

Sustainable and Inclusive Recovery during Pandemic: Challenges and Opportunities for India

*Dr. Kapila Mahindra¹ and Dr. Dattatrey R. Mane²

¹Post-Doctoral Fellow (UGC), Department of Management Science, Savitribai Phule Pune University, Pune, India,

²Professor, Department of Management Science, Savitribai Phule Pune University, Pune, India

E-mail: ¹kapila9785@gmail.com, ²dattatrymane@rocketmail.com

Abstract—COVID-19 crisis has highlighted the evident disparities in our economic system, as a result, several legislators are now considering ways to make financial markets even more sustainable and equitable. The COVID-19 epidemic has hindered decades of efforts to promote sustainable growth, which has significantly impacted the implementation of the 2030 Agenda. In 2020, 255 million permanent jobs were destroyed, more than 100 million people were forced back into hunger and poverty, and 101 million children and youth failed to meet the minimum reading competency standard, undoing the educational gains made over the previous two decades. Violence against women and girls has increased, and child marriage is predicted to rise as well. Due to irresponsible use of digital technologies, the epidemic has deepened and exacerbated existing disparities as well as magnified xenophobia and racist outbursts, hate speech, protectionism, and divisive populism. Furthermore, the COVID-19-related economic downturn hasn't done anything to halt the climate problem. Together, these elements threaten the realisation of the 2030 Agenda for Sustainable Development and the achievement of the SDGs.

This paper investigates the effects of the COVID-19 pandemic on the Indian economy. Particular focus is placed on the opportunities and difficulties brought about by the epidemic as well as the contribution of digital technology to the economic recovery that followed the outbreak. Emerging technologies are discussed as being a key factor in the global economic recovery, but they will face significant challenges on the way to become sustainable and inclusive, especially in terms of inequality and job creation.

Keywords: Covid-19, Digital Transformation, Pandemic, Recovery.

1. INTRODUCTION

During December 2019, an unusual strain of the coronavirus known as SARS-CoV-2 caused the eruption of respiratory ailment “known as COVID-19 acronym for Coronavirus Disease-2019” was originated from Wuhan city of China’s Hubei. Alike other flu viruses, SARS-CoV-2 attacks the respirational system that resulted in cough, breathlessness, fatigue and fever etc. Because the particular cause of the SARS-CoV-2 was not known, grounded on the genome structure it was determined to be from a genera coronavirus family member. The virus by now blowout to more than 213 countries and places across the world and on 11th March 2020 it was declared as a pandemic by the World Health

Organization (WHO). The world was by now struggling to control the exceptional spread of this transmittable disease. To control the mutilation of COVID-19 exceptional public health arrangements were introduced, that includes travel restrictions, social distancing and quarantine. To implement social distancing, the “lock-down” process was instigated all-over the world by abstaining from doing what was essentially human. The lock-down means restricting millions of peoples to their homes, terminating almost all economic actions and shutting down the businesses. Through all economic sectors, the labour force had reduced that caused low production. Colleges and schools had been shut down, and demand for manufactured products and commodities had reduced. Furthermore, this pandemic had left various hospitals in ambiguity, having reached their maximum capacity. Subsequently, it leads to a world economy, education and health crisis. In this critical scenario, the top priority was to mitigate the spread of infections by keeping social distancing precautions. To battle against this pandemic, we needed to hold this emergency strongly by resuming all arrangements while retaining social distancing. These challenges motivated our researchers of the different areas to contribute towards rebuilding our global arrangements. Furthermore, all the global activities including health, education and businesses were becoming severely dependent upon technologies. As a result, various nations had started to implement digital technologies including the Machine Learning, Internet of Things (IoT), Artificial Intelligence, Fog/Edge Computing and others to combat the global disaster and to shrink the risk of community transmission. The quick diagnosis, constantly monitoring of the infection, observing the mass gathering, treatment, contact tracing and the containment zone, helping medical doctors and nurses, providing e-learning, enabling telemedicine, all these requirements were strongly dependent upon the availability of wireless communications [1].

2. RESEARCH QUESTION

In this paper author intends to examine the impact of Covid-19 pandemic with specific reference to Indian economy while

discussing the Challenges and opportunities created during pandemic and identifying the role of digital technology in sustaining post pandemic economic recovery along with discussing the role of emerging technologies in the worldwide economic recovery.

3. LITERATURE REVIEW

A survey on the use of the Internet of Things (IoT) in the fight against coronavirus is presented by Mondal et al. (2021). They also suggested an IoT-based infection detection system that works well for the early identification of COVID-19 infected or suspected individuals. Smart Thermostat, Intelligent Cap, and Smart Spec are examples of dependable and reasonably priced gadgets that can be used to keep an infected individual under observation by preventing viral spread [1]. To stop the spread of viruses and lessen the intense burden on our medical staff, author Kumar et al. (2021) proposed a smart healthcare infrastructure using IoT. Applications of IoT include tracking the position of a patient in quarantine in real time, monitoring their health remotely and storing patient data, determining whether an ambulance is available for a COVID-19 patient etc [2].

