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Jean-Pierre Doussoulin

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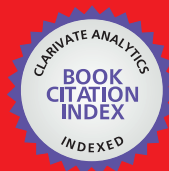
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COVID-19: Turning a Threat into an Opportunity for the Circular Economy

Jean Pierre Doussoulin

Abstract

The current crisis dominates everything from health to day-to-day life. But it will pass over within a relatively short space of time and the economic recession seems likely to reverse the long-standing pattern. Given the gravity of the circumstances, nations have been constrained to undertake unusual approach arrangements. This article proposes a framework of the COVID-19 effect following analysis and comparison of the most prominent concepts of the public health and circular economy. Our paper helps to identify the positions of each of these concepts with regard to public health, environmental sustainability and economic growth. This study enriches the literature on the environmental sciences and public health by providing analysis of the effects of the policies. Finally, this article recognizes that there must be local action priorities that allow for small and sequential wins in economic, health and environmental aspects in the territory.

Keywords: COVID-19, circular economy, waste, health, growth, environment

1. Introduction

As a result of this pandemic, we can note the disappearance of questions and conversations related to climate change [1]. It seems that the lack of progress towards the objectives of the Paris agreement has disappeared into the background. What would once have been the center of attention in most forums and agendas does not even reach the inside pages of magazines or newscasts. Our global consciousness has shifted towards survival and transcendence, as a species, which are immediate threats to our lives [2].

This desire for transcendence allows us to analyze what happens when we are closer to the top of the pyramid and all our basic concepts are covered as in Maslow's pyramid [3]. With the pandemic around the world, we have all been taken down on some levels and we are now looking to protect ourselves and our loved ones.

On the surface, it seems that all efforts, all activities and all initiatives have shifted away from the greatest threat to our planet, climate change, towards the immediate and more tangible threat to our lives of COVID-19 [4].

The desire for transcendence can also be expressed towards transhumanism and environmental sustainability. Transhumanism is a social movement predicated on

the belief that we can and should leave behind our biological condition by merging with technology [5]. Environmental sustainability is responsibly interacting with the planet to maintain natural resources and give the ability of future generations to meet their needs. It can be interpreted as an steady state economy [6]. This status depends on legal, thermodynamic, and economic aspects of ecosystem services [7, 8].

This chapter proposes a new regard of the circular economy following analysis of the most prominent issues related with COVID-19, government responses to the crisis and sustainability.

The significance of this article is that it addresses the criticisms of the circular economy paradigms by considering three dimensions of analysis related to the COVID-19 outbreak [9]. The increased demand for sustainable production processes post COVID-19 justifies the need for more effective policies with a focus on human health [1, 10].

2. Methodology

The methodology used in this paper takes sustainability, health care, economic growth and dimensions to provide an analysis related to COVID-19. **Figure 1** presents the analysis of how these three dimensions might be reinterpreted using the framework proposed by Doussoulin [9]. As shown in **Figure 1**, when $\pi = 100\%$, $z = 0$ and $w = 0$, all attention dedicated by the government are apportioned to economic growth. Alternatively, if $\pi = 0$, $z = 0$ and $w = 100\%$, then all attention is given to health care. It is also possible the attention to the earth as a natural resource, this can be represented by the point where $\pi = 0$, $z = 100\%$ and $w = 0$, which corresponds to a sustainable future [11–13].

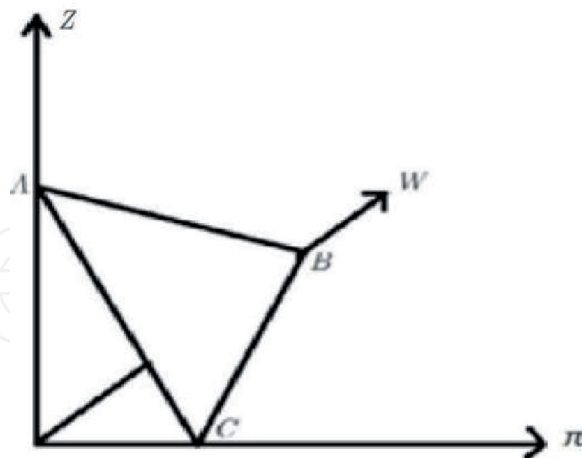


Figure 1.

