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ORIGINAL RESEARCH

Technology enabled communication during COVID 19: analysis of tweets from top ten Indian IT companies using NVIVO

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Abstract The corona virus (COVID-19) pandemic has impacted industries across the globe. Lockdown was imposed to curb the spread of the deadly virus. This resulted in closure of the factories and manufacturing units. Few sectors switched to work from home (WFH) for the first time. The present study aims to understand and analyze the way in which Information Technology (IT) sector communicated on Twitter during the pandemic. The top ten IT companies in India were selected on the basis of net sales. Qualitative data analysis was employed to extract tweets, understand and analyze them. Tweets were extracted from the official Twitter handles of these top ten IT companies using N-Capture extension tool of NVivo 12 software from April 1, 2020 to April 30, 2021. To get insights out of collected data, Word Cloud, TreeMap and Sentiment Analysis of tweets were carried out using NVivo 12 software. The research found that IT companies focussed on digital transformation, business development, customer satisfaction and enriching customer experience, new product development for healthcare and insurance and organizational resilience. They also focussed on effective communication through Twitter in times of crisis. Most of the companies tweeted moderately positive. Very small numbers of tweets were found to be very negative.

Keywords COVID-19 · Organization resilience · Twitter · Word cloud · Tree map · Sentiment analysis · Content analysis · NVIVO

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1 Introduction

India has passed through several waves of coronavirus, a disease caused by severe acute respiratory syndrome coronavirus 2 (SAR CoV-2), also known as novel coronavirus (COVID-19). Covid 19 affected people across the globe in different ways. The outbreak of corona virus (COVID-19) was declared as a pandemic by World Health Organization (WHO) in 2020 [1]. This announcement changed people's lives economically, socially, and psychologically. COVID-19 caused an extensive damage to businesses in India. The COVID-19 induced lockdown forced people to stay away from work place. COVID-19 in India initially was characterised by fewer cases and lesser fatalities in comparison to many other developed countries, due to an early lockdown. Subsequently, the economic constraints forced government to ease COVID-19 restrictions. Hence there was surge in COVID-19 cases and India became the third-worst affected country worldwide. The second wave was more fatal as compared to the first wave. There was chaos, shortage of medical supplies, high mortality rate and spread of virus at an

alarming rate. The industries in India responded to it with various efforts and policies such as work from home (WFH), physical distancing, COVID leave, provision of mass insurance, COVID allowances etc. IT sector was fast to respond towards resilience. These companies responded with twin aim. The first aim was to slow down and reduce the spread of the virus. The second aim was to provide sense of security and care during the pandemic. These companies realised the fact that people need money to survive, stress and boredom. Organizations found that global COVID-19 outbreak was the new reality. It had completely changed the way people worked or lived. Hence, it was necessary for organizations to acclimatise with the change [2]. Therefore, to manage brand communications during pandemic, using online communication technology became imperative. It has been observed organizations extensively used social media platforms to promote their products and services before pandemic [3]. During the crisis, physical events such as business conferences, meetings, consortiums were cancelled and there was a sudden increase of people staying indoors. Perhaps, people shifted to spending more time online than before. Hence, organizations used online communication technology such as email, social media platforms, etc. to professionally interact with each other [4].

Throughout the pandemic, twitter served as leading public platform for sharing, receiving and engaging content among different groups of people. It emerged out as a powerful tool to communicate with customers, employees and society at a large [5]. Twitter was also quick in response to the pandemic. Twitter enforced strict content-vetting policies to protect netizens from rampant misinformation. The purpose of the same was to protect users from harmful content and benefit them with healthier feed.

1.1 Background

The Information Technology (IT) industry of India benefited hugely from the liberalization of the Indian economy. It is primarily a knowledge-based industry dependent upon skilled manpower. Availability of skilled personnel has resultedin the growth of IT sector in India. The Indian IT sector can be classified into four broad categories namely IT services, IT enabled services, software products, and hardware.

The information technology (IT) industry in India is highly accomplished and dynamic and thus globally recognised. The ‘dotcom bubble’ or ‘millennium bug’ was the turning point in the IT sector phenomenal and historic rise. The sector provided unmatched solution to sort out the issue of turn of millennium. This solution established the technological supremacy of the Indian IT sector. India is not only enjoying supremacy in software space, but also leader in the rapidly evolving global IT-Business Process Outsourcing (BPO) or Business Process Management (BPM) market.

