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RESEARCH ARTICLE

Analysis of the Changing Patterns of Email Usage in the Indian Information Technology Sector due to Covid-19

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Abstract

Objectives: To analyse the impact of the Covid-19 pandemic on employees working in the Indian IT sector in terms of email access frequency. **Methods:** To achieve our result, we gathered data from 189 people working in the IT sector in the month of March 2023 and analysed it. Out of these, 144 were males (76%) and 45 were females (24%). In terms of the work location, 112 people (59%) were from metros and the balance 77 (41%) were from non-metros. We also tested a few hypotheses related to it. Data for the study was obtained using primary study by an online questionnaire created using Google forms. It was shared with different people from the Indian IT sector across the major cities like Bangalore, Hyderabad, Pune, Mumbai, on a convenience sampling basis and using electronic media like emails and social media groups. The respondents had to perceive the scenario before the pandemic and give their responses accordingly. For the data analysis, Gender, Location and Experience were the independent variables, and Email Access Frequency and Email number were the dependent variables. Analysis was done using SPSS and MS Excel using charts. Analysis of Variance (ANOVA) was used to test the hypotheses for differences in email usage before and during the pandemic. **Findings:** Our research shows that there was a significant change in email access frequency of employees before the Covid-19 pandemic and during it. The frequency of accessing emails has increased by 16.5% overall i.e., they have been accessing emails more frequently during the pandemic than before. The increase is more for females (52.9%) than males (10.2%) and for both, metro as well as non-metro work locations. While similar studies have been conducted in other geographies worldwide, the reported increase in emails in those studies has been very diverse i.e., from 5% to 95%. Also, other studies were conducted in their specific regions with a focus on analyzing the impact on the wellness of people. **Novelty:** As per our knowledge, this kind of study focused on email access frequency and usage, is new in the context of India for the IT sector.

Keywords: Email Usage; Information Technology; Covid19; Pandemic; Work Pattern

1 Introduction

The Corona virus pandemic (also referred to as Covid-19) is reported to have started around December 2019 in the Wuhan province of China. Over the last few years, the usage of digital technologies has increased. However, during the pandemic, remote working was mandated. To realize it, the use of digital work tools increased drastically which allowed them to work from home[(1)]. The culture of communication and institutional rules influence how people use email. In addition, at the beginning of their career, students act as per perceived expectations and as per institutional rules[(2)].

Organizations have been forced to ask their employees to work from home due to the pandemic[(3)]. However, this new practice of working remotely raises questions on changing team working dynamics, choice of communication modes, virtual leadership, and overall impact on team performance. While it is prudent to keep track of the work every individual is doing, alternatives to long and frequent emails, like Facetime, video conferences, and even good, old phone calls, are better. However, this won't work for industries that need to be physically working. Technology remains key but there is also added pressure on an organization's IT services due to which an assessment of the load on technology services needs to be considered.

[(4)] conducted a study and analyzed the effects of work from home on the satisfaction levels of employees of IT service companies due to the Covid-19 pandemic. It was found that the mean usage of emails had increased by almost 7%. Also, employees were able to manage lower levels of output by working longer hours. In addition, one of the reasons for lower satisfaction was the increased costs of communication, coordination, and collaboration. A study was conducted to examine the usage of the internet during the pandemic. It was noticed that the usage of email had increased by 52.77%[(5)]. A study of usage of Work-Related Emails (WRE) during the pandemic,[(6)] has made a reference to an analysis by PoliteMail in 2020 of over 650 million emails. The study revealed a 95% increase in work emails during the period of study in which organizations required employees to work from home during the pandemic. The statistics also suggested that the pandemic has led to an increased reliance on emails with more emails being sent during both work and non-work hours. Another study[(7)] was conducted about changes in people's digital communication during the pandemic which reported an overall increase in email by almost 22%. With reference to ethnicity, it was found that Asian Americans were more likely to have increased emails. Similarly, people with a bachelor's degree or higher were more likely to use email than others. In terms of employment status, working people were more likely to have email communication with friends and family. In addition, people in urban areas were more likely to use email than those in rural areas. Similarly, people who had gone out for any social outing were more likely to have increased communication over email.

