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Proceedings of the 21st European Conference on Knowledge Management

A Virtual Conference hosted by Coventry University, UK

2–4 December 2020

Edited by

Professor Alexeis Garcia-Perez

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A conference managed by ACI, UK

Proceedings of the

21st European Conference on Knowledge Management ECKM 2020

Supported By

Coventry University
UK

2–4 December 2020

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E-Book ISBN: 978-1-912764-82-2
E-Book ISSN: 2048-8971
Book version ISBN: 978-1-912764-81-5
Book Version ISSN: 2048-8963

Published by Academic Conferences International Limited, Reading, UK
www.academic-conferences.org

Contents

How can Systems Thinking Help Us Handling the COVID-19 Crisis?

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DOI: 10.34190/EKM.20.256

Abstract: Purpose: COVID-19 pandemic outbreak remains one of the most influential events in the global economy over the recent years. While being primarily public health-related, it has a tremendous impact on many other aspects, such as public transport, education, and business management. Many businesses were forced to introduce rapid changes to their business models in order to survive. The aim of this paper is to show the complexity and inter-relations of changes triggered by COVID-19 outbreak. Understanding of this complexity is crucial for developing business resilience to similar events in the future. Methodology: The paper uses Systems Thinking approach to analyse influence of COVID-19 pandemic on business operations. Causal loop diagrams are used to show the complicated mechanisms behind the impact of pandemic on several aspects of business operation and management. Findings: Causal loop diagrams indicate that complicated relations between various elements may produce surprising and unexpected outcomes. The existing delays may result in actions bringing counterintuitive results. Perceptions of some variables play more important roles than actual variables and it often requires more than one actor to solve a particular problem – hence the need for organisational, as well as social learning. Adaptive business management may prove to be a particular challenge for small business owners. Research limitations: The paper is mostly of a conceptual nature. Causal loop diagrams require extensive data in order to be transformed into full Systems Thinking models. Hence this paper may serve as a basis for further development. Practical implications: The paper provides useful insights into the complex nature of contemporary business operation and management in the wake of a major epidemiological crisis. It may contribute to a better understanding of important factors that often tend to be disregarded and not paid enough attention to by business owners/managers. Originality/value: The paper links one of the major current challenges for the global economy with Systems Thinking, which offers a holistic perspective on business operation and management with emphasis on linkages and interactions between numerous stakeholders involved. It offers food for thought not only for academics, but also to business owners/managers, aware of the complexity of contemporary world.

Keywords: COVID-19 crisis, Systems Thinking, continuous learning, adaptive business management, global knowledge economy

1. Introduction

The year 2020 marked its place in the contemporary history through the outbreak of the COVID-19 pandemic. Looking for an event of a similar character, one has go back over one hundred years back to the pandemic of Spanish flu. But even referring to the Spanish flu pandemic does not cast a lot of light on the current developments with COVID-19, because the way the global economy works now is substantially different from the way it worked one century ago (Fernandes, 2020). The complexity of business relations crossing not only single borders of countries but spanning across continents, the speed of the COVID-19 spread, as well as the speed and availability of news (and fake news) on this topic (Ramnath, Kairaitis, & Malhotra, 2020), make this pandemic an unprecedented event.

The COVID-19 pandemic, even though at the beginning perceived mostly as a challenge for public health care systems, proved to be a multifaceted phenomenon (Donthu & Gustafsson, 2020). Currently it seems to have influenced and transformed several areas of our life (van Bavel et al., 2020), including public transportation and education systems. However, one of the most important changes triggered by the COVID-19 outbreak refers to the business sector. Along the development of the COVID-19 pandemic, governments started to introduce numerous regulations, limitations and restrictions intended to maintain the spread of the virus under control. As in the spring 2020 the situation in most countries started to deteriorate, the intensity of those government activities also increased reaching its peak during many lock-downs, administered in many European countries. That had a very significant and negative, sometimes even devastating impact on many businesses, especially those from the SMEs sector. In the spring and summer 2020 numerous “shield programmes” were launched to protect the business sector against the most severe economic consequences of the imposed restriction. The autumn 2020 brings further increase in the number of new active cases of COVID-19 and the hope that pandemic can be already over disappeared. The COIVD pandemic seems to become a long-term issue and the COVID-19 crisis in most countries will not be a matter of weeks or months, but rather quarters or even years.

