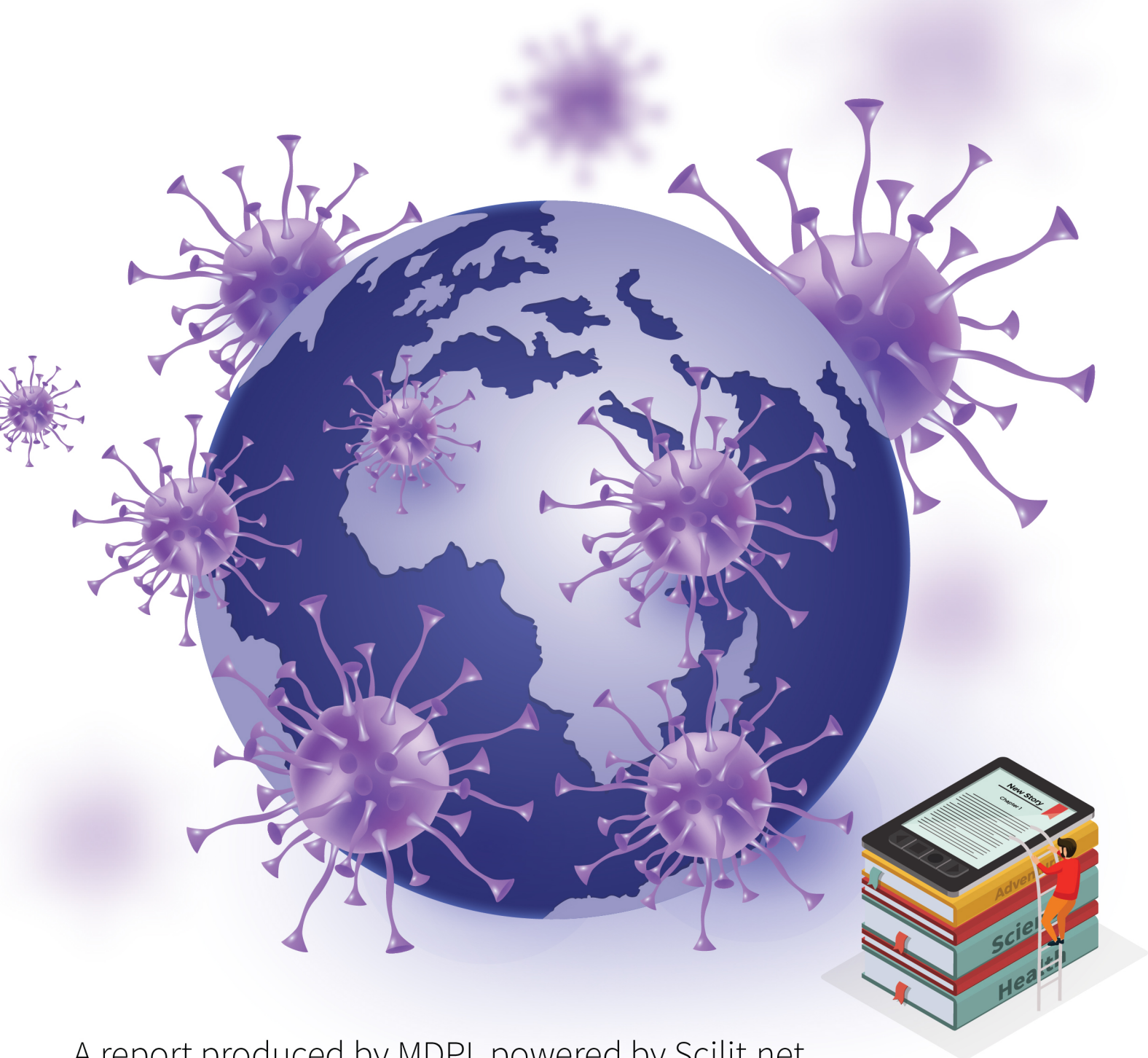




The Impact of Covid-19 Pandemic on Scholarly Publishing Industry:

A Quantitative Analysis



A report produced by MDPI, powered by Scilit.net.

Executive Summary

As the coronavirus pandemic has continually spread across nations, many industries have been hit by this pandemic. In this report, we try to evaluate the impact of the coronavirus pandemic on the industry of scholarly publishing. The report consists of four parts: the first part evaluates the impact of the pandemic on global research output; the second part looks at country level performance in 2020; the third part focuses on the impact on publishing houses; the last part takes a different approach by investigating how open access publishing has been influencing the pandemic. Data used in this report were collected from Scilit [1], which is a comprehensive, free database for scientists using a new method to collate data and index scientific material.

Listed below are the key findings in our report:

1. In terms of overall output level, the Covid-19 pandemic has had little impact on the total output of scholarly publications globally. However, the growth rate of open access publishing slowed down in 2020 comparing to subscription-based publishing.
2. At the country level, more than 90% of countries saw increased counts of published research papers in 2020. However, a large proportion of the top 20 countries in terms of publications as well as the cumulative totals of Covid-19 cases have seen a decreasing growth rate in 2020.
3. At the publishing house level, the medium and small sized publishing houses have borne most of the brunt, whereas the impact on major publishing houses was trivial. This means that a large proportion of market redistribution took place in 2020.
4. Open access publishing has also impacted the fight against this pandemic in a positive way. Nearly 50% of research papers relevant to Covid-19 were published in open access format in 2020, when the average fraction of open access was just 35.5% in 2020.

