

Impact of COVID-19 on digital platforms and change in E-commerce shopping trends

Bhavna Galhotra

Department of computer science and engineering
JIMS, 3, Institutional Area Sector 5, Rohini
New Delhi, 110085, India
bhavna.jims@gmail.com

Ayushi Dewan

Department of computer science and engineering
USICT, GGSIPU, Sector 16 C, Dwarka, Delhi, 110078
ayushidewan@gmail.com

Abstract— Digital platforms are considered to be the tools for performing a huge number of tasks. It mainly enables a data-driven world rather than process-driven. Digital platforms are used in huge sectors mainly in market places, media platforms, knowledge platforms, etc. Over the years, digital platforms have been observing a massive increase as people tend to buy online and also use other services which can be subscription-based or free of cost on various online channels. Electronic commerce platforms are facing a lot of challenges due to COVID-19 pandemic worldwide. COVID-19 has impacted customer shopping trends on many digital platforms. The pandemic has affected customer behavior, the amount of sales, and the overall supply chain drastically. People tend to feel treacherous while buying online which has led to major variation in the number of orders of various categories of goods like grocery, healthcare, luxury, fashion etc. In India particularly, four lockdown phases have been observed as of now with varying trends in customer behavior while buying online. In this paper, a systematic analysis has been conducted on various categories of goods and chattels sold on numerous digital platforms during the COVID-19 pandemic in the lockdown phases. The analysis mainly focuses on the impact of the COVID-19 pandemic on businesses observing at the change in customer buying trends and secondly, a careful analysis has been conducted on the customer feedback based on many parameters like the usage, performance, security, usefulness, satisfaction factors etc. of the digital platforms in the lockdown phases. The paper is concluded with a comparative analysis of all four phases of lockdown as observed in India with the most common items ordered category-wise.

Keywords—Digital platforms, Electronic commerce, COVID-19, analysis

I. INTRODUCTION

With the spread of the COVID 19, there is a change in the life of human beings. The measures to be adopted were the lockdowns, self-isolation, social distancing, which have a wide impact on the digital media consumption, to keep themselves occupied, people entertained, socially connected and be in touch with the friends and family. Digital platforms were the best option for people to be connected [1]. The pandemic has highlighted the basic needs to bridge the digital functionality within and across the countries, digital platforms have given the solution to many problems. Technology has proved a useful and necessary tool to help in a crisis. Within this context, the

technology has intense effects on the lives of the citizens and ensure the access to the E-learning tools, online digital platforms for meetings, Entertainment platforms, Social media, E commerce, Health care sectors, access to the information available online. [2] [3] With the use of the digital platforms for various purposes people feel secured and also digitally independent for completing their task. Schooling for the kids also had a different experience where the online teaching tools were used to connect with the students, there were various platforms being used for the fast and safe response to various health problems. The e commerce platforms were used to deliver the essentials at the door steps, E commerce platforms which were used for the buying and selling of goods and services were mainly used to deliver the essentials which included the groceries, masks, sanitizers and other essentials commodities. With the Adoption of the ML and AI technology the slots were fixed for the areas to deliver the products and the routes mapping were done for fast and safe delivery of the products. [4] Apart from having the safe shopping and access to the essential products in the COVID 19 lockdown situation, E commerce is also known for befitting the farmers, by establishing the block chain technology in which they used to bypass the intermediaries and sell their products directly to the wholesale buyers. This has helped the farmers grow financially, also reducing the wastage. [5] With the increase in the COVID 19 spread people are enthusiastic to explore more buying options online for essentials/non essentials good and services for the safety point of view. The only concern is the support of implementing the social distancing norms due to the minimum amount of physical contact being involved taking care of the security and safety norms. Most of the people have switched to the digital wallets for doing the online transactions. [6] Few people are still reluctant for the use of the digital wallets to transfer the money. Industry experts have termed e-commerce as the best support system provided to the people in the cities under lockdown to fight against the pandemic. E commerce is plagued with various challenges which the authors feel that will unlock the true potential during the pandemic and beyond. With the positivity in the usage of the digital there are certain negatives also associated with the digital consumption [7]. The applications related to the food,

