BIBLIOMETRIC ANALYSIS ON THE COVID-19 IMPACT ON CORPORATE SUSTAINABILITY

Hiranya Dissanayake[1,2*], D.B.P.H. Dissabandara[3], K.L.W. Perera[4], A.R. Ajward[5]

[1) , 3), 4),5)] University of Sri Jayewardenepura, Sri Lanka

[2)] Wayamba University of Sri Lanka, Sri Lanka

Abstract

The importance of achieving sustainable development goals is reconsidered due to the COVID-19 pandemic. There are studies that have been conducted to analyze the impact of COVID-19 on corporate sustainability. Nonetheless, there is scant research that has synthesized the literature on the impact of COVID-19 on corporate sustainability. The objectives of this study are to highlight major challenges and current trends in the domain of COVID-19's effects on corporate sustainability, as well as to make recommendations for future research directions. The volume of research on COVID-19 and corporate sustainability between 2020 and 2022 is examined using a bibliometric analysis of 397 studies from the SCOPUS database. Using Biblioshiny software, researchers in this study selected the highly impactful authors, sources, nations, and documents based on their citations and the number of publications. Sustainability is a highly influential journal, and Ho M.T. is a highly influential author with 354 citations. There are few studies on this topic, but India and the United States have published the most articles. In addition, the themes discussed by the researchers fall into three clusters based on Multiple Correspondence Analysis (MCA) including COVID-19's impact on sustainability, COVID-19's impact on environmental sustainability, and COVID-19's impact on digitalization. Finally, this study suggests relevant study directions for future studies using thematic map analysis. The areas that include COVID-19 impact on education, digitalization, cities, and environmental sustainability are the recommendations for future researchers. In addition, this study assists practitioners and policymakers in understanding the impact of the COVID-19 pandemic on corporate sustainability and taking appropriate actions to achieve sustainable development goals (SDGs).

Keywords

COVID-19, Sustainability, Environmental Sustainability, Bibliometric Analysis

JEL Classification

G 34, H 12, M 14

[*] Corresponding author, **Hiranya Dissanayake** – hiranya@wyb.ac.lk.

Introduction

The coronavirus disease (COVID-19) pandemic has led to a short-term drop in global carbon emissions, but it is unclear how the pandemic will affect the transition to a low-carbon economy in the long run (Guérin and Suntheim, 2021). Environmental pressures, primarily associated with energy use, experienced a steep reduction of 7–8% in 2020, followed by a gradual recovery to 2-3% below the pre-COVID baseline estimate. This impact includes greenhouse gas (GHG) emissions, nitrogen oxide (NOx), and sulfur dioxide (SO2) emissions , and the usage of fossil fuel resources.

Air pollutant emissions, materials use, and land-use change related to agriculture are less affected, both in the short and long run: ammonia (NH3) is the least affected air pollutant; biotic resources are less affected for materials use; and land-use change, particularly the change in harvested area, is minimal. In the short run, cropland area (harvested area) is more or less fixed, and the relatively rapid rebound of food demand ensures that land-use change remains very close to baseline levels. Combined with the minor effects on forestry, this suggests that the reduced economic activity may not significantly impact biodiversity and ecosystem services (OECD, 2021).

Other environmental pressures are caused by different economic factors and have different effects. The emissions of particulate matter (PM 2.5), which includes both black carbon and organic carbon, are linked to transportation (which is highly affected) and residential activities (which is low affected), among other things. There are a lot of industrial activities that use metals, but they are not as affected in the short term. Over time, they have started to do less well than other industries. There will be a significant drop in construction in 2020, impacting non-metallic minerals (OECD, 2021).

1. Review of the scientific literature

The COVID-19 epidemic has had many detrimental consequences on the global social fabric. It has negatively impacted employees' and their families' livelihoods and well-being (UN, 2020; Sajjad, 2021). International Labour Organisation (2021) exhibited that the employees' working hours are drastically reduced in the first two quarters of 2020. Millions of people lost their jobs and are still dealing with the terrible impacts of the epidemic, even though specific sectors and businesses have successfully moved their business activities online (The Lancet, 2020). Social sustainability and workers' livelihoods have been adversely affected by COVID-19.

