


A Study on the Impact of the COVID-19 Pandemic on Primary, Secondary, and Tertiary Sectors of the Indian Economy

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ABSTRACT

COVID-19 emerged in China in December. The World Health Organization declared this virus as Global Disaster in March. The coronavirus has affected the social, economic, and political dimensions of the nations globally. In this study, the authors consider the impact of novel coronavirus (COVID-19) on the different activities of the primary, secondary, and tertiary sectors of the Indian economy and various policies and reforms that have been taken by the government. The secondary data is collected to put down this literature. Each sector of the economy faces chaos due to coronavirus. Migrant workers or laborers go to their state in the lockdown, a ban on materials, electronics imported from China, supply chain disruption, disturbance in the cash flow are some of the majors reasons that have led to the uncertainty in different sectors. A fund issued by the government can be utilized effectively to give benefits to employees, workers, farmers, organizations, and industries.

KEYWORDS

Agriculture, Coronavirus, COVID-19, Demand, Economy, Industry, Lockdown, Sectors

INTRODUCTION

A group of people identified with pneumonia in the Wuhan City of China in December. The unknown cause of pneumonia is associated with the seafood market of Wuhan. Chinese Center for Disease Control and Prevention (ChinaCDC quickly sends a team that contacts the health authorities of Hubei and Wuhan to perform the inquisition. The investigation on the pneumonia bunch of persons uncovered the seventh kind of coronavirus named as a novel coronavirus (2019-nCoV) (Zhu et al., 2020). The *International Committee on Taxonomy of Viruses (ICTV)* relabeled the coronavirus as SARS-CoV2 from 2019-nCoV and the disease originated from this coronavirus entitled COVID-19 (Gorbalenya et al., 2020). There are previously six kinds of coronavirus that lead to ailment to human health. Out of six, four coronavirus species: Human Coronavirus-229E, Human Coronavirus-OC43, Human Coronavirus-NL63, Human Coronavirus-HKU1 commonly results in the cold symptoms in human being and other two which are Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and

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the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) arouse deadly repository ailment (Su et al., 2020). The intermediary source of transmission to persons is not determined, but the person-to-person transmission is verified globally. The person-to-person transmission of coronavirus takes place by respiratory droplets and links up way. When a healthy person comes in touch with the infected people, subjected to coughing, sprayer, and sneezing results in the droplets transmission via the nose, mouth, eyes. COVID-19 disease is also transmitted through the indirect contact of the healthy person with the objects or surfaces used by COVID-19 patients (Shereen et al., 2020; World Health Organization, 2020a). World Health Organization (WHO) announced the global crisis of coronavirus in March 2020 as the person-to-person transmission is increasing because no intermediary source of transmission is identified and no vaccine is formed. The objective of the committee is to inform the countries to prevent their countries from the impact of COVID-19 through proper care, isolation of infected persons, and to trace the persons who come in contact with the infected person(Sohrabi et al., 2020). World health organization published guidelines incorporating: wash hands thoroughly with the soap, stay away from the people with having COVID-19, Follow social distancing norms, do not touch the face, wear masks while going outside, in the presence of symptoms of cough or cold happen immediately meet the doctor(World Health Organization, 2020b). By sticking to these guidelines, people can tackle COVID-19 disease since no vaccine is made yet.

COVID-19 pandemic affects adversely the social, economic, and political sectors of both developed and developing nations. Only when the COVID-19 disaster comes to end, the countries will be in a position to analyze the social, economic effects of the pandemic (Gennaro et al., 2020). Since India is a developing country, the coronavirus crisis affected the economy of India. According to Kenessey (1987), the economy of the country is theorized into three main sectors viz. Primary Sector, Secondary Sector, Tertiary Sector. Each of the sectors itself includes many activities like agriculture, mining, tourism, education, etc. Since India is a highly densely populated country, the government implemented a lockdown all over India to curb the spread of the virus from 24 March to 14 April 2020, and then later elongated till 3 May 2020 which indirectly jolted its economy. Section 2 discusses the impact of the COVID-19 on the Indian economy by various researchers but none of them provide the effect of the coronavirus on the different activities under each sector separately. Each publication related to the spillover of a virus on the Indian economy overlooks certain activities or reforms. Therefore, in this paper, we present the effect of coronavirus on each activity under three-sector apart. The goal of performing this study is considered as underneath:

- a) To examine the impact of the COVID-19 on the primary, secondary, and tertiary sectors of the India Economy.
- b) Reforms to be reckoned with to cover the COVID-19 effect on the Indian Economy.

Structure of the Paper: Afterwards introduction, the next section explores the literature review of the studies that discussed the consequences of coronavirus on the Indian economy. Further sections present the methodology and the findings of the research questions. The last section concludes the paper.

LITERATURE REVIEW

The different authors provide the discussion related to the consequences of COVID-19 on the Indian and Global economy. Table 1 depicts the contributions and gaps of the studies that discussed the impact of the virus on the various sectors of the economy. Nicola et al. (2020)consider the repercussion of the coronavirus worldwide. Due to the coronavirus outbreak, the rate of agricultural products reduced by 20 percent, and demand for petroleum also dripped because of lockdown imposed in the countries, manufacturing companies incur a loss as work from home is not possible in these companies,

COVID-19 affects secondary and higher education, tourism, and hospitality sectors influenced by this pandemic in the view of air travel restrictions, buying or selling process of house or land become difficult during this time, café and food restaurants are closed that highly impact the food sector. The social impact of coronavirus can be observable through the rise in Domestic Violence. Ozili and Arun (2020) discuss the consequences of COVID-19 on the Global economy from January to March 2020. The monetary policy and international airline constraints rigorously affected the economic activities and stock market prices while the fiscal policy and one state to another state within-country movement restrictions result in a favorable influence on economic activities. The coronavirus crisis has both benefits and drawbacks. On the positive side, the government of many countries like the United Kingdom, Italy improves health care services, online education systems. On the negative side, the crisis brings recession, the people denunciation that policies are insufficient to handle this global emergency. According to Dev and Sengupta (2020), the effect of the crisis depends on the span of the lockdown, and how the economic situation changes after the restrictions are removed. The author discusses the economic condition of India before the beginning of this pandemic and the impact of the crisis on the agriculture sector, informal sector, micro, small and medium enterprises, and financial markets. The policies made by the government of India and the Reserve Bank to tackle the impact of the coronavirus are also considered.

Saini (2020) presents the situation of the Indian economy before and through the COVID-19 pandemic. Stock markets, Pharmaceutical sector, Banking, and Education sector, MSME, Tourism sector, Options markets, and FMCG sector are explored by the author. The impact of the crisis is measured using the Gross domestic product and the unemployment rate. The changes made in the policies by the government to handle the economic situation are explored too. As stated by Das and Patnaik (2020), domestic demand decreased on account of job losses and salary reduction in the coronavirus pandemic. The Gross Domestic Product rate of India diminishes by four percent. The transportation, telecom, and airline sectors are harshly affected by the COVID-19 emergency. Intrastate and interstate movement of Goods is severely affected by this disaster. Chaudhary et al. (2020) analyze the impact of coronavirus on the Tourism sector, Retail sector, Capital Markets, Aviation sector, Micro, Small & Medium Enterprises (MSMEs), workers, and Gross Domestic Product (GDP) rate of India. Due to the crisis, the revenue generated from the aviation sector decreased by 1.56 Billion Dollars. Strict guidelines are followed by the workers for working in the industry. Migrant laborers are working in their states now and unwilling to go to another state in the search of works that lead to the shortage of workers in the industrial sector. This disaster lets the government reconsider the policies for the overall growth of India in all the sectors.