India is a leading sourcing destination as it accounts for roughly 55% market share of the US$ 200–250 billion global services sourcing business in 2019-20 (IBEF Report). The sector has increased its contribution to India’s GDP from 1.2% to 1998 to 8% in 2020. The increase in export could be attributed to rapid digitization and timely transition to remote working environments by the IT companies amid coronavirus pandemic.The IT industry maintained the growth momentum in hiring and recruitment too. The IT industry registered 138,000 fresh recruitments in FY20. The IT & BPM industry provides employment opportunity to more than 4.5 million employees in India in FY21. There is increasing trend witnessed in IT & BPM industry’s revenue too. The IT & BPM industry revenue is expected to increase by of 2.3% than the previous financial year. The domestic revenue and export revenue is estimated at US$ 45 billion and US$ 150 billion respectively in FY21. There is 7.3% growth in the IT spending in FY21 India from the previous year (Gartner Estimates). It is valued at US$ 93 billion in 2021. The spending is further estimated to be at US$ 98.5 billion in 2022.

Indian software product industry is also riding the growth path andforecasted to reach US$ 100 billion by 2025. The Indian IT companies are focussing on increasing their global footprint by investing internationally and overseas. This will enable them to enhance and expand the global service delivery centres. Tata Consultancy Services (TCS) has already taken step in this direction. In February 2021, it has announced to recruit about 1500 technology employees for United Kingdom team over the next year. This will further consolidate the capabilities of TCS to serve and deliver the clients in efficient manner. United States of America (USA) is the largest contributor to the data annotation market in India. USA commanded 60% share of the US$ 250 million data annotation market in India in FY20. The data annotation market is expected to grow exponentially by 2030 around US$ 7 billion. Therefore, the Indian tech giants like Infosys, TCS and Tech Mahindra are continuously diversifying and innovating in block chain and artificial intelligence to create differentiated offerings.

By now, India has become the most preferred off shoring destination for IT companies across the world. Many countries have shown greater confidence in Indian IT companies. India’s IT sector is forecasted to reach US$ 100 billion by 2025. India is already a leader in the global sourcing market and now it is all set to tap the growing opportunities in the emerging technologies such as digital transformation, artificial intelligence, voice command and robotics.

1.2 Contribution of the research

IT sector of India has always been known for its cutting-edge innovation. During crisis, there was a need for IT sector to support their employees. Hence, the aim of the study is to understand how rapidly the IT industry transitioned to WFH model keeping the health and safety of employees as its foremost priority. Since, majority of IT companies were working remotely, there was a need to develop robust communication strategies to deal with different phases of pandemic communication. As a part of research in this article, it is reviewed how IT companies responded/tweeted to COVID-19 to deal with crisis in India. Furthermore, the research explores the programme and policies adopted by IT companies to ease out vulnerabilities caused by COVID-19. This research contributes to the growing body of knowledge in direction of measures taken by IT companies towards the safety and well-being of its employees and their dependents during COVID-19.

The novelty of the study lies in its approach to understand the resilience and proactivity of IT companies during coronavirus crisis; to understand the key focus areas of concerns of the companies towards the leaders of the IT sector in India during the period and to understand the sentiments.

Due care was taken to ensure that the limitations do not plague the study and the analysis is done with objectivity [34–36]. To the knowledge of the researchers, this is the first study of its kind to provide a comprehensive overview of the sentiments of the tweets of top IT companies of India during COVID 19.

2 Literature review

2.1 Online communication technology

The need of integration of business strategy and IT strategy has been previously recognized by [6, 7]. As the global community faces COVID-19 pandemic together, the significance of strategic alignment of business and IT has gone to next level. In response to global pandemic it is essential for organizations to prepare for the new normal. The COVID-19 pandemic has accelerated the need for digital transformation. With maximum number of employees working remotely, the use of digital tools for communication has accelerated. During pandemic, people extensively used twitter to talk about recent issues and interests. State leaders, politicians and organizations used twitter to communicate about emergencies, health bulletins, advisory, policies and measures during pandemic.

Twitter witnessed 20% user growth during COVID-19 due to surge in pandemic posts and ongoing product improvement [8]. Since March 2020, COVID-19 related posts dominated on twitter. Twitter enabled real time communication with public during crisis [9]. In 2021, twitter audience has counted approximately 322.4 million monthly active users in comparison to 290.5 million monthly active users in 2019 and is projected to reach more than 340 million monthly active users [10].

2.2 Organizational resilience

Resilience can be termed as capabilities that enable individuals, firms or ecosystems to combat deep crisis [11]. It is robustness of any firm to withstand difficult situations or crisis. The concept of resilience can be understood from different perspectives—from personal to organizational and from sectoral to societal [12]. The researchers of ecology opined the concept of resilience with an objective to study the impact of external disturbances on ecosystems [13]. Further, resilience has also been applied in various other fields like engineering, psychology, economics, management and political science [13–17].

Resilience is a broader term and is an aggregation of preparedness, response and adaption [18]. resilience can occur at three levels—firstly at the microeconomic level, the resilience of an individual firm, another at the macroeconomic level, resilience of a sector, market or an industry and lastly at the macroeconomic level, collective resilience of all individual firms and markets [19]. However, management studies look resilience from two perspectives, one at the individual level [20] and another at the organizational level [21]. The present study focuses on resilience at the organizational level.

