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Evaluating the Impact of COVID-19 on Society, Environment, Economy, and Education

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Abstract: The COVID-19 pandemic has caused drastic changes across the globe, affecting all areas of life. This paper provides a comprehensive study on the influence of COVID-19 in various fields such as the economy, education, society, the environment, and globalization. In this study, both the positive and negative consequences of the COVID-19 pandemic on education are studied. Modern technologies are combined with conventional teaching to improve the communication between instructors and learners. COVID-19 also greatly affected people with disabilities and those who are older, with these persons experiencing more complications in their normal routine activities. Additionally, COVID-19 provided negative impacts on world economies, greatly affecting the business, agriculture, entertainment, tourism, and service sectors. The impact of COVID-19 on these sectors is also investigated in this study, and this study provides some meaningful insights and suggestions for revitalizing the tourism sector. The association between globalization and travel restrictions is studied. In addition to economic and human health concerns, the influence of a lockdown on environmental health is also investigated. During periods of lockdown, the amount of pollutants in the air, soil, and water was significantly reduced. This study motivates researchers to investigate the positive and negative consequences of the COVID-19 pandemic in various unexplored areas.

Keywords: coronavirus; COVID-19; SARS-CoV-2; environment; economy; education; society

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1. Introduction

A pandemic is an outbreak of an infectious disease throughout the whole world, spread by human interactions [1]. Many outbreaks of infectious diseases, such as the Hong-Kong Flu, severe acute respiratory syndrome (SARS), Spanish Flu, and Asian Flu, have been studied in the literature [2]. In recent years, seven major outbreaks, namely hantavirus syndrome, H1N1 influenza, H5N1 influenza, SARS, Middle East respiratory syndrome (MERS), Ebola, and coronavirus, occurred [3]. Among these pandemics, the first to occur was H1N1 influenza, in 2009. H1N1 was responsible for more than 18,000 fatalities [4]. Similarly, more than 11,000 persons died due to the Ebola virus [5]. Both Ebola and SARS drastically affected socio-economic aspects in Africa and China [6]. Similarly, Zika virus spread in 64 different countries and affected more than 200,000 persons [2]. In 2009, H1N1 also disturbed various sectors such as healthcare, education, and tourism. Pandemics are not only responsible for high mortality rates but also have negative impacts on the economy, education, health, tourism, and the environment.

Recently, a new pandemic named coronavirus disease 2019 (COVID-19) arose in Wuhan, the capital of China's Hubei province [7]. COVID-19 is a very infectious disease caused by a new coronavirus named Severe Acute Respiratory Syndrome coronavirus-2 (SARS-CoV-2). SARS-CoV-2 has a higher affinity to human ACE 2 [8] than the original

SARS virus strain [9]. SARS-CoV-2 is an enveloped positive-sense single-stranded RNA virus [10,11]. The virion releases RNA into the cell. Copies of the virus are created, which infect and capture more cells, especially those within the lungs. The outbreak of COVID-19 was first identified in Wuhan in December 2019. The World Health Organization (WHO) declared this outbreak as a pandemic on 11 March 2021 [12]. As of 21 September 2021, about 221 countries and territories have reported 4,716,983 deaths and 230,028,186 cases [13]. Table 1 depicts the statistics for the mortality rates in different countries.

Table 1. Statistics of mortality rate variation from 17th June 2020 to 13th September 2021 [13].

	COVID-19 Data as of 17th June 2020			COVID-19 Data as of 13th September 2021		
Area	**Confirmed**	**Recovered**	**Death (%)**	**Confirmed**	**Recovered**	**Death (%)**
Worldwide	8,428,600	4411,367	450,452	225,488,198	202,082,597	4,644,372
China	83,265	78,379	4634	95,248	89,861	4636
Japan	17,628	15,850	931	1,632,091	1,478,100	16,742
Singapore	41,216	31,938	26	71,687	68,188	58
South Korea	12,198	10,774	279	274,415	245,505	2360
Germany	189,504	173,600	8927	4,087,109	3,831,800	93,128
United States	2,234,471	918,796	119,941	41,853,362	31,871,868	677,988
France	158,174	73,667	29,575	6,905,071	6,509,260	115,517
Canada	99,853	62,017	8254	1,542,280	1,473,825	27,198
Italy	237,828	179,455	34,448	4,606,413	4,349,160	129,919
India	367,264	194,438	12,262	33,264,175	32,447,032	442,907
Russia	553,301	304,342	7478	7,140,070	6,389,657	192,749
Belgium	60,244	16,684	9675	1,207,516	1,105,366	25,454
Iran	195,051	154,812	9185	5,295,786	4,568,236	114,311
Switzerland	31,187	28,900	1956	808,050	720,152	11,010

In the initial phases of the COVID-19 pandemic, most countries put an emphasis on social distancing and screening people infected by COVID-19 to prevent the spread of the novel coronavirus. Travel restrictions were imposed by many countries to control infections by the novel coronavirus. Moreover, countries enforced strict lockdown policies to control the spread of COVID-19 and to decrease the mortality rates. Lockdowns have negative consequences on society, the economy, and education. However, it has a positive impact on the environment due to the low emission of pollutants from vehicles and industries [14]. Stock market crashes, manufacturing unit closures, and migrant labor movement are some of the major consequences of this pandemic. The demand and supply of goods were greatly affected by these lockdowns. There is a close association between the development of economic activities and environmental pollution [15]. Due to restrictions on economic activities, environmental pollution was drastically reduced. COVID-19 also affected the mental health of researchers and students due to quarantine and lockdown restrictions [16].

This paper provides a systematic analysis of the influence of COVID-19 in various sectors, such as society, environment, education, and globalization. The main contributions of this paper are as follows:

- Every aspect of society is analyzed from the perspective of the implication on their health;
- The effect of lockdowns due to the COVID-19 pandemic on water, air, and wildlife is studied in detail;

- The impact of the COVID-19 pandemic on the agriculture, entertainment, and manufacturing sectors is discussed, and strategic plans for strengthening the agriculture sector are investigated;
- The influence of the COVID-19 pandemic on education is investigated, and both positive and negative consequences of COVID-19 on education are studied in detail.

The rest of the paper is structured as follows. Section 2 presents the effect of the COVID-19 pandemic on society. The impact of pandemic on environment is discussed in Section 3. The economy after the pandemic is presented in Section 4. Section 5 presents the implication of the pandemic on education. Section 6 discuss the impact of the pandemic on globalization. Section 7 presents a discussion on the impact of the COVID-19 pandemic on various sectors, and finally the concluding remarks are drawn in Section 8.

