

The annual G20 scorecard – Research performance 2023 Executive summary

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Author biographies

Gordon Rogers is a Lead Data Scientist at the Institute for Scientific Information™. He has worked in the fields of bibliometrics, data analysis and software engineering for more than 20 years at Clarivate and its former parent company. As a former member of our Consultancy team, he has supported clients around the world in evaluating their research portfolio and strategy. ORCID: [0000-0002-9971-2731](https://orcid.org/0000-0002-9971-2731). Web of Science ResearcherID: [ABA-6554-2020](https://www.researcherid.com/ABA-6554-2020).

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About the Institute for Scientific Information

The Institute for Scientific Information at Clarivate™ has pioneered the organization of the world's research information for more than half a century. Today it remains committed to promoting integrity in research while improving the retrieval, interpretation and utility of scientific information.

It maintains the knowledge corpus upon which the Web of Science™ index and related information and analytical content and services are built. It disseminates that knowledge externally through events, conferences and publications while conducting primary research to sustain, extend and improve the knowledge base.

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Introduction

The Institute for Scientific Information (ISI), a part of Clarivate, publishes an annual scorecard that summarizes and compares the research and innovation profile of the G20 group. By their nature, these large and influential economies are expected to have strong technology bases underpinned by significant investment in education, research and innovation.

The annual G20 scorecard is part of a wide range of regional and analytical summaries that ISI publish through our Global Research Report series. This year the series also includes reports on the United States (Summer 2023) and Mainland China (Fall 2023) and a report detailing our innovative approaches to profiled research analyses that transform our interpretation of research performance (Spring 2023). These reports are available for free download on the [ISI website](#).

The global research network has, for decades, been led by the U.S., which has been a magnet for talented and aspiring researchers who wish to develop their competency. The balance of global research has shifted in the last 20 years. Once dominated by the G7, research excellence is emerging and growing across many regions. Where once the global research network looked in each year much like the last, now there is more rapid change and the centers for innovative technologies are as

likely to be in Asia, Latin America or the Middle East as in Europe or North America. Mainland China's rapid growth and improving impact has been a frequently reported feature but other countries/regions are also becoming significant research contributors.

This pace of change on a global scale makes the annual G20 scorecard an essential source of rapid reference, benchmarking and key knowledge for policymakers and government officials, researchers and institutions, international organizations and NGOs, and industry and innovation leaders around the world.

ISI is delighted to make the G20 scorecard an online publication this year, with features that make our data even more accessible and rapid comparative analyses much more feasible. We expect to extend the range and depth of features every year and to increase the value of this analysis to our users.