Due to pandemic, organizational resilience has gained momentum and it can be understood as an organization's ability to survive and thrive amid adversity by engaging in transformative activities [15]. Hence, organizational resilience can be described through four key skills—responding, monitoring, anticipating and learning [22]. The global uncertainties and unprecedented situations have prompted organizations to build resilience [23]. The outbreak of coronavirus has undoubtedly disrupted business operation. Companies have embraced the change and endured to the new environment by navigating to new business models. The increasing threat of recent coronavirus has encouraged organizations to mount for a quick holistic response to ensure well-being of employees.

Resilience is a process-oriented approach with three interrelated stages—anticipation, coping and adaption [22]. Another study points out the dynamic nature of resilience as an interaction between organization and the environment [13]. Hence, organizations are required to effectively respond during and after adverse events such as pandemic. Therefore, it is espoused that resilient organizations not only respond to past events but also to current events and

anticipate future to continuously innovate and evolve during crisis [22]. In response to corona virus, firms are required to chalk out strategies and communicate their COVID 19 preparedness, response and control plans to employees to build trust. These plans should incorporate several workplace factors such as maintaining social distancing, hygiene and cleanliness at workplace to reduce the risk of exposure at work. The organizations should also identify all areas and job tasks with potential exposures to coronavirus and outline the preventive measures. Employers should carry out risk assessment work related exposures to protect their employees. Employer's COVID 19 preparedness should also include relief packages such as care leave, vaccination drives and medical support for employees and dependents. It is necessary for organizations to develop policies and infrastructure that supports employees and their families to cope with the pandemic.

3 Research methodology

The research methodology section describes the methods and techniques used to conduct the Twitter analysis for the paper. It discusses the aspects related to framework within which the research was conducted. The framework employed for conducting the analysis included identification of the IT companies for research and the selection criteria of tweets; extraction of tweets using N-Capture extension tool of NVivo 12 software; data sets used and time frame for the study; followed by data analysis strategy discussion. It also discusses the nuances associated with each of the aforementioned steps in detail and presents the skeleton of the research. Section 3.1 through Sect. 3.4 presents the algorithmic view of the research methods employed for the study.

3.1 Identification of companies and selection criteria

Due the high potential of the IT companies in terms of huge turnover and growth, this sector was deemed appropriate for the study. The list of top 10 companies considered for analysis were obtained from Statistica report for the year 2021 (Table 1).

Table 1 The top ten IT companies in India on the basis of net sales for the year 2021

Sr. no	IT companies	Net sales
1	Tata Consultancy Services (TCS)	1359.63
2	Infosys	859.23
3	Wipro	502.99
4	HCL Technologies	356.73
5	Tech Mahindra	296.41
6	Larsen and Tubro Infotech (L&TI)	115.63
7	Mindtree	79.68
8	Mphasis	55.61
9	Oracle Financial Services Software (OFS)	36.45
10	Persistent Systems	24.8

Source: Statistica Research Department, 2021

Table 2 Official Twitter handles of Top 10 IT companies in India

Sr. no	Company	Twitter handle
1	TCS	@TCS
2	Infosys	@Infosys
3	Wipro	@Wipro
4	HCL Technologies	@hcltech
5	Tech Mahindra	@tech_mahindra
6	L&TI	@LTI_Global
7	Mindtree	@Mindtree_Ltd
8	Mphasis	@Mphasis
9	OFS	@OracleFS
10	Persistent Systems	@Persistentsys

Source: Generated by authors from Twitter

3.2 Data extraction strategy

Twitter is one the world's biggest social media platform and is widely used by companies to reach out to their stakeholders [5]. It hosts abundant user generated data which closely reflects public's response/reaction/sentiment towards any issue [24]. In this research, the tweets of the top ten IT Companies were extracted from their official twitter handles using NVivo 12 (Trial Version) with Licence Key NVD20-KZ000-SH020-5RE82. These IT companies are Infosys, Tata Consultancy Services (TCS), Wipro, Larsen and Toubro Infotech (LTI), HCL Technology, Tech Mahindra, Mindtree, Mphasis, Oracle Financial Services (OFS), and Persistent Technology. The tweets were extracted using the N-Capture tool for Google Chrome. The tweets were also checked manually by visiting the twitter account of the top ten IT companies and reading tweets [25].

The twitter handles of these companies are presented in Table 2.

3.3 Data sets used and time frame used for the study

Tweets from the twitter handles of the respective companies were extracted from April 1, 2020 to August 31, 2021. The rationale for the selecting this time frame is to capture the communication of these companies during first and second wave of Covid 19 pandemic in India. India witnessed the voluntary one-day lockdown in the month of April, 2020. Thereafter, complete lockdown was imposed from May, 2020 owing to the spread of the disease. India witnessed

much stronger second wave of the pandemic during April–May 2021. The tweets from April, 2020 were chosen to describe how these companies communicated on Twitter during first wave of the pandemic. It also included their preparedness towards tackling the pandemic. Tweets from April, 2021 captured the organization resilience, vaccination and recovering from the aftershock of pandemic.

