RESEARCH REPORT

ON

The Impact of Smartphones on Work productivity during the pandemic.

PRESENTED BY

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DEPARTMENT OF MASTER OF SCIENCE IN INFORMATION TECHNOLOGY

AT

SVKM'S

USHA PRAVIN GANDHI

COLLEGE OF MANAGEMENT.

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CERTIFICATE

This is to certify that ~~Mr.~~/Ms. **Divya Puthran** has completed the research report on **The Impact of Smartphones on Work productivity during the pandemic** in Semester 4 as a partial fulfilment of MSC University of Mumbai. During the academic year 2020-2021

Date: 29/5/21

Signature Of Professor:

PREFACE

It gives me enormous pleasure to present this report of project documentation / black book and the research paper that I presented for my last year. The research idea came to me when during this pandemic which everyone had to adjust with the new normal of life.

I started noticing that most of the office work that is reports, meetings and continuous being on the job was done with the help of Smartphones. So I started looking into this research And after much research, we discovered various surveys essentially needed to implement my research.

Once, I completed the processing of my surveys, I started analyzing my data and came to a Result and Conclusion which supported my research.

So, in conclusion, I tried to form a analyzed conclusion and this black book is maintained for the same purpose.

Therefore, I hope you adore analysis the book and appreciate it because it will be satisfactory for our efforts.

ACKNOWLEDGEMENT

It gives me great pleasure to submit the Research report on The Impact of Smartphones on Work productivity during the pandemic. The report won't be probable deprived of the guidance of our teachers.

I would like to use this chance to convey my Gratitude to Management of USHA PRAVIN GANDHI COLLEGE OF ARTS, SCIENCE AND COMMERCE for generous me this chance to accomplish this research.

I am very thankful to Dr. Anju Kapoor, The Principal of UPG College for her co-operation in the successful accomplishment of our research.

A special thanks to our project guide and also our Co-ordinator Mrs. Smruti Nanavaty for her most sincere efforts, support and encouraging contribution throughout the research.

I would like to express thanks all our teachers, friends & our family for their support, motivation and encouragement.

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INTRODUCTION

The Covid-19 pandemic has led to a certain surge in the use of digital technology due to the country's nationwide lockdown and social distancing practices. Everyone in the world had to adjust the new way of life. The pandemic has led the organizations and institutions to shift from Work from office to Work from Home. Work from Home (WFH) has resulted in most people taking to the internet and internet-based services to communicate, interact, and continue with their job responsibilities from home.

Smartphones has played an important role during the pandemic, which have seen major changes resulting from the use of smartphones by their staffs that use them to complete their tasks, and communicate with a remote workplace while working from home. The boundary between one's professional and personal life has begun to gradually disappear day after day. With the help of WFM, it is now seen that employees perform their duties in the evening or during holidays and vacations.

Thus, owning a smartphone gives employees the ability to communicate with their place of work and perform their duties any time and any place. Employees can communicate with each other and do their work all the time. If managers give their employees some flexibility in working hours, this is a positive thing.

The impacts of smartphone usage in the workplace may be positive or negative which may influence work productivity in any organization. In this study, the impacts of smartphones on employees work presentation were recognized and the mechanism of dealing with these influences are described in order to help, develop and increase their productivity or work performance.

BACKGROUND

This paper explains the study on the impact of smartphones in the work productivity during the pandemic from the perspective of the employee. It highlights how the smartphone technology which came into existence and has caused drastic changes in the field of communication in the last 14 months during the pandemic. Cell phones have been developing quickly and are increasingly integrated in people's lives.

The impacts of smartphone usage in the workplace may be positive or negative which may influence work productivity in any organization. In this study, the impacts of smartphones on employees work presentation were recognized and the mechanism of dealing with these influences are described in order to help, develop and increase their productivity or work performance

The increasing expectation for availability and quick responses to seniors make employees feel gratified to respond directly, even on their time off. In this study, researcher explored the impact of using smartphones for work productivity. Due to confidentiality of the respondents, the people will be referred as Respondent in this paper.

The focuses were on the impact of smartphones on productivity of employees, the type of digital technology used in the workplace and the type of smartphone applications, systems or regulations that would assist their work.

OBJECTIVE AND SCOPE

Objective of this Research is to answer these questions:

- What are the factors that affect work performance in the workplace?
- What are the levels of work performance in the workplace with the help of Smartphones?
- What are the most frequently used applications or functions in smartphones in the workplace?
- What are the systems that will help facilitate and increase work performance, if they are available on smartphones?

Scope of this Research:

- The Scope of the study explains the extent to which the research area will be explored in the work and specifies within the study will be operating
- The working preferences of the employee
- The smartphone impact on the employee
- Software used by the employees as a complete package during the pandemic

LITERATURE REVIEW

The Covid-19 pandemic has led to a certain surge in the use of digital technology due to the country's nationwide lockdown and social distancing practices. Everyone in the world had to adjust the new way of life. The pandemic has led the organizations and institutions to shift from Work from office to Work from Home. Work from Home (WFH) has resulted in most people taking to the internet and internet-based services to communicate, interact, and continue with their job responsibilities from home.

Smartphones has played an important role during the pandemic, which have seen major changes resulting from the use of smartphones by their staffs that use them to complete their tasks, and communicate with a remote workplace while working from home. The boundary between one's professional and personal life has begun to gradually disappear day after day. With the help of WFM, it is now seen that employees perform their duties in the evening or during holidays and vacations.

Thus, owning a smartphone gives employees the ability to communicate with their place of work and perform their duties any time and any place. Employees can communicate with each other and do their work all the time. If managers give their employees some flexibility in working hours, this is a positive thing.

