

Apps in Time of Pandemic:

Digital Usage and Gratifications in Transition towards #SmartCity

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Abstract

INTRODUCTION: The study explores how during COVID-19 pandemic online apps helped people applying uses gratification paradigm to identify needs, usages and gratification of users.

OBJECTIVES: The paper investigates how COVID-19 pandemic has affected the usage pattern of online apps? What is the gratification level of using online apps during COVID-19 pandemic? How users perceive the use of online apps during COVID-19 pandemic?

METHODS: The study employs small scale snowball sampling survey across major cities of India addressing questions on comparative usage pattern of online apps before and during the pandemic, users' gratification and users' opinion of using online apps.

RESULTS: Usage of few apps like news, video, health increased during the pandemic with frequency and intensity of usage. Users are concerned with misinformation spread through social media, demeaning family bonding due to high usage of apps, digital divide failing to provide enough job opportunities.

CONCLUSION: Specific apps to deal with health emergencies should be developed along with mechanism against spread of misinformation and strategic attempts for digital inclusion.

Keywords: apps, social media, uses gratification, pandemic, india, post-humanism, smart city, risk society

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1. Introduction

Discussing Ulrich Beck's thesis on global risk society, developed in the post-Chernobyl era, D. S. L. Jarvis [1] wrote, "Risks are now incalculable and beyond the prospects for control, measurement, socialisation and compensation....Science now fails us, with conflicting

reports, contradictory assessments and wide variance in risk calculations. Faith in the risk technocrats evaporates, the hegemony of experts dissolves and risk assessment becomes no more than a political game than advances sectional interests." The recent COVID-19 global pandemic has similarly stripped off the embellished blanket of safety and security that the late modern society so laboriously has woven in the minds of people. Capitalism with its nature of abundance and manufactured

stability maintains a hierarchy that ensures best benefits for the ones in the higher strata of structure. When situation such as a global pandemic hits hard challenging the core essence of capitalism, the stability is shaken down to mere irregular access of basic essentials – at times even not that. This triggers a demand for a new system of society, politics, culture and economics that would not fail humanity at times of such crisis. Thus innovative solutions and creative outlooks for every aspect of life and living become that essential vaccine which safeguards the civilization in its struggle for survival. Technology since long attempted to ease this struggle in various ways. The gradually increasing dependency of human on technology has pushed the society closer towards an era of post-humanism [2]. This fetched a densely mediated world where interaction and cohabitation with technology is of much higher frequency than with other human beings. However this change has not occurred just during the pandemic.

There have been continuous attempts for gradual transformation towards a digital world over past few decades. The Smart City Mission of Government of India [3] acknowledges “robust IT connectivity and digitalization” with e-Governance as core infrastructure elements of a smart city. Further in 2016 India identified 20 cities for developing round one smart cities of India. India and the world at present are facing an unprecedented global crisis in this digital age. Due to the COVID-19 pandemic the gradual digitalization process witnessed a challenge for serving the suddenly increasing netizens in right way. India’s internet data consumption at the beginning of lockdown rose by 13% with 308 petabytes being consumed every day [4]. This high consumption of data clearly shows that citizens are accessing internet more than before as the crisis sets in.

This triggers the question how people in this first large scale global pandemic of digital age are coping with the situation with the help of internet. Are there innovative solutions that internet is providing for everyone in their fight for survival? For what purposes people are using internet? How online apps are helping them in such situation? How satisfied people are with the services of these apps? Further there have been various concerns with the rising usage of online apps. Such diverse recent concerns raise queries about quality and nature of experience of the users as well as their reaction to various issues related to the usage of online apps during the pandemic. The present study thus seizes the opportunity to investigate these questions. India, with second highest number of internet users in the world [5], with 40% internet penetration [6] till far and at the first phase of developing smart cities, becomes a valuable case study to explore how a developing nation with huge possibility of digitalization is coping up with this pandemic.

2. Usage and Gratification

When Bernard Berelson investigated in 1945 ‘what “missing the newspaper” means’ during New York’s newspaper delivery strike [7], it was not only the beginning of a new era of theoretical and empirical exploration into the role and effect of mass media in society, but it was the beginning of a search into the inter-dependency and inter-relation between human and mediated manufacture. The proliferation of the Uses gratification paradigm [8] enjoyed major contributions from Lazarsfeld [9], Herzog [10] and Wilbur Schramm [11]. The core assumption of the paradigm is that media are used more in cases where the motives for using the media are met with greater satisfaction of the needs.

As McQuail [12] has explained, “personal social circumstances and psychological dispositions together influence both general habits of media use and also beliefs and expectations about the benefits offered by media, which shape specific acts of media choice and consumptions followed by assessments of the value of the experience (with consequences for further media use) and possibility, application of benefits acquired in other areas of experience and social activity.” Different social situations demand greater usage of media for satisfying various needs. Usage of media can increase to ease social tensions, to attain information for social awareness, to replace real life opportunities, for social affirmation of specific values and to be updated to participate and be included in social interaction. The COVID-19 pandemic has witnessed increased use of internet. This then triggers obvious questions behind the motives, uses and gratifications of using the medium.