3.4 Data analysis strategy

In the first stage, the tweets were segregated into two categories (2020 and 2021) for all the IT companies. Thereafter, tweets were filtered using the key words Covid, Covid 19 and pandemic. This process was repeated for rest of the companies. This exercise resulted into providing tweets related to Covid, Covid 19 and pandemic for 2020 and 2021. Table 3 present the total number of tweets and Covid related tweets for these companies for the year 2020 and 2021.

The data collected was then coded using NVivo 12 software and analysed with the help of qualitative analysis techniques. The study excluded re-tweets, photos and video messages. Qualitative research methods provide in-depth description and insightful interpretations of socio, contextual and environmental factors [26, 27]. It gives the provision of analyzing existing documents. There are two categories of documents for qualitative analysis, viz. Public Records and Personal documents/archives [28].

The data that was grouped was then analyzed using the quantitative content analysis technique in NVIVO 12 software. Different from qualitative content analysis, quantitative content analysis is more directed towards quantitative descriptions of the visible communication content [29, 30]. Content analysis was chosen because it can describe the communication content of a person or media [31]. Content analysis is suitable because it can see the relationship between the content and communication goals, describe the meaning, and focus on quantitative description, meaning the frequency of appearance of the characteristics of existing content [32].

Further word cloud analysis, tree map analysis and sentiment analysis were done to examine the way in which IT companies communicated with their stakeholders on Twitter. The algorithmic view of the research methods employed for the study is presented in Fig. 1.

Table 3 Total tweets and Covid related tweets by top ten IT companies in India (2020 and 2021)

Companies	2020		2021	
	Tweets	Covid related tweets	Tweets	Covid related tweets
TCS	628	39	489	48
Infosys	1484	120	1501	120
Wipro	1537	67	600	28
HCL Technologies	1133	188	870	63
Tech Mahindra	1751	263	872	47
L&TI	587	41	486	18
Mindtree	973	146	349	22
Mphasis	645	51	418	38
OFS	305	7	119	7
Persistent Systems	872	89	481	15
Total tweets	9915	1011	6185	382

Source: Generated by the authors from the twitter handles of respective companies

4 Analysis and findings

The extracted data was analyzed using qualitative software tool NVIVO. This section presents the analysis of the data. Tweets were analysed using word cloud analysis, tree map analysis and sentiment analysis. Section 4.1 presents the critical Analysis through Word cloud and tree map for tweets by Top 10 IT companies selected for the study. Section 4.2 presents the sentiment analysis for the tweets done in context of the study.

4.1 Critical analysis

Word Cloud and Tree map offer better visualization of results [33]. Word cloud is generated on the basis of frequency and percentage of words in the data set. The word cloud is generated on the basis of keywords being represented as per the frequency in the data sets in the study [34].

In order to show large amounts of data in hierarchical order, NVivo provides a treemap diagram as an output. Treemap is a data visualization technique in a hierarchical order. The space in the visualization is split up into a series of nested rectangles of different dimensions, sizes and shapes with a number of coding references. A node with a large number of coding references displays the largest rectangle. The sizes of other rectangles are considered in relation to each other.

Following Figs. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21 represents the word clouds and tree maps for the top ten IT Companies in India.

Figure 2 represents the word cloud and Fig. 3 represents the tree map for the IT company TCS. The twitter handle of TCS is at the centre represented by its web address. It is then surrounded by business, digital services, customer experiences, innovation, growth, digital transformation, pandemic, and healthcare. TCS primarily focussed on business, organization resilience, and successful pandemic management.