Three dimensions: Economic growth, health care and sustainability. Source: [9]

3. Discussion

This section outlines a set of matters involving the COVID-19 crisis through the exploration of three dimensions: sustainability, health care and economic growth, as follow:

3.1 Sustainability

3.1.1 Industrial circular economy

The circular economy has rapidly gathered momentum within sustainable development initiatives due to its potential for decoupling economic development and growth from resource consumption [14, 15]. The industrial circular economy corresponds to $\pi = 0$, $z = 100\%$ and $w = 0$ in **Figure 1**. Manufacturing companies play a critical role in the implementation of the circular economy at the industrial level. Success with this role requires a rethinking of the overall value generation logic and the redefinition of business success, by reconfiguring existing business models or creating new business models for the circular economy [16, 17].

The transition of manufacturing companies' business models to the circular economy is still limited, with low market penetration across sectors. Among several external and internal barriers, manufacturing companies face shortcomings in capabilities and skills and require knowledge and scientific-based guidance for business modeling within the context of the circular economy [18, 19].

Academic literature is unable to support companies adequately, due to a core gap related to the lack of systematized practices to provide guidance and advice to manufacturing companies during the design of business models for the circular economy [20]. Based on this gap, a design research methodology was applied in this research, with the objective of developing a theoretical framework to provide guidance and advice for policy-makers and stakeholders [21].

3.1.2 Pressure on the MSW industry

The workload of the MSW (management solid waste) industry has increased due to significant rises in household consumption in Japan [22] and the construction sector in France [23].

The Center for Disease Control (CDC) is saying the same as the World Health Organization and also what Ocean is saying, that solid waste is not an effective vector for the transmission of corona virus from one person to another by being within six feet of that person. Something people need to be aware of when they are at work, whether it is collecting trash, recycling material or a disposal facility. The CDC just late last week, issued a new waste specific fact sheet [24].

That indicated that corona virus can live on cardboard for up to 24 hours, which causes some concerns in our industry. People are also urged to delay their spring cleaning. Individuals will admit that this has not always been successfully communicated [25]. As people at home with a lot spare time, they are using it to clean out their attics, garages and basements, and this is generating a significant amount of material that has stressed the system to some extent. Authors are also communicating the importance of not reusing gloves and masks that people are now wearing and that they should be thrown in the trash after use [26].

We can agree that generally individuals do not want to recycle. The material, even though it is mostly made of plastic, is not recycled on the curbside and unfortunately, what we have seen a great deal is many people throwing away gloves and masks on the street, in parking lots and in parks which is bad for public health in the environment [27]. The fact that some facilities are closing due to small amounts of coronavirus on things that are being handled, at a time when the commodity pricing is actually going up, is ironic. There have been a number of facilities that perform

recycling that have actually closed. They closed because they were unable to provide sufficient social distancing between workers. However most facilities have been either installing Plexiglas separators between the sorters or pickers on the line or they have been separating the pickers [28, 29].

The commercial sector in the United States shut down a major source of recovered paper. A major source of clean, recovered paper was lost, and so it is our hope that, as the United States returns to something like the new normal, we will see that those paper sources in the commercial sector will be available to recycling facilities [30].

There is an interaction at the weighing facilities and to reduce the potential of exposure to the attendants who work there, the use of cash and the signing of documents is being eliminated. Other steps are being taken to ensure there is as little interaction as possible with customers at drop-off centers, where people go to drop off various types of materials such as glass, books or batteries. Those facilities have seen a significant increase in the number of customers that they are receiving so there is a need to keep the customers six feet apart from each other and also from the staff. Disposal facilities also pose a number of hazards and challenges when a waste, hauler or a private citizen goes through a small facility, whether it is by dumper truck or to bring some boxes from the household, hazardous waste or other material [31].

These facilities are urging people to wear masks. Some people are not happy being asked to wear them at some of the facilities. Some facilities have higher safety measures to maintain distance and enforce their rules. Curbside recycling collection has been suspended in several communities [31]. For the use of vehicles, at recycling plants and composting plants, a number of issues in handling the materials and during maintenance were coming up. In the United States, the drop-off centers are adding to the burden. People are very slowly beginning to go back to work and it is our expectation that this is going to continue and some authors will argue a decrease in the amount of residential waste and an increase in the amount of commercial waste being generated [32].

Things were coming to a point where waste management was at risk of stopping because of the worries of the workers and some of their employees, basically there was a very short time frame to sort this out. If it is a commercial collection, maybe it could be stopped, if it is a household collection, it probably could not be, and it cannot be run by a single person because of health and safety or other issues. People could then think about transporting individuals separately through the collection point, and some local authorities in the UK have been taking that approach where they have individually taken collections, from the curbside where the transfer has been done. Other solutions might be screens in the cabs, therefore there is a guidance on screens [33].