Therefore, taking the above into account, the following research question can be formulated: How businesses response to the prolonged exposure to the COVID-19 crisis? What kind of actions are they prone to undertake and what are the drivers of those actions?

This paper will aim at answering this question by the application of systems thinking theory and the usage of Vensim PLE tool. The paper develops as follow. First, the brief characteristics of the COVID-19 crisis is presented. Second, the systems thinking approach is discussed and its applicability to the COVID-19 crisis analysis is justified. Then, the proposed model of business response to the COVID-19 crisis is presented and explained. Finally, in the conclusion section the paper is summarized, theoretical and practical contributions are presented, paper limitations are listed, and avenues for the future research are indicated.

2. COVID-19 crisis

A new coronavirus SARS-COV-2 appeared in Wuhan, China in December 2019. It started an epidemic of a respiratory syndrome of COVID-19 that has spread from China reaching 114 countries in three months, hence causing a global pandemic as declared by the World Health Organisation (van Bavel et al., 2020). The seriousness of the COVID-19 crisis is also reflected by the rapidly growing body of literature dedicated to this topic; it is estimated that since January 2020 during two quarters the number of papers on the COVID-19 doubled every twenty days (Ramnath et al., 2020).

The economic impact the COVID-19 crisis is so far very significant, and since the crisis is not over yet, the ultimate effects remain unknown and business forecasts remain highly ambiguous (Baker, Bloom, Davis, & Terry, 2020). The lock-downs introduced in the spring 2020 already decreased consumption and had dramatic effects in some sectors, especially small scale services. Supply chains that span globally were disrupted introducing chaos in business operations in virtually all countries. Consumption pattern were changed rapidly, creating numerous shortages of many goods while at the same time leaving markets with substantial surpluses of other goods. Volatility in global financial markets rose to the levels recorded during the last financial crisis of 2008 (Fernandes, 2020). This volatility suggests that apart from clearly adverse influence of the COVID-19 crisis on the global economy, this crisis causes also a lot of uncertainty. Similar conclusions come from analysing newspaper feeds and business expectation surveys (Baker et al., 2020). Nevertheless, the progression of the pandemic can be modelled and for example SIR models are used for this purpose by public health experts. They may also serve economists as a source knowledge on trade-offs between the public health and economic consequences of COVID-19-related restrictions and social distancing measures (Atkeson, 2020).

As the COVID-19 crisis unfolds and uncertainty about the around it grows, the role of mass media and – even more importantly – social media remains very important. Yet, the danger of misinformation phenomena during the pandemic is as serious as never before, leading to coining the new term of "infodemic" (Cinelli et al., 2020). Infodemic can speed up the epidemic process by shaping and fragmenting social response to the COVID-19 pandemic. Research show that social media are particularly prone to spread false information on this topic (Pennycook, McPhetres, Zhang, & Rand, 2020).

To sum up, even though at the time of writing this paper the COVID-19 crisis lasts already for more than half a year, the developments are still very fresh and quite often, unverified. The number of new papers on the COVID-19 pandemic does not correlate with their overall quality. It could be said that the state of the art is being created on our eyes and we have only limited options at hand. The scientists need to use their experience, intuition and the common sense in the analysis of the situation and in the proposal of certain solutions related to the COVID-19 crisis.

3. Systems thinking

Systems Thinking is a term having a few meanings. It can be treated as a perspective, a language or as a set of tools, which include causal loops used in the model presented in this paper. Systems Thinking is defined as opposite to linear thinking and offers holistic approach to the analysed phenomena. Its possible applications span across various fields and disciplines (Monat & Gannon, 2015).