Impact of the Pandemic on Overall Output Level

We collected the data of total scientific research papers (including all types of papers published in academic journals) from 2006 to 2020 for our analysis. Figure 1 depicts the total number of publications each year and an annual growth rate curve across the examined period. As of 31 December 2020, the total number of research papers published in 2020 is approximately 4,268,208, which is higher than the 4,049,303 papers published in 2019. Although the growth rate of 2020 is slightly lower than that of 2019, considering the volatility of the growth rate curve, we cannot tell if the slowdown is caused by the pandemic. Therefore, from the point of global overall output level, we found no conspicuous negative impact caused by the Covid-19 pandemic.

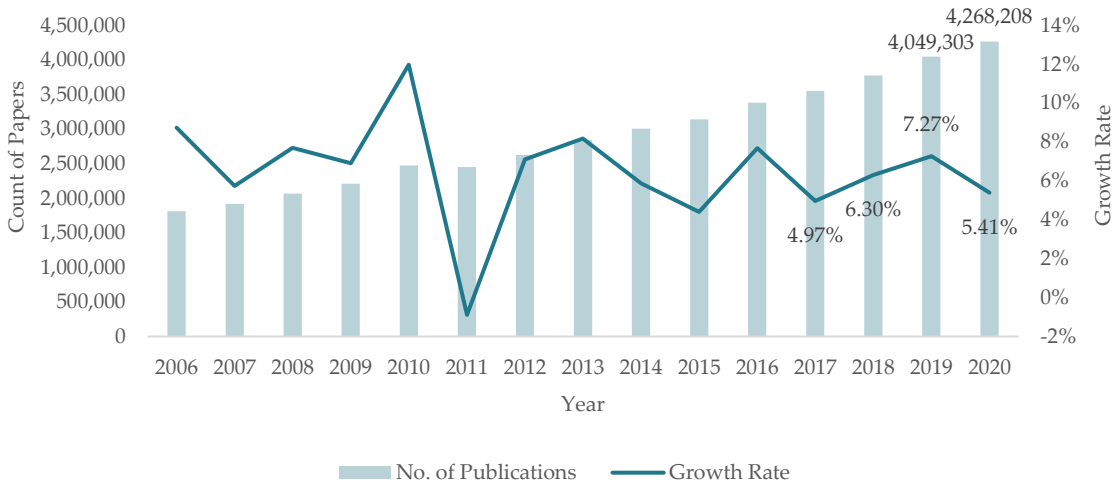


Figure 1. Annual total publications and growth rate from 2006 to 2020.

Nonetheless, we noted that the pandemic seems to have affected open access publishing more than subscription-based publishing. (Note: Scilit includes gold, green, bronze, and diamond open access. In the case of bronze open access, *i.e.*, papers that are under copyright but freely available, many articles are only freely available after 6–24 months embargo, therefore the number of open access items may still increase for 2020.) Though the total number of open access publications and subscription publications both increased by small margins in 2020 comparing to the previous year (see Figure 2), we observed a sharp decline of annual growth rate in 2020 for open access publications—from 11.35% to 5.74%, the lowest level in five years. By contrast, the growth rate of subscription-based publications in 2020 was much more stable (Figure 2).

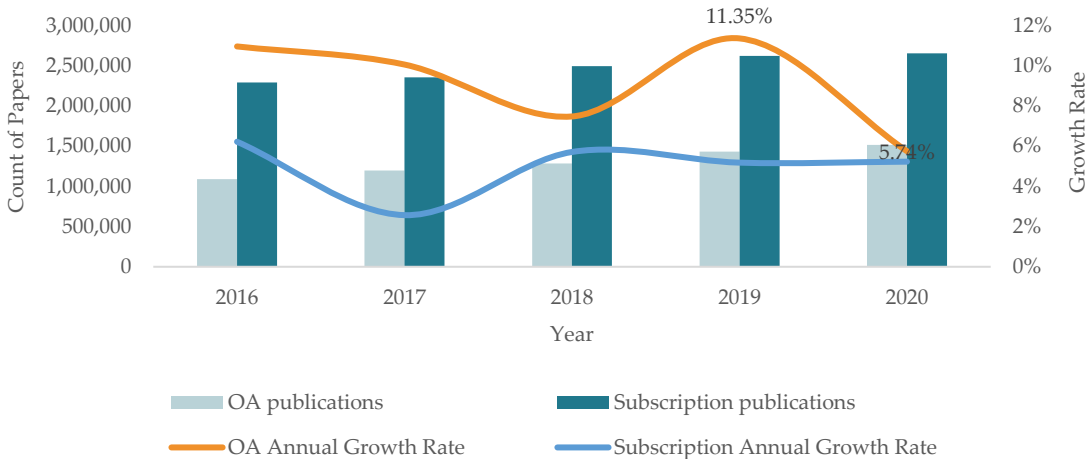


Figure 2. Open access publications vs. subscription-based publications, 2016–2020.

Impact of Pandemic at the Country Level

We examined 191 countries' publication records in 2020 and 2019, and discovered that more than 90% of the countries published more papers in 2020 than the previous year. Ninety countries' growth rates for 2020 slowed down compared to the the previous year, which is quite close to the 89 countries with slowed-down growth rates in 2019. This result is in line with our conclusion in the first part that the pandemic has had little impact on total global research output.

