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Shipment Delivery and Covid-19: An Indian Context

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Abstract*—*The novel coronavirus disease also known as COVID-19 has disrupted almost every sector of human development. From mental health to physical wellbeing, from sports to tourism, from schools to offices, from travelling to leisure, from entertainment to social life, from exports to local sales everything has been disordered. While everyone around the globe was under lockdowns and strict stay at home orders were given by the respective governments, the businesses, factories and enterprises were locked and sinking to new lows.

I. INTRODUCTION

The COVID-19 pandemic disrupted almost every aspect of life including shipment delivery industry (Alam et al., 2020). Government imposed lockdowns and curfews forced everyone to stay at home, which lead to closure of many businesses. Thousands of hundreds of people from the urban areas started heading towards their native places because they had no work and no source of income(*COVID-19 Lockdowns*, n.d.). When the lockdown was imposed in India for the first time, the orders for the government was total blackout of the streets. No one was allowed to come outside of the houses. Tourism halted and was brought to a stand-still(Alam & Parveen, 2021). This total lockdown led to utter panic among the people as they started to worry about the food and grocery items and other daily use products.

Since no movement was allowed, transportation of goods and items was halted all of a sudden. People started realizing and understanding that the disease was not a fluke and they had to protect themselves and their families. Online stores stopped taking orders and the current open orders were either cancelled of the assured delivery dates were changed to “as soon as possible”. India has a vast network of shipment delivery touching almost every city and village in the country(Press Trust of India, n.d.). With the manyfold increase of e-commerce in India, the shipment delivery system also picked up the pace, but the lockdowns and curfew had tremendously affected the services.

Shipment delivery, in India, includes shipment of goods, grocery, apparel purchased online, cooked food ordered on various platforms, money orders, gifts, important documents and papers etc. These services can be used by an individual just to send a birthday wishes postcard, or people running a small business as well as giants like Amazon and Flipkart(*Best Courier Service in India For Online Business*, n.d.).

In this paper, we have discussed the effects of COVID-19 on the shipment delivery industry. We present a comparison between the pre, during and post (the new normal) COVID-19 status of the shipment industry in an Indian perspective.

II. LITERATURE REVIEW

To obtain the studies of interest we passed word queries to the search column present in the databases. We have used generic terms so that we get a broader result set. The primary search term used is placed between the logic AND and OR operators ang can we written as

"Query": {"COVID-19" (in all metadata) AND "Shipment" (in all metadata) AND "India" (in all metadata)} "filter": {Publication Date: (01/03/2020 TO 01/07/2021)} OR

{"Coronavirus" (in all metadata) AND "Shipment" (in all metadata) AND "India" (in all metadata)} "filter": {Publication Date: (01/03/2020 TO 01/07/2021)}

The major databases which were explored includes:

- ACM Digital Library
- IEEE Xplore Digital Library
- MDPI
- ScienceDirect
- SpringerLink
- Wiley Online

The main reason for exploring these major databases is their rich library of conference proceedings and journals and articles.

No results were found in either of the databases for the searched query. But a few related papers popped up in the search results. Mahajan et. al. fond that online product availability fell by 10% on average, but there was little impact on online prices. This fall in product availability in online retail was equally matched by a fall in product arrivals in the wholesale markets, pointing toward a general supply chain disruption (Mahajan & Tomar, 2021). Research conducted by Sharma et. al. gave insights on the challenges, solutions and recommendations, which when followed can strengthen the logistics supply chain management in developing countries like India (Sharma et al., 2020).

Singh et. al. proposed an action plan to tackle pandemic based disruptions for fulfilling the need of food grains, ingredients, medicine, PPE, and other essential items (Singh et al., 2021). Sinha et. al. developed a novel modelling approach to identify few nodes, which require additional inventory allocations (strategic inventory reserves) to ensure minimum service level (67%) under the possibility of lead time disruptions(Sinha et al., 2021).

III. DELIVERY SYSTEM BEFORE COVID-19

India has been experiencing a 19% growth in parcel volume since the year 2013 and stands at the third position only after China and Norway. 2.8 billion parcels have been shipped reaching a CAGR of 22% in 2013. Before the onset of the novel coronavirus, the delivery industry and logistics was being used abundantly throughout the country. The promise and commitment they assured the users and their clients like accuracy, timely and quick delivery were increasing the faith of the users on them. The exponential increase in the number of relocations, movement of goods, manufacturing sectors, retails and online e-commerce have helped delivery industry in growing rapidlybetween the years 2010 to 2019 before the onset of COVID-19 pandemic. Shipment delivery was experiencing its steady growth since the introduction of online ecommerce giant, Amazon and the biggest local player, Flipkart. The giants could foresee the benefits and interests in the shipment delivery system way before the e-commerce was a thing of every household. Therefore, they introduced their own, self-controlled and supervised shipment delivery entities. Amazon named its shipment delivery unit as Amazon Transportation Services whereas, Flipkart named it to be Ekart Logistics.