Systems Thinking approach has already been used with application to public health problem before the COVID-19 crisis. It is mostly because improving public health requires deep understanding of system complexity that is behind public health problems, when it comes to both causing and solving them. It was in 2008 when Leischow

et al. claimed that collaboration across a wide array of disciplines and fields is necessary for preventing and containing pandemic influenza, pointing out that each separate activity to address this disease is necessary but insufficient in itself (Leischow et al., 2008). All the observations made in this paper are fully applicable to the COVID-19 crisis. Particularly valuable in the current situation, the fundamental systems-thinking perspectives and approaches include: attention to how new knowledge is gained, managed, exchanged, interpreted, integrated, and disseminated, a network-centric approach based on building relations among and between individuals and organizations, the development of models and projections, using a variety of analytic approaches (Leischow et al., 2008).

Among a number of papers dedicated to the COVID-19 crisis, System Thinking approach is rarely used. This kind of perspective was presented in the case of healthcare mask production in Korea (Lee, Chen, McDonald, & O'Neill, 2020). A more comprehensive attempt to employ Systems Thinking can be found in the paper on drive-through testing sites (Araz, Ramirez-Nafarrate, Jehn, & Wilson, 2020), where a conceptual framework for addressing disease dynamics and logistics of mass distribution was provided. A causal loop diagram showing societal response to the COVID-19 threat serves as an example that Systems Thinking approach may bridge public health issues with social relations, perceptions, attitudes and actions undertaken on their basis (Bradley, Mansouri, Kee, & Garcia, 2020). A very general and hence hardly useful view on the use of Systems Thinking in the current situation was presented by Hassan et al. (Hassan et al., 2020). Probably the most inclusive effort to capture the complexity of the COVID-19 crisis was made by Sahin et al. (2020). Their causal loop diagram includes four areas: economy, environment, health and society. They are inter-related and all linked to the fifth element, which is government activities performed due to the COVID-19 outburst.

Unfortunately, there are no scientific papers using Systems Thinking approach to explain in a more detailed way business behaviour during the COVID-19 crisis. The above mentioned attempts to use this methodology in other fields suggest that the characteristics of the current situation makes System Thinking a very suitable framework for studying business management in these turbulent times. The current situation is multifactorial, dynamic and nonlinear, hence compartmental knowledge originating from scientific silos is likely to obstruct understanding of the inter-relations among all the significant variables (Leischow et al., 2008). Therefore, the Systems Thinking approach can be considered as the one offering adequate tools for analysing business operations and management in the wake of the COVID-19 spread.

4. Business response to the COVID-19 crisis

The current COVID-19 crisis affected many aspects of everyday life, bringing significant changes. Businesses around the world had to respond to those changes. The actions they had to undertake can be divided into two categories. The first one ("Business Actions Aimed at Compliance") comprises of actions that were forced by regulations, restrictions and limitations imposed by the authorities. In most cases their direct impact on business performance was harmful, yet those actions were carried out either entirely voluntarily or in the fear of legal sanctions and reputation risk (pressure from various stakeholders to comply). The other category ("Business Actions Aimed at Survival & Development") include all the actions that were undertaken to protect the business from the adverse impact of the COVID-19 pandemic. Some of them were intended to achieve or continue firm growth in spite of the unfavourable external conditions, while others were meant to save the business from discontinuance or bankruptcy. Naturally, some of the actions from this category may be contradictory with compliance actions or can be even illegal (e.g. breaking quarantine or concealing the fact of being infected). The intensity of both types of actions mentioned above depends heavily on the question of how serious in the perception of business owners, managers and employees, the COVID-19 crisis and its impact on businesses are. Perceptions may play a more important role than their real analogues (van Bavel et al., 2020). That is why "Perceived Seriousness of COVID-19 Crisis" is the central part of the proposed model of business response to the COVID-19 crisis – see Figure 1.