The world will alter in many ways during the Post-COVID era, often known as "The new normal," and people will act and appear considerably differently (Makroo 2020) [3]. Technology advancement will have a big impact on everything from business to education. almost in every thinkable industry, such as remote health checks and home schooling (Saeed et al. 2020) [4], The use of work from home will be facilitated by digital technologies. In this study, we also talk about the "post-COVID" condition and how Internet of Things (IoT) technology might help with the post-pandemic situation in several fields like health, education, and the economy.

4. DATA COLLECTION

In this review paper an attempt has been made to provide a comprehensive foundation on the topic. For this secondary data has been collected from various sources viz. Government publications, public records, historical and statistical documents, business documents and technical and trade journals.

5. OVERALL COVID-19 PANDEMIC IMPACT ANALYSIS

The Covid-19 outbreak has had a serious negative influence on the nation's economy and financial system. Nevertheless, there are only a few sociocultural aspects where the impact of COVID-19 may be clearly recognized, including inequalities, culture, societal behaviour, acceptability, and exposure. In addition, political variables like governance, cooperation on a national and worldwide scale, policies, bribes, and political vision have had an impact during the pandemic. During this time, numerous perspectives have been held on technological elements such clean energy, industries, research, and technological advancement. The following list includes a

number of additional areas where the pandemic has had an impact:

The Covid-19 pandemic have also had an impact on school, college and university admissions. Students' sessions are delayed, which had a significant impact on their admission. Along with the loss of education and skills, this costs the financial loss to the country. This could be contributing to the rise in unemployment in the nation [5]. In 2019, the Global Health Security Index evaluated a country's readiness for this kind of pandemic on a scale of 10 to 100. India ranks 57 out of 195 nations, which is significantly lower than Italy and China. In 2017–18, the Indian government spent just 1.28 percent of its GDP, down from 1.02 percent the previous year. It is anticipated that the per capita expenditure on health and healthcare will increase from Rs. 621 per person in 2009-10 to Rs. 1657 per person in 2017–2018 [6]. Few social and healthcare organisations estimate that it is still lower than in other nations, though. Around 18 percent of its GDP was spent by the USA. So, the Indian government must increase its investments in the healthcare and medical sector. By 2025, the present Indian government expects this sector will use 2.5 percent of the country's GDP [8].

India has a large population and is home to many workers and farmers who earn money every day and spend it on food and housing. India's population enjoys to share their issues with one another. In this country, helping others in many ways—financially, personally, and socially—is extremely widespread. The government issued an order to preserve social and physical distance in response to COVID-19 in order to stop the virus's spread. For people who earn and spend money every day due to social isolation, there will be no work and no food [7]. These employees are facing hunger and a lack of incomes during the lockout. The industry's sales stop as a result of preserving social distance, and all the businesses are at risk of going out of business or being shut down. Due to closure, the production sector was also greatly disrupted. Due to the fact that employees in the IT sector complete their projects and activities from home, so the sector is somewhat steady. As long as the nation's basic services are taken into account, banking and financial operations were still conducted there [2].

Globally, Covid-19 has spread by person to person contact as well as from objects that an infected person has touched. The Indian government had put restrictions on all imports to diagnose this. One of the major industries contributing to India's GDP is transport. Services on the air and train have been shut down. If the losses in these industries are computed, they come to almost US\$18 billion [5]. Public and private transportation: One of the industries most impacted by COVID-19 is the public and private transportation industry. The pandemic posing prudently affected everyone, from rickshaw drivers to passengers on public, private, and metro trains. In March 2020, India's total energy demand decreased by 11%. Most of Indian population is heavily dependent on

small-scale industries. Lockdown caused all industry to stop down. For a safe stay, the workers and staff returned to their homes. Small-scale industries were unable to pay their employees during the closure because their operations have entirely ceased [5].

The oil market is exiled as a result of the COVID-19 lockdown. The coronavirus has had an impact on the global energy market. Few laborers only resided in the country's urban areas. Construction, transportation, and other industries were negatively impacted due to the labor shortage. The decrease in electricity demand has pushed several coal plants to run at lower capacity, which has lowered the mix of the overall generation. While the entire shutdown of India's economy was meant to stop the COVID-19 catastrophe, it is also providing millions of people with clear and pure air, which is good for their health. The levels of small particulate matter (PM) 2.5 start to decline as cars and other forms of large transportation are kept off the road, building work is suspended, and factories and other industries cease production. As a result, COVID 19 has had a favourable influence from an environmental standpoint [9].