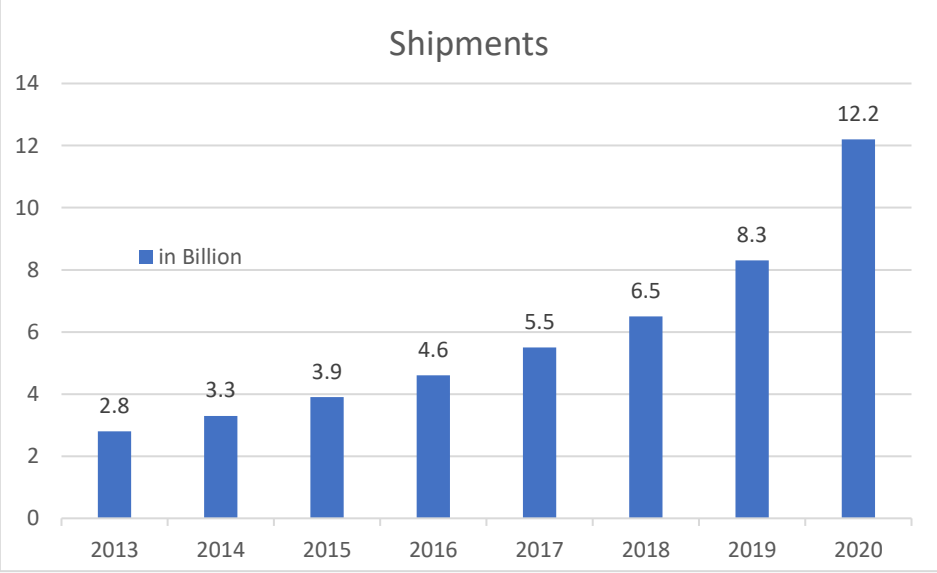

Fig.1: Shipments growth per year (2013-2020).

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Indian shipment volume was growing significantly and reached 8.3 billion parcels in 2019 before the onset on the pandemic. Amazon Transportation Services reported a parcel volume growth of 54.5% in 2019 when compared to 2018. Logistic and shipments accounted for 11% of the GDP of the country. India's e-commerce sector was worth 320 billion dollar (2374864 Crores India Rupees) in 2019. Figure 1 depicts the increase in the number of shipments from 2013 to 2020 in India. It is evident from the graph that from 2013 to 2018 the number of shipments is increasing at a steady pace of 15-16% each year. But the year 2019 witnesses a bump in the number of shipments to year-on-year (YoY) increase of 21%. The next year, 2020, further increased the number of shipments YoY increase of 31% making the total to 12.2 billion shipments.

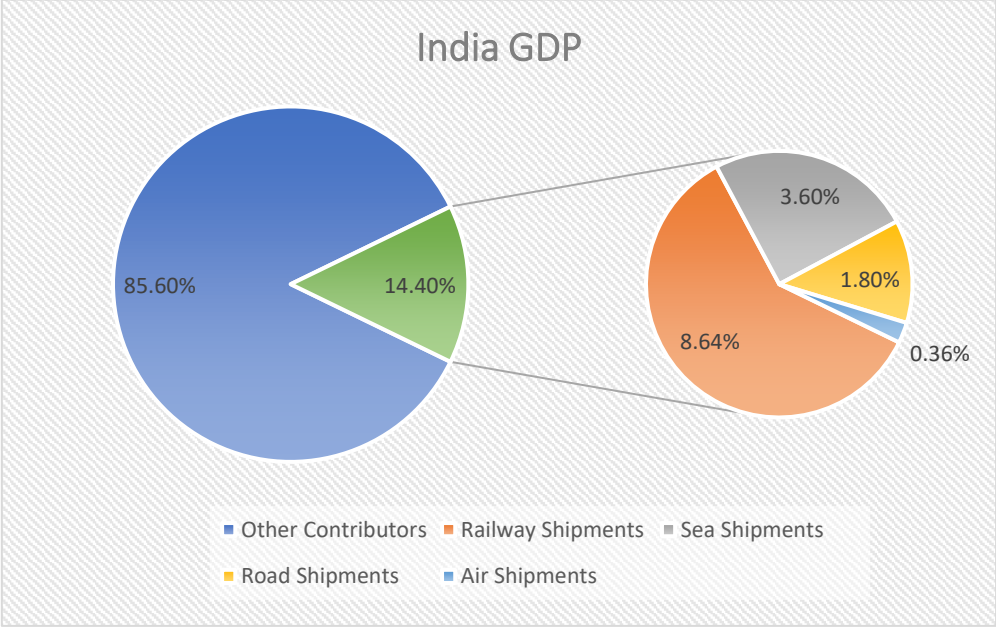

Fig.2: GDP share of Logistic and shipment industry in India (14.40%)