However, when we look at the top 20 countries with the highest number of papers, some different discoveries can be made. The top 20 countries in terms of number of papers published in 2020 are the United States, China, United Kingdom, India, Germany, Japan, Italy, France, Brazil, Canada, Spain, Australia, South Korea, Iran, Russia, Netherlands, Indonesia, Switzerland, Turkey, and Poland. According to the WHO's latest statistics [2], most of these 20 countries also have the most cumulative Covid-19 cases. This makes them a more representative and informative sample for our analysis.

Figure 3 shows that all of the 20 mentioned countries have had increased numbers of publications in 2020, but 14 of them had a decreasing growth rate in 2020 (Figure 4a–d), whereas only 7 of them had decreasing growth rates in 2018 and 2 in 2017.

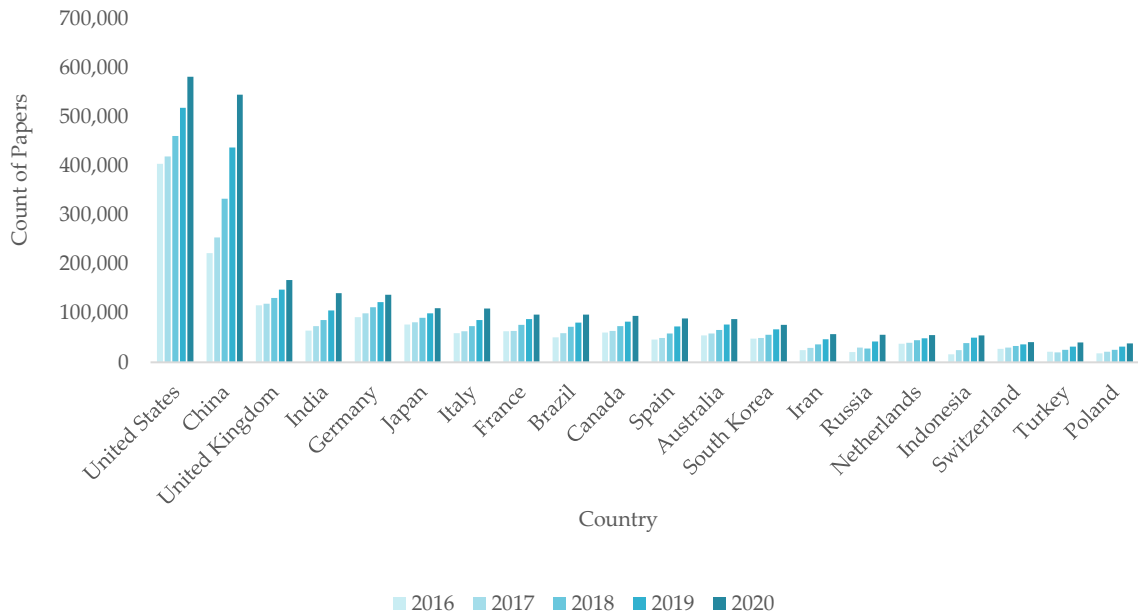


Figure 3. Publication record of top 20 countries by number of papers in 2020 from 2016 to 2020.

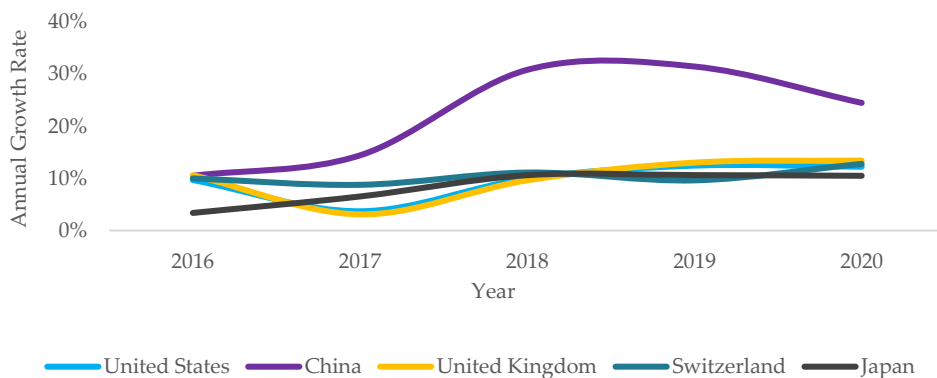


Figure 4 (a)

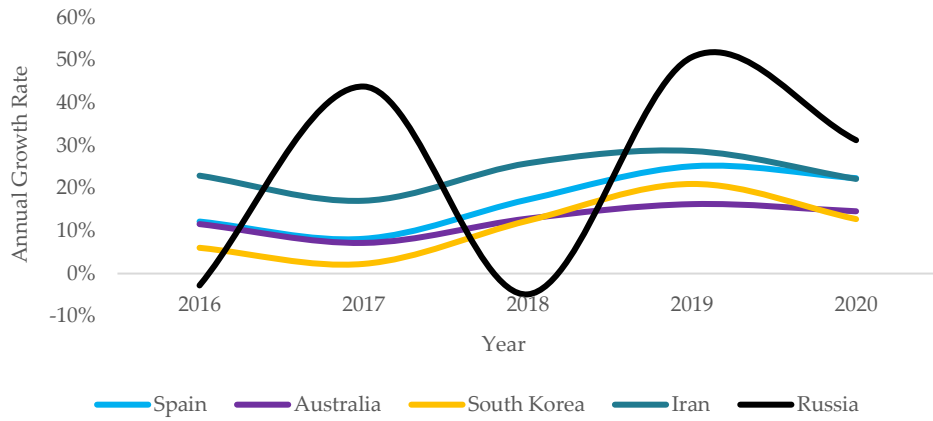


Figure 4 (b)