2. Impact of COVID-19 on Society

The COVID-19 pandemic has affected both the economic and health conditions of all age group people [17]. It shows a drastic impact on the various people, who are living below the poverty line, with disabilities, coming under older age group, belonging to indigenous communities, etc. The entire world has seen a rapid increase in the number of positive cases due to the lack of prior awareness of these types of coronaviruses. This can create a serious risk for humans and other living beings. Specific groups are striving for their basic amenities and medical treatment as young people are given more preference over old people. This is responsible for generating the feelings of inequality, discrimination, and isolation among the weaker sections [18]. The COVID-19 pandemic has created many trade-offs unknowingly in our society. Although, the coronavirus can attack on any age group of people, tobacco taking peoples are more vulnerable than others as this virus has a tendency to attack on lungs and causes severe acute rupturing of respiratory system [19]. This virus created major shifts in the way of thinking, socializing, communication, and living. Table 2 shows the distribution of age and sex based confirmed COVID-19 cases.

Table 2. Distribution of age and sex based confirmed COVID-19 death cases in the United States on 9 August 2021.

Age	Male	Female
under 1 Year	54	44
1–4 Years	26	24
5–14 Years	77	61
15–24 Years	736	496
25–34 Years	3380	2015
35–44 Years	8665	4902
45–54 Years	23,386	12,270
55–64 Years	53,443	31,416
65–74 Years	87,264	56,756
75–84 Years	97,661	75,994
85 and above	79,113	106,075

2.1. Older Generation

The initial reports on the COVID-19 pandemic revealed that approximately 80% fatalities occurred in the peoples whose age over than 65 years [20]. The International Human Rights Law guarantees everybody to obtain the highest attainable standards of health, in contrast to which during the shortage of services in a pandemic, the treatment of older people was perceived as of less importance than that of young and healthy people [21]. The elderly population with diabetes, asthma, and cardio-vascular attacks, are more susceptible to the infection caused by coronavirus. To combat with the scarcity of essentials amid the pandemic, isolating oneself is an essential measure that resulted in further increment in emotional imbalance in society [22]. Due to poor health care systems

in most of the countries, older peoples are giving less importance than the younger ones. Hence, governments should design the proper plans to strengthen their health care systems for handling the pandemic situation.

The old peoples also suffer from depression and mental health problems. The modern technologies are unable to mitigate the problems associated with old peoples [23]. In future, the webinars or workshops on digital technology should be organised for elderly population.

2.2. Young Generation

Young population is one-fourth of the total world's population. Young people participated in various economic and social activities enthusiastically. They are working to help the economic weaker sections. They provided innovative ideas to solve the social and economic problems [24]. However, young persons were suffering from the social and economic impacts of the COVID-19 pandemic.

It is observed from a report that 267 million out of 1.8 billion young population (i.e., age from 15 to 24) were not involved in education and employment before the pandemic [25]. After the COVID-19 pandemic, this crisis becomes more excavate than the previous situation. According to a global survey on Youth and COVID-19, there is a 42% reduction in the income of employees [26]. In developing countries, young employees experienced more reduction in their income and working hours. This have put enormous psychological effect on the young population. It is found that 17% of young population suffer from depression and angst [27]. Young population feel apprehensive and uncertainty about the future due to disruption in business and education, social isolation, and personal stress [28]. Young population has less severe health impacts than the elderly population [29].

There is a need to implement employment policies to mitigate the unemployment crisis arises due to the COVID-19 pandemic. The sports activities and mental health services should be integrated in the employment policies to alleviate the mental health issues.

2.3. Disabled People

The disabled population are facing various challenges such as medical care, personal hygiene, and implementing social distancing. These persons may be dependent on external help for doing their daily routine and solving other issues [30]. Disabled population are more vulnerable to the COVID-19 pandemic. The following challenges are confronted by disabled population during this pandemic [31].

- Incapability to wear mask
  Some disabled persons are unable to wear mask due to their disability or health issues. Some persons may feel uncomfortable to breathe and panic. Some persons wearing masks are unable to communicate with other through the lip reading [32]. Hence, there is no need to make it compulsion that every disabled person should wear a mask.
- Inaccessibility of telehealth services
  Visually impaired persons are unable to access cognitive delays. For deaf, the sign language interpreters are required to access the telehealth services.
- Inaccessibility of COVID-19 testing centers
  The disabled persons are unable to visit the testing centers independently. They required a safe ambulance facility, which is impossible in this pandemic situation.
- Impact of social distancing
  The social distancing plays a vital role in preventing the outbreak of coronavirus. Without the assistance of other persons, disabled persons face complications in doing their daily activities and also suffer from mental problems [33].
- Incompetent of health policies
  In the initial phase of the COVID-19 pandemic, the health policies did not consider the requirement of support staff for disabled persons. Due to this, many persons experienced adverse effect on their health without the helper's assistance.

3. Impact of COVID-19 on Environment

Nowadays, the lifestyle of human beings has caused a drastic impact on environment. The population has increased from 1 billion (1800) to 7.7 billion in 2020 [34]. Human beings are drastically utilizing the natural resources for new developments of industries, infrastructure, and habitats. Due to the increase in human population, the demands of dairy and meat products, such as eggs, meat, and milk, have also increased. This has encouraged the poultry farming and livestock raising, which are actually considered as the main door for persuading the transmission of various viruses from the wildlife world to the human world [35]. The reduction in green cover of the Earth will severely affect our lives in the long run. Amazonian evergreen forests are known as the carbon stores of ecosystem. According to the World Wildlife Fund, forests cover more than 30% of the Earth's surface [19]. It is predicted that human beings will face a complete loss of rainforest cover in the basin by 2100 due to the decrease in rainfall and the increase in temperature [36]. Exploitation of forest vegetation, burning of fossil fuels, releasing poisonous exhaust from industries and transportation are responsible for disturbing the ecosystem.

It has been observed from the study of the United Nations Environment Programme (UNEP) and International Livestock Research Institute (ILRI) on Zoonotic that epidemics will be occurring more repeatedly in near future due to the drastic change in climate and food chain [37]. The unexpected changes in environment and wild life disturbed the balance in food chain. The wild animals left their habitats and are moving towards the cities or villages due to large scale deforestation. This also led to the transmission of novel microbes and pathogens from these animals to human beings. Hence, the food cycle is affected severely and is responsible for more frequently occurring zoonotic diseases in near future [38]. There are millions of undiscovered and undefined virus species, which are present in animals. They may severely infect the human beings. According to Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) report, if there exists a genetic diversity, it will help in building resistance among animal population [39]. It also reduces the outbreak of infectious diseases. Recently, farmers are using pesticides and fertilizers in crops to evade the insects, weeds, and various diseases. However, the extensive usage of pesticides and fertilizers may help the pathogens to develop more resistance towards the medicinal treatment of zoonotic diseases.

3.1. Impact on Air

The COVID-19 pandemic has affected the environment in more lethal manners. During this pandemic, air quality is significantly improved due to reduction in human activity and manufacturing operations [40]. This pandemic has helped the nature in rejuvenating itself. Rivers are clean and skies are clearer. A study on the outbreak of SARS reported that the mortality rate in China's most air polluted areas was twice as high as in the least polluted ones [41]. The pathogens along with pollutants can form a strong bond, which might help them to stay intact in atmosphere for long duration and gives them an easy way to enter into the human body. According to Annual State of Global Air Report [42], 95% of planet's population is breathing unhealthy air. Due to air pollution, 1.61 million deaths are reported in India every year. In similar fashion, China faces 1.58 million deaths annually.