shopping and travel have been severely affected our freedom of the movements and also the food and products being ordered. The lockdown has severely affected the production, transportation and distribution. There is an effect on the speed of the internet data being provided due to the high demand in the consumption as people are more engaged to the video chats, online learnings and video conferencing tools which needs high speed of internet [8]. There are certain challenges faced by the E commerce organisations as the sales of the non-essential commodities are mostly affected, also the amount being spent on the advertisements both for the traditional and digital have a huge dent on the market [9]. In this paper authors have tried to find out the various digital platforms being used during the lockdown phase, did they feel comfortable in buying the products using e commerce platforms due to safety concerns. The authors have conducted a small survey and got 200 responses, with the help of which they were able to analyse which all platforms were being preferred during the COVID 19 lockdown phase and which all products were ordered using e commerce platforms and also in different lock down phases.

II. BACKGROUND STUDY

With the advancements in technology, digital platforms are becoming more popular. Also, with the usage of the advanced ML and AI techniques, all the organizations try to switch their businesses to digital platforms. Digital platforms have cultivated the interest in multiple disciplines for their abilities to develop new technologies, models or the mechanism to work effectively and efficiently. [10] Like in the crisis of the COVID 19, it is only the technology and digitization which has covered the complete loss and also transformed the thinking of people staying at their homes, simultaneously working without any hassle. It is the digital era which has converted the classroom teachings to virtual classroom teachings, physical cash to the digital wallets, and office meetings to the video conferencing board room chats. [11]The digitization is not confined to only learning but it has explored the wings in the entertainment like gaming, subscription-based OTT platforms, Social Media / YouTube channels, Health care sector has also emerged with the digital movement as the health-related applications for the Doctor advice or ordering the medicines online is considered to be the most used applications during the Lockdown phase. Below is the graph of the author's analysis study which shows the various platforms being used during the lockdown phase.

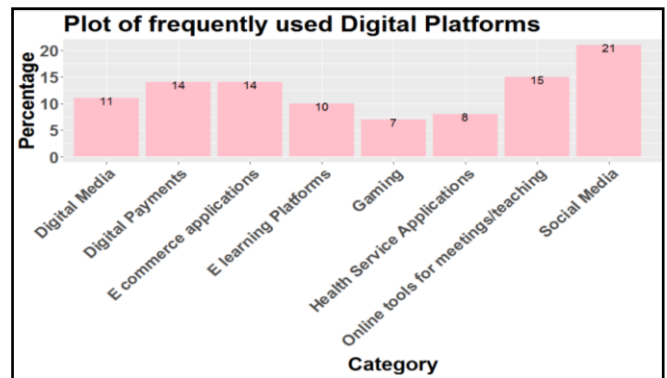


Figure 1: Digital Platforms Being used during COVID 19

All the people who have used the digital platforms for their usage during the lockdown must have the different opinion in response to the user related to the digital platforms, the usage is related to their comfort, subscription, online tools for meeting or conducting the sessions, health related applications etc. In figure 2 given below, the graph shows the results of the various people who have used the digital platforms in the lockdown phase. With the help of this parameter which is the usage of the various digital platforms, authors tried to explore that which all variations of the digital platforms did the respondents used and if they have explored the applications and their feature if they were comfortable in using the applications or not. As per the results, the authors were amazed that all the age group of the respondents felt comfortable in using all types of applications, authors felt that due to the COVID 19 pandemic situation most of the people tried to solve their problems using the applications available on the digital platforms. People tried to explore the applications for entertainment as well as the health related requirements.