There are health and safety issues in assessing the safety of the screen and the material. Whether or not the driver can see through it, whether they can get out of a vehicle safely if there is an accident, and if it is effective in case somebody sneezes and if it will really stop an aerosol from circulating in a cab. There has been quite a lot in the media about viral load and long term exposure to viral load [34].

To what extent can some of the lessons learned in UK composting sites and reducing work exposure to aerosols be translated to the virus or are the particles too small? Authors argued that the reason that has happened is because people in their homes are seeing all this waste being generated and being putting out on the curb which is not usual and seeing it taken away by trucks [35]. Normally, when the garbage truck comes to the house, people are not at home, they are at work, and so the fact that there are these people out there every single day performing this essential service when citizens are told to stay at home has been a way to reinforce the importance of the industry. Authors argue that in the long term, this will

benefit the industry in a number of things, but in the short-term, we will continue to have challenges related to reducing exposure because, unfortunately, the virus is very contagious compared to other diseases. It spreads easily, and at least some component of the virus can live on cardboard for a while [36].

3.1.3 Facilities dedicated to hazardous waste treatment

There is limited research on the viability of this virus in the recycling stream. As pointed out earlier, we need to make sure that those workers who are working with recycling are not touching the recycled material and being infected by COVID-19 [37].

It is a terrible pandemic, so in terms of waste we have to make sure that people are managing it safely. It also highlights deficiencies in the system in the past which individuals are now having to correct to ensure the health and safety of the workers properly. Maybe now people need to address how we protect our workers in general. People need to make the point and highlight the fact that the message must be quite clear to the citizens and to the overall community through different channels that separate collection and recycling services are a part of the overall waste management system and part of those essential services that must keep running [38]. It would be a bad thing if the message that was sent out was that these kinds of services can be interrupted or can be stopped. The support of the people is needed and would be difficult to get back if lost, as all international researchers assert [39].

It would be interesting to analyze where facilities dedicated to hazardous waste treatment are lacking and countries where sufficient capacities exist. The import of hazardous waste from outside the EU is worrying not because of the lack of business, but because it means that potentially stockpiles of hazardous waste will grow and grow in the coming months, with all associated risks for health and the environment. Authors argue that increase is not really the right word to best define the situation. It would be better to say shift: there is a shift in terms of the nature of hazardous waste, a shift from non-dedicated to dedicated hazardous waste treatment facilities and a shift in the internal movement of waste [40].

It is possible to improve recycling in the time of COVID-19. Particularly, People have to think about the fact that if houses are separating their recyclables or households, they cannot contaminate themselves. There is no reason that any city should tell its citizens not to continue recycling. The point is that only recyclables from one household, which only people in that household have touched, are put out for collection for recycling or put into a bin where somebody else will empty. It does require that cities who find recycling to be important at the city level should think about extra storage and extra capacity.

3.2 Health care

3.2.1 Personal protective equipment and COVID-19

We are living in unstable and uncertain times due to current health, economic and social instabilities [41]. The significant challenges to the waste industry are putting authorities and waste workers under significant pressure. That is where it is our duty to ensure that our members and the waste management industry have knowledge and information to keep our towns and cities clean and healthy. Proper waste management is an essential public service that cannot be overlooked in this time of crisis [42].

Pandemics prove to the public worldwide that for crucial issues, scientific support of political decisions and data-driven decision-making is absolutely necessary for a

proper response so a new relationship between science and policy is needed. This is something that has been lacking in waste management the last ten or fifteen years [43].

This period marks a return of single-use plastics after three years of efforts to ban them under a specific framework. Thus, single-use plastics are coming back today and this time also with gloves, with masks and with personal protective equipment that might be infectious [27].

This difficult period is not a reason to change our policies and circular economics for plastics and single-use plastics. Authors argue that the plastic industry is trying to use the pandemics as an excuse to delay any new regulation or secretly use plastics, both at a European or national level [44, 45].

We have a range of wastes being generated at the moment and initially it comes down to segregation and while people may be seeing the volumes of personal protective equipment (PPE) and other medical wastes increasing, we have to look at the relative risk of those wastes. Waste from people who treat a COVID-19 patient, will be particularly risky. [46].