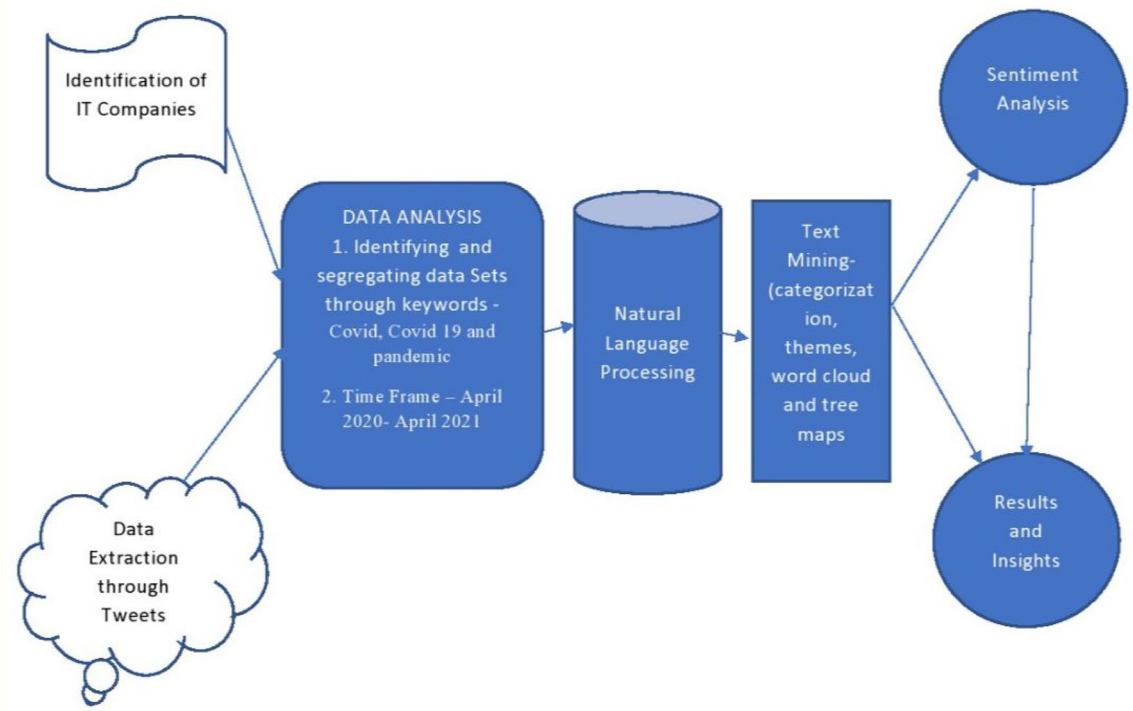

Fig. 1 A framework used to conduct analysis of tweets of top 10 IT companies during COVID-19

Fig. 2 Word cloud for TCS

Fig. 3 Tree map for tweets by TCS

Figure 4 represents the word cloud and Fig. 5 represents the tree map by the IT company Infosys. Https Infosys is at the center surrounded by themes like solutions, experience, industry work, growth, business, clients, digital technology, services, cyber security, customers and help customers during the pandemic, digital transformation, and being resilient.

Figure 6 represents the Word cloud and Fig. 7 represents the treemap for Wipro. Wipro is at the center surrounded by transformation, learn and know business, innovations, customers, industry, Wipro virtual, services, technologies, organizations etc.

Figure 8 represents the word cloud and Fig. 9 represents the treemap for HCL Technologies. Learn, digital technology, customer, enterprise, global, services, women, pandemic, Covid, employees, innovation, cloud were the key highlights of the word cloud by HCL.

Figure 10 represents the word cloud and Fig. 11 represents the treemap for Tech Mahindra. It focussed on unlock the next, technology, business, 5G, read and know, digital transformation, technology, services, customer experiences, Covid, solution, enterprise, etc.