Many researchers have reported positive impacts of using smartphones at workplace. Google (2016) stated that smartphones can benefit a work environment by promoting self-sufficiency; instilling strong employee/organization relationships from top to bottom and encouraging knowledge sharing. According to Spark (2015), employees feel relax and comfortable while using their personal smartphones, and this personal and stress-free factor primes towards work efficiency. Smartphone has gained its popularity as a communication platform in the workplace because it provides an improved purpose to help workers organize their assignments and allows people to work anyplace anytime.

However, there were also several negative bearings reported. For example, Barnes & Thornburg LLP (2017) explained the excessive use of smartphones at work can lead to addiction and obsession which can inferior the work productivity.

Smartphone usage also diverts employees from information and others in the meeting. The use of smartphones has directed to an increased workload, distorting of work/life boundaries, intrusive with leisure time, and spousal hatred/family conflicts.

This paper explains the study on the impact of smartphones in the work productivity during the pandemic from the perspective of the employee. It highlights how the smartphone technology which came into existence and has caused drastic changes in the field of communication in the last 14 months during the pandemic. Cell phones have been developing quickly and are increasingly integrated in people's lives.

The impacts of smartphone usage in the workplace may be positive or negative which may influence work productivity in any organization. In this study, the impacts of smartphones on employees work presentation were recognized and the mechanism of dealing with these influences are described in order to help, develop and increase their productivity or work performance.

METHODOLOGY

Population of the Study

This research found many employees of various nationalities, experiences and fields. The researcher chose employees who were competent at their work so as to get clear and genuine answers which would contribute expressively to the success of this study. Survey questionnaires were circulated to a total of 33 people. From 22 questionnaires distributed, 30 responses were acknowledged. The sample consisted of 33 employees with 60.6 % Male and 39.4% Female candidates. The majority of the participants were from the age group of 18 to 25 years (72.7 %) and 26 to 35 years (18.2%). Employees are basically from various fields such as Marketing (24.2%), IT (21.2%), Finance (18.2%), Sales (18.2%), E-Retail (9.1%) and HR (9.1%). The total response rate attained in this research was 91.7%, which is considered a very good response rate within the field of research. Following the questionnaires, interviews on three employees were also led in order to gain better knowledge and understanding of the effect of using smartphones in the workplace.

Questionnaire

The researcher prepared a questionnaire in one language that is English using the Google Form. Then the researcher distributed the questionnaire to those who have established recognition for hard-work, to assurance sincere and clear responses which can contribute meaningfully to the success of this study. The data was analyzed for research purpose. The Appropriate percentages and frequencies were computed to assist in analyzing the data.

Interviews

In-depth interviews were implemented in this study. For the interviews, three employees were selected and were asked questions on the influence of using smartphones in the workplace, the applications frequently used, and their propositions on using smartphones in the workplace to simplify their work. In these interviews, the researcher met employees from different departments and field which includes HR, IT, E-Retail etc.

Hypotheses

Based on the analysis of responses to the questionnaires, two hypotheses were formulated. These hypotheses were tested using the Google form and will be reported in the following paper.

Instruments of the Study

The researcher collected a questionnaire consisting of five areas as follows:

A. The general information of the respondents.

B. The Working environment preferences of the employee during the pandemic.

C. Applications most used in smartphones.

D. Features that affect work performance, which consists of 4 dimensions, and they are the following:

- Smartphone usage.
- Limitations on usage.
- Satisfaction.
- Mobility

E. How smartphones have made it easier for being on the job communication and updates/meetings during the pandemic.

F. Systems that will help simplify and increase work performance if accessible on smartphones. (most preferable software)

Questionnaire validity

Since the collected data from the questionnaire is the primary data, we focus on Qualitative analysis. In order to verify the content validity of the questionnaire, we have Machine learning Algorithms to prove our analysis. 1 expert were requested to check the content validity of the questionnaire. The experts' suggestions and comments fixated on the items being re-phrased, or correction of grammar and spelling errors in the questionnaire items. The researcher trailed the experts' recommendations and, after the adjustments, the questionnaire was distributed to the study sample. Since the sample data was primary data it has used quality data analysis for the content validity. We have used Logistic regression to prove our analysis

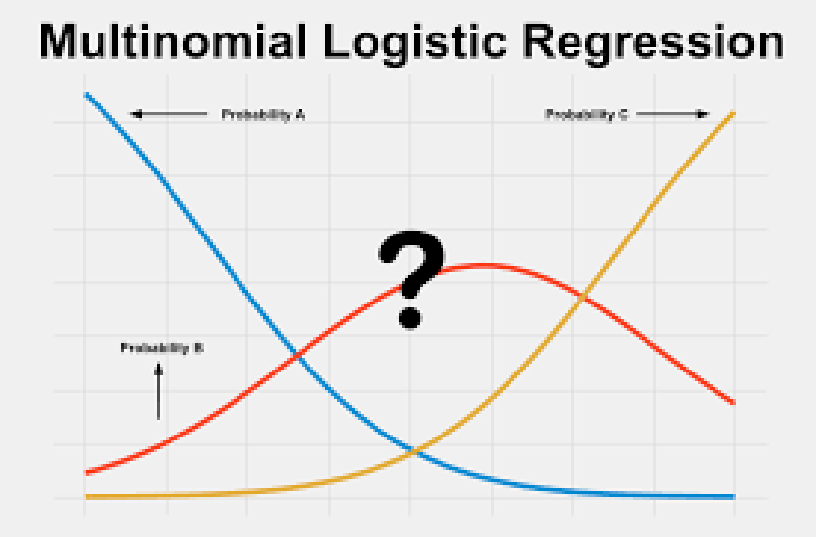
Logistic Regression

Since the data collected through the surveys and questionnaire were primary data. We prefer doing the Qualitative data analysis on the categorical data using the logistic regression. We somewhat got the accuracy of the model and helped us predict the analysis for the research,

In statistics, the logistic model (or logit model) is used to model the probability of a certain class or event existing such as pass/fail, win/lose, alive/dead or healthy/sick. This can be extended to model several classes of events such as determining whether an image contains a cat, dog, lion, etc. Each object being detected in the image would be assigned a probability between 0 and 1, with a sum of one.