Recent studies on uses gratifications have explored social networking sites [13], online games [14], mobile apps [15], virtual communities [16] and more. Different researches have tried to capture the factors that lead the users to use social media and identified factors like social interaction, entertainment, escape, information, exposure, influence and inclusiveness to be important determinants [17]. Gan et al [18] further classified the types of gratifications as cognitive, affective, social and tension-released. Hsiao et al. [19] classified motivations as utilitarian, social and hedonic. There have also been studies on the usage of social media during pandemic [20] [21], particularly the H1N1 pandemic [22] of recent past. However not any past pandemic in recent times has been as severe as COVID-19 pandemic and has not witnessed this scale of upsurge of use of internet globally. Thus it provides an opportunity to investigate the impact of pandemic in the changing nature of usage and gratifications that internet users are drawing from the medium. Further application of uses gratification concept in analysis of the rising apps and social media usage pattern has been scarcely used, particularly in the background of pandemic and health communication. In this context the present study stands distinct as it explores different usage of online apps and social media during the recent pandemic, particularly as an exploration of a theoretical extension. As the study focuses on the users’ behavioural pattern during the COVID-19 pandemic

along with their preferences, opinions and gratifications of using the apps, it takes an in-depth look into the dynamism of uses gratification theory, into the changing usage patterns during the most recent pandemic and into the shifting relation between man and machine at the verge of post-humanist world. By investigating the motives behind the rising usage of internet, the study also attempts to comprehend the tendency of increasing usage of internet during the pandemic, establishing a relation between two. In the selection of its sample from a developing nation, India which is in process of transforming towards the first phase of smart cities, the study stands distinct offering a perspective from a multi-cultural, multi-lingual, multi-religious and dual economic nation. The study thus not only provides a theoretical deliberation, but also provides an understanding of people's usage of digital technology for survival in difficult times, giving substantial evidences and references for developing smart cities.

3. Method

The present study thus explores the usages and gratifications of online apps including social media during the COVID-19 pandemic of 2020. For this the study explores the following research questions.

- RQ₁: How COVID-19 pandemic has affected the usage pattern of online apps?
- RQ₂: What is the gratification level of using online apps during COVID-19 pandemic?
- RQ₃: How users perceived the use of online apps during COVID-19 pandemic?

For RQ₁, to explore the impact of the pandemic on the behavioural pattern of using online apps, the research focused to compare the usage pattern before and during the pandemic based on accessing internet, frequency of using internet, intensity of using internet, activities in internet and preferences of apps usage. For RQ₂ the gratification level was measured through simple rating scale. For RQ₃ the respondents' direction and degree of opinions were measured based on various statements related to using apps during COVID-19 pandemic.

For all these measurements, survey method [23] has been applied. Considering all the respondents are users of online apps, the survey was conducted online. The online survey questionnaire consists of 25 questions excluding the demographical questions. The questions were developed to detect the users' access pattern of internet, their frequency of accessing internet, their intensity of using internet, their activity patterns in internet, their choice of apps, the intensity of using the apps, the changes in using internet and apps before and during the pandemic, their satisfaction level of using the apps during the pandemic along with testing the direction and degree of opinion on nine different aspects of using online apps during pandemic. The questionnaire was developed

keeping in mind the research questions. So a series of questions was asked to compare the usage pattern of online apps before and after pandemic to explore the first research question as how the pandemic has affected the usage pattern. Also many questions were asked along with a rating question to understand the gratification level of online apps used during the pandemic, as the second research question demands. To address the third research question a series of questions were asked to understand the direction and degree of agreement with various statements that represent different perceptions towards usage of online apps during the pandemic. Thus the survey instrument ensured face validity. Also as the result showed, the survey instrument significantly illustrated predictive, concurrent and construct validity by offering results that affirmed with the published internet usage statistics, general predictions of apps usage and the theoretical explanation of usage gratification.

For the survey the data was collected from different cities of India keeping in mind the urban centres, metropolitan areas and phase-one smart cities as urban penetration of internet is higher than the rural penetration in India [24]. The survey sample collected was mainly through purposive snowball sampling initiated from the established network of the researchers. The snowball sampling was initiated purposefully approaching at least one respondent from most of the proposed smart cities of India. The respondent was then requested to forward the online survey link further among other people they know residing in those areas and using internet. This has helped to approach many people across India who are now in a transition phase towards a more digital lifestyle and those who are already using internet heavily. Thus the sampling technique ensured targeted useful responses to be included in the survey. As the purpose of the study was to detect the possible changes in the usage pattern of online apps due to COVID-19 pandemic and to analyze the perceptions of the users on using online apps during pandemic, the study thus aimed for a small scale intensive investigation where the background of the respondents was analyzed to understand the responsive patterns. The survey was conducted during the months of May and June 2020 with the total sample size of 204. With a substantive requirement of 100 survey sample size for any statistically significant result [25] and considering the non-parametric nature of sample collection for rather detailed understanding of the survey responses rather than generalization, the sample collected sufficed the purpose. Survey data was analyzed based on descriptive statistics and discussed in reference to uses gratification and other established theories.