The shipments and logistics have a share of around 14.4% in the Indian Economy. The Indian economy is a 3.05 trillion USD economy standing at number 6 in the largest economies of the world, only after USA, China, Japan, Germany and UK. The shipment and logistics enjoy a healthy share of 439.2 billion in the GDP of India.Railways has the maximum contribution in the total share of shipments and logistics at 60%, followed by Sea transport at 25%. Roadways contribute at 12% and the air travel contributes at 3%. The data is summarized in table 1.

Table 1: Share of shipment components in GDP of India.

SHIPMENT COMPONENT	SHARE IN %	SHARE IN USD (BILLION)
Railway	60%	263.52
Sea	25%	109.80
Road	12%	52.70
Air	3%	13.18

Smartphones and the internet are slowly and gradually increasing its depth in the India with the rural population increasing its number exponentially. In 2013 the total number of smartphone users was around 76 billion which has been steadily increasing to 479.34 million in 2018. The number of users was increasing at nominal pace in 2019 with 563.58 million users as depicted in figure 3. The beginning of the year 2020 saw a similar rise in the number of smartphone users until the announcement of the lockdowns and travel restrictions were announced. The details about during lockdown growth will be discussed in the next section.

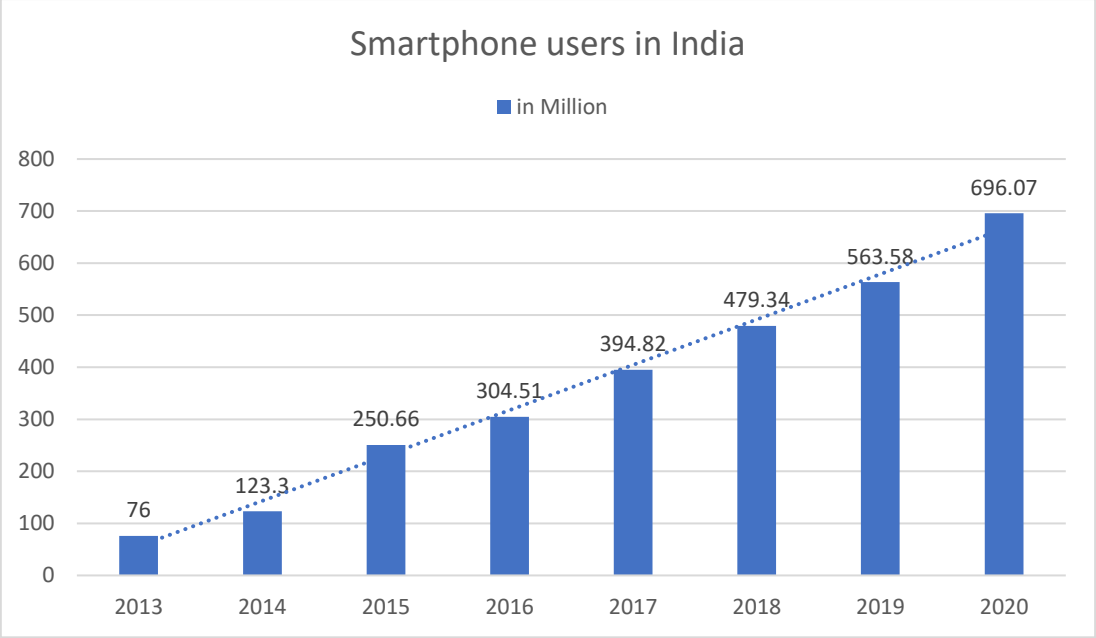

Fig.3: Number of smartphone users in India.

The penetration of the smartphone and the internet into the rural regions allowed the users to purchase items online or send gifts to their family and friends. This new trend helped greatly in increasing the shipments being travelled from one place to another. From figure 1 and figure 3, we can infer that with the increase in smartphones sales the number of shipments also increased. And as the number of users of smartphones and internet increase, the number of users willing to purchase things online also increases which in turn increases the number of shipments.

