

Adapting to Change: Exploring the Influence of COVID-19 on the E-Commerce Landscape in India

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Abstract:- The COVID-19 pandemic left a profound impact across multiple sectors, including education, IT, manufacturing, media, advertising, sports, food, film industry, restaurants, and healthcare. Various preventive measures were implemented to curb the community spread, such as phased lockdowns, suspension of national and international flights, restrictions on public gatherings, the widespread adoption of work-from-home (WFH) practices, and the identification of containment zones. Both private and public sectors grappled with the adverse effects of the pandemic, leading to widespread employee layoffs during the 2019-2020 sessions. In response to lockdowns and government restrictions, people increasingly turned to online platforms for their purchasing needs. This shift not only propelled the growth of the e-commerce sector but also served as a source of job creation during the challenging circumstances of the pandemic.

The pandemic triggered a reevaluation of human lifestyles and perceptions. This Paper primarily focuses on examining the e-commerce sector's development and its broader societal implications during the unprecedented times of the COVID-19 pandemic.

Keywords:- COVID-19, Pandemic, lock-down, Job Sector etc.

I. INTRODUCTION

The COVID-19 pandemic, which originated in Wuhan, China, was first identified in December 2019 and swiftly became a global concern, prompting the World Health Organization (WHO) to declare it a pandemic. The ensuing months, starting from March 2020, witnessed widespread lockdowns across the globe to curb the community spread of COVID-19, affecting organizations across various sectors. During this challenging period, both private and public sector companies experienced unanticipated downturns, leading to economic hardships, particularly due to sudden shutdowns in manufacturing and other sectors. However, amid these challenges, the e-commerce sector demonstrated resilience. In contrast to many industries, e-commerce not only survived but also expanded significantly, offering job opportunities to those adversely affected. The e-commerce surge played a pivotal role in stabilizing not only India's GDP but also contributing positively to the global economic landscape. Faced with uncertainties, people turned to e-commerce platforms for their reliability and convenience in the midst of the pandemic. Major players

such as Alibaba, Amazon India, and Flipkart reported substantial revenue growth, bolstering India's GDP. Even established retail giants, like Reliance, shifted their focus toward e-commerce. The pandemic acted as a catalyst for the rapid launch and transition of numerous small companies to e-commerce platforms, including Meesho, Nykaa, Myntra, Big Bazaar, among others. Consumers increasingly relied on these platforms for essential purchases like groceries, medicines, and clothing. E-commerce's success was further facilitated by efficient payment gateways such as Paytm, PhonePe, and Google Pay, providing secure and convenient transaction options. Despite the surge in internet consumption during the pandemic, which led to reduced internet speeds, it did not impede the growth of the e-commerce sector. The simplicity of online shopping and its associated benefits transformed consumer behavior and mindset. Notably, even after the easing of lockdowns and in normal conditions, people continued to exhibit a preference for online shopping over traditional retail. This shift in consumer preferences poses a challenge for the retail market, which witnesses a decline in business compared to the thriving e-commerce industry. The rise of e-commerce, to some extent, impacts local retailers. The comparison of retail and e-commerce sales further underscores the significant impact of this transformation in the way people approach shopping. [11][12].

II. RELATED WORK

In their paper, W Cullen G* et al. [1] describe the effects of pandemics on mental health in many ways. According to a survey in China conducted on 1210 COVID-responder people, 54% were suffering from the psychological effects of COVID, where 29% were facing anxiety and 17% had experienced depression. In such cases, the impact of COVID on mental health is not good as, if we consider the health factor of the patient, this will somewhere damage other parts of the body organ. So it's not good in any way and the Centers for Disease Control USA posts a guideline for their frontline workers and the general public to get out of traumatic illness, which includes more awareness about viruses, self-care, proper diet, and lots of other activities that are good for overall health and mind. Xiong a, b, c, d et al [2] reveal the fact of mental health in the general population through a Google Scholar survey to gain more insight into it and finds that most countries are affected globally, but eight are severely affected, and they are China, Spain, Italy, Iran, US, Turkey, Nepal, and Denmark, where the rates of depression were up-to (14.6% to 48.3%), anxiety (6.33% to 50.9%), psychological distress

(34.43% to 38% Basically, women, people 40 years of age, and psychic patients are mostly affected. * et al [3] show the impact of COVID-19 on research. They focused on the research part and wanted to demonstrate that before the pandemic in the biomedical sector, only 2% of research was conducted and seemed to be completed on virology research, but in a pandemic, it gets raised by 20% comparatively. The COVID outbreak opens a new door for researchers and only on this topic or outbreak, more than 20,000 papers have been published in different good journals, and other journals are flooded with such papers. Shazia Rashid et al [4] show in their findings that COVID touches on education and research. So after the pandemic, there was a shutdown in colleges and schools where teachers had focused on the digital classroom. Pandemics also come with the fact that educators need more training on teaching through different tools and technology. Though there are no offline classes now, we feel the same gesture and presence of teachers and students. So we are one step closer to technology in teaching. The big colleges and schools have to research the post-pandemic evaluations and outcomes for students because now the scenario has changed, everything is open, so evaluation is going to be a hectic task. SebleTadesse * et al [5] try to depict and highlight the impact of COVID on education in developing countries. Because of the pandemic, education systems all around the world collapsed in schools, colleges, and universities. The only way was to continue with distance education with the help of technology, where teachers would teach through an online mode. Face-to-face interaction closes but opens a new way where teachers come into contact with something new which shows them the path for teaching online via different platforms like Google Meet and Zoom. Peterson, K. Ozili, et al [6] showed how a health crisis and pandemic affect the world economy badly. An economic fall causes many things, such as unemployment, the downfall of new start-ups, raised death toll rates, depression, unhappiness, etc. The authors highlight the effect of a pandemic on the global economy and how it is responsible for raising the poverty rate during the pandemic. It hits badly the government authorities throughout the globe. So, in this study, the focus has been given to finding the decreasing rate of global GDP and poverty alleviation. To do so, they collected and studied 170 countries' data from OurWorldindata.com, which consists of calculating total COVID-19 cases, total deaths, stringency index, human

development index, and gross domestic product per capita, where they used the robust least square regression method and an econometric panel technique such as OLS. The study reveals that the Gov. invested a lot in health and education, which in turn created jobs and helped in recovering GDP. Also, in this way, we can say such efforts help in the alleviation of poverty. Sandeep Kumar M* et al. [8] highlight the social effects of a pandemic. With the spread of a pandemic in 2020, the government declared a lockdown and people began to live in their homes. People explore many games on the internet. Many gaming companies earned good revenue during this pandemic time.

III. AFFECT OF COVID-19 ON HUMAN PSYCHOLOGY

COVID-19, also referred to as SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2), is a highly contagious virus that primarily enters the body through the nose. Individuals infected with this transmissible virus commonly experience symptoms such as mild to moderate fever (100.4°F), headache, runny nose, cough, sore throat, and muscle pain, predominantly affecting the respiratory system. For the majority of cases, specific treatments are not required, as patients typically recover within a two-week period by adhering to basic precautions. These precautions include home isolation, consuming nutritious foods and vegetables, and engaging in regular yoga practices. However, in critical situations where individuals have a compromised immune system, come into contact with COVID-19, and develop severe pneumonia, specialized medical treatment, care, and prescribed medications become necessary. Those with pre-existing chronic conditions such as diabetes, respiratory issues, kidney disease, and the elderly face a heightened risk of severe illness and mortality when infected with the COVID-19 virus. Governments have implemented measures to curb the virus's spread, urging individuals to protect themselves by staying at home, wearing masks, practicing regular handwashing with soap, and using hand sanitizers to eliminate remaining germs on their hands. These preventive measures play a crucial role in slowing down the virus's spread and mitigating its impact on public health. The below figure [1] & figure [2] shows the symptoms with complication and spread of Covid-19 via coughing & sneezing.

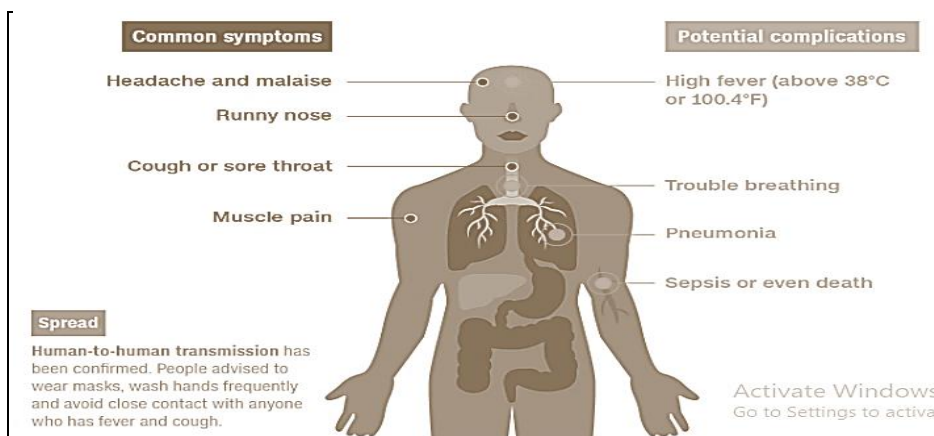


Fig. 1: Common symptoms and complication

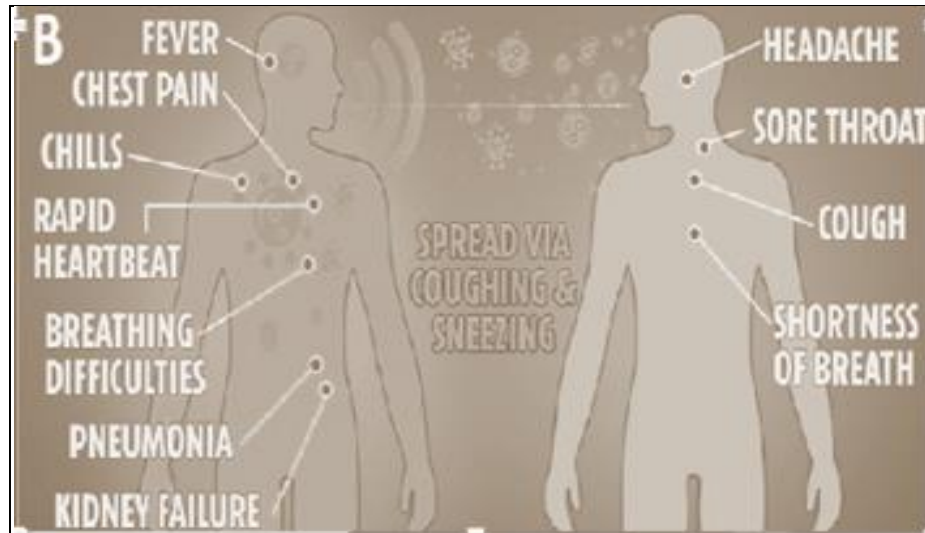


Fig. 2: Spread of sneezing and after effect as complication

A. Characteristics of COVID-19 include:

➤ High Contagiousness:

- COVID-19 is recognized for its highly contagious nature, facilitating easy transmission between individuals.