Fig. 4 Word cloud based on tweets by Infosys

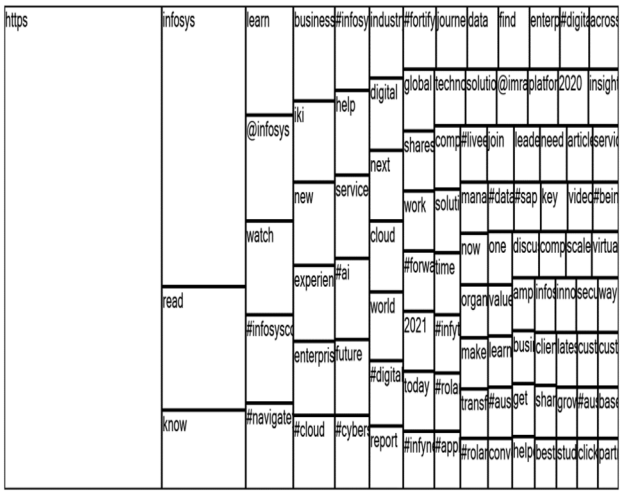

Fig. 5 Tree map for tweets by Infosys

Fig. 6 Word cloud for Wipro

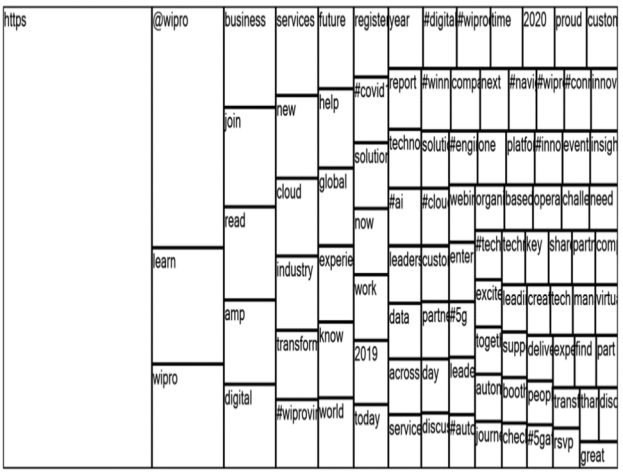

Fig. 7 Tree map for tweets by Wipro

Fig. 8 World cloud for tweets by HCL

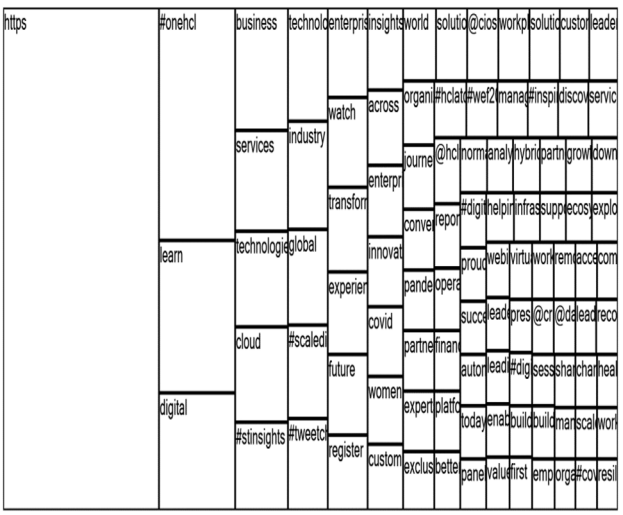

Fig. 9 Tree map for tweets by HCL

Fig. 10 Word cloud for tweets by Tech Mahindra

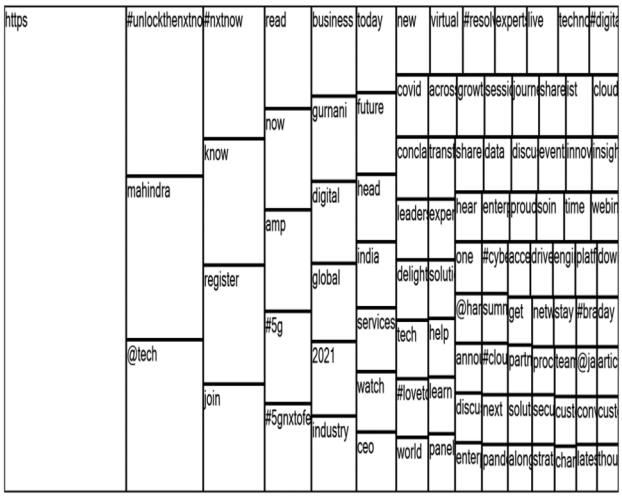

Fig. 11 Tree map for tweets by Tech Mahindra

Figure 12 represents the word cloud and Fig. 13 represents the treemap of LTI. It talked about business, solution, digital transformation, lead, global, cloud, digital insurance, people, process, industry, Block chain, innovation, help, performance, organizations etc.

Figure 14 represents the word cloud and Fig. 15 represents the treemap for Mindtree. Mindtree is at the center surrounded by digital technology, digital transformation, business, industry, customers, cloud, learn digital, services, challenges, virtual, insurtech, reimagine new normal, global, organization, transformation, experts, agile, operating, leadership, strategy and many more.

Figure 16 represents the word cloud and Fig. 17 represents the treemap of Mphasis. Mphasis is at the center of the word cloud being surrounded by learn, solution, customers, digital, articles, services, clients, industry, stay ahead, security, infrastructure, innovation, transformation, pandemic and many more.

Fig. 12 Word cloud for tweets by LTI

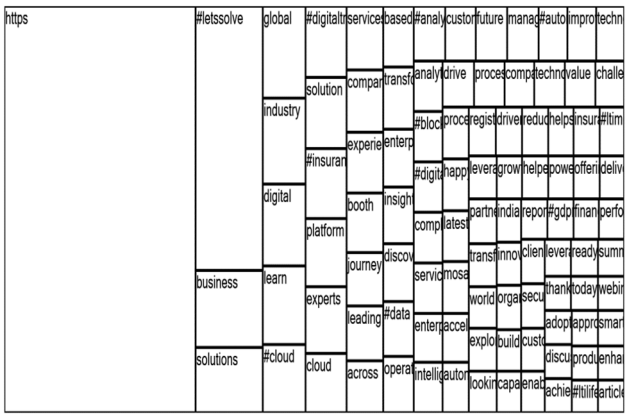

Fig. 13 Tree map for tweets by LTI

Figure 18 represents word cloud and Fig. 19 represents tree map of OFS. It focussed on banks, banking services, Oracle fs, digital, better banking, digital banking, technology, management, transformation, healthcare, customers, cloud, Covid, billing, health insurance and many more.

Figure 20 represents the word cloud and Fig. 21 represents the tree map of Persistent Systems. The key focus points of Persistent Systems are digital, business, solution, digital transformation, solution, customer, healthcare, innovation, cloud, platform, enterprise, data, working, banking, experience, sales force and more.