IV. DELIVERY SYSTEM BURING COVID-19

In the beginning of 2020 corona virus was just a name in India. People of the country didn't know about the seriousness of the disease or the spreading capability of the virus. It was on 30th January when India recorded or tested a patient positive for the virus. By 1st March 2020, India recorded just 2 positive cases for the virus. But no travel restrictions were imposed till then, people were free to come to India from abroad as well as countries which reported a lot of new cases as well as deaths. This led to a spike in the positive cases, on 6th March the total was 31, which increased to 44 on 9th march 2020. There were no restrictions in the country and all the regularities were still taking place as normal. It was on 25th March 2020, when India realized the severeness of the disease and imposed a total lockdown and movement restrictions throughout the country.

The total lockdown led to removal of people and vehicles from the road. The migrant people in the cities like Delhi, Mumbai, Bangalore etc. went jobless and were forced to leave the big city keeping in eyes the expenses needed to stay there without a job and the striction of movement and removal of vehicles and stoppage of trains forced the poor migrants to travel to their hometowns on either foot, or manual carriages. During the early stages of the lockdown and the onset of the pandemic, the business to business and the business to consumer shipments collapsed to a standstill. The impacts were profound as businesses and offices were closed and locked out. The Indian e-commerce and parcel delivery sectors were severely hit. For the first few weeks, people were not allowed to go anywhere except to buy the daily essential and food items. During this time, the shipment delivery system was at stand still. In the next few weeks, government realized that movement of goods is a necessity for the people, so the shipment industry was given a little respite from the strictness. The movement of goods like food items, medicines and daily essentials started but a very low level. Only 5% of the total goods carrying vehicles were on the road at that time. E-commerce was allowed to sell items on their platform but only those items which fell under the category of "essentials". But, the migration of the working class to their native places led to decrease of man power present to do the job. This further resulted in pulling back the shipment delivery industry.

In mid of May, the Indian government allowed the e-commerce firms to resume full operations, which led to a surge in volume. In April 2020, the Center of Disease Control and Prevention (CDC) published some important guidelines for the delivery agents to ensure their safety and

reducing the spread of the COVID-29. Aside from the obvious and most important measures like staying at home when ill or not well, disinfecting surfaces and hands with prescribed sanitizers, wearing a face mask of the required standard, wash hands regularly with hand wash and avoiding touching your face, the CDC emphasized the benefits of practicing contactless deliveries whenever possible.

Some of the main points from the CDC's recommendations for proper contactless delivery services during the COVID-19 pandemic are listed below:

- Maintaining a minimum distance of 6 feet from other people.
- Limiting contact with frequently touched surfaces and items such as door bells, door knob and handles, lift buttons etc.
- Avoiding the customers touching the pens, scanner and other such items belonging to the delivery agents.
- Wearing gloves when ever required and washing and changing them at regular intervals.

Like the CDC, the Occupational Safety and Health Administration (OSHA) also recommended business and organizations to practice and implement contactless deliveries whenever and where ever possible. In a letter published for shipment delivery workforce, the following strict and mandatory guidelines were introduced.

- Set up flexible working hours environment and suggest the workers to stay at home when not well or feeling sick.
- Reduce the interaction between customers as well as coworkers whenever possible.
- Leave the deliveries at doorstep with the consent of the buyer and step back whenever possible.
- Promote personal hygiene of the staff and provide sanitizer, handwash.
- Avoid workers from sharing and exchanging tools, equipment's, scanners etc.
- Use EPA-approved cleaning chemicals that are labeled for use against COVID-19.
- Encourage staff to report and disclose any COVID-19 related health or safety concerns they might have.

With all these efforts and restrictions, India was among the top countries with maximum COVID-19 cases.

The COVID-19 pandemic and the lockdowns and restrictions forced the communities to stay indoors at home which led to the increase in the business-to-consumer market which exploded as people under lockdown and stay at home orders turned to the internet to make their purchases, sales of smartphones among them also skyrocketed in various online platforms. Offline sales did not rise since the shops and showrooms were all closed due to the pandemic. The online sales further hyped the shipment and transportation industry. In 2020, the number of smartphone users increased significantly to 696.07 million. Figure 4 depicts the trend in detail. In the beginning of the year when COVID-19 was not a scare in India, the increase in the smartphone users was according to the previous trends. Early March was also witnessing the same number of smartphone sales as earlier, but the implementation of lockdown and stay at home orders, drastically reduced the sale and shipments of smartphone as well as every other item. April, saw the minimum number of smartphones sold in a month ending a decade long trend. From the month of May onwards, with some lenience from the government, the sale and shipment grew to the normal and exploded to new heights towards the end of the year with holidays and festivities.

