

Review of Impacts of Covid-19 on Circular Economy and Sustainability in Developed and Developing Countries with Lesson Learnt

Khawla Al-Muhannadi¹, Doğuş Binek²
Doctoral School of Economic and Regional Sciences,
Hungarian University of Agriculture and Life Sciences, Hungary

¹Email: AlMuhannedi.Khawla@phd.uni-szie.hu

²Email: dogusbinek@gmail.com

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Abstract

Circular Economy is considered by many as a promising approach for achieving economic, social, and environmental sustainability, simultaneously on the ground, in short, and long terms, and so saving the planet, the business, and people's livelihood. Covid-19 pandemic and shutdown of businesses, demolishing of social lifestyle beyond recognition, with approval or non-resistance of almost everyone, have shown an extreme example of how much drastic changes are possible, and overnight, without a ratified five-year plan, or social unrest, at least at the first month. This paper reviews recently published articles (in 2020) that are looking at impacts related to Circular Economy implementation, opportunities, and lost ones, for public and private organizations, with a focus on SMEs, during the Covid-19 Pandemic, which started globally in February 2020 and still ongoing. SMEs are very important for any economy, and they can be an irreplaceable player at crises times for instance to provide jobs, provide the link between polices and people and to feed the nation. SMEs however are small by definition, with small budget and staff, and less access to bank loans and also, they are more vulnerable to shutdown and movement restrictions. The research main question is how can SMEs be enabled to play their vital role in getting nations through the crises, understanding current impacts and opportunities for pushing towards a greener and more sustainable development.

A systematic review focused on environmental impacts of the pandemic and showed conflicting findings. Economic and social impacts were also reviewed. The different impacts mentioned in different literatures were discussed and compared. This paper discusses the role played by SMEs in national economies, the strength and weakness of SMEs and impacts on them by the Pandemic and also potential for them to be part of the solution for their countries in relevance to their strength, weaknesses and potential. The paper concludes with recommendations reviewed from the different studies that took place on 2020 in diverse places globally, for how SMEs can contribute in supporting Circular Economy and

*Corresponding author e-mail: AlMuhannedi.Khawla@phd.uni-szie.hu

sustainability building on its intrinsic strength and benefiting from recommended support that can be provided by governments and decision makers. The paper reemphasized the importance role SMEs can play in difficult situation to promote sustainability with its three pillars, and recommendations include how government’s policy and intervention can better help the survival and sustainability of SMEs in their countries.

Keywords: *Circular Economy, Covid-19, SME, Sustainability, environmental impact, developing countries, systematic review.*

JEL Classification: *Q56, Q58, A14, F20, F60, F64.*

1. Research design and methodology

This paper is a result of literature review of more than fifty recent articles from different geographical regions and different researchers using different methods and looking at different aspects of impacts of Covid19 on the economy, society or environment. The paper looked at impacts of Covid-19 Pandemic on Sustainability, by reviewing and comparing findings from the different researcher, and concluding with recommendations for how government’s policy and intervention can better help the survival and sustainability of SMEs in their countries.

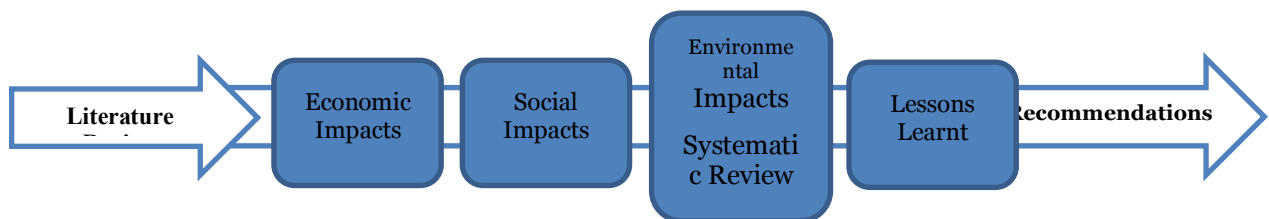


Figure 1. Process map of the stages of the Literature Review (based on SD Pillars)

1.1 Research questions:

The main question is about whether or not the pandemic situation and its implications benefited the environmental pillar of the sustainable development or not. To understand that, the research started with understanding the economic and social impacts of Covid-19 situation, and then focusing on the details of the environmental impacts based on published literature and published reports and recent declaration Of the United Nations (UN) and its specialist organizations and programs, such as United NATION Environment Program (UNEP). The other main question is about current and potential role of SMEs to support sustainable development on national level, and what is needed for SMEs to be able to play this role.

- What is the Role of SMEs in sustainable development before, during and post Covid-19?
- What are the impacts of Covid-19 Situation on SMEs?
- What are the Impacts of Covid-19 on the three pillars of Sustainable Development?
- Did the Environment Benefit from Covid-19 Precautionary procedures and lockdown?
- What is needed for SMEs to support Circular Economy and sustainable development at the crises and after it?

1.2 Results of the research

The review should thus allow us to understand the importance of SMEs in the national economy and the expected impacts of Covid-19 on SMEs ; the economic impacts of the pandemic; and details of environmental impacts looking at benefits as well as losses; and finally recommendations to support the potential role of SMEs on reviving the economy and elevating negative social and environmental impacts.

1.3 Implications and limitations of the study

The severe social and economic impacts of Covid-19 and the shutdowns and other precautionary procedures changed people's life, and made survival and health main priorities. Restrictions of movement and dealing with day-to-day situations and crises also impacted research and especially field work. Most literature reviewed are theoretical or based on on-line and social media surveys. The real size and shape of impacts is yet to be revealed after situation settled. On the other hand, some regions were more active in research and publications than others, and focus on impacts was mainly health, economic followed by social but less in environmental. Looking at impacts on Circular Economy as such was not a priority for literatures found and reviewed, which made the focus of the study on environmental impacts as one of the three pillars of Sustainable Development and a integral part of Circular Economy.