The general concept of this model is that the real danger resulting from the pandemic is filtered by three different channels, through which the knowledge is passed to business owners, managers and employees building their awareness about the current situation. On the basis of this awareness, business activities are planned and carried out and that refers to the both above-mentioned categories of actions. Those actions, in turn, have their – positive and negative – consequences for the development of pandemic situation in the country, hence closing feedback loops.

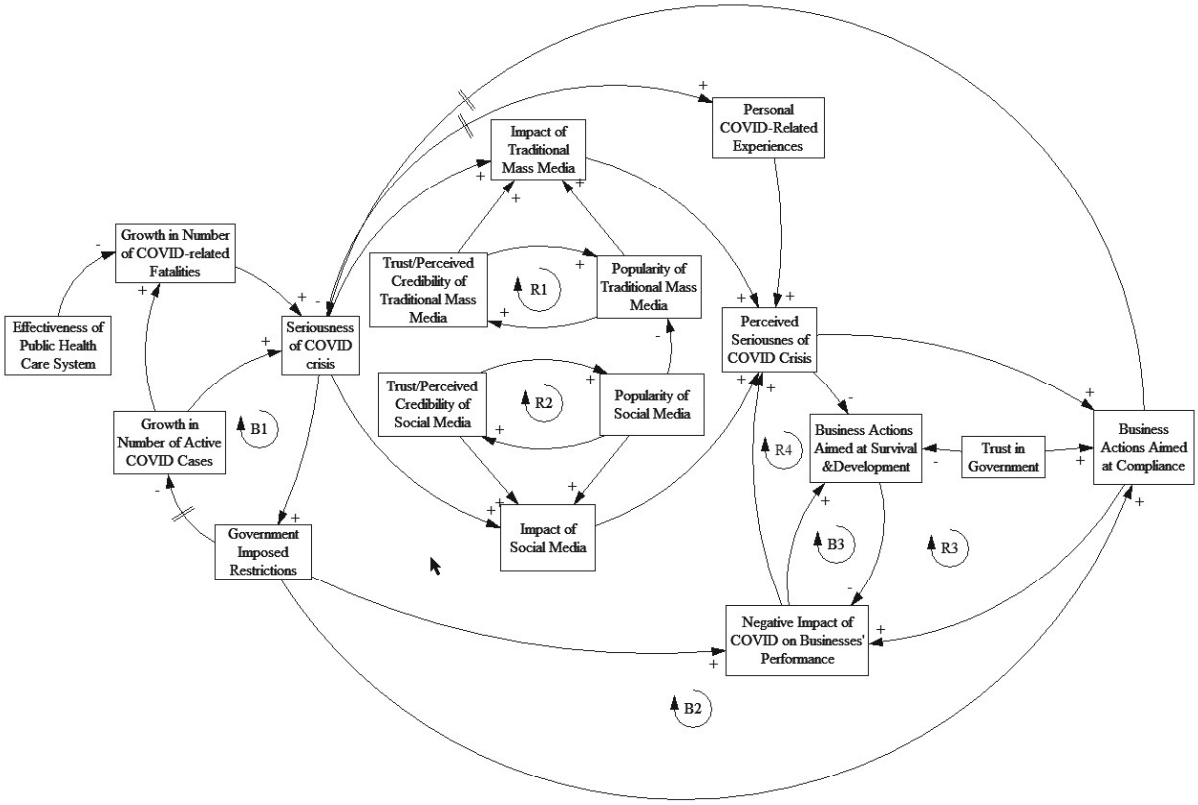

Figure 1: Business response to the COVID-19 crisis – causal loop diagram. (own elaboration using Vensim PLE)

The perception of the seriousness the COVID-19 crisis is based on how serious it really is. Two important elements illustrating the spread of the virus, which are understandable to the general public, are the number of newly detected infections and the number of fatalities. Both numbers are published and widely discussed over the media – traditional mass media and social media as well. In this way, the media serve as a kind of relay, transmitting the description of the reality to their recipients. Furthermore, the real impact of COVID-19 is filtered by personal experiences regarding severity of the pandemic: personal knowledge of people infected (how many and how seriously impacted), own experiences of infection or those related to the closest family members). In addition to that, the perceived seriousness of the COVID-19 crisis is to a high extent influenced by the negative impact of COVID-19 on business conduct and performance; this can be called the professional experience of the pandemic.