4. Result

4.1. Demography

For the small scale survey data collected was of 204 respondents. Among this 82% of the respondents fall under the age group of 18 to 36 years, followed by 9% between 13 and 17 years and 5% between 37 and 45 years of age. So the respondents are mostly of young age group with only seven respondents being above the age of 46 years and one above 71 years. The behavioural aspects and opinions thus largely reflect that of the young internet users. Considering 72% of internet users in India are from the age group of 16 to 39 years and 81% from the age group of 16 to 49 years [24], the emphasis on the young internet users for this study is thus justified. Quite expectedly thus 58% of the respondents are students, while 31% are salaried and 11% are earning otherwise. 70% of the respondents have completed their post-graduate or graduate degrees in which 34% have completed the graduate degree. 20% of the respondents are yet to complete their graduate degree while 6% of the respondents hold degrees higher than masters'. 58% of the respondents are female while 42% are male. However in case of representation from economic classes, the respondents come from a wide range of sections without any particular bias to any specific category. Thus 17% respondents are from category of monthly average family income of 20,001 to 30,000 Indian rupees, followed by 16% respondents from the category of 10,001 to 20,000, 14% from 30,001 to 50,000, 13% from 1,000 to 10,000 and 12% each from 50,001 to 70,000 and from 90,001 to 1, 50,000. To summarize out of 199 respondents who responded to this question, 60% of the respondents have average monthly family income below 50,001 Indian rupees and 38% of respondents have average monthly family income above 50,001. 32% of the respondents however have three family members, while 30% have four family members and 17% have five family members. Thus it can be said 79% of the respondents have three to five family members. To establish a better perspective in this regard, the 2011's census report of India considered rupees 816/capita/month to be the rural poverty line of India [26]. 3% of the respondents have also declared their average monthly family income to be less than 1,000 rupees. The responses came from 87 different cities from 20 states of India.

4.2. Usage Pattern

Access

Table 1. Comparison of internet access devices: Before and during the pandemic

Mode of Access	Percentage of Users	
	Before Pandemic	During Pandemic
Mobile	97	97
Personal Computers	44	46
Workplace Computers	15	5
Public Computers	1.5	0

Table 2. Comparison of internet access points: Before and during the pandemic

Point of Access	Percentage of Users	
	Before Pandemic	During Pandemic
Personal connection	89	86
Home connection	38	41
Workplace	15	3
Public places	4	0.5
Not accessing	0	0.5

In consideration of choice of device through which the respondents accessed internet, based on table 1 it can be seen that 97% of the total respondents who used mobile before the pandemic kept using it with a slight drop of 0.5%. However before the pandemic 44% of the total respondents used personal computers, which during the pandemic shot up to 46%. This change of percentage can be explained with the fall of usage of organizational computers from 15% to 5% and the fall of usage of computers at cyber cafes from 2% to 0%. In both the cases of pre-pandemic and during the pandemic, no one was there who was not using internet. This explains that out of 17% of the users who were earlier using internet at organizations or at cyber cafés, only 2% started to use internet at personal computer during the pandemic. However as no one was not accessing internet it explained that the respondents had more than one device to access internet and thus used internet during the pandemic either via their own mobiles or via their other device available at home. Pandemic it seemed could not make anyone to lose their internet access. The users found a way to access internet even during the pandemic.

Similarly before the pandemic, as is evident from table 2, 89% of the respondents were using internet with their personal internet connection which witnessed a little drop of 3% during pandemic with 86% users accessing internet with their personal internet connection. This drop in usage of personal internet connection can be explained with 3% rise of home internet connection usage which rose from 38% usage pre-pandemic to 41% usage during the pandemic. There was also an expected considerable drop of percentage of using internet connections available at public places. This shows that during pandemic people are

going to use internet connections at home more than that of their personal mobile devices which are generally used more while travelling or outside home. Wi-fi zones created in public places of various cities in such situation could not be useful.

Frequency and intensity

Internet usage has increased considerably during the pandemic. There have been reports stating that in the first few weeks of the lockdown in India, internet usage shot up by 13% [4].