The effects of remote work on collaboration among information workers were studied[(8)] to answer the question – can we isolate the effect of switching to working from home, on information workers' collaboration activities from other factors. It was found that working from home caused people to shift between collaboration tools in which email hours stayed stable i.e., no statistically significant effect of working from home, on hours spent on email. However, remote work increased the number of emails sent by workers.

In another study[(9)], the frequency of time spent on meeting and email activity before and throughout the first stage of the pandemic was studied. 16 metropolitan statistical areas (MSAs) that were under lockdown were selected. It was noticed that the average number of internal emails increased by 5.2%. However no significant change was noticed in the number of external emails. Their study post the lockdown, reported that number of internal emails remained significantly higher than pre-lockdown.

In a study of over 170 employees conducted in Germany[(10)], it was noticed that the sudden lockdown due to the pandemic had an impact on the way of agile working. People adapted smoothly to working from home with only a small loss of productivity. They adapted to technology tools, and this helped in working from home. However, usage of project management software decreased at least in the period immediately following the lockdown.

The pandemic has changed peoples' use of digital communication methods like voice calls, social media, video calls, and emails. 24% of people more frequently used email during the pandemic. The use of digital communication methods such as email, social media, voice, and video calls is expected to continue to increase in the future. However, the preferences may change[(11)].

Research conducted by TechRepublic[(12)] indicates that more than 55% of senders had increased email volume since the pandemic.

In a different study, an examination of the potential impact of stressors incidental to the work environment during Covid-19 on the productivity of employees working in the IT sector in India found that different environmental, psychological workplace, financial, and interpersonal stressors have adversely impacted work quality and efficiency. Consequently, organizations must take this factor into consideration and support employees[(13)]. Remote working is a challenge for employees in the Information Technology industry because of workplace isolation, peer absence, and working too much or not working at all. However, no significant gender and age group differences were observed i.e., the impact seemed to be the same for everyone. Flexible working

time, and the use of new technology were the few positives reported in the study[14].

In her study of working women in the Mumbai region,[15] found that, although working from home was seen as a blessing for most working women, it has not been easy for working women due to lack of sharing of domestic work, the homeschooling of children and overall domestic problems. As a result, mobility has been compromised in their lives. Workers from the India IT and ITES sector have to deal with work related stress[16]. One of the causes is high speed data connections which allow them to work from any location and access emails at any time. This leads to work obsession.

In another study conducted in Nigeria, it was found that email usage patterns of Nigerian academic staff differed significantly from each other. Usage of personal email address was preferred over the official one. Hence, it is recommended that important information should be shared over personal email for faster responses[17].

In a study on email behavior during the pandemic with a specific focus on phishing-themed emails, it was found that due to the pandemic lockdown and mass quarantine of individuals, there were some adverse consequences in the way people live, socialize and work. The study found that emails are being used for phishing attacks and the aim is to target individuals and organizations[18].

2 Methodology

2.1 Sample and Data Collection

Data for the study was obtained using primary study and via an online questionnaire created using Google forms. It was shared with different people from the Indian IT sector on a convenience sampling basis and using electronic media like emails and social media groups. The questionnaire has two parts – the first one is to obtain demographic information (gender, age group, location, experience level). The second part has ten questions in which the respondents were asked to specify their pattern of usage of emails before and during the pandemic. For the data analysis, Gender and Location were the independent variables, and Email Access Frequency and Email number were the dependent variables. Additional data related to Email Usage, Access – days of the week, Access – times of the day was also gathered for detailed analysis at a later stage if needed. The questionnaire received 227 responses. Out of these, 38 responses were discarded – either because they were duplicate, incomplete, or filled in by people not working in the Indian IT sector. So, analysis was done on the sample of 189 responses.