Figure 2: Usage of digital platforms during the lockdown phases

III. METHODOLOGY

This study is carried out to analyse the impact of COVID-19 on various digital platforms. The methodology adopted to conduct the analysis is explained in this section. R tool is used to analyse the results in this paper. "R is a language and environment for statistical computing and graphics" [12]It's an object-oriented language and environment where objects,

whether they be a single number, data set, or model output, are stored within an R session/workspace, it is used for this study as it is an integrated suite of software facilities for data manipulation, calculation and graphical display. It is an effective data handling and storage facility, a large, coherent, integrated collection of intermediate tools for data analysis, graphical facilities for data analysis.

In this study, R has been used to conduct the analysis and drawing the results from the considered dataset. The dataset has been filtered according to the various parameters taken in the study. Different data frames have been created for each set of parameter taken so as to get the desired results for the analysis. In this study, the visualization using graphs has been used for comparing different discrete categories. Various stacked bar graphs have been created using the ggplot2 and reshape2 libraries and inbuilt function for better visualization of the result.

The dataset was used for the analysis has been accumulated by conducting a survey online through Google forms. 200 responses were received out of which 95 were female and 105 were male respondents. Apart from this data has been collected from various age groups for better analysis. The age groups taken into account while conducting the survey were less than 20 years, 20-30 years, 31-45 years and more than 45 years. There were various parameters on the basis of which this analysis has been done. The data was collected with the help of google form on the basis of the gender, age, which all digital platforms were mostly used, issues faced to buy essentials online, was buying a safe with the choice of the products ordered online, Did the usage of the digital platforms were difficult in different lockdowns, how was the performance of the digital platforms, what was the usefulness and ease of use for the Digital platforms, what was the attitude of the people towards the digital platforms in the lockdown phase, the satisfaction factors and security concerns, what was the intension to use the platform and what all essentials were mostly ordered. On the basis of the responses, the authors were able to find out the need of the digital platforms for the COVID lockdown scenario

Some of them are as follows:

Table 1: Dataset real and fake followers count

Parameter	Explanation
P 1	Digital platforms preferred in lockdown
P2	Products ordered more frequently
P3	Usage of digital platforms
P4	Performance of digital platforms
P5	Usefulness of digital platforms
P6	Attitude towards using digital platforms
P7	Satisfaction Factors
P8	Security concerns
P9	Intention to use E-commerce in future
P10	Categories of products ordered in each lockdown phase in India

Above mentioned parameters have been analyzed to find out that how the digital platforms have evolved in the situation of lockdown phase and primarily our study on how the E

commerce platforms are being used for buying and selling of essentials or non-essential commodities.

IV. ANALYSIS AND RESULTS

All the analysis is done using R, which is used to find the various frequencies on the basis of the data and find out which all commodities were more frequently ordered during different phases of the COVID 19 lockdown. Below is figure 3, which shows the Increase in percentage of various categories of products ordered in lockdown phases as observed in India amid the COVID-19 pandemic. The plot below has been created using R. The plot mainly portrays the massive increase in orders of electronics at 25%, followed by Food and Beverages at 21%.

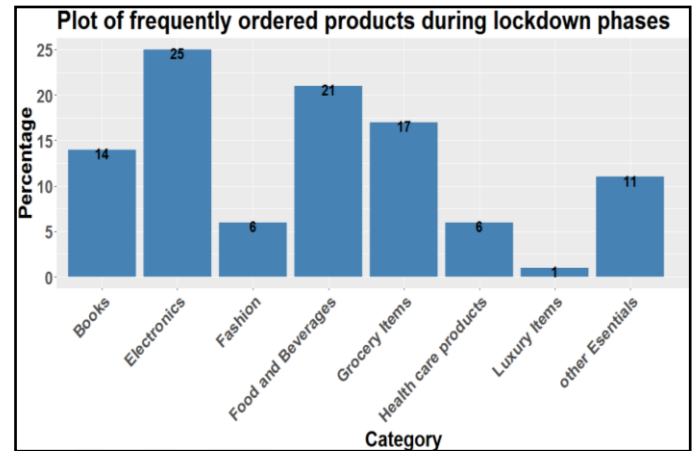


Figure 3: Plot of frequently ordered products during lockdowns

A. Performance based on using digital platforms during COVID-19

Authors also tried to find out the performance of the various digital platforms during the lockdown phase, the graph shows the results in percentage where the people have mostly agreed to the pointers focusing on the applications features, how much friendly the interface is, were people aware of the application and its purpose. Performance graph shows did the application resolved the purpose of the installations and is it able to overcome with its objective?