A lot of medical waste will be produced. There will also be some pharmaceutical waste. There will be ventilated type waste; there will be collection mechanisms for contaminated waste, and proper, genuine medical waste. These wastes need to be collected and treated appropriately, not necessarily by incineration where alternative treatments are in place. They should be genuinely treated as infectious medical wastes. There will be a lot more medical waste in our general waste. It has been argued that if we start to call them social distancing wastes rather than medical wastes, even though they look like medical wastes, some distinctions may be able to be made [47, 48].

3.2.2 COVID-19 and HIV virus

Authors claim that many of the patients who have COVID-19 who are very sick and also have other conditions as well. In addition to dealing with the pandemic, people also need to consider that those wastes may also have hepatitis or HIV, as well as those other viruses that we would normally manage as healthcare waste [40, 49]. Individuals have to be aware of the fact that, while this is a very serious pandemic, there are other people that are sick with other diseases, and we have to ensure that these other conditions are managed.

As well as waste, there are other contaminants that could be present. People should be treating anything that is known to be infectious or reliably suspected, and this is where it is not necessary that PPE is classified as medical waste. While authors are seeing pressure from an increasing volume and a decrease in weight into the system, we have to still make sure that we are taking care of health. In effect, COVID-19 is like a little ball of genetic material with a fatty inside with a little protein sticking out of it. People need to ensure that people can use heat when necessary, but not necessarily high temperature in washing. It would be useful to have facilities for washing clothes and washing linen. These wastes should be kept out of the waste stream. People need to ensure that the threat against waste workers is mitigated and that may be done by social distancing and PPE. Welfare facilities that ensure that people can wash their hands should also be given because it is not a good idea that more people get sick [50].

It would also be useful to have facilities to ensure that people can maintain not only their personal hygiene, but also environmental hygiene. As authors argue, as there is an increase in the volume of waste arriving to waste facilities, all need to be operating effectively in this situation. It depends on existing infrastructures and the capacities for the treatment of hazardous waste and it also depends on the strictness of lockdown and how it impacts the industrial activities. It is important to say that the other waste treatment facilities never stop during the crisis. Part of the

healthcare waste is treated in hazardous waste incinerators and, during this period, where the quantity and mostly the volume of this care waste rises by twenty to forty percent, all permitted capacities are used [31, 51].

A change in the distribution of the different categories of hazardous waste has been observed. Some industrial activities work intensively, for example, the pharmaceutical sector, and others slow down or have even stopped completely, such as the automotive industry and all the suppliers, hazardous waste from households and hazardous waste in small quantities, drums or buckets from refuse collectors. Another important aspect is those non dedicated facilities which treat hazardous waste as a side activity, have slowed down or drastically reduced or even shut down, such as part of the cement industry due to the stopping of activity in the construction sector. Companies have dedicated operators for the treatment of hazardous waste, and they have been able to take over. If we take the case of Europe, we face an increase of transboundary shipments from within the EU to countries where treatment capacities are lacking [38].

3.2.3 Medical waste recycling and government issue

Waste management has been classed as an essential public service in most countries, which means waste management professionals must navigate the health and safety risks related to coronavirus, although, information about the virus is still evolving [52]. It is essential that countries ensure that waste workers, especially frontline collection and processing employees, are afforded maximum protection and remain safe and can support communities in mitigating the spread of the virus [44]. The medical issue corresponds to $\pi = 0$, $z = 0$ and $w = 100\%$ in **Figure 1**.

Some governments have been talking somewhat about the role of the public in protecting solid waste workers [53]. One of the byproducts of the corona virus epidemic has been a very significant increase in the amount of residential recycling and that includes making waste materials safe. The government recommends that people do not use loose tissues or wipes to clean down something that could impact the workers [10].

French and Spanish citizens claim that the first challenge at the beginning of the crisis was to state which of their activities was essential, ensuring that all employees who have to be on-site to operate the facilities can circulate freely during lockdown and be able to secure supplies opportunely. Also, subcontractors facilitate the help of authorities in case of problems. The second action concerned, behaviors and work practices. New safety measures should be applied in order to protect workers by adapting the management of operation teams and their way of working and deploying teleworking. For all others, and last but not least, all necessary personal protective equipment should be provided to everybody, which is probably the trickiest point during this crisis [54, 55].

3.3 Economic growth in COVID-19

We are in the middle of the storm, which does not allow us to see clearly what is coming. But at present the most important thing is to take care of people's health and then employment, which means that people have to understand that we are experiencing a crisis.