➤ Response to UV Rays and Sunlight:

- Coronaviruses, including COVID-19, exhibit a short lifespan when exposed to UV rays and sunlight, leading to their deactivation.

➤ Survivability in Specific Environments:

- The virus can persist for an extended period at room temperature, with increased survivability observed in environments with low humidity (below 50%).

➤ Surface Persistence:

- COVID-19 can remain viable on surfaces for up to 72 hours, presenting a risk of transmission through contact with contaminated surfaces.

➤ Affinity for the Respiratory System:

- Primarily affecting the respiratory system, COVID-19 targets the human lungs, causing respiratory distress.

➤ Genetic Relationship with SARS-CoV and MERS:

- COVID-19 belongs to the same virus family as Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and Middle East Respiratory Syndrome (MERS), which emerged in 2002 and 2012, respectively.

➤ Existence of Variants:

- COVID-19 exhibits various variants, each characterized by distinct features. Key variants include:
 - ✓ Alpha (B.1.1.7): First identified in the United Kingdom in late December 2020.
 - ✓ Beta (B.1.351): Initially reported in South Africa in December 2020.
 - ✓ Gamma (P.1): First reported in Brazil in early January 2021.
 - ✓ Delta (B.1.617.2): First identified in India in December 2020.
 - ✓ Omicron (B.1.1.529): First reported in South Africa in November 2021..

The following figure [3] shows the structure of the Novel Coronavirus. It is encoded by the following genes Membrane protein, RNA, Nucleocapsid protein, spike protein, and envelope protein. The working of each individual is different and is explained below.

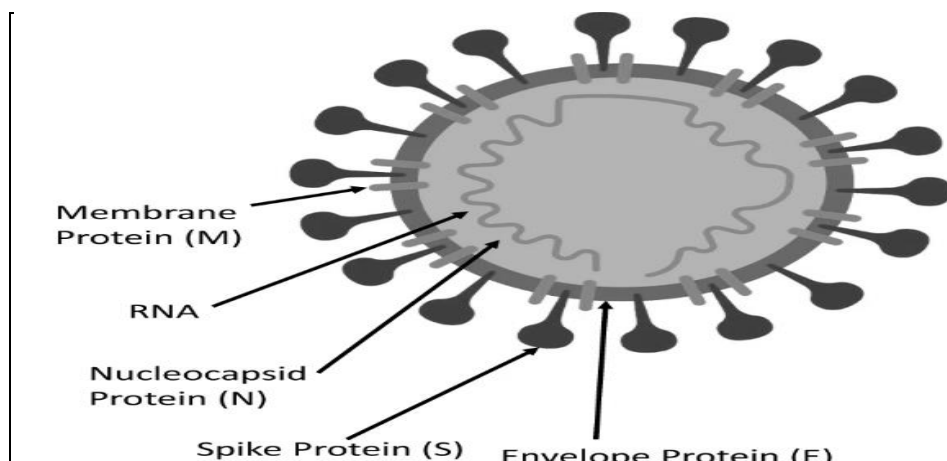


Fig. 3: Structure of novel covid-19

B. Briefing here structural protein and its function

- **Membrane Protein (M):** Serving as a pivotal organizer of CORONA VIRUS assemblies, the Membrane Protein plays a crucial role in determining the shape of the viral envelope.
- **Nucleocapsid Protein (N):** This protein is intricately bound to the RNA genome, contributing to the construction of the nucleocapsid. Its functions extend to packaging into virions and playing a vital role in viral replications.
- **Spike Protein:** Essential for binding to host cell receptors, the Spike Protein serves as a key factor facilitating the virus's entry into the host cell.
- **Envelope Protein:** This protein interacts with the Membrane Protein, collaboratively forming the viral envelope [34]. Shifting focus to the psychological impact of pandemics, COVID-19 has been a source of anxiety, phobia, and depression for both existing patients and the general population. Stigmatization, feelings of alienation, and guilt have become prevalent. The continuous influx of pandemic-related information

through TV and digital media, including statistics on infections and deaths, has contributed to heightened anxiety and mental health challenges. Those affected often experience trauma and depression, necessitating prompt intervention from qualified psychiatrists. Seeking consultation with a physician is essential for individuals facing such issues. Engaging in diverse activities such as yoga, singing, dancing, etc., has been recognized as a positive strategy for managing anxiety and depression. Notably, a significant number of COVID-19 patients are reported to be asymptomatic, ultimately recovering from the virus. The psychological ramifications underscore the importance of holistic care, emphasizing mental health support for individuals impacted by the pandemic.

The current scenario is much better than before. Panic must be avoided [30]. The following figure [4] shows the spike in anxiety and depression because of a pandemic. Also, showing the Percentage of US adults who suffered from anxiety and depression [31].

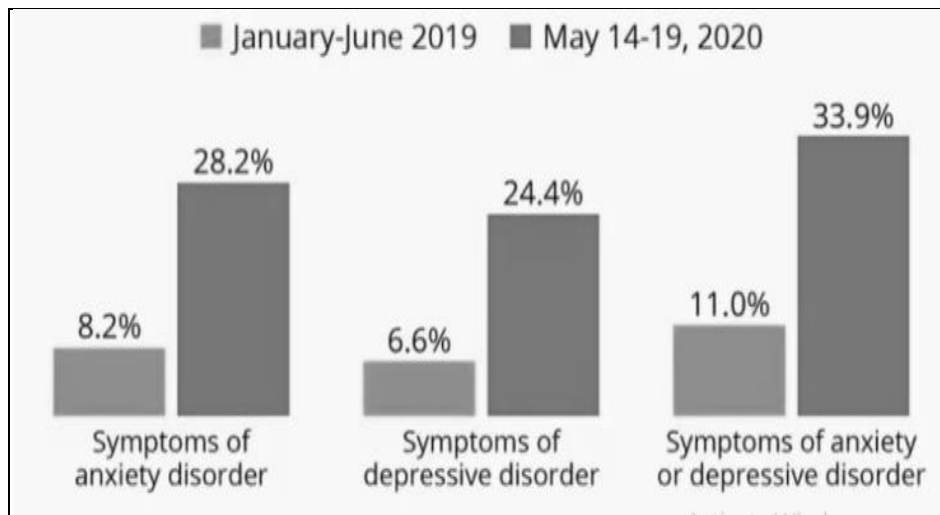


Fig. 4: Percentage of US adult suffering from COVID-19

IV. POST COVID-19 INDIAN ECONOMY

The Indian economy has witnessed substantial repercussions due to the COVID-19 pandemic, resulting in a decline in domestic demand and significant challenges such as job losses and salary reductions. The GDP of India experienced a slowdown in the fourth quarter of 2019-20, with the projected growth rate for the year 2020-2021 initially forecasted at 5.7%. However, the actual estimated GDP growth rate for 2020-2021 plummeted to 1.9%, underscoring the profound economic impact of the pandemic. Countries, including India, have been actively exploring strategies to navigate through these unprecedented challenges [19]. Labor organizations and policies have not been immune to the effects of the pandemic. The

International Monetary Fund (IMF) anticipated an extraordinary loss in global GDP and warned of potential starvation due to disruptions in the supply chain of essential goods. Economic stress became pervasive on a global scale [20]. Analyzing the economic outlook for India from 2019 to 2025, projections have been categorized as moderate, average, and severe. The accompanying figure [5] illustrates that a high GDP is associated with a growth rate of 7.45%, while a moderate GDP corresponds to a growth rate of 3.45%. In the worst-case scenario, the projected growth rate is 1.45% [21]. These figures underscore the diverse impact and recovery trajectories faced by the Indian economy post the pandemic.

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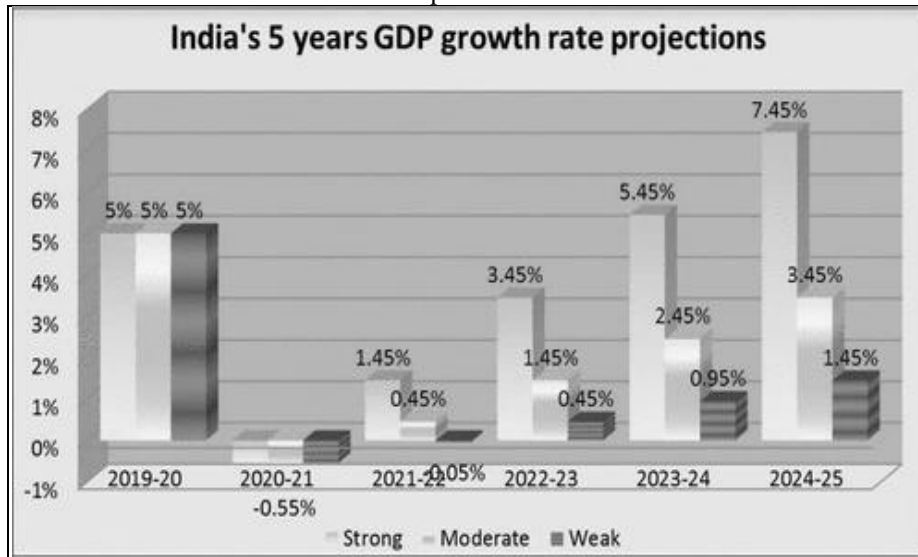


Fig. 5: India's 5 Year growth rate projection

The Indian economy faced a downturn attributed to the impact of the COVID-19 pandemic, as depicted in the comparison figure [6], which outlines economic performances alongside other countries like China, the US, Canada, Japan, and others. Notably, for the April-June 2020 period, all countries, excluding China, reported a negative quarter-on-quarter (QOQ) GDP rate.

In the fiscal year 2020-21, the Indian economy contracted by 7.3%. However, preliminary advanced projections indicate a real-term growth of 9.2% in 2021-22. Anticipating further expansion, GDP is projected to grow by 8-8.5% in 2022-23, accompanied by substantial investments in various projects in the coming years. These projections

align with recent forecasts by the World Bank and the Asian Development Bank, predicting 8.7% and 7.5% real GDP growth for 2022-23, respectively. India's real GDP is expected to exhibit impressive growth rates of 9% in both 2021-22 and 2022-23, followed by 7.1% in 2023-2024, positioning it as the world's fastest-growing economy for these three consecutive years. For the fiscal year 2021-22, the agricultural and allied industries are forecasted to grow by 3.9%, the industry sector by 11.8%, and the services sector by 8.2%. These optimistic projections signal a positive trajectory for India's economic recovery and growth in the years ahead.