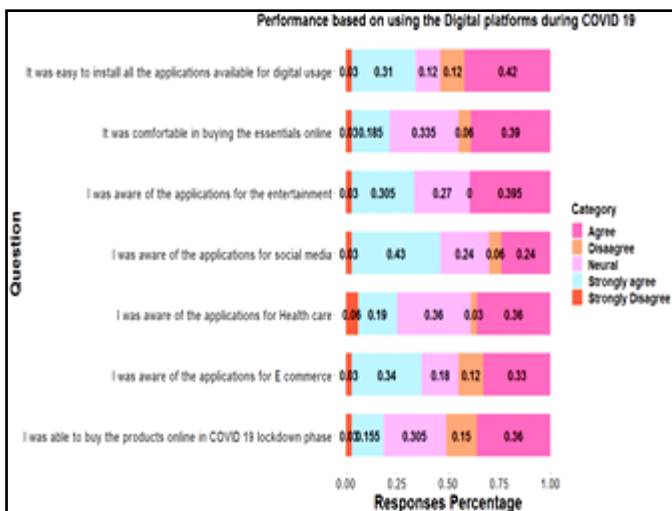


Figure 4: Performance based on using the digital platforms during COVID-19

B. Attitude towards using digital platforms during lockdown phase

As per this parameter, the author tried to find out the attitude towards using the platforms during the lockdown phase as with the availability and awareness of the digital platforms the usage and the attitude also plays a vital role in finding whether the people were interested in the digital platforms and their benefits. If they have used the platform, did the application solve their objective and if people got the benefits of using the same. In figure 5 given below the authors have tried to know about the platforms usage and the respondent's attitude towards using the platforms. With the help of the attitude results authors were able to find the future objectives of the digital platforms, attitude shows the users engagement with the applications.

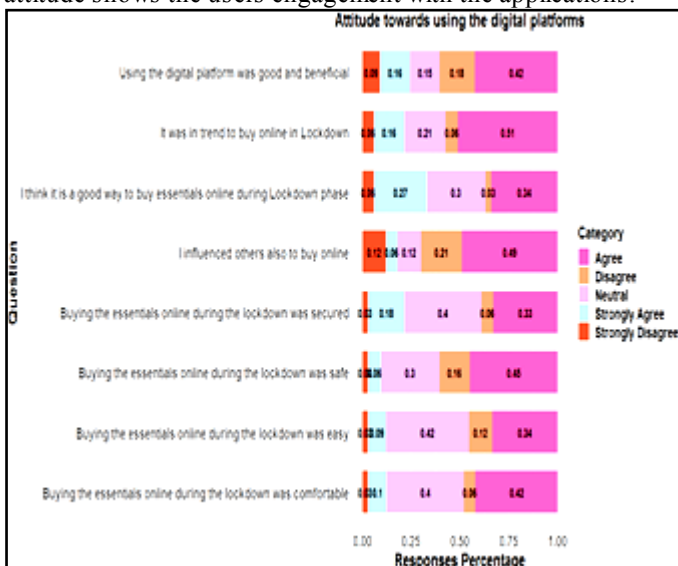


Figure 5: Attitude towards using the digital platforms

C. Satisfaction

Satisfaction plays an important role in finding whether the users were satisfied with digital platforms or not. This survey shows how much people were satisfied with the usage of the applications, how much secured and friendly the application tends to be. This parameter decides the gaps as well as the points for the improvements. For eg, in the graph below there are values which show that health care applications were able to resolve the issues during the lockdown phase, this shows that people are now trying to adapt the digital era for smooth and hassle free lifestyle in which healthcare plays a vital role.