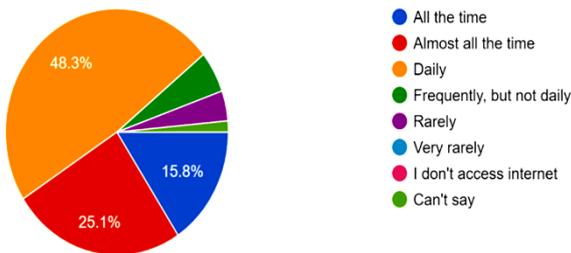


Figure 1. Percentage of respondents using internet before pandemic based on frequency and intensity of access

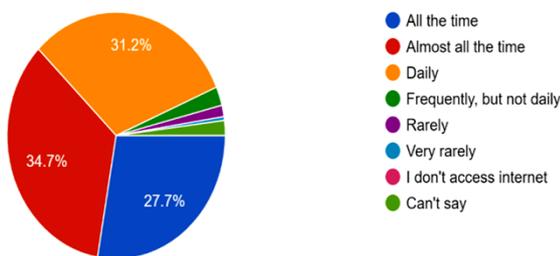


Figure 2. Percentage of respondents using internet during pandemic based on frequency and intensity of access

In agreement to the same, the present study finds, as evident from figure 1 and figure 2, that while in the pre-pandemic time only 25% respondents were using internet almost all the time in a day, during the pandemic, the same shot up by 10 point to 35%. Similarly before the pandemic only 16% respondents were using internet whole day while during the pandemic 28% respondents were using internet whole day. However earlier while 48% of the respondents were using internet daily for some time, it fell down to 31% during the pandemic. There is 5 point drop among the frequent users and 3% drop among the users who used internet rarely. So the frequent users and rare users of internet became more regular users during the pandemic. However there was none before or during the pandemic who was not using internet. There was still one case where the respondent reduced using

internet during the pandemic than earlier in the sample collected. This shows that in cases where someone was using internet mainly for professional reasons, might choose not to use internet much during the pandemic. Here the reason of using internet lesser than earlier is not the issue of access, as every respondent did have access to internet before and during the pandemic, the reason might be the personal choice exercised by the user.

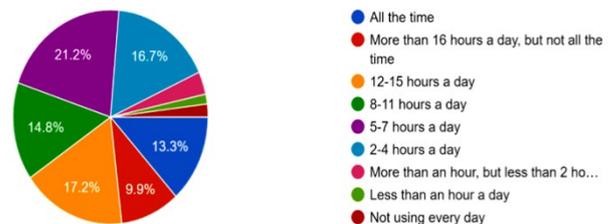


Figure 3. Percentage of respondents using online apps during pandemic based on frequency and intensity of usage

Further, in using different apps and social media, as it is found from figure 3 that 21% of the respondents are using apps for five to seven hours every day, while 17% respondents are using for 12 to 15 hours every day and again 17% of the respondents are using for two to four hours a day. 15% respondents are using apps for eight to 11 hours a day. 13% respondents interestingly have responded stating they use internet for whole day while 10% respondents use internet more than 16 hours a day. Only 3% respondents use internet every day for an hour or two, while 1% use less than an hour and 2% does not use internet every day. This shows as the frequency of using internet increased during the pandemic, respondents were intensively using different apps and social media. Following Henry Assael's [27] classification of users of internet, only 7% of the respondents are not heavy users of internet. Even raising the time determinant of heavy users of Assael from 20 hours a week to 25 hours a week of internet usage, only 24% of the respondents would not qualify as heavy users of internet among the study respondents. Thus the intensity of using internet for almost three fourth of the respondents qualify them as heavy users of the medium. This not only shows the increasing dependency of people on internet during pandemic, but also shows the spreading extensity of population using internet heavily.

Activity

As the frequency and intensity of internet usage increased during the pandemic, the obvious question that is triggered is whether the online activity pattern has also changed during the pandemic. Table 1 shows the finding of the question as what the respondents were spending so much of their time on in internet.

Table 3. Comparison of internet activity pattern: Before and during the pandemic

Type of Activity on Internet	Percentage of Users	
	Before Pandemic	During Pandemic
Communicate	72	70
Study	67	70
Video	64	68
Music	62	62
News	57	63
Professional	51	49
Shopping	45	25
Financial Transaction	35	36

In comparison of activities done by the internet users before and during the pandemic, it is found as is evident from table 3 that there are slight drops in the percentage of users during the pandemic, who used internet prior to pandemic to communicate and for professional work. There is a serious drop of percentage of users during the pandemic who used internet prior to the pandemic for shopping purpose. As various professional and e-commerce activities were stalled due to lock-down, the drops in percentage of users of such activities could be explained. In the same time, there is considerable increase of percentage of users from before the pandemic to during the pandemic on online activities such as news consumption, studying and video watching along with a slight increase in financial transactions. These changes are evident in the data presented in Table 3. As the lock-down and social distancing became norms during the pandemic, a large section of respondents who were students, had to shift their course-work activities online which is evident from the data. However rather than communicating with others, respondents were spending more time consuming news and videos. This offered an interesting finding that even though social distancing and lockdown have compelled people to stay in door, still rather than using internet to connect with each other more than before, the respondents had chosen to use internet more for news updates and for entertainment. Thus the usage of internet has been not only to connect, but also for surveillance and entertainment – the classic functions of mass communication [12] as extended in this digital era.