Logistic regression is a statistical model that in its basic form uses a logistic function to model a binary dependent variable, although many more complex extensions exist.

In regression analysis, logistic regression (or logit regression) is estimating the parameters of a logistic model (a form of binary regression). Mathematically, a binary logistic model has a dependent variable with two possible values, such as pass/fail which is represented by an indicator variable, where the two values are labeled "0" and "1".



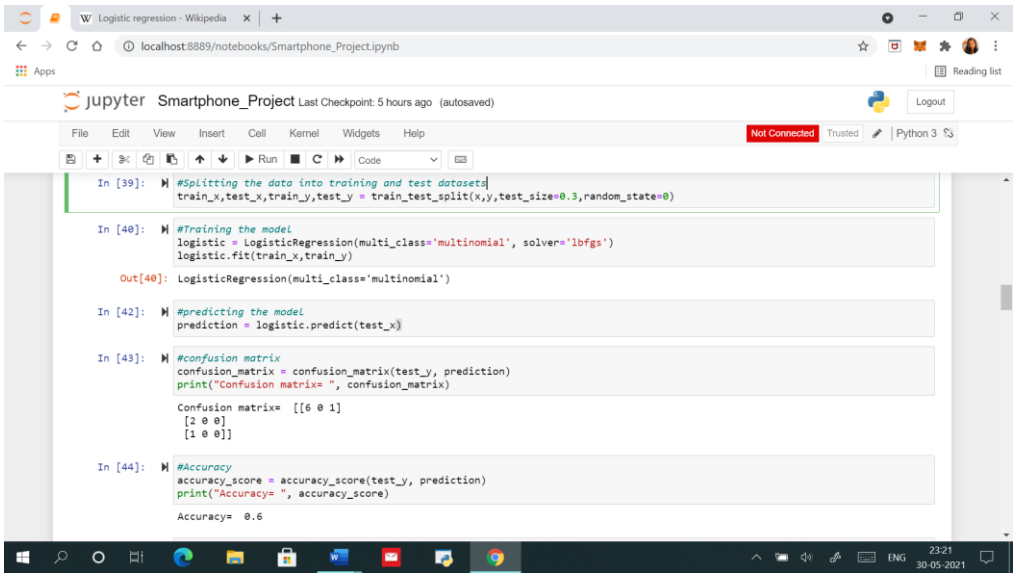
#This Algorithms shows the employee's working preference during the pandemic

#Be It Work from Home, work from Office or Both

```
#Importing the dataset
print("Analysis performed by Divya Puthran for Preferences")
import pandas as pd
data = pd.read_csv("Preferences.csv")
#Importing Libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix

import matplotlib.pyplot as plt
%matplotlib inline
data.shape
data.head()
#data Visualization
data['Preference'] = data['Preference'].map({'Work from Home':0, 'Work from Office':1, 'Both':2})
data1 = pd.get_dummies(data,drop_first=True)
print(data1)
column_list = list(data1.columns)
print("Column list of data1 = ", column_list)
#All x features
features = list(set(column_list)- set(['Preference']))
print("Features = ", features)
#output values in y
y= data1['Preference'].values
#all x values
x= data1[features].values
```

```
#Splitting the data into training and test datasets
train_x,test_x,train_y,test_y = train_test_split(x,y,test_size=0.3,random_state=0)
#Training the model
logistic = LogisticRegression(multi_class='multinomial', solver='lbfgs')
logistic.fit(train_x,train_y)
#predicting the model
prediction = logistic.predict(test_x)
#confusion matrix
confusion_matrix = confusion_matrix(test_y, prediction)
print("Confusion matrix= ", confusion_matrix)
#Accuracy
accuracy_score = accuracy_score(test_y, prediction)
print("Accuracy= ", accuracy_score)
```



#This Algorithms shows the employee's thought about "Smartphone Having Positive Impact or not"