During the lockdown period, air quality is significantly improved due to reduction in $PM_{2.5}$, SO_2, and NO_2. This may led to reduction in the mortality rate. The researchers from Harvard University's T.H. Chan School of Public Health found the association between the number of COVID-19 deaths and $PM_{2.5}$ levels. They stated that the small increment of one microgram per cubic meter of $PM_{2.5}$ in air had led to 8% higher death rates (95% confidence interval) during SARS-CoV-2 [43]. The concentration of various harmful gases was greatly reduced in various countries after the lockdown. In the USA, 49% reduction in NO_2 and 37% in CO concentration was observed in the air quality [44]. A drop of 70% in harmful nitrogen dioxide was analyzed in Delhi after the lockdown [45]. Figure 1 depicts the impact of lockdown on the concentration of NO_2 in China [46]. It is found from Figure 1 that there is no rise in the levels of pollutants even after the new year festival.

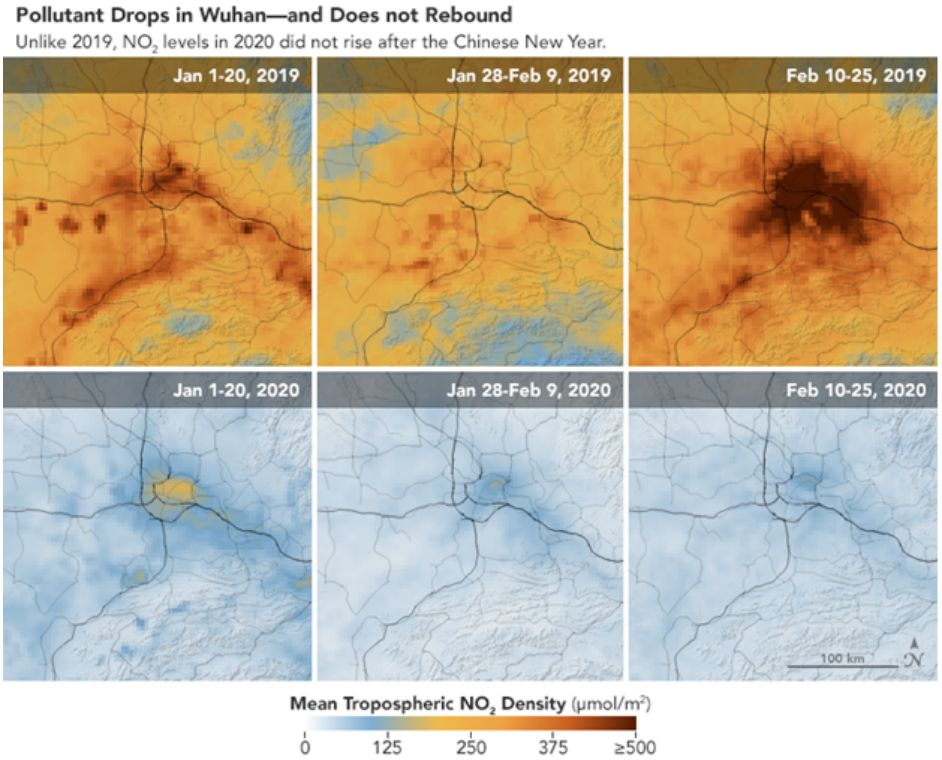

Figure 1. Impact on Nitrogen Dioxide level due to COVID-19 (1 January 2019–25 February 2020) [46].

The concentration levels of air pollutants are drastically reduced during this pandemic. This may led to a decrease in the number of patients who face asthma, lung problems, or heart attacks [47]. These changes are not perennial after the post-COVID-19 situation. The government should take some preventive measures to maintain better air quality. The renewable energy systems should be widely used in manufacturing industries [48]. The government should encourage the peoples for installing the solar panels. Affordable public transportation should be increased to reduce the road traffic and pollution. Tax reduction, subsides, and financial incentives should be given on the purchase of electrical vehicles.

3.2. Impact on Water

In this pandemic, the formation of acid rain is drastically reduced due to the decrease in air pollutants. The industrial wastewater was extremely reduced due to the lockdown period [49]. The restriction in religious activities, fishing, and social functions may led to less disposal of solid waste. The self-cleaning properties of river are improved with better water quality. The dissolved oxygen level in river is increased to approximately 5 mg/L in Yamuna River, Delhi [50]. In Italy, the water of Venice's canals was cleaner than the previous year [51]. The fishes are seen in the Venice's canals. The marine ecosystem is also recovered after the decline in fishing activities and reducing the blue carbon [52].

There is no evidence about the survival of coronavirus in drinking water supplies. However, it is possible in untreated drinking water. Since the structure of SARS-CoV-2 is the same as that of the previously detected coronaviruses, the same precautions have to be taken, which were mentioned for the previously discovered coronaviruses [48]. Adopting frequent hand hygiene and using water disinfection can help in reducing the risks associated with SARS-CoV-2. Governments have to design the proper rules and regulations for an efficient treatment of solid and water waste received from the industries. International and national rules should be designed to handle the overfishing problem.

3.3. Impact on Wildlife

The wildlife economy plays a crucial role in effectuating the several sustainable development goals and supporting local communities whose economic dependency greatly relies on wildlife. According to the World Travel & Tourism Council [53], wildlife tourism supports 21.8 million jobs across the World or 6.8% of the total travel and tourism jobs. The lockdown in various countries, closure of international borders and shutting down of transport have severely affected this sector. Most of people left this sector. Due to less cash flow, this sector is almost closed. The protection of wildlife and endangered species is facing a big blockage amid this pandemic [54]. This also led to the decrease in the funding of the anti-poaching units. The poaching activity has been increased due to the less strict rules and regulations. In addition to this, jobless people were dependent on wildlife for their living.

Another major concern is the illegal activity. It will speed up the transmission of SARS-CoV-2 virus from animals to humans as these animals are usually kept without proper maintenance of hygiene. These animals might be the home for various pathogens and undiscovered viruses. It is observed that 75% of new infectious diseases come from the consuming animals [55].

4. Impact of COVID-19 on Economy

The economy of any country depends on its agriculture, industries, businesses, government investments, import, and export. The COVID-19 pandemic directly affected all the sectors. The economists over the entire world are analyzing the impact of this pandemic on the global economy [56]. The global economic growth will be subjected to 1.6% decline in 2020 and 3.2% in 2021 [57]. It is predicted from the literature that China will be affected by this pandemic. The economic growth in China may be declined by 2.4% as compared with the earlier estimation (i.e., 5.7%) [57].

International Monetary Fund has also estimated that the global economy will fall off to 3% and global Gross Domestic Product (GDP) will lower by 3% [58]. Its impact can be easily seen on the various sectors of different countries who are depending on China for trade or manufacturing [59]. It is also estimated that services and manufacturing sector will face tremendous losses. The tourism and travel industry will be severely affected. International entertainment industry and sports' brands industries will face a severe loss in their revenues and marketing [60]. Thus, the impact of the COVID-19 pandemic on economy is going to be very drastic unless the reliable and proper strategic plans are developed to handle this affray.