In COVID-19, women lost jobs by 4.2% compared with men by 3.0% (UN Women, 2021). In addition, one in five women reported losing their job during the pandemic across 45 countries. In addition, the work at home situation observed an increase in household sexual and domestic violence (UNDP, 2021). Workers in the food system, including those in processing and distribution, were also exposed as vulnerable, with little priority to their income protection or health and safety. Precarious and unsafe working conditions, low wages, a lack of social protection, and limited bargaining power were already common in the food industry (UN Women, 2021).

According to PWC (2021), hospitality and leisure, higher education, industrial manufacturing, and the automotive sector have more than 80% impact globally (See Figure no. 1). In the same vein, the Australian Business Survey (2021) also found that failure rates are higher in the same and retail sectors, transport, leather and footwear, handloom and crafts, and construction sectors. In Sri Lanka, the situation is similar. The tourism, garment sector, agriculture, and Small and Medium sector businesses have significantly identified losses in their income (Gunawardana, Gamage and Ranathunga, 2020; Kathairmalainathan, 2021).

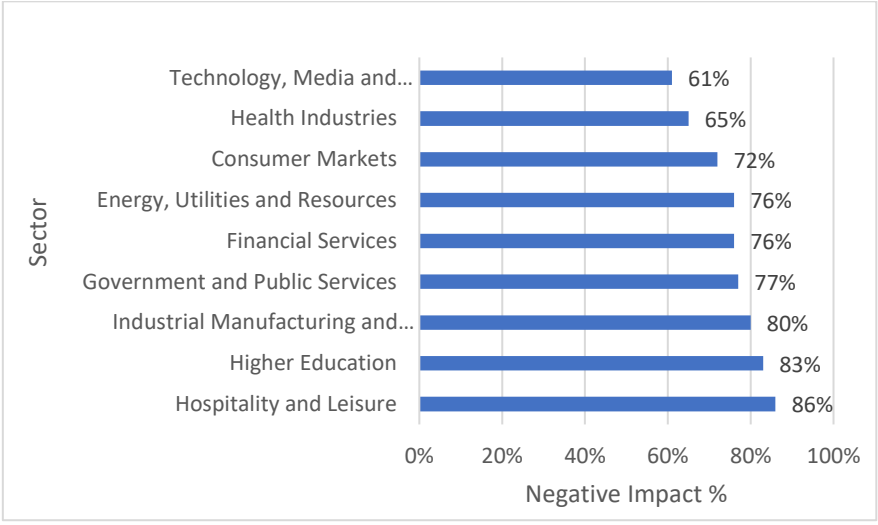

Figure no. 1 Sectors experienced negative impact due to COVID-19

Source: Own elaboration based on PWC (2021)

Zhang et al. (, 2021) surveyed China and examined the corporate sustainability pre and during COVID periods and found that protecting biodiversity, having a health and safety plan in place, and job creation are the top three things that changed their perceived importance after COVID-19. This study considers that only 13 items for measuring CS do not adequately represent the concept and consider China as a sample. In contrast, empirical evidence suggests that CSR has increased with this crisis (Giacomini et al., 2021; Ramya and Baral, 2021).

There is a dearth of studies that use bibliometrics to identify the trends and other meta-data relevant to COVID -19 and corporate sustainability. Bibliometric analysis is a quantitative study of physical published units, or of biblio-graphic units, or of the surrogates for either (Broadus, 1987 p.376). Despite the fact that the bibliographic analysis under social science was first introduced in late 1980, there have been many papers published in recent years related to this analysis. Researchers and interested

parties will benefit from such an analysis by gaining valuable insights into the meta-data on publications.

Accordingly, the primary objective of this study is to examine the main trends in publication, top journals, top authors, top countries of publications, top key words according to higher frequency, top themes and top cited articles from the year 2020 to the present, papers related to the concept of COVID-19 and Corporate Sustainability have been published.

2. Research methodology

Due to how much information it provides on a specific subject, bibliometric analysis is becoming more and more important. (White and McCain, 1998; van Eck and Waltman,2017). A statistician and mathematician named Garfield (1955) described this approach as one that "combines several mathematical tools and statistical methodologies to examine and scan publications, such as articles and different books." Scientific research is interpreted and patterns within a topic are found using statistical methods. (De Bakker, Groenewegen, and Den Hond, 2005; Bouyssou and Marchant, 201; Bouyssou and Marchant, 2012). Bibliometric analysis sheds light on current advancements in the field and opens new lines of study, as opposed to merely informing readers about earlier trends in the field. (Durieux and Gevenois, 2010). This study used Biblioshiny software for the analysis of data (Aria and Cuccurullo, 2017).