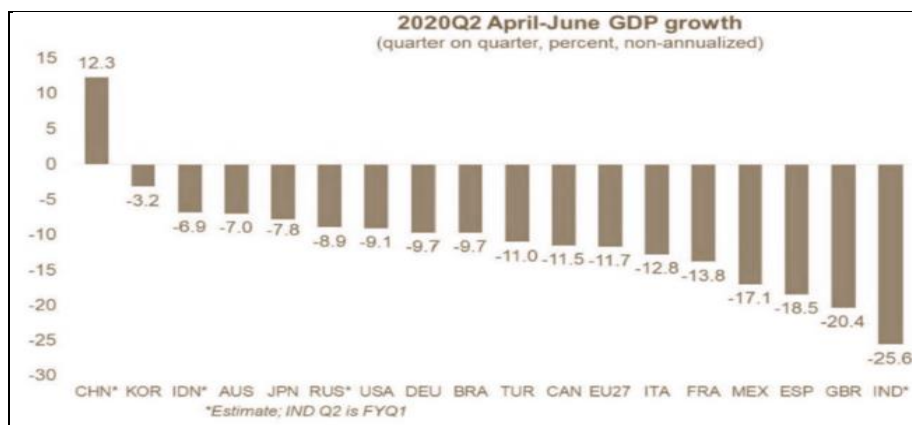


Fig. 6: India economy falls down during COVID-19

VI. COVID-19 AND INDIA AT PRESENT

India faced severe repercussions in the initial stages of the COVID-19 pandemic, resulting in a considerable loss of lives due to the unfamiliarity of the virus and the absence of vaccines or specific treatments. As a youthful nation with limited infrastructure to handle such a crisis simultaneously, India, guided by Prime Minister Narendra Modi, implemented four major lockdowns:

- March 25, 2020 – April 14, 2020 (21 days)
- April 15, 2020 – May 3, 2020 (19 days)

- May 4, 2020 – May 17, 2020 (14 days)
- May 18, 2020 – May 31, 2020 (14 days)

These lockdowns played a crucial role in containing the community spread of the virus. The government issued clear directives on the use of hand sanitizers and masks both indoors and outdoors. Individuals diagnosed with COVID-19 were required to undergo a 14-day quarantine. Despite facing numerous challenges, India successfully developed a vaccine for the coronavirus named COVAXIN, manufactured by Bharat Biotech, with a production capacity

of 6 crore doses per month. India not only ensured the timely distribution of vaccines within its states but also extended support to other nations, including Bangladesh, Myanmar, Afghanistan, Ukraine, etc. According to the World Health Organization (WHO) report on May 18, 2022, India recorded a total of 524,260 deaths and 43,125,370 confirmed cases. In an effort to chart a positive future, India initiated the SwasthyaChintanShivir in Gujarat. The government provided clarity on the Cowin certificate issued

in Pune. Furthermore, the Union Minister of Health and the National Health Authority introduced various schemes to aid researchers, entrepreneurs, and the Ayushman Bharat Digital Mission. These collective initiatives showcase India's comprehensive approach to navigate and recover from the challenges posed by the pandemic.

The current situation of India as of 18 May 2022 is shown below [fig: -7].

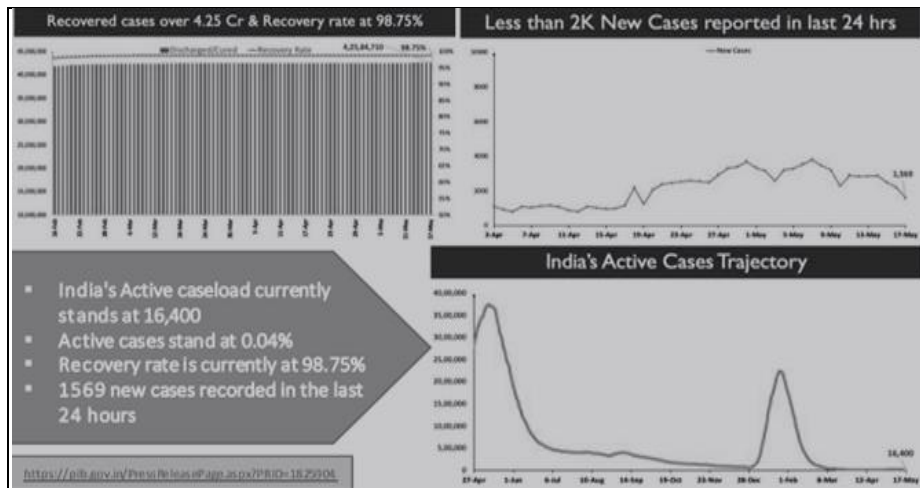


Fig. 7: Overall cases and its preventive measure

The below fig [8] shows total numbers of confirmed cases in India up-to 10 June 2022 are 43205106.

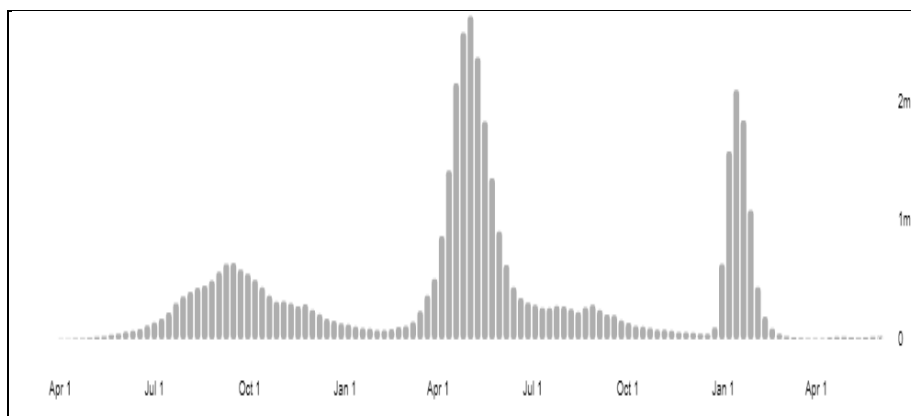


Fig. 8: Confirmed cases in India

The below fig [9] shows total numbers of death cases in India up-to 10 June 2022 are 524747.

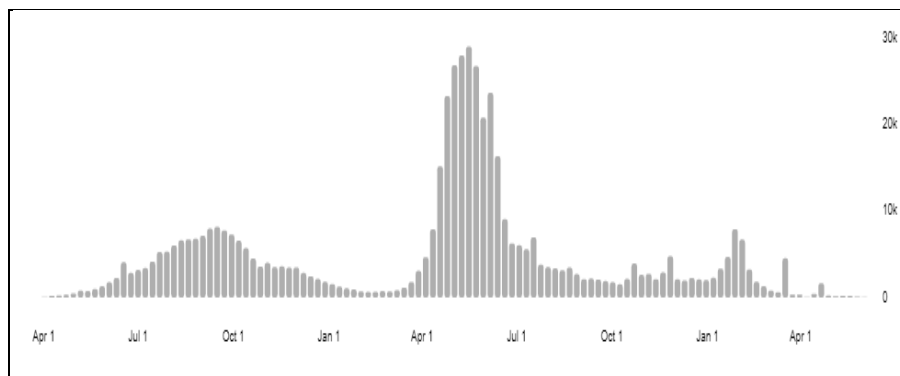


Fig. 9: Number of death in India

The total number of testing done through RT-PCR was 84424 crore as of 18-May-22 where the test positivity rate in India was 0.59% (fig: 11) and the daily positive rate was

0.44% (fig: 10). The following fig [10] & fig [11] shows the daily positivity rate and testing rate.

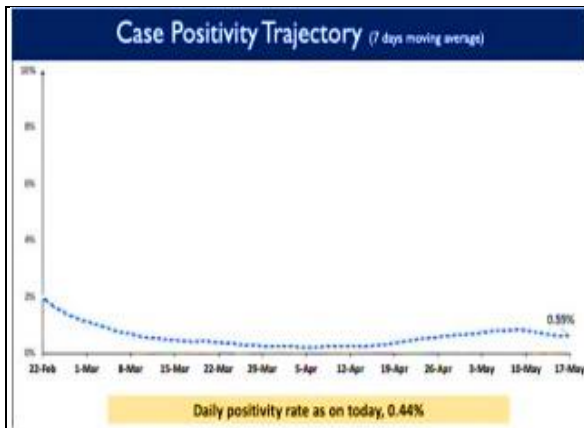


Fig. 10: Daily positive rate

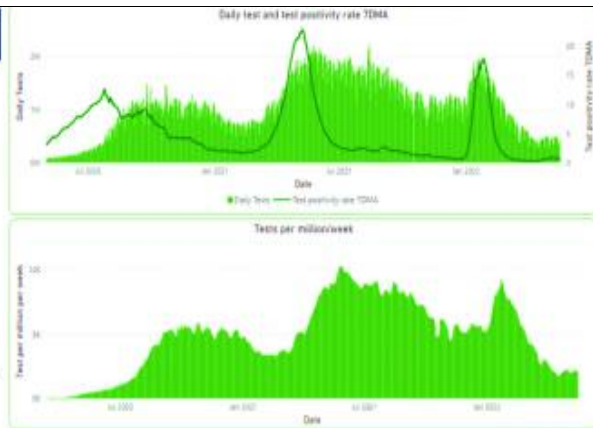


Fig. 11: Daily testing rate

As of 18-May-2022, the total number of vaccines provided to different states and UT by the Indian Govt. is 194.00 crore and there are still 18 crore vaccines left unused

by states and UT. The following figure [12] depicts its segregation based on population.