2. Introduction

This paper conducts a literature review to understand impacts of the pandemic of the adaptation of circular economy and sustainability practices by SMEs but also by other organizations. The paper starts with the importance of SMEs for the sustainability especially the economic sustainability locally in developed and developing countries. It then researches in the impacts of COVID-19 on global economy, followed by impacts of COVID-19 on SMEs. These then lead to impacts of COVID-19 on Circular Economy and Sustainability. The paper is a result of literature review of more than fifty recent articles from different geographical regions and different researchers using different methods and looking at different aspects of impacts of Covid19 on the economy, society or environment. A systematic review is used then to analyze the environmental impacts of the pandemic (Table 1), followed by discussion section of the findings. The last part is conclusion and Recommendations for governments and other players for best utilization of the pandemic for understanding their SMEs, supporting them to survive, and opening opportunities for them to contribute in being part of the solution for the problem and the incentive for rebuilding the economy on green initiatives following a new normal.

3. Importance of SMEs

Small and medium-sized enterprises (SMEs) are “key contributor to economic activity” (Alekseev et al., 2020:20), and the “backbone of every economy” (Eggers, 2020). They ‘play vital role in the global and national economy of countries (Brown, 2020). In the Middle East and North Africa (MENA) region, “Over 90% of SMEs are very small, employing less than 50 people, yet SMEs contribute to 60% of GDP and 70% of employment” (Hoorens et al., 2020), with women entrepreneurial sector gaining importance in the economic development process, mainly via SMEs and NGOs aiming to empower women in economic development (Klaa, 2019). In 2018 the number of SMEs operating in Scotland was 343,535, accounting for 99.3% of all private sector firms and employing around 60% of the Scottish workforce (Brown, 2020). In Pakistan, “MSMEs represent over 90% of the national enterprises” and “contribute 40% to the GDP, with over 40% to export earnings (Shah, 2018 in Shafi et al., 2020), and in representing in China “99.6% of China’s companies, 80% of national employment, and more than 60% of GDP” (Bouey, 2020, p.7 in Beraha & Đuričin, 2020).

4. Impacts of COVID-19 on global economy

The World Health Organization (WHO) declared the outbreak of the COVID-19 as a global pandemic towards the end of the first quarter of 2020, and the number of registered cases globally, is growing rapidly every day, as we are in the last quarter of this leap year. In response to that, and to prevent the wide spread of the virus, many governments imposed national policies that impacted business in general including production, falling demand and job losses across sectors globally (Beraha & Đuričin, 2020). Most measures and orders from governments happened quickly, and many businesses were in shock, and were concerned about the daily losses and unclear futuristic picture. Some governments introduced support packages faster than other, and some governments could not offer much to businesses, due to their inability to do so. Despite the significant shifts in the world in the last thirty years, what happened in few months is “unprecedented and would affect the mindset of the current and the coming generations for a long time” (Buheji, 2020)

It is predicted that the COVID-19 outbreak the world needs a “support package of up to \$2.5 trillion to cope with the damage” (UNCTAD, 2020), as the COVID-19 crisis had a devastating effect on the global economy with “more than 20.5 million jobs loss in the US alone before the end of April 2020” (Lambert, 2020). According to the International Labor Organization (ILO, 2020): almost “25 million people around the globe could lose their jobs,

and workers” income of as much as USD 3.4 trillion’, and around 2.7 billion workers are impacted by the lockdowns measures, which is 81% of the total global workers . ILO (2020:8,1) also estimated losses in global working hours to amount to 8.6% in the fourth quarter of 2020, which is equivalent to 245 million full-time jobs, while that of second quarter are revised now at 17.3% or 495 million full time equivalent (FTE) jobs. The pandemic is also expected to cause global foreign direct investment to shrink by 5%– 15% (UNCTAD, 2020). The global GDP has also been predicted to be affected between 2.3% to 4.8% (ADB, 2020). According to ILO(2020):“It is the worst global crisis since the Second World War”. Job loss in the U.S.A. for instance is estimated around three million jobs by midsummer in 2020, with a similar trend in Europe and other parts of the world (Siddiqui, 2020). Furthermore, South Asia, particularly for Pakistan, is predicted by the World Bank to face a deep recession in what is assumed to be its worst economic performance in 40 years (World Bank, 2020). Based on these statistics, the current global crisis will likely be worse than the 2008 crisis (UNCTAD, 2020).

5. Impacts of COVID-19 on SMEs

The early evidence indicates that the impact of the COVID-19 pandemic on SMEs is worse than the 2008 financial crisis. Given that SMEs are the engines of economies around the world, their collapse could significantly impact the growth of national economies(Beraha& Đuričin, 2020). “Yet, we know very little about how these small businesses were affected by the current crisis”(Aleksiev et al.,2020:20). However, it is known that “SMEs are generally more vulnerable in times of economic crisis” (Beraha& Đuričin, 2020), and in situations where ‘external crisis jeopardizes markets, such as the recent COVID-19 outbreak, SMEs are hit with great force’ (Eggers ,2020). ‘The negative effect of the invisible enemy is ravaging the entire world populace, leading to global economic crisis. Businesses across the globe are feeling the negative impact of the coronavirus COVID-19 pandemic threatening their going concern status’(Musa and Aifuwa, 2020:55), while ‘Within this business world, small companies are likely to suffer more than larger ones because they tend to be more vulnerable with fewer resources to adapt to a rapidly changing context’ (ITC,2020).