4.1. Agriculture

In order to discontinue the outbreak of COVID-19, lockdown was imposed on most of the countries. This affected the food-supply chains, availability of crops, and logistic services [61]. These restrictions could have led to the rise of traumatic condition for the people living in developing countries. Agriculture is the most crucial service that cannot be put in an immobilize state. However, the collective actions have been taken by various countries for surplus food production and cold storages. This will help those countries who are dependent on others for their food supply [62]. Undoubtedly, the pandemic greatly affected the economy and led to income reductions. They might face unemployment in near future. The government of various countries are putting their effort to balance both the lives and livelihoods [63]. They are investing in recovery measures and safe food delivery to the unemployed and poor people. Figure 2 depicts the impact of COVID-19 on agriculture.

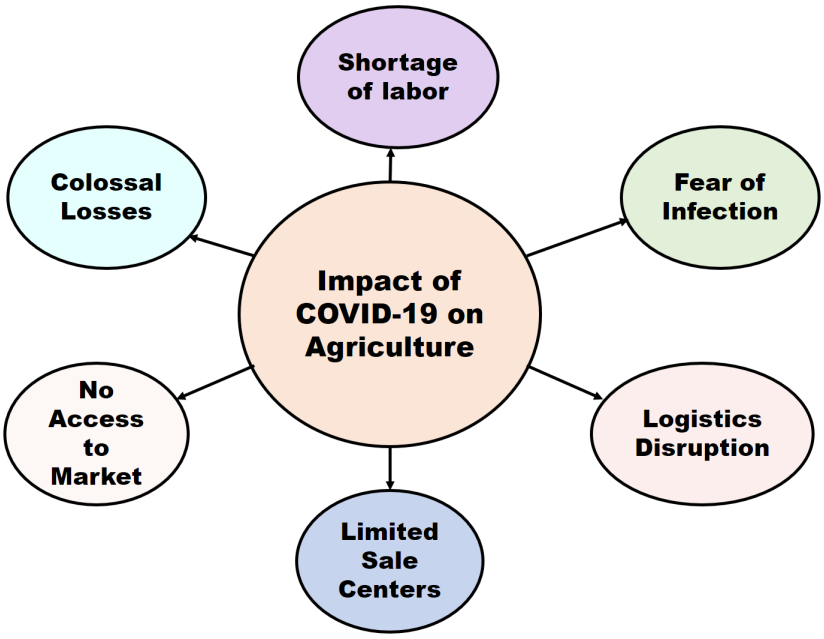

Figure 2. Impact of the COVID-19 pandemic on the agriculture sector.

The governments are taking valiant measures to fight against the chronic crisis in food-supply chains. Shortage of labor may create the stumbling blocks for the farmers. The United Nation World Food Program has estimated that about 130 million and more (i.e., from 135 to 265 million) population will face acute food insecurity by the end of 2020 [64]. The World Bank Group is closely associated with governments for monitoring the domestic food and agriculture supply chains. They are also investigating the impact of unemployment and income on their food buying capabilities [65]. The short and long term financing strategies are required to rebuild the existing projects. Recently, unanticipated climatic conditions and various insect attacks are becoming a new challenge in front of farmers and governments. Both are taking appropriate measures to implement the control operations for preventing the agriculture farmlands and crops. Figure 3 illustrates the strategic plans for strengthening the agriculture sector after the post-COVID situation.

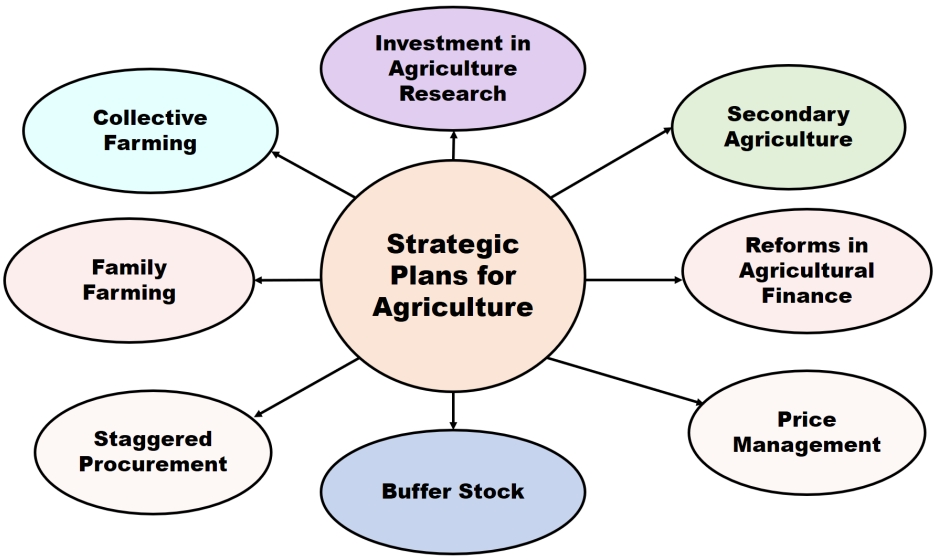

Figure 3. Strategic plans for strengthening the agriculture sector after post-COVID [66].

4.2. Business

The COVID-19 pandemic has drastically affected the micro, small, and medium enterprises (MSME). According to All Indian Manufacturer Association, 19% to 43% of different enterprises may disappear if the crisis persists for long duration (i.e., more than 8 weeks) [67]. Due to lockdown and quarantine period, people have shown limited working possibilities. Consumers are purchasing the essential and limited items that will directly affect the demand-supply chain [68]. Goods which are subjected to import–export market, will see a relative decline in their market due to the seizing of trade across countries. The Economic Times reported that there is worry about the MSME sector, which accounts for third of India's manufacturing output and 45% exports affect 63 million households [69].

In current scenario, wages and salaries are big issues. There are zero revenues due to shutdown of manufacturing units. High bills, loans, and wages will be impossible for these MSMEs in near future. MSME sector has created more than 90% of jobs in India. These jobs may be disappeared from various sectors [70]. The Global Alliance for Mass Entrepreneurship created a $100 million small stabilization fund to help the small business in this crisis [71]. The businesses are facing loss due to the struggle in the delivery of goods, limited transportation facility, and unavailability of migrant workers. In India, 12 million people may lose their jobs in the hospitality industry.

After COVID-19, the restarting of manufacturing units might be a difficult task. There are many challenges, such as liquidity crunch, labor shortage, and strict rules to maintain the appropriate COVID-19 behavior.