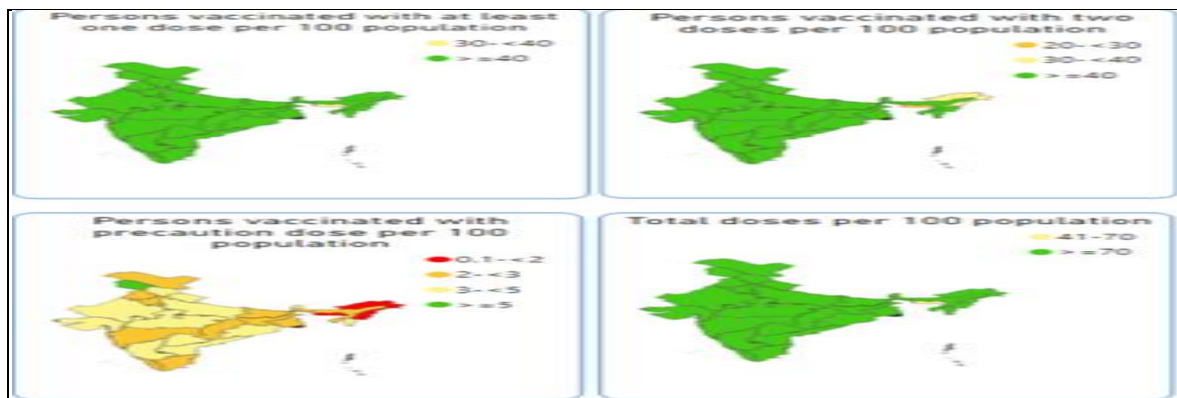


Fig. 12: Vaccine provided in different state by Indian Govt

The following table [1] shows cumulative vaccine dose coverage including health care workers, Front line workers, and further, it shows for different age groups people.

Table 1: Cumulative vaccine dose

	Cumulative vaccine Dose coverage	
HCW	1st Dose	10406233
	2nd Dose	10030869
	Precautionary Dose	5050470
FLWs	1st Dose	18417795
	2nd Dose	17567604
	Precautionary Dose	8238587
Age Group 12-14 Years	1st Dose	32083364
	2nd Dose	12663031
Age Group 15-18 Years	1st Dose	59038939
	2nd Dose	44239799
Age Group 45-59 Years	1st Dose	203157157
	2nd Dose	189800461
Over 60 Years	1st Dose	127025201
	2nd Dose	118317203
Cumulative 1st Dose administered		1006795142
Cumulative end Dose administered		878095971
Total Precaution Dose		31419993
GRAND TOTAL		1916311106

VII. E-COMMERCE IN INDIA

E-commerce has seen a gradual but significant expansion in India over the past few decades, driven by the widespread adoption of mobile phones and fast internet connections. This transformative trend has impacted both businesses and consumers, extending beyond metro cities to villages and rural areas, enabling users to effortlessly purchase products with convenient payment options at their fingertips. The concept of electronic business platforms was conceived in 1991, but the lack of fast internet connections in the 1990s impeded the execution of online payment processing and goods purchasing. In 2002, IRCTC introduced an online application for railway reservations, marking a crucial juncture when people started embracing internet usage. Flipkart played a pivotal role in popularizing e-commerce in India, and later initiatives by Mukesh Ambani, offering free internet SIM cards, revolutionized internet usage in the country, impacting not only e-commerce but various other sectors. Several major e-commerce companies in India have been instrumental in shaping the industry's growth, including Flipkart, Amazon, Snapdeal, Myntra, AJIO, Shopclues.com, and Jabang.com. The acceptance of this shopping method has grown significantly among Indians, who now order daily essentials such as milk, medicine, groceries, and gadgets online, receiving items at their doorstep with convenient payment

options like cash on delivery or online payments through UPI.

The COVID-19 pandemic further accelerated the shift towards e-commerce, with people relying more on online platforms for their purchases. Despite the challenges posed by the pandemic, the e-commerce market experienced substantial growth, witnessing a 30% increase in orders of various items in the fourth quarter of 2020. This increased acceptance suggests that the Indian e-commerce market is projected to reach up to US\$350 billion by 2030.

Various sectors, including manufacturing, aviation, tourism, and electronics, have played vital roles in the rising and sustained growth of e-commerce in India. The logistics industry has particularly contributed significantly to this growth. In addition to established giants like Flipkart, Amazon, and Myntra, numerous small startup companies are making strides in establishing their presence in the e-commerce business.

The accompanying figure [13] illustrates the correlation between the growth of the e-commerce industry and the increasing speed of the internet. The trajectory suggests a promising future for the Indian e-commerce market, with continued growth and innovation driven by evolving consumer preferences and technological advancements.

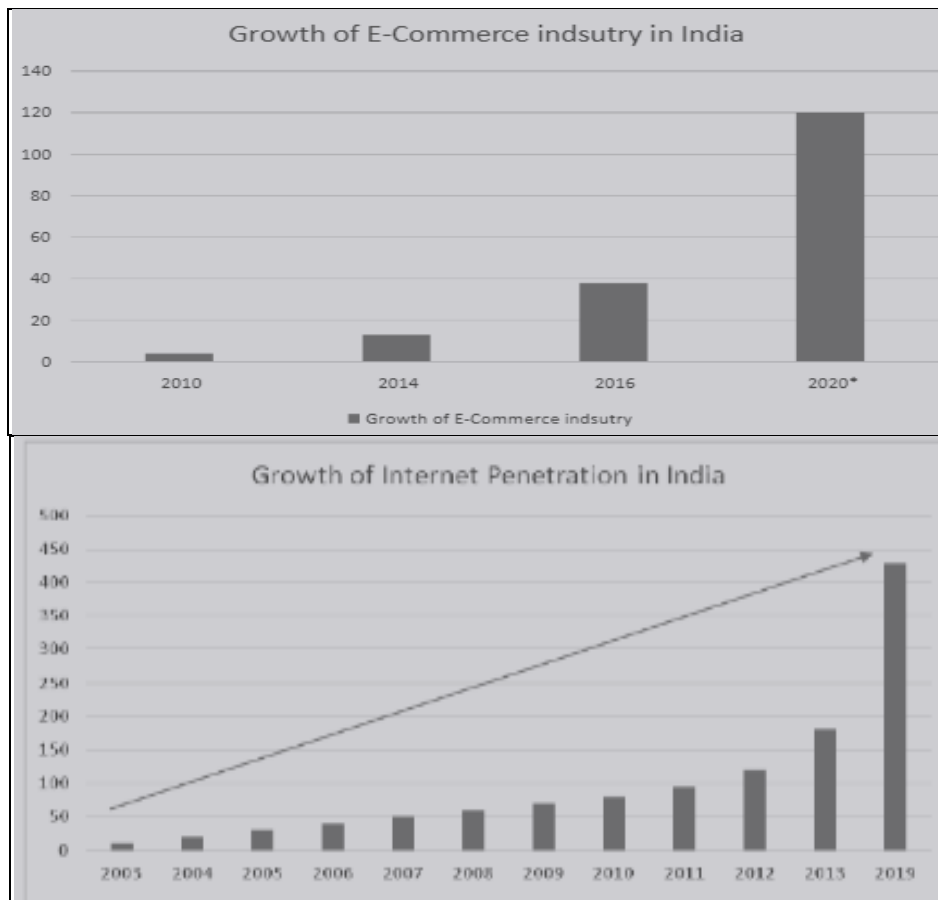


Fig. 13: Growth of Indian ecommerce Top of Form

VIII. EFFECT OF COVID-19 ON INDIAN E-COMMERCE

The COVID-19 pandemic has left a profound impact on various aspects of human life, causing disruptions in the global economy and affecting millions of individuals globally. Beyond health concerns, it has led to economic downturns, disruptions in world trade, and challenges in daily life. Sectors like healthcare, aviation, information technology, solar power, and transportation have been severely affected. Economically, the fallout resulted in job losses, prompting many blue-collar workers in India to migrate back to their native places. This migration resulted in tragic consequences, with people losing their lives and families losing their primary breadwinners. Economic challenges exacerbated issues of poverty and food insecurity, with many individuals globally living on less than \$1.90 per day. Education also faced significant disruptions, causing a considerable hiatus in primary schools and colleges, with offline classes on hold for approximately 1.6 years. The impact was particularly substantial for Indian students in classes 10th and 12th, facing challenges attending physical classes. As a response, people sought alternative solutions, such as remote work, virtual meetings, and online education. While internet speed initially posed challenges, improvements by internet service providers facilitated the transition to digital platforms. E-commerce businesses encountered a unique set of challenges during the

pandemic. Shifts in shopping trends caused significant changes in the orders of essential goods, including groceries, healthcare products, and fashion items. With lockdowns and safety measures in place, people turned to e-commerce for its accessibility, convenience, competitive pricing, diverse product range, and easy payment options. The five lockdowns in India witnessed varying behaviors in online shopping trends.

Data from datareportal.com highlights trends in purchasing interests during the pandemic, focusing on essentials such as groceries, household items, personal care products, clothes, and entertainment. The role of the internet and mobile usage played a crucial role in the growth of e-commerce, as people spent more time at home during the pandemic, exploring online shopping options.

According to datareportal.com, individuals in the age groups of 16-24, 25-34, and 35-44 exhibited significant engagement in online shopping. The table [2] provides insights into global online shopping engagement categorized by different age groups. Overall, the pandemic has reshaped various aspects of human life, prompting shifts in consumer behavior, work dynamics, and the reliance on digital platforms for everyday needs.

COVID-19: - spending more time shopping online.

Table 2: Different people spent time on shopping online

Age	Gender	Percentage
16-24	M/F	47% / 44%
25-34	M/F	55%/50%
35-44	M/F	52%/48%
45-54	M/F	44%/40%
55-64	M/F	33%/30

The following table [3] shows trends of Purchasing interest in different essentials:

Table 3: Trends and types of purchasing on Indian ecommerce website

Categories of Items	Uses
Groceries & Foods	33%
Household	29%
Personal care	27%
Clothes	19%
Entertainment	17%
Cosmetics	15%
Chocolate	12%

Above all activities become very easy because of internet speed which is increasing year by year. So following table [4] shows data based on the different parameters for Jan 2019-20-21.

Table 4: Growth of Internet and it's uses

Year	Average speed of Mobile Internet	Year on Year change in avg. speed of Mobile internet connection	Average speed of Fixed internet connection	Year on year change in average speed of fixed internet connection
2019	10.06 MBPS	+10%	26.71 MBPS	+36%
2020	11.46 MBPS	+11%	42.14 MBPS	+58%
2021	12.91 MBPS	+127%	53.90 MBPS	+27.9%

The following table [5] shows the website based on average monthly traffic.

Table 5: Monthly traffic of website.

Year	Website	Category	Monthly traffic	Time per visit	Pages per visit
2019	Amazon	Shopping	421900.000	05m 15s	7.4
	Flip kart	Shopping	252900.000	05m 12s	6.2
	Wikipedia	Reference	310200.000	03m14s	2.4
2020	Amazon	Shopping	340800.000	5m 36s	6.9
	Google	Search	517000.000`	9m 15s	7.3
	Wikipedia	Reference	275100.000	3m 17s	2.5
2021	Amazon	Shopping	Total visit	Specific visit	Pages per visit
			396m	88.9m	7.32
	Google	Search	4.13B	176m	7.51
	Wikipedia	Reference	520m	113m	2.24

By seeing the below table for the year Jan (2019-20-21), we can conclude that people are spending more time on the internet and doing different activities on different websites as the internet speed is increasing year by year.