‘Covid-19 has created an enormous systemic economic shock, potentially surpassing the one created by the global financial crisis (GFC) in 2007/08’ (Baker et al, 2020; Brown and Rocha, 2020 in Brown 2020). ‘Such is the uniqueness of the current crisis some label it a metaphorical “black swan event” for entrepreneurship, as it encompasses virtually every sector, every type of business and every country spanning the global economy (Kuckertz et al, 2020 in Brown 2020). However, Impacts on SMEs varies in intensity and duration between economies, countries, size and resilience of businesses and sectors. Food and Medical items distribution, during Covid-19 pandemic, for instance, receives priority to maintain open supply chain systems for food and medicines (Oxford Business group, 2020 in Tasnim,2020). However, SMEs, especially working in the food sector, are one of the sectors that are affected, not only in the economy but also in behavior related to food processing(Gunawan and Siregar, 2020).

SMEs ‘may be most vulnerable to the economic effects of COVID-19 as they are less able to deal with the economic impacts of lockdown restrictions and access the financial support needed to survive’(Hoorens et al.,2020). In a study by Piette and Zachary (2015 in Fitriasisari, 2020:53) it was found that SMEs are perceived by banks to present a higher risk during crises, which in turn explains tighter credit, as the number of COVID-19 cases registered globally reached 1,214,466 confirmed cases, with a total of 67,767 deaths spread across 211 countries (Fitriasisari, 2020:53). Furthermore, SMEs “lack the potential to deal with the uncertainty” created by Covid-19, noting that even in normal conditions, SMEs often have to “struggle in the competitive business environment because of the scale and size of business and limited resources” (Sharma, 2020). From all above, the Pandemic Situation and restrictions whether by government policies, banks or demand-supply chains, form great impacts on SMEs function, form, size, and survival.

6. Impacts of COVID-19 on Circular Economy and Sustainability

‘The emergence of COVID-19 has brought unprecedented turbulence to the societal and economic systems around the world ...(and) no industry sector has remained unaffected’ (Neumeyer et al., 2020). Yet, “most policy initiatives protect the building blocks of their linear economies – established corporations and their supply

chains, financial markets, or existing industries – sidelining waste management and resource concerns, (creating) challenges (that) fuel ongoing conversations ... about the post-COVID 19 reprogramming of our linear economy towards a more circular one... (where) entrepreneurs can play a vital role” (Neumeyer et al., 2020). “The COVID-19 pandemic has exposed businesses and societies to the shortfalls of *normal* patterns of production, consumption, and their long-lasting impact on supply chains”(Nadia et al., 2020) . The crisis highlighted weak points in the normal linear model; “entrenched inequality, climate breakdown and inherent fragility” with amplifying the “interconnectedness of all humans across the globe and the interdependencies binding our natural, social and economic systems” concluding that “we are only as strong as our most vulnerable citizens” (Haigh & Bäunker, 2020). Individuals and groups promoting for sustainability worldwide do not consider linear economic systems as the way forward, with its clear impacts on species extinction, habit destruction and resources depletion and contamination in its thrive to maximizing economic growth, and also its impacts on mankind future generations. Furthermore, the crises exposed and challenged the existing economic models that are dependent on continuous supply of raw materials through linear supply chains . Boyer et al.(2020) notes that the CE principles can mitigate the overconsumption of row materials and the overproduction of waste as a small but growing number of individual firms employing more circular business models in industry. Circular Economy is also viewed by Schröder(2020) as a successful way forward in reducing existing tension and struggle around resource conflict. On other words, “under the collective experience of the covid-19 pandemic, there has never been a more salient time to consider how the circular economy could be translated into reality – a new normal – when economies begin to pick up again”(Haigh & Bäunker, 2020). According to Neumeyer et al.(2020) “researchers and practitioners need to recognize that entrepreneurs are important change agents who can help in the transition to a more sustainable and circular economy”, as ‘entrepreneurial ecosystems play an important role in the foundation and growth of enterprises and determine the long-term prospects of regional development and sustainable urban development(Neumeyer et al., 2020). Entrepreneurship is needed to fill gaps and build bridges to take CE from theory to practice. According to Nogueira et al. (2019): ‘Efforts to create the circular economy aim at closing material loops, but these efforts are limited because they only consider the flows of a few types of capital - natural, manufactured and financial, and are based on specific interests of a few actors. Other types of capital - human, social, political, cultural and digital - are often ignored, and as such the full scope of dynamics in a system is missed’.

