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Role of Engineering Technologist to Solve the Impact of COVID-19 to the Society

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Abstract: The aim of this work is to study on the impact of COVID-19 to society and the role of engineering technologists to resolve the issue. Coronavirus disease (COVID-19) is an irresistible infection induced by a newly discovered coronavirus. The virus disseminated immediately from a person when a COVID-19 case coughs or exhales producing droplet that reaches the nose, mouth or eyes of another person. The outbreak of coronavirus is a front and leading a human buskin affecting hundreds of thousands of people. This disease also becomes a severe growing impact on society, the global economy, and education. This paper will discuss the impact of COVID-19 on society. Social reciprocities, interactions, and relations between the people have become united into our life. COVID 19 had changed the daily behavior of humans and the surrounding ecological system. So, if such an interaction is absent leads to stressful states of isolation, anxiety, panic, mental disorders, health hazards, and many other issues that impact the life of the person and the cooperative society as a whole. This paper also dedicated to presenting the role of engineering technologist with a perspective on the evolving situation and implications for the world. The technologist should come up with a design solution that would give guidance to solve the Impact of COVID-19 on the Society. They need to find out the solution to relative well in tackling the virus. Technologist can help share rightful knowledge and information that can help with COVID-19 responses. Technologist' response to the virus has been providing information, research, and assistance that will have an immeasurable impact on the pace and efficiency of our response to the COVID-19. The outbreak is going fast, and some of the perspectives in this paper may fall rapidly out of date. However, the data analysis of COVID-19 in the world will be given in this paper.

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Keywords: Coronavirus, COVID-19, Impact to the Society, Technologist and COVID-19 data analysis

1. Introduction

In December 2019, an outbreak of coronavirus disease (COVID-19) was reported regarding a cluster of pneumonia of unknown etiology in the city of Wuhan, the capital of China's Hubei province [1][2]. This disease is caused by the virus named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which has been subsequently spread and affected 210 countries and territories globally, resulting in an ongoing 2019-20 coronavirus pandemic [3][4]. On 10th February of 2020, the World Health Organization (WHO) declared an official name for the new coronavirus disease: COVID-19 stands for Corona Virus Disease 19.

There are some common symptoms of COVID-19 that include cough, fever, shortness of breath, sore throat, loss of smell and taste, etc. Perhaps this disease can be deadly with a 2.0 % case fatality rate. The time exposure of COVID-19 to the outset of the symptoms may take up from 2 to 14 days. Meanwhile, the majority of the patient resulted in mild or some might progress to viral pneumonia and multi-organ failure. However, the severe disease might result in death due to massive alveolar damage and progressive respiratory failure [3]. The first COVID-19 case in Malaysia was detected on 24th January of 2020. As of April 15, 2020, about 2,004,819 confirmed cases of the coronavirus COVID-19, a death toll of 126,830 deaths and more than 485,000 people had recovered in all around the world [4].

Hospitals all around the world are scrambling to secure enough for personal protective equipment (PPE) to ensure the workers are safe while treating the approaching wave of coronavirus patients. Thus, civil and environmental engineering start to study on how reusable PPE might help fill in critical shortages due to single-use PPE such as gowns and N95 masks are being discarded by the millions. Besides that, mechanical engineering also helps in testing and measuring the filtration efficiency of different candidate materials for face masks. Therefore, the purpose of this paper is to identify the impact of COVID-19 to the society and the role of engineering technologists to resolve it. With the emerging of technologies such as Artificial Intelligence (AI), facial recognition, the Internet of Things (IoT), thermal sensors, etc. are being used to help in the prevention of the further spread of the COVID-19 diseases around the world and to save the world free from this deadly disease.

2. Background of Study

The typical crown-like particles as shown in Figure 1, only can be observed under the transmission electron microscope (TEM). Based on the research [5], SARS-CoV-2 is almost similar to the original SARS-CoV, but they still have some differences. In earlier assumptions stated that the virus comes from bats, pangolins, which possibly through the zoonotic origin. After a long way of research, China researchers found out that there is only one part of the amino acids in a certain part of the genome sequences between the viruses from pangolins and other from humans. At most 92.0 % of the genetic material was shared between pangolin coronavirus and SARS-CoV-2, thus it can prove that pangolins aren't the intermediate host [6].

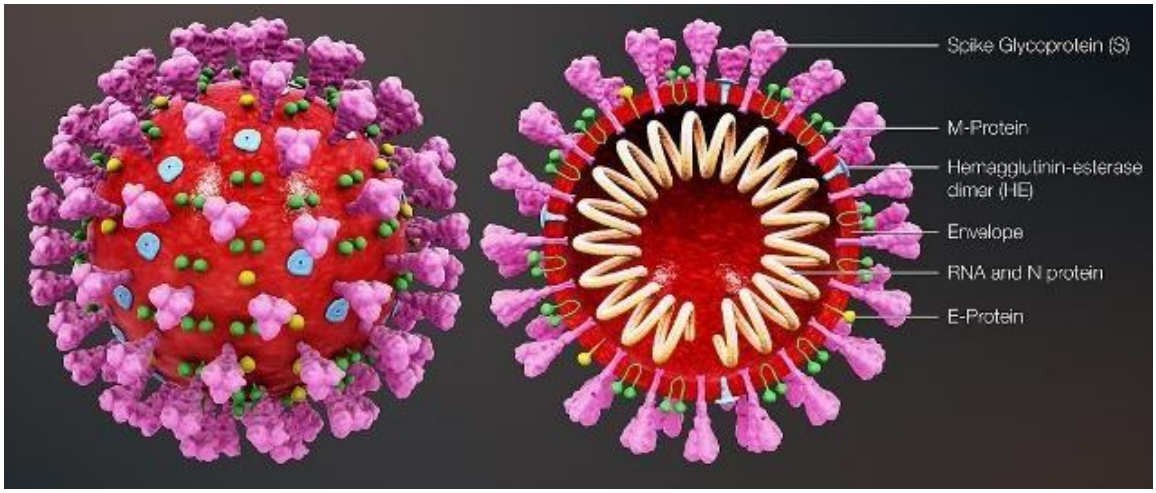

Figure 1: Structure of SARS-CoV-2

At this critical stage of the outbreak, it is important to enhance a great understanding of the transmission pattern and the potential of human-to-human transmission towards individual, communities, institutions as well as local and national governments. According to the Centers for Disease Control and Presentation (CDC), the primary factor causes the virus to spread when people are in close contact within 1-3m or via small droplet that produced when people are coughing, talking or sneezing, thus these outputs small droplet may fall onto the surface or ground instead of being infectious over long distances. A study in Hong Kong investigated that there is a 100 million virus stand that appears in one milliliter(ml) of most patients' saliva [6]. For instance, the information towards transmission characteristics will help to coordinate the current screening and containment strategies, support decision making and anticipating the risk of pandemic spread of COVID-19.

Based on WHO, COVID-19 can be divided into 4 groups of transmission. They are countries or local areas with no cases reported, sporadic cases, clusters or cases or community transmission [7]. Thus, there are some proposed physical and social distancing measures can be implemented to slow the spread of disease by stopping the transmission chains of the COVID-19. This measure is used to prevent the newly infected group from appearing and spreading around. The measures are used in conjunction with individual protective measures against COVID-19 such as frequent hand washing and cough etiquette. To be effective all the measures should be accompanied with clear, accessible and regular risk communication to explain the response strategy and public health measures such as social distancing must be implemented with full engagement.