The scale and seriousness of the COVID-19 crisis can be influenced by the government (in the broad sense of this term, including the central government as well as regional and local governments and other public institutions) in two ways. Firstly, the number of newly infected people (cases) can be to some extent controlled via restrictions and regulations imposed by the government (obligatory face masks, limitations regarding attendance in public places, restrictions applied to bars, restaurants, banned mass events, etc.). This number of new cases is obviously related to the number of fatalities, but additionally, a rapid accumulation of active cases can result in exceeding the capacity of the health care system and increased number of deaths, hence the effectiveness of public health care system is vital when it comes to restraining the number of fatalities. Appropriate preparations, proper organization and management of hospitals should be the priorities for the government (McKibbin & Fernando, 2020).

The government imposed restrictions are generally triggered by seriousness of the COVID-19 crisis – governments respond to the growing number of active cases and COVID-19-related deaths by issuing regulations aimed at getting pandemic under control, including even full lock-down, when necessary. This is shown in the model by the balancing loop B1. It should be noted here that there is a significant delay between introducing restrictions and their visible consequences, expressed in the decrease in the growth of active COVID-19 cases. On the other hand, all those restrictions have immediate and negative impact on businesses and their performance. The delayed influence on the number of active COVID-19 cases combined with the immediate negative impact on businesses may result in undermining trust in government. People in business sector may

challenge the imposed regulations, when they see they are costly to their business and yet they do not improve the pandemic situation in any visible way. The level of trust to the government will influence the efforts made both to comply with restrictions (the greater trust, the greater efforts) and to survive and develop businesses (the smaller trust, the greater efforts).

The government imposed restrictions force businesses to perform actions aimed at compliance with these restrictions. The scale of those actions will be dependent not only on the scale of restrictions, but it will also reflect the level of trust in the government (i.e. the belief that restrictions are necessary, adequate to the current situation and effective). Another important determinant of those actions is the perceived seriousness of the COVID-19 crisis – if business owners, managers and employees perceive situation as serious, they are more engaged in compliance-oriented activities. If the actions aimed at compliance (such as wearing masks, maintaining social distancing, adhering to other rules and norms) are popular in the business sector, they contribute to lowering the level of seriousness of the COVID-19 crisis (Atkeson, 2020), therefore closing the balancing loop B2.

The perception of how serious is the COVID-19 crisis is, as mentioned before, built partly on the basis of information revealed by the media, both traditional and social. The impact of the media is dependent of their popularity and their perceived credibility, between which there are the reinforcing loops R1 and R2. The more popular is the medium, the more tight is the information bubble created by this medium and hence its perceived credibility grows (Kaakinen, Sirola, Savolainen, & Oksanen, 2020). The more credible is the medium in the perception of the user, the more often it is used. Technological changes, including growing availability of stable Internet connection, continuously improved algorithms of content selection and general social tends make social media more and more popular, which reduces the popularity of traditional mass media (Pentina & Tarafdar, 2014; Spohr, 2017). Therefore, it seems that social media are likely to play the leading role in formulating opinions on the COVID-19 crisis, which brings well-known concerns about the accuracy, reliability and truthfulness of information they present (Cinelli et al., 2020; Pennycook et al., 2020). If the share of fake news presented in social media grows, then the perception of the COVID-19 crisis may be to a great extent based of the false picture created by those media.

If the business sector perceives the COVID-19 crisis as a serious threat, then the tendency to undertake actions that are aimed at compliance with the imposed restrictions and rules is stronger, as the need to protect business partners, employees and customers is more evident. Most of such actions have adverse impact on businesses, as they usually result in increasing the costs of business operations which is additionally accompanied by a decrease in revenues. Hence, the greater adherence to the restrictions and rules imposed for protecting the society against COVID-19 infections, the more perceptible is the negative influence of this crisis on business sector. This, in turn, leads to the increased level of the perceived seriousness of the COVID-19 crisis and in this way the reinforcing loop R3 is closed.