Topic	Explanation	Summary	Reference
Reduction in air pollution	pollutant emissions and natural resource use have slowed	As the pandemic has limited our economic activities, consumption and movement, pollutant emissions and natural resource use have slowed, and the rate of environmental damage has fallen in most areas.	Unece , 2020
	Decrease in some air pollutants like NOx and SOx.	A study conducted to examine the status of air quality during and pre-COVID-19 lockdown, and to recommend some long-term Findings: “the declining trend of air pollution level in Kolkata (India) during lockdown is a momentary phenomenon”, during the lockdown, showing positive environmental impacts The result shows that the pollutants like CO, NO2 and SO2 are significantly decreased, The decrease however is thought to be momentary	Bera et al.,2020
	Dramatic but temporary improvements in air quality as industry and transport shut down.	Shipping has declined worldwide and reduced impacts on marine systems might be expected. likely to see a global decline in greenhouse gas emissions, as well as large reductions in other drivers of global warming, such as the contrail cirrus from high-flying aircraft. Seattleite images have shown dramatic improvements in air quality in every country affected by the pandemic, as industry and transport shut down. The improvement is thought to be only temporary short-term.	Corlett et al., 2020
	Reduction in greenhouse gases globally	Global atmospheric emissions are reduced by 2.5Gt of greenhouse gases, 0.6Mt of PM2.5, and 5.1Mt of SO2 and NOx.	Lenzen et al.,2020
Increase in some air pollutants	O3 has been slightly increased in 2020 during the lockdown	The objective of this study is to examine the status of air quality during and pre-COVID-19 lockdown and to recommend some long-term sustainable environmental management plan. The result shows that the average level of O3 has been slightly increased in 2020 during the lockdown due to close-down of all industrial and transport activities In India,	Bera et al.,2020
Co2 continue to rise	CO2 concentrations in the atmosphere continue to rise	Despite all other improvements and decrease in some pollutants, Carbon dioxide concentration in the atmosphere continues to rise.	Unece, 2020
	temporary emissions reductions only have a limited effect on atmospheric concentrations.	Efforts to control COVID-19 transmission have reduced economic activity and led to temporary improvements in air quality in some areas. In contrast, as carbon dioxide and other greenhouse gases that drive climate change persist for a long time in the atmosphere, temporary emissions reductions only have a limited effect on atmospheric concentrations. Carbon dioxide levels at observing stations around the world in the first months of 2020 have been higher than in 2019.	Who, 2020

Topic	Explanation	Summary	Reference
Increasing waste in food packaging	Food provision became a priority together with safety from virus spread. Food packaging increased.	the UK government has made efforts to provide certain populations with food parcels and free meals to collect and take home	Nicola et al., 2020
	Increase in plastic especially in packaging		Unece , 2020
Increase food waste	Due to transport issues	As transportation and other service sectors clamped down farmers are unable to buy and sell their goods, this leads to wastage of efforts and goods and imbalance in economy.	Mishra& Mishra, 2020
Medical waste	Management challenge	Managing massive healthcare waste became a challenge for both developed and developing countries.	Unep, 2020b
	Huge face masks ,gloves and medical waste reaching the ocean.	From the beaches of the Côte d'Azur to the Soko Islands in Hong Kong, single-use COVID-19 waste (such as gloves and masks) is washing up along shorelines around the world, reported Francesca Giuliani-Hoffman for CNN . A new study revealed that roughly 129 billion face masks and 65 billion gloves have been used each month since the pandemic began , and according to recent reports, a significant amount of this medical waste is dumped into the world's oceans, where it can be ingested by species such as seabirds and sea turtles that confuse it for food.	Giuliani-Hoffman, CNN, 2020
Covid waste may result in 'more masks than jellyfish' in the sea	roughly 129 billion face masks monthly, mostly reaching the world's oceans.	Francesca Giuliani-Hoffman, CNN (From the beaches of the Côte d'Azur to the Soko Islands in Hong Kong), single-use COVID-19 waste (such as gloves and masks) is washing up along shorelines around the world. roughly 129 billion face masks have been used each month since the pandemic began. a significant amount of this medical waste is dumped into the world's oceans.	Giuliani-Hoffman, CNN, 2020
waste management	Due to prioritizing health issues	Challenges to green resource and waste management As health issues becoming the priority	Neumeyer et al.,2020
	Impact on Waste management operations	Lockdown induced mobility restrictions and economic downturn also impacted the operations of waste management.	Unep, 2020b
Relaxing plastic reduction regulations	to meet the immediate demand for increased home deliveries of food and provisions.	Efforts to control and minimize plastic received a setback and many countries had to relax their regulations on plastic only to meet the immediate demand for increased home deliveries of food and provisions.	Unep, 2020b
	Halt waste recycling as Priority to avoid infection.	Waste recycling in the informal sector came almost to a halt due to fears and concerns about infection.	Unep, 2020b
Increase in illegal dumping of waste	Restricted conservation activities	Activities to conserve ecosystems and biodiversity have been restricted leading to an increase in illegal waste-dumping, hunting and logging, for example	Unece , 2020
Single-use-gloves	Priority to avoid infection.	resources and waste management with health and safety concerns (e.g. single-use-gloves)	Neumeyer et al.,2020
Short term environmental benefits	Only short-term environmental benefits and not sustainable	Any short-term environmental benefits as a result of COVID-19 come at an unacceptable human and economic cost, and are no substitute for planned and sustained action on air quality and climate.	Who,2020
Increase unsustainable harvest of nature	Due to increasing poverty	As people lose their livelihoods, increased poverty will likely lead more people to turn to unsustainable harvesting of natural resources.	Unece , 2020
Delaying environmental solutions	Due to delay in negotiations	The lockdown has led to the postponement of vital negotiations on global environmental governance in the expected climate change and biodiversity "super year".	Unece , 2020
Rewarding green energy use	Stop charging for green energy	Tax relief for the economy is also the best rated package of measures by medium-sized enterprises . Some countries stopped charging for green energy Slovenia temporarily released SMEs from paying electricity from renewable source	Beraha& Đuričin, 2020
Research facilities shut down	University laboratories and other research facilities have shut down	ending many lab-based experiments and halting new research and impacting research,	Corlett et al., 2020
	universities shifted face-to-face education to remote or online learning, creating significant challenges higher education community	The Covid-19 pandemic has undoubtedly disrupted the higher education sector worldwide leading to the near-total closures of universities and colleges. Universities shifted face-to-face education to remote or online learning. These have created significant challenges for the global higher education community	Abdulkareem & Eidan (2020)
Halt field research	because of travel and entry restrictions, and safety concerns,	which also means that inability to conduct field-based social research that requires interviews or focus groups, and to conduct oceanographic research cruises	Corlett et al., 2020
missed opportunities to identify conservation priorities	Due to Postponement or cancelling of research	Postponement or cancelling of research results in, missed opportunities to identify conservation priorities and monitor the health of endangered species and ecosystems, and provide practical solutions for the protection and sustainable use of resources on which human well-being depends.	Corlett et al., 2020
reduce funds available to national governments and conservation foundations,	Because of The looming global economic recession. and potentially reduce funding for research grants and conservation programs	Projects funded by the Inter-American development bank (IDB) and the Global Environment Facility (GEF), for example, are now requesting a formal risk analysis related to the pandemic to assess whether and by how much the projects they fund will be impacted by the virus. Conservation research is unlikely to be a government priority during the post-pandemic economic recovery, and conservation biologists must communicate the many benefits that both this research, and biodiversity itself, provide society. Organizations reliant on external donors to employ staff and implement research and conservation activities will be particularly vulnerable	(Corlett et al., 2020)