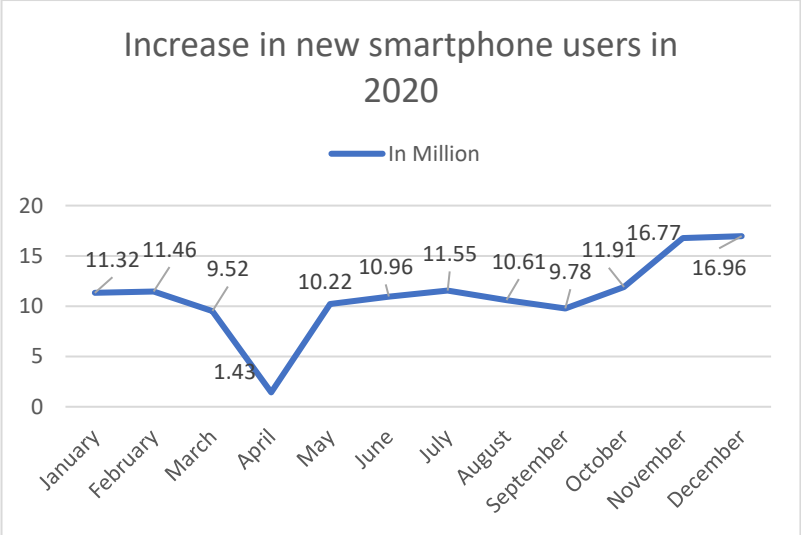

Fig.4: New smartphone usersper month in 2020

Since offline market was not fully operational and functional, people moved towards purchasing smartphone via the online mode. This switch from offline (local shops, showrooms, malls etc.) mode to the online (Amazon, Flipkart etc.) mode helped in increasing the number of shipments to a large extent.

In table 2, we summarize the number of new smartphone sales in 2020 on a monthly note.

Table 2: Smartphone sales in 2020

Month	New smartphone sales	Month	New smartphone sales
January	11.32	July	11.55
February	11.46	August	10.61
March	9.52	September	9.78
April	1.43	October	11.91
May	10.22	November	16.77
June	10.96	December	16.96
Total		**132.49 million**	

Another major bearer of the increase in the sale of smartphones was the shifting of the classes, meetings, seminars, lectures, conferences etc. to the online mode. Everyone was supposed to be at home and at the same time attend their classes, meetings as well as do their job in a work from home (WFH) manner. This WFH wave also triggered an increase in the number of shipments because college students, office workers, teachers and professors had to switch to technology in order to fulfil their duty and day to day tasks. The sale of personal computers, tablets, iPads and laptops saw an increase during the period and most of them being purchased online hence increasing the number of shipments. In figure 5 we have tried to depict the number of shipments each month in the year 2020. As the lockdown was announced in mid-march, the shipments became scarce. With relaxation and lifting of stay-at-home orders, the number of shipments rose at an unprecedented rate with 2 billion shipments in the month of December only.