Fig. 14 Wordcloud for tweets by Mindtree

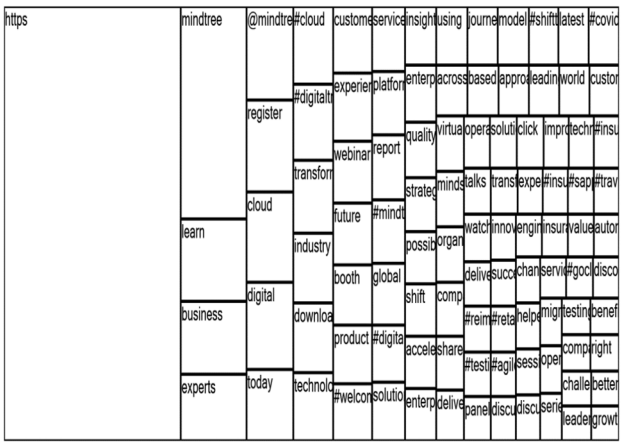

Fig. 15 TreeMap for tweets by Mindtree

4.2 Sentiment analysis

Twitter sentiment analysis is a specialized area within sentiment analysis for computer assisted qualitative study tool. NVivo performs sentiment analysis by identifying and evaluating opinions expressed in text/tweets using automated methods. It is useful in predicting feelings behind words, sentences, or a whole document [35]. Sentiment Analysis has gained importance in the recent years [36, 37]. There

Fig. 16 Word cloud for tweets by Mphasis

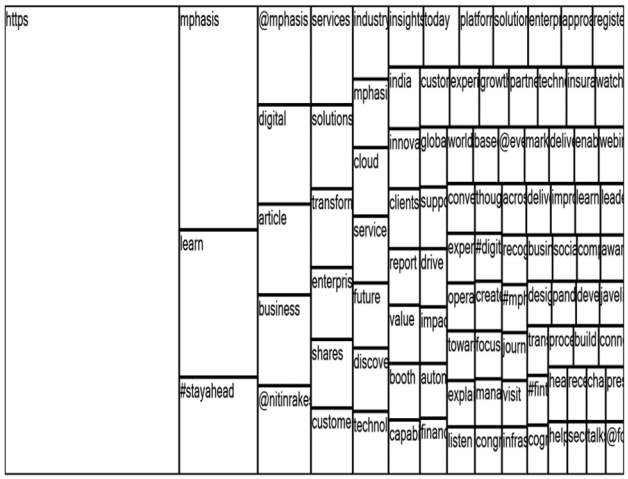

Fig. 17 Tree map for tweets by Mphasis

is an ample amount of literature available on Sentiment Analysis of Tweets on Twitter [38, 39]. Sentiment Analysis is an automated way to extract the sentiment of people from opinion, reviews or tweets on the twitter platform [40]. Sentiment Analysis helps to categorize large number of opinions on online communication channels like Twitter [41, 42]. The companies can use sentiment analysis to know about customer, employees and various stakeholders' sentiments about its policies, programmes and welfare activities. This very usefulness of Sentiment Analysis has spread the use of this technique to management and social science discipline