Topic	Explanation	Summary	Reference
Impact on commodities market	disturbances in supply chains can severely and quickly affect the commodity markets	The disturbances in supply chains can severely affect the commodity markets in short time duration, while food security is a prime concern. The prices of major commodities are facing a downward trend since January 2020.	Rajput, et al., 2020)
	Consequences of COVID-19 on commodity market are large and likely to exist for longer	The consequences of COVID-19 on human health and commodity market are large and are likely to exist for quite some time. The global impact of this new pandemic is, however, indefinite and expected to be followed by weaker growth and deep recessions even in advanced economies	Rajput, et al., 2020)
Agriculture and Food Business	Increase in export of some food products	exports of some agricultural products especially grain and oil held strong and even increased, implying the essential demand for staple food during the pandemic	LIN & ZHANG, 2020)
	Global food consumption unaffected	global food consumption is largely unaffected due to the inelastic demand of most agricultural commodities and the short duration of the shock Food insecurity resulting from the pandemic in many developing countries, was accompanied with little effect if any of global food consumption	(Elleby et al.,2020)
	Agriculture industry least affected	The agriculture industry is one of the least affected so far by this pandemic due to its indirect relation with economic activities	Rajput, et al., 2020)
	Decline in agriculture businesses exports	Decline in agriculture businesses exports on average agricultural businesses experienced declines in the exports,	Lin & Zhang, 2020)
Future uncertainty	Future impact on achieving SDGs due to global health emergencies, and a global economic slowdown.	Coronavirus outbreaks cause global health emergencies, and a global economic slowdown. Trade, investment, and employment have all been affected and the crisis will have an impact on achieving the Sustainable Development Goals. Large-scale social restrictions include at least consolation of schools and workplaces, restrictions on religious activities, and restrictions on activities in public places or facilities. Coronavirus outbreaks cause global health emergencies, and a global economic slowdown	Fitriasari, 2020
	Expected more pressure on environment post covid19 With less constraints and less budget	Once the pandemic eases, pressure on the environment will resume and risks being less constrained, if recovery investment goes to dirty industries and less finance is available for green investment.	Unece , 2020
	Unknown processes for rebuilding Rapid Post-covid green economy	There is a risk that many countries might perceive a green recovery as a luxury good. Countries are going to want to start rebuilding their economies as soon as possible, but it is yet unknown how this process will affect the ambitious climate targets and The Green New Deal.	Fitriasari, 2020
Wildlife	Turtle nesting and Birds nesting records increased	More nests have been or are expected to be laid in the 2020 nesting season compared to the previous years in the UAE and Qatar. "ere has been a decrease in disturbance on nesting beaches due to the COVID-19 lockdown.	Al-Muhannadi et al. , 2020
	Less staff for monitoring and beach cleanup	the lockdown also decreased the number of field workers available for monitoring sea turtles and hence, there may not be records of all the nests. "is also meant that there was a decrease in the usual rescue and treatment of stranded turtles. "there are also fewer beach cleanup activities, which can result in beach debris accumulation and make it challenging for nesting turtles and hatchlings to navigate the beach to the sea.	Al-Muhannadi et al. , 2020
Increase in Plastic Waste Footprint (PWF)	Increase in energy and environmental footprint of products needed for personal protection and healthcare	he impact of the pandemic and epidemic following through the life cycles of various plastic products, particularly those needed for personal protection and healthcare, is assessed. The energy and environmental footprints of these product systems have increased rapidly in response to the surge in the number of COVID-19 cases worldwide, while critical hazardous waste management issues are emerging due to the need to ensure destruction of residual pathogens in household and medical waste.	Klemeš et al., 2020
Decrease In solid waste production	solid waste production in the main cities in Brazil has decreased	In a study analyzing data from 30 cities, representing a population of more than 53.8 million people (25.4% of the Brazilian population). Unexpectedly, solid waste production in the main cities in Brazil has decreased during the social isolation period, possibly because of reduced activity in commercial areas. The latest data on solid waste in Brazil have revealed that more than 35% of medical waste has not been	Urban & Nakada, 2020
hindering resource and energy saving	Suspension of recycling wasted electricity and portable water production from waste	The suspension of recycling programs has hindered natural resources from being saved, with emphasis on 24,076 MWh of electric power and 185,929 m3 of potable water – respectively enough to supply 152,475 households and 40,010 people, over a month.	Urban & Nakada, 2020
Recycling suspension and increase landfill waste	Environmental and economic impacts of waste sent to landfill instead of being sold for recycling	total sale price for recyclable materials during the suspension of recycling programs reaches more than 781 thousand dollars, being these materials disposed in landfills – demanding an extra volume of 19,000 m3 – reducing landfill lifespan, and hence causing a double loss: economic and environmental.	Urban & Nakada, 2020

