

RESEARCH PAPER

Multidisciplinary Analysis of International Environments Based on Impacts of Covid-19: State of Art

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ABSTRACT

Drawing lessons from the Covid-19 pandemic according to literature, this contribution aims to show that greening the United Nations System with stronger environmental considerations, can help to shift the global economy from fossil energy to renewable energy with public-health resilient systems. This contribution starts with highlighting the fact that past economic crises and the implementation of the Sustainable Development Global Agenda have not been able to generate strong institutional arrangements for sustainable development including climate resilience building and public health resilient systems. This allows us to apprehend the possibility that the Covid-19 pandemic crisis may face the same incapacity. In response to these statements, this contribution shares the opinion that institutional reforms within the United Nations System may lead to perennial normative provisions and institutional arrangements able to make sustainable development happen with resilient public-health systems. This note highlights the fall of GHG emissions during the Covid-19 pandemic. It shows, however, based on the history of the past crisis, that the huge investment being mobilized to recover from the pandemic can quickly absorb GHG emissions fall. The way out suggested is that both the Global Economy and the Global Public Health agendas can be revisited to be strengthened by stronger environmental considerations. One of our findings is that multilateralism can adopt suitable institutional arrangements in Global Environmental Governance throughout the current global agenda on International Environmental Governance Reform within the United Nations System.

KEYWORDS: Covid-19 pandemic; Public-health systems; Coronavirus lockdowns; GHG emissions fall; Economic crisis.

1. Introduction

The Covid-19 threat has for several weeks interrupted industrial activity in many countries. Greenhouse Gas (GHG) Emissions have drastically dropped in that insignificant lapse of time. As a result of this, the largest industrial cities across the planet were unveiled from their pollution blanket sheets and the air became healthier. Confinement has withheld man from the street and wild animals invested cities. Nature is thus redistributing, more equitably, land occupation between humans and other living

creatures. This point highlights fossil industry responsibility in environmental and public health threats. It confirms that the fossil global economy has a significant part in global warming and public health issues. The impacts of Covid-19 echo the capacity of the huge investment, being mobilized to recover from the pandemic, to quickly absorb the fall in Covid-19 GHG Emissions. It however suggests that both the Global Economy and the Global Public Health Agendas be revisited with the purpose to be strengthened by stronger environmental considerations. To this end, this contribution exhorts the international community to adopt suitable institutional arrangements in Global Environmental Governance. The ongoing global agenda of International Environmental Governance Reform within the United Nations System is presented as an opportunity to reach such a goal.

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impacts of Covid-19 and no paper presents a state of art about them to find important points. It demonstrates a serious gap due to the importance of the Covid-19 epidemic and its impacts. Therefore, in this paper, we are going to fill this gap by analyzing published articles and find the important points based on the impacts of Covid-19 on international environments using the

Failure Modes and Effects Analysis (FMEA) method [18].
The impact of COVID-19 on the aspects of the global environments can be seen, including the industries are affected by this pandemic. A summary of the literature review in the table below is provided in this regard.

Tab. 1. Review of the affected industries by COVID-19

Important Finding	Reference	Reviewed industries												
		Agriculture	Petroleum & oil	Manufacturing	Education	Finance	Healthcare	Pharmaceutical	Hospitality	Tourism	Aviation	Housing sector	Sports	Information tech
House prices are set to fall over as a result of the Covid-19 downturn.	Allen and McQuinn 2020											√		
Participate in hospitality and tourism, were affected on a scale unprecedented in peacetime.	Baum and Hai 2020							√	√					
COVID-19 inflicted a heavy toll on global aviation.	Dube et al. 2021										√			
The pandemic has influenced the variance of the stock markets	Shehzad et al. 2020					√								
Quarantine conditions have had a significant impact on global production-rates and supply chains.	Shokrani et al. 2020			√										
Simulation model can help in developing a resilient and responsive food supply chain to match the varying demand	Singh et al. 2020													√
The 2020 Tokyo Olympic Games was postponed until July 2021 and disturbed the sporting calendar in East Asia in the first quarter of 2020	Tan and Lee 2020											√		
The COVID-19 has been associated with an insidious wave of psychological stress among healthcare personnel (HCP)	Thatrimontrichai et al. 2021							√						
COVID-19 has a great impact on the cross-correlation of multifractal property between crude oil and most selected agricultural future markets	Wang et al. 2020	√	√											
The psychological stress made online learning during the isolation period less effective and less helpful for students	Yassin et al. 2021					√								