The current scenario according to datareportal is that the population of India by Jan 2022 was 1.40 billion out of these 658 million Indians are using the internet. According to Kepios, the number of internet users in India increased by (+5.4%) between Jan 2021-2022.

IX. IMPACT OF COVID 19 PANDEMIC ON TOP B2C COMPANIES

The global business environment witnessed a deceleration during the pandemic, impacting various sectors and contributing to a downturn in global GDP. Sectors such as education, research, IT, manufacturing, advertising, media, restaurants, film, food, and healthcare experienced notable setbacks. However, amid these challenges, the e-commerce sector emerged as a thriving industry, showcasing significant business growth. The success of e-commerce can be attributed to the widespread use of the Internet, particularly among the younger demographic, utilizing mobile phones across both developed and undeveloped countries. A comparative study of the top B2C companies,

ranked from 1st to 13th, offers insights into their growth calculated by Gross Merchandise Value (GMV) for the years 2018, 2019, and 2020. GMV is determined by multiplying the total number of goods sold by the price of goods. The tabular comparison delineates the percentage change for the sessions 2018-19 and 2019-20, providing a comprehensive view of the companies' performance over the years. Notably, among the 13 countries tabulated, 11 are from the USA and China. While some countries experienced a notable decline in their GMV, companies like Alibaba, Amazon, JD.com, and Pinduoduo maintained consistent rankings. However, there were alterations in the rankings of Expedia and Booking.com, which dropped from 5th and 6th in 2019 to 11th and 12th in 2020. Despite a reduction in the total GMV of a few top B2C companies, there was an overall increase of 20% in 2020, surpassing the growth observed in 2019 (17.9%). Significant spikes were observed in Shopify (95%) and Wal-Mart (72%). The aggregate B2C GMV for all 13 countries amounted to \$2.9 trillion in 2020, indicating substantial growth compared to the preceding years. In summary, the table [6] presents the GMV data for the top B2C companies by 2020, highlighting the resilience and growth of the e-commerce sector despite the challenges posed by the pandemic.

Table 6: Yearwise GMV of different countries

Rank by GMV		company-HQ-	Industry	GMV (\$ billion)			GMV Change (%)	
2020	2019			2018	2019	2020	2018-2019	2019-20
1	1	Alibaba-China	E-commerce	866	954	1145	10.2	20.1
2	2	Amazon-USA	E-commerce	344	417	575	21	38
3	3	JD.com-China	E-commerce	253	302	379	19.1	25.4
4	4	Pinduoduo-china	E-commerce	71	146	242	104.4	65.9
5	9	shopify-canada	Internet Media	41	61	120	48.7	95.6
6	7	eBay-USA	E-commerce	90	86	100	-4.8	17
7	10	Meituan-china	E-commerce	43	57	71	33	24.6
8	12	walmart-USA	consumer goods	25	37	64	47	72.4
9	8	Uber-USA	Internet Media	50	65	58	30.5	10.5
10	13	Rakuten-Japan	E-commerce	30	34	42	13.6	24.2
11	5	Expedia-USA	Internet Media	100	108	37	8.2	-65.9
12	6	Booking holding-USA	Internet Media	93	96	35	4	-63.3
13	11	Airnb-USA	Internet Media	29	38	24	29.3	-37.1
		companies above		2035	2399	2890	17.9	20.5

X. COMPARATIVE STUDY OF BIGGEST ECONOMY USING DIFFERENT PARAMETER

The dataset encompasses seven countries, and the accompanying table [7] delineates the consistent ascent in online retail sales profits spanning from 2018 to 2020. Among the featured economies (Australia, Canada, China, Korea, Singapore, UK, and the US), Korea distinguishes itself by achieving the highest percentage of online retail sales, with China and the UK securing the 2nd and 3rd positions, respectively. The upward trajectory of online retail sales percentages is evident across all countries, indicating a positive momentum for e-commerce. While conventional

retail sales may exhibit fluctuations among these nations from 2018 to 2020, the influence of online retail sales has been particularly noteworthy. This trend has played a pivotal role in fostering growth in both Business-to-Business (B2B) and Business-to-Consumer (B2C) e-commerce. The tabulated format presents a lucid portrayal of the upswing in online retail sales for the specified countries during the specified period. Overall, the data underscores the escalating significance of online retail as a substantial catalyst for economic activity and the expansion of e-commerce across diverse nations.

Table 7: Retail sales growth of different country.

Country(Economy)	Online retail sales(\$ billion)			Retail sales(\$ billion)			Online share (% of retail sales)		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Australia	13.5	14.4	22.9	239	229	242	5.6	6.3	9.4
Canada	13.9	16.5	28.1	467	462	452	3	3.6	6.2
China	1,060.40	1,233.60	1,414.30	5,755	5,957	5,681	18.4	21	25
Korea	76.8	84.3	104.4	423	406	403	18.2	20.8	25.9
Singapore	1.6	1.9	3.2	34	32	27	4.7	5.9	11.7
UK	84	89	130.6	565	564	560	14.9	15.8	23.3
US	519.6	598	791.7	5,269	5,452	5,638	10	11	14
Economic above	1770	2038	2495	12752	13102	13003	14	16	19

XI. COVID 19 IMPACT ON WORLD GDP

The dataset below outlines the percentage change in real GDP for the years 2020 to 2022. The considerable impact of the 2020 pandemic resulted in a widespread slowdown. The data presented indicates a significant deceleration in the world GDP of advanced economies, reflecting the adverse effects of the pandemic. However, there is a noticeable recovery in the subsequent years, 2021 and 2022, indicating a positive trend. India stands out with the highest annual percentage change in GDP, surpassing all

advanced economies and Asian nations. The tabulated data in Table [8] emphasizes India's position as having the highest GDP among all economies globally. To calculate annualized GDP growth rates, the process involves determining the GDP for two consecutive years. The next step is subtracting the GDP of the first year from that of the second year. Finally, the difference is divided by the GDP of the first year to ascertain the growth rate. This approach enables a thorough assessment of the economic growth dynamics across the specified years.

Table 8: Annual GDP of different country

Real GDP annual % change	Projections		
	2020	2021	2022
World output	-3.3	6	4.4
Advanced Economies	-4.7	5.1	3.6
US	-3.5	6.4	3.5
Euro Area	-6.6	4.4	3.8
Germany	-4.9	3.6	3.4
France	-8.2	5.8	4.2
Italy	-8.9	4.2	3.6
Spain	-11	6.4	4.7
Japan	-4.8	3.3	2.5
UK	-9.9	5.3	5.1
Canada	-5.4	5	4.7
Other Advanced economies	-2.1	4.4	3.4
Emerging Market & developing economies	-2.2	6.7	5
Emerging & developing ASIA	-1	8.6	6
China	2.3	8.4	5.6
India	-8	12.5	6.9
ASEAN-5	-3.4	4.9	6.1

Emerging & developing Europe	-2	4.4	3.9
Russia	-3.1	3.8	3.8
Latin America & Caribbean	-7	4.6	3.1
Brazil	-4.1	3.7	2.6
Mexico	-8.2	5	3
Middle east & central Asia	-2.9	3.7	3.8
Saudi Arabia	-4.1	2.9	4
Sub-sahranafrika	-1.9	3.4	4
Nigeria	-1.8	2.5	2.3
south Africa	-7	3.1	2
Emerging market & Middle income economies	-2.4	6.9	5
low income developing countries	0	4.3	5.2

XII. EFFECT OF COVID-19 IN OTHER SECTOR

The effects of the COVID-19 pandemic have been diverse across various sectors, with each industry facing unique challenges and opportunities. Here's an overview of the impact on different sectors:

A. Healthcare Sector:

- **Positive Impact:** Increased demand for healthcare services, medical supplies, and pharmaceuticals.
- **Negative Impact:** Overwhelmed healthcare systems, disruptions in non-COVID medical services, and financial strain on some healthcare providers.

B. Travel and Tourism:

- **Negative Impact:** A significant decline in both international and domestic travel, border closures, and substantial revenue loss for airlines, hotels, and tourism-related businesses.

C. Hospitality and Restaurants:

- **Negative Impact:** Closure of dining establishments, reduced dine-in capacity, decreased demand for hospitality services, and disruptions in the supply chain for food and beverages.

D. Retail:

- **Negative Impact:** Temporary closure of physical stores, interruptions in the supply chain, reduced consumer spending, and a surge in online shopping.

E. Entertainment and Events:

- **Negative Impact:** Cancellation or postponement of events, closure of theaters and entertainment venues, and challenges for the film and event industry.

F. Education:

- **Negative Impact:** Disruption of in-person classes, a shift to online learning, challenges in adapting to virtual education, and financial strain on educational institutions.

G. Manufacturing and Supply Chain:

- **Negative Impact:** Disruptions in the global supply chain, factory closures, decreased production, and challenges in logistics and distribution.

H. Technology and E-commerce:

- **Mixed Impact:** Increased demand for online services, remote work technologies, and e-commerce. However, some sectors faced challenges in the supply chain and production.

I. Finance and Banking:

- **Negative Impact:** Economic uncertainties leading to market volatility, increased loan defaults, challenges for financial institutions, and changes in consumer spending behavior.

J. Real Estate:

- **Negative Impact:** Slowdown in property transactions, reduced demand for commercial real estate, and challenges in the residential real estate market.

K. Automotive:

- **Negative Impact:** Decreased demand for automobiles, production delays, and disruptions in the automotive supply chain.

L. Energy:

- **Negative Impact:** Reduced demand for oil and gas, low oil prices, and financial challenges for energy companies.

M. Agriculture:

- **Mixed Impact:** Disruptions in the supply chain, labor shortages, and changes in consumer demand for certain agricultural products.

N. Telecommunications:

- **Positive Impact:** Increased demand for internet services, virtual communication tools, and teleconferencing.

O. Pharmaceuticals and Biotech:

- **Positive Impact:** Accelerated research and development efforts, increased demand for healthcare products, and heightened awareness of the industry's significance.

Each sector has navigated through the dynamic challenges posed by the pandemic, and recovery efforts are ongoing worldwide.