Figure 6: Satisfaction Factors

D. Security concerns while digital platforms during lockdown phase

During the COVID 19 situation, when millions of people were instructed to stay safe and be at home there were certain norms given by the government to follow, as the lockdown came in 5 different forms wherein the lockdown 1 no one was allowed to come out of their homes and then lockdown 2 there was with relaxations for buying the essentials during 12-5 time and further, in lockdown 3 there were availabilities of the essentials from 7 am-7 pm. Many people tried to confine themselves at home therefore they used to order the essentials using the e-commerce platforms which used to deliver the goods zone wise by allowing the time for deliveries. Below is figure 7, which show the percentage of the respondents who felt safe or unsafe buying the essentials online. As per the respondents, 50% of them felt safe and comfortable buying the good online whereas other 50% felt unsafe as to the factor of who will be delivering, whether the goods would be hygenic etc.

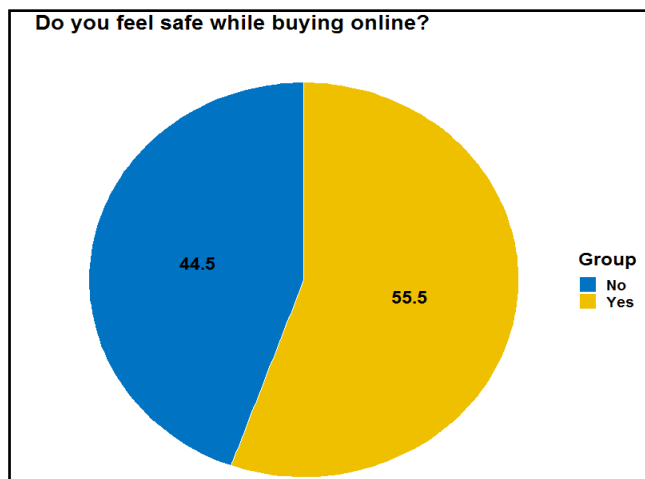


Figure 7: Pie-chart portraying safety using E-commerce

In the above Figure 7, 44.5% of the respondents said they do not feel safe while ordering online amid COVID-19. Whereas, 54.5% of the respondents agreed they feel safe while using E-commerce in lockdown.

E. Comparison of various categories of products ordered amid different lockdown phases

In India, four lockdown phases have been observed as of now. Figure 8, shows the comparative analysis done based on Lockdown 1, Lockdown 2, Lockdown 3 and Lockdown 4 on various categories available on E-commerce platforms. It can be observed on the basis of lockdown phases:

- LOCKDOWN 1: In lockdown 1, i.e. from 25th March'20 to 14th April'20, 30% of the times, Essentials were ordered, followed by 28% Groceries, 19% food and beverages to be particular, 7% Luxury products, 6% Books and 5% of the times Fashion items and non-essentials have been ordered.
- LOCKDOWN 2: In lockdown 2, i.e. from 15th April'20 to 3rd May'20, 30% of the times, Essentials were ordered, followed by 25% Groceries, 22% food and beverages to be particular, 3% Luxury products, 10% Books and 5% of the times Fashion items and 12% non-essentials have been ordered.
- LOCKDOWN 3: In lockdown 3, i.e. from 4th May'20 to 17th May'20, 25% of the times, Essentials were ordered, followed by 25% Groceries, 13% food and beverages to be particular, 7% Luxury products, 12% Books and 6% of the times Fashion items and 12% non-essentials have been ordered.
- LOCKDOWN 4: In lockdown 4, i.e. from 18th May'20 to 31st May'20, 12% of the times, Essentials were ordered, followed by 13% Groceries, 12% food and beverages to be particular, 16% Luxury products, 12% Books and 18% of the times Fashion items and 17% non-essentials have been ordered.