METHODOLOGY

In this section, we discussed the methodology we used to answer the question framed on the impact of the pandemic on the Indian Economy. The Review methodology includes research questions, search criteria, acceptance, and rejection criteria. The data used in this review is secondary.

Table 1. Contributions and Gaps in the Studies

Selected Studies	Contributions	Gaps
Nicola et al. (2020)	Discuss the impact of the coronavirus on the different sectors in Japan, China, the USA, the UK, and European nations.	Not illustrates the consequences of a virus on FMCGs and the Indian Economy. Not explore the policies and programs to overcome this problem.
Ozili and Arun (2020)	Present the ramifications made by the coronavirus globally on travel, hospitality, sports, financial, events, entertainment, health and education, oil, and import-dependent nations. Mention the policies and reforms related to the pandemic condition.	Not analyze the effect of virus from a complete perspective of the Indian economy. Not review the primary sector.
Dev and Sengupta (2020)	Impact of coronavirus on Indian agriculture, industry, financial, informal sector. Discuss the policies and programs to handle the consequences of the virus.	Not study the education, tourism, hospitality, FMCGs, media, entertainment, food sectors.
Saini (2020)	Explore the repercussions of global emergency on the Indian stock market, options market, tourism, pharmaceutical, MSMEs, FMCG, banking, education sector.	Not consider the reforms and policies to tackle the pandemic situation. Not discuss the effect of COVID-19 on the primary sector.
Das and Patnaik (2020)	Examine the long and short-term recommendations to deal with the COVID-19 situation. Discuss the impact of coronavirus on different sectors of the Indian Economy in the terms of consumption and GDP.	Not fully scrutinize each sector separately Consider the data up to 24 march 2020 for their study.
Chaudhary et al. (2020)	Talk about the effect of coronavirus on tourism, aviation, and retail, Capital Markets, oil market, and MSMEs in the Indian context. Policy and Programme suggestion.	Not explore the primary sectors and hospital, pharmaceuticals, media, education, research, Food sectors, etc.

Research Questions

To fulfill the goal of this study we designed four research questions. The research questions exhibit below:

- i) What are the impacts of the COVID-19 on the primary or natural sector of India's Economy?
- ii) How the coronavirus should affect the secondary or industrial sector of India's Economy?
- iii) What are the consequences of the coronavirus pandemic on the tertiary or service sector of the India Economy?
- iv) What reforms should be taken by the government of India to cover the COVID-19 effect on the Economy?

Search Strategy

We used the simple query on Google scholar and Google to find secondary data. The keywords Impact of COVID-19 on and AND/OR are used with various activities under three sectors. The String used to find the data is given beneath:

[[Impact of COVID-19 on]AND [Agriculture OR Petroleum and Oil Industry OR Dairy OR Fishing or Manufacturing OR Education OR Financial Services OR Hospitals and Pharmaceutical OR Hospitality OR Tourism OR Real Estate OR Technology OR Media OR Research and Development

OR Food Services OR Fast Moving Consumer Goods OR Transportation] AND [Sector of Indian Economy]]

The various newspaper articles, journals, and blogs cover the effect of COVID-19 or coronavirus on the Indian economy are extracted. The combined result of search strategy and inclusion and exclusion criteria (Section 3.3) for the selection of the secondary data is given in Table 2.

Table 2. Outcomes of Data Search and its strategy

Secondary Data Activities	Journals/Research Articles	Newspapers Articles	Blogs/ Magazines
Agriculture	2	-	1
Petroleum & Oil	-	4	1
Fishing	1	2	1
Dairy	-	2	1
Manufacturing	1	1	3
Education	1	-	2
Financial services	-	1	2
Hospitals& Pharmaceutical	-	1	3
Hospitality, Tourism	2	-	3
Real Estate	-	-	4
Technology, R&D, Media	3	2	1
Food Services	1	1	-
Fast Moving Consumer Goods	-	2	4
Transportation	-	1	2

Inclusion and Exclusion Criteria

To select the journals, newspaper articles related to the research questions acceptance and rejection criteria are specified.

Inclusion Criteria

- Incorporate journals, newspaper articles published from March to September 2020.
- Incorporate journals, newspaper articles typed in the English language.
- Involve papers printed in the journal, conference proceedings.
- Incorporate journals, newspaper articles on the impact of COVID-19 or coronavirus on the natural, industrial and service sectors of the Indian economy.

Exclusion Criteria

- Preclude journals, newspaper articles issued before March 2020.
- Preclude journals, newspaper articles typed in a language excluding English.
- Preclude journals, newspaper articles on the effect of coronavirus on other dimensions of society.
- Preclude articles on the results of COVID-19 on the sectors of the economy of countries apart from India.

We perform the qualitative analysis of the effect of coronavirus on different activities that come under three main sectors of the economy. The word cloud is generated for given text available on the consequences of the pandemic on each activity. The amount of significance given to the particular words used by the authors, researchers, and editors depends on their size.

FINDINGS

The secondary data which is available related to the consequences of this pandemic on each sector of the economy is used to examine each question separately. In this section, the various activities that come under each sector are presented.

Impact of the Covid-19 on the Primary Sector

The sector that incorporates the production and extraction of raw materials is considered the Primary or Natural Sector.

Agriculture

Since agriculture is the backbone of India, the crisis results in the reduction of GDP because of disruption in agriculture activities. The enforcement of Lockdown causes the Migrant laborers to move their state which results in the lack of workers for sowing the seeds on the farm and for cutting the crops.

The crisis of coronavirus results in the closing of the crop markets, interstate and intrastate travel restrictions on transportation of the crops, and procurement of the crops by the government are also halted (Arumugam et al., 2020). According to Sahoo and Samal (2020), coronavirus has affected Indian agriculture in the followings ways: delay in sowing and harvesting the crops due to shortage of laborers, farmers sells their crop at a lower rate, the large stock of crops are present in the storage area on the account of crops movement restriction at the port. The government of India should provide money packages, transportation facilities to help the farmers to get through this crisis.

COVID-19 has a very rigorous effect on agriculture. The farmers face difficulties from heavy or less monsoon in the sowing, growing, and harvesting of the crops but this year they have to face another problem one from coronavirus and another from Locust attack. The coronavirus results in the turmoil of the supply chain of crops. The farmers get loan debt as the crops sell at fewer prices. The government should bring certain reforms such as private agriculture, and give agriculture land on rent to bring investment for the growth in agriculture (Staff, 2020). From Figure 1, it is clear that the various authors majorly discuss the role of government during the lockdown. Coronavirus mainly affected the rancher, supply chain, rural areas farmers as these words appear significantly large in the word cloud. Whereas less attention was paid to the rabi season, horticultural products, reaped products, crop loans, and Garib kalyan yojana. As the laborers move to their native location less focus is given on contract farming during the coronavirus pandemic. Sources of income and money movement are also diminished in the global emergency.