3. Important Points About Impacts of Covid-19 and International Environments

The most important points are determined according to the results of VOSviewer 1.6.10. As we analyzed these points, we would echo Schiermeier (2020) who noticed that the sharp reductions in carbon emissions and air pollution caused by coronavirus-related lockdowns have offered a sort of preview of the kind of improvements that can be made when drastic action is taken. The author shares the concern as many do that these changes could however be easily wiped out by efforts to quickly ramp up economies. Governments around the world may

be more willing to relax regulations to jump-start companies [35]. WHO is going through a plural crisis which can find a solution in the perspectives of the future we want of green economy in the context of sustainable development and poverty eradication. Public health issues ought, indeed, be apprehended through a sustainable development spectrum. Environmental considerations should be apprehended in an anticipatory vision to be given an irreversible pre-eminence in the global public health agenda of the future we want. International environment governance and its ongoing reforms within the United Nations System appears more

and more as an opportunity to revisit the institutional dimension of the public health global agenda. The climate may have been spared with the slowdown in industrial activity but environmentalists fear that these achievements will deteriorate with the resumption of work once the confinement is complete. We will take up some of these concerns and fears in the following.

3.1. Environmental conditions under the Covid-19 threat

The Covid-19 pandemic has slashed greenhouse gas emissions and air pollution around the world [8]. A sudden drop in carbon emissions has been noticed as a result of industries, transport networks, and businesses were closed down [34], [31], [19]. Accordingly, if there is something positive to take from the Covid-19 threat it could be that the crisis had offered a taste of the air we might breathe in a low-carbon future. [12] reported that satellite imagery from the likes of NASA and the European Space Agency (ESA) has shown a reduction in emissions around the world over the last few weeks even a significant drop in polluting gases like nitrogen dioxide (NO₂) as countries try to contain the spread of the new coronavirus. These tendencies were noticed across the planet. China's carbon emissions fell by around 25% over the four first weeks of the pandemic. The difference is significant, even up to Beijing as noticed through satellite imagery analysis between January and February 2019 [43], [17]. In Europe, the Copernicus Sentinel-5P Satellite reveals the decline of air pollution especially nitrogen dioxide concentration over Italy due to the nationwide lockdown to prevent the spread of the coronavirus. This reduction is particularly visible in northern Italy which coincides with its nationwide lockdown to prevent the spread of the coronavirus [21], [7]. In Spain, the concentration of nitrogen dioxide in Madrid and Barcelona has dropped significantly under the state of alarm [6], [13]. reported that Air pollution in UK cities has fallen as the country went into Coronavirus lockdown and the air quality has indeed started to improve alongside the sharp reduction in traffic that causes much of the pollution in cities. France and Paris have seen their usual traffic disappear under containment. Satellite images show a lower concentration of nitrogen dioxide compared to last year which is an unprecedented drop in pollution. The same observations were noticeable throughout France due to the factories and shops at a standstill, but above all to the fall in road

traffic up to -80% in Île-de-France, -70% in the Grand Est, and -62% in the Lyon metropolitan area (Bouillon-Minois et al., 2020). Virghileanu et al. (2020) reported that measurements from the European Space Agency's Sentinel-5P satellite show that levels of nitrogen dioxide (NO₂) over cities and industrial areas in Asia and Europe were lower than in the same period in 2019, by as much as 40%.