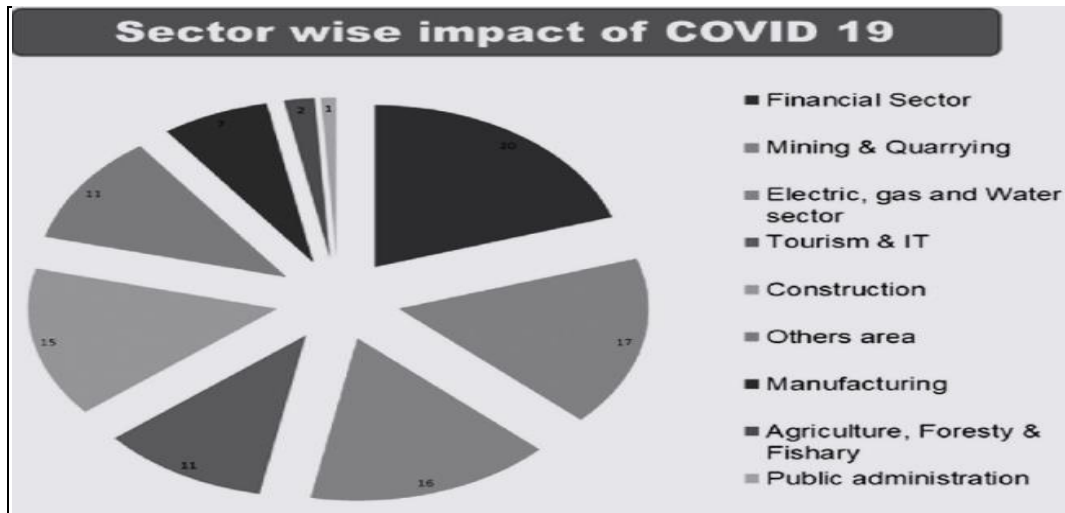


Fig. 14: Impact of COVID-19 on different sector

XIII. COVID 19'S IMPACT ON THE MANUFACTURING INDUSTRY

The global ramifications of the COVID-19 pandemic were extensive, particularly in the manufacturing sector. Stringent lockdown measures, enacted to curb the virus's spread, resulted in significant disruptions to transportation systems, impeding the movement of goods across national and international borders. This, in turn, reverberated throughout the entire supply chain, culminating in the closure of manufacturing industries and widespread job losses. China, a major player in the global GDP landscape, experienced disruptions that rippled through prominent economies such as India and the United States. India, for instance, grappled with a sharp economic decline of 7% in the initial quarter of 2020-21, accompanied by a contraction of over half in the manufacturing industry between March 2020 and 2021. Despite these challenges, India played a pivotal role in the first wave by exporting a substantial quantity of medicines to combat COVID-19. The World

Trade Organization (WTO) projected a staggering 32% decline in global trade in goods for the year 2020. This decline, coupled with disrupted supply chains and heightened demand for essential goods, precipitated price hikes. Manufacturing industries faced shortages due to the breakdown of functional supply chains and a shortage of available manpower. During the pandemic, the concept of Industry 4.0 gained prominence, emphasizing automation and advanced technologies. The need for reduced dependence on manual labor and the ability to adapt to unforeseen disruptions underscored the importance of embracing technological advancements in manufacturing. In summary, the impact of COVID-19 on the manufacturing industry was profound, necessitating a reevaluation of conventional practices and highlighting the importance of resilience and adaptability in the face of global challenges. The accompanying Figure [15] visually depicts the substantial impact of the pandemic on the manufacturing sector.

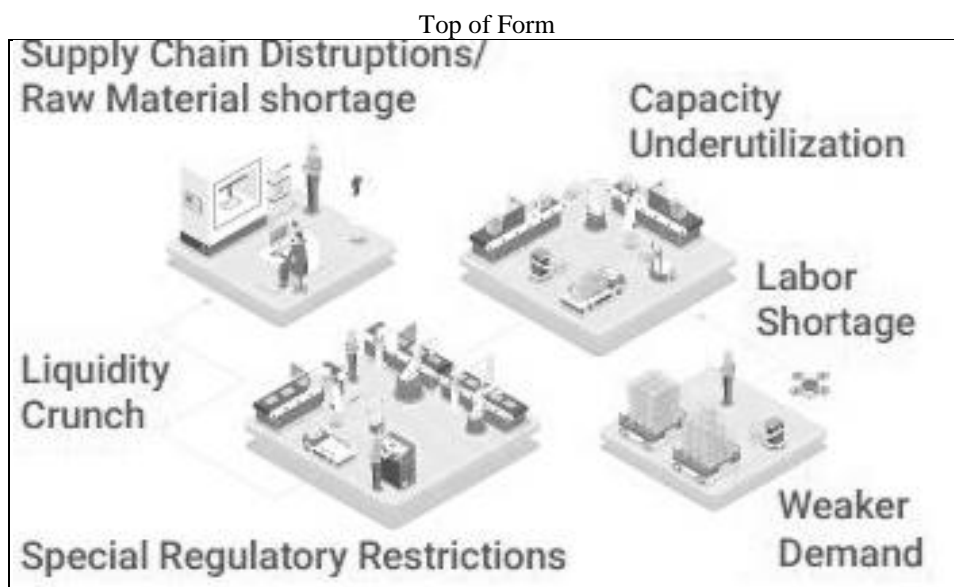


Fig. 15: Impact of COVID-19 on manufacturing unit

XIV. THE IMPACT OF COVID 19 ON THE AVIATION INDUSTRY

The aviation sector faced severe repercussions due to the onslaught of COVID-19, leading to a comprehensive suspension and prompting concerns about a post-pandemic economic downturn. The stringent cessation of aviation activities from March 25th to May 24th, spanning a sixty-day period, resulted in substantial financial losses. Crisil estimates peg the lockdown-induced loss at a staggering INR 240 billion for the Indian aviation sector [13]. This financial setback wasn't confined to India alone; the global aviation industry bore a similar burden. The impact rippled through various sectors interconnected with aviation,

causing their complete collapse. Tourism, a pivotal contributor to the economic vitality of nations, experienced a significant downturn. The challenge lies in aligning the aviation sector with the current circumstances, with a gradual return to operations anticipated only when conditions normalize. However, the journey toward full recovery and the restoration of regular business trends is expected to be protracted. In response to this crisis, a set of rules and regulations has been instituted to facilitate the recovery of the aviation sector and ensure a smooth operational transition [14]. The visual representation of COVID-19's impact on the aviation sector is depicted in Figure [16] and Figure [17].

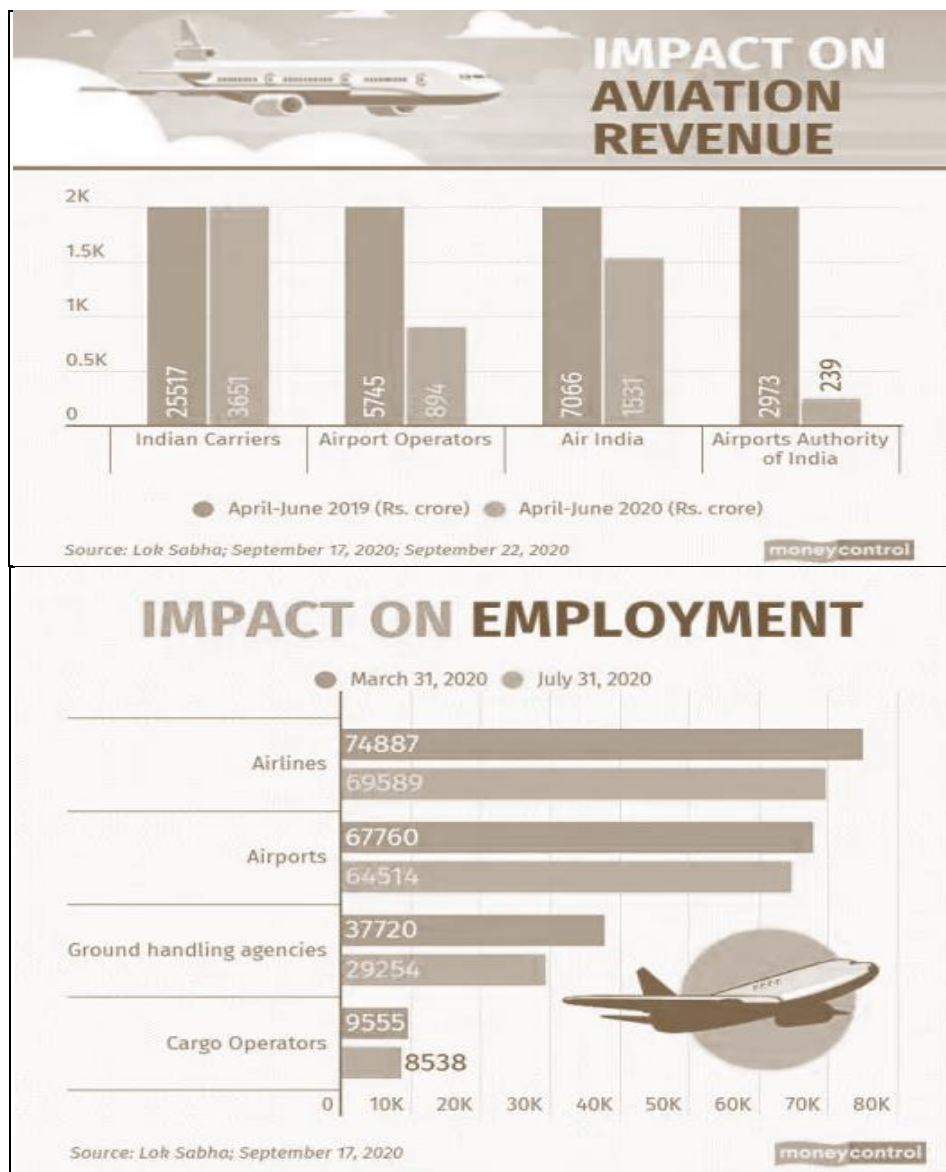


Fig. 16: Impact of COVID-19 on aviation sector

As per the Airplane authority of India, the aviation industry's revenue downturn had a severe impact on employment. Air India employees were compelled to remain at home without pay until further notice. Ground handling agencies were particularly hard-hit, and the employment

scenario in tourism and aviation experienced significant setbacks. The accompanying figure illustrates a decline in both domestic and international traffic, along with a decrease in passenger footfall across AAI.