However, if the perceived seriousness of the COVID-19 crisis is low, then naturally businesses would rather focus on the actions that are aimed at their survival and development, reducing their efforts to comply with the restrictions to the necessary minimum that is forced by e.g. legal sanctions. In this case the negative impact of the COVID-19 crisis is less perceptible for businesses and that leads to two different outcomes. Firstly, the less severe is the negative impact of the crisis, the less incentives appear to try and save the business, as it does not seem to be endangered that much. That is the mechanism grasped by the balancing loop B3. Secondly, the less severe is the negative impact of the crisis, the less seriously it is perceived by businesses, closing the reinforcing loop R4, leading to even greater disproportion between the efforts to successfully run businesses in spite of the COVID-19 crisis and the efforts to comply with the policies adopted to protect the society against the pandemic.

5. Conclusions

As can be seen from the proposed model, the response of the business sector to the current COVID-19 crisis and its development may be channelled into two streams of actions, aimed at either compliance (with the primary view on protecting own staff as well as other members of the society) or business survival and development (with the primary view on business performance). To what extent businesses would engage in each of those actions depends to a great extent on their perception of how serious is the threat of the COVID-19 crisis. This perception is formed by media and by experiencing the reality by personal and business experiences. Additionally, the question of how adequately the government reacts to the crisis and its perception of the

business sector remains an important factor. From the proposed model it is clear that there are many actors involved in shaping the business response to one of the most challenging events in our recent history.

With regard to the academic contribution, it should be noted that using systems thinking approach to analyse the consequences of the COVID-19 outbreak is relatively novel and not extensively used. The characteristics of systems thinking makes this methodology particularly useful when applied to complex relations, interdependencies, positive and negative feedback loops and delays.

From the practical point of view, this paper may be helpful in achieving better understanding of how businesses may react to some changes initiated by other businesses, government institutions or media. It emphasises the fact that the perceptions of some phenomena are a far more important determinant of actual actions than the real phenomena as such. For business owners and business managers this paper offers a reflection on how they may respond to what they know about the COVID-19 crisis in their country and how their knowledge on that is shaped.

The paper is not free from some limitations. First of all, it is a conceptual work. Making a complete systems thinking model requires extensive data, which may be difficult to obtain. Furthermore, there are some more elements that can be potentially included in the model, such as factors capturing cultural differences; research suggest that cultural aspects are important in this context (van Bavel et al., 2020). Hofstede cultural dimensions, including individualism, could help explaining differences in attitudes towards the pandemic between countries. Finally, the proposed model is of a preliminary character and it can – and should – be developed to offer more in-depth insights into the business response to the COVID-19 crisis.

This paper offers several research avenues to follow. As mentioned above, a more detailed version of the proposed model can be created. When fed with the sufficient data, the model can contribute to a much deeper understanding of how business react to the pandemic and how their response can changed to suit the current social and economic situation in a better way.

References

Araz, O. M., Ramirez-Nafarrate, A., Jehn, M., & Wilson, F. A. (2020). The importance of widespread testing for COVID-19 pandemic: systems thinking for drive-through testing sites. *Health Systems*, *9*(2), 119–123. https://doi.org/10.1080/20476965.2020.1758000

Atkeson, A. (2020). *What Will Be the Economic Impact of COVID-19 in the US? Rough Estimates of Disease Scenarios*. *NBER Working Paper Series*. Retrieved from http://www.nber.org/papers/w26867

Baker, S. R., Bloom, N., Davis, S. J., & Terry, S. J. (2020). *COVID-INDUCED ECONOMIC UNCERTAINTY*. *NBER WORKING PAPER SERIES*. https://doi.org/10.1017/CBO9781107415324.004