#Be It Yes, No or Maybe

```
#Importing the dataset
print("Analysis performed by Divya Puthran for employee's thought about Smartphone Having Positive Impact or not"  )
import pandas as pd
data2 = pd.read_csv("impact.csv")
#Importing Libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix
import matplotlib.pyplot as plt
%matplotlib inline
data2.head()


#data Visualization
data2['Smartphone_PositiveImpact'] = data2['Smartphone_PositiveImpact'].map({'Yes':0, 'No':1, 'Maybe':2})
data3 = pd.get_dummies(data2,drop_first=True)
print(data3)
column_list = list(data3.columns)
print("Column list of data1 = ", column_list)
#All x features
features = list(set(column_list)- set(['Smartphone_PositiveImpact']))
print("Features = ", features)
#output values in y
y= data3['Smartphone_PositiveImpact'].values
#all x values
```

```
x= data3[features].values
#Splitting the data into training and test datasets
train_x,test_x,train_y,test_y = train_test_split(x,y,test_size=0.3,random_state=0)
#Training the model
logistic = LogisticRegression(multi_class='multinomial', solver='lbfgs')
logistic.fit(train_x,train_y)
#predicting the model
prediction = logistic.predict(test_x)
#confusion matrix
confusion_matrix = confusion_matrix(test_y, prediction)
print("Confusion matrix= ", confusion_matrix)
#Accuracy
accuracy_score = accuracy_score(test_y, prediction)
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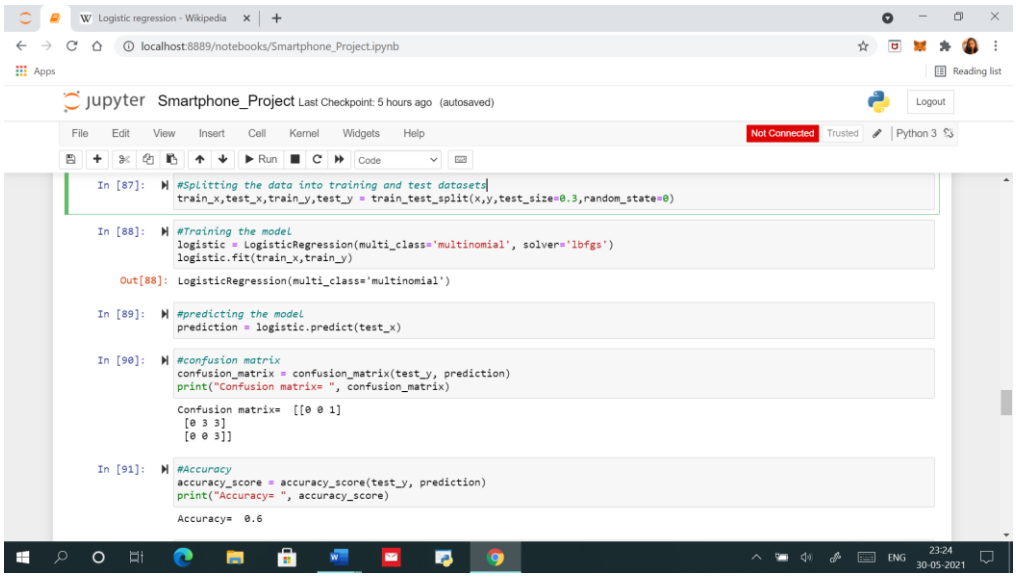
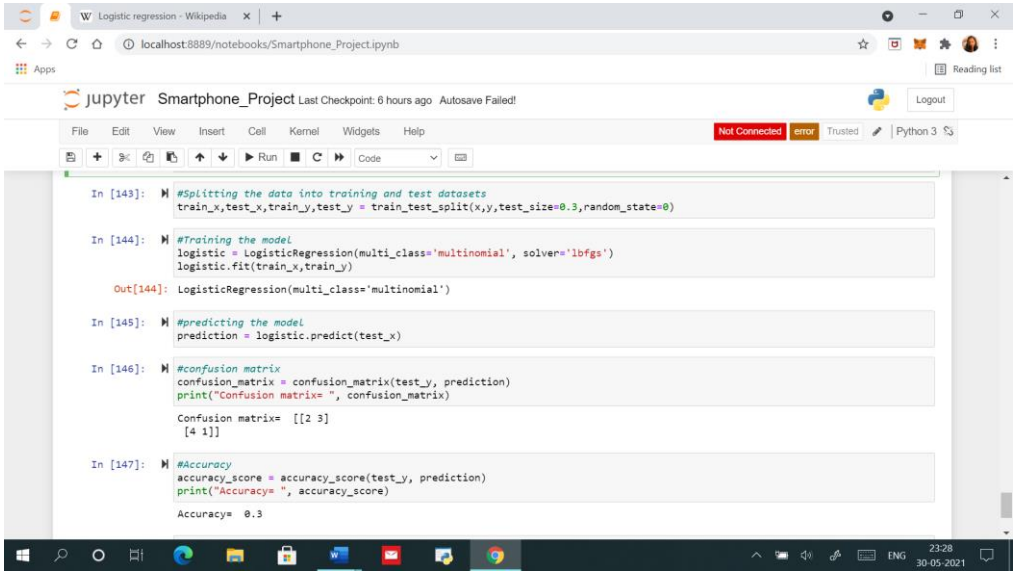


#This Algorithms shows the employee's best preference software which help them in their productivity during the pandemic"

```
#Importing the dataset
print("Analysis performed by Divya Puthran for employee's best preference software"  )
import pandas as pd
data4= pd.read_csv("Software.csv")
#Importing Libraries
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LogisticRegression
from sklearn.metrics import accuracy_score
from sklearn.metrics import confusion_matrix
import matplotlib.pyplot as plt
%matplotlib inline
data4.head()
#data Visualization
data4['Complete_Package'] = data4['Complete_Package'].map({'Google Meet':0, 'Company Website':1, 'Microsoft Teams':2, 'WhatsApp':3 })
data5 = pd.get_dummies(data4,drop_first=True)
print(data5)
column_list = list(data5.columns)
print("Column list of data1 = ", column_list)
#All x features
features = list(set(column_list)- set(['Complete_Package']))
print("Features = ", features)
#output values in y
y= data5['Complete_Package'].values
#all x values
x= data5[features].values
```