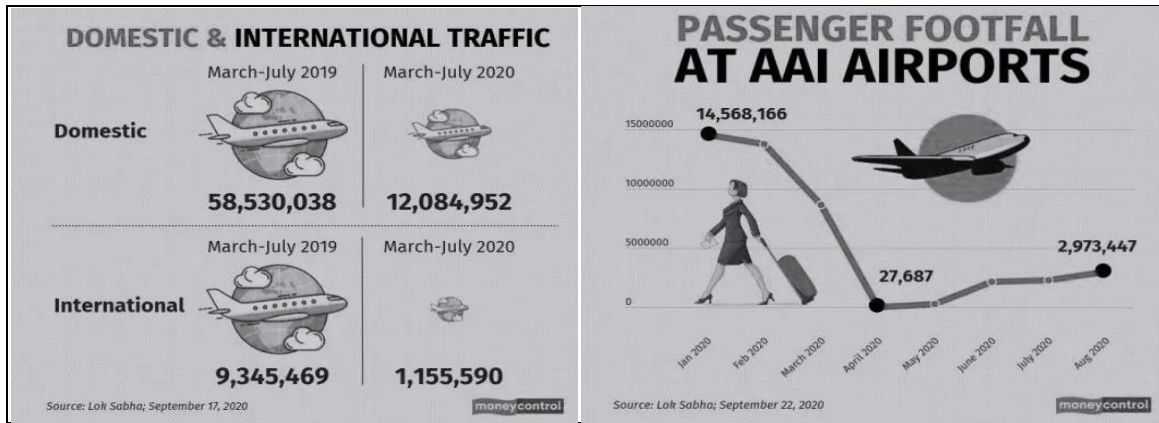


Fig. 17: Impact of COVID-19 on aviation sector

XV. COVID-19 ON THE AGRICULTURE SECTOR

Agriculture stands as a crucial aspect of human life, integral to our existence. The indispensability of agriculture becomes even more apparent during pandemics or disasters, where the world grapples with the dire situation of potential starvation. Such challenges arise due to disruptions in transportation, leading to a cascade effect on the entire supply chain. The scarcity of labor further compounds the problem, making the cultivation process difficult to execute. The repercussions extend beyond India, affecting countries like China and others in the wake of the pandemic. Initially, India faced challenges with the availability of wheat and rice, but over time, these staples became accessible in every ration shop across the country, indicating a partial resolution of the supply chain issues. In response to the imperative of preserving human lives, especially in situations where viruses spread through contact and airborne transmission, China innovatively utilized drones for food delivery during the pandemic. This global health crisis has underscored the

vulnerabilities of the global food system, emphasizing the need for the world to glean important lessons from the COVID-19 pandemic. The lessons learned extend to the imperative of stockpiling essential provisions and placing a heightened focus on agriculture to navigate through challenging times [16][17]. Figures [18] and [19] visually depict the impact of COVID-19 on the agriculture sector. In the context of the pandemic, a phone survey highlights the plight of women in Nepal and India, particularly in the absence of adequate knowledge about farming practices. A staggering 50% of farmers in both countries have been severely impacted by the pandemic. The accompanying figure illustrates the effect of COVID-19 on women farmers' access to information in Nepal and India [31]. Notably, there has been an observed shortage of labor in the rice-wheat system, leading to a significant decline in production, falling by up to 23%. India now faces the challenge of implementing innovative solutions and research to address and mitigate such constraints.

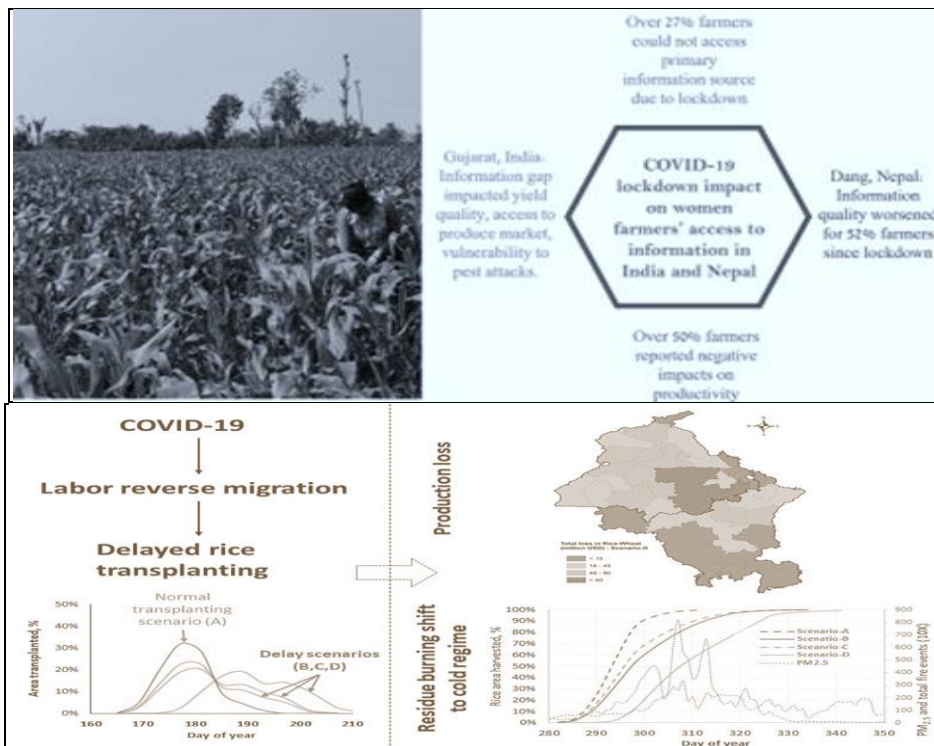


Fig. 18: Impact of COVID-19 on agriculture

XVI. COVID-19 IMPACTS ON THE TOURISM SECTOR

In the global GDP landscape and India's revenue streams, the tourism sector plays a pivotal role. However, the onset of the pandemic has cast a significant impact on this sector. India, renowned for its rich culture, yoga, spiritualism, historical heritage, and natural beauty, attracts numerous foreign visitors. The pandemic delivered a severe blow to this industry, resulting in a loss of 100.08 million jobs worldwide. In 2020, the aviation sector witnessed a staggering drop of 78%. Tourism, being a sector that indirectly contributes revenue to various other industries such as aviation, hotels, restaurants, retail, and entertainment, experienced a cascading effect during the pandemic. The repercussions were felt across multiple sectors. As a developing country, India heavily relies on tourism for employment creation, tax generation, and

foreign exchange earnings, all of which play crucial roles in the nation's GDP. Post-pandemic, the challenge lies in rejuvenating foreign interest in visiting India, akin to pre-pandemic levels. To achieve this, the establishment of clear protocols and rules becomes imperative, aiding in the estimation of foreign visits [18]. On April 10, 2020, a significant landmark in the tourism sector, the iconic TAJ hotel, was forced to close due to the pandemic, leading to the loss of numerous jobs. The exact timeline for its resumption remained unclear, creating uncertainties. The TAJ hotel, known for its allure among foreigners, contributed substantially to revenue and played a vital role in the Indian GDP. The decline in tourist arrivals in India from February 2020, compared to the previous fiscal year (2019), is evident. The accompanying figure [20] illustrates the substantial decrease in tourist arrivals in India.

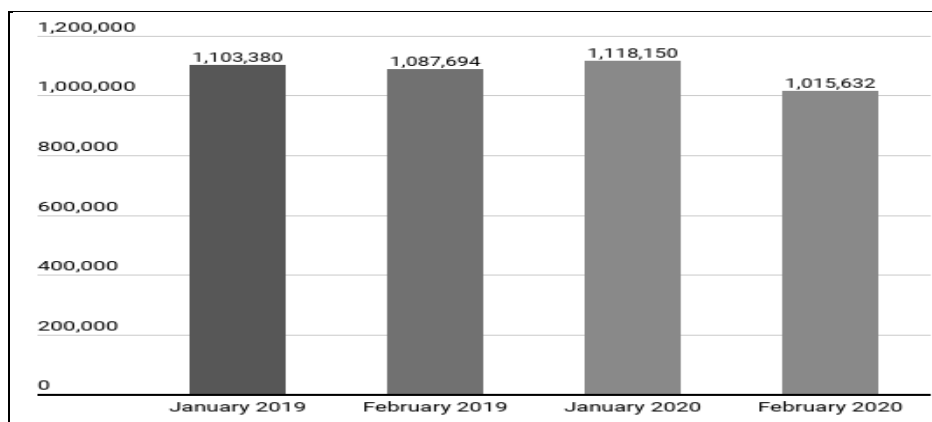


Fig. 19: Decline of tourist arrival in India

XVII. FUTURE OF E-COMMERCE

The landscape of business in India has been transformed by the advent of e-commerce. This shift indicates a persistent market demand, with consumers favoring the convenience of purchasing goods at their fingertips. Projections suggest a substantial growth in the e-commerce market, anticipated to reach US\$188 billion by 2025 and a remarkable US\$350 billion by 2030. This expansion is predicted to amount to a 21.5% increase,

translating to US\$74.8 billion. The visual representation in the provided figure [21] underscores the upward trajectory of e-commerce, projecting a significant market size of US\$350 billion by 2030. Notably, the surge in e-commerce is closely tied to the adoption of 5G mobile technology among Indian consumers. The shipment of 5G mobile devices has experienced an impressive growth of 555% Year Over Year (YOY), further contributing to the flourishing e-commerce landscape.

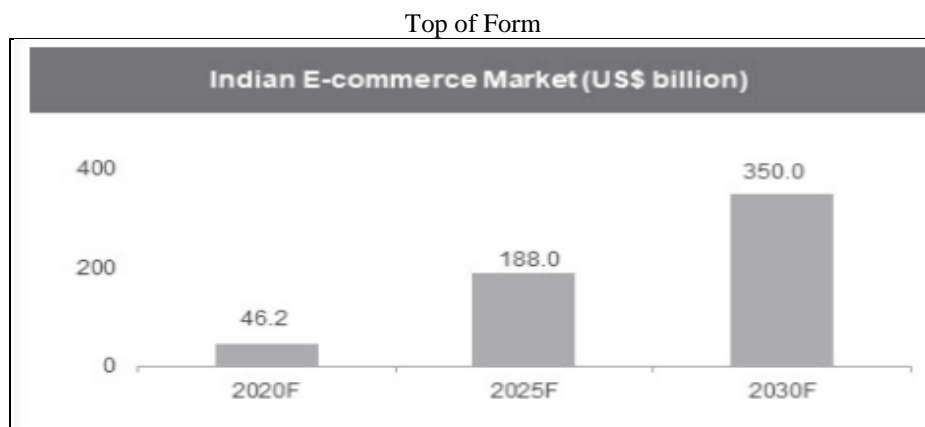


Fig. 20: Indian ecommerce market growth

The following figure [22] shows the market size of the e-commerce industry in India, trends, and forecast (in Billion \$).