3.2. Creation partially restored under the COVID-19 threat

As a consequence of the drop in pollution emissions, the Covid-19 global threat contributed to partial creation restoration. Bates et al. (2021) observed that while humans were all been socially isolated the Olive Ridley Sea turtles in India and the Hawksbill Sea Turtle in Brazil have been making the most of the deserted beaches to nest in peace. Bakalis et al. (2020) reported that the animal world flourishes in the absence of man on April 11, 2020. They added that the confinement has given back to the creeks their original purity where all the wildlife unfolds again. It has been also noticed that rarely have the park wardens have seen so many birds, dolphins or so many two whales frolicking so close to the coast: an enchanted break for the animal world. In the Albanian lagoon of Narta, the Covid-19 pandemic increased regularly the number of flamingos due to the absence of fishing boats, factories shut down and the absence of tourists. As the confinement went on, the number of birds in the neighborhood of cities in France was increasing and scientists sought to understand the effects of confinement on birds [1].

3.3. Towards huge investments to recover from the Covid-19 pandemic

Deconfinement scenarios started at different dates and are different from one country to another. As of the 20th of April, 2020, deconfinement processes were initiated in Denmark, Germany, Switzerland, and Austria as a result of ends the lockdowns. France followed with a progressive end of confinement which started May 11, 2020 [14]. As they engage in their deconfinement processes, all countries plan strong COVID-19 responses with huge investments to bring their economy back to pre-Covid19 statures. According to the Asian Development Bank 2020, Outlook which is the Asian Development Bank's (ADB) annual flagship economic publication, regional economic growth in developing Asia will decline sharply in 2020 due to the effects of the novel

coronavirus (Covid-19) pandemic, before recovering in 2021 [4], [25]. said that growth in the region is expected to slow sharply to 2.2% in 2020 under the effects of the current health emergency and then rebound to 6.2% in 2021. The media mentions the global character of the Asian economy where development banks' largest shareholders are the US (15.6% of total shares), Japan (15.6%), China (6.4%), India (6.3%), and Australia (5.8%). They added that recovery scenarios explored under the COVID-19 impacts suggest a global cost of between US\$2 trillion and US\$4.1 trillion, equivalent to between 2.3 percent and 4.8 percent of global GDP with a hard hit in Europe, the US, and other regional economies [22], [25]. On May 19, 2020, France and Germany announced to back the creation of an EU bond to raise €500 billion to boost the European economy, severely weakened by the Covid-19 pandemic [16].

3.4. Greening the planet with Covid-19 carbon emissions drops

The desire to perpetuate Covid-19 carbon emissions drops in post-pandemic decades is shared throughout the planet. [30] reported in this regard that European politicians, companies, lawmakers, and activists called for green investment to restart growth after the coronavirus pandemic. The author mentioned that these environmentalists believe that fighting climate change and promoting biodiversity would rebuild stronger economies. [41] shared that the Covid-19 experience ought to call for major investments to jolt the economy in the right direction towards a sustainable, low-carbon path. The author shared the conviction that if we invest in climate-smart infrastructure, we can not only ensure that the economy does not stall out. We would also accelerate progress towards a resilient and competitive clean energy economy [41]. He added that the Covid-19 pandemic could lead to a Stronger America if the country crafts its response in a way that fosters sustainable economic and social benefits that will create a brighter future for all Americans. [41] believes that such a post-Covid-19 move is conceivable because the post-Great 2009 Recession led to the 2009 American Recovery and Reinvestment Act which adopted energy-related provisions. He added that even though these achievements were a small part of the overall package, they were nonetheless the largest single public investment in clean energy the United States has made to date. We also may note that the French Government is anticipating the greening post-

Covid-19 fossil global economy. Air France-KLM confirmed on April 25, 2020, that it has obtained the aid of 7 billion euros from the French Government to cope with the virtual paralysis of its activity caused by the coronavirus pandemic. One of the conditions of the deal was that Air France ought to become a more environmentally friendly airline. It is hoped that the use of the €500 billion funds created to help the EU countries and industries recover from the Covid-19 pandemic would have an important greening component. German Chancellor said the fund aims to support a sustainable recovery that restores and enhances growth in the EU [26], [22].