4.3. Entertainment

The COVID-19 pandemic has also affected the film industry. However, digital commerce and technology have been raised in this discussion [72]. This is one of the most prominent sectors. Online gaming, radio, and digital media subscriptions, and the over-the-top (OTT) media service platform are largely increased in this pandemic situation. They may provide more revenues in the upcoming years. Whereas, film industry, theater, and live events are facing a huge loss as stated by the Event and Entertainment Management Association (EEMA) [73]. The reason behind dwindling of these revenues is the shutdown of theaters and multiplexes. These setbacks are not limited to the end of the pandemic. According to the post-COVID-19 conditions, people will show variable behavior in the acceptance of outward media. Many people may prefer the home media [74]. Large numbers of people are dependent on this sector for their employment. They might face the unemployment after this pandemic situation. The new and innovative ideas are required for delivery of digital content and events such as virtual live events. The advance cloud and remote work stations are required for implementing the novel ideas.

4.4. Travel and Tourism

Travel and tourism play a vital role in the social and economic development of any country [75]. Tourism industry indirectly affects several sectors, such as labor, agricultural products (food and beverage), transport, and accommodation. According to the Global Trade Analysis Project (GTAP), both skilled and unskilled labor require 30% share of tourism expenditure in developed and developing countries. Figure 4 depicts the various inputs required for the tourism industry [76].

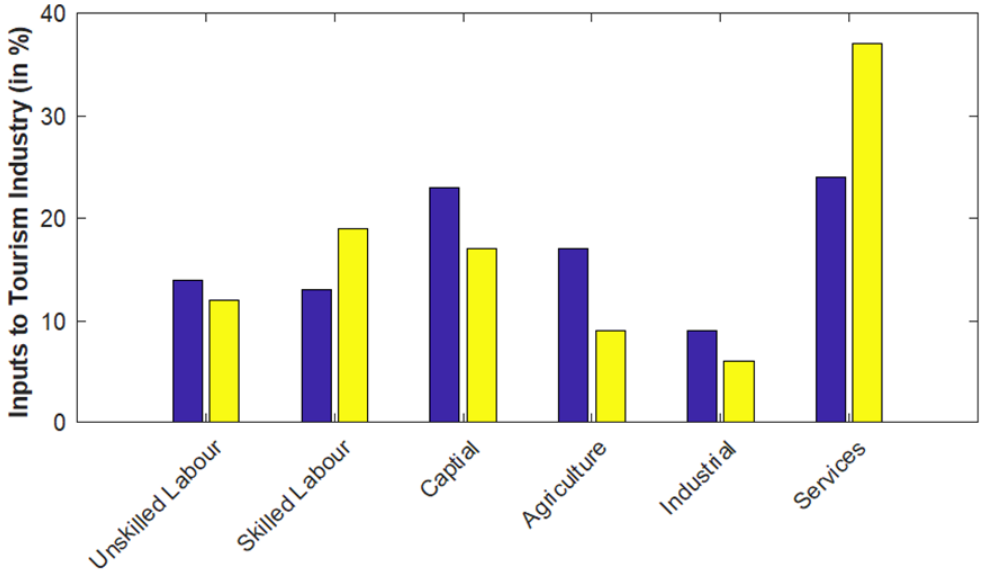

Figure 4. Contributions of different sectors towards the tourism industry [76].

However, this industry faces the hardest-hit in the pandemic situation. COVID-19 greatly affected the travel and tourism industry. The emergency measures were applied on tourist locations that put a large impact on the people's mobility [77]. According to the United Nations World Tourism Organization (UNWTO), the arrivals of international tourists was decreased by 72% from January 2020 to October 2020. Due to this, the export revenues have a loss of USD 935 billion. This loss is approximately ten times more than the loss made in 2009 under the economic crisis [78]. Most of the restaurants face high operating costs due to the maintenance of social distancing, sanitation, and hygiene. Hence, restaurants were closed due to less number of tourists and high operating cost. Some restaurants were also converted into the quarantine centers. The sustainability of travel and tourism industry is a challenging task in this pandemic situation. Figure 5 shows the deviation of the number of foreign tourists in the current year over 2019.

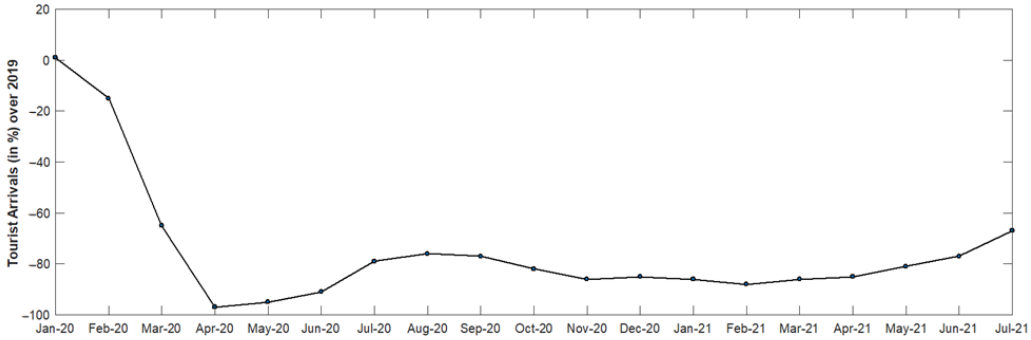

Figure 5. Foreign tourist arrivals in 2020 and 2021 [79].

The tourism industries of both developing and developed countries suffer from this crisis. According to UNWTO, the tourist arrivals were reduced by 60–90% for developing countries. During this pandemic situation, domestic travel has greatly raised [80]. This will slightly affect the economy of developing countries. The developing countries mainly depend upon the international travel. Indian tourism is estimated to face a great revenue loss of INR 1.25 trillion the year 2020 due to the closure of hotels and aviation industry. According to CARE report, Indian tourism industry expects a revenue loss of INR 69,400 crore due to the suspensions of international flights [81,82]. It was mentioned that there will be 50% loss in foreign exchange earnings in 2021. Indian Airlines has reported a loss of

USD 600 million for January–March quarter. The government of India is planning a rescue package of up to INR 100–120 billion. It has been decided to put off the taxes to a later time on Indian aviation sector until it comes back to its feet. The companies could be permitted to pay the taxes interest-free in next tax-cycle. In South Africa, the tourist arrivals were reduced by 71% during this pandemic situation [83]. The revenue was reduced from 15.8 million to 5 million in 2020. South Africa did not receive any visitors from April to September 2020. During this crisis, Australia faced 81.4% reduction in the number of tourists. However, the United Kingdom (UK) and Zimbabwe received a large number of overseas tourists as compared to other countries. After the lift up of restrictions in the UK, the number of visitors was greatly increased from 19,862 in April 2020 to 267,942 in August 2020 [79]. Figure 6 shows the number of tourist arrival in different constituents in 2021.