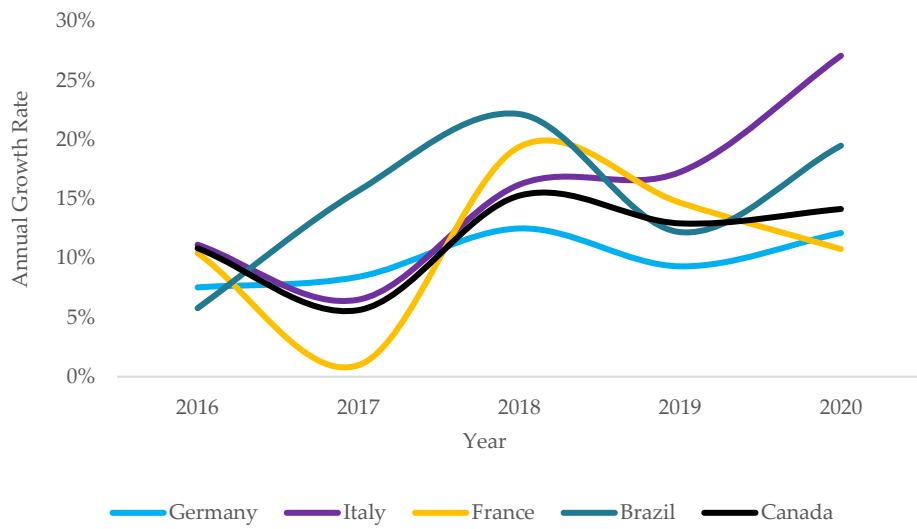


Figure 4 (c)

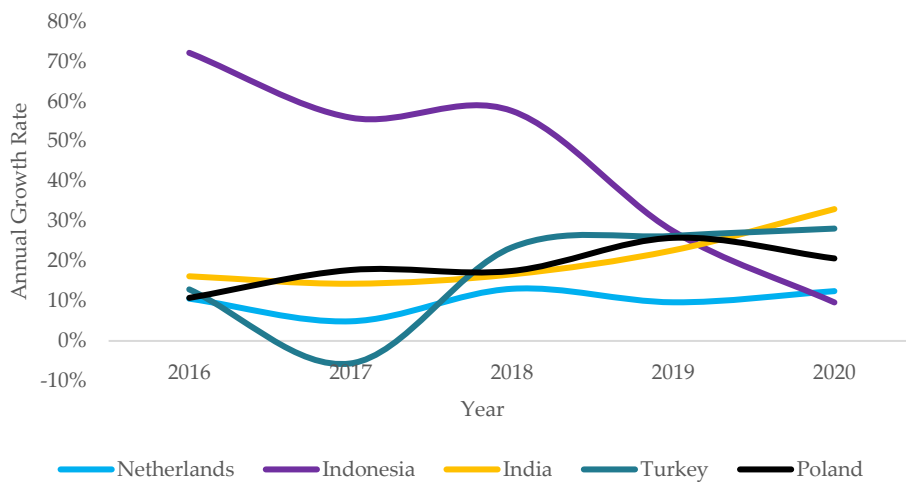


Figure 4 (d)

Figure 4. Growth rate of top 20 countries with most publications.

Figure 5 (below) shows the top 20 countries by number of Covid-19 related papers published in 2020. By searching for keywords "Covid-19" OR "Coronavirus" OR "SARS-CoV-2" on Scilit and filtering results by including only research articles and reviews published in 2020, we found 144,134 entries. The USA, China, UK, Italy and India are the top 5 countries in terms of the number of Covid-

19 related research papers. Countries colored in light blue are also on the list of the top 20 countries with the most confirmed cumulative Covid-19 cases.