```
#Splitting the data into training and test datasets
train_x,test_x,train_y,test_y = train_test_split(x,y,test_size=0.3,random_state=0)
#Training the model
logistic = LogisticRegression(multi_class='multinomial', solver='lbfgs')
logistic.fit(train_x,train_y)
#predicting the model
prediction = logistic.predict(test_x)
#confusion matrix
confusion_matrix = confusion_matrix(test_y, prediction)
print("Confusion matrix= ", confusion_matrix)
#Accuracy
accuracy_score = accuracy_score(test_y, prediction)
print("Accuracy= ", accuracy_score)
```

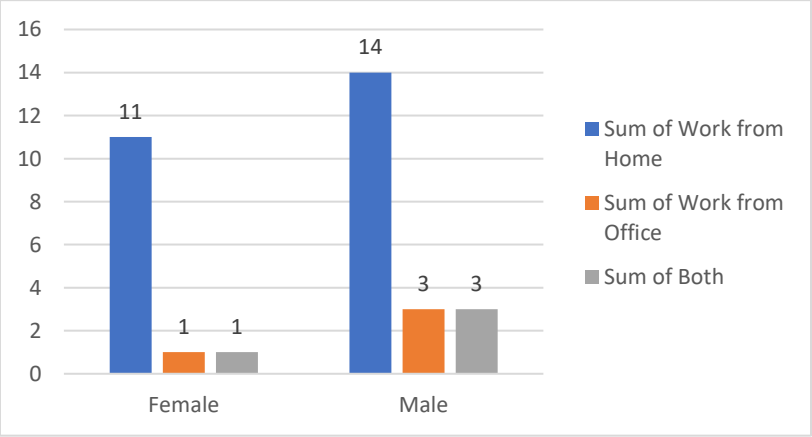


RESULTS

Employee productivity is an assessment criterion which measures the employee's work productivity. Progress and productivity are an estimation standard of employee's workability in a stated time period. There is a reason for this standard, that organizational success is typically based on the workforce, so an employee's productivity is the main consideration for a business to be full-fledged. Employee productivity is of elemental status to the "relationship between an organization's technology investments and its corresponding efficiency gains, or return on investment" (Rouse, 2014). Based on numerous literature reviews, the researcher found three factors that are employee preference for working during the pandemic. They are Work from Home, Work from Office or Both.

Preferences

In this study, the researcher discovered that Work from Home, Work from Office or Both had Medium level of importance from the people. For Work from Home, the majority of employees that is 25 employees out of total 33 employees with 11 Females and 14 Males prefer Work from Home during the pandemic. For Work from Office, that is 4 employees out of total 33 employees with 1 Females and 3 Males prefer Work from Office during the pandemic. For Both (Work from Home and Work from Office), that is 4 employees out of total 33 employees with 1 Females and 3 Males prefer Both during the pandemic. With the help of Logistic Regression, the accuracy of the model shows 0.6, which is pretty good level.



Usage of Smartphone:

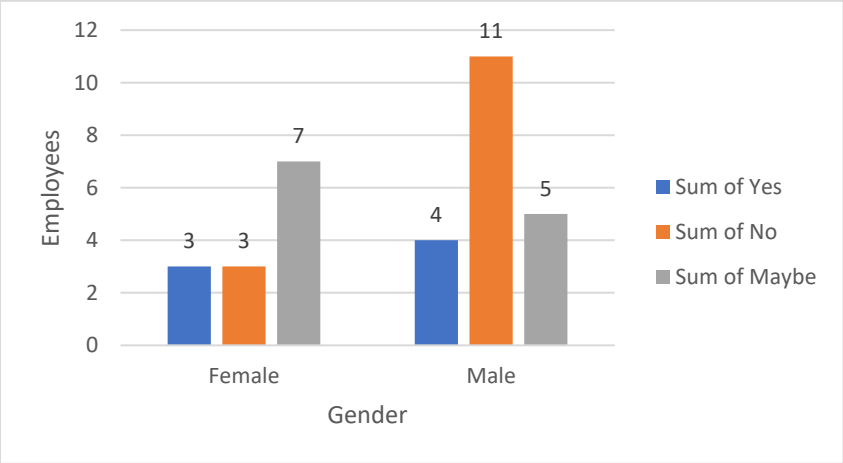
Employees do not use smartphones during meetings, and used the phone at the medium level due to the lack of availability of applications related to work. For restrictions, the majority of employees prefer to use their smartphones during breaks, so as not to incur penalties or have their salaries reduced due to excessive use of their smartphones during working hours and monitoring by officials is not activated. All this led to the medium level for restrictions. As for satisfaction, the majority of employees feel happy and satisfied if their smartphones are with them during working hours. That is because they want to be connected to their relatives and their families in case of an emergency, at the same as using some of the general applications that may help them in their work. There are a few employees who consider that smartphones are not useful for their work because of the nature of their work, which prevents the use of a smartphone for private work reasons. For mobility, many of the staffs were in favor of the establishment of smartphone applications in order to be in touch with all colleagues.