3.5. The decline in pollutant emissions in the post-Covid-19 phase

A quick reverse of the drop in pollutant emissions is to be feared even expected. There are indeed tangible reasons to be concerned about a quick recovery of the decline in carbon emissions that has resulted from coronavirus lockdowns throughout the planet. [23] stated that the decline in carbon emissions that has resulted from coronavirus lockdowns could easily be reversed by efforts to quickly ramp up economies. [3] noted that with factories shut down and millions of people not driving, due to coronavirus lockdowns, the air's clearer in some of the world's major cities but the pollution reductions may be very short-term, as governments move to boost their devastated economies. [36] shared the same concerns in revealing that in China's Hubei Province where nitrogen dioxide levels fell by 40% during the strict regional lockdown, businesses are starting to open back up and people are driving again which means more pollution. Authors added that China's plans to reignite the economy could make it even worse than before quoting a report released by the NGO Global Energy Monitor which found that China green-lighted plans for more coal-fired power capacity last month than in all of 2019.

3.6. Global climate resilient economy and global fossil 'resilient' economy

The global economic recovery from Covid-19 is going to be operated through the sustainability paradigm of mutual exclusion of Global climate-resilient Economy and Global Fossil 'Resilient' Economy. The hope that mankind would take advantage of Covid-19 pollutant emissions drops to switch into a climate resilience building economic system, will go strong. [29], says the virus is prompting us to change our habits in

ways that could make a longer-term contribution to climate protection mentioning the positive effects of working from home, video conferencing, working shorter weeks, or staggering office hours to reduce traffic. [20] noted that the Covid-19 outbreak revealed what life might be like if we were to act seriously on climate change and what it might be like if we don't. These fears and those mentioned earlier in this paper show that Global Fossil Economy is a 'resilient' phenomenon. This 'resilience' survived Global Sustainable Development Agenda implementation and economic crisis environmental positive effects such as the 2008 crisis. This phenomenon will survive the Covid-19 pandemic.

This mutual exclusion between the two forces is revealing an emerging sustainable development paradigm that can be handled by algorithm development and mathematical modeling especially at the local scale. If multilateralism is failing to show a way out to practical solutions to green the planet, the local scale is bringing hope towards global climate resilience building perennial perspectives. Indeed, at the consumer, community, landscape, and national levels populations are creating ways to build climate resilience to the detriment of the fossil economy. In fact, at these scales, climate resilience-building actions, projects, activities, policies, frameworks, and legislation are more efficiently implemented. In Europe, biological and other sustainable agricultural practices are leading to European culture and way of life dedicated to climate resilience building. The areas allocated to sustainable agriculture are increasing as well as the number of farmers and consumers. These achievements are enabling climate resilience building to overcome slowly but surely indeed, the fossil economy threat.

3.7. An ideal framework to anticipate global climate resilience building from the local scale

Sustainable development is being operated at the individual, community, and landscape scales. The landscape is an ideal framework to anticipate global climate resilience building from the consumer and the community perspectives [28]. Within the landscape, there are indeed natural and genetic resources but also economic activities, the population, and consumers. The landscape is for the planet what the patient is for the population. The patient ought to be treated to avoid pandemics occur among the population. Likewise, the landscape needs care when sick to

prevent the planet, our house from burning. Technology perspectives on landscape engineering are gathering the contribution of several scientific and technology fields including landscape geomatics and smart landscape technology [24]. This dynamic initiated under United Nations System Biodiversity implementing agenda is showing that its possible to measure landscape indicators coding the landscape productivity to an optimal level allowing its self-regeneration while feeding its habitants and consumers. Optimal production indicators code therefore each landscape by its optimal capacity of production. Results of such sustainable management of natural and genetic resources at the landscape scale can be replicated at the regional and global scales to help the international community reverse current post-industrial practices to sustainable pre-industrial practices and make sustainable development happen. One of the multilateral biggest challenges of the coming decades will be to replicate climate resilience building success stories from the local scale to the regional and global scales. To overcome the global challenge of shifting from the post-industrial fossil global economy to renewable energy and climate resilience building global economy, the local and the global scales ought to walk in mutual supportiveness. It is in such a path, among others, that the international community will be able to replicate local climate resilience building success stories to the regional and even global climate resilience success stories. To make this happen, international environmental governance reform ought to include local stakeholders and create suitable governance institutions giving pre-eminence to environmental considerations.