2.2 Data Collection Instrument

The reliability of the questionnaire was checked using the Cronbach Alpha method (Table 1). The greater the Cronbach alpha, the higher the correlation between the items for that dimension. For both the dimensions, the values of Cronbach Alpha are above 0.70 which indicates that the validity of the questionnaire was acceptable.

Table 1. Cronbach Alpha values

Dimension	Item	Cronbach Alpha
Email Access Frequency	Pre-pandemic During the pandemic	0.764
Email number	Pre-pandemic During the pandemic	0.933

The Kaiser-Meyer-Olkin (KMO) test was done to test the sampling adequacy. As seen in Table 2, the KMO measure of sampling adequacy is 0.589. Since the MSA must exceed 0.50, our value is acceptable. Bartlett's test of sphericity significance value is .000 which is less than .005 hence satisfactory indicating that there is sufficient correlation amongst variables.

Table 2. KMO and Bartlett Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.589**
Bartlett's Test of Sphericity	Approx. Chi-Square	792.027
	df	45
	Sig.	.000

Data gathered from the respondents was analyzed using SPSS software and MS Excel. The results were tabulated and analyzed to depict the results. The demographic profile of the respondents is shown in Table 3.

Table 3. Demographic Profile of Respondents

Variable	Characteristics	Number	Percentage
Gender	Male	144	76.2
	Female	45	23.8
Age Group	18-30 years	65	34.3
	30-40 years	24	12.7
	40-50 years	81	42.9
	50-100 years	19	10.1
Location	Metro	112	59.3
	Non-metro	77	40.7
Experience level	0-5 years	68	36.0
	5-10 years	19	10.0
	10-20 years	40	21.2
	20-100 years	62	32.8

3 Results and Discussion

3.1 Analysis of the Email Access Frequency Analysis by Gender

Email access frequency analysis before the pandemic and during it, is indicated in Figures 1 and 2.

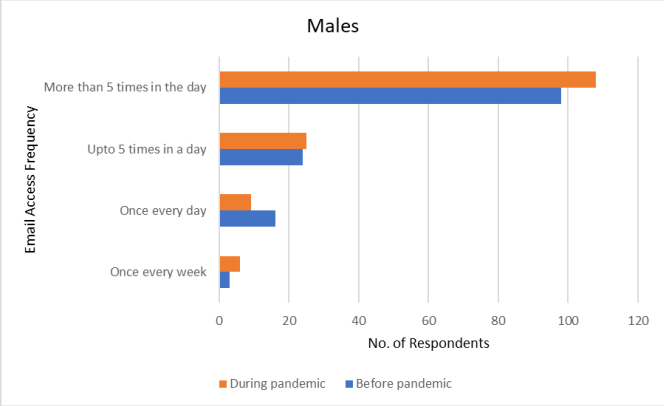

Fig 1. Email Access Frequency Analysis for Males

The average email access frequency has increased by 16.5%. We see that in terms of percentage, the increase of email access frequency is more in females (52.9%) than in males (10.2%).

We notice that most males accessed their emails more than 5 times a day before the pandemic. Even during the pandemic, the frequency of access is more than 5 times a day. However, the percentage of this value has increased to 10.2% (98 males accessed emails more than 5 times a day before the pandemic and 108 males are accessing it during the pandemic).

A similar observation exists for females as well. Before the pandemic, majority of the females accessed emails more than 5 times a day. During the pandemic, the majority still access emails more than 5 times a day. However, the percentage increase is more, as noticed in Figure 2 . The rate of increase of females accessing emails more than 5 times a day is 52.9% (17 females before the pandemic and 26 during the pandemic)

In the studies done so far by various researchers, there was no specific reported observation of there being a difference in the email access frequency between the genders. The novelty of our study is that it shows that there is indeed a significant difference in the email access frequency with females using it more, as compared to males.