Use of apps

The present study attempts to explore particularly the usage of apps including social media before and during the pandemic. Transferring service accesses to user-friendly applications has been a characteristic of smart cities. The present study explores different services and activities chosen to be done through online apps during the pandemic.

Table 4. Comparison of apps usage pattern: Before and during the pandemic

Type of Apps	Percentage of Users	
	Before Pandemic	During Pandemic
News	64	71
Food Delivery	52	25
Cab Booking	52	10
Video	49	53
E-Wallets	43	36
Reading	40	47
Photo	39	40
Grocery	32	28
Shopping		
Health	0	31

There have been drastic changes in apps usages before and during the pandemic, as evident from Table 4. The apps which witnessed huge fall in usage during pandemic and lockdown are food delivery apps, cab booking apps and online wallets. As lock-down, social distancing and contamination scare were prevailing the reason for the drop of usage of these apps can thus be explained easily. However interestingly online grocery shopping apps usage also declined which in the same logic could have risen as people were expected to prefer online mode of transactions for regular purchases. In such cases contamination fear and lack of availability of online groceries might be reasons for this decline of online grocery apps. The apps which witnessed sharp rise in usage are news apps, video apps, reading apps, photo apps and off course health apps. The choice of news and video apps agrees with the fact that more people were using internet for news and watching videos as seen earlier. However in addition to that more people have started to use reading apps and photo apps during the pandemic. This can be explained as that due to lock-down respondents found different ways to use their time resulting into sharp rise in reading activities and slight rise in using photo apps. What is most striking is the use of health apps which none was using before the pandemic, but 31% of respondents were using during the pandemic. It is interesting to note that in this digital age, social distancing, lock-down and pandemic would drive people to resort to health apps. This digital assistance is thus equipping people to navigate through difficult times such as this health emergency.

Respondents also chose apps that they were using the most before and during the pandemic. The top five apps before the pandemic were –

- (i) Video watching apps with 19% user-respondents
- (ii) Social networking apps with 17% user-respondents
- (iii) News apps with 12% user-respondents
- (iv) Music apps with 11% user-respondents
- (v) Shopping apps with 8% user-respondents

The top five apps used by the respondents during the pandemic were –

- (i) News apps with 25% user-respondents
- (ii) Video watching apps with 24% user-respondents
- (iii) Social networking apps with 11% user-respondents
- (iv) Music apps with 8% user-respondents
- (v) Reading apps with 6% user-respondents

In both these cases there had been wide variety of usage. The range is more diverse during the pandemic rather than before the pandemic. Before the pandemic, there were users who mostly used reading apps, learning apps, food delivery apps, cab booking apps, online wallets, photo apps etc. However during the pandemic, there were respondents who were using learning apps, online wallets, health apps, photo apps and many. The variety of apps usage increased during the pandemic than before showing increasing interest among the users in exploring new apps and using them to fulfil different purposes.

4.3. Users' experience

Usage of applications

The respondents were asked to rank-order the purposes for using the applications during the pandemic. The first preference of the top ten purposes served by the applications is as follows.

- (i) Entertainment
- (ii) News/Information
- (iii) Learning
- (iv) Connecting with others
- (v) Creative expression
- (vi) Shopping
- (vii) Financial transactions
- (viii) Professional work
- (ix) Health & fitness
- (x) Social work

The second preferences for the top ten purposes served by applications during the pandemic are as follows.

- (i) News/Information
- (ii) Entertainment and connecting with others
- (iii) Connecting with others
- (iv) Learning
- (v) Professional work
- (vi) Creative expression
- (vii) Professional work
- (viii) Health and fitness
- (ix) Social work
- (x) Shopping

Thus it is observed that most of the respondents found entertainment to be the most important purpose served by the online apps, followed by news and information. The

top five important purposes thus served by the online apps are entertainment, news and information, learning, connecting with others and creative expressions. Few believed professional work is also an important purpose for using the apps. However contrarily they claimed that the least important purposes served by these applications are social work and health and fitness, followed by shopping and financial transactions. Thus it can be deduced that during the pandemic online applications are widely used to get information and news of the world; during the lockdown with spare times in hand, people used apps for entertainment purposes as well. However as social distancing became a norm these apps helped them to connect with others and keep on learning when outdoor activities were stalled. These apps helped the users to spend their time with creativity which in turn helped them to keep up their mental health as well. When lockdown and fear of contamination were prevailing these apps helped them to purchase their daily essentials. However apps were not much used for health and fitness purposes which can be an area of development for similar situations in future. There is very minor applicability of apps in social service during the pandemic, even shopping option was also limited to many.