This bibliometric analysis focuses on research in area of “COVID-19” and “Corporate Sustainability”. Our analysis does not include studies done in tongues other than English, medicines and other non-related disciplines and published in 2023. The SCOPUS database reveals 397 papers on “COVID-19” and “Corporate Sustainability”., including 287 (72%) original research articles, 33(8%) book chapters, 28 (7%) conference proceedings, 25 (6%), review articles, 24 (6%) editorial, erratum, books and surveys. This study considered SCOPUS database for the collection of data because it consists extensive research findings related to the business and management area.

The main objective of this study is analyzed using biblioshiny software which consists of user friendly and comprehensive analysis of bibliometric data. The trend graph is used to examine the trend of publications. Next, Bradford law, total citations and total number of publications, h-index, I index and J index are used to examine the source analysis. Thirdly, lotka law, total citations and total number of publications, h-index, I index and J index are used to examine the author analysis. Total citations and number of publications is analyzed for country analysis. Fourthly, word cloud, word frequency used to analyze key words and thematic maps and cluster analysis is used to analyze themes. Finally, researchers conduct critical analysis of highly cited papers.

3. Results and discussions

- **Trend analysis**

Error! Reference source not found. 2 depicts the publication trend in the research on "Impact of Corporate Sustainability" in the Scopus database from 2020 to 2022. This illustrates a steady growth of publications and the maximum number of publications in the year 2021. This is mainly due to the COVID-19 that appeared in December 2019 and had an impact on the word in 2020 and most researches were concerned on this area and were published in 2022. Significantly, corporate sustainability is important in the COVID-19 pandemic period as the economic and social effects accelerate during this time. Accordingly, more researchers are paying attention to conducting research in this field.

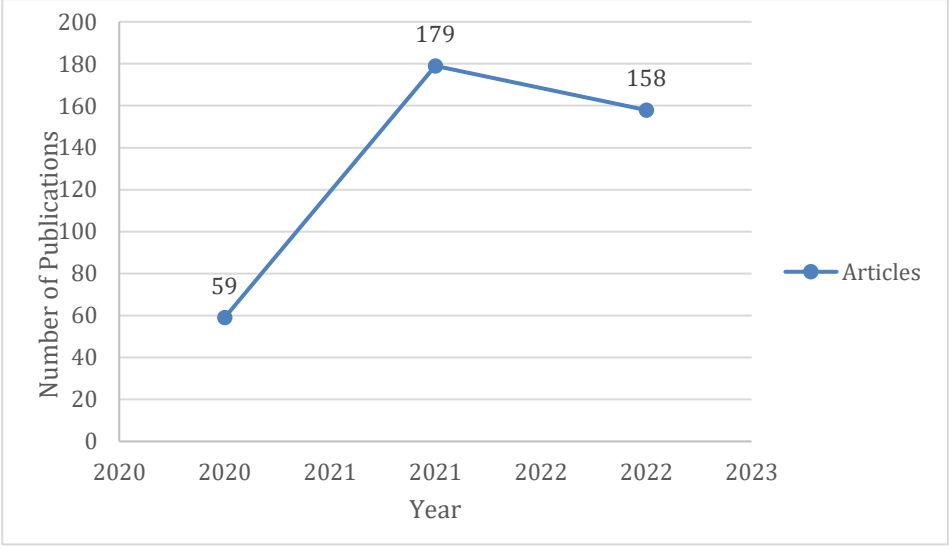

Figure no. 2 Trend Analysis
Source: Own elaboration based on Scopus database

- **Source analysis**

Initially bradford law was examined related to the validity of the source analysis. Accordingly, we found that core sources are 4 journals which published 1/3 of publications. Next, middle important sources consist of 64 journals which published next 1/3 of publications. Lastly, low important sources consist 130 journals which published one article and makes next 1/3 of publications.

Table 1 illustrates the results of source analysis related to the COVID-19 impact on corporate sustainability. The most cited and with the most publications is the

Sustainability Journal with 1684 citations for 114 publications. Second and third highest citated journals are Journal of Cleaner Production and Annal of Operations Research. All journals mentioned in table 1 received more than 140 citations and have been indexed in ABS ranking.