Petroleum and Oil

As stated by Jacob (2020), the productivity of crude oil and gas decreased by 6.1 and 5.2 percent. Analysis of Petroleum consumption data shows the demand for petroleum has been at the lowest rate in the past 10 years. Usage of Diesel cut down by 24 percent, Petrol tears down by 16 percent, and Aviation Turbine Fuel reduced by 32 percent (Abdi, 2020).

Indian Oil and Gas Industry made 5.2 percent of oil demand. To meet the demand, India imports 84 percent of oil and 53 percent of gas annually. The worldwide lockdown due to COVID-19 also affected the Indian Oil and Gas industry. Customers experience officers assumed that recovery in this sector requires more time than expected (Jacob and Nutula, 2020). According to Printer (2020),

because of coronavirus, the West Texas Intermediate benchmark for Crude oil Pricing has reported significant drops in the price of oil from \$61 to \$23. Lockdown in India results in the fall of fuel demand except for LPG.

Figure 1. Keywords for Agriculture



The nation or countries that import oil gets it at a lower price whereas the nations that export the oil must look at another alternative to earn profits. As a result of the Lockdown in India, the refiners reduced their oil production by 25-30 percent (Kar, 2020). Figure 2 exhibits that the word diesel is predominantly discussed by the various articles. Due to lockdown, the consumption of petroleum, oil, and gas, and aviation fuel decreased. The price of crude oil, global oil demand go downwards as the worldwide restrictions. Because of the pandemic, the least demand for oil was recorded for the first time in the world. The traveling restriction enables the government of the nations to improve the old roads and makes the new ones.

Fishing

International trade related to the fish market has a 38 percent share in the whole world. 14.5 million People incorporated into the fishery sector affected by the COVID-19 lockdown in India. The period during which the lockdown is implemented is crucial for fish and shrimp farming. There are 75 and 130 days lockdown in east and west marines respectively. Port restrictions, interstate logistics restrictions, supply chain disordering impact the fish markets (Purkait, 2020).

According to the Central Institute of Fisheries Technology (CIFT), the marine sector incurs approximately 6838 crore loss per month due to the coronavirus. Gujarat exports seafood to China which is affected since January when the COVID-19 pandemic hit China (Kochi, 2020). India is the fourth largest exporter of Fish worldwide. As stated by the Union Fisheries Minister, the fish export from India is reduced by 5-10 percent as a consequence of COVID-19 this year (2019-2020) (PTI, 2020a).

Production of shrimps declined to one-third of actual production because of coronavirus. Processing in the production plant is stopped as the laborers go to their hometown when the lockdown is declared. The international demand for shrimp has also significantly dropped due to worldwide

Figure 2. Keywords for Petroleum and Oil Industry



lockdown. Thousands of shrimp seeds and broodstock were destroyed in the course of the curfew (Soudamini and Mohapatra, 2020). Figure 3 indicates the lockdown as a result of the pandemic primarily impacted the supply chains of the east and west coast. The countries near the ocean such as Andhra Pradesh, West Bengal are mainly bear the consequences. The COVID-19 affected the exports of seafood to the United State of America. A shortage of migrant workers affects the packaging of the fish in the factories. There is a declining trend in the income of the fishers and consumption of fish.

Dairy

According to Shashidhar, A. (2020), Dairy Industry incurs a 25-30 percent fall in the course of Lockdown in India. 15 percent of milk utilization is stopped immediately due to restrictions on marriages, cafeteria, canteen, restaurants, and roadside stall. Smaller Dairy farmers sell milk to the big corporative which acquires additional milk to provide aid to farmers in this situation. Odisha, West Bengal states compel dairy workers to throw their milk as the states do not require milk due to a fall in consumption. In Maharashtra, the price of milk drops by 4 rupees. Global Price of Skimmed Milk Powder (SMP) cut from Rs 340 to Rs 230 per Kg. The customers brought paneer, cheese in large quantities in the lockdown as stated by the Managing Director of AMUL. It is evident from Figure 4 that milk and demand words have given major emphasis by the different publishers. Lockdown has different consequences on dairy products and milk producers. Availability of surplus milk results in the price reduction of milk. Due to supply chain restrictions, the procurement of milk is difficult for the industries. The rate of skimmed milk powder decrease worldwide because of a decline in milk consumption.

the production of goods. The industries that have higher productivity, trained workforce deal with the coronavirus situation by making recoveries plan. The industries that have lesser productivity affect badly reason being lower profit, lesser workers in the course of lockdown (Jayaraman, 2020).

Impact of the Covid-19 on the Tertiary Sector

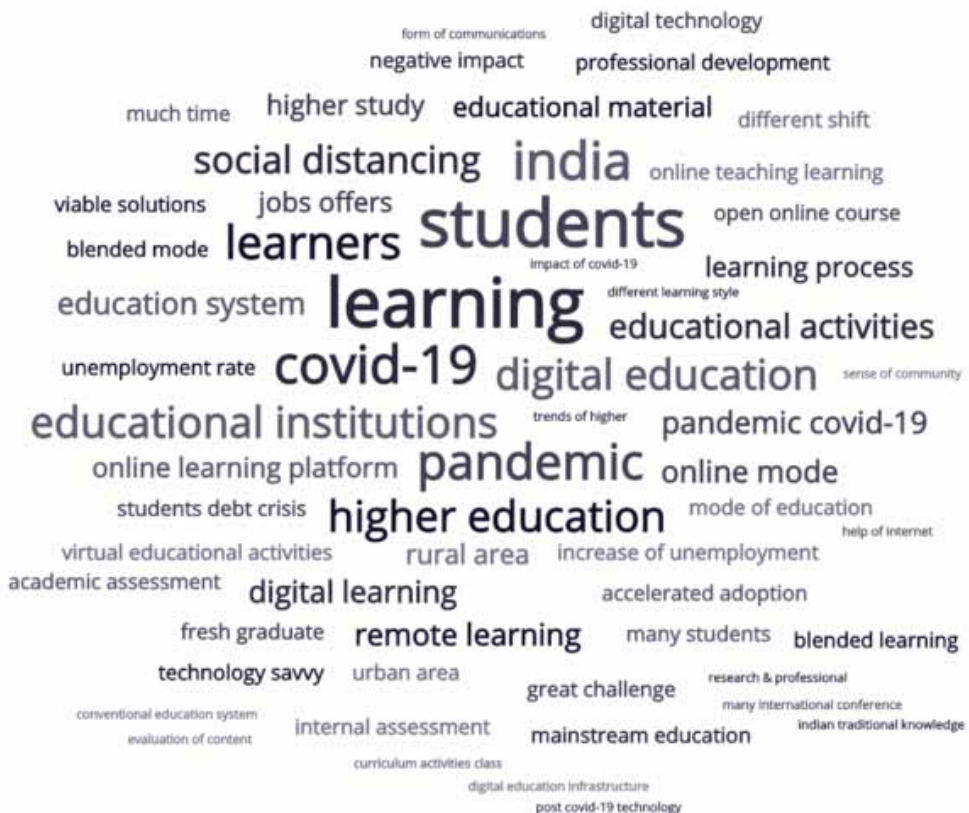
The sector which pledges the non-tangible goods or services refers to the Tertiary Sector or Service Sector.