On the basis of 50% of the respondents who said that they were comfortable buying the goods online is given in figure 7. Using the e-commerce applications during the lockdown phase has mostly ordered essentials, groceries and food and beverages in lockdown 1, the situation was similar in phase 2 as well but there was a drastic change in the lockdown 4 where the essentials as well as non-essential go hand in hand in which people have ordered more of non-essentials as compare to essentials. With the help of figure 8, shown below the fashion will take time to pick for being ordered online due to the pandemic situation of COVID 19.

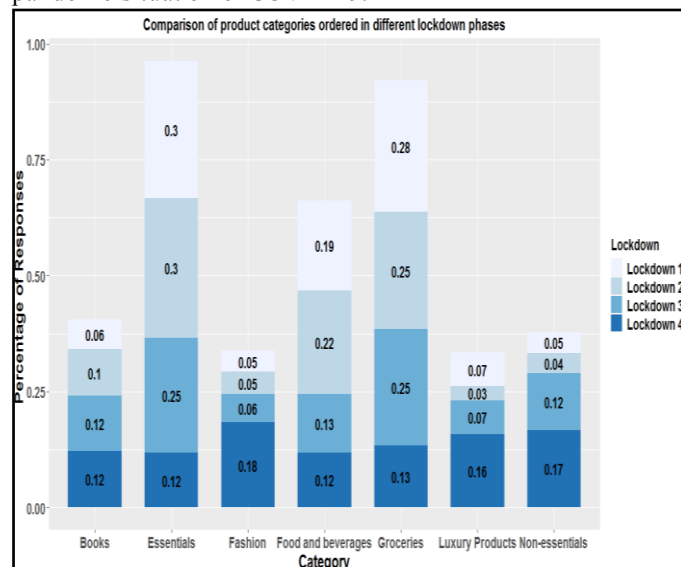


Figure 8: Comparison of product categories ordered in 4 lockdowns in India

V. CONCLUSION

With the help of this survey, the authors were able to find out the various digital platforms that were being used during the lockdown phase. Also if all the digital platforms were secured for future usage or not? How people felt in using the e-commerce applications for buying the goods online. Did they feel safe in buying, if some of the people bought online which all the products did they order in different lockdown phases? The results and survey analysis shows that most of the people used the digital platforms for some of the other purpose as per their needs and requirements, either they used the digital media, entertainment OTT platforms, platforms for ordering online essentials online. Most of the people felt comfortable in installing the applications, people were amazed by the user-friendly environment and the feature provided by the applications. There was a digital transformation for the school teachers and staff to conduct the classes online. People tried to shift and bought the goods/essentials online taking care of the safety norms but they ought the essentials more as compare to the non-essential goods.

VI. FUTURE WORK

In this study, further, a prediction based model can be built on the basis of the results obtained. This can be done using Machine learning and further prediction can be done for various factors like what all products will be preferred in the coming days to order online. Apart from this, it can be predicted which sectors will be profitable for businesses and various E-commerce platforms. Also, security concerns can be taken into account as derived from this study.

The figure 9 shown below shows the intension for the usage of the digital platforms and this comes with the analysis results where most of the respondents felt that the applications were used in the occurrence, the applications like the health care is also being used frequently for the safety, gaming applications were used for the entertainment and also e commerce applications were used for the buying and selling of the essentials and non-essentials. These are the various factors which will give a bright future to different organizations to work more in developing the applications in these areas so that the people will explore more with the increase in the usage of the technology. Since due to the COVID 19 situation people have explored these applications and found the best ways to provide the solution to the various problems. The future of these applications is way ahead and they can be easily adapted by the millennials.