3. Analysis of Confirmed COVID-19 Deaths

All the affected countries (with the assistance of WHO) have published the latest findings on the impact of COVID-19 on daily basis over the past few months. Since 2 January, the three-level of WHO (China country office, Regional Office for the Western Pacific and headquarters) have been working together to reply to this outburst of COVID 19. On 30th January 2020, WHO published the outbreak a Public Health Emergency of International Concern (PHEIC). On 1th March 2020, WHO's Director-General characterized COVID-19 as a pandemic [8]. Figure 2 shows that before March, there are not any death cases over the countries. But, after March 2020, the coronavirus was suddenly outbreak in many countries. The confirmed COVID 19 deaths have increased rapidly in the whole world. According to the graph, the death cases because of COVID-19 has reached almost 170000 by March 2020.

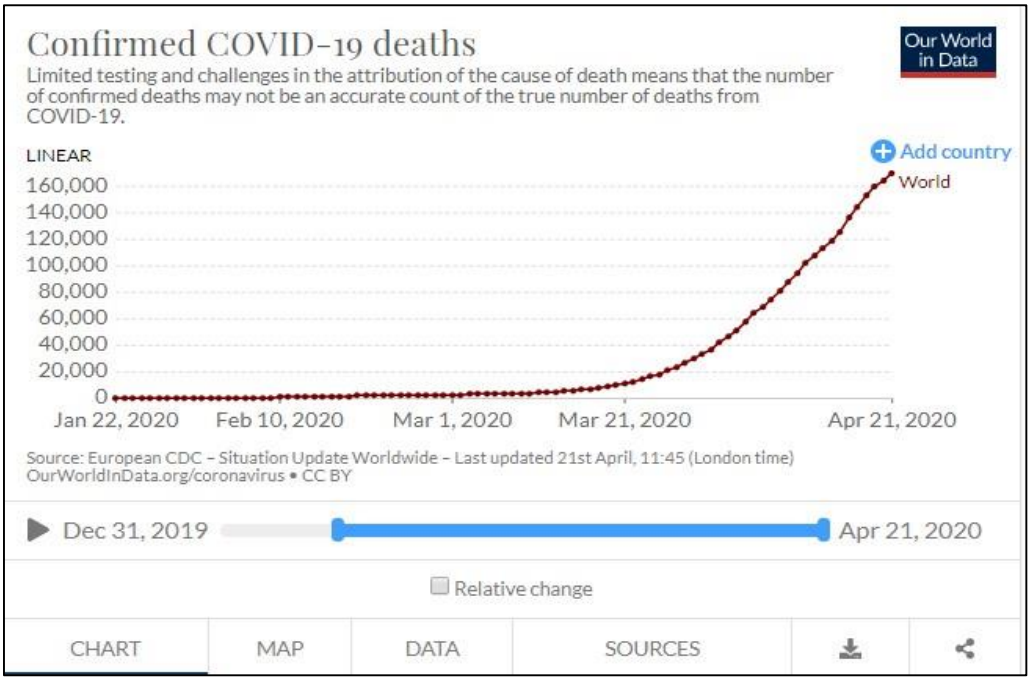

Figure 2: The graph of Confirmed COVID-19 deaths

There are three points to consider in confirmed death cases, from Figure 2 above. First, the actual death rate from COVID 19 is perhaps to be higher than the number of confirmed deaths in Figure 2. This is due to insufficient examination and problems in the attribution of the cause of death. The difference between reported confirmed deaths and total deaths is varied by countries. Second, how COVID 19 deaths are recorded may vary between countries. For example, some countries may only count hospital deaths. At the same time, other countries have commenced to include deaths in homes. The reported deaths Figure 2 on given data does not necessarily show the number of new deaths on that day, this is due to delay in this discussed paper. [8]

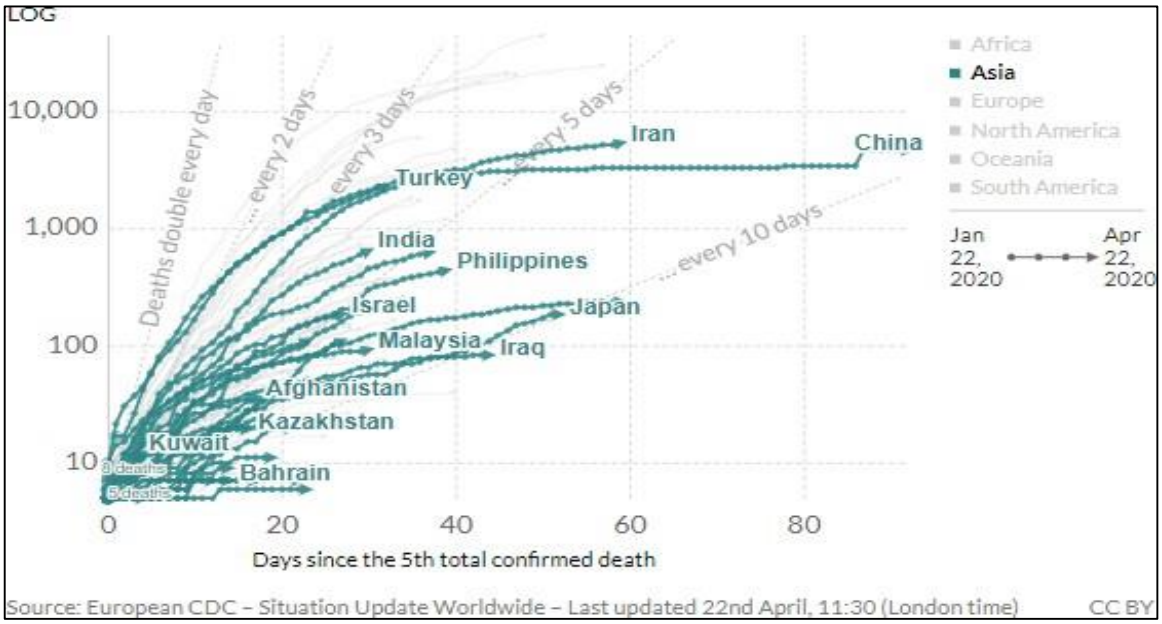

Figure 3: chart of daily confirmed deaths

Figure 3 shows the charts which utterly the variation in confirmed deaths overtimes are not very useful to answer the question of how the rate of the outbreak compares between different countries.