Education

Jena (2020) states that approximately 32 crore higher education students are affected due to coronavirus as reported by UNESCO. The colleges, institutes, universities get closed and the exam gets postponed. The students and teachers are not physically present in the classrooms. To deal with this situation, the institution follows online teaching. However, this is the very first time that in whole India classes, exams are taken online.

The students and research scholar that are working on science and chemistry-related project pre-COVID are majorly affected due to the closure of the laboratory. The school students that are in non-board classes can get promoted based on their previous marks. In some cases, the parents are unable to pay the fees of the students and children because lockdown results in unemployment, low wages to the workers, employees. Students who got admission to foreign universities attend online classes by sitting at their home place as the travel restrictions to other countries. As shown in Figure 6 learning and students are the two keywords that notably appear in the word cloud. More emphasis is

Figure 6. Keywords for Education



given on digital education or online teaching in educational institutions. Higher education, educational activities, and job applications encounter the consequences of the pandemic. The students face the great challenge of adapting to the online mode of learning. The teachers taught students in different shifts and measure their academic assessment through virtual activities. Because of the lockdown, the unemployment rate has also increased.

Kasrekar and Tapaswi (2020) describe the worldwide lockdown affects 91 percent of students of the whole world. The Indian government opts for the online learning platform for the students but the students in the rural area still get affected. Many students in rural areas do not have access to technology, laptop, computer, and the internet that affects their education. The Indian Government does not have the budget to provide each village or remote area with to access continuous internet connectivity and electricity another limitation of online classes is students get distracted by online games and social media.

Financial Services

According to Kishore(2020), 19 sectors that do not have any debt before COVID-19, have got Rs 15.5 lakh crore of dues after coronavirus. 11 sectors that already have debt before COVID-19, it has got Rs 22.2 lakh crore of dues after coronavirus. Non-banking financial companies (NBFC) have Rs 7.98 crore of debt. The agriculture sector has Rs 9.8 lakh crore of debt.

Figure 7. Keywords for Financial Services



The coronavirus affected banking, insurance, and non-banking financial companies. The Reserve Bank of India has allowed a low rate of lending and credit facility to the small businessman. However, this provision may lead to more non-performing assets and bad loan recovery. Non-banking financial companies face credit losses as the companies are not able to specify how to recover their payments from small businesses or Micro, Small & Medium Enterprises (MSMEs). The small businessman also goes in losses due to trading restrictions and the non-availability of customers. The people have either lost their job or less payment as of COVID-19. Therefore, people are not able to pay their loans

Figure 8 that the government plays the main role in the hospitals and pharmaceuticals industry during the pandemic. There were a shortage and disruption in medical supplies. The active pharmaceutical ingredients are imported from China but due to transportation restrictions, the unavailability of the raw ingredients increases the price of the medicines. Some of the companies close their production in the course of lockdown. Demand for sanitizers, hospital beds goes up in this period.

Sharma (2020) states the pandemic increases the price of medicines or drugs. The ingredients required for medicine production are heavily imported from china. Global lockdown leads to a scarcity of ingredients and also increases their price. The supply of medicine from china is impacted because of the temporary closure of factories and industries. According to the FICCI- E&Y survey (Federation of Indian Chambers of Commerce and Industry, in alliance with Ernst & Young multinational professional services providers, has produced the report on the impact of coronavirus on the private healthcare sector), the private healthcare sector bears approximately 14,000-24,000 crore loss this year (Bureau, 2020).

Hospitality and Tourism

Patel et al. (2020) explore that in 2019 India comes at 34th rank in the Travel and Tourism Competitiveness Report. There is 25-30 percent of falls in foreign travelers at the beginning of March. COVID-19 Pandemic affects domestic flights. 50 million jobs are lost in this sector worldwide as of COVID-19. The hotel bookings, domestic, and international airlines travel restrictions in the course of lockdown in India impact the tourism sector badly. India has at least 2000 hotels and 1000 restaurants licensed by the Federation of hotel restaurant association of India provide jobs to millions of youths but their jobs are at risk because of this pandemic. Travel agencies also face the toughest situation as all international flights and domestic flights are canceled in lockdown (Kumar, 2020a). As illustrated in Figure 9, the tourism industry confronts the serious effect of the pandemic. As a result of international travel restrictions, the foreign tourist footfall decreased which further results in the reduction of revenue of the hotel industry. The COVID-19 crisis hits the average daily rate of travelers and the aviation sector bears the loss of thousands of crore. The government of India makes emergency changes to tackle the situation.

Federation of Associations in Indian Tourism & Hospitality incurs a loss of Rs 10 lakh crore and lost 3.8 crore jobs as of coronavirus. The hotel industry suffers from a loss of a maximum of \$1.5 billion as stated by Hotelivate. At the end of March, there is an 80 percent fall in the occupancy rate of hotels (Goswami and Soundararajan, 2020 Jaiswal, 2020). Singh (2020) discusses that approximately \$85 billion loss is incurred by the hotel, aviation, and travel sector together as reported by the Indian Association of Tour Operators. The airline industry suffers a loss of a maximum of \$3.6 Billion this year. The airlines' passenger rate drops to negative. 60 percent of hotels are completely closed in India.

Real Estate

Dubey (2020) said the sector has been affected by a coronavirus from three main dimensions: Labor, Financial, and Demand. In the case of Labor terms, enforcement of lockdown makes the laborers go to their hometown, and cancellations of trains make it difficult for them to return to their workplaces after the lockdown is lifted. In the case of Finance terms, approximately 4.66 lakh unit constructions were delayed due to coronavirus. Residential sales also decrease from 2.61 lakh units to 1.96 lakh units. In the case of Demand terms, Demand in this sector rises when the Reserve Bank of India lowers the lending rates. The non-resident Indians will invest in real estate when the value of the rupee falls.

According to Mishra (2020), house sales dropped by 79 percent in big cities from April to June month because of coronavirus. 53 percent of customers buy a house 6 months later, 33 percent of customers renovate their old home, and 47 percent of customers buy property only if it is fairly priced as per the report of Housing.com. The builders are impacted by the COVID-19 as the supply

Figure 9. Keywords for the Tourism Industry



of building materials is halted from china. The cost of developing the building is increased. Leasing or renting of office area reduced by 50 percent in large cities.

As per the Anarock report, (Virendra and Chowdhury, 2020) the construction of office areas has been increasing for the past 3 years However, a shortage of workers and supply of material problems result in a 15-30 percent decline in provided newly constructed areas from Supply before COVID-19. Demand from customers for new office site constructions reduce by 17-34 percent from Demand before COVID-19. In the Retail sector, the construction of new malls has been stopped in the coronavirus situation and customers also spend less money because of low wages. Leasing or renting of malls drops by 14 percent. Figure 10 depicts the demand keyword appears more striking than other keywords in the real estate word cloud. The demand for office space whether on rent or lease is dropped. The people are looking for affordable housing. The developer has stopped launching new projects as the old project experience a construction delay. A decline in consumer spending impacts the Indian retail market. Inventory of raw materials remains unused as of the labor shortage.