Our study has found that the email usage has increased by 16.5% during the pandemic. This is more than twice the figure of 7% reported by [4] which is a study done for the Indian IT sector in March 2020. An equivalent study done for the students of a particular education institution of Bangladesh [5] has reported an increase of email usage of 52.77%. A similar study conducted for a US sample [7] has reported an increase of 22%. While different studies conducted for different geographies and at different

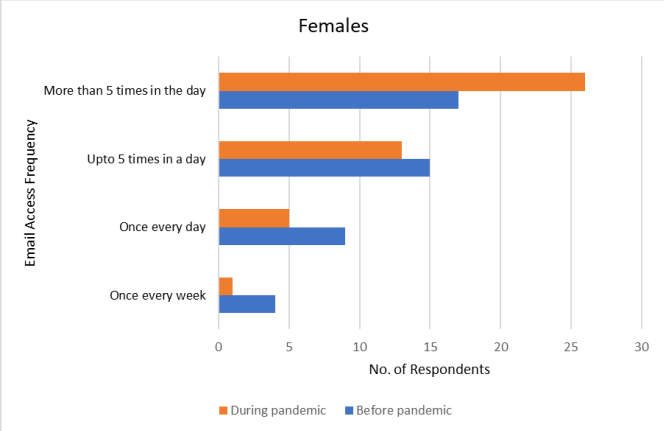

Fig 2. Email Frequency Analysis for Females

times report different figures, they all indicate a definite increase in email usage post the pandemic. Our study has observed a similar pattern of increased email usage.

3.2 Analysis of Email Access Frequency by Work Location

An analysis of the data by Work location is shown in Figure 3.

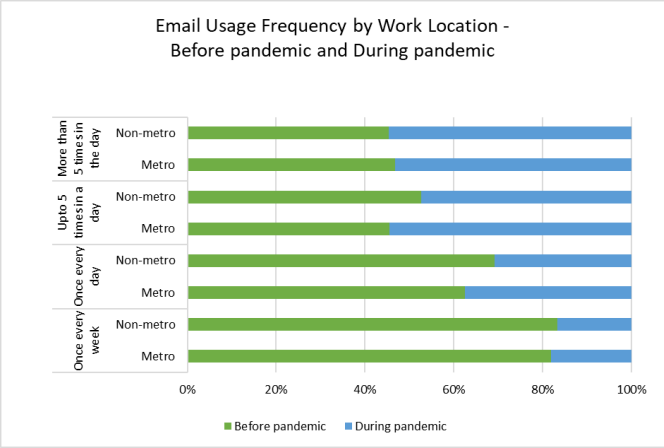

Fig 3. Email Access Frequency Analysis by Work Location (Metro / Non-metro)

Around 59.3% of the respondents are working from metros and the balance 40.7% are working from smaller towns i.e., non-metros.

We see that the email access frequency for both metro and non-metro respondents was less before the pandemic. However, email access frequency has increased significantly during the pandemic.

For metros, 96 respondents accessed emails more than once every day. During the pandemic, this number went up to 111 i.e., an increase of 15.6%. On the other hand, for non-metros, 74 respondents accessed emails more than once a day. During the pandemic, this number went up to 83 i.e., an increase of 12.1%.

Overall, irrespective of location (metro or non-metro), the email access frequency has increased.

As per our knowledge, the other studies conducted to study email usage haven't focused on the analysis of email usage based on location (metro versus non-metro). However, our study has considered location for analysis and reports that the email access frequency has increased by 15.6% for people working from metros whereas the equivalent increase if 12.1% for those working from non-metro places. It shows that irrespective of the location, the email usage has increased during the pandemic. This is a new finding.

3.3 Hypothesis Testing

Test 1: Frequency of mail access before the pandemic and during the pandemic

H0: There is no significant difference in the frequency of accessing emails before the pandemic and during the pandemic.

H1: There is a significant difference in the frequency of accessing emails before the pandemic and during the pandemic.

We will use the ANOVA test to compute if there is a difference in email access frequency before the pandemic and during it.