4. Conclusion

The Covid-19 pandemic brought the planet back to pre-industrial revolution environmental and public health standards. Many have nourished the hope that such conditions be preserved and kept in post-pandemic decades to enable a switch from current post-industrial resolution practices to climate resilience building sustainable development standards. This contribution shows that such hopes are legitimate but may never happen because the international community failed in the past in similar experiences. Economic crises and the implementation of the Sustainable Development Global Agenda have not been able to generate perennial changes towards sustainable development including climate resilience building and public health

substantial achievements. These realities, among others, led us in this contribution to share the opinion that institutional reforms within the United Nations System may lead to better results. According to the literature review, we endeavored to show that greening the System with stronger environmental considerations, has the potential to shift the global economy from fossil energy to renewable energy. This note highlights the fall of GHG emissions during the Covid-19 pandemic. It shows, however, based on the history of the past crisis, that the huge investment being mobilized to recover from the pandemic can quickly absorb GHG emissions fall. The way out suggested is that both the Global Economy and the Global Public Health agendas can be revisited to be strengthened by stronger environmental considerations. One of our findings is that Multilateralism can overcome such a challenge in resuming and completing the ongoing International Environmental Governance Reform Agenda within the United Nations System. National and international organizations are invited to create together appropriate plans for local-scale issues which will act and manage the pre-eminence of environmental considerations in conformity with climate resilience building exigences of the future we want for generations to come.

References

- [1] Abd Rabou, A. F. N. How Is the COVID-19 Outbreak Affecting Wildlife around the World?. *Open Journal of Ecology*, Vol. 10, No. 8, (2020).
- [2] Allen-Coghlan, M., & McQuinn, K. M. The potential impact of Covid-19 on the Irish housing sector. *International Journal of Housing Markets and Analysis* (2020).
- [3] Arora, S., Bhaukhandi, K. D., & Mishra, P. K. Coronavirus lockdown helped the environment to bounce back. *Science of the Total Environment*, (2020), p. 140573.
- [4] Asian Development Bank. *Asian Development Outlook (ADO) 2020: What Drives Innovation in Asia?* Asian Development Bank (2020).
- [5] Bakalis, S., Valdramidis, V. P., Argyropoulos, D., Ahrne, L., Chen, J., Cullen, P. J., ... & Van Impe, J. F. Perspectives from CO+ RE: How COVID-19 changed our food systems and food security paradigms. *Current Research in Food Science*, Vol. 3, No. 166, (2020).
- [6] Baldasano, J. M. COVID-19 lockdown effects on air quality by NO₂ in the cities of Barcelona and Madrid (Spain). *Science of the Total Environment*, Vol. 741, (2020), p. 140353.
- [7] Bar, H. COVID-19 lockdown: animal life, ecosystem and atmospheric environment. *Environment, development and sustainability*, Vol. 23, No. 6, (2021), pp. 8161-8178.
- [8] Barua, S., & Nath, S. D. The impact of COVID-19 on air pollution: Evidence from global data. *Journal of Cleaner Production*, Vol. 298, (2021), p. 126755.
- [9] Bates, A. E., Primack, R. B., Duarte, C. M., & PAN-Environment Working Group. Global COVID-19 lockdown highlights humans as both threats and custodians of the environment. *Biological Conservation*, (2021), p. 109175.
- [10] Baum, T. ir Hai, NTT Hospitality, tourism, human rights and the impact of COVID19, (2020), pp. 2397-2407.
- [11] Bouillon-Minois, J. B., Lesage, F. X., Schmidt, J., & Dutheil, F. Coronavirus and exceptional health situations: the first disaster with benefits on air pollution. *Disaster Medicine and Public Health Preparedness*, Vol. 14, No. 3, (2020), pp. e28-e30.
- [12] Cheval, S., Mihai Adamescu, C., Georgiadis, T., Herrnegger, M., Piticar, A., & Legates, D. R. Observed and Potential Impacts of the COVID-19 Pandemic on the Environment. *International journal of environmental research and public health*, Vol. 17, No. 11, (2020), p. 4140.
- [13] Cole, M. A., Elliott, R. J., & Liu, B. The impact of the Wuhan Covid-19 lockdown on air pollution and health: a machine learning and augmented synthetic control approach. *Environmental and Resource Economics*, Vol. 76, No. 4, (2020), pp.