Table1 : Systematic Review of Environmental Impacts of Covid-19 Pandemic on CE

Environmental aspects, on the other hand, showed conflicting phenomena, as seen in the systematic review in Table1 above. . From one end, air pollution noticeably decreased, with limiting travel by airplanes and even trains, buses and cars. Mount Everest was visible from Kathmandu valley, located 200 km away, for the first time. Also, in the Arabian Gulf, people on the east coast of Saudi Arabia took pictures of Bahrain located on the other side of the Saudi-Bahraini sea bridge, that was never visible before, with more than 2 Million cars crossing the bridge annually, before the lockdown. Field researchers saw and recorded more nesting of sea turtles and birds globally. Many citizens worldwide shared videos on the internet of species and wildlife roaming public places, where high traffic of vehicles and people stopped. But on the other end, millions of masks with plastic lining, and ropes, were recorded in the sea trapping, torturing, and killing birds and wildlife with no mercy. Also, chemicals were used in high excess to disinfect surfaces, everywhere, with no EIA or concurrent study of their impacts on the environment and health. At the beginning of the pandemic, many news stories and social media videos and posts got many to think that the environment is benefiting from the Covid19 situation. Being able to see mountains and lights of buildings on the other side of the sea was attributed by some news reporters and social media environmental bloggers, to improve in air quality and absence of smoke and other pollutants. Also wildlife was reported to be seen and filmed in places that had high traffic or crowding of humans before the pandemic. Some news were also shared in social media about how the Ozone layer is healing, because of the lockdown. According to publications, reports and official declarations of different agencies in the United Nation (UN), environmental impacts of the pandemic are huge and spread all over different countries. “Any short-term environmental benefits as a result of COVID-19 come at an unacceptable human and economic cost, and are no substitute for planned and sustained action on air quality and climate”(WHO,2020). Efforts to control COVID-19 transmission have reduced economic activity and led to temporary improvements in air quality in some areas (UNEP,2020b). In contrast, as carbon dioxide and other greenhouse gases that drive climate change persist for a long time in the atmosphere, temporary emissions reductions only have a limited effect on atmospheric concentrations. Carbon dioxide levels at observing stations around the world in the many first months of 2020 have been higher than in 2019.(WHO,2020). In India, for instance, a study conducted by Bera et al. (2020) to examine the status of air quality during and pre-COVID-19 lockdown shown decrease in most pollutants like Sulphur oxides (SO_x) and nitrogen oxides (NO_x) and Carbon Monoxide (CO), but also an increase in others like the Ozone. It is stated in this study that “the declining trend of air pollution level in Kolkata (India) during lockdown is a momentary phenomenon”, during the lockdown, showing positive environmental impacts. But CO₂ concentrations in the atmosphere continue to rise and there is an increased use of plastics, notably in packaging(UNEP,2020).

However, "managing massive healthcare waste became a challenge for both developed and developing countries" (UNEP,2020b). As food provision became a priority together with safety from virus spread, food packaging increased (Nicola, 2020). As a result, “efforts to control and minimize plastic received a setback and countries had to relax their regulations on plastic only to meet the immediate demand for increased home deliveries of food and provisions” (UNEP,2020b). Lockdown induced mobility restrictions and economic downturn also impacted the operations of waste management (UNEP,2020b). As transportation and other service sectors clamped down farmers are unable to buy and sell their goods, this leads to wastage of efforts and goods and imbalance in economy (Mishra& Mishra, 2020). Waste recycling in the informal sector came almost to a halt due to fears and concerns about infection (UNEP,2020b). “The sudden shift in waste composition and quantity highlights the need for a dynamically responsive waste management system, to deal with the rapid increase in “energy and environmental footprint” of products especially related to personal protection and healthcare” with “critical hazardous waste management issues are emerging” for both domestic and medical waste, with the necessity to deal with “residual pathogens” in. (Klemeš et al., 2020)

Efforts to control COVID-19 transmission have reduced economic activity and led to temporary improvements in air quality in some areas. In contrast, as carbon dioxide and other greenhouse gases that drive climate change persist for a long time in the atmosphere, temporary emissions reductions only have a limited effect on atmospheric concentrations. Carbon dioxide levels at observing stations around the world in the first months of 2020 have been higher than in 2019 (WHO,2020).

University laboratories and other research facilities have shut down, ending many lab-based experiments and halting new research, with loss of access to field sites, because of travel and entry restrictions, and safety concerns, which also means that inability to conduct field-based social research that requires interviews or focus groups, and to conduct oceanographic research cruises(Corlett et al., 2020). Postponement or cancelling of

research results in “missed opportunities to identify conservation priorities, monitor the health of endangered species and ecosystems, and provide practical solutions for the protection and sustainable use of resources on which human well-being depends” (Corlett et al., 2020).

Protected Areas, Natural habitat and fragile wildlife is likely to receive less attention, during the pandemic, with expected big impacts, as conservation field workers are overwhelmed with health and economic difficulties and movement restriction. Wildlife crimes are likely to increase with less surveillances and frequent patrolling in the protected areas and absence with financial support is a challenge for maintaining the conservation efforts(Neupane, 2020).