Fig. 18 Word cloud for tweets by OFS

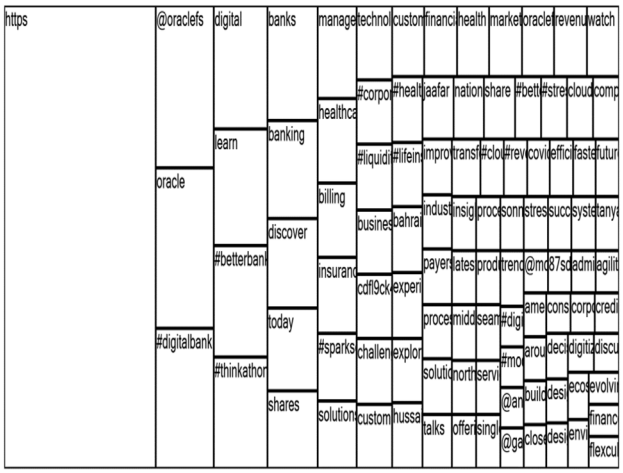

Fig. 19 Tree map for tweets by OFS

Fig. 20 Word cloud for tweets by Persistent Systems

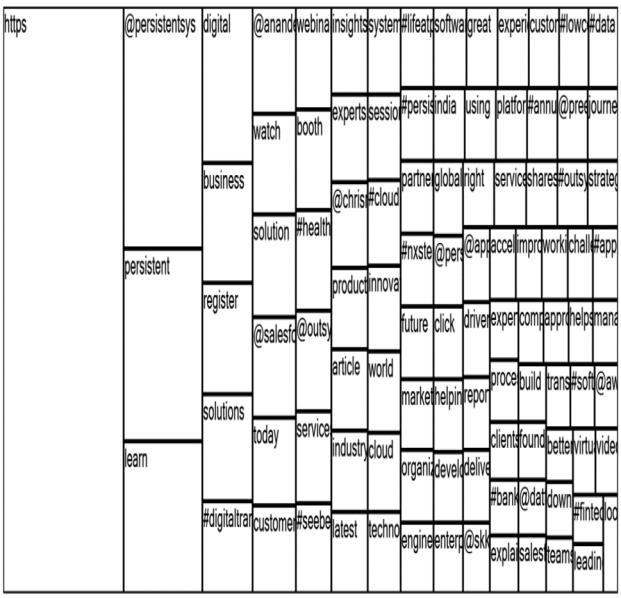

Fig. 21 Tree map for tweets by Persistent Systems

apart from computer science [43]. Initial sentiment analysis included binary classifications (positive and negative) of tweets. NVivo allows extracting four sentiments based on the opinion of people on twitter [44, 45] The four sentiments extracted automatically are; very negative, moderately negative, moderately positive and very positive. The sentiment analysis of tweets by Top 10 IT companies on Twitter is presented in Table 4.

Table 4 contains the sentiment analysis of tweets by the IT companies on Twitter. Most of the stakeholders of the IT companies perceived tweets as moderately positive except for OFS. There is equal number of moderately positive and moderately negative sentiments for tweets by OFS. Persistent Systems has the highest number of moderately positive and very positive sentiments in total 1841 followed by Wipro and MindTree with a total of 1369 and 1090 respectively. The sentiment analysis of the tweets by the IT companies suggests that most of the stakeholders found these tweets to be positive. It is clearly visible that only a few tweets were very negative for all the top ten IT companies under study in this paper. Overall, it is evident that the IT industry tweeted and responded positively during Covid crisis.

Table 4 Sentiment analysis of Tweets by the top ten IT companies

Sr. no	Company	Very negative	Moderately negative	Moderately positive	Very positive
1	TCS	73	158	558	290
2	Infosys	101	344	769	194
3	Wipro	132	420	1028	341
4	HCL Technologies	101	344	769	194
5	Tech Mahindra	37	75	296	139
6	L&T I	101	344	769	194
7	Mindtree	71	238	820	270
8	Mphasis	88	271	700	277
9	OFS	6	20	20	5
10	Persistent Systems	182	218	836	1005

Source: Analysis by the authors

5 Conclusion and directions of future research

The COVID-19 crisis affected organizations across the globe. India witnessed the disruptive impact of COVID-19 in terms of economic activity as well as loss of lives. Several organizations in India struggled to cope up with the crisis. However, IT companies embraced the pandemic by being more resilient and quickly switched to a remote-working model and gave highest importance to employee's health and safety. For example top Indian IT companies TCS and Infosys decided to discard the 20-year-old work model and switched to new mode of work.

The text sets and data sets revealed the following themes under the #COVID19 keyword for all the top 10 IT companies—digital transformation, the future of technology, adopting global practices, healthcare, transformative leadership, and being agile. TCS through #TCSEmpowers contributed $200 million to COVID 19 relief and response efforts. From setting up isolation centers, to distributing medical supplies like PPE kits, respiratory systems and meals to health workers to bridging education gaps through Edu Virtual Assist and providing access to emergency ambulance services/food/health materials to more than 200,000 households. TCS extended its support to more than 1,80,000 people across India during pandemic.

In the wake of COVID-19, IT companies realized that robust IT infrastructure was needed to support business and other functions during and post-COVID-19. Therefore, several technological advancements in the fields of generative Artificial Intelligence tools like Chat Generative Pretrained Transformer, Machine Learning, Robotics, Data Analytics, insurtech and Cybersecurity accelerated during the pandemic. The IT sector was also very swift in responding to the COVID-19 crisis by adopting various customer-friendly approaches, employee welfare activities and stakeholder concerns. The COVID-19 crisis accelerated digitization of customer interactions in India as customers preferably communicated through several digital channels and IT companies responded in turn. IT sector focussed on business development by incorporating customer-centric approaches. Customer satisfaction and customer experience were given much importance in their tweets. The National Association of Software and Service Companies (NASSCOM) reported that the Indian IT sector's revenue increased by 15.5% to $227 billion in FY22, adding 3.33 lakh jobs annually, bringing the sector's total employment to 5.84 million. TCS generated the highest revenue of 1,67,311 Crores in FY22 followed by Infosys which stood at the second place with total revenue of 1.02 Crores followed by HCL Technologies which generated total revenue of approximately 80,000 crores [46].

Further, every study is constrained by certain research limitations. The limitations of this study are the direction for future research. Future researchers may look at thematic analysis of the tweets by the IT companies. Another study can be conducted to compare the analysis of tweets from the IT and non-IT sectors. The third direction for future research could be to take up a quantitative study and present an algorithmic model for the same.

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Declarations

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