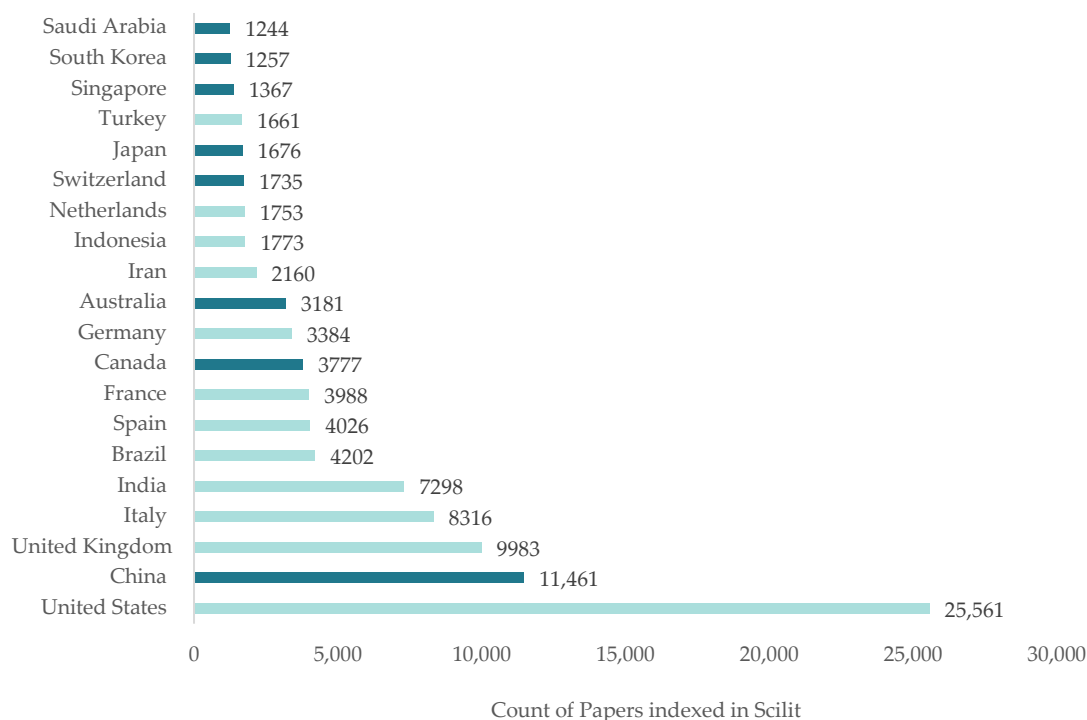


Figure 5. Top 20 countries with most Covid-19 related research papers published in 2020.

Impact of Pandemic at the Publishing House Level

Numbers for the Entire Journal Market (Closed Access and Open Access)

We performed an analysis of the top 100 publishers in 2020 and combined all the other publishers as one category — “others”. All these smaller publishers (the long tail) lost ground in 2020 with a reduction of 39,339 published articles (Figure 6).



Figure 6. Top 100 publishers’ and small publishers’ publication records, 2016–2020.

Although the sum of articles published by the top 100 publishers grew by 234,299 in 2020, only 23 top publishers had actually published more papers than the year before, while 87 of them experienced a decline with a combined reduction of 113,445 comparing to 2019. In comparison, within the period of 2016 to 2019, the average number of publishers with decreased numbers of annual publications was 33.

In 2020, the total number of global scientific research papers was approximately 4.2 million, and around 52% of them were published by the world's top 10 publishers. As shown in Figure 7, on top of the list is Elsevier, which claimed almost 20% of the total world publications, followed by Springer Nature (9.19%), Wiley (6.90%), MDPI (3.85%), Informa UK Limited (3.73%), Oxford University Press (2.16%), Ovid Technologies (2.03%), Institute of Electrical and Electronics Engineers (2.00%), SAGE publications (1.84%), and American Chemical Society (1.52%).

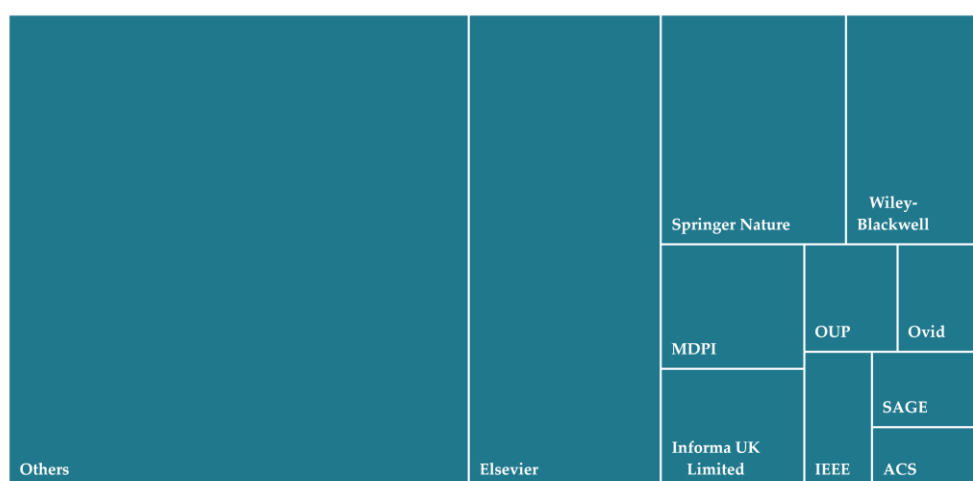


Figure 7. Top 10 publishers by number of published articles in 2020. Note: OUP is the abbreviation for Oxford University Press; IEEE—Institute of Electrical and Electronics Engineers; ACS—American Chemical Society.

We compared the publication statistics of the top ten publishers for a time span of 5 years (from 2016 to 2020) and observed that all of those publishers' total publication numbers in 2020 had exceeded that of the year before (Figure 8). MDPI increased the most (by 52.01%), followed by Institute of Electrical and Electronics Engineers (IEEE; 44.80%), Wiley (17.75%), Elsevier (13.55%), Ovid Technology (9.16%), Springer Nature (7.73%), Oxford University Press (4.84%), American Chemical Society (4.21%), and Informa UK Limited (1.05%) (Figure 9). This may imply that the impact of the pandemic on the world's major publishers is quite trivial compared to the impact on medium and small publishers.



Figure 8. Top 10 publishers' publication numbers from 2016 to 2020.