However, people still can probably know how many the case confirmed deaths in different countries and comparison among the countries due to the chart. The chart above is composed to allow such comparisons. The trajectory for each country begins on the day when that country has 5 confirmed deaths. This enables oneself to compare how quickly the number of confirmed deaths increases after the explosion of COVID 19 transferred a similar stage in each country. The grey lines in the background help us to see how fast the number of confirmed deaths is rising. These lines show the trajectories for growing times of 1, 2,3,5, and 10 days. If the inclination that the country is on is steeper than a particular grey line. For instance, there are several countries for which the slope was steeper than the '…every 2 days' line, which mean their death count doubled faster than every two days. [8]

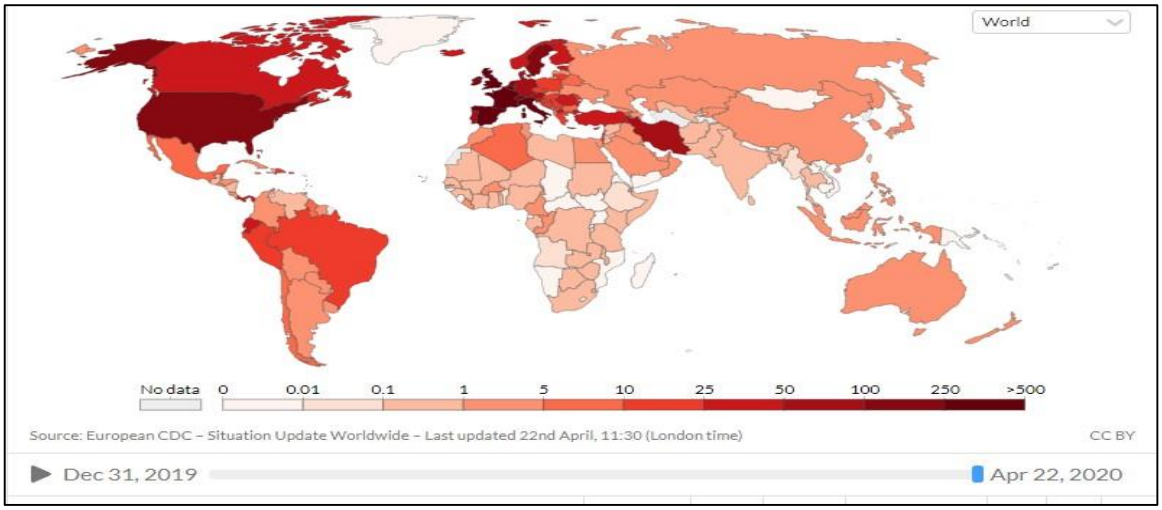

Figure 4: Map of Total confirmed COVID-19 deaths per million people Apr 22, 2020

From Figure 4, it can be insightful to comprehend not just how many have died compared to how many people really in that country. For instance, if 1,000 people died in Iceland out of a population of 340,000, that would have a very bigger impact than the same number dying in the USA, with a population of 331 million. The death count in more populated countries leads to be higher. The coronavirus COVID-19 is affecting 210 countries and territories around the world and 2 international conveyances. The day is reset after midnight GMT+0. On April 23, 2020, 10 new cases of death were found in South Africa. Then, 1129 new death cases were discovered in the United States [9]. Germany, Japan, Vietnam, and the United have inscribed cases in patients who did not personally visit China but incurred the virus from someone else who had visited Wuhan, China. These cases of human-to-human transmission are the most worrisome, according to the WHO.[9]

In any case, it can be challenging to attribute death to a specific cause. Health problems are often interrelated and multiplying, which means that underlying diseases usually lead to difficulties and eventually death. The same is true in the case of COVID-19: the disease may cause other health problems, such as pneumonia and acute respiratory distress syndrome (ARDS).

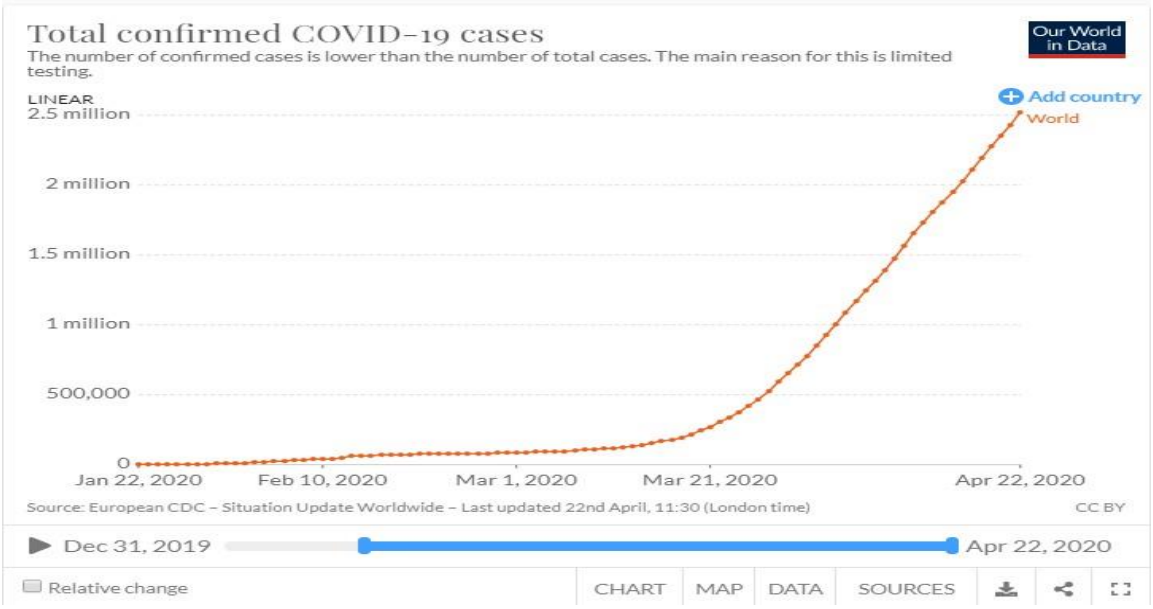

Figure 5: Total confirmed COVID-19 cases

Figure 5 shows that there are 245723 confirmed COVID- 19 cases in the world on the 22nd of April 2020, in 213 countries. The reported case figures on a given date do not certainly confirm the number of new cases on that day: this is due to delays in reporting; The real number of cases is possible to be much higher than the number of confirmed cases; this is due to limited testing. The stalk observed on Feb, 12 is the result, for the most part, of a change in diagnosis classification for which 13,332 clinically rather than laboratory-confirmed cases were all reported as new cases on Feb 2, even though they were diagnosed in the previous days and weeks.