If applications were fully implemented, they feel, they would be given opportunities to exchange views and information, as well as many work-related activities at any time or any place. They also said they intended to use their smartphones more in the workplace in the future. However, there were a few who did not care replacement of computers by smartphones because the former has a more practical side such that the storage and screen size is bigger and the speed is faster. That arrived at the medium level.

Level of work performance in the workplace

The research determined that the level of the employee's productivity in the workplace had a medium level of importance. Many of the staffs agreed that smartphones help exchange knowledge and information between them, and that they can form working groups with better social networking sites. Also, many of the support staff said that some general applications help facilitate and develop work such as falling workload, finishing work quickly and with better efficiency. For many of the employees were asked about the positive impact of Smartphone for work productivity during the pandemic. Out of 33 employees 7 that is 3

Female and 4 Male agreed to the positive impact of the smartphone. 14 employees that is 3 Female and 11 Male did not agree to the positive impact of the smartphone and rest 12 employees that is 7 Female and 5 Male says Maybe as they are not sure of the impact and they believe in both positive and negative impact of smartphone o work productivity during the pandemic. With the help of logistic Regression model, the Accuracy of this model is 0.6 which is good accuracy level



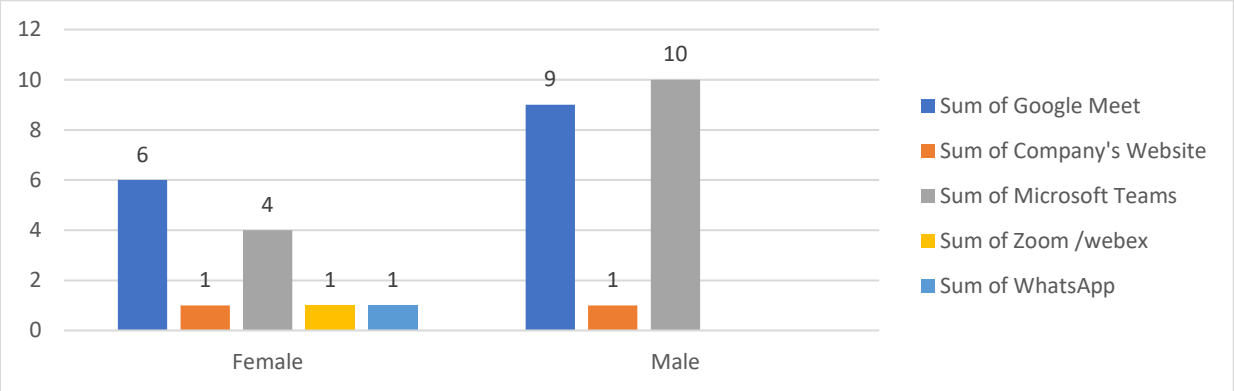
Most frequently used applications/function in the workplace

Most of the respondents use smartphones for the internet (except social network) and use smartphones for the persistence of personal phone calls and social networking, while the tiniest is the games applications because during free time in working hours, employee use the internet to browse or visit sites for news, as well as make phone calls which are, mostly, associated to private work.

Systems will help facilitate and increase work performance if they are available

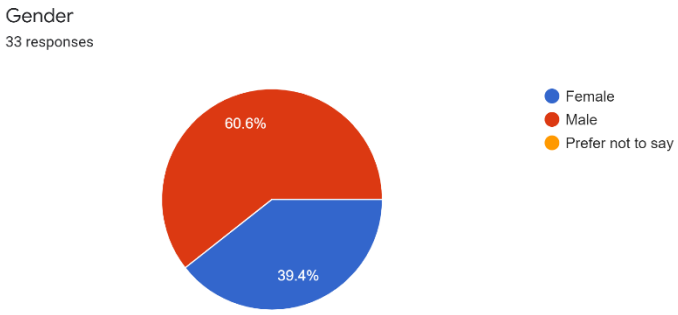