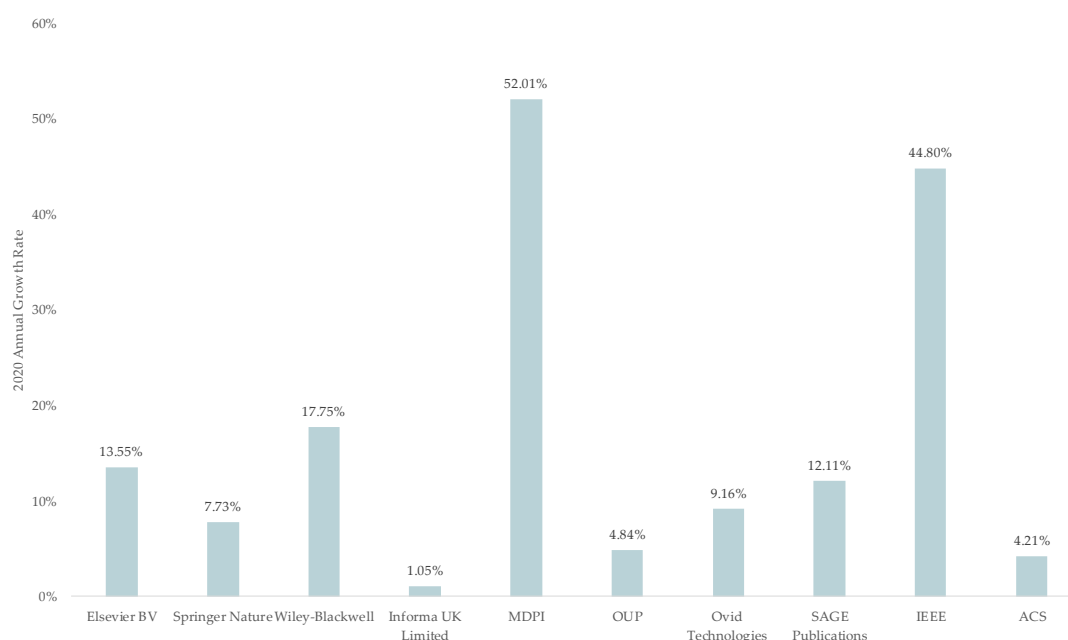


Figure 9. Top 10 publishers' growth rates in 2020.

Open Access Market Only

We performed an analysis of the top 100 open access publishers in 2020 and combined all the other smaller publishers as one category—"others" (Figure 10). All of these smaller publishers (the long tail) lost ground in 2020 with a reduction of 48,019 open access articles. However, even in the top 100, there are 48 publishers that lost ground with a combined reduction of 55,272. In other words, in 2020 there seemed to be considerable market concentration of open access journal articles with a market growth of 82,129 but market redistribution of 103,291, with MDPI, Springer Nature and Wiley-Blackwell representing most of that redistribution.

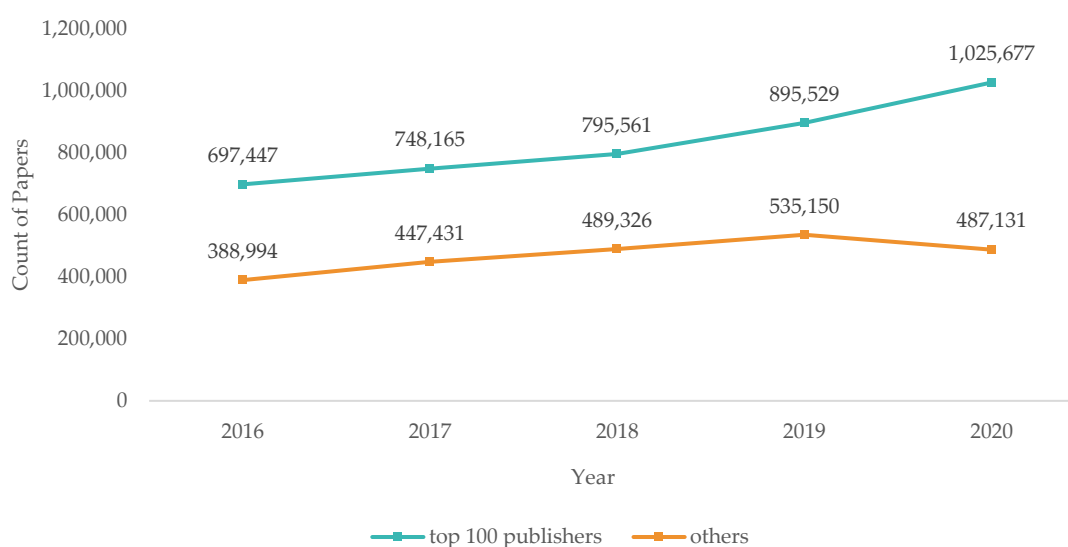


Figure 10. Top 100 open access publishers and smaller publishers' publication record (2005–2020).

Approximately 1.5 million open access journal articles were published in 2020. As can be seen from Figure 11, the top 10 publishers by number of open access articles account for nearly 50% of the total open access publications. MDPI tops the list claiming 10.87% of the total open access output, followed by Springer Nature (9.45%), Elsevier (9.43%), Wiley (6.11%), Frontiers (3.12%), Informa UK

Limited (1.89%), Oxford University Press (1.76%), SAGE (1.70%), Hindawi (1.63%), and Public Library of Science (1.34%).