Table no. 1 Source analysis

Source	h_index	g_index	m_index	TC	NP	PY_start
Sustainability (Switzerland)	21	37	5.25	1684	114	2020
Journal of Cleaner Production	3	5	0.75	362	5	2020
Annals of Operations Research	2	3	0.67	336	3	2021
Sustainable Production and Consumption	5	5	1.67	254	5	2021
International Journal of Operations And Production Management	1	1	0.33	248	1	2021
Energy Research and Social Science	2	2	0.50	237	2	2020
Heliyon	3	4	0.75	231	4	2020
World Development	2	2	0.50	185	2	2020
Environment, Development and Sustainability	3	5	1.00	183	5	2021
Sustainability: Science, Practice, and Policy	4	5	1.00	145	5	2020

TC: Total Citations, NP: Number of publications, PY : Year of first publication

Source: Own elaboration based on Biblioshiny Software

- **Author analysis**

Initially Lotka law examined the validity of author's analysis. Accordingly, 94% of authors published only one article and 5% of authors published two articles and 1% of authors published more than two articles. This confirms the Lotka law. According to Table 2, highest cited authors who received greater than 177 citations are depicted. Highest cited author is Ho M.T and second highest author was Ivanov D.

Table no. 2 Author analysis

Authors	h_index	g_index	m_index	TC	NP	PY_start
Ho M-T	2	2	0.50	354	2	2020
Ivanov D	2	2	0.67	335	2	2021
Sarkis J	1	1	0.33	248	1	2021
Ali Sm	2	2	0.50	228	2	2020
Kabir G	2	2	0.50	228	2	2020
Moktadir Ma	3	3	1.00	211	3	2021
Islam Smd-U	1	1	0.25	211	1	2020
Rume T	1	1	0.25	211	1	2020

Barbier Eb	1	1	0.25	177	1	2020
Burgess Jc	1	1	0.25	177	1	2020
Khuc Q	1	1	0.25	177	1	2020
La V-P	1	1	0.25	177	1	2020
Nguyen H-KT	1	1	0.25	177	1	2020
Nguyen K-LP	1	1	0.25	177	1	2020
Nguyen M-H	1	1	0.25	177	1	2020
Pham T-H	1	1	0.25	177	1	2020
Tran T	1	1	0.25	177	1	2020
Vuong Q-H	1	1	0.25	177	1	2020
Vuong T-T	1	1	0.25	177	1	2020

TC: Total Citations,NP: Number of publications, PY : Year of first publication

Source: Own elaboration based on Biblioshiny Software

- **Country analysis**

Table 3 illustrates the highest cited countries that published articles related to COVID-19 and sustainability and received more than 150 citations. This indicates Bangladesh as highest cited country which published 39 articles. Second and third highest cited countries are USA, United Kingdom which published 93 and 71 publications respectively. India was the country which had the highest number of publications -98 and 85 citations. The highest cited countries are developed countries except Bangladesh. There is a dearth of studies related to emerging country context.

Table no. 3. Country analysis

Country	TP	TC	Average Article Citations
Bangladesh	39	548	109.6
USA	93	515	27.1
United Kingdom	71	444	44.4
Germany	53	419	38.1
China	86	418	15.5
Finland	5	273	91
Spain	68	218	11.5
Australia	44	183	14.1
Sweden	10	182	45.5
Italy	57	151	10.1

TP: Total Publications, TC: Total Citations

Source: Own elaboration based on Biblioshiny Software

- **Keyword analysis**

Table 4 and Figure no. 3 illustrates the keyword analysis related to the COVID-19 and sustainability. Highest occurred keywords are "COVID-19" and "Sustainability". Other than that, key words which occur more than 10 items include resilience, higher education, lock down, environment, environmental sustainability and supply chain. In addition, economic sustainability, social sustainability and financial sustainability are also frequently discussed by the authors. In addition, e-learning, health and hospitality sector impact is frequently discussed in previous literature.

Table no. 4. Keyword analysis

Words	**Occurrences**
resilience	21
higher education	12
lockdown	12
environment	11
environmental sustainability	11
supply chain	10
social sustainability	9
business sustainability	8
sustainable development	8
sars-cov-2	7
tourism	7
crisis	6
e-learning	6
health	6
economic sustainability	5

Source: Own elaboration based on Biblioshiny Software

Figure no. 3 Wordcloud
Source: Own elaboration based on Biblioshiny Software

Error! Reference source not found. 4 exhibits the thematic map related to COVID-19 and sustainability. It provides a pictorial presentation of the trending themes in this area of research. Bottom-right part of the map shows the basic themes representing the well-established research issues in this area. The themes including crisis management, business sustainability, higher education, sustainable development, and resilience are considered as basic themes.