Executive summary

Region	Snapshot of research footprint
Argentina	While the mean impact of most output is below average, research in Medicine has an impact over 1.5 times the world average. This is mostly due to higher levels of international collaboration and, after normalising for collaboration, their Collaborative CNCI is below average in all subject areas. Strong Sustainable Development Goal (SDG) focus on Life on Land (15) and Life below Water (14).
Australia	Mean CNCI remains high at around 1.4, and Collaborative CNCI is also high, around 1.1. International output has risen during the last decade but is showing signs of levelling off in the most recent years. SDG focus is on Peace & Justice (SDG 16) and Quality Education (4). While impact is above average in most SDGs, it is below average in Peace & Justice.
Brazil	Output in Humanities is three times more likely than the G20 average to be published in an Open Access (OA) journal. However, while the average proportion of OA content for the G20 has doubled over the last 10 years to just over 40%, Brazil's OA percentage has remained constantly just below 40%.
Canada	Above average proportion of output in Social Sciences, subjects allied to Medicine, Humanities and Arts, although OA output is below average in all categories. Allowing for collaboration class, output is cited just above average for both domestic and international research.
Mainland China	Accrued three times as many patents as any other individual G20 member in 2021. CNCI and Collaborative CNCI are similar throughout the period. This trend is present in most subject areas, except the Arts and Humanities. SDG focus is on Sustainable Cities (11) and Clean Water and Energy (6 and 7), with above average impact in most SDGs.
France	CNCI remains strong, although domestic CNCI is lower than would be expected for a strong research economy at 0.77. Collaborative CNCI remains below the world average of 1.0 throughout. In Medicine, however, CNCI is above 1.5, and Collaborative CNCI is just above world average.
Germany	Collaborative CNCI has been declining over the period and now stands below the world average of 1.0. Despite an increase in international collaboration early in the last decade, this has levelled off in recent years. The percentage of OA output increased significantly in 2020, possibly due to Plan S.
India	Despite recently overtaking Mainland China as the most populous country, GDP is only a third that of Mainland China and, during the last decade, research output is five times smaller. Above average output in Engineering and Maths & Physical Sciences where impact is just below the world average. SDG focus is on Clean Water (6), Responsible Consumption (12) and Clean Energy (7).
Indonesia	International collaboration has fallen from above 80% to below 65% over the last decade. The percentage of OA output has increased from below 20% to nearly 60% over the same period and is above average in all subject areas. Proportion of output on SDG 1, No Poverty, is more than 4 times the G20 average, and this work is cited above the world average.
Italy	OA output remained around the G20 average until 2020, when it increased significantly, possibly due to Plan S. Proportion of output in Medicine is above the G20 average, and this work is highly cited at nearly 1.5 times the world average.

Region	Snapshot of research footprint
Japan	The percentage of female researchers remains below a fifth. Research productivity also remains among the lowest in the G20. The proportion of OA output remains just above the G20 average, although the gap has closed in recent years. Patents per business expenditure on R&D (BERD) is high.
Mexico	Output in Medicine is above average impact, although this comprises a below average proportion of output. Just under half of output is internationally collaborative. Productivity, measured by papers per either researcher or government expenditure on R&D (GERD), is among the highest in the G20.
Russia	CNCI is low, at 0.70 over the last decade, with fewer than a fifth of papers receiving more citations than the world average. Collaborative CNCI is even lower, at 0.55. SDG focus is on Clean Energy (7) and Industry (9).
Saudi Arabia	Highest average CNCI of any G20 nation at 1.41, however Collaborative CNCI is lower at 1.05. More than four-fifths of papers are internationally collaborative, the highest proportion in the G20.
South Africa	Patents per BERD is the highest of the non-Asian G20 countries. In 2022, more than half of output was published in OA journals. Productivity is among the highest of all G20 nations.
South Korea	GERD as a percentage of GDP is higher than for any other G20 country, at nearly 5%. Patents per BERD is, as with the other East Asian countries in the G20, also high, as is researchers per thousand people, at more than 10.
Türkiye	Proportion of internationally collaborative output has increased from a fifth to a third over the last decade, with average impact increasing from around 0.7 to just over 1.0 over the same period. SDG focus is on Education (4), Economic Growth (8) and Gender Equality (5).
United Kingdom	In 2022, more than half of output was published in OA journals. Collaborative CNCI remains above the world average but has fallen during the last decade. Collaborative CNCI is higher for domestic papers than international output, in contrast to most other G20 nations.
United States	Both CNCI and Collaborative CNCI have fallen over the last decade. This trend is clear in most subject areas, although Medicine is an exception. The proportion of output in SDG 16, Peace, Justice and Strong Institutions, is more than twice the G20 average, and this work is cited above average.

Explore the interactive Annual G20 scorecard – Research performance 2023 at <https://clarivate.com/the-institute-for-scientific-information/2023-g20-scorecard>

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Our Global Research Reports draw on our unique industry insights to offer insights, analysis, ideas and commentary to enlighten and stimulate debate.

Each one in the series demonstrates the huge potential of research data to inform management issues in research assessment and research policy and to accelerate development of the global research base.

Advice on the use of the standard methodology and information about comparative institutional analyses used in this report is available.

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