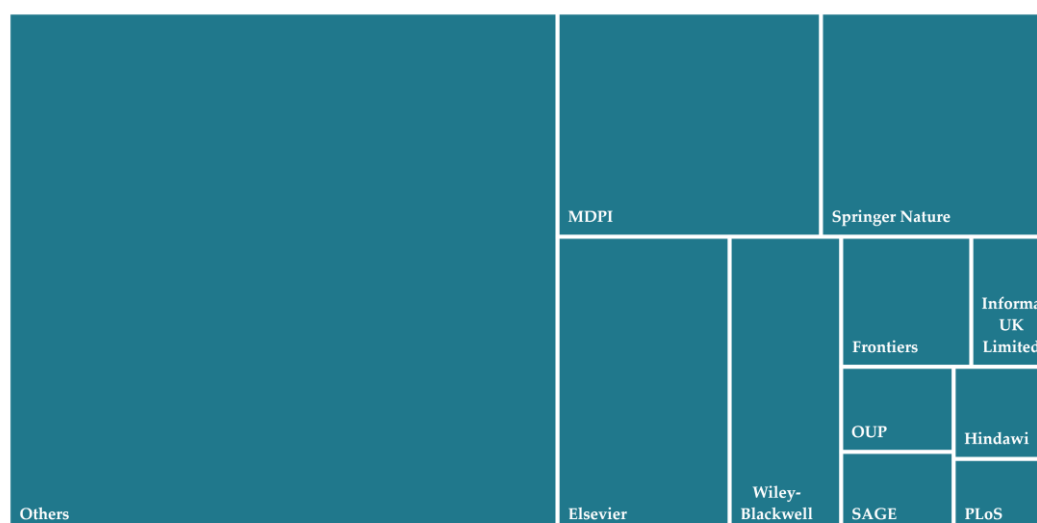


Figure 12. Open access publisher market distribution in 2020.

Figure 13 shows the growth rate for the top 10 open access publishers in 2020. Figure 14 depicts the open access publication record of the above-mentioned top 10 publishers from 2016 to 2020. As can be seen from the two figures, nine of the publishers had an increased number of open access publications in 2020 compared to the previous year, within which MDPI increased the most (by 52.08%), followed by Frontiers (39.07%), SAGE (33.79%), Wiley (33.70%), Hindawi (30.83%), and Springer Nature (21.11%). Oxford University Press was the only publisher which experienced a drop in open access publications (by 21.84%) in 2020.

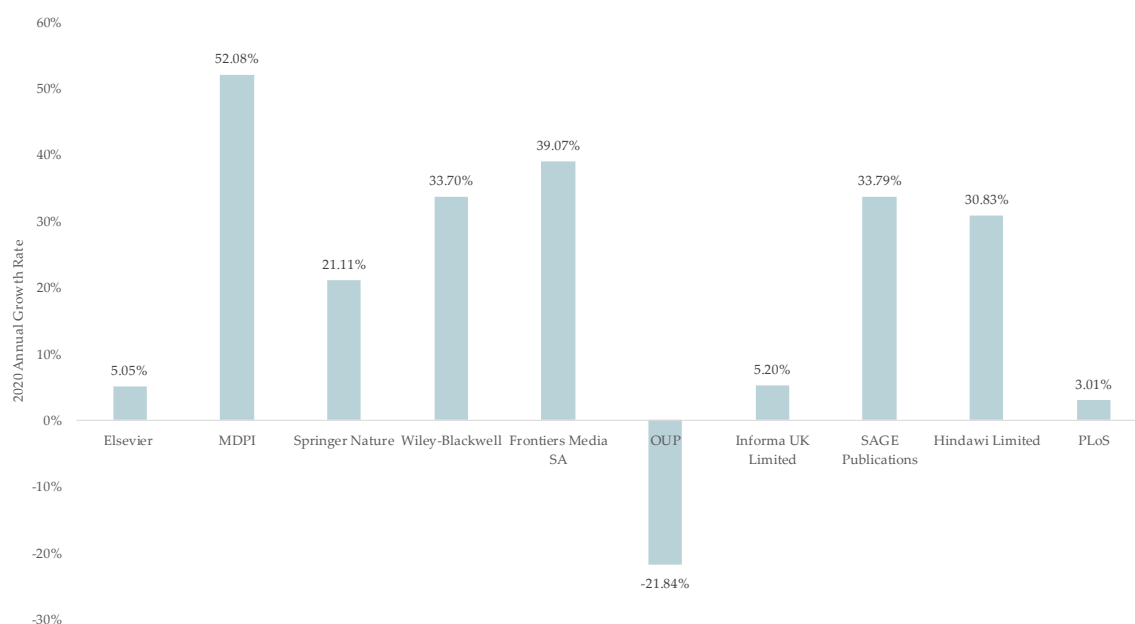


Figure 13. Top 10 open access publishers' growth rates of 2020.