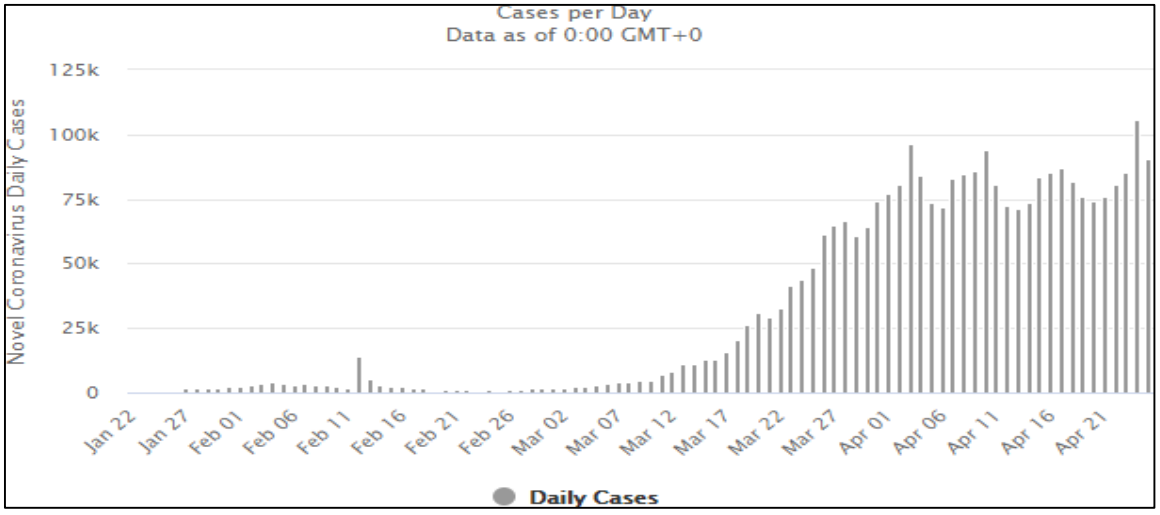

Figure 6: Daily New Cases

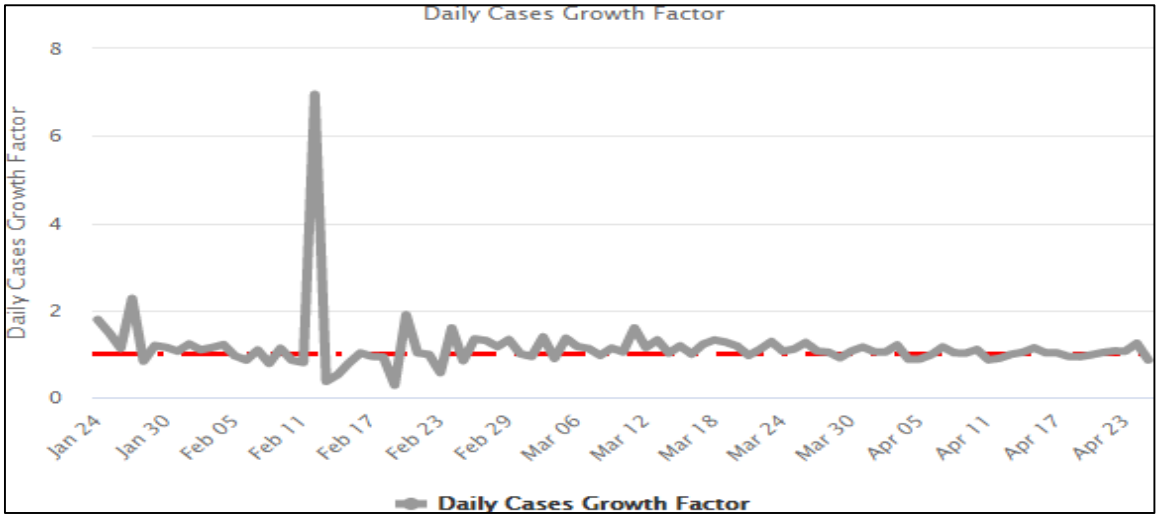

Figure 7: Daily Cases Growth Factor

The growth factor is the factor by which a quantity reproduces itself over time. The formula used is every day's new cases or new cases on a preceding day. For example, a quantity growing by 7.0 % every period (in this case daily) has a growth factor of 1.07. A growth factor above 1 indicates an increase, whereas one which remains between 0 and 1 it is a sign of decline, with the quantity ultimately growing zero, whereas a growth factor regularly above a could signal exponential growth.[10]

A large volume of data about the pandemic is produced every day. Although organizations such as WHO, CDC, Johns Hopkins University, and Worldometers are broadcasting important statistics daily, the data is not analyzed efficiently to provide insights. The COVID-19 pandemic is a complex system involving companies, human behavior, biology, and governments. It is determined by healthcare, economics, governance, and geopolitics. Deep Knowledge Group has developed advanced analytical frameworks to investigate this data. The result is presented in the form of open-source country rankings to assist people and governments to make informed decisions that maximize beneficial outcomes for humanity. When the seriousness of the pandemic became transparent, Deep Knowledge Group modified its existing analytical frameworks, previously applied to complex domains such as AI for Drug Discovery and NeuroTech, to the global COVID-19 pandemic landscape. A team of authorities collected and analyzed data created for 200 countries around the world. The results based on a deep analysis of 60 countries, was released today. To communicate insight effectively, the analysts developed a ranking system. The rankings can be used as an agent for businesses and governments to help in effective making and could assist in the response effort to maximize health, stabilize economies, and help communities, and help communities reopen for business. The analytical methodology will be modified over the next few months for advanced and qualitative assessment and AI may be used to analyze this data in the most efficient way.

The COVID-19 analytical frameworks have been created to quickly assess the changing state in countries as they attempt to moderate the health and economic consequences of the virus. Big Data Analysis is applied to quantified and relevant parameters. By comparing them in concrete ways, they can assist as practical tools for decision-makers. The analytics are fact-based and unbiased and can be accessed free of charge. Restrictive metrics and analytical techniques may be uncovered to relevant organizations and responsible governmental bodies. The analysis shows that some countries have confirmed to be very effective in early resistance to COVID-19. These countries focus on early prevention to take isolation measures before the number of confirmed cases exceeds 50,000 and use effective methods to treat inpatients. For example, China and Germany immediately mobilized emergency operations as soon as possible to restrain the virus and improve the hospital's capabilities.

They used technologies including AI, robotics, and big data analysis, and combined medical and healthcare management technologies built-in complex ways.

The well-defined methodology is used for each country to rank with a numerical score assembled. Each ranking is given a particular weightage, or factor, that is used as inputs to develop analytical equations. These mathematical ranking frameworks were generated over the past five years for use in highly complex and multidimensional industries and domains including the AI for the drug discovery sector.

Figure 8: The COVID-19 Safety Ranking

The COVID-19 Safety Ranking Framework contrives benchmarking to manage levels of health and safety for each country during the pandemic diseases. It examines the data for over 200 countries and the rankings eventually included sixty countries. The countries were decided using 24 specific parameters in four different categories: Monitoring, Government Management Efficiency, Quarantine Efficiency and Detection, and Emergency Treatment Readiness. The Safety into account protection from COVID-19 infection, dying and negative patient issues, infection monitoring and metrics on segregating, detection, safety, management, and stability in the broadest sense, including protection from extreme negative outcomes as a result of the pandemic beyond health. Countries unable to counterpoise this pandemic could trigger a chain of issues preceding to negative outcomes for entire nations, and their geographic and economic bystanders. We saw such a situation spread out with ISIS in Syria which pointed to a flood of refugees into Europe. Therefore, in formulating the Safety and Risk Rankings, parameters relating to countries' stability and protection from negative economic and geopolitical consequences were considered [11].