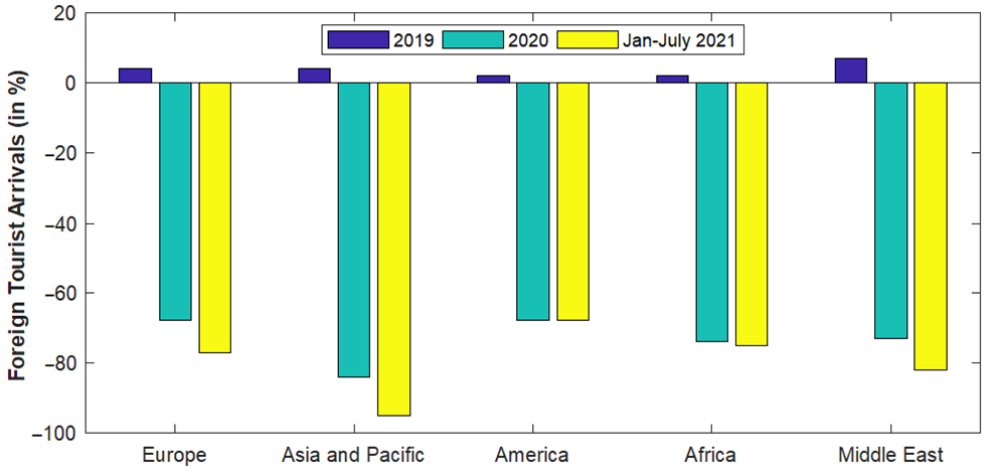

Figure 6. Number of foreign tourist arrivals in different constituents [79].

This pandemic also affected the Air Cargo and increased the export cost. One possible solution is to reduce the size of their fleets or modernize their fleets. The aviation company can design new plans for well-planned deliveries, more fuel efficient models or by retaining order planes, and reducing capital expenditure on new aircraft.

4.5. Service and Manufacturing Sectors

China is the major supplier of raw materials, small parts and tools to various manufacturing industries across the globe [84]. Due to seizing of borders across countries, world's manufacturing units especially those which are dependent on China for supply of raw material are facing a big blockage in their production. Many manufacturing units either switched to a smarter model or switched to the production of medical related products during this pandemic. The United Nations Conference on Trade and Development (UNCTAD) has estimated a shrink of 5% to 15% in the global foreign direct investment as the shutdown of manufacturing sector [85]. The electronics and electrical companies are significantly affected from this pandemic as most of their critical parts are supplied from China. According to the International Labor Organization (ILO), it is estimated that around 25 million people will face unemployment at a global level in pandemic [86]. In the service sector companies, very few peoples are coming to their offices. Most of the employees are doing their work from home.

5. Impact of COVID-19 on Education

The educational system is drastically affected from the COVID-19 pandemic. Nationwide lockdown imposed the closure of schools, colleges, tuitions, examinations, and universities. According to the UNICEF, 98.5% of the worldwide student population is affected from the closure of education hubs in around 186 countries [87]. In total, 60% of children's learning loss is observed in the least educated family. It was assumed that the closure of educational institutions may help in preventing the spread of coronavirus. Recent

studies on COVID-19 have predicted that the closure of educational institutions has decreased the mortality rate by 2% to 4% [88]. This scenario can be changed if the appropriate COVID-19 behaviors are not adopted.

Another study shows that although children can catch coronavirus, they rarely show severe symptoms and they can be act as an intermediator for coronavirus. That is why the educational institutes were closed to stop the outbreak of COVID-19. However, the closure of educational institutes is not the best solution. Its effectiveness can be varied with respect to the timeline of the outbreak of COVID-19 [89]. If it was implemented in the early phase of COVID-19, then this will show major impact on the depreciation of mortality rate. Whereas, if this step is taken in the later phase, then this may not display major impact on the mortality rate. After the reopening of educational institutions, a small increase in the death rate was observed [90].

The closure of educational institutes directly affect students, teachers, staff members, and their families. The main impacts have been shown in various sectors over the long term run [89] including:

- Global Stock Market
  Education put a great impact on the global stock market. Highly educated traders have utilized the new technologies and tactics to analyze the stock market and gain more benefit. Due to this pandemic, less experienced traders will be produced from the institutions.
- Food Insecurity
  Students and their families who directly depends upon the mid-day meals. In India, more than 100 million children are taking mid-day meals. They faced food insecurity in this pandemic.
- Internet Services
  Internet services and digital technologies such as tablets, mobiles, and laptops are required for online learning. The high demand of these items may led to an increase in their cost. The students who are living in rural areas, were facing lack of infrastructure for accessing the Internet facilities.
- Healthcare Issues
  The families who currently do not have any way of earning bread are expected to face many healthcare issues.

The UNESCO has provided suggestions for adapting distance learning methods and online learning programs. In India, the central government has taken various preventive measures. The Indian government declared the complete closure of educational institutions in the earlier phase of the COVID-19 pandemic. However, this closure affected various competitive examinations, internships, placements, counseling operations of students, etc. Figures 7 and 8 show the positive and negative consequences of the COVID-19 pandemic on education.

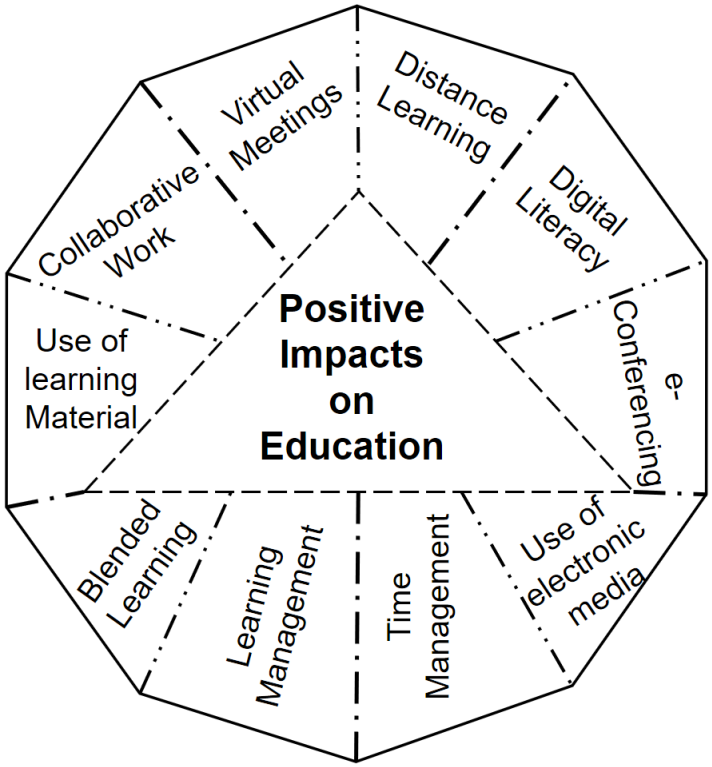

Figure 7. Positive impacts of COVID-19 on education.