The themes gaining importance in the recent past are presented in the top-right part of the map. It mainly includes five research issues: environment, digitization impacts, air pollution, health, cities and social support. The top-left part shows the niche themes. This includes corporate sustainability, digital transformation, leadership, sustainability reporting, economic sustainability, Post Covid-19 and institutional theory which future research needs to be further explored. Finally, financial sustainability, crisis and hospitality industry are classified as emerging themes/declining themes. It is mainly because most of the studies discussed these, and it is required to investigate these themes with different variants that are not the same as these keywords.

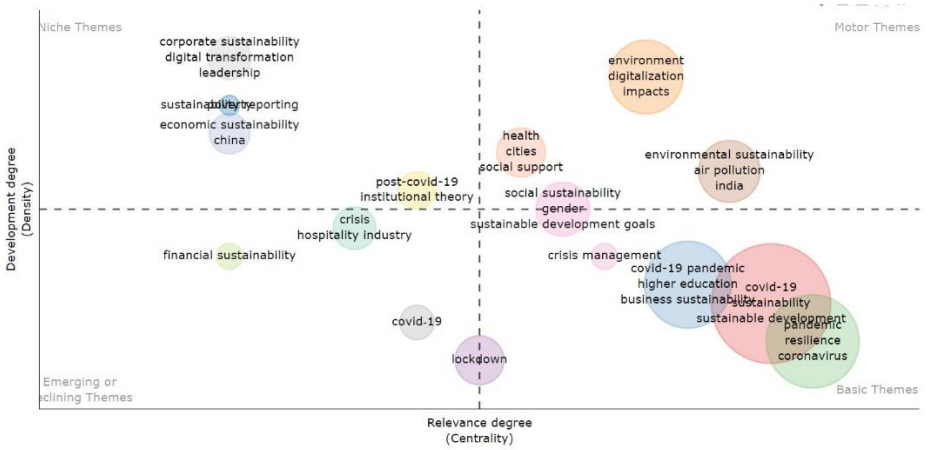

Figure no. 4. Thematic map
Source: Constructed based on Biblioshiny Software

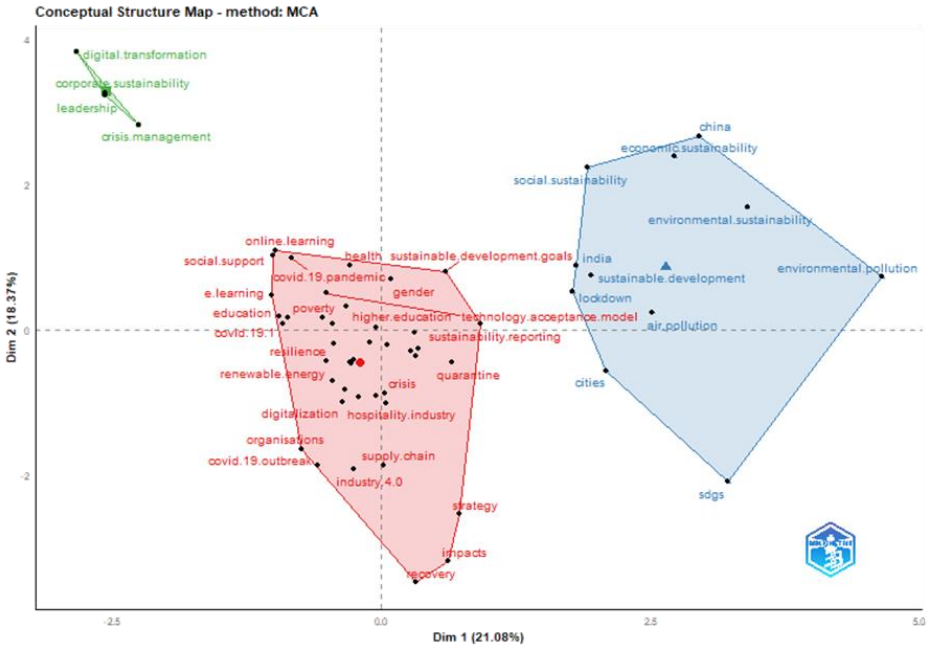

Figure no. 5. Cluster analysis
Source: Own elaboration based on Biblioshiny Software

In bibliometrics, cluster analysis compresses the complex keyword network into numerous smaller categories based on the frequency of two keywords occurring

simultaneously. The hierarchical clustering method and multiple correspondence analysis (MCA) are employed in this research. COVID-19 and sustainability studies can be described using cluster analysis in Figure no.5.