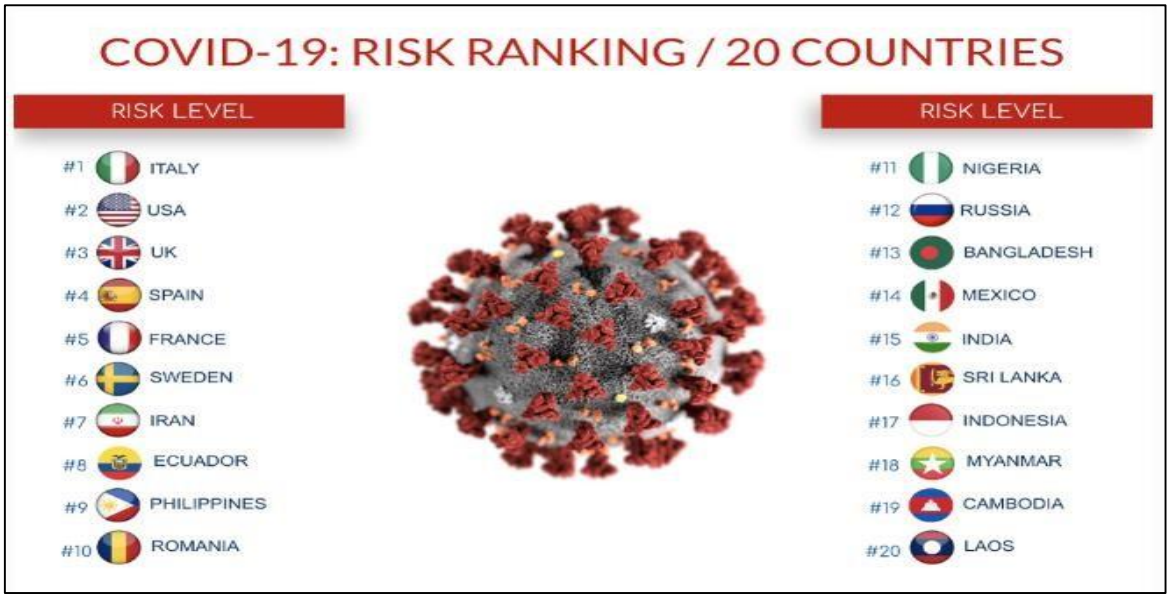

Figure 9: The COVID-19 Risk Ranking

The COVID-19 Risk Ranking Framework handles benchmarking of countries according to their levels of risk according to a variation of medical and non-medical factors. There are including the risk of infection, death, lasting health condition, and hospitalization as well as the country's risk of negative economic, quality-of-life, and geopolitical effects resulting from the pandemic. The framework provides information on which countries where residents will have the greatest likelihood of positive outcomes during the global COVID-19 pandemic, across the full scope of factors impacting general, wellness, safety, and quality of life. It employs 24 specific parameters grouped into different categories. There are Government Management, Healthcare Efficiency, Infection Spread Risk and Regional Specific Risks. [11]

Figure 10: Top 10 COVID-19 Treatment Efficiency Ranking

The COVID-19 Treatment Efficiency Ranking framework conducts benchmarking of countries according to how well they are monitoring infection spread, enabling citizens with the tools and information needed to manage non-critical cases at home without overburdening the healthcare infrastructure, how well they are treating critical cases and how well they are rapidly developing an

improved test, vaccines and more effective COVID-19 treatments. Disease Management, Emergency Treatment and Novel Approaches to Treatment R&D.

Figure 11: Asia-Pacific Region COVID-19 Safety Countries Ranking

The COVID-19 APAC safety or risk ranking framework utilizes a transformed version of its global COVID-19 Countries Safety and Risk Ranking Frameworks tuned to the particular of the APAC. The pandemic started in APAC, and that it is several weeks ahead of other countries in the overall timeline of the COVID-19, particular consideration should be given to the unique character of the region.

4. Role of Engineering Technologist

In engineering, they cover many different types of activity. Engineers ensure the works to be better and always being updated. Besides that, they also use their creativity and pieces of knowledge to design solutions to the world's problems or circumstances and help to build a better future for the generations. An engineer will be slightly different from the engineering technologists as engineering technologist's education is even more applied and less theoretical than the engineer's education, though in board sense both of the engineers have a focus on practical application. Moreover, technologists often assist engineers to handle and undergo project either large-scale or small-scale, once a project manager has determined an idea is theoretically feasible within the parameters observed in the physical world, the main task of the technologists is to translate the engineer's idea into practical reality. In theory and practice, engineering and engineering technology share on a common foundation of knowledge in Mathematics, Science, Engineering and design principles.

The engineers are keen to help identify potential solutions and facilitate useful contacts as its national and international engineering networks that could give a helping hand toward governments such as solve problems and assists the public health response. Besides that, engineers also like to encourage innovation and ideas across all areas, including critical infrastructure, business management, supply chain as well as healthcare systems. The COVID-19 pandemic poses an unprecedented global challenge, therefore the emerging of technologies is being deployed all across the world to fight the coronavirus outbreak. Thus, engineers or engineering technologists play an important role to help with the responses to COVID-19 effects.

With the efforts of engineering technologists, some of the products such as robots, drones and others give great help against the outbreak. Healthcare information technologies, telemedicine, Artificial

Intelligent (AI) interfaces also played a pivotal role in the country such as China, Japan, US to the novel coronavirus outbreak, likes proactive surveillance for rapid detection and diagnosis of infection, immediate isolation and rigorous contact tracing, AI-assisted infection risk identification, online screening and introduce a new application such as consultation platforms. The emergence of innovative development uses of information technologies bring benefits as it can reduce human interactions, rapid and precision diagnosis.

5. Technologies Used to Combat COVID-19

The government around the world has to deploy the latest technologies to combat the COVID-19 pandemic. With this help of the technologies, governments are easier to track the coronavirus outbreak and by using robots it can reduce the contact between the infected people and front liners. There are some common techniques as shown below, which are used to combat the coronavirus.

5.1 Drone

Essentially, a drone named as an Unmanned Aerial Vehicle (UAV), is a flying robot that can be remotely controlled or fly autonomously through the software-controlled flight plans in their embedded systems. The drone is working in conjunction with onboard sensors as well as GPS which can ease the navigations. In China, the government has been piloting ways to incorporate drones into its response to COVID-19. By using technology, the drone can conduct remote surveillance, identifying ill citizens through thermal imagery. MedTech companies are rolling out the drones to provide services and care to those quarantined or practicing social distance [12]. The coronavirus outbreak has given automated delivery a new sense of urgency, using drones to undertake the task of surveillance has been implemented in many countries such as Malaysia, China, USA, etc. Pudu Technology and others have startup deliver the medical supplies niche in time, as shown in Figure 12. It helps some hospitals respond to the developing coronavirus emergency.

Perhaps, the delivery drones can handle a high volume of works and aren't susceptible to illness or easily spreading of the virus. Besides that, the drone can conduct crop-spraying to spray the disinfectant over public areas in an attempt to kill the virus. Moreover, the drone equipped with a thermal sensor is used to check the temperature of the citizens. The drone is expected to become a part of the country's efforts to keep the problem at bay in the coming days.

Figure 12: Using drones to deliver healthcare [12]

5.2 Robots

Besides drone, the robot is another machine that is widely used in hospitals nowadays. The robots are no stranger in the healthcare system as it designed to do one or more tasks automatically with

precision and speed. Thus, the robots are helping to reduce human-to-human contact during COVID-19. Pudu Tech released a product namely PuduBot in the year 2018. The previous function of this robot is used to deliver food to customers in restaurants. Yet, the deployment of PuduBot has brought convenience to many hospitals in South Korea as well as China. In South Korea, they start-up Pudu Tech, for instance, leverages robots to deliver supplies to the hospital and their patients. The supplies that are carried by the robot can be hand sanitizer, face mask and other useful supplies which can help the individual in the hospital on a recurrent basis.

Furthermore, the robot can deliver food or medicine to the quarantined people, where social distancing can be well implemented. PuduBot has been independently researched by engineering technologists. The robot developed its positioning and navigating technologies based on a multi-sensory strategy. The navigations of the robot used a proprietary PuduSLAM algorithm that integrates data from multiple sensors such as a vision camera with a sensor directly up and two truth depth cameras located in the bottom part of the robot [13]. The robot also builds in with lidar, which uses laser pulses to build a 3D model of the environment around the robot, which enhances the visualization of the robot as it helps the robot to "see" other objects.