Activities to conserve ecosystems and biodiversity have been restricted leading to an increase in illegal waste-dumping, hunting and logging, for example (UNECE,2020). Al-Muhannadi et al.(2020) noted in recent studies of sea turtles conservations in islands and coastlines of the Arabian Gulf, that more sea turtles seem to have successfully arrived and nested in UAE and Qatar, but less resources were available to contribute in both recording and conservation efforts due to the lockdown and precautionary procedures. Furthermore, less conservation staff and field worker were available for sea turtle monitoring during the lockdown also decreased the number of beach cleanup activities by volunteers and hence, a decrease in the usual rescue and treatment of stranded turtles, and increasing the risk on hatchlings as beach debris accumulation can “make it challenging for nesting turtles and hatchlings to navigate the beach to the sea”(Al-Muhannadi et al.,2020). It also meant fewer working hours and manpower available for reporting and recording of all the nests along the beaches in the Arabian Gulf.

“Any short-term environmental benefits as a result of COVID-19 come at an unacceptable human and economic cost, and are no substitute for planned and sustained action on air quality and climate” (WHO,2020). As people lose their livelihoods, increased poverty will likely lead more people to turn to unsustainable harvesting of natural resources. The lockdown has led to the postponement of vital negotiations on global environmental governance in the expected climate change and biodiversity “super year”. Once the pandemic eases, pressure on the environment will resume and risks being less constrained, if recovery investment goes to dirty industries and less finance is available for green investment (UNECE, 2020).

As with many concerns discussed here, the impact will depend on how long shutdowns last and whether different activities related to conservation and environmental protection are “simply postponed or permanently cancelled” (Corlett et al., 2020). Furthermore, once the pandemic eases, pressure on the environment will resume and risks being less constrained, if recovery investment goes to dirty industries and less finance is available for green investment (UNECE , 2020)

7. Results and Discussion

Impacts of COVID-19 pandemic on economy was found to be devastating, even worse than that of the economic crises on 2008, and the WorldWar2. Job loss partially or fully was found to be evident everywhere with more presence in relatively new SMEs , and amongst those who lacked the ability to shift their business to online.

The crises and its severe economic and social impacts reduced the countries all over the world had to take huge debts as their GPA decreased and they needed to provide aid packages and health care testing and containments equipment and facilities. There is a register of life loss, especially amongst the medical staff, from all-over the world, and lockdown precautionary procedures impacted businesses and livelihood of everyone.

Agriculture was impacted severely in some areas and less in other areas. According to Rajput et al. (2020) “the agriculture industry is one of the least affected so far by this pandemic due to its indirect relation with economic activities”. However Pu & Zhong(2020) raises concern that “unreasonable restrictions would block the

outflow channels of agricultural products, and hinder necessary production inputs”, and “destroy production cycles, and finally undermine production capacity”. This was illustrated further by Zhang et al.(2020) due to strict prevention and control measures, negative impact on agricultural production are expected because of “resource misallocation and efficiency loss”. Also, the study projected that “COVID-19 will lower China's agricultural growth rate by 0.4%–2.0% in 2020 under different scenarios” (Zhang et al.,2020), but also the ultimate impact of COVID-19 pandemic will greatly depend on the severity and duration of its outspread, but it is expected to have long-lasting implications(Rajput et al. 2020), which requires policy-makers attention to make up for the losses by first identifying how heavily epidemics affect agriculture through different channels and the mechanism of this impact(Zhang et al.,2020). According to Elleby et al. (2020), food insecurity resulting from the pandemic in many developing countries, was accompanied with little effect ,if any, on global food consumption “due to the inelastic demand of most agricultural commodities and the short duration of the shock”, but also with reduction in greenhouse gases from agriculture by about 1% in 2020. Furthermore, although agricultural businesses went through declines in the exports in general with increase in some products such as grains , oil and medicinal herbs “implying the essential demand for staple food during the pandemic”, impact of the pandemic on SMEs “was more severe than that on larger firms” (LIN & ZHANG, 2020).

Positive environmental impacts were found due to decrease in air pollution with the phenomenal decrease in use of transport, but also wildlife was seen more often and outside their usual places. Environmental benefits however, was thought to be only short-term and not sustainable. Co₂ also continue to rise.

Also negative impacts were reported by environmental NGOs related the excess use of masks and gloves that end up in the sea and harming wildlife by entanglement or mistaking them for food. “Conservationists warn Covid waste may result in 'more masks than jellyfish' in the sea” (CNN,2020). Single-use COVID-19 medical waste such as gloves and masks is washing up along shorelines around the world, including a monthly 129 billion face masks and 65 billion gloves dumped into the world's oceans, since the pandemic began, where it can be ingested by species such as seabirds and sea turtles that confuse it for food (CNN,2020).

Waste management issues in general, including Increasing waste in food packaging, that became a big growing due to food safety issues related to Covid-19 and provision of food on daily basis to large number of people who lost their jobs or became homeless. On the other hand, food waste has increased due the halt of and clamped down of transportation and other service sectors resulting in disabling farmers from sell their goods. Different operations of waste management are disrupted including halting of waste recycling in some regions, relaxing plastic reduction regulations and even increase in plastic especially in packaging and increase in illegal dumping. This and the massive increase in medical waste provided Challenges to green resource and waste management. Due to the state of emergency in many laces and economic crises, environmental solutions are delayed and receiving much less attention, accompanied with increase unsustainable harvest of nature that is likely to continue post covid19 with expected more pressure on environment.