First cluster includes COVID-19 and education, digitalization, supply chain, health, social support and sustainable development goals. Second cluster includes sustainable development, environmental pollution, environmental sustainability, social sustainability, china and india. Third cluster includes digital transformation, corporate sustainability, leadership and crisis management.

- **Article analysis**

The highly selected articles related to "COVID-19" and "Corporate Sustainability is listed in Appendix. This section summaries the findings of these articles.

Two of the highly cited articles are related to the supply chain sustainability. Initially, Sarkis (2020) makes suggestions for future study on how to assess supply chain sustainability in the post-COVID-19 era. Current supply networks and operations have never experienced the events or reactions related to the COVID-19 pandemic. Academics and practitioners are attempting to comprehend how this event will force us to reevaluate fundamental theories and ideas in our field. Sustainability suffers as a result. Short-term improvements in environmental viability are evident, but further research is required to fully understand long-term effects. Sustainability and resilience are complimentary ideas that demand investigation.

Next, Karmaker et al. (2021) explore the factors that affect sustainable supply chains (SSCs) in Bangladesh, an emerging country, in order to address supply chain disruptions during such a pandemic. In order to accomplish this, a framework based on Pareto analysis, fuzzy theory, total interpretive structural modeling (TISM), and matrixed impacts cruises multiplication with classification is proposed. An evaluation of the proposed approach is conducted with the assistance of academic experts from emerging economies as well as seasoned supply chain practitioners. It is evident from this study that there are important connections and vital relationships between the drivers in order to enhance the SCS in the context of COVID-19. As a result of the research, it is also evident that both the government and supply chain partners need to make financial investments to deal with the immediate impact that COVID-19 will have on the supply chain. To ensure long-term viability of supply networks, it is essential to develop policies that take automation and health protocols into consideration.

Another two articles explain about the impact of COVID-19 on environmental sustainability. Initially, Rume and Islam (2020) investigate both the beneficial and detrimental effects of the COVID-19 pandemic on the environment by literature review. According to their findings, positive impact includes improvement of air quality in various cities, reduction of the level of GHG emissions, reduction of noise and water pollution, and reduction of tourist pressure on environment. However, the COVID-19 has negative effects as well, such as an increase in medical waste, the careless use of

disinfectants, masks, and gloves, and the weight of untreated wastes that continuously endanger the ecosystem. Finally, this study suggests that there is a possibility that economic activity will pick up again following the pandemic, and things may take a different turn.

Additionally, in the wake of COVID-19, the global airline industry faces fresh, modern difficulties in regards to adopting and putting into practice environmental sustainability policies (Amankwah-Amoah, 2020). As part of the study, firm-level sustainability initiatives are discussed, such as upgrading to environmentally friendly aircraft and offsetting emissions footprints, as well as institutional initiatives that include the European Union Emission Trading System and the Aviation Carbon Offset and Reduction Scheme. According to this research, some businesses and airlines have tried to steer clear of environmental commitments and practices in order to address current issues such as cost pressures, survival threats, and the devaluation of environmental sustainability.

Next, Empirical evidence discussed about COVID-19 impact on sustainable development and sustainable development goals. Firstly, Barbier and Burgess (2020) find ways to align economic incentives for long-term sustainable development while supporting multiple SDGs simultaneously. This study suggests three policies to achieve these goals: a fossil fuel subsidy swap to finance clean energy projects and the expansion of renewable energy in rural areas; reallocating irrigation subsidies to improve water supply, sanitation, and wastewater infrastructure; and establishing a tropical carbon tax, a tax on fossil fuels intended to fund climate-related initiatives that are not man-made. In less developed countries, such innovative and cost-effective policy frameworks promote greater progress towards the SDGs and do not require substantial external assistance.