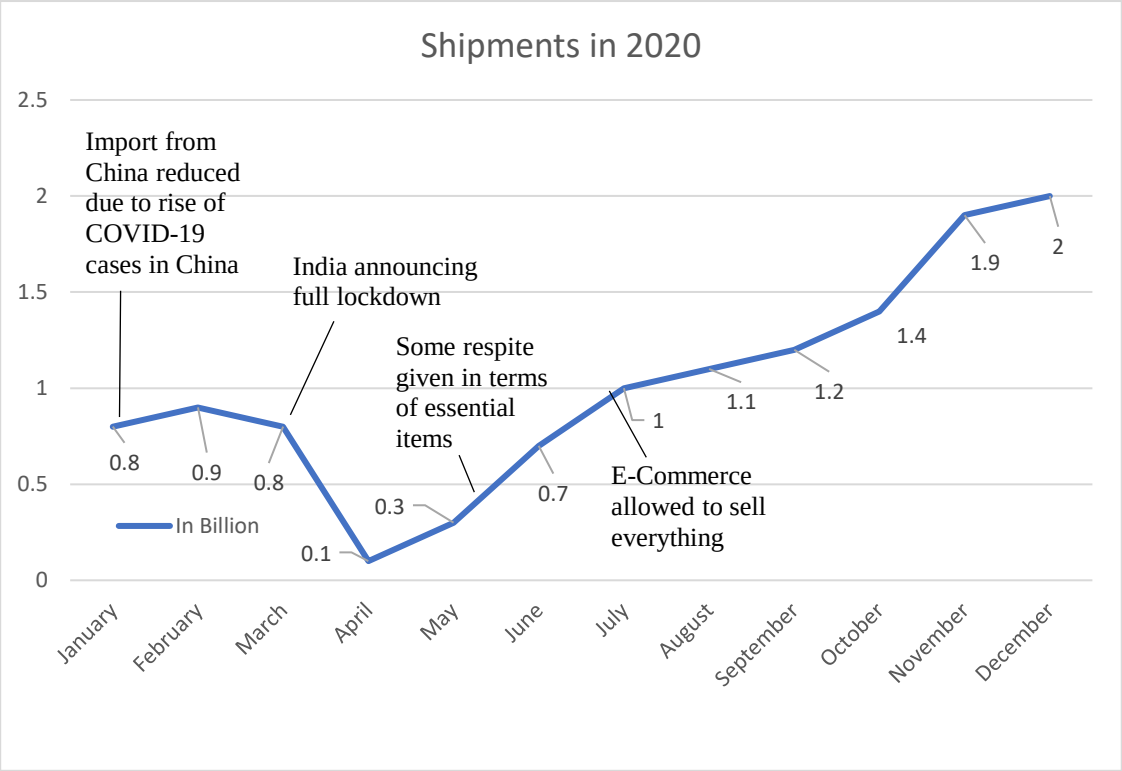

Fig.5: Shipments in India in 2020

In table 3, we summarize the number of shipments in2020 on a monthly note.

Table 3: Monthly shipments in 2020

Month	No of shipments	Month	No of shipments
January	0.8	July	1
February	0.9	August	1.1
March	0.8	September	1.2
April	0.1	October	1.4
May	0.3	November	1.9
June	0.7	December	2
Total		**12.2 billion**	

The WFH paradigm also saw an increase in purchase and shipments of information technology. Personal computers, laptop and accessories sales saw a hike. The hike was predominantly visible in the third quarter (Q3). Figure 6 depicts the comparison of sales of IT components for the year 2019 and 2020. Q1 2020 saw a similar sale as in Q1 of 2019. Q2, due to lockdown and stay at home orders saw a significant decline in the sales. But once the restrictions were lifted and online sales commenced, the figure rose to a new high in the Q3 2020. Q4 2020 again saw a huge YoY difference. The data is summarized in table 4.

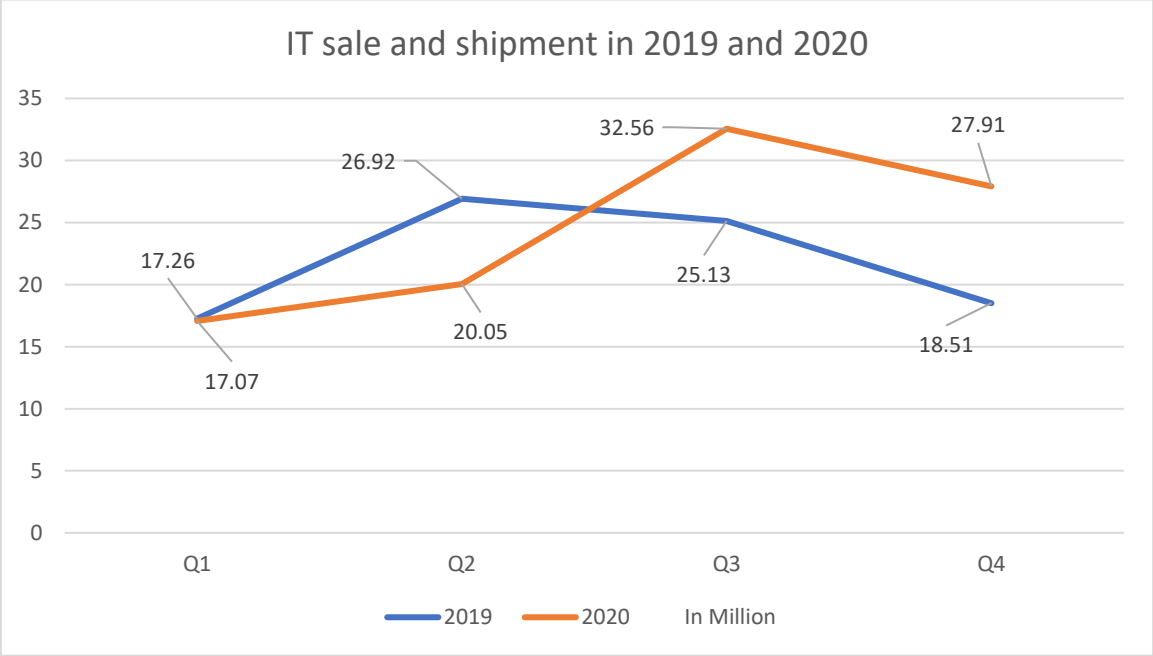

Fig.6: IT sale and shipment: 2019-2020

Table 4: Quarterly shipments of IT items: 2019-2020

Quarter	2019 (million)	2020 (million)	Difference 2020-2019
Q1	17.26	17.07	-0.19
Q2	26.92	20.05	-6.87
Q3	25.13	32.56	7.43
Q4	18.51	27.91	9.4
Total	87.82	97.59	9.77