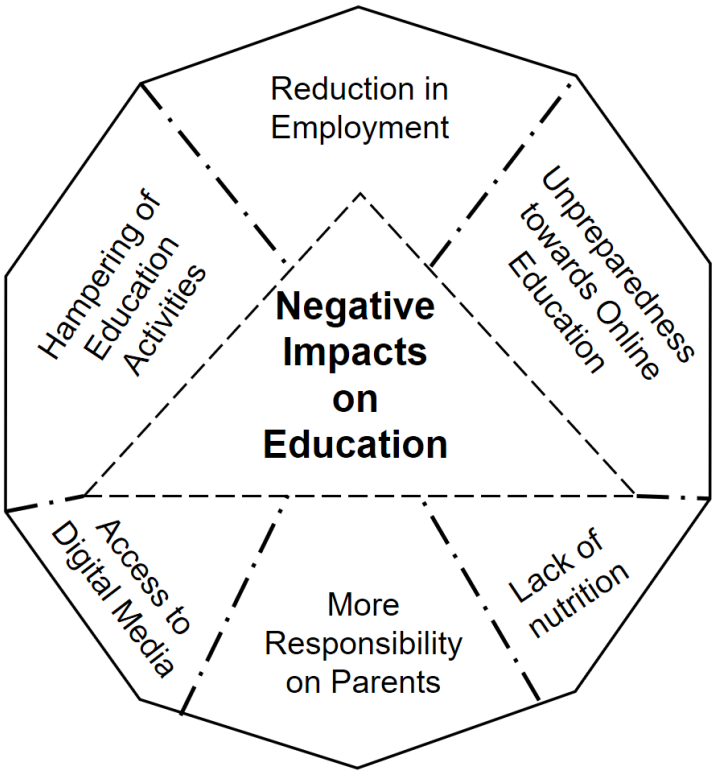

Figure 8. Negative impacts of COVID-19 on education.

5.1. Impact on Students

Due to the closure of educational institutions, students have adopted the distant learning methods. However, still many schools are striving to execute the online learning. Some children are unable to take the electronic gadgets and an appropriate Internet facility

in their areas [91]. This imposed a major challenge in the use of distant learning program. For working parents, it is very difficult to keep an eye on their ward and maintain a balance in their home environment. To overcome the above-mentioned problems, there is a need to develop a strong infrastructure system [92]. It will accelerate the learning of students suffering from the learning loss during summer or weekend breaks. It will also help to grab few extra global opportunities of interacting and learning outside their school by connecting them to the entire world. Figure 9 depicts the impact of COVID-19 on students.

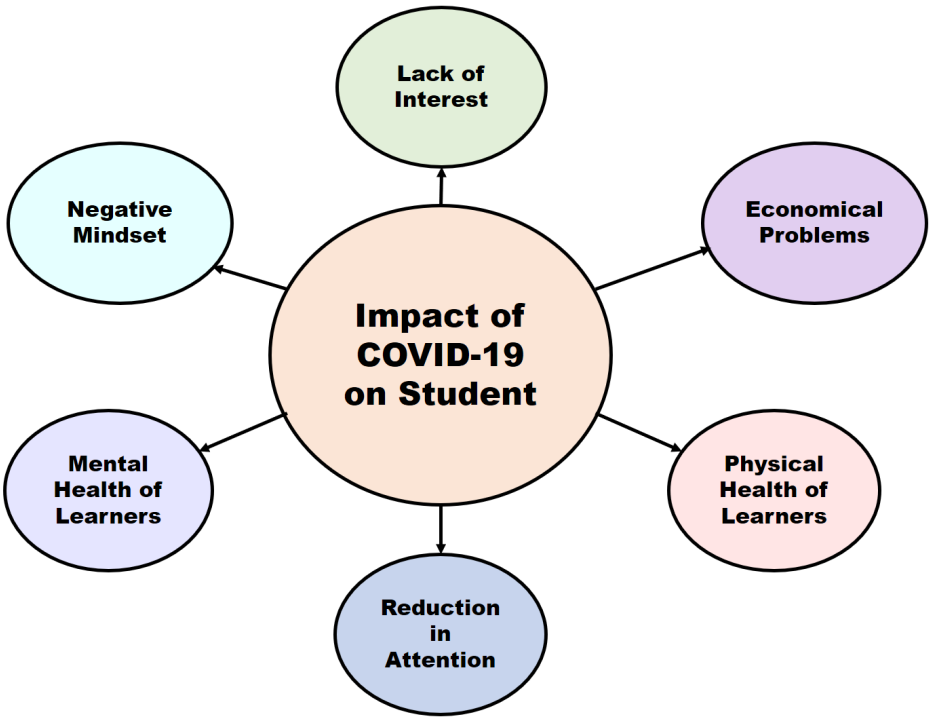

Figure 9. Impact of COVID-19 on students.

In India, the government started the Massive Open Online Courses (MOOCs) and online courses for both instructors and students. The online resources such as the National Repository of Open Educational Resources, DIKSHA, and e-Pathshala were developed to cover the syllabus of class 1st to 12th standard [93]. The database of online courses named as SWAYAM was developed for graduate and post graduate students. Thirty-two Direct To Home (DTH) channels were made accessible for online classes. These were available on all the major cable connection.

5.2. Impact on Research

Due to online learning, a huge traffic on the Internet has created a great strain for the service providers. Teleconferencing or Videoconferencing were widely used to communicate with experts in-place of meeting rooms [94]. Only 2% of researchers were working in the field of virology before this pandemic. Nowadays, a large number of researchers and laboratories have been dedicated to COVID-19. This has led to an approximate 10–15% increase in research in the biomedical field [95]. On the other hand, artificial intelligence and machine learning researchers have been conducting extensive research studies with several published articles in various reputed journals [96–100]. Moreover, a large number of research articles on COVID-19 has been uploaded on preprint servers such as bioRxiv, medRxiv, and arXiv. The potential lapses were found during the peer review process, which greatly affect the prestige of major journals [101]. The Lancet and other prestigious journals retracted the published articles and findings [102]. In this pandemic, a collaborative platform was made for knowledge gathering and expertise sharing among researchers and scholars [103].

Various reputed laboratories across the world have closed their doors for visitors, employees, and non-essential staff. The scientists started their work at home. Many researchers and scientists of reputed laboratories have collaborated over cloud computing. They have pooled resources to access supercomputers from IBM for doing research [104]. High Performance Computing Consortium on COVID-19 is also being used for various critical purposes such as:

- Forecasting the spread of the disease;
- Discovery of vaccines for COVID-19;
- Screening of chemical compounds to design new COVID-19 vaccine.

6. Impact of COVID-19 on Globalization

The main motivation behind globalization is to improve the life expectancy and reduce newborn mortality rate through different aspects of globalization [105]. Different aspects of globalization can be involved such social, economic, and political ones (see Figure 10) [105]. The developing countries focused on the economic aspect of globalization, which promoted wealth creation to improve the health of their populations, while developed countries focused on social integration.