Figure 13: Robots in Medicine [13]

5.3 Telemedicine

In the presence of Medical Engineering Technologists, the advancement in healthcare technologies has increased the demand for engineering technologists. During this pandemic period, human-to-human interaction is limited, thus telemedicine is encouraged to be implemented and keep the frontline safe from the COVID-19 pandemic quickly evolves. This is one of the most effective ways to deal with and control the COVID-19 pandemic as it can be practice providing service care for the patients. The method of the telemedicine provides services such as advice, consult, monitoring between doctors and patients online over a secure connection. This telemedicine can help the patient undergo screening processing for possible coronavirus cases.

And telemedicine is presenting itself as the ideal solution to these woes by limiting patient displacement to hospitals, allocating hospital capacity to important cases, all while curbing the disease's spread. Telemedicine can be used through applications and the microphone can be used by the patients to do remote self-examinations, seeking some professional advice that can help the citizen to solve their problem [14]. Telemedicine is also used to monitor and follow up on the patient after hospital discharge. The main potential of telemedicine is supporting triage and sorting people susceptible to COVID-19

before referral to the hospital. Therefore, telemedicine can be easily implemented and utilized by people with current technology.

Figure 14: Telemedicine during COVID-19

5.4 AI Tracking

Artificial Intelligent (AI) is a wide-ranging branch of computer science that concentrates more on the creation of intelligent machines that work and react like humans. Therefore, AI tools used to predict whether the newly infected patients with the novel COVID-19 go on to develop severe lung disease. The engineer has designed a different way of an algorithm, which this feature can help the doctors in making choices about which part to prioritize care in a resource-stretched health care system. This tool has high accuracy over the prediction of who will go to the developed acute respiratory disease syndrome (ARDS) and severe COVID-19 illness.

Next, AI systems have proven to be valuable in tracking the epidemics by sourcing a diverse array from Twitter, Facebook, airline booking, Weibo message to news reports and sensors on the connected devices. The largest effort used to slow the spread of the illness is the SenseTime's body temperature detection software uses the AI system to help in screening for the potential coronavirus carrier in public spaces, especially at the airport. AI system builds into the SenseTime detector which can detect the elevated temperature of people with the use of infrared cameras and AI algorithms. Infervision's coronavirus detector reads computed tomography (CT) lung scans for visual signs of pneumonia that are associated with the virus strain. According to Gevo [14], Infervision's software has been used to review more than 32,000 coronavirus cases and it is in 34 hospitals, including facilities in Wuhan, China and Japan where the virus originated.

Figure 15: AI system thermal-imaging scanner placed in the airport

6. Impact of COVID-19 on Society

As emphasized by the United Nations Secretary-General, during the launch of a COVID-19 Global Humanitarian Response Plan on 23 March 2020 "We must come to the aid of the ultra-vulnerable – millions upon millions of people who are least able to protect themselves. This is a matter of basic human solidarity. It is also crucial for combating the virus. This is the moment to step up for the vulnerable."

The COVID-19 outbreak affects all segments of the population and is particularly detrimental to members of those social groups in the most vulnerable situations, continues to affect populations, including people living in poverty situations, older persons, persons with disabilities, youth, and indigenous peoples. Early evidence indicates that the health and economic impacts of the virus are being borne disproportionately by poor people [15]. For example, homeless people, because they may be unable to safely shelter in place, are highly exposed to the danger of the virus. People without access to running water, refugees, migrants, or displaced persons also stand to suffer disproportionately both from the pandemic and its aftermath whether due to limited movement, fewer employment opportunities, increased xenophobia, etc.

If not properly addressed through policy the social crisis created by the COVID-19 pandemic may also increase inequality, exclusion, discrimination and global unemployment in the medium and long term. Comprehensive, universal social protection systems, when in place, play a much durable role in protecting workers and in reducing the prevalence of poverty, since they act as automatic stabilizers. That is, they provide basic income security at all times, thereby enhancing people's capacity to manage and overcome shocks.

6.1 COVID-19 and Global Health

The relationship between human health and disease is neither a new concept nor a new subject. The emergence of COVID- 19 in China at the end of 2019 has caused a large global outbreak and is a major public health issue. This virus is highly infectious and can be transmitted through droplets and close contact. The human to the human spreading of the virus occurs due to close contact with an infected person exposed to coughing, sneezing, respiratory droplets or aerosols as seen in Figure 16. These aerosols can penetrate the human body (respiratory system) via inhalation through the nose or mouth [16- 17].

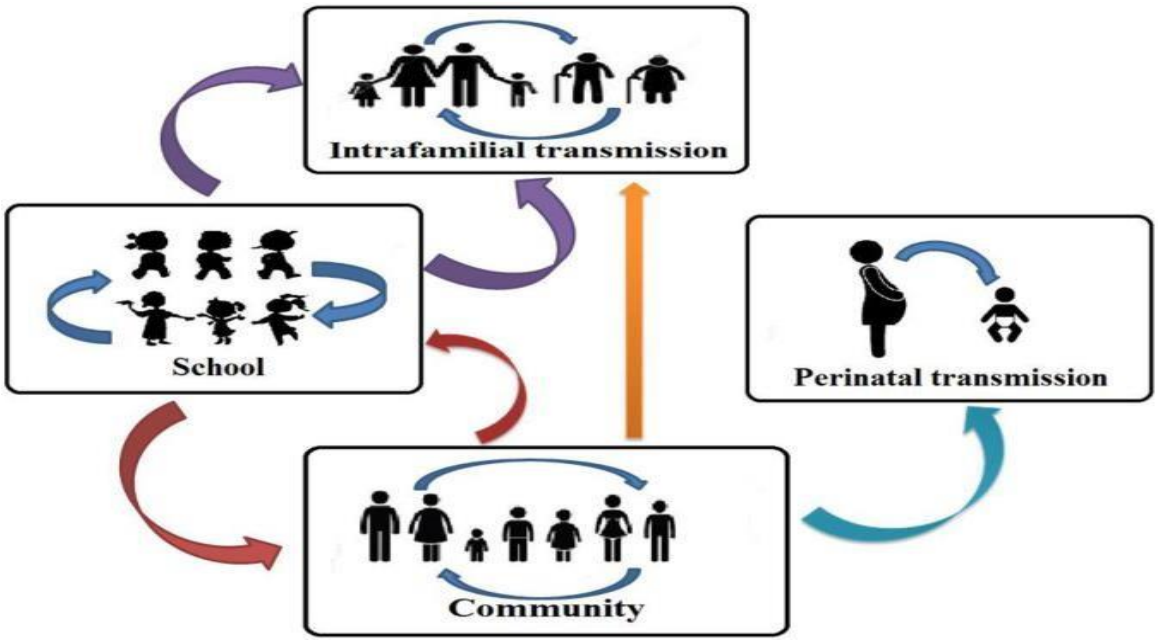

Figure 16: Transmission dynamics of SARS-CoV-2 infection in People

The clinical spectrum for individuals with COVID-19 infection ranges from mild or non-specific signs and symptoms of acute respiratory illness such as fever, cough, fatigue, shortness of breath, to severe pneumonia with respiratory failure and septic shock, which are very similar to other coronavirus diseases [18]. The presenting features of COVID-19 disease in adults are pronounced. It is a matter of great importance to clarify the correlation between COVID-19 and immune-rheumatologic patients. Taking into consideration the quick and frantic spread of the epidemic, the health of rheumatic patients is a matter of prime concern.