Migrant workers were more likely to lose their jobs, both in rural and urban areas. This might point to a greater risk in their line of work as well as their decision to leave those employment and head back to their homes during the lockdown [10]. Lack of buyers and transportation were the main barriers to selling, and a lack of labour or equipment was the main barrier to harvesting. Since most workers had little to no savings before the financial crisis and there were no social safety nets, any economic shock might put them and their dependent household members at risk of food and consumption instability, financial indebtedness, or both.

6. CHALLENGES FOR WORKING WOMEN

The COVID-19 outbreak and the ensuing economic downturn have had a profound impact on everyone in the world. For working women, the negative effects of this shock have been particularly severe because it has increased the load of their already unequally allocated domestic work liability, making them more susceptible to "cutbacks and lay-offs." India saw a lockdown that was among the longest and strictest in the world, mirroring the worldwide situation there. The results show that there is a gender difference in economic outcomes, with women having a larger probability of losing their jobs. The closure of schools, the cessation of domestic help, frequent kitchen time, the lack of social interaction, the irregular office hours, the stress of job insecurity, the simultaneous demands of all family members present in the home, etc. presented serious challenges to those who were able to keep their jobs. All of this added to the persistent worry about spreading infection at work and during commutes, which put more mental strain on working women. The chance of contracting the virus when travelling to and from work in a shared or public vehicle rose. Avoiding direct or indirect touch with visitors, co-workers and workplace objects was

challenging while working at an office. Therefore, during the pandemic and lockdown, the spillover effects of stress and exhaustion from work to home life and vice versa may be of a considerably higher scale, making it difficult for women to balance the two.

The quick switch from face-to-face to online instruction, on the other hand, increased the strain for women in academia. Due to a variety of issues, including learning how to use a digital platform to create graphical presentations for the students, addressing the unique needs of children in accordance with their competences, and effectively communicating with them, they lost their creativity. Similar to this, women in the information technology (IT) sector had decreased productivity as a result of frequently juggling work and personal obligations with no regular work hours [17].

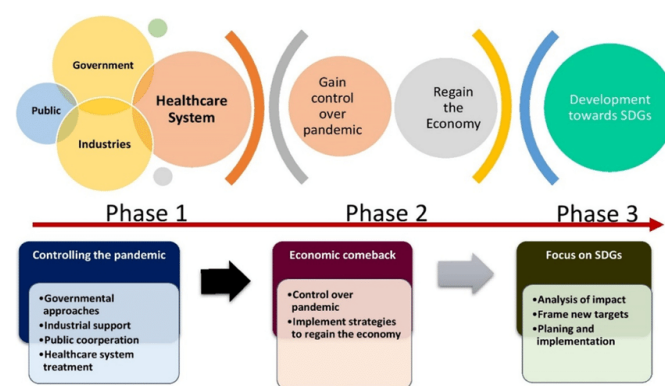


Figure 1: A typical approach towards the pandemic.

7. ROLE OF DIGITAL TECHNOLOGY IN OVERALL ECONOMIC RECOVERY

The world will alter in many ways during the Post-COVID era, often known as "The new normal," and people will act and appear significantly differently [3]. Technology advancement will have a big impact on everything from business to education. Work from home (WFH) has been adopted with the aid of digital technology almost in every conceivable field, including home schooling, remote health check-up, etc. [4].

7.1 Lower Consumption

Even if the lockdown ends, almost every sector is accustomed to working from home (WFH). At least 4-5 days per week are dedicated to formal job, thus middle-class individuals may wonder, "Why do I need a wardrobe full of clothes when I can manage life with much less"? As a result, overall materialism may be reduced [11].

7.2 Home Schooling

All classrooms, digital libraries, and laboratories can now be accessible online using a smartphone or laptop via video conferencing [12] using Google Classroom, Zoom applications, etc. [13]. This applies to education at all levels, from elementary school to colleges. Students may attend

schools or universities for group activities or to develop their social skills. Through the use of VR [14] and 3D interface, all significant administrative meetings and technical/non-technical conferences have been organised. A successful virtual educational system will undoubtedly be made possible by the Internet of Things (IoT), Bluetooth technology, robotics, AR/VR, and high-speed internet connectivity [15]. Additionally, because all of the amenities can be accessible online, it has cut down on travel costs, though high-speed internet connectivity is still required.

7.3 Rising of Internet of Things

The IoT network has grown impressively throughout the COVID-19 pandemic emergency, and by employing it in a wide range of intelligent applications, automation in many areas, including health, education, and industry, has been made possible. The enormous contribution of IoT integration with AI, 5G internet connectivity, and other cutting-edge technology is what enables a wide range of outstanding smart applications, including smart homes, smart cities, smart oceans, and smart spaces [16]. Our daily lives will be made easier in the post-pandemic age because to this tremendous shift in IoT research [7].