Users' gratification

Respondents' satisfaction with online apps was very high as seen in the result. In a scale of 0 to 10 where 0 is the worst and 10 is the best experience of using apps during the pandemic, 82% of respondents rated 6 or above and 53% respondents rated 8 or above. Only 6% respondents rated their experience 4 or below while 13% respondents rated at the mid-point of 5. The detail of the responses can be seen in Table 3.

Table 5. Users' experience rating of online apps usage during pandemic where 10 is the best and 0 is the worst

Rating point	Percentage of Users
10	20
9	14
8	19
7	19
6	10
5	13
4	5
3	1
2	0.5
1	0
0	0

In a separate question 49% of users responded that online apps during health emergencies such as COVID-19

pandemic are useful while 30% respondents believed it to be very useful. 20% respondents find it to be neither useful, nor useless. Only 1% respondent found the apps not useful. Definitely online apps have helped the respondents in different ways during the pandemic with high level of satisfaction. In a detail analysis between the types of apps used mostly during the pandemic and satisfaction level of using the apps, it is found that out of the 50 respondents who mostly used news apps during the pandemic, 15 found that very useful while 29 found that to be useful and none found it to be useless in any degree. Similarly out of total 49 respondents who mostly used video watching apps 16 found it useful while 23 found it very useful as none found it useless at any degree. Among the two respondents who marked usage of online apps during pandemic as useless and as very useless, one who was using video watching apps mostly marked it as useless and one who was using social media apps mostly marked it as very useless.

4.4. Users' opinion

New users

59% of the respondents agreed with the opinion that during pandemic many people who were not using any online app earlier have started using these. 26% respondents strongly agreed with the statement while 11% neither agreed, nor disagreed. Only 4% disagreed while none strongly disagreed. This shows that there is high possibility that not only the frequency and intensity of the usage of online applications have increased during the pandemic, but the number of new users have also increased. Adding new users explains the increasing necessity of online apps during pandemic and increasing dependency of people on online apps to survive through the situations such as the pandemic.

New usage

61% agreed with the opinion that many people have found new usage of online apps during the pandemic. 28% respondents strongly agreed with the statement while 11% neither agreed nor disagreed. Only 1% respondent disagreed with the statement while none strongly disagreed. This shows the possibility that people have devoted their time in exploring online apps and the features of the existing apps. This exploration of online apps shows that people are not only interested in using apps but also looking for different support mechanism during the pandemic through these apps. For example, it is seen earlier that 31% of the respondents who were not using health apps have started using it during the pandemic. Thus many people have found new usage of online apps during the pandemic making the citizens much more dependent on digital technology.

Necessity of apps

31% of the respondents agreed with the statement that without the online apps it was not possible to survive through the pandemic, while 26% respondents strongly agreed with the statement. 24% respondents neither agreed nor disagreed with the statement while 15% disagreed and 3% strongly disagreed. Thus while 57% respondents agreed with the statement with varying degree, only 18% respondents disagreed with the statement in varying degree of the opinion. The dependency of users on online apps during the pandemic is obvious. As is seen earlier, for news or for entertainment or to connect with others, online apps have been a major support during the pandemic. These apps have made life much easier of the users. However in the same time it has to be kept in mind that there exists certain percentage of users who found online apps redundant and believed it to be possible to live through such emergency situation without such support.

Misinformation

While 49% respondents agreed with the statement that social media have created lots of misinformation among citizens during the pandemic, 18% strongly agreed with it. 27% of the respondents neither agreed nor disagreed with the statement, while 6% respondents disagreed. None of the respondents strongly disagreed with the statement. 67% of the respondents thus believed that though online apps were useful during pandemic but simultaneously it was responsible for creating lots of misconception and misunderstanding which are dangerous in times like health emergencies. In this context it has to be kept in mind that 71% of the respondents were using apps for news consumption during the pandemic. The primary purpose served by the apps was to receive news and information. In such situation when people are depended on apps for the news, it becomes a major concern if misinformation is spread through these apps.

Alienation

As online apps have been used to to connect with others during the time of lockdown and social distancing, it simultaneously for many has created distancing within the family. 40% of the respondents agreed with the statement that online apps are responsible for generating alienation and social distancing within the family while 12% respondents have strongly agreed with the statement. 26% respondents neither agreed nor disagreed with the statement. However there are 19% respondents who disagreed with it while 1% strongly disagreed. Thus while 52% believed online apps were responsible in creating distance among family members, 20% respondents did not think so. In a time of crisis, online apps are helping people to cope up with the situation; however simultaneously increasing usage of online apps is creating different set of problems.