A recurring question relates to the time frame in which we will emerge from this crisis. In this sense, the recovery curve represents the impact of coronavirus on the economy. This can have a V- shape if the stoppage is abrupt and the reactivation is rapid, which would not be the effect of COVID-19 for many countries. If economic indicators take longer to reach the levels they were before the recession, a U- shape

may appear. Finally, if the crisis implies a recession in the economy and a very slow recovery, we would be describing the L-shape [56].

There is widespread uncertainty about the economic effects of the crisis [57]. Some authors argue that the recovery will be similar to that which occurred in China between 2005 and 2013, following the tendency of L-shaped growth [58]. This economic effect may be very different in the other countries. In this case, what counts is the adaptation of the population to this “new normality” [59].

This means that people have to adapt quickly, and be flexible in how they proceed. People have to understand that spirits are exacerbated, and act accordingly, both for employees and employers [60]. The second thing is to know that we are in a situation that demands priorities, and here it is the health issue. It would be interesting to measure this problem and understand that very complex weeks are coming, and take measures to try to stop or mitigate the impacts on the environment through the application of waste management policies [44].

In the first part of this chapter we described three dimensions of analysis, now we will briefly delve into the economic dimension. The economic growth and labor issues corresponds to $\pi = 100\%$, $z = 0$ and $w = 0$ in **Figure 1**. It is useful to recognize waste management workers by definition, formal and informal, in daily contact with waste, who are more vulnerable than other categories of the population to potential health problems.

In this way, one of the key issues that is arising all over the world is the need to protect waste workers, formal or informal, as a special asset that provides an essential service. Not only the International Labour Organization, but also many unions and NGOs are advocating putting the protection of waste workers in the center of our attention in this period. For countries outside of the EU and North America, outside of the high-income countries, most recycling is done by independent or informal recyclists who collect materials simply to feed their families [41].

Some countries which have informal recyclers are countries such as South Africa, but also some countries in Europe such as Serbia. There are many people who cannot eat because they are in lockdown. They would normally be picking up recyclables and now they are not allowed to go out. Also people who are in formalized recycling situations. For those in Colombia or Brazil, the government often tells people to stop recycling. At the same time, we even see in the Netherlands a tremendous amount of littering, and so the environment is changing quickly and nobody is really thinking about what these informal workers actually need [61].

Some authors claim that recycling is determined by the country's income level. Low and middle income countries where most recycling happens by independent or informal recyclers, whether formalized as in Brazil and Colombia, or tolerated or semi formalized as in India should have these systems reestablished [62]. What is really important is to figure out a way for them to continue to provide the service that they provide for the city by managing its recyclables and giving the people and their families a way of making a living by thinking actively about how they can safely go about their work [40].

4. Conclusions

We really hope that the post-crisis crisis will be the momentum for radical change in society worldwide. We also propose that people should be referring to expert guidance, not only from their national and regional governments, but also coming out of the World Health Organization and also for low-and middle-income countries.

The COVID-19 crisis assumes that the effects are divided among economic growth, medical and sustainability. So how do we distribute the effect and the

recovery efforts between these dimensions? How to allocate time and humans resources, not mention which trials and which patients?

In this chapter we have not wanted to give specialized answers from an economic, or medical or environmental point of view, but rather to relate these answers to other topics of interest to society.

There is an abundance of guidance to discuss about the economy, and to adapt it for the environment, and economically, an austere fiscal policy, which prioritizes employment and reactivation, through the optimization of resources and efforts.

We need to reprioritize our priorities. What is important and what is not important is central, and this is why we also need to face changes in human behavior. We want to argue that one of the things that seem to be a very important thing is the idea of solidarity. It is just a matter of finding it with respect to health care waste because there is a great deal that has been written and it is just necessary that persons access that which it is suitable for the situation. We can build all this knowledge during this new situation, every one of us.

The government response needs to act on three issues. First, to ensure that essential services are carried out without any interruption. Secondly, to ensure worker's safety above any other measure, because we need these teams, we need these people, and we need these heroes on the streets and, thirdly, we need to ensure frequent and easy communication to the citizens to stop fake news and to avoid dissemination of misunderstanding.

Finally, a good way to face the crisis is to win small battles, in health, through the territorial management of contagions, in the environment avoiding very long-term objectives, and instead targeting more short- and medium-term goals.

Author details

Jean Pierre Doussoulin^{1,2}

1 Universidad Austral de Chile, Economic Institute, Valdivia, Chile

2 Université Gustave Eiffel, Research Team on the Use of Panel Data in Economics, Paris, France

*Address all correspondence to: jean.doussoulin@uach.cl;
jean-pierre.doussoulin@u-pem.fr

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