

G20 research and innovation scorecard 2026

Executive Summary

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Author biographies

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Tina Jablanovic is a Data Analyst at the Institute for Scientific Information. She has a background in mathematics which shaped her path toward data analysis and bibliometrics. She is particularly interested in data-driven approaches, analytical methods, and practical applications of statistics in research evaluation. Her work focuses on analyzing trends and patterns in emerging topics and supporting the annual Highly Cited Researchers list and data analysis underpinning US News & World Report Best Global Universities Rankings.

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Introduction

The G20 research and innovation scorecard, updated annually by the Institute for Scientific Information (ISI), offers a comprehensive snapshot of the research and innovation capabilities of the 21 G20 members. As a self-described forum of “**both developing and developed countries which seeks to find solutions to global economic and financial issues**”, its members comprise many of the largest countries by population and GDP and are evenly split between the Global South and the Global North. They represent nearly 80% of the world population and produce nearly 85% of its GDP.

The G20 scorecard provides a vital tool for researchers, technologists and policymakers tracking global research trends.

In 2026, the United States holds the G20 presidency, hosting the Leaders’ Summit in December around three core themes: removing regulatory burdens to boost economic prosperity, securing affordable and resilient energy supply chains, and pioneering innovations in technology and AI. As the G20 sharpens its focus on innovation and economic growth, a more fundamental question is also rising to the surface: how do we know whether research investment is actually delivering real-world impact?

This question matters because the scale of G20 investment is enormous. The United States and Mainland China each invest more than \$1 trillion in R&D annually, while the European Union contributes more than \$600 billion. Countries like South Korea devote nearly 5% of GDP to research, and major economies such as the U.S., Japan, and Germany all exceed 3%.

The G20 scorecard provides a wealth of data identifying not only the research and innovation output of each member but also exploring signals of real-world impact, in the form of Research Footprints, that highlight each member’s contribution to research aligned to the UN Sustainable Development Goals (SDGs).

ISI promotes the responsible evaluation of research through qualitative narratives informed by comprehensive profiles. Whether analyzing researchers, universities, journals, funders or countries, research can never, and should never, be summarized in a single metric. We encourage readers to examine the rich and comprehensive data in the scorecard for themselves and combine these data with those from other sources to identify narratives that are relevant or interesting to them.

The following pages offer selected highlights of this year’s key findings, organized by G20 member.

For full member data, explore the G20 research and innovation scorecard 2026.

Key:

BERD	Business Sector Expenditure on R&D
CNCI	Category Normalized Citation Impact – a standard indicator that compares the accumulated citation count for a research paper to other research papers of the same document type, published in the same year and in the same journal based subject category in the Web of Science Core Collection.
Collab-CNCI	Collaborative CNCI – whereby the accumulated citation count for each research paper is normalized against other research papers of the same publication year, the same subject category, the same document type and – critically – the same collaboration type.
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
PPP	Purchasing Power Parity
SDG	United Nations Sustainable Development Goals

G20 members' performance

African Union

Output	Output more than doubled over the period from 2016 (~65k papers) to 2025 (~140k).
Impact	Category Normalized Citation Impact (CNCI) is close to the global average, at 0.99, rising from 0.91 in 2016 to 1.05 by 2025, with around 15% of papers over this period uncited.
Disciplines	Most fields are around the G20 average share of output. However, Agricultural & Veterinary Sciences stands out at 1.37 times the G20 average percentage for this field, albeit with only 9% of papers.
SDGs	Above-G20-average focus on SDG 1 No Poverty (1.87 times G20 average). CNCI in SDG 8 Decent Work and Economic Growth is high at 1.22, while citation impact is around the global average (1.0) in most other SDGs.

Argentina

Gender	High share of female researchers whether measured by headcount (54%) or full-time equivalent (FTE, 53.4%) in 2023.
Impact	Although overall CNCI is just below average, the Medicine & Health Sciences discipline stands out, with a CNCI of 1.63.
Disciplines	Nearly half of papers are in Natural Sciences (47.9%), around 1.06 times the G20 average. Humanities & the Arts is 2.43 times average, albeit with only 10% of total output.
SDGs	Focus on SDG 15 Life on Land is very high at 2.17 times the average G20 share. CNCI is high in SDG 3 Good Health and Well-being (1.29) and SDG 5 Gender Equality (1.27).
Open Access	Around two-thirds (66.9%) of papers are open access.

Australia

Population	Smallest member by population, but third, behind the United States and Germany, for GDP per capita.
Impact	Both CNCI and Collaborative CNCI (Collab-CNCI), which also takes collaboration into account, are consistently well above average at around 1.46 and 1.16 respectively. Around 10% of papers from 2016 to 2025 remain uncited.
Disciplines	More than a third of papers (~37%) are in Medical & Health Sciences, which is 1.2 times the G20 average. Above-G20-average focus within this field on Health Sciences, also ~37%, about 1.5 times the average.
SDGs	High focus on SDG 16 Peace, Justice and Strong Institutions (1.81 times the G20 average). CNCI is well above the global average across all SDGs.
Open Access	Increase in open access rate from 46.6% in 2016 to around 70.2% in 2025.
Collaboration	The largest increase in collaborations is with Mainland China, rising from 10.9% to 20.6% of output between 2016 and 2025, with around 10% of output over this period involving bilateral collaboration between the two partners. These collaborations are most commonly in Natural Sciences (55.8% of collaborations with Mainland China) and Engineering & Technology (45.6%).

