Df Sum Sq Mean Sq F value Pr(>F) re$Are.you.willing.to.dine.out.duringCOVID. 1 0.36 0.3560 1.001 0.319
Residuals 108 38.41 0.3556
```

#Therefore p-value > 0.05, we accept Null Hypothesis Ho, Hence, Age affect on dinning out in restaurants during COVID.

Question 2:

Does marital status affect on taking children to dine out in restaurants during COVID?

#Null Hypothesis Ho: Marital status affect on taking children to dine out in restaurants during COVID.

#Alternative Hypothesis H1: Marital status doesn't affect on taking children to dine out in restaurants during COVID.

```
                                Pearson's Chi-squared test
data: re$Marital.Status and re$Are.you.willing.to.take.children.along.with.you. to.restaurant.
X-squared = 4.4382, df = 1, p-value = 0.0351
```

#Therefore p-value < 0.05, we accept Alternative Hypothesis H1, Hence, Marital status doesn't affect on taking children to dine out in restaurants during COVID.

Question 3:

Does Education effect on team outing to restaurant during COVID? #Null Hypothesis Ho: Education effect on team outing to restaurant during COVID. #Alternative Hypothesis H1: Education doesn't affect on team outing to restaurant during COVID

```
aj=aov(re$Education~re$Are.you.willing.to.go.team.outing.to.restaurant.during. COVID.)
summary(aj)
   Df Sum Sq Mean Sq F value Pr(>F)  re$Are.you.willing.to.go.team.outing.to. 1 0.91 0.9091 1.748
0.189  restaurant.during.COVID.
Residuals 108 56.18 0.5202
```

#Therefore p-value > 0.05, we accept Null Hypothesis Ho, Hence, Education effect on team outing to restaurant during COVID.

Question 4:

Does Marital status effect on attending and celebrating party's at restaurants during COVID?
#Null Hypothesis Ho: Marital status effect on attending and celebrating party's at restaurants during COVID.
#Alternative Hypothesis H1: Marital status doesn't affect on attending and celebrating party's at restaurants during COVID.

```
Pearson's Chi-squared test
data: re$Marital.Status and re$Are.you.willing.to.celebrate.party.s.attend.at.r estaurants.during.COVID.
X-squared = 0.57085, df = 1, p-value = 0.4499
```

#Therefore p-value > 0.05, we accept Null Hypothesis Ho, Hence, Marital status effect on attending and celebrating party's at restaurants during COVID

ANNOVA TEST

Based on Health and Safety:

#Null Hypothesis Ho: There is no significance difference between Age and Health and Hygiene in Customer preference.

#Alternative Hypothesis H1: There is significance difference between Age and Health and Hygiene in Customer preference.

```
aj=aov(re$Age~re$Health.and.Safety)
summary(aj)
 Df Sum Sq Mean Sq F value Pr(>F)  re$Health.and.Safety 1 3.63 3.627 11.15
0.00116 ** Residuals 108 35.14 0.325
```

#Therefore, p-value < 0.05, We accept Alternative Hypothesis H1, Hence, there is significance difference between Age and Health and Hygiene in Customer preference.

Based on Dinning Preference:

#Null Hypothesis Ho: There is no significance difference between Income and Dinning Preference in Restaurants.

#Alternative Hypothesis H1: There is significance difference between Income and Dinning Preference in Restaurants.

```
aj=aov(re$Gender~re$Dinnig.Preference)
summary(aj)
 Df Sum Sq Mean Sq F value Pr(>F) re$Dinnig.Preference 1 0.377 0.3772
1.503 0.223
Residuals 108 27.114 0.2511
```

#Therefore, p-value > 0.05, We accept Null Hypothesis Ho, Hence, there is no significance difference between Income and Dinning Preference in Restaurants.

Based on Digitization:

#Null Hypothesis Ho: There is no significance difference between Education and Digitization in Restaurants.

#Alternative Hypothesis H1: There is significance difference between Education and Digitization in Restaurants.

```
aj=aov(re$Education~re$Dizitization)
summary(aj)
 Df Sum Sq Mean Sq F value Pr(>F)
re$Dizitization 1 4.19 4.194 8.562 0.00418 **
Residuals 108 52.90 0.490
```

#Therefore, p-value < 0.05, We accept Alternative Hypothesis H1, Hence, there is significance difference between Education and Digitization in Restaurants.

Conclusion:

As, we conclude that 20% of people are only willing to dine out in the restaurant and the factors that influence in customer preferences on Dinning out like Hygiene safety digitization were like age, education, income, etc. This Survey says that restaurants need to focus on operational changes and upgrade to use of technology as these customers prefer contactless Digital Menu Based on QR, digital bookings. Customer preference further shifted towards Hygiene and health like Screening, Social distancing, training to staff regarding hygiene and sanitization procedures.

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