Alekseev et al.(2020) argues that ‘COVID-19 pandemic and associated public health interventions have led to substantial changes in business and work environments’, with government orders forcing businesses to close suddenly, as ‘infection risks led to an accelerated adaptation of modern sales and communication technologies, and school closures placed increased childcare duties on many working parents’. Recognizing that the pressure imposed on owners, managers, and employees of SMEs, that are run often by centralized management of few responsible individuals, while these small businesses are ‘a key driver of economic growth and employment in the U.S., as well as a central focus of many policy efforts, they are often underrepresented in traditional data sources’ (Buffington, Dennis, Dinlersoz, Foster, and Klimek, 2020 in Alekseev et al, 2020).

8. Conclusion and recommendations

According to ITC(2020): in order to help SMEs, it is useful to consider the way in which the pandemic crisis affects SMEs, for ‘it does not strike all at once, but in a cycle of phases’. The current crises provided a wealth of examples and a good opportunity to study these phases in different SMEs all over the globe, if a central entity like the UNDP or World Ban started such an initiative. Such initiatives can also provide a better understanding of the most efficient and essential ways that governments and aid agencies can follow in circumstances similar

or even more cruel than this crises. As Alekseev et al.(2020:20) argued in his study that studies the impacts of COVID-19 Pandemic on small businesses by researching evidence from the owners, managers, and Employees: ‘findings highlight the struggles faced by small businesses and their employees, and underscore the need for policy interventions ... would help us compare how differences in government responses and orders impacted small businesses in various countries, and provide better evidence for effective policy interventions’.

SMEs are believed to have great potential for growth and surviving difficult circumstances. According to Sharma(2020): SMEs have been able to bypass barriers and grow into large enterprises, despite not enjoying sufficient resources, with known examples such as Facebook and , Amazon’ that started in garage or home with scarce resources, made it big with sheer passion and skill’, which is exactly the same grit needed by SMEs’ in order to face the challenges thrown by Covid-19’. But SMEs ‘lack the potential to deal with the uncertainty created by Covid-19’, and even under normal conditions, ‘SMEs often have to struggle in the competitive business environment because of the scale and size of business and limited resources’ (Sharma, 2020). SME have a significant role in increasing employment, forming gross domestic product (GDP), and providing safety nets, especially for people affected by the financial and economic crisis. (Fitriasari, 2020:53). In other words, SMEs dominate the Scottish business population (and other places in the World), so how these firms survive, adjust and adapt to the Covid-19 crisis will have an enormous bearing on future economic and societal welfare in Scotland for years to come. (Brown, 2020)

The authors of this paper believe that gaps, especially in environmental protection and promotion, can provide a promising opportunity for SMEs to develop new product, service, or solutions, that can fill needs, in temporary absence of other competitors, which can be the start of an emerging market or small businesses that can deal with the three pillars of sustainability simultaneously. Encouraging, supporting and rewarding initiatives in that direction lay in the hands of governments, policy makers and funding agencies. In extraordinary situations like Covid19 Pandemic, extraordinary set of minds, and processes are needed. Policy making need to deal with the pandemic with good governance and in meaningful informative and transparent participatory approach with all stakeholders involved, including, and with focus on, SMEs. This presents important opportunities for policymakers, researchers and international organizations like UN agencies that are seeking to understand the aggregate and distributional effects of large economic shocks such as COVID-19 on the performance of small businesses, and how to design better policies, frameworks and guidelines to maximize the readiness and ability in SMEs both to survive and contribute in the solution when crises hit again. Circular Economy can succeed in reducing existing tension concerning resource conflict and distribution inequality according to Schröder(2020) with multi-stakeholders approach in resource management, based on governance participatory practices.

“While Asia, Europe and the USA have been the most directly impacted regions, and transport and tourism the immediately hit sectors, the indirect effects transmitted along international supply chains are being felt across the entire world economy. These ripple effects highlight the intrinsic link between socio-economic and environmental dimensions, and emphasise the challenge of addressing unsustainable global patterns. How humanity reacts to this crisis will define the post-pandemic world”.(Lenzen et al.,2020) Recommendations derived from UNEP seem to go into the direction of the necessity of not going back to the ‘normal’ lifestyle on the level of states small and large organizations, and individuals, before that Pandemic, as ‘normal’ is placing our future in doubt by damaging the health of our species, societies, economies and the planet. “We cannot go back to our old ‘normal’. Instead, we must go forward, charting a future where we focus our energies on building low-carbon, nature-positive economies and societies” (UNEP,2020).

Food security and protecting domestic agriculture and small scale food producers that are usually run by SMEs and small family businesses unfolded itself as an important aspect of sustainability. Countries that had their shares of failure and success in large scale during the pandemic in that filed like China can possibly offer recommendations to other developing countries experiencing serious outbreak to protect domestic agricultural production and their own food security. One of the lessons learnt is when a negative effect is inevitable, the key question to policy-makers should be how to make up for the loss by mitigation and compensation, by first identify the weight and the mechanism of the impact on agriculture through different channels and of this impact, keeping in mind that SMEs are more impacted than bigger businesses.

It is the conclusion of the authors of this paper that governments need to direct sufficient resources to ensure the continuity of conservational and environmental protection programs and policies that existed pre-covid, and also to record and register any changes in number and behavior of migratory species, for this is a unique opportunity to gather baseline data of that nature for future analysis. The Pandemic Situation proven that virtualization and digitization is possible, and also a very efficient solution saving not only the environment, but also money and resources. It is the recommendation of this paper to capitalize the work in that direction, and support SMEs to save energy and materials by shifting to on-line businesses and offices. Also post-covid plans for green recovery, strategies an programs, should be in place to ensure that there will not be a rush to business-as-usual or worse after the pandemic is over and the lockdown is lifted.

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