However, there are a number of designing problems that IoT-based frameworks have encountered. Several issues relating to pandemic management, including as privacy, security, scalability, and connection, are addressed and illustrated.

8. RECOMMENDATIONS AND FUTURE ROADMAPS

The following suggestions and recommendations have been made in light of the literature that is currently accessible and that is given in this study in order to address COVID-19's challenges:

To avoid a long-term economic catastrophe, a few key threats in fiscal, monetary, and financial policies must be taken into account and implemented exactly. The worldwide closure of educational institutions (schools, colleges, and universities) will cause serious disruptions in the education of students and children as well as delays in internal evaluation. The educational institution needs resources to repair the harm to learning after it is open in order to mitigate these effects and eliminate the negative ones. In addition, the Indian Prime Minister's demand for respect for medical professionals has been a real morale booster. However, because of declining tax receipts, government support measures such as cash infusions, tax breaks, and other exemptions have become essential for the survival of the nation's providers of health services. In addition, the government should place more of an emphasis on NGOs, private healthcare facilities, and public/private research institutes to develop low-cost healthcare medicines, safeguarding tools, devices, testing facilities, locations for isolation centres, accessories, etc. to combat COVID-19.

In terms of the Indian industrial sector, India needs to think about allowing some essential manufacturing and small or

large industries to restart with some restrictions in order to jump-start the economy and prevent job losses while the country is under the strictest lockdown in the world to contain the COVID-19 outbreak. Large industries in the production of textiles, autos, and electronics should be planned to operate at 30–40% capacity with proper sanitation and social distance standards at the workplace. The Indian power ministry must rely more on its renewable generation during lockdown rather than the traditional large base plant supply and try to manage the market-clearing price of the wholesale electricity market in addition to steps that need to be taken to make supply-demand balance as soon as possible in order to combat the reduced demand for power supply and revenue loss for distribution companies.

Additionally, to encourage, supervise, and assess the close functionality of legal laws, guidelines, and programmes execution, motivating ministries and its policymakers, leadership by the centre, state governments, local, and financial organisations will play a significant role. Because the majority of the government's planning initiatives fail because of improperly followed regulations, a specialised monitoring governance is necessary. Political sway and a lack of transparency are the primary reasons that many crucial programmes fail in developing nations like India; as a result, they must be reduced.

The coronavirus pandemic was much reduced because to a number of newly developed technologies, such as machine learning, deep learning (DL), artificial intelligence (AI), the internet of things (IoT), drones, and others. However, taking into account all of these tools, we suggest some additional information on how to use them to combat the COVID-19 epidemic. The creation of quick and automatic alert systems needs further research attention. We see a significant expansion of IoT infrastructure along with other cutting-edge technologies to combat the COVID-19 pandemic. The smartphone also played a significant role in the fight against worldwide pandemics like COVID-19 by offering a variety of incredible applications.

9. CONCLUSION

While a worldwide epidemic like COVID-19 engulfed the entire planet, massive attempts are being made as part of the IoT, AI, and 5G revolution to lessen its effects in a coordinated manner. This article examined a number of cutting-edge technology that have been modified to combat the COVID-19 pandemic. With IoT-based cloud services, Covid infected and suspected individuals can be managed and monitored remotely and intelligently. In addition, the IoT-based infrastructure has a significant impact on the e-learning, e-commerce, and automated industries. To avoid direct contact and preserve social distances, individuals are becoming accustomed to online shopping and contactless delivery with the aid of cloud infrastructure. The implementation of e-learning, where students can continue their education through video

conferencing and other learning apps, was made possible by this infrastructure.

This paper attempted to oversee the unique challenges that India is currently experiencing due to COVID 19 on all fronts and also made some suggestions about how quickly various industries can recover and develop. Major effects on the key industries that drive every nation's economy have been discussed with their growth in the overall development and advancement (also more affected owing to COVID 19 breakout). The economic and financial, educational, healthcare, industrial, power and energy, oil market, employment, and environmental sectors comprises the majority of these sectors.

To challenge the existing quo and advanced well-being of all, radical political, social, and economic reforms are required. Through a more equitable economic structure based on tax equity and prosperity rather than development as the priority, these reforms will make it possible to distribute wealth and power. They will also lessen our reliance on carbon to stop global warming, safeguard ecological systems, and restore them. Without the flourishing of effective, accountable, and inclusive justice systems and procedures to lessen violence and settle disputes amicably, the Sustainable Development Goals (SDGs) cannot be fulfilled.

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