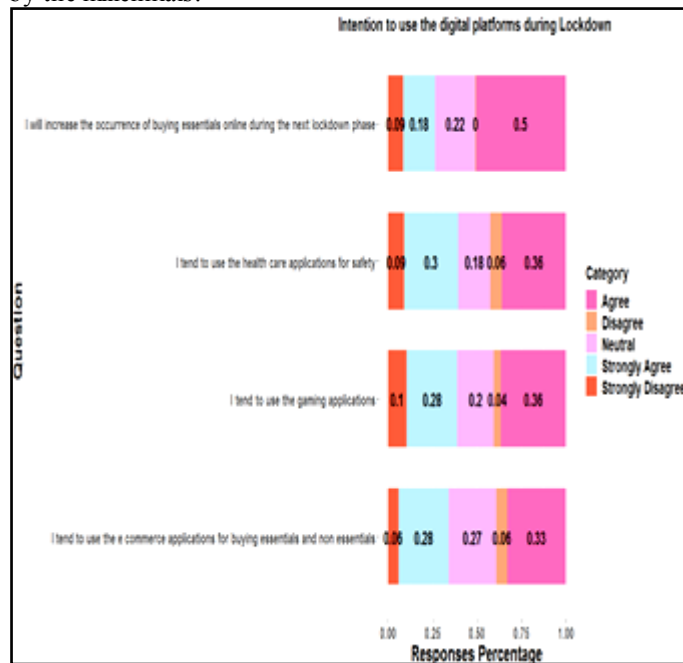


Figure 9: Intention to use the digital platforms during lockdown

REFERENCES

- [1] R. Lakshmi Narayanan, "FUTURE OF DIGITAL MARKETING IN 2020.," *Research Gate*, November 2019.
- [2] B. Galhotra, "Evolution of E-commerce In India: A Review and Its Future Scope," *2019 International Conference on Machine Learning, Big Data, Cloud and Parallel Computing (COMITCon)*, no. 10.1109/COMITCon.2019.8862252., pp. 226-231, 2019.
- [3] "Digital Technologies and the COVID19pandemic," United Cities and Local Governments, Spain, 15.04, 2020.
- [4] M. T. P. ., P. D. F. Raffaele Cioffi, "Artificial Intelligence and Machine Learning Adaptions in Smart Productions : Progress, Trend and Directions," *MDPI*, vol. 492, no. 10/3390, pp. 1-26, 2020.
- [5] P. S. M. & U. S. Mehta, "Enable e-commerce to disable Covid-19," *Economic Times, India*, April 14, 2020.
- [6] R. & S. K. Kolandaisamy, "The Impact of E-Wallets for Current Generation," *Journal of Advanced Research in Dynamical and Control Systems*, vol. 12, no. 01-Special Issue, pp. 751-759, 2020.
- [7] M. S. A. S. ., B. Roberto RUGGIERI, "The impact of Digital Platforms on Business Models: An empirical investigation on innovative start-ups," *Management & Marketing: Challenges for the Knowledge Society*, vol. 13, no. 4, pp. 1210-1225, December 2018.
- [8] J. A. M. A. H. M. K. S. B. C. S. S. M. I. H. R. Nitin Kumar, "Challenges and Opportunities of E-Commerce in India: Pathway for Sustainable E-Commerce," *International journal of Engineering, Business and Management (IJEEM)*, vol. 2, no. 2, pp. 13-21, April 2018.
- [9] S. N. Chaithralaxmi.T, "E-COMMERCE IN INDIA – OPPORTUNITIES AND CHALLENGES," *International Journal of Latest Trends in Engineering and Technology*, pp. 505-510, 2016.
- [10] B. G. Y. A. Devesh Lowe, "Discovering Binge watching and Audience Engagement through Sentiment Analysis," *IJAST*, vol. vol. 29, no. no. 7, pp. 8030-8038., Jun. 2020.
- [11] O. Kamble, "The Impact Of COVID-19 On Digital Consumption," *Your story*, 7th Apr 2020, 7th Apr 2020.
- [12] "What is R?," [Online]. Available: <https://www.r-project.org/about.html>.