Most systems that simplify and increase employee's productivity in smartphones are from the company portal and the IT systems. Because these are the company portal, employee can access through the internal network only. Also, the company portal contains a lot of information relating to the employee. Moreover, an employee can also request vacation time through this portal and other thing. As per the above discussion, we can achieve that the widely usage of smartphones is not an exceptional case.

However, we also observed that the impact of smartphone usage in and employee productivity is not that high. As far as employees' efficiency is concerned, it can be seen that this might be due to the lack of applications which would permit workers to perform their work after working hours. This study will help the decision makers to consider the smartphone as one of the best tools in increasing work performance and employee productivity and to introduce new applications that can assist employees in performing their work via smartphones. In this research, the employees were asked about their complete package software that they use in this pandemic which helps them to increase their work productivity using for audio and video conferencing to communicate with their managers, team leaders. Out of 33 employees, 15 employee that is 6 Female ad 9 Male choose Google Meet as their software. 14 employees that is 4 Females and 10 Male choose Microsoft Teams as their software. 2 employee that is 1 Female and 1 Male choose Company's website, 1 Female employee choose Zoom/WebEx and 1 Female employee choose WhatsApp as their Software. According to the analysis from this survey it shows that most of the employees prefer Google Meet as the Complete Package software that they can use to increase their work productivity during this pandemic. With the help of Logistic Regression model, the accuracy of this data is 0.3 level.

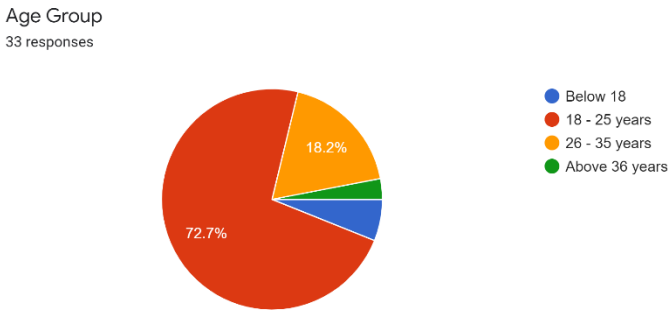


Further Analysis Results from the survey questions:

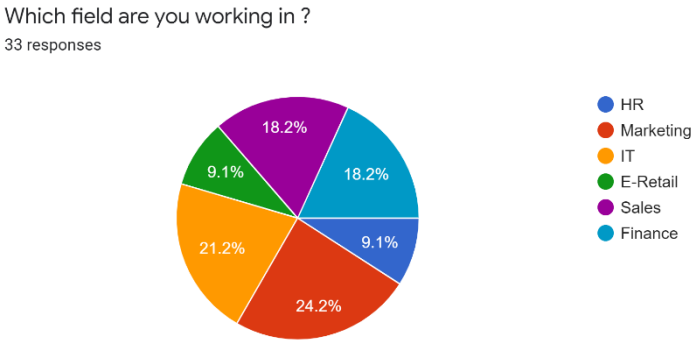
- For this research, 33 employees attempted this survey. Out of which 60.6% were Male and 39.4% were Female



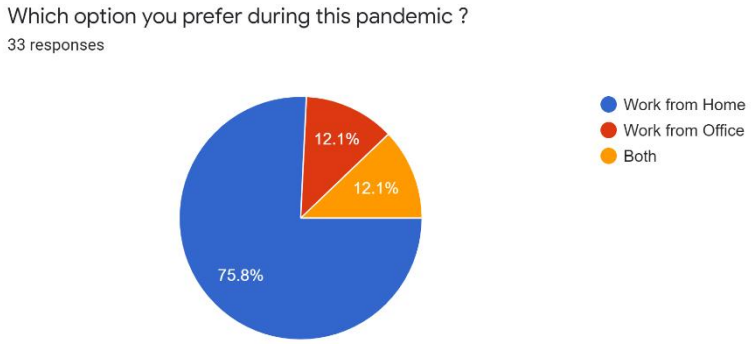
- The Age Group were 72.7% (18- 25 years old) and 18.2% (26- 35 year old)



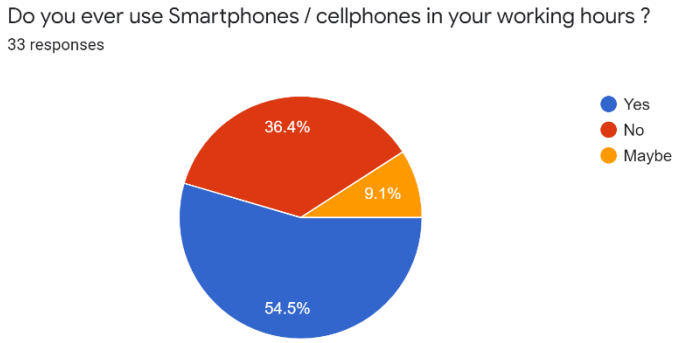
- The employees belonged to different fields such as Marketing (24.2%), IT (21.4%), Sales (18.2%), Finance (18.2%), E-retail (9.1%), HR (9.1%)



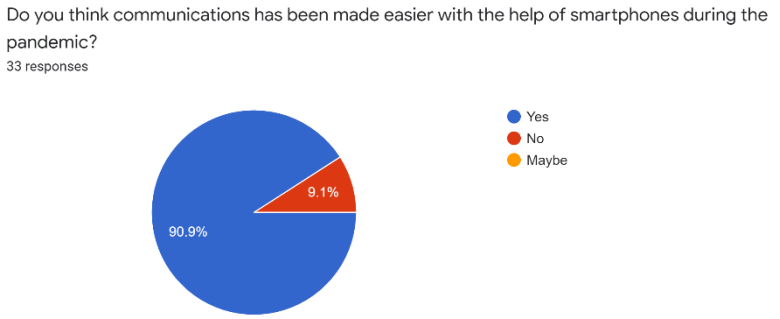
- The working preferences of the employee, Work From Home (75.8%), Work from Office (12.1%), or Both (12.1%).



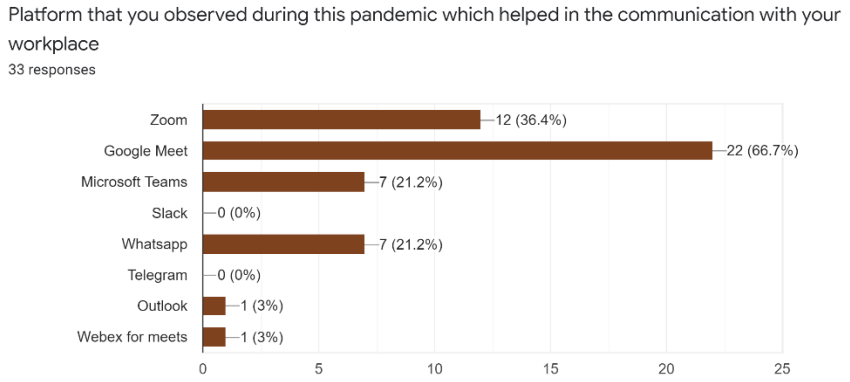
- Whether the employee use Smartphone during working hours, Yes (54.5%), No (36.4%) or Maybe (9.1%)



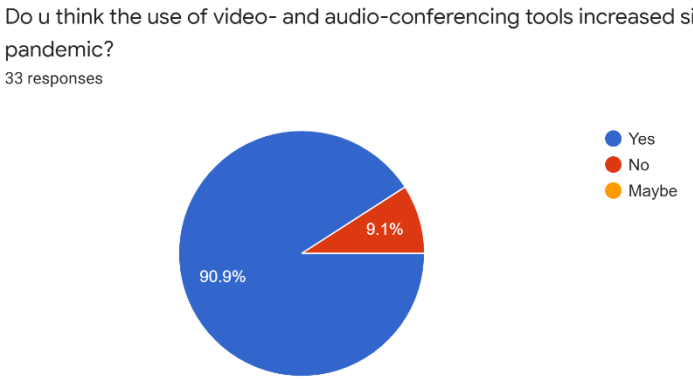
- Do Employee think communications has been made easier with the help of smartphones during the pandemic? - Yes (90.9%), No (9.1%)



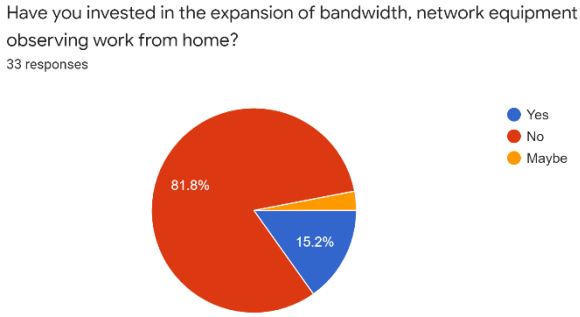