Secondly, Ranjbari et al. (2021)investigate how COVID-19 impacts sustainability triple bottom line in order to advance long-term sustainable development. This study evaluated the current state of sustainable development research and how COVID-19 affects TBL viability, identifying gaps in research and future directions for sustainable development research after COVID-19. According to the findings, the COVID-19 pandemic has had a significant impact on the triple sustainability pillars and the sustainable development agenda from the perspectives of economic, social, and environmental factors. The future research gaps identified in this study include examining sustainability transition possibilities following COVID-19, focusing on SDGs 1, 8,9,12, 17, and 19.

Other researchers consider the impact of COVID-19 on different countries. According to La et al. (2020), the circumstance is examined in light of science journalism, social media, and Vietnam's response to the situation. The news about COVID-19 was gathered from official media sources between January 1 and April 4 using a self-made web crawl engine. In the end, 14,952 news items were included in the dataset. It is clear from these results that Vietnam is politically prepared to combat the pandemic from the outset, despite its limited resources. The Vietnamese scientific community has conducted a number of scientific studies on the new virus and timely media and government reports have been made available as reliable sources of information regarding any outbreak developments.

Next, using specific examples from Finland and Sweden, Kanda and Kivimaa (2020) explore the implications for research on the sustainability transition in energy and mobility in this context. As a result of the COVID-19 pandemic, work and other daily activities that are already being digitalized are likely to have longer-lasting effects on the overall consumption of fossil fuels and the need for mobility. In addition to the danger of increasing populism and undemocratic political responses, the crisis may also compel governments to improve their resilience to future shocks.

The tenth cited article discussed about the COVID-19 impact on tourism industry. According to Jones and Comfort (2020), the 2019 Coronavirus Disease (COVID-19) pandemic has altered the dynamics between sustainability and the hospitality industry. As a result of the research, it has been demonstrated that the crisis has profound effects on the sustainability of the hospitality industry. Despite the fact that the crisis has provided us with an opportunity to envision a more sustainable future, it is likely that the business and many of its loyal customers will have a difficult time adapting to this vision.

Conclusions

This study presents a bibliometric review in order to identify trends, top contributions, top authors, and other meta-data for COVID-19 and Corporate Sustainability studies. Several papers on COVID-19 and corporate sustainability have been published in the Scopus database since 2020 with the orgination of COVID-19 pandemic in the world. In addition, the keyword analysis revealed that most researchers were interested in COVID-19 impact on corporate sustainability, sustainable development and environmental sustainability. As a result of the study, we recommend that future researchers examine topics such as impact of COVID-19 on envirionmental sustainability, digitalization, environmental pollution, social sustainability, health and cities. According to the citations analysis, Bangladesh, USA, United Kingdom and Germany have the highest number of citations. Therefore, based on our findings, we propose that COVID-19 impact on CS research should be accelerated in developing countries. As a pioneering study, this study examined bibliometric indicators associated with publications. It suggests that researchers and regulators could gain insight into a number of COVID-19 impact on CS issues from this study. The results of this study are subject to a number of limitations, so it is important to interpret and understand them appropriately.

In our study, we primarily examined research published in the SCOPUS database and published in English, but future studies could include other databases and other languages as well. In addition, future researchers can conduct bibliometric analysis using different softwares such as Vos Viewer, Publish Vs Perish, etc. Moreover, future researchers can consider co-citation analysis, bibliographic coupling and identify different clusters related to the COVID-19 impact on corporate sustainability.