Technology, Research & Development, and Media

Kumar et al. (2020) discuss the use of technology in tackling COVID-19. From the patient's side, artificial intelligence is used for the detection and diagnosis of coronavirus symptoms (lung infections) through clinical imaging. Machine learning techniques are used to predict the health problems of the patients by inputting medical conditions. From medicine's side, deep learning approaches are used

to find the medicine for coronavirus infection and to analyze the structure of various proteins. The Information Technology sector is highly impacted by the coronavirus. The revenue of TCS, Infosys, HCL, Tech Mahindra, and Wipro is reduced by 6, 5, 8, 9, and 7.5 percent respectively (Pramanik, 2020).

Figure 10. Keywords for Real Estate



As per the report of Gartner (PTI, 2020c), there is an 8 percent reduction in the money invested in information technology. There is 13.2, 15.1, 1.8, 2.6 percent falls in spending in data center system, devices, communication services, enterprise software. Department of Science and Technology-Science and Engineering Board (DST-SERB) under the Government of India has been working on five projects to handle coronavirus infection (Srinivasa, 2020). Figure 11 shows the words newspaper, information, and COVID-19 are primarily focus on the word cloud. Employees and journalists receive less pay. Revenue earned through advertising by the print media also dripped. From the infection fear, the newspaper circulation among the clients ceased. The customers prefer electronic media or web media to get major news. Researchers work on the neural network, machine learning, and artificial intelligence, deep learning technologies to find the cure for the COVID-19. They analyze the amino acid sequence and level of protein in various chemical compositions.

According to Jadhav and Shivaji (2020), the print media also suffered from this pandemic. The newspaper agencies reduce the wages of their workers. The income gained by agencies through advertising further falls. People stop buying newspapers as they are terrified by the information on social media that infection is also spreading through newspapers. Along with this reason, the restrictions on transportation in lockdown forced newspaper publishers to stop printing the Newspapers. There is a 90 percent reduction in demand for printing newspapers in Delhi. The online media communicate

information related to the Educational sector, health, entertainment, business, and commercial sector, and fake news rumored on the media to the people (Balarabe, 2020).

Figure 11. Keywords for Technology, Research & Development, and Media



Food Services

There are 80 percent little falls and 20 percent disastrous falls in the sale of food produce by farmers. 80 percent of farmers decrease the price of their production and at least 50 percent of farmers decrease the price by more than half. There is a decline in income earned by 90 percent of farmers from their food production and 60 percent of farmers bear more than half a fall in their income. A report based on a household survey identified 62 percent disturbance in their food consumption. Vegetable eating dropped in up to 30 percent of households. But in 15 percent of households, there is a rise in the ingestion of vegetables. Female farmers face more problems in the livelihood and diet than male farmers (Harris et al., 2020).

The coronavirus affected food security in four ways- availability, accessibility, usage, and stability. Poor and migrant workers are harshly impacted by COVID-19 for food consumption. Disorder in the food chain and fall in demand make availability of food difficult and results in income loss for farmers, suppliers. The people are not able to access and consume the proper diet because of the decrease in wages or income and job loss. The stability of getting food is unreliable as of worldwide lockdown, shortage of migrant workers, import, and export restrictions (Kumar, 2020b). As presented in Figure 12, vegetables produced by the farmers are highly targeted by the COVID-19 crisis. The pandemic restriction affects the procurement of vegetables. The farmers that have small land face a loss in their income. The government regulates various financial strategies such as subsidies of food grains, direct cash grants. The production and supplies of the food are impacted by the unavailability of laborers, shortage of input materials.

Figure 12. Keywords for Food Services



Transportation

Auto rickshaws, Cab, Buses, and Trains are the different modes used for transportation in India. As India is a highly populated country, the public transport medium is highly crowded. Indian government imposes the social distancing norms by putting a limit on the number of commuters in public transport. In the course of lockdown, the Indian railways incur a loss of Rs 6,500 crore, and the Indian aviation incurs a loss of Rs 3,600 crore. Toll collections declined by 8 percent from the previous year (Naik, 2020). Figure 13 shows the word public transport has been crucially discussed by the various publishers in their articles. The logistics sector incurs the loss in the form of less freight volume for transportation and non-availability of the drivers. As the government closed interstate or border and seaway paths, the movement of products among the different nations and states has been halted. The subsequent restrictive measures such as personal protective equipment kit, daily temperature checkup, and face cover shields must be implemented in the logistics company.

Road transport, rail transport, and sea transport dropped by 20, 21.3, and 19.7 percent as per the report of ICRA in the COVID-19 pandemic. There is a reduction in freight availability because of curfew. Disordering of supply chains, interstate travel restrictions reduce the income generated from the logistics sector (PTI, 2020d).

Figure 13. Keywords for Transportation Service



Fast-Moving Consumer Goods (FMCG)

According to Joshi and Mitra (2020), the demand for daily need items spikes during the beginning of lockdown. The industries increase the manufacturing of more products and items to meet the demands. An unusual steep rise in demand leads to disturbance in supply chain management. There is a fall in the growth of the FMCG sector at the end of March month. Demand for hand sanitizers, soap, hand wash liquid rises whereas demand for cosmetics, cloth, etc. falls.

Due to the closure of the store or local markets, people start buying the items from the online platform. It is represented in Figure 14 that the keywords products, consumer, and demand show an equal level of significance in the word cloud. The demand for fresh vegetables and fruits, personal care and hygiene products, floor cleaners surged. After the announcement of the lockdown, people buy things under a panic condition which leads to the shortage of essential commodities. During the lockdown, customers prefer online grocery shopping. The company focuses on the production of necessary items. The COVID-19 crisis changes the shopping behavior of the customers. In the first two months of the year 2020, the growth in the FMCG sector is 7.5 percent, but in March, growth falls to 4 percent because of COVID-19 (Haider, 2020). As stated by Garg (2020), the coronavirus pandemic changes the behavior of customers, the FMCG sector needs to remodel its strategies to attract customers. Consumers focus on products and items that deal with a healthy lifestyle and hygiene. The demand for non-essential items returns to normal slowly.

The coronavirus has affected the FMCG industries in many ways: the customers buying grocery through the online store, people start purchasing more packed foods, and in the case of beauty line-customers give more emphasis on the hygiene products and stop purchasing fragrances, makeup, etc, there is an increase in demand of preventative medicine for fever, cough (Sareen et al.,2020).

Figure 14. Keywords for Fast Moving Consumer Goods



Reforms to be Reckon with to cover the Covid-19 Effect on the Indian Economy

To manage the repercussion of the coronavirus pandemic, the government of India and Industries need to change, follow, and develop new policies and programs. Table 3 present the implication required in the different activities of the three main sectors.

CONCLUSION

The coronavirus pandemic has jolted all nations worldwide. Its impact can also be seen in the Indian Economy. In the view of the Primary sector, the migrant workers go to their state which has affected the harvesting, sowing of the crops. Consumption of milk decreases as of the supply chain disturbance. The export of fish and kinds of seafood impacted the fisherman's life living in the coastal areas. Petroleum and diesel consumption has fallen because of the closure of educational institutions, industries, and 61 days complete lockdown. In the matter of Manufacturing industries, factories, industries have a temporary shutdown. The salaries of workers and employees have cut down, companies start discharging employees, shortage in the supply of raw materials, difficulty in the selling of finished products are major issues confronted by industries.