Bradley, D. T., Mansouri, M. A., Kee, F., & Garcia, L. M. T. (2020, April 1). A systems approach to preventing and responding to COVID-19. *EClinicalMedicine*. Elsevier. https://doi.org/10.1016/j.eclinm.2020.100325

Cinelli, M., Quattrociocchi, W., Galeazzi, A., Valensise, C. M., Brugnoli, E., Schmidt, A. L., … Scala, A. (2020). The COVID-19 Social Media Infodemic, 1–18. Retrieved from http://arxiv.org/abs/2003.05004

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117*, 284–289. https://doi.org/10.1016/j.jbusres.2020.06.008

Fernandes, N. (2020). *Economic effects of coronavirus outbreak (COVID-19) on the world economy* (https://ssrn.com/abstract=3557504). *SSRN Electronic Journal, ISSN 1556-5068, Elsevier BV,*.

Hassan, I., Obaid, F., Ahmed, R., Abdelrahman, L., Adam, S., Adam, O., … Kashif, T. (2020). A Systems Thinking approach for responding to the COVID-19 pandemic. *Eastern Mediterranean Health Journal= La Revue de Sante de La Mediterranee Orientale= Al-Majallah Al-Sihhiyah Li-Sharq Al-Mutawassit*, *26*(8), 872–876.

Kaakinen, M., Sirola, A., Savolainen, I., & Oksanen, A. (2020). Shared identity and shared information in social media: development and validation of the identity bubble reinforcement scale. *Media Psychology*, *23*(1), 25–51. https://doi.org/10.1080/15213269.2018.1544910

Lee, E., Chen, Y.-Y., McDonald, M., & O'Neill, E. (2020). Dynamic Response Systems of Healthcare Mask Production to COVID-19: A Case Study of Korea. *Systems*, *8*(2), 18. https://doi.org/10.3390/systems8020018

Leischow, S. J., Best, A., Trochim, W. M., Clark, P. I., Gallagher, R. S., Marcus, S. E., & Matthews, E. (2008). Systems thinking to improve the public's health. *American Journal of Preventive Medicine*, *35*(2), S196–S203.

McKibbin, W. J., & Fernando, R. (2020). *The Global Macroeconomic Impacts of COVID-19: Seven Scenarios*. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3547729

Monat, J. P., & Gannon, T. F. (2015). What is systems thinking? A review of selected literature plus recommendations. *American Journal of Systems Science*, *4*(1), 11–26.

Pennycook, G., McPhetres, J., Zhang, Y., & Rand, D. G. (2020). Fighting COVID-19 misinformation on social media: Experimental evidence for a scalable accuracy nudge intervention. *PsyArXiv [Working Paper]*, 1–24. https://doi.org/10.31234/OSF.IO/UHBK9

Pentina, I., & Tarafdar, M. (2014). From "information" to "knowing": Exploring the role of social media in contemporary news consumption. *Computers in Human Behavior*, *35*, 211–223. https://doi.org/https://doi.org/10.1016/j.chb.2014.02.045

Ramnath, V. R., Kairaitis, K., & Malhotra, A. (2020). The challenge of COVID-19 has accelerated the use of new data-sharing technologies. *Respirology (Carlton, Vic.)*, *25*(8), 800–801. https://doi.org/10.1111/resp.13894

Sahin, O., Salim, H., Suprun, E., Richards, R., MacAskill, S., Heilgeist, S., … Beal, C. D. (2020). Developing a preliminary causal loop diagram for understanding the wicked complexity of the COVID-19 pandemic. *Systems*, *8*(2), 20.

Spohr, D. (2017). Fake news and ideological polarization: Filter bubbles and selective exposure on social media. *Business Information Review*, *34*(3), 150–160. https://doi.org/10.1177/0266382117722446

van Bavel, J. J., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., … Weeden, K. A. (2020). COVID-19 pandemic response. *Nature Human Behaviour*, *4*(May), 460–471. https://doi.org/10.1038/s41562-020-0884-z