References

[1] Amankwah-Amoah, J. (2020) 'Stepping up and stepping out of COVID-19: New challenges for environmental sustainability policies in the global airline industry', *Journal of Cleaner Production*, 271, p. 123000.
[2] Aria, M. and Cuccurullo, C. (2017) 'bibliometrix: An R-tool for comprehensive science mapping analysis', *Journal of Informetrics*, 11(4), pp. 959–975. Available at: https://doi.org/10.1016/j.joi.2017.08.007.
[3] Barbier, E.B. and Burgess, J.C. (2020) 'Sustainability and development after COVID-19', *World development*, 135, p. 105082.
[4] Broadus, R.N. (1987) 'Early approaches to bibliometrics', *Journal of the American Society for Information Science*, 38(2), pp. 127–129. Available at: https://doi.org/10.1002/(SICI)1097-4571(198703)38:2<127::AID-ASI6>3.0.CO;2-K.
[5] Durieux, V. and Gevenois, P. (2010) 'Bibliometric Indicators: Quality Measurements of Scientific Publication', *Radiology*, 255, pp. 342–51. Available at: https://doi.org/10.1148/radiol.09090626.
[6] Garfield, E. (1955) 'Citation indexes for science: A new dimension in documentation through association of ideas', *Science*, 122(3159), pp. 108–111.
[7] Giacomini, D. *et al.* (2021) 'Corporate social responsibility actions and organizational legitimacy at the peak of COVID-19: a sentiment analysis', *Corporate Governance (Bingley)*, 21(6), pp. 1043–1058. Available at: https://doi.org/10.1108/CG-09-2020-0389.
[8] Guérin, P. and Suntheim, F. (2021) 'Firms' environmental performance and the COVID-19 crisis', *Economics Letters*, 205. Available at: https://doi.org/10.1016/j.econlet.2021.109956.
[9] Gunawardana, P., Gamage, P. and Ranathunga, M. (2020) 'The impact of COVID - 19 to MSME Sector in Sri Lanka 2020'.
[10] Jones, P. and Comfort, D. (2020) 'The COVID-19 crisis and sustainability in the hospitality industry', *International Journal of Contemporary Hospitality Management*, 32(10), pp. 3037–3050. Available at: https://doi.org/10.1108/IJCHM-04-2020-0357.
[11] Kanda, W. and Kivimaa, P. (2020) 'What opportunities could the COVID-19 outbreak offer for sustainability transitions research on electricity and mobility?', *Energy Research & Social Science*, 68, p. 101666.
[12] Karmaker, C.L. *et al.* (2021) 'Improving supply chain sustainability in the context of COVID-19 pandemic in an emerging economy: Exploring drivers using an integrated model', *Sustainable production and consumption*, 26, pp. 411–427.
[13] Kathairmalainathan, D. (2021) 'Impact of COVID-19 on Economic Sustainability in Sri lanka', *SSRN Electronic Journal* [Preprint]. Available at: https://doi.org/10.2139/ssrn.3913594.
[14] La, V.-P. *et al.* (2020) 'Policy response, social media and science journalism for the sustainability of the public health system amid the COVID-19 outbreak: the Vietnam lessons', *Sustainability*, 12(7), p. 2931.
[15] OECD (2021) 'The long-term environmental implications of COVID-19', *Oecd*, (May), pp. 1–10.

[16] PwC (2021) Global Crisis Survey 2021. Available at: https://www.pwc.com/gx/en/issues/crisis-solutions/global-crisis-survey.html (Accessed: 23 June 2022).
[17] Ramya, S.M. and Baral, R. (2021) 'CSR during COVID-19: exploring select organizations' intents and activities', *Corporate Governance (Bingley)*, 21(6), pp. 1028–1042. Available at: https://doi.org/10.1108/CG-09-2020-0426.
[18] Ranjbari, M. *et al.* (2021) 'Three pillars of sustainability in the wake of COVID-19: A systematic review and future research agenda for sustainable development', *Journal of Cleaner Production*, 297, p. 126660.
[19] Rume, T. and Islam, S.D.-U. (2020) 'Environmental effects of COVID-19 pandemic and potential strategies of sustainability', *Heliyon*, 6(9), p. e04965.
[20] Sajjad, A. (2021) 'The COVID-19 pandemic, social sustainability and global supply chain resilience: a review', *Corporate Governance (Bingley)*, 21(6), pp. 1142–1154. Available at: https://doi.org/10.1108/CG-12-2020-0554.
[21] Sarkis, J. (2020) 'Supply chain sustainability: learning from the COVID-19 pandemic', *International Journal of Operations & Production Management*, 41(1), pp. 63–73.
[22] The Lancet (2020) 'The plight of essential workers during the COVID-19 pandemic', *The Lancet*, 395(10237), p. 1587. Available at: https://doi.org/10.1016/S0140-6736(20)31200-9.
[23] UN (2020) 'The world of work and COVID-19', *United Nations*, 06(June), p. 27.
[24] UN Women (2021) *a Feminist Plan for sustainability and Justice*.
[25] Zhang, D. *et al.* (2021) 'The impact of COVID-19 on business perspectives of sustainable development and corporate social responsibility in China', *Environment, Development and Sustainability* [Preprint]. Available at: https://doi.org/10.1007/s10668-021-01798-y.