V. DELIVERY SYSTEM AFTER OR WITH COVID-19 (THE NEW NORMAL)

Due to the COVID-19 pandemic, the shipment volumes which were projected for the year 2026 are likely to be reached by 2023. The huge demands to home deliver almost everything has acted as a catalyst to increase these numbers.Shipment and logistic industry need to step up to the challenge of making deliveries safer and convenient for both costumers and the employees.

Inevitable shifts that need to be kept in mind for better, efficient and sustainable future

- Shift to Regionalization from Globalization
- Hold Intermediate Inventory and Safety Stock
- Uncover and address hidden supply chain vulnerabilities
- Build resilience through Digital Transformation

The shipment companies need to keep the above points in mind in order to be ready for future disruptions and "black swan" events such as another pandemic, trade wars, regulatory changes, or even acts of war or terrorism.

A few methods have been listed below which can be used in order to keep shipments sustainable, efficient and safe for both, the employees and the customers.

- Contactless last-mile delivery solution can prove to be crucial in the new normal.
- The use of dronescan be one more method in delivering the last mile solution(Alam et al., n.d.).
- Use of smart locker solution is the next method
- Leading shipment companies are using connected technologies to collect and share data in real time to help drivers reduce fuel consumption and drive safely.
- Logistics providers will need to optimize and automate as much as possible and collaborate with others to operate safely, efficiently and pre-emptively. And as the world adjusts to a new normal, the safe and efficient movement of goods is at the very heart of economic recovery.
- Companies can use sensors to monitor the temperature of packages in real time; if it varies beyond a certain tolerance, then an alert can be sent and corrective actions taken, resulting in less waste, lower costs and more on-time deliveries.

In figure 7, we have shown the forecasted growth of shipments in India. These forecasts suggest that the number of shipments will keep growing at a constant rate with major contribution from online retails.

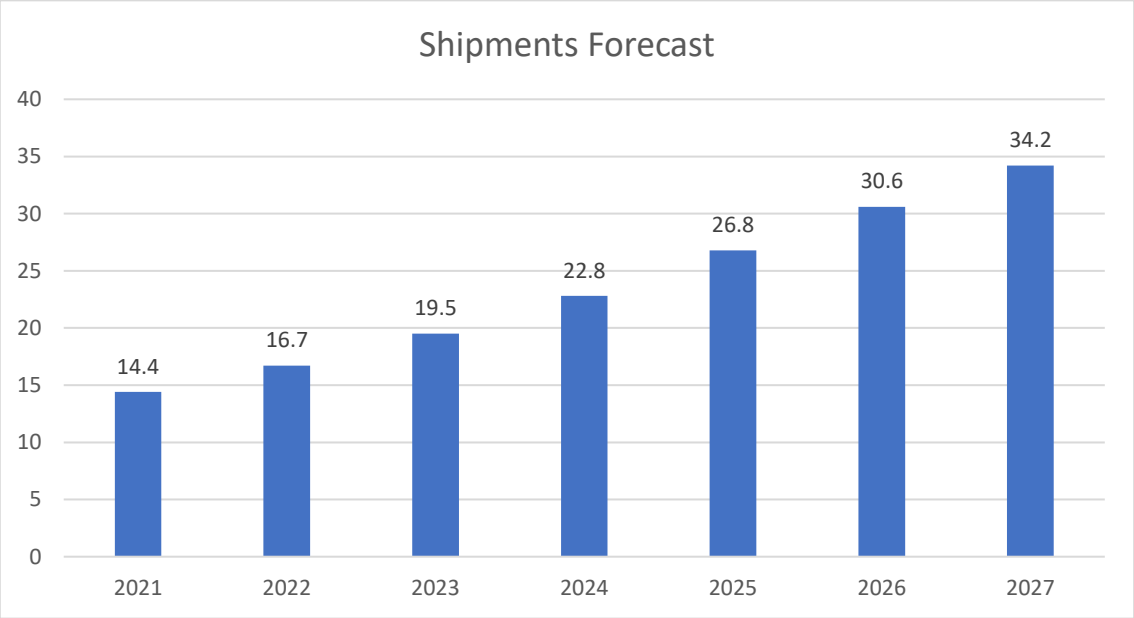

Fig.7: Shipment's growth (forecasted) per year (2021-2027).