- 553-580.
- [14] Di Domenico, L., Pullano, G., Sabbatini, C. E., Boëlle, P. Y., & Colizza, V. Modelling safe protocols for reopening schools during the COVID-19 pandemic in France. *Nature communications*, Vol. 12, No. 1, (2021), pp. 1-10.
- [15] Dube, K., Nhamo, G., & Chikodzi, D. COVID-19 pandemic and prospects for recovery of the global aviation industry. *Journal of Air Transport Management*, Vol. 92, (2021), p. 102022.
- [16] Engelen, K. C. Europe's Covid-19 Battle. *The International Economy*, Vol. 34, No. 2, (2020), pp. 12-15.
- [17] Erikson, S. Pandemics show us what government is for. *Nature human behaviour*, Vol. 4, No. 5, (2020), pp. 441-442.
- [18] Ershadi, M. J., & Ershadi, M. M. Implementation of failure modes and effects analysis in detergent production companies: a case study. *Environmental Quality Management*, Vol. 27, No. 3, (2018), pp. 89-95.
- [19] Ershadi, M. M., & Shemirani, H. S. Using mathematical modeling for analysis of the impact of client choice on preventive healthcare facility network design. *International Journal of Healthcare Management*, Vol. 14, No. 2, (2021), pp. 588-602.
- [20] Fuentes, R., Galeotti, M., Lanza, A., & Manzano, B. COVID-19 and climate change: a tale of two global problems. *Sustainability*, Vol. 12, No. 20, (2020), p. 8560.
- [21] Goldberg, D. L., Anenberg, S. C., Griffin, D., McLinden, C. A., Lu, Z., & Streets, D. G. Disentangling the impact of the COVID-19 lockdowns on urban NO₂ from natural variability. *Geophysical Research Letters*, Vol. 47, No. 17, e2020GL089269, (2020).
- [22] Han, E., Tan, M. M. J., Turk, E., Sridhar, D., Leung, G. M., Shibuya, K., ... & Legido-Quigley, H. Lessons learnt from easing COVID-19 restrictions: an analysis of countries and regions in Asia Pacific and Europe. *The Lancet*, (2020).
- [23] Helm, D. The environmental impacts of the coronavirus. *Environmental and Resource Economics*, Vol. 76, No. 1, (2020), pp. 21-38.
- [24] Hochschild, V., Braun, A., Sommer, C., Warth, G., & Omran, A. Visualizing landscapes by geospatial techniques. In *Modern approaches to the visualization of landscapes* (2020), pp. 47-78. Springer VS, Wiesbaden.
- [25] Jiang, P., Van Fan, Y., & Klemeš, J. J. Impacts of COVID-19 on energy demand and consumption: Challenges, lessons and emerging opportunities. *Applied energy*, Vol. 285, (2021), p. 116441.
- [26] Ladi, S., & Tsarouhas, D. EU economic governance and Covid-19: policy learning and windows of opportunity. *Journal of European Integration*, Vol. 42, No. 8, (2020), pp. 1041-1056.
- [27] Lashin, A. R., Mossa, M., El-Bediwi, A., & Kamal, M. Study of some physical properties of the rapidly solidified Sn–Sb–Cu–Zn alloys. *Materials & Design*, Vol. 43, (2013), pp. 322-326.
- [28] Leibensperger, C., Yang, P., Zhao, Q., Wei, S., & Cai, X. The synergy between stakeholders for cellulosic biofuel development: Perspectives, opportunities, and barriers. *Renewable and Sustainable Energy Reviews*, Vol. 137, (2021), p. 110613.
- [29] Markard, J., & Rosenbloom, D. A tale of two crises: COVID-19 and climate. *Sustainability: Science, Practice and Policy*, Vol. 16, No. 1, (2020), pp. 53-60.
- [30] Pietrocola, M., Rodrigues, E., Bercot, F., & Schnorr, S. Risk Society and Science Education. *Science & education*, Vol. 30, No. 2, (2021), pp. 209-233.