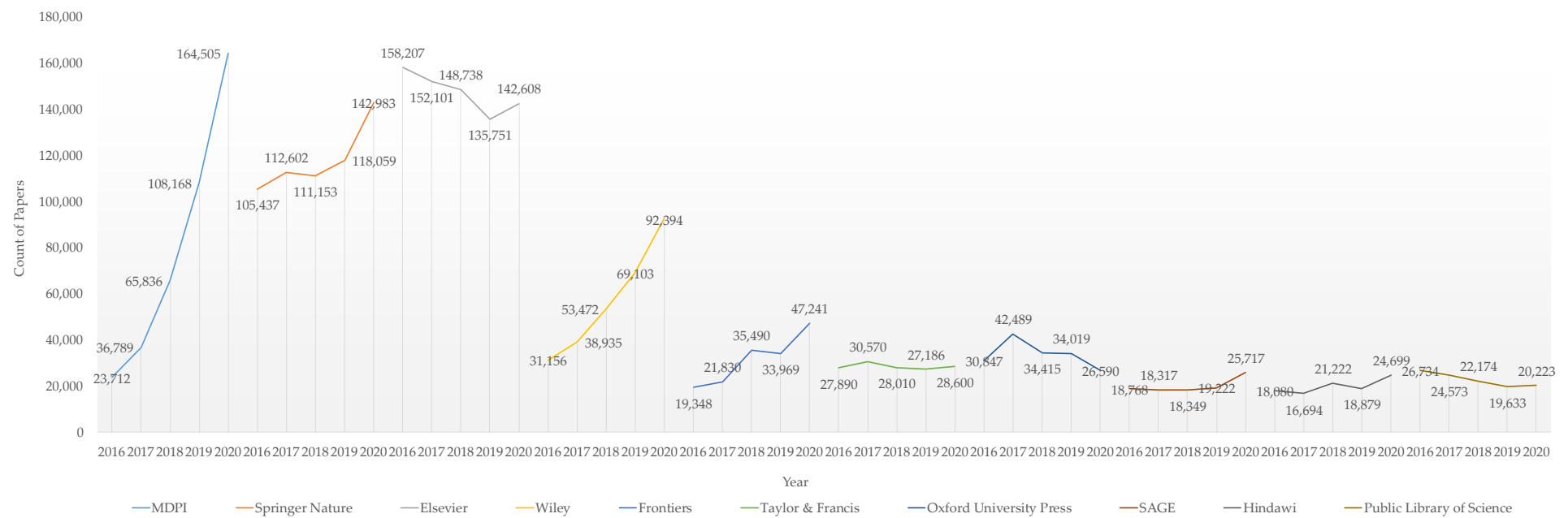


Figure 14. Top 10 open access publishers' annual publication records, from 2016 to 2020.

Impact of Open Access Publishing on the Pandemic

In this last part, we reverse our research approach by looking at how the open access publishing has been influencing the fight against the pandemic. As can be seen from Figure 15, the overall proportion of open access publications in total research output was 35.5% in 2020 (Figure 15).

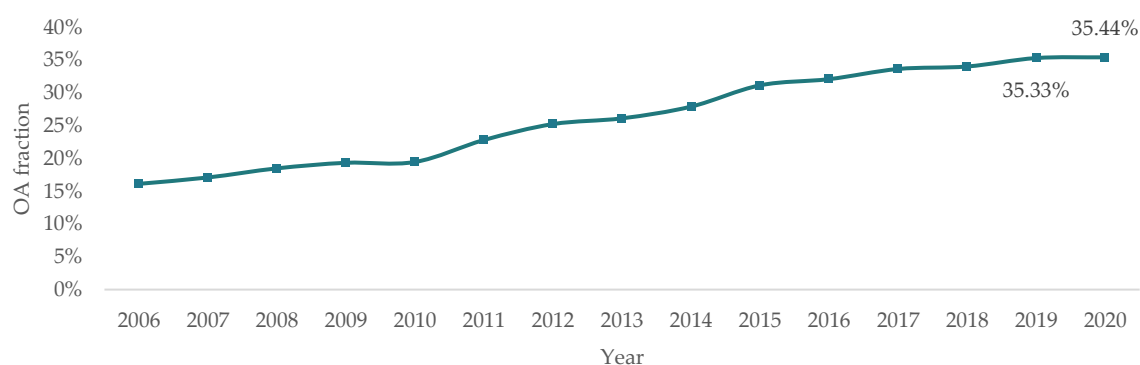


Figure 15. The proportion of open access articles in total research output from 2006 to 2020.

By searching for keywords “Covid-19” OR “Coronavirus” OR “SARS-CoV-2” on Scilit and filtering results by including only research articles and reviews published in 2020, we acquired 144,134 entries, of which 69,344 (48%) were open access publications and 74,790 were published in subscription mode (Figure 16). This means that nearly half of the Covid-19 related studies were published in open access format, way above the average proportion of open access publications.

It shows the importance of open access publication and the positive contribution it can bring to the scientific community as well as the welfare of human beings, especially during a global health emergency like the Covid-19 pandemic.

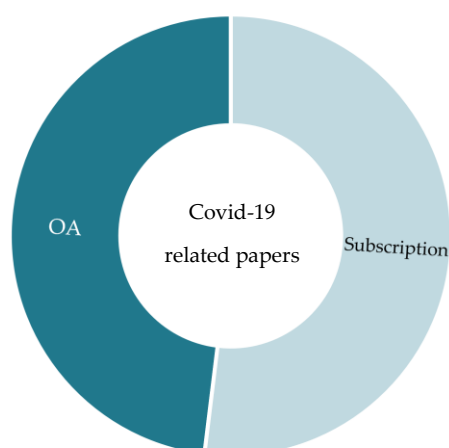


Figure 16. Proportion of open access and subscription-based papers related to Covid-19.

References

- 1 Scilit.net Homepage. Available online: <https://www.scilit.net/> (accessed on 8 January 2021).
- 2 WHO Coronavirus Disease (COVID-19) Dashboard. Available online: <https://covid19.who.int/table> (accessed on 8 January 2021).