Employment

Economic slowdown due to pandemic has resulted into possibility of recession. This has hit hard many small businesses and enterprises. Many people have lost their jobs and faced pay cuts. However as many services were available online, different apps offered the opportunity of earning for many. 27% of the respondents thus believed that online apps have provided job opportunities for many during the financial crisis due to pandemic while 10% of the respondents strongly agreed with the statement. Interestingly 41% of the respondents neither agreed nor disagreed with it while 18% respondents disagreed and 3% respondents strongly disagreed. So only 37% respondents agreeing with the employability aspect, 21% disagreeing and 41% uncertain about it, it is to be noted that a nation like India with 40% internet penetration online apps might not largely be source of income for many; however simultaneously in time of crisis it has helped many people as well.

Surveillance

There have been many instances prior to pandemic when surveillance through social media and various other apps has come under severe criticism. In the same time there have been instances where application of digital surveillance technology has helped in controlling spread of pandemic [28]. 44% respondents agreed with the statement that surveillance through online apps cannot be avoided during health emergencies and pandemics. 7% respondents strongly agreed with the statement while 8% respondents disagreed and 3% respondents strongly disagreed. 37% of the respondents neither agreed, nor disagreed. More than half of the respondents 51%, accepts the fact that surveillance through apps are necessary to cope up with pandemic.

Digressive non-productivity

There is growing number of studies on the side-effects of using social media and online apps heavily [29]. One of the major concerns with the heavy users of social media and other online apps is the resultant lethargic condition which becomes a hindrance towards productivity. This also creates diversion from many serious issues and concerns. In the present study 29% respondents agreed with the statement that online apps are wasting time which could have been used in more productive manner during the pandemic. 14% of the respondents strongly agreed with the statement while 18% respondents disagreed and 1% only strongly disagreed. 38% of the respondents neither agreed, nor disagreed with the statement. This shows that there is a concern among the user-respondents who are mostly heavy users of internet during the pandemic that their productivity is stalled with heavy usage of online apps. Awareness of sensible and smart usage of technology is also necessary with the advancement of technology.

Future of apps

54% of the respondents agreed with the statement that use of online apps was going to rise. 27% of the respondents strongly agreed with the statement while 17% neither agreed, nor disagreed and only 2% disagreed with none strongly disagreeing with the statement. A country like India which was gradually growing towards digitalization, COVID-19 pandemic has worked as a big push towards it. As the business, lifestyle and social functions are going to change a lot after the pandemic it seems the respondents believed the digitalization of India, people's usage of and dependence on online apps are going to rise faster and further. This has indeed hastened the process of creating smart cities in India.

5. Discussion

Baran and Davis [30] writes in explaining the Uses Gratification concept that "Uses Gratifications approach provides a framework for understanding when and how different media consumers become more or less active and what the consequences of that increased or decreased involvement might be." There have already been statistics released by various organizations on the increased use of internet during the COVID-19 pandemic. The questions that the present study attempts to answer are when and how internet users are becoming more or less active and what the impact is of this increased or decreased usage of internet and of particularly online apps. The study affirms with other reports that there has been increased use of internet during pandemic. As people are staying in-door during the lockdown period, tendencies were seen towards using the home internet connection more rather than personal connection. Digitalization and developing smart cities include creating free wi-fi hubs in different public spots for easy access of internet. Though the initiative should be applauded, yet it is important to note that during times like pandemic, many people are dependent on home internet connection and not the public ones. To bridge the digital divide, it is thus important to install free wi-fi zones in areas where there is lack of home internet service providers or less access to paid internet connectivity. Thus it will help to inform and update the residents of that zone during pandemic or health emergencies.

The frequency of accessing internet has also increased during the pandemic with more people using internet daily than before and for longer duration. This definitely calls for developing an infrastructure that can support sudden rise of traffic and data consumption which became difficult to handle at the beginning of the lock-down period in India. As stated earlier the present study attempts to explain the reason behind this rise of traffic and describe its nature. The main three activities that witnessed sharp rise during the pandemic are news and information consumption, watching videos and study related activities. As lock-down implemented few restrictions, so there were few expected declines like that

of online shopping activities. The three major usage of internet and online apps during the pandemic are surveillance or information gathering about this sudden unexpected situation of pandemic and developing an understanding of the situation, entertainment as easing up social tensions that resulted due to health emergency as well as to pass the free times during the lock-down. Also as many of the respondents were students, so a lot of learning activities shifted online also received a considerable share. One interesting addition to the list of apps has been health apps which witnessed a surge of users during the pandemic. This explains that internet users were not only using apps to get news and information about the pandemic, but they are also transferring the knowledge into action by downloading and using health apps either for maintaining their health and fitness or to purchase medical products and services, or simply to avail many added features that health apps started to provide during the pandemic. In any case it is evident that many people are trying to survive through the health emergency with the help of online apps. So investment in developing such apps for providing useful information and availing necessary services should be encouraged and initiated.