6.2 COVID-19 and Economy

Loss of lives due to any pandemic causes definite irretrievable damage to society. But apart from this, COVID-19 has severely demobilized the global economy. To restrict the further transmission of the disease in the community, many of the affected countries have decided to undergo complete lockdown. Major international flights and also all types of business transports have been deferred amid different countries. Due to lockdown all domestic flights, railway service (except goods trains), bus, truck, and vehicle transports are suspended with special exemption to those associated with essential commodities. In almost all the COVID-19 stricken countries, entire educational, commercial, sports and spiritual institutions are closed.

Industries are suffering a lot as many of these excepting those related to essential amenities are closed for a long time in many countries. People belonging to the tourism and transportation industry are also facing the utmost difficulties. The production level has gone very low. The economy of many so-called powerful countries is now facing the threat of high inflation and increasing unemployment as a result of lack of productivity and excessive expenditure for the treatment and rehabilitation of the COVID- 19 victims and their families [19]. Lockdown will directly affect the GDP of each country in the major economics (Figure 17 and Figure 18).

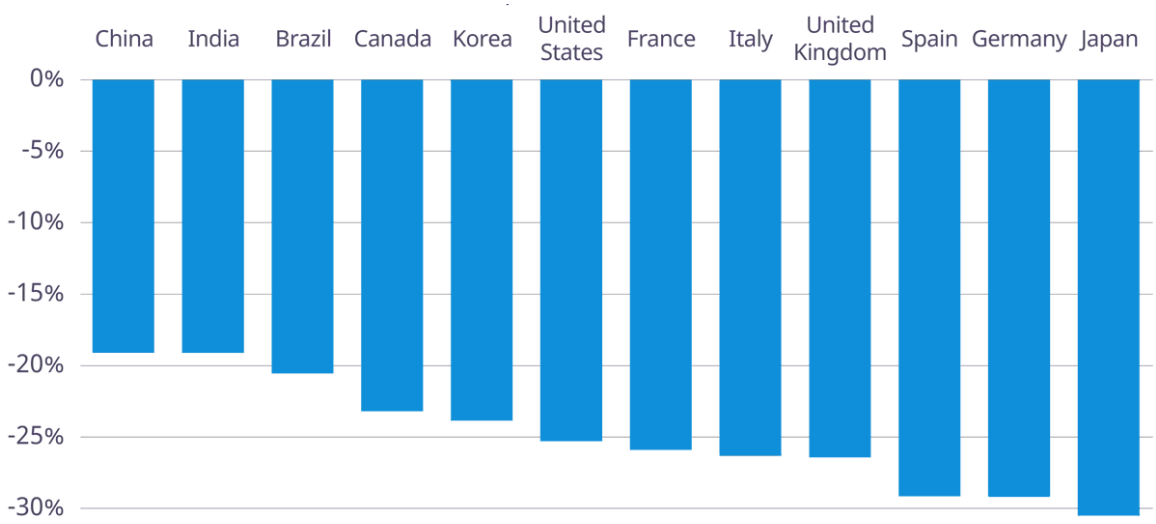

Figure 17: The initial impact of containment measures felt worldwide; Selected countries, in % of GDP at constant prices

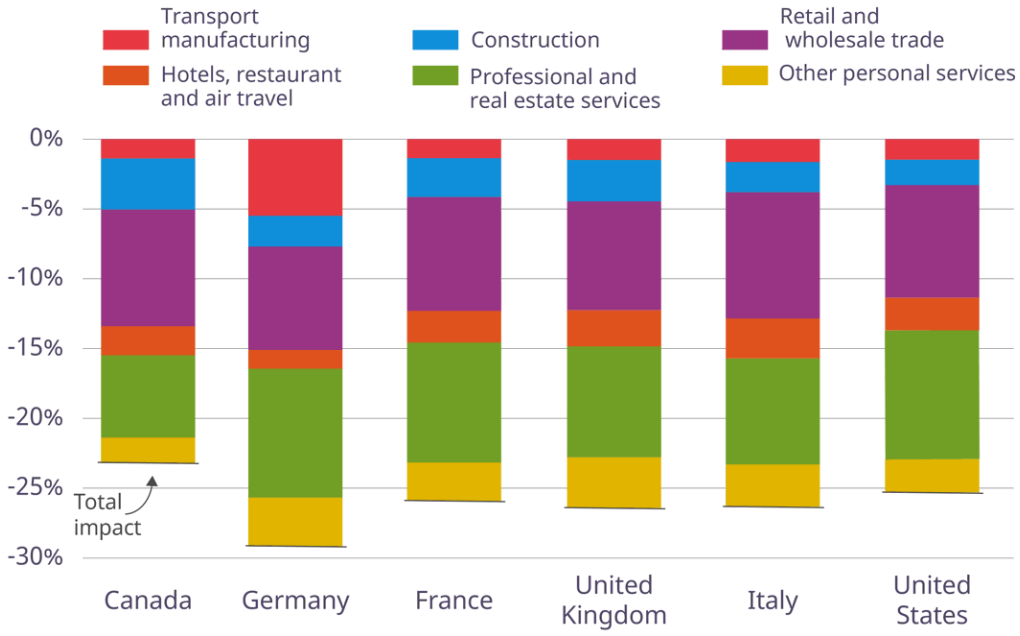

Figure 18: Partial or complete shutdowns will be felt across the economy; Selected G7 countries, in % of GDP at constant prices

For each month, there will be an approximate loss of 2.0 % points in annual GDP growth. The tourism sector alone faces an output decrease as high as 50.0 % to 70.0 %. According to the World Trade Organization (WTO) and the Organization for Economic Cooperation and Development (OECD) have indicated COVID-19 pandemic as the largest threat to the global economy since the financial emergency of 2008–2009. Some of the experts are even saying that human civilization has not faced such an unprecedented emergency after World War-II. So, COVID-19 has undoubtedly put forth a remarkably bad effect on the day-to-day life of the entire human society and also on the world economy.

6.3 COVID-19 and Global Environment

From the very beginning of civilization, human beings gradually started manipulating nature for their benefit. To satisfy the demand for increasing population industrialization and urbanization became inevitable, and the obvious significance was proved to be detrimental to the global environment.

Further, environmental concerns include air pollution, water pollution, climate change, ozone layer depletion, global warming, depletion of groundwater level, change of biodiversity & ecosystem, arsenic contamination and many more [20][21].

But, due to the unusual outbreak of COVID-19, almost every big and small cities and villages in the affected countries are under partial or total lockdown for a long period ranging from a few weeks up to a few months. All local and central administrations worldwide have banned the free movement of their citizens outside their home to avoid community transmission Various religious, cultural, social, scientific sport, and political mass gathering events like, Hajj, Olympics, etc. are cancelled. Various types of industries are not functioning, all types of travels are cancelled.

Meanwhile, efforts to restrict the transmission of the SARS- CoV-2, by restricting the movement have had an outstanding environmental effect. Due to the non-functioning of industries, industrial waste emission has decreased to a large extent. Vehicles are hardly found on the roads resulting in almost zero emission of greenhouse gases and toxic tiny suspended particles to the environment. Due to lesser demand for power in industries, the use of fossil fuels or conventional energy sources has been lowered considerably. Ecosystems are being greatly recovered. In many big cities, the inhabitants are experiencing a clear sky for the first time in their lives. The pollution level in tourist spots such as forests, sea beaches, hill areas, etc. is also shrinking largely. The ozone layer has been found to have revived to some extent [22]. The pandemic has displayed its contrasting consequence on human civilization, in the sense that, on one hand, it has executed worldwide destruction, but created a very positive impact on the world environment on the other hand.