In terms of tertiary sectors, digital learning takes the seat of physical classroom learning. The students and teachers make use of an online education platform. The banks, NBFCs, and insurance companies face the risk of non-payment because of low incomes and a job loss of employees or workers, and a decrease in cash flow among peoples. The print agencies stop printing the newspapers as people has to fear that the spreading of the virus can occur by handling newspapers too. The business of the hotel and tourism industry has closedown since a ban on international and national flights. People stop purchasing new houses, construction of ongoing projects stop because of material shortage. The government of India launched various schemes under Atmanirbhar Bharat Abhiyan. This is time to convert the pandemic crisis into opportunity and to make the Make in India program victorious.

Table 3. Reforms in the sectors to tackle the COVID-19

S. No.	Activities	Policies and Programs
1.	Agriculture	The various schemes have been launched by the government under Atmanirbhar Bharat Abhiyan. A Fund of Rs 1Lakh crore has been assigned to farmers, agricultural organizations. Unemployment wages are given to MANREGA workers (Staff, 2020). The government has provided the farmers e-NAM (National Agriculture Market) platform. The amount of direct transfers of money to farmers has been raised. The center and state governments motivated the farmers to contract farming with the investors. The government should upgrade the market channels for selling and buying crops. The large warehouses for storing the crops can be converted into open mandis or markets. E-commerce is promoted in the delivery of agricultural commodities.
2.	Fishing	The government has provided the fisherman Rs 20,000 crore for fish production for 5 years under PM MatsyaSampada Yojana (Staff, 2020). The government announces to provide \$ 31.5 million to fisherman families for 61 days lockdown (Soudamini and Mohapatra, 2020). The Andhra Pradesh state government tries to increase the price of shrimps by discussing with the traders. There is a sharp rise in online demand and deliveries of fish(Soudaminiand Mohapatra, 2020).
3.	Dairy	The central government has issued a fund of Rs 15,000 crore for enhancing the living infrastructure of farm animals and Rs 13,000 crore for the vaccination of dairy animals (Staff, 2020). The dairy companies like Creamline Dairy and Lactalis have started delivering the milk and milk products directly to the doors of the customers (Shashidhar, 2020). The cow, sheep, pig, and buffalo once free from foot and mouth disease, and then the Indian government can export dairy products and meats without any barriers (Hussain, 2020).
4.	Education	Online learning teaches students personalized learning. The student makes better use of study time and gets the global exposure of education due to e-learning. Online learning improves digital literacy (Jena, 2020). This pandemic brings more global collaboration between students, universities. The teachers and students will find more innovative techniques for teaching and learning (Blog, 2020).
5.	Financial services	The Center government provides credit guarantees to the MSMEs and liquidity to the banks by decreasing the lending rate. The RBI issued notice to the banks to collect only three months of installment and interest from borrowers (Attrra, 2020).
6.	Hospitals, Pharmaceutical	The center government issued a fund of \$ 181 million for the manufacturing of medical devices, active pharmaceutical ingredients, and medicine. The government should promote a flexible supply chain, easing tax payment, and provide a separate economic zone for the pharmaceutical industry (Dadhich, 2020).
7.	Hospitality, Tourism	The Ministry of tourism solves this crisis by paying the salaries to an employee and reduces the amount of payment from the hotel in form of tax and loan installment. The hotel industry needs to reform its business model. Digitalization should be extended in the tourism and hotel sector (Jaiswal, 2020).
8.	Real Estate	The Real estate and housing sector require more digitalization in house, space touring, and online payments. The cost needs to be rationalized with the available space for sale. The government of India decreased the interest rates (repo and reverse repo rate is 4.4 and 4 percent), cash reserve ratio. The RBI gives borrowers three months more for loan repayment. A fund of Rs 1.7 Lakh crore was issued to the migrant workers, farmers under the PM Gareeb Kalyan Scheme(Virendra and Chowdhury, 2020). The state governments used the amount of Rs 31,000 crore to reduce the effect of the pandemic on the construction worker's welfare. The central government provides an extension of six months for ongoing government building construction. RBI permits the NBFCs for the suspension of the Date of Commencement of Commercial Operations (DCCO) (Chauhan and Kapoor, 2020).
9.	Fast Moving Consumer Goods	FMCG companies are required to focus more on organic food products. This pandemic push companies to make the Make in India program successful. There is a sharp rise in the use of E-commerce platforms. The companies can launch new products according to customer needs and brings more flexibility to supply chain management (Joshi and Mitra, 2020). The FMCG companies now concentrate on rural areas which have got a little effect on the coronavirus and contribute to the 40 percent sales. During the lockdown, the rural area contributes more towards online shopping than urban areas (PTI, 2020e).
10.	Transportation	The use of public transport and cycling must be uplifted. The employees need to get motivated about the benefits of cycling the bike-sharing strategy can be promoted by the local governments (Qamar, 2020).
11.	Manufacturing	The manufacturing industries have now opportunities to reduce production dependence on china and use cheap labor available in India for the manufacturing process (Chopra, 2020). The industries can make use of a 3D printing facility, the Internet of Things, and machine learning applications to improve the quality, value of the production units. Companies can boost production by engaging robotics in the manufacturing process (Tamanna, 2020).

REFERENCES

- Abdi, B. (2020). *Covid-19 impact: India's petroleum consumption falls to a 10-year low*. <https://energy.economictimes.indiatimes.com/news/oil-and-gas/covid-19-impact-indias-petroleum-consumption-falls-to-10-year-low/75064474>
- Abhishek Dadhich, A. (2020). *The COVID-19 pandemic and the Indian pharmaceutical industry*. <https://www.europeanpharmaceuticalreview.com/article/117413/the-covid-19-pandemic-and-the-indian-pharmaceutical-industry/>
- Arumugam, D. U., Kanagavalli, D. G., & Manida, M. (2020). COVID-19: Impact of Agriculture in India. *Aegaeum Journal*, 8(5), 480–488.
- Attria, C. (2020). *The long-lasting impact of COVID-19 on the financial services sector*. <https://www.moneycontrol.com/news/business/companies/the-long-lasting-impact-of-covid-19-on-the-financial-services-sector-5302981.html>
- Balarabe, U. B. (2020). Impact of COVID-19 and Pandemic Lockdown in India: Role of Media during Lockdown. Eureka Publications, 175-184.
- Berkel, R. V. (2020). *India's manufacturing reels from the impact of COVID-19*. <https://www.unido.org/stories/indias-manufacturing-reels-impact-covid-19#story-start>
- Blog. (2020). *Impact of Covid-19 on Higher Education—Challenges & Opportunities*. <http://jgu.edu.in/blog/2020/06/29/impact-of-covid-19-on-higher-education-challenges-opportunities/>
- Bureau. (2020). *Covid-19 leaves the private healthcare sector in financial distress: FICCI-EY-study*. <https://www.thehindubusinessline.com/economy/macro-economy/covid-19-leaves-private-healthcare-sector-in-financial-distress-ficci-ey-study/article31362331.ece#>
- Chaudhary, M., Sodani, P. R., & Das, S. (2020). Effect of COVID-19 on Economy in India: Some Reflections for Policy and Programme. *Journal of Health Management*, 22(2), 169–180. doi:10.1177/0972063420935541
- Chauhan, A. S., & Kapoor, S. (2020). *Impact of coronavirus on Indian real estate*. <https://www.99acres.com/articles/impact-of-coronavirus-outbreak-on-indian-real-estate.html#hashtag7>
- Chopra, S. (2020). *How COVID 19 can be a 'blessing in disguise' for India's manufacturing sector*. <https://government.economictimes.indiatimes.com/news/economy/how-covid-19-can-be-a-blessing-in-disguise-for-Indias-manufacturing-sector/75426628>
- Das, D. K. K., & Patnaik, S. (2020). The Impact of COVID-19 in Indian Economy – An Empirical Study. *International Journal of Electrical Engineering and Technology*, 11(3), 194–202.
- Dev, S. M., & Sengupta, R. (2020). *Covid-19: Impact on the Indian economy*. Indira Gandhi Institute of Development Research, Mumbai Working Papers.
- Dubey, S. (2020). *Three Ways to Assess Covid-19's Impact On India's Real Estate Sector*. <https://www.bloombergquint.com/coronavirus-outbreak/three-ways-to-assess-covid-19s-impact-on-indias-real-estate-sector>
- Garg, A. (2020). *Impact of COVID-19 on the FMCG sector in India*. <https://blog.smallcase.com/impact-of-covid-19-on-the-fmcg-sector-in-india/>
- Gennaro, F. D., Pizzol, D., Marotta, C., Antunes, M., Racalbutto, V., Veronese, N., & Smith, L. (2020). Coronavirus Diseases (COVID-19) Current Status and Future Perspectives: A Narrative Review. *International Journal of Environmental Research and Public Health*, 17(8), 2690. doi:10.3390/ijerph17082690 PMID:32295188
- Gorbalenya, A. E., Baker, S. C., Baric, R. S., Groot, R. J. d., Drosten, C., Gulyaeva, A. A., Haagmans, B. L., Lauber, C., Leontovich, A. M., Neuman, B. W., Penzar, D., Perlman, S., Poon, L. L. M., Samborskiy, D., Sidorov, I. A., Sola, I., & Ziebuhr, J. (2020). Severe acute respiratory syndrome-related coronavirus: The species and its viruses—a statement of the Coronavirus Study Group. *Nature Microbiology*, 5, 536–544.
- Goswami, A., & Soundararajan, N. (2020). *Impact of COVID-19 on Tourism In India*. <http://www.businessworld.in/article/Impact-Of-COVID-19-On-Tourism-In-India/16-06-2020-286114/>