The user-respondents as it is seen are very satisfied by using online apps during the pandemic. As the satisfaction levels are compared with the activities it is seen that these gratifications are generated with the quality and quantity of information and news received through online apps, the high level of entertainment offered by various apps and social media. Pandemic also has worked as a big push by inspiring and compelling many to use online apps to satisfy various purposes. Maintaining social distancing, fighting out the fear of contamination and keeping up mental health these news, entertainment, learning apps have helped the users in various ways. The dependency and utility of the apps were so high that most of the users accepted surveillance through online apps if that means more safety from the chances of contamination.

However in the same time there have been serious concerns with misinformation spread via social media. In cases of health emergencies misinformation might cause lives of people, create a lot of misconception leading to malpractices. The high usage of social media and other online apps have also driven the users into a self-centred world alienated from other family members. Much of the times the apps were used for entertainment purposes, that appeal to right brain mostly, leading to higher release of dopamine creating a hypnotic state for the users [31]. As Krugman effect [32] studies established, this creates a hypnotic effect compelling the users to lose much of their productive time and human interactions. Interactive media such as internet mostly demand active participation of the audience. Uses gratification concept has proliferated from this active audience studies. However even in such cases the acknowledgement of the users that they are losing much of their productive time and family bonding due to internet and online apps, illustrates that features of post-human era where less human interaction and more digital

interaction controls the lives of people. Though online apps have been very useful in the times of pandemic, yet it has to be kept in mind that over-dependency on digital technology might affect society in a negative way. There rises the necessity of digital detoxification to be promoted even in the times of pandemic.

Another important aspect of using online apps during pandemic is that it has created many job opportunities at the time of financial crisis resulted out of the health emergency. However in a country like India where internet penetration is only 40%, wherein the global inequality index ranks the country among the bottom 15 [33], the concern with digital divide should be high. India is still in transition towards digitalization, with first round of smart cities developing. Investing on apps to fight health emergencies as such in future is essential, but not the only solution. COVID-19 pandemic has created the big push where many laggards have transformed into adapters of the new technology, as with Roger's diffusion of innovation [34] concept can be explained. However still a large section of population does not have fast and uninterrupted internet connection. Priority should be for digital inclusion along with developing more suitable health apps. Also a mechanism for fighting misinformation should also be established. Developing apps might not be only solution in such cases, society should be trained and awareness should be spread on sensible usage of apps.

6. Conclusion

The first research question (RQ₁) was, how COVID-19 pandemic has affected the usage pattern of online apps. As is evident from the result and discussion the pandemic has increased the frequency and intensity of using internet. People have shifted from using public internet connections to home internet connections. There is higher amount of news and entertainment video consumption during the pandemic than before along with declining usages of shopping, food delivery, cab booking and financial transactions apps. Many new users have been added during the pandemic as many new apps have been explored by the users. Thus the main usages of online apps including social media during the pandemic as identified are surveillance or information accumulation, news and information processing for understanding the situation, entertainment and connecting with others.

The second research question (RQ₂) was about the gratification level of using online apps during COVID-19 pandemic. As seen in the result section, the gratification level of using online apps has been very high. Many users believed it would have been difficult to cope up with the pandemic, lockdown and social distancing without online apps. Thus it can be said that information seeking need, entertainment need, need for developing comprehensive understanding of the situation, need for social interaction were largely satisfied with the online apps during the pandemic.

The third research question (RQ₃) was how users perceived the use of online apps during COVID-19 pandemic. In this explorative question it was found that though most of the users are satisfied using the online apps, but there is concern with misinformation spreading through social media apps. There is also a wide-spread acknowledgement of the fact that high usage of online apps has resulted into low level of interaction with family members. Digital divide has also been a concern. In case of creating job opportunities in time of financial crisis these apps have not been very successful due to this digital divide. The users acknowledge that the future holds higher amount of digital penetration with more activities going online and more people resorting to online apps usage.

The study thus in the stream of uses gratification theories explores the usage and gratifications from online apps, particularly during and as result of the pandemic. In its exploration the study has dependent on purposive snowball sampling which if adapted to a stratified random sampling procedure with larger sample size might produce result appropriate of generalization. However that would require much time and resource as a major project. The present study thus can be used as preliminary work for such large scale projects offering probable variables and insights to explore. Further as the study is conducted online only, it does not include a particular section of the society which might not access internet or access very little. To understand and include the nature of internet usage of this section of society, only online survey might not be appropriate. The present study targets the internet users groups as regular internet users thus establishing the delimitation of the study as such. However to address the issue of digital divide and how it has been impacted during the pandemic, it will be useful to conduct the survey in a more inclusive way. Also the present study does not include all the cities that are in the list of proposed smart cities of India. A study can thus either be developed to include all for a larger result, or to target one or very few for a more in-depth analysis.

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