Table 4. ANOVA values for Email Access Frequency

ANOVA: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Pre_Email_Frequency	189	637	3.37037	0.819543		
During_Email_Frequency	189	681	3.603175	0.485309		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	5.121693	1	5.121693	7.850229	0.005344	3.866309
Within Groups	245.3122	376	0.652426			
Total	250.4339	377				

As seen in Table 4, the calculated value of F (7.850229) is higher than the critical value of F (3.866309). This indicates that there is a significant difference in the mean values. In addition, the P-value is 0.005344 which is significantly smaller than 0.05 for 95% level. Thus, we reject the NULL hypothesis and conclude that there is a significant difference in the frequency of accessing emails before the pandemic and during it.

This can also be seen graphically in Figures 1, 2 and 3.

Test 2: Relationship between the number of emails before the pandemic and during the pandemic

H0: There is no significant difference in the number of emails before the pandemic and during the pandemic.

H1: There is a significant difference in the number of emails before the pandemic and during the pandemic.

We will use the ANOVA test to compute if there is a difference in the number of emails before the pandemic and during it.

Table 5. Email Usage Analysis for Number of Emails

ANOVA: Single Factor						
SUMMARY						
Groups	Count	Sum	Average	Variance		
Pre_Email_Number	189	355	1.878307	1.24575031		
During_Email_Number	189	420	2.222222	1.312056738		
ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	11.17724868	1	11.17725	8.739712161	0.00331	3.866309063
Within Groups	480.8677249	376	1.278904			
Total	492.0449735	377				

As seen in Table 5, the calculated value of F (8.739712161) is higher than the critical value of F (3.866309063). This indicates that there is a significant difference in the mean values. In addition, the P-value is 0.00331 which is significantly smaller than 0.05 for 95% level. Thus, we reject the NULL hypothesis and conclude that there is a significant difference in the number of emails before the pandemic and during it.

4 Conclusion

In this study, we analysed the email data patterns of the Indian IT population before the pandemic and during it. This study has noted that the Covid-19 pandemic has created a lot of changes in the lives of working Indian IT professionals mainly with

respect to email usage. All of them resort to emails for communication and there has been a significant change in the frequency of accessing emails before the pandemic and during it. The frequency of accessing emails has increased by 16.5% i.e., they have been accessing emails more frequently during the pandemic than before. This is irrespective of the gender and location of work (metro, non-metro). In addition, the number of emails they are processing has also increased significantly.

The results of this study are in line with the studies conducted by other researchers across the other geographies which noted that there is an increase in email usage during the pandemic. However, in the case of this study, an additional observation is that the increase in email access frequency is significantly more in females (52.9%) as against males (10.2%). Also, increase in email access frequency is marginally more for the metro population (15.6%) as against the non-metro population (12.1%).

As seen from the research done by various other researchers and mentioned in the literature review, there has been an impact on the productivity and other behavioural aspects of employees due to working from home. One of the measures of this impact is related to emails – both number and access frequency. With the thinning of boundaries between personal and working life, this aspect of email access and number is bound to cause an adverse effect on employees. Organizations should be cognizant of it and should take these factors into consideration while devising policies for their employees to allow them to continue working effectively.

This research is also helpful for organizations that use email marketing. They can capitalize on the increased email access frequency of people and increase the effectiveness of their marketing campaigns.

4.1 Future Research

This study has been done for people working in the Indian IT sector which uses emails extensively. The study has focused on just one industry; it will help if similar studies were conducted for other industries in order to assess the impact there.

While the study establishes that there is a significant change caused in the email usage patterns, it cannot be said conclusively that this change has come about only because of the pandemic. Further study will need to be done to establish this. In addition, as a part of the study, various other data related to the type of emails (personal, official), access – days of the week, and access – times of the day can be gathered, and a study can be conducted to see if there have been changes in these parameters before and during the pandemic. For future research, this paper recommends collecting and analysing this additional data related to types of emails and the access days and times. In addition, reaching out to a wider audience across other industries and considering other variables to study the causal effect will give deeper insights into this topic.

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