- [31] Rahimi Rise, Z., Ershadi, M. M., & Shahabi Haghighgi, S. H. Scenario-based analysis about COVID-19 outbreak in Iran using systematic dynamics modeling-with a focus on the transportation system. *Journal of Transportation Research*, Vol. 17, No. 2, (2020), pp. 33-48.
- [32] Rahimi Rise, Z., & Ershadi, M. M. An integrated HFMEA simulation-based multi-objective optimisation model to improve the performances of hospitals: A case study. *Journal of Simulation*, (2021), pp. 1-22.
- [33] Rise, Z. R., & Ershadi, M. M. Socioeconomic analysis of infectious diseases based on different scenarios using uncertain SEIAR system dynamics with effective subsystems and ANFIS. *Journal of Economic and Administrative Sciences* (2022).
- [34] Sarfraz, M., Shehzad, K., & Farid, A. Gauging the air quality of New York: a non-linear Nexus between COVID-19 and nitrogen dioxide emission. *Air Quality, Atmosphere & Health*, Vol. 13, No. 9, (2020), pp. 1135-1145.
- [35] Schiermeier, Q. Why pollution is plummeting in some cities--but not others. *Nature*, Vol. 580, No. 7803, (2020), pp. 313-314.
- [36] Shearer, C., Myllyvirta, L., Yu, A., Aitken, G., Mathew-Sha, N., Dallos, G., & Nace, T. Boom and Bust 2020: Tracking the global coal plant pipeline. *Global Energy Monitor*. Sierra Club, Greenpeace, CREA (2020).
- [37] Shehzad, K., Xiaoxing, L., & Kazouz, H. COVID-19's disasters are perilous than Global Financial Crisis: A rumor or fact?. *Finance Research Letters*, Vol. 36, (2020), p. 101669.
- [38] Singh, S., Kumar, R., Panchal, R., & Tiwari, M. K. Impact of COVID-19 on logistics systems and disruptions in food supply chain. *International Journal of Production Research*, Vol. 59, No. 7, (2021), pp. 1993-2008.
- [39] Tan, T. C., & Lee, J. W. Covid-19 and sport in the Asia Pacific region. *Sport in Society*, Vol. 23, No. 12, (2020), pp. 1883-1888.
- [40] Thatrimontrichai, A., Weber, D. J., & Apisarnthanarak, A. Mental health among healthcare personnel during COVID-19 in Asia: a systematic review. *Journal of the Formosan Medical Association*, Vol. 120, No. 6, (2021), pp. 1296-1304.
- [41] Tracker, C. A. A government roadmap for addressing the climate and post COVID-19 economic crises. CAT (Climate Action Tracker). URL: <https://climateactiontracker.org/publications/addressing-theclimate-and-post-covid-19-economic-crises/> (accessed 5.19.20).
- [42] Virghileanu, M., Săvulescu, I., Mihai, B. A., Nistor, C., & Dobre, R. Nitrogen Dioxide (NO₂) Pollution monitoring with Sentinel-5P satellite imagery over Europe during the coronavirus pandemic outbreak. *Remote Sensing*, Vol. 12, No. 21, (2020), p. 3575.
- [43] Wang, Q., Lu, M., Bai, Z., & Wang, K. Coronavirus pandemic reduced China's CO₂ emissions in short-term, while stimulus packages may lead to emissions growth in medium-and long-term. *Applied energy*, Vol. 278, (2020), p. 115735.
- [44] Wang, T., Du, Z., Zhu, F., Cao, Z., An, Y., Gao, Y., & Jiang, B. Comorbidities and multi-organ injuries in the treatment of COVID-19. *The Lancet*, Vol. 395, (10228), e52, (2020).
- [45] Cheng, A., & Szeto, E. Changing Hong Kong university students' national identity through studying abroad. *Asian Education and Development Studies* (2019).

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