6.4 Social Impact of COVID-19

The report: "Position Note on the Social and Economic Impacts of COVID-19 in Asia-Pacific," calls on countries in the region to avoid returning to the pre-pandemic environmentally unsustainable development path, and to capitalize on the opportunity to build a better future. It argues for a new human rights-based, just and the fair social contract between governments and people, and advocates for social safety nets with a broader reach, universal health insurance, and affordable access to digital connectivity, as the new normal. "While we must focus on the immediate needs of a health crisis, the accompanying economic and social crises also need urgent attention. These feed on pre-pandemic vulnerabilities that will be a fire hard to contain, if not addressed together," said Kanni Wignaraja, UN Assistant Secretary-General and UNDP Director of the Regional Bureau for Asia and the Pacific. "Bold proposals in this report address the multiple shocks together, by proposing a different set of choices today to build a different tomorrow" [23].

i. Older Persons

Older persons are particularly susceptible to the risk of infection from COVID-19, especially those with chronic health conditions such as hypertension, cardiovascular disease and diabetes. Older persons are not just struggling with greater health risks but are also likely to be less capable of supporting themselves in isolation. Although social distancing is necessary to reduce the spread of the disease, if not implemented correctly, such measures can also lead to the increased social isolation of older persons at a time when they may be at the most need of support.

The discourse around COVID-19, in which it is perceived as a disease of older people, exacerbates negative stereotypes about older persons who may be viewed as weak, unimportant and a burden on society. Such age-based discrimination may manifest in the provision of services because the treatment of older persons may be perceived to have less value than the treatment of younger generations. International human rights law guarantees everyone the right to the highest attainable standard of health and obligates governments to take steps to provide medical care to those who need it. Shortages of ventilators, for example, necessitate the adoption of triage policies and protocols based on medical, evidence-based and ethical factors, rather than arbitrary decisions based on age [24].

In this context, solidarity between generations, combating discrimination against older people, and upholding the right to health, including access to information, care and medical services is key.

ii. Persons with Disabilities

Even at the best of times, persons with disabilities face challenges in accessing health-care services, due to lack of availability, accessibility, affordability, as well as stigma and discrimination. The risks of infection from COVID-19 for persons with disabilities are compounded by other issues, which warrant specific action: disruption of services and support, pre-existing health conditions in some cases which leave them more at risk of developing serious illness or dying, being excluded from health information and mainstream health provision, living in a world where accessibility is often limited and where barriers to goods and services are a challenge, and being disproportionately more likely to live in institutional settings [25].

General individual self-care and other preventive measures against the COVID-19 outbreak can entail challenges for persons with disabilities. For instance, some persons with disabilities may have difficulties in implementing measures to keep the virus at bay, including personal hygiene and recommended frequent cleaning of surfaces and homes. Cleaning homes and washing hands frequently can be challenging, due to physical impairments, environmental barriers, or interrupted services. Others may not be able to practice social distancing or cannot isolate themselves as thoroughly as other people, because they require regular help and support from other people for everyday self-care tasks.

To ensure that persons with disabilities can access to information on COVID-19, it must be made available in accessible formats. Healthcare buildings must also be physically accessible to persons with mobility, sensory and cognitive impairments. Moreover, persons with disabilities must not be prevented from accessing the health services they need in times of emergency due to any financial barriers.

iii. Youths

Many governments have called on youths to embrace the effort to protect themselves and the overall population. Youths are also in a position to help those who are most vulnerable and to aid in increasing public health social awareness campaigns among their communities. Thus, youths are critical to limiting the virus's spread and its impact on public health, society, and the economy at large.

In terms of employment, youths are disproportionately unemployed, and those who are employed often work in the informal economy or gig economy, on precarious contracts or in the service sectors of the economy, that are likely to be severely affected by COVID-19 [26]. More than one billion youths are now no longer physically in school after the closure of schools and universities across many jurisdictions. The disruption in education and learning could have medium and long-term consequences on the quality of education, though the efforts made by teachers, school administrations, local and national governments to cope with the unprecedented circumstances to the best of their ability should be recognized.

Many vulnerable youths such as migrants or homeless youths are in precarious situations. They are the ones who can easily be overlooked if governments do not pay specific attention, as they tend to be already in a situation without even their minimum requirements being met on health, education, employment and well-being.

iv. Indigenous People

Indigenous people are particularly vulnerable at this time due to significantly higher rates of communicable and non- communicable diseases, lack of access to essential services, absence of culturally appropriate healthcare, and if any, under-equipped and under-staffed local medical facilities. The first point of prevention is the dissemination of information in indigenous languages, thus ensuring

that services and facilities are appropriate to the specific situation of indigenous people, and all are reached.

The large number of indigenous people who are outside of the social protection system further contributes to vulnerability, particularly if they are dependent on income from the broader economy – produce, tourism, handicrafts and employment in urban areas [27]. In this regard, governments should ensure that interim financial support measures include indigenous peoples and other vulnerable groups. Indigenous people are also seeking their solutions to this pandemic. They are taking action and using traditional knowledge and practices as well as preventive measures – in their languages.

v. Sport for Development and Peace

Sport is a major contributor to economic and social development. Its role is well recognized by governments, including in the Political Declaration of the 2030 Agenda, which reflects on "the contribution sports make to the empowerment of women and young people, individuals and communities, as well as to health, education and social inclusion objectives."

Since its onset, the COVID-19 pandemic has spread to almost all countries of the world. Social and physical distancing measures, lockdowns of businesses, schools and overall social life, which have become commonplace to curtail the spread of the disease, have also disrupted many regular aspects of life, including sport and physical activity. This policy brief highlights the challenges COVID-19 has posed to both the sporting world and to physical activity and well-being, including for marginalized or vulnerable groups. It further provides recommendations for Governments and other stakeholders, as well as for the UN system, to support the safe reopening of sporting events, as well as to support physical activity during the pandemic and beyond [28].

To safeguard the health of athletes and others involved, most major sporting events at international, regional and national levels have been cancelled or postponed – from marathons to football tournaments, athletics championships to basketball games, handball to ice hockey, rugby, cricket, sailing, skiing, weightlifting to wrestling and more. The Olympics and Paralympics, for the first time in the history of the modern games, have been postponed and will be held in 2021.

7. Conclusion

A pandemic is not new in human history. But what makes the COVID-19 pandemic special is that it takes place in an unprecedented backdrop when the interconnectivity and interdependence between people, between countries and between continents are so deep. The achievements people have made in technology, intelligence and transportation make them both physically and psychologically globalized. Environmental change is one of the biggest and most vital challenges of the 21st century. Despite all their efforts to restore the nature during the last few decades, humans could only move a few steps forward. But during the last few months, the consequences of the pandemic have successfully recovered the environment to a large extent that should set a positive impact on global climate change. Whatever be the cause or origin, the occurrence of COVID-19 has emphasized improving the mutually affective connection between humans and nature. At this point, it is indispensable to control the source of disease, cut off the transmission path, and use the existing drugs & means to control the progress of the disease proactively. Like all the preceding disasters on the earth, let all be optimistic enough that, human beings will win over the pandemic in due course of time, but they should know the limits to which they can thrust nature before it is too late.

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