Figure 8 depicts the forecasted increase of smartphone users in India. The upcoming years will see a persistent increase in the number of new smartphone users. From figure 7 and figure 8, we can infer that, as the number of smartphone users will increase, the number of shipments may also increase.

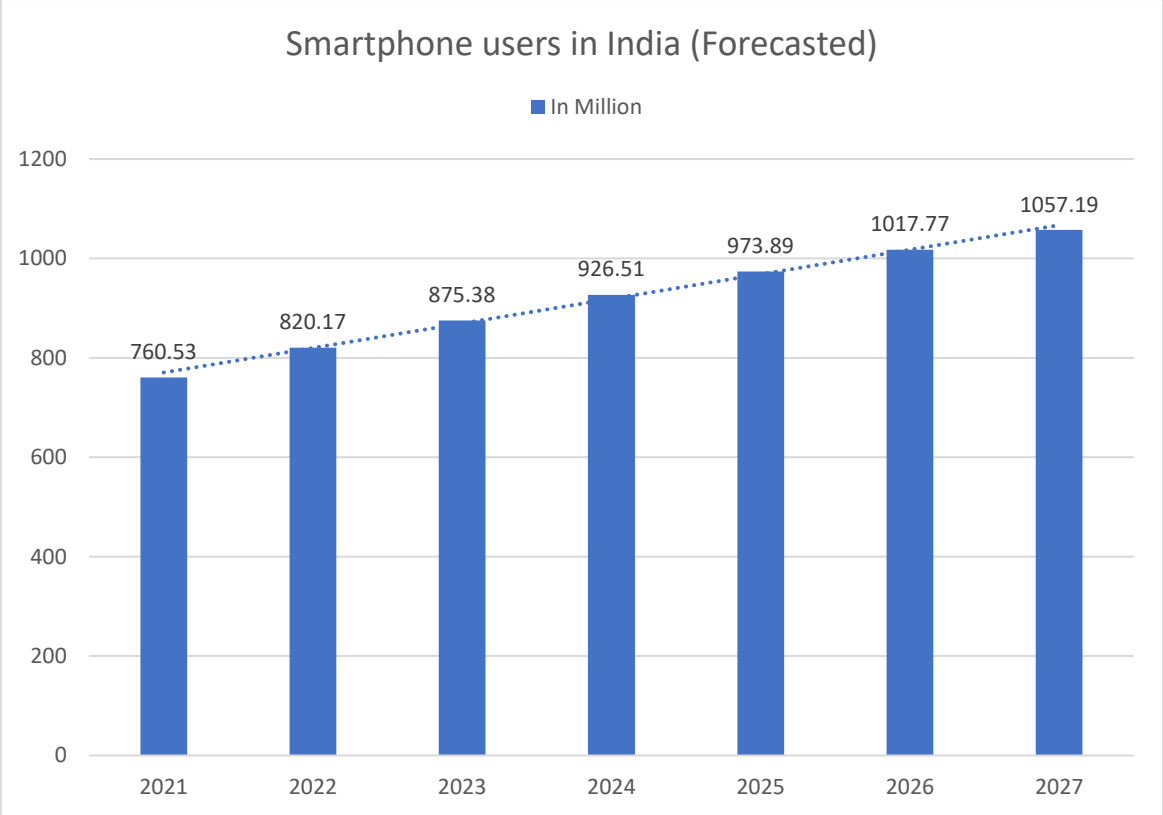

Fig.8: Forecast of increase of smartphone users in India

VI. CONCLUSION

The coronavirus pandemic has profoundly affected our world this year. It has caused many unexpected disruptions, accelerated some existing trends and forced us to make some changes to how we work and live. Some of these changes will likely last even after COVID-19 is no longer a threat to public health. Many of these transformations will be for the better — such as expanded delivery options for consumers and businesses alike. Easier accessibility of goods and services could make everyone's lives run more smoothly. In this paper we have tried to compare the shipment delivery system in pre COVID-19, during COVID-19 and post COVID-19 (or the new normal) scenarios. We concluded that the estimations which were made for the year 2026 will be achieved in the year 2023 itself due to the pandemic and the burst in the orders for the online retailers. The increase in the penetration pf smartphones and internet into the rural India has undoubtedly contributed in the increase in the number of shipments in India. The COVID-19 pandemic has proved to be a boon to the shipment industry as well as the online business.

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