- Haider, S. (2020). *COVID-19 pulls down FMCG growth: Nielsen*. <https://www.thehindu.com/business/covid-19-pulls-down-fmcg-growth-nielsen/article31475876.ece>
- Harris, J., Depenbusch, L., Pal, A. A., Nair, R. M., & Ramasamy, S. (2020). Food system disruption: Initial livelihood and dietary effects of COVID-19 on vegetable producers in India. *Food Security*, 12(4), 841–851. doi:10.1007/s12571-020-01064-5 PMID:32837650
- Hussain, S. (2020). *India's COVID-19 Crisis Has Placed Its Dairy Farmers at a Crossroads*. <https://thewire.in/agriculture/india-covid-19-dairy-farmers-milk-production>
- Jacob, A., & Nutula, P. (2020). *OPINION: COVID-19 impact on the Oil & Gas industry - A perspective*. <https://energy.economictimes.indiatimes.com/news/oil-and-gas/opinion-covid-19-impact-on-the-oil-gas-industry-a-perspective/75726882>
- Jacob, S. (2020). *Covid-19 impact: India crude oil production plummets 5.5% in March*. https://www.business-standard.com/article/economy-policy/covid-19-impact-india-crude-oil-production-plummets-5-5-in-march-120042300887_1.html
- Jadhav, D. S. G. (2020). Impact of Covid-19 on Indian Print Media. *DogoRangsang Research Journal*, 10(6), 122–129.
- Jaiswal, T. (2020). *What is the Impact of Coronavirus on Indian Tourism and Travel Industry?* <https://transfin.in/impact-of-coronavirus-on-indian-tourism-and-travel-industry>
- Jayaraman, R. (2020). *The COVID 19 Lockdown and the Indian manufacturing industry – effects and recovery*. <https://www.manufacturingtodayindia.com/sectors/7361-the-covid-19-lockdown-and-the-indian-manufacturing-industry-effects-and-recovery>
- Jena, P. K. (2020). Impact of Covid-19 on higher education in India. *International Journal of Advanced Education and Research*, 5(3), 77–81.
- Joshi, S., & Mitra, S. (2020). *Covid-19 Impact on India's FMCG Sector*. <https://benoriknowledge.com/insight/covid-19-impact-on-indias-fmcg-sector/>
- Kar, S. K. (2020). *Will the oil industry survive COVID-19 effects?* <https://energy.economictimes.indiatimes.com/energy-speak/will-the-oil-industry-survive-covid-19-effects/4125>
- Kasrekar, D., & Tapaswi, G. W. (2020). *Impact of COVID-19 on Education System in India*. <https://www.latestlaws.com/articles/impact-of-covid-19-on-education-system-in-india/>
- Kenessey, Z. (1987). The Primary, Secondary, Tertiary, and Quaternary Sectors of the Economy. *Review of Income and Wealth*, 33(4), 359–385. doi:10.1111/j.1475-4991.1987.tb00680.x
- Khetan, S., Lakhani, M., Attra, C., Gaitonde, M., Iyer, S., Lodha, A., & Haria, P. (2020). *COVID-19: impact on the financial services sector*. https://assets.ey.com/content/dam/ey-sites/ey-com/en_in/topics/covid-19/covid-19-impact-on-the-financial-services-sector.pdf
- Kishore, R. (2020). *70% of the banking sector debt is affected by the Covid-19 impact*. <https://www.hindustantimes.com/india-news/70-of-banking-sector-debt-affected-by-covid-19-s-impact/story-MAYiYZWz5NE6Pijm7XQNSJ.html>
- Kochi, V. S. K. (2020). *Covid-19 inflicts a daily loss of 224 crores to Indias fishery sector*. <https://www.thehindubusinessline.com/economy/agri-business/covid-19-causes-a-daily-loss-of-224-crore-to-indias-fishery-sector/article31388582.ece#>
- Kumar, A., Gupta, P. K., & Srivastava, A. (2020). A review of modern technologies for tackling the COVID-19 pandemic. *Diabetes & Metabolic Syndrome*, 14(4), 569–573. doi:10.1016/j.dsx.2020.05.008 PMID:32413821
- Kumar, S. (2020b). *Opinion: Impact of Covid-19 pandemic on food security of India*. <https://government.economictimes.indiatimes.com/news/policy/opinion-impact-of-the-covid-19-pandemic-on-food-security-of-india/77048453>
- Kumar, V. (2020a). Indian Tourism Industry and COVID-19: Present Scenario. *Journal of Tourism and Hospitality Education*, 10, 179–185. doi:10.3126/jthe.v10i0.28768