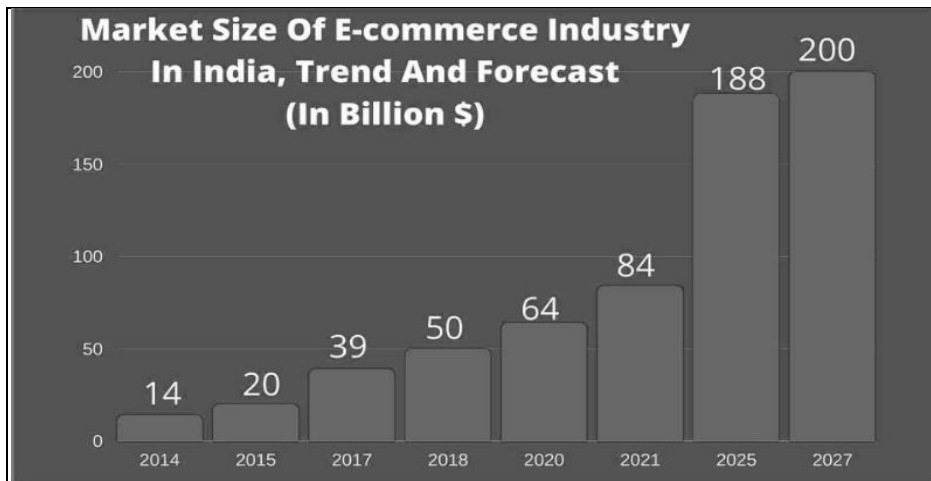


Fig. 21: Market Size of ecommerce in India

The success story of e-commerce started in 2007 as a start-up, i.e. by Flip kart. Initially, it is very challenging for the flip kart to convince people to purchase goods from their platform. But with the various ease and facilities provided by companies such as Millions of products over e-commerce platforms, at their fingertips, they can select and pay online

with different UPI. Product will be delivered on doorsteps. Above all is the reason which makes e-commerce famous among all age groups.

The following figure [23] shows the revenue of flip kart private limited for FY-2014-21

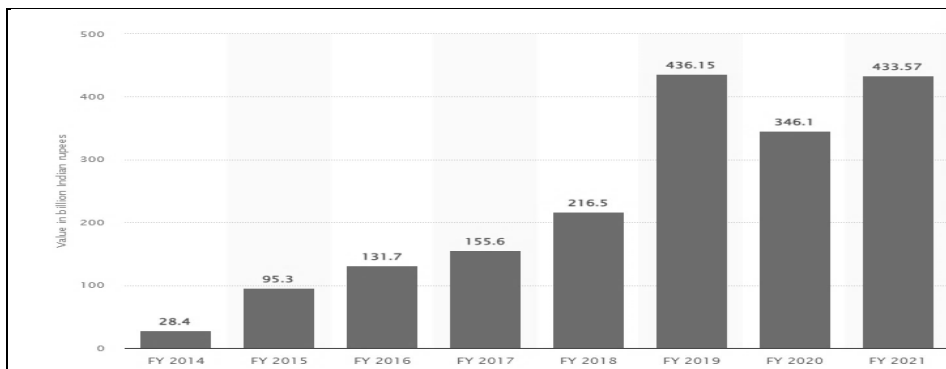


Fig. 22: Revenue of Flipkart

Flip kart private Limited generated revenue of 433 billion Indian rupees in the year 2021 with an increment of 25% as compared to last FY. With the good internet connection, there is a tremendous rise in customer ranking, and the internet was one of the main reasons for the success of e-commerce. Among e-commerce platforms, it comes

2nd and is the only competitor in the market right now against amazon.

The following figure [24] shows the revenue of Amazon for FY 2004-2019.

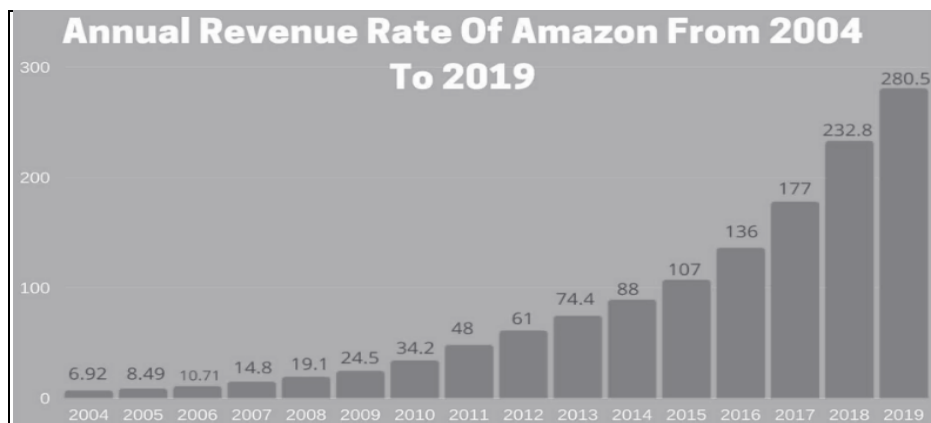


Fig. 23: Revenue for amazon from 2004-2019

Amazon, in 2004, initiated a significant investment amounting to \$5 billion, and over time, they have judiciously utilized \$4 billion of this capital. This substantial investment primarily facilitated Amazon's expansion endeavors, including onboarding diverse sellers onto the platform, enhancing warehouse and logistics capabilities, and offering attractive incentives to newly acquired customers. The company also directed attention towards the development of various grocery verticals and diversified payment options. Zeff Bezos, the founder of Amazon, noted in 2017 that the Amazon app was the most downloaded in India, underscoring the platform's popularity in the country. Amazon's commitment to innovation is evident in its focus on enhancing the capabilities of its smart AI-based speaker, Amazon Echo, powered by the voice-controlled personal assistant, Alexa. Notably, Amazon is actively working on the creation of a Hindi e-commerce portal tailored for Tier 2 and Tier 3 cities in India, recognizing the prevalence of Hindi in these regions. The Indian government's strategic initiatives, announced in 2014, have significantly

contributed to the growth of e-commerce. Schemes such as "Make in India," "Start-up India," "Digital India," "Skill India," and the "Innovation Fund" have provided a conducive environment for the sector. Government e-marketplace (GeM) was established through the Directorate General of Supply and Disposal to streamline government purchases, enabling online transactions of up to ₹50,000. Additionally, the government has introduced an online trading platform connecting farmers to wholesale markets, currently spanning 21 mandis across seven states, with plans to expand to 7,000 mandis. Under the Ministry of Women and Child Development, the government launched Mahila e-haat, a portal specifically designed for women entrepreneurs. Here, women can showcase their products without incurring any charges. In a move to promote foreign players in the Indian e-commerce landscape, the government increased the Foreign Direct Investment (FDI) limit to 100% [37]. Figures [25] and [26] illustrate the National Agriculture Market model and Mahila e-haat, respectively.

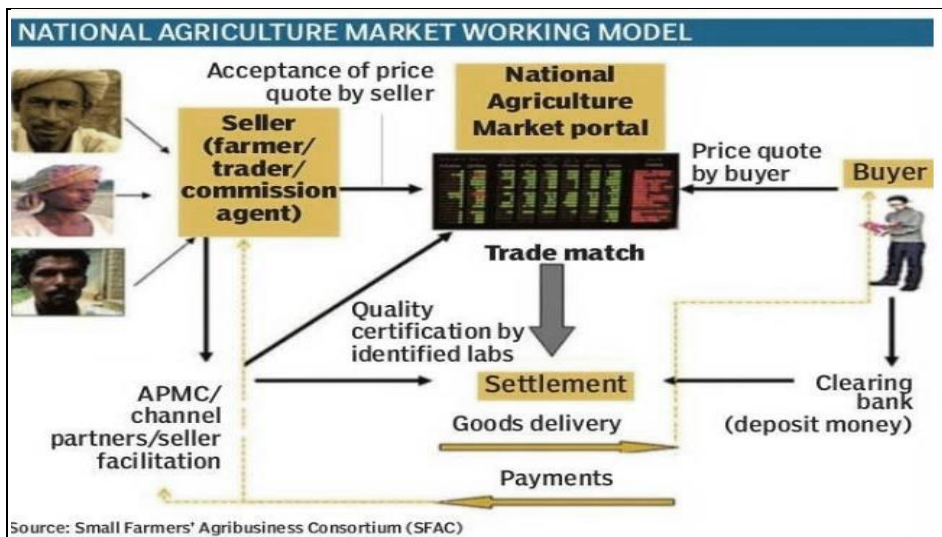


Fig. 24: National agriculture market model



Fig. 25: Mahilla-e-haat

XVIII. CONCLUSION

This analysis delves into the profound ramifications of the COVID-19 pandemic on the landscape of Indian e-commerce, unraveling its multifaceted impact across various sectors. The onset of a pandemic invariably triggers a cascade of adverse effects, permeating human psychology and compelling a considerable portion of the workforce to reassess their employment situations, often leading to job displacements. The pervasive negative influence of a pandemic becomes palpable, casting a shadow over every facet of human life. Contrary to the prevailing challenges, the advent of the virus ushered in a period of significant growth for the e-commerce sector in India. Witnessing an unprecedented surge in popularity, online shopping emerged as a preferred mode of commerce for consumers, who began embracing diverse portals to fulfill their purchasing needs. Amidst the economic turmoil induced by the pandemic, India managed to ascend to the top tier among global nations, boasting the highest Gross Domestic Product (GDP). Remarkably, the e-commerce boom extended beyond established giants, with numerous mid-sized and small-scale enterprises venturing into the digital realm by establishing their presence on e-commerce platforms. This burgeoning trend has not only facilitated the sustenance of these businesses but has also become a substantial contributor to the overall Indian GDP. The proactive role of the Government of India in bolstering the e-commerce ecosystem is evident through the formulation and implementation of various schemes aimed at fostering growth in this sector. These initiatives, both direct and indirect, have played a pivotal role in propelling the e-commerce industry toward its objectives, fostering an environment conducive to its sustained expansion. Looking ahead, the collective experience gained from navigating the challenges posed by the COVID-19 pandemic positions society to confront any future adversities with resilience and fortitude. The collaborative efforts that led to the triumph over the pandemic serve as a testament to the potential of collective action in overcoming challenges and underscore the unwavering spirit of humanity. As India continues to chart its course towards economic recovery, the lessons learned during this period will undoubtedly inform and fortify our response to any unforeseen events in the future.

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