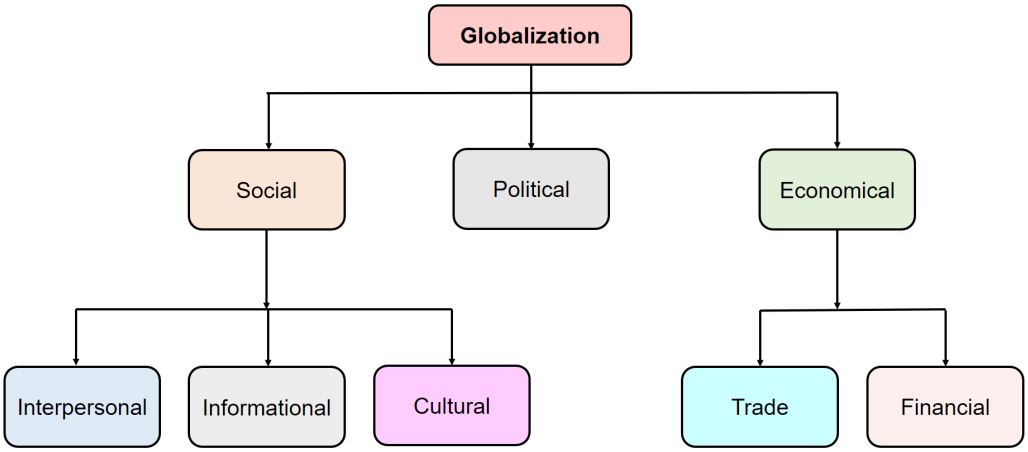

Figure 10. Main aspects of globalization.

During the COVID-19 situation, social globalization plays a significant role in handling the containment of coronavirus. The countries with high social globalization have taken quick actions to impose the travel restrictions and other control measures. The countries with higher political globalization have less interested to impose the travel restrictions [106]. They have taken a lot of time to take the strict travel restrictions. However, there is no strong association between economic globalization and travel restrictions. A country with more political globalization, cultural, and interpersonal has less expectation to impose the travel restrictions in this pandemic situation [107]. Most of the countries whose policies to support the globalization have the least interest to implement any restrictions on travel.

According to the Internal Labor Organization, the unemployment has increased by approximately 25 million globally [108]. The trade of Los Angeles was reduced by 22% in the first quarter of 2020. The developing countries such as South Asia and Africa observed 3.6% fall in their GDP. Some food chains declared bankruptcy. Thailand and Malaysia have been greatly affected by the COVID-19 pandemic. There has been a 14% downfall in job related to travel and tourism industry [109]. It has also been noted that the economic impact exceeds USD 220 billion in the United States. After this pandemic, governments are focusing on developing the domestic supply chain for some important products. For instance, South Korea has used robots in production industries. It is also noted that vaccines and medical equipment are being delivered from developed countries to developing countries.

7. Discussion

Recently, a significant improvement in the tourism sector has been observed in some countries and a decrease in others. As travel restrictions are lifted, travelers are gradually starting to travel in Europe and other places in the world. In Mexico, the same number of international tourists were received in June 2021 as in 2019. In July 2021, 35% and 49% fewer tourists arrived in France and the United States, respectively, than in 2019 [105]. In July 2021, the Caribbean had an 11% increase in tourism compared to 2020. During the January–July 2021 period, Asia experienced a 95% decrease in international travel compared to the same period in 2019 [109].

We have noted also that during this pandemic, more globalized countries implemented strict travel restrictions as compared to less globalized ones. Indeed, globalized countries have a large number of confirmed cases due to a slow response towards the resulting cases [110]. In the early phase of COVID-19, European countries with significant health facilities did not set travel restrictions. The economic and political aspects had a great impact on the choice of strict travel restrictions [111]. In addition, a country with more social and cultural aspects requires an extra time duration to implement the travel restrictions. After this pandemic, the worst-hit countries put in place anti-trade policies and measures without relying on developed countries. However, globalization is responsible for low inflation. The globalization will not be ended even if the de-globalization gains some momentum.

Both positive and negative impacts are observed in the field of education and research. In particular, about one billion of students were affected from the preventive measures taken by the governments [112]. Thanks to this pandemic, governments have taken an initiative to develop online learning platforms. The Internet connectivity is still one of the main challenges for implementing online learning especially in rural areas. Because of the pandemic situation, researchers have not had enough time to do their research work. Many of them were preoccupied with taking care of their children rather than doing scientific research. Additionally, due to the lockdown, the researchers did not have enough time to carry out the administrative activities.

The COVID-19 pandemic has greatly affected the small-scale businesses as compared to the large-scale businesses [113]. Similarly, self-employed persons were more affected than the salaried persons [114]. It is observed that 43% of small-scale businesses were shut down by the end of December 2020 [115]. The female owners of small-scale businesses faced a 35% more loss than the male owners. The minorities in both developing and developed countries were greatly affected from COVID-19 [116]. After the COVID-19 duration, the digital economy will be extensively used by the entrepreneurs. The digital platforms will be used to advertise and sell the products [117]. The entrepreneurs can use online communities to find new collaborates, envisage new opportunities, and acquire the assistance to solve the particular problem [118]. Hence, there is no need to move the entrepreneurs from place to another for establishing their business.

Due to the strict lockdown, the elderly and disabled population are greatly affected from mental health problems. During the strict lockdown period, these persons suffer from depression, sleep disturbances, and anxiety. However, these problems cannot be eliminated by using the latest technology in the lockdown duration [119]. These population are unable to use the latest technology. Hence, there is a need to organize webinars or workshops on the use of digital technology for elderly and disabled population. COVID-19 put positive impacts on the environmental health due to the reduction in harmful gases from industrial activities. In addition to this, the negative impacts are also perceived on the environment. Human beings were restricted to their home for doing their business, and other activities, which led to an indoor pollution [47]. The proper ventilation and waste management are required to discontinue the spread of coronavirus infection. The improper treatment of unused medical wastes such as gloves, masks, and gowns may produce a new environmental problem.

8. Conclusions

The COVID-19 pandemic has caused a dramatic loss to human life. It has drastically affected almost all the areas of human life. This study investigated the environmental health, social-economic impacts, and strategic plans to alleviate the influence of COVID-19 on different sectors. The disabled and old aged persons were unable to use the modern technologies for subscription services and latest information on pandemic. Governments should take an initiative for providing the basic amenities, accommodation, and digital technology to older and disable persons. Education sector is not an exception. Online learning mechanisms were used to compensate the theoretical concepts. However, the practical learning is drastically affected from this pandemic.

The number of foreign tourist arrivals decreased by 84% from March to December 2020 as compared to the previous year. After the relaxation in COVID-19 restrictions and vaccination, a modest improvement has been shown in the tourism industry especially in Mexico and the Caribbean. The chances are very high for the implementation of travel restrictions in more globalized countries. However, some states were not provided the actual data of COVID-19 outbreak due to the panic of economic crisis. Social globalization has resilient impact on the policy implementation. Despite the negative impacts on globalization and society, COVID-19 provided a better situation for improving the environmental health. The change in lifestyle of human beings greatly reduced the emission of carbon. The effective and efficient measures are required to handle the water waste and medical waste, such as masks, gloves, etc.

In future, the risk management of tourists travel after the COVID-19 pandemic will be investigated. The impact of lockdown on small businesses, young women, children, and rural areas can be analyzed to develop the effective plans for future pandemics.

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