- Mishra, S. (2020). *Impact of Coronavirus on Indian real estate*. <https://housing.com/news/impact-of-coronavirus-on-indian-real-estate/>
- Naik, J. K. (2020). *Impact of Covid-19 on the usage of public transport*. <https://timesofindia.indiatimes.com/readersblog/creative-thoughts/impact-of-covid-19-on-the-usage-of-public-transport-21917/>
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The Socio-Economic Implications of the Coronavirus and COVID-19 Pandemic: A review. *International Journal of Surgery (London, England)*, 78, 185–193. doi:10.1016/j.ijssu.2020.04.018 PMID:32305533
- Ozili, P. K., & Arun, T. (2020). Spillover of COVID-19: Impact on the Global Economy. *SSRN Electronic Journal*. 10.2139/ssrn.3562570
- Patel, P. K., Sharma, D. J., Kharoliwal, D. S., & Khemariya, D. P. (2020). The Effects of Novel Corona Virus (Covid-19) in the Tourism Industry in India. *International Journal of Engineering Research & Technology (Ahmedabad)*, 9(5).
- Pramanik, A. (2020). *Covid-19 impact: Q1 to be a washout for the IT sector, say, analysts*. <https://economictimes.indiatimes.com/markets/stocks/news/covid-19-impact-q1-to-be-a-washout-for-it-sector-say-analysts/articleshow/76799107.cms?from=mdr>
- Printer, K. R. (2020). *Impact of Covid-19 on the Oil and Gas Sector*. <https://www.industrialautomationindia.in/articleitm/9754/Impact-of-Covid-19-on-the-Oil-and-Gas-Sector/articles>
- PTI. (2020a). *India's fish export likely to fall 5-10% in FY20 due to COVID-19 crisis: Government*. <https://economictimes.indiatimes.com/news/economy/agriculture/indias-fish-export-likely-to-fall-5-10-in-fy20-due-to-covid-19-crisis-government/articleshow/76004904.cms>
- PTI. (2020b). *COVID-19 crisis to impact small private dairies: IND-RA*. <https://www.outlookindia.com/newscroll/covid19-crisis-to-impact-small-private-dairies-indra/1838397>
- PTI. (2020c). *COVID-19 impact: India Inc's IT spends may fall 8% in 2020 to \$83.5 billion, says Gartner*. <https://www.financialexpress.com/industry/technology/covid-19-impact-india-incs-it-spends-may-fall-8-in-2020-to-83-5-billion-says-gartner/1979758/>
- PTI. (2020d). *Domestic road transport sector likely to contract by 18-20% in FY21: Iera*. https://www.business-standard.com/article/economy-policy/domestic-road-transport-sector-likely-to-contract-by-18-20-in-fy21-iera-120080600992_1.html
- PTI. (2020e). *Middle, rural India driving 'strategic priorities' of FMCG companies: Nielsen*. <https://www.financialexpress.com/economy/middle-rural-India-driving-strategic-priorities-of-FMCG-companies-nielsen/2091995/>
- Purkait, S., Karmakar, S., Chowdhury, S., Mali, P., & Sau, S. K. (2020). Impacts of Novel Coronavirus (COVID-19) Pandemic on Fisheries Sector in India: A Minireview. *Indian Journal of Pure & Applied Biosciences*, 8(3), 487–492. doi:10.18782/2582-2845.8179
- Qamar, S. (2020). *Covid-19 and Transport: Impact and Suggestions*. <https://www.magzter.com/article/News/TerraGreen/Covid-19-And-Transport-Impact-And-Suggestions>
- Ramesh, S. (2020). *Impact of Coronavirus on Indian Healthcare Sector*. <https://www.careeranna.com/articles/coronavirus-impact-indian-healthcare-sector/>
- Sahoo, J. P., & Samal, K. C. (2020). Impact of COVID-19 on Indian Agriculture. *Agriculture Letters*, 1(3), 45–46.
- Sahoo, P., & Ashwani, . (2020). COVID-19 and Indian Economy: Impact on Growth, Manufacturing, Trade, and MSME Sector. *Global Business Review*, 21(5), 1159–1183. doi:10.1177/0972150920945687
- Saini, R. (2020). The Impact of Corona Virus on Indian Economy. *SSRN Electronic Journal*.
- Sareen, A., Pandit, A., Jain, A., Vardhan, V., Srinivasan, P., Talele, N., & Dawer, I. (2020). *Coronavirus Effect on Indian FMCG Industries and Services*.
- Sharma, S. (2020). *COVID-19 impact on Indian pharma companies*. <https://www.pharmatutor.org/articles/covid-19-impact-on-indian-pharma-companies>

- Shashidhar, A. (2020). *Coronavirus impact: Dairy industry faces a 30% dip in demand*. <https://www.businesstoday.in/current/corporate/coronavirus-impact-dairy-industry-faces-30--dip-in-demand/story/400517.html>
- Shereen, M. A., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020). COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *Journal of Advanced Research*, 24, 91–98. doi:10.1016/j.jare.2020.03.005 PMID:32257431
- Singh, N. (2020). *The Impact of Covid-19 on Travel & Tourism Industry in India and its Future*. <https://www.tourmyindia.com/blog/impact-of-covid-19-on-travel-tourism-industry/>
- Sohrabi, C., Alsafi, Z., O'Neill, N., Khan, M., Kerwan, A., Al-Jabir, A., Iosifidis, C., & Agha, R. (2020). World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, 76, 71–76. doi:10.1016/j.ijssu.2020.02.034 PMID:32112977
- Soudamini, & Mohapatra, M. (2020). *Fish and Aquatic Food Systems COVID-19 Updates: India*. <https://fish.cgiar.org/news-and-updates/news/fish-and-aquatic-food-systems-covid-19-updates-india>
- Srinivasa, K. (2020). *View from India: Covid-19 keeps R&D busy*. <https://eandt.theiet.org/content/articles/2020/04/view-from-india-covid-19-keeps-rd-units-busy/>
- Staff, C. D. (2020). *COVID-19 and its Impact on Agriculture*. <https://www.civildaily.com/burning-issue-covid-19-and-its-impact-on-agriculture/>
- Su, S., Wong, G., Shi, W., Liu, J., Lai, A. C. K., Zhou, J., Liu, W., Bi, Y., & Gao, G. F. (2020). Epidemiology, Genetic Recombination, and Pathogenesis of Coronaviruses. *Trends in Microbiology*, 24(6), 490–502. doi:10.1016/j.tim.2016.03.003 PMID:27012512
- Tamanna. (2020). *COVID-19: What is the Future of the Manufacturing Industry in India?* <https://www.inventiva.co.in/stories/tamanna/covid-19-what-is-the-future-of-the-manufacturing-industry-in-india/>
- Virendra Joshi, V., & Chowdhury, A. B. (2020). *COVID-19: Impact on the Indian Real Estate Sector*. https://api.anarock.com/uploads/research/ANAROCK_Covid-19%20Impact%20on%20Indian%20RE%20Sector.pdf
- World Health Organization. (2020a). *Modes of transmission of the virus causing COVID-19: implications for IPC precaution recommendations*. <https://www.who.int/docs/default-source/coronaviruse/20200329-scientific-brief1-final-corrected-revised-final.pdf>
- World Health Organization. (2020b). *Advice for Public*. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- Zhu, N., Zhang, D., Wang, W., Li, X., Yang, B., Song, J., Zhao, X., Huang, B., Shi, W., Lu, R., Niu, P., Zhan, F., Ma, X., Wang, D., Xu, W., Wu, G., Gao, G. F., & Tan, W. (2020). A Novel Coronavirus from Patients with Pneumonia in China. *The New England Journal of Medicine*, 382(8), 727–733. doi:10.1056/NEJMoa2001017 PMID:31978945

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