- Platform that helped the employee to communicate during the pandemic



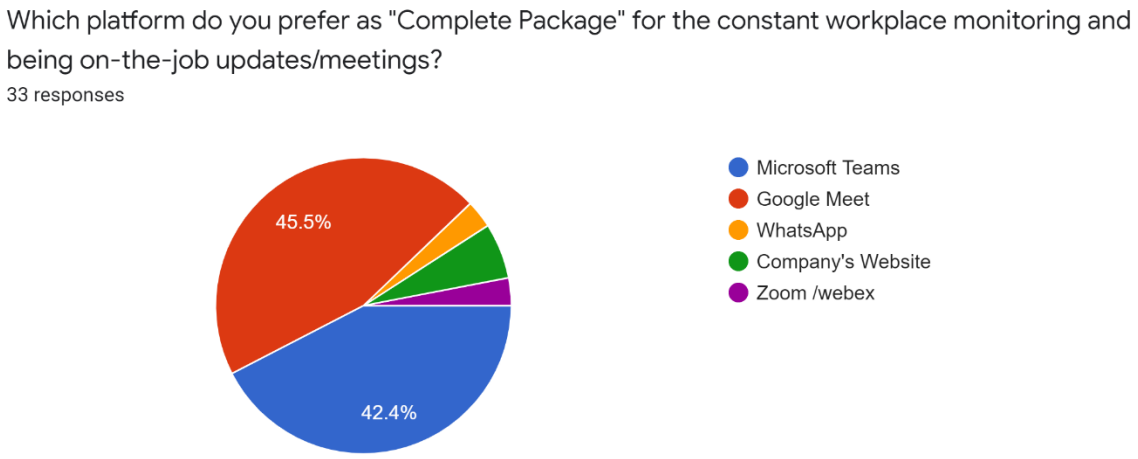
- Do employee thinks the use of video- and audio-conferencing tools increased significantly during this pandemic? - Yes (90.9%), No (9.1%)



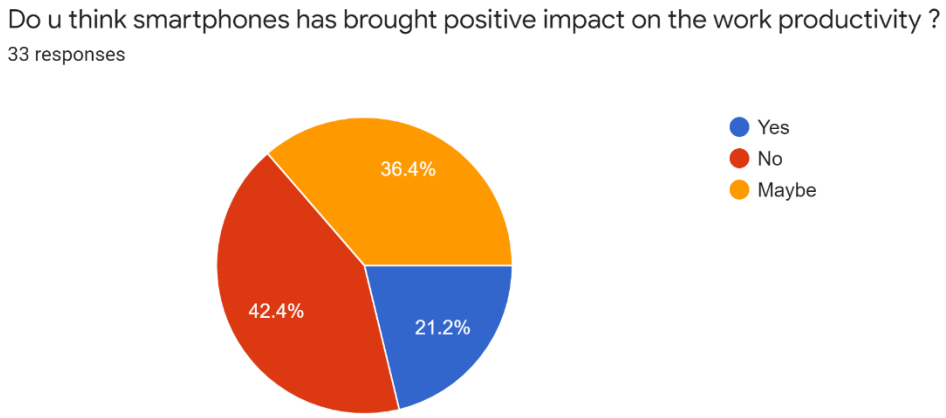
- Has the Employee invested in the expansion of bandwidth, network equipment or smartphone while observing work from home?



- Platform that employee prefer as "Complete Package" for the constant workplace monitoring and being on-the-job updates/meetings?



- Smartphones has brought positive impact on the work productivity ?



CONCLUSION

Through this study, the researcher's goal was to find the impact of smartphones in the work productivity during the pandemic and its positive/negative impact in the development and facilitating of work, which could lead to increased work performance in the organization.

As expected, the researcher found that there are positive/negative influences attached to the use of the smartphone during the work productivity it depends on different attitude of the employee. Among the most projecting pros found by a researcher is the mobility of the employee who, with the aid of a smartphone, can communicate with colleagues at work or any applications may also use it now or in the future, the employee can communicate or use applications at anytime and anywhere.

As expected, the researcher found out that employee usually prefer Work from Home during this pandemic and overall has a negative impact of using Smartphone during the working hours and the most used software that help them to communicate with their managers and colleagues through audio and video conferencing tools during the pandemic is the Google Meet Application.

FUTURE PROPOSAL

The following are some references proposed that may improve the productivity of employees:

1. Allow the use of cellphones during working hours, and ensure the phones are used properly.

2. Since most of the participants in the questionnaire use their smartphones during the working hours (96.4%), the researcher suggests the formation of specialized smartphone applications. These applications would help to facilitate, develop and increase work performance.

3. Create a specialized application for the employees, that allows employee to communicate with each other, with the opportunity of the separation of women and men, and also appropriate to the exchange of information and knowledge at work.

4. Consent the use of internet wireless LAN (Wi-Fi) in the workplace but develop an ethical code to guide their use. This is vital to avoid internet misuse.

5. In the future make in-depth education on the benefits of smartphones and how it contributes to the growth and increases employee productivity or work performance.

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