Brazil

Impact	CNCI and Collab-CNCI remain consistently below average between 2016 and 2025, while in Natural Sciences, Engineering & Technology and Agricultural & Veterinary Sciences CNCI shows a slight decline.
Disciplines	Focus on Agricultural & Veterinary Sciences is 2.13 times the G20 average with 14.1% of papers.
SDGs	Above average focus on SDG 2 Zero Hunger and SDG 15 Life on Land at 1.61 and 1.54 times the G20 average respectively.
Open Access	OA rate remains almost unchanged, increasing only slightly from 59.1% in 2016 to 60.2% in 2025.
Collaboration	Two-fifths of papers involve collaboration between two or more domestic institutions (Domestic Multi, 41.1%). Collaborations with the United States have remained consistently well above those with other countries/regions since 2016 (at over 12%), with almost half of these (5.97% of total output) being bilateral.

Canada

Impact	CNCI and Collab-CNCI are consistently above average, while 11.32% of papers remain uncited.
Disciplines	Focus on Medical & Health Sciences is 1.27 times the G20 average with 38.3% of papers in this field. CNCI for these papers has consistently remained at or above 1.5 from 2016 to the present.
SDGs	Above-average focus on SDG 16 Peace, Justice and Strong Institutions, SDG 5 Gender Equality and SDG 10 Reduced Inequalities. CNCI is above average in all SDGs.
Open Access	The share of OA papers increased by just over 50% between 2016 and 2025, rising from 40.5% to 64.1%.
Collaboration	Collaborations with the United States are well above those with other countries/regions, averaging 25.6% over the past decade, with 47.8% of these papers in Medical & Health Sciences.

China Mainland

Output	Published more than 1 million articles and reviews indexed in Web of Science Core Collection in 2025.
Patents	High patent applications per million PPP\$ of Business Enterprise Expenditure on R&D (BERD) at around 2,250 in 2024.
Disciplines	Focus on Natural Sciences with 56.1% of papers, 1.24 times the G20 average, and Engineering & Technology with 43.9% of papers, 1.79 times the average. Apart from a small fall in 2023 in Medical & Health Sciences and Natural Sciences, all fields have shown continuous year-on-year increases.
Collaboration	Around three-quarters (77.3%) of output is domestic. Among international collaborations, the United States remains the leading partner, although the share of collaborations between the two countries has declined substantially since 2021 - from 8.9% to 4.8% in 2025. While this can partly be attributed to Mainland China's significant increase in output over this period, this still represents a fall from around 60,000 to 50,000 papers.

European Union

Output	Published more than 6.4 million articles and reviews indexed in Web of Science Core Collection in the past decade, a few thousand more than Mainland China.
Impact	CNCI over the period 2016 to 2025 is slightly above average (1.07), while Collab-CNCI is slightly below average (0.93).
SDGs	While output is around the G20 average share in most SDGs, CNCI is higher in SDG 2 Zero Hunger (1.21) and SDG 9 Industry, Innovation and Infrastructure (1.29). Collab-CNCI is lower, but still above the global average in both SDGs (1.07 and 1.18 respectively).
Open Access	Overall, the number of OA papers increased by 29% between 2016 and 2025. Much of this increase is driven by papers published both in gold/hybrid/bronze OA journals and in green repositories (rising from 25.7% in 2016 to 52.3% in 2025).
Collaboration	Collaborations with the United States (~12%) and the United Kingdom (~9%) remain consistently high. Collaborations with Mainland China have increased over the period (3.3% in 2016 to 7.0% in 2025), with nearly half of these bilateral.

France

Output	Generally flat at around 90,000 papers each year over the past decade, with 63.2% of papers involving international collaboration.
SDGs	CNCI is high in SDG 5 Gender Equality (1.59) and SDG 9 Industry, Innovation and Infrastructure (1.55).
Collaboration	Collaborations with the United States, United Kingdom, Germany, Italy and Spain have been steadily increasing, primarily through quadrilateral+ collaborations.
Disciplines	Half of the papers (51.5%) are in Natural Sciences, 1.14 times the G20 average.

Germany

Gender	In 2023, less than a quarter (24.3%) of FTE researchers and less than a third (29.6%) of researchers by headcount were female.
Impact	High average CNCI (1.29) while Collab-CNCI is around average (1.01).
Disciplines	Focus on Medical & Health Sciences is slightly above the G20 average (1.06) with 32% of papers, of which 65% are in Clinical Medicine. CNCI is also high in this category (1.44) and has remained high compared with other categories over time, consistently staying above 1.3 since 2016.
SDGs	Focus on most SDGs are close to the G20 average, with SDG 10 Reduced Inequalities an exception at 1.44 times the average focus. CNCI is above average across all SDGs.
Collaboration	Although collaborations with the United States, United Kingdom, France and Italy remain strong, the largest increase over the past decade was with Mainland China, rising from 4.9% in 2016 to 9.4% in 2025, with an almost equal share of bilateral and quadrilateral+ collaborations (2.9% and 2.7% of total output, respectively).

India

Output	Output has doubled over the past decade, from 91k papers in 2016 to 193k in 2025.
Gender	In 2020, less than one-fifth (18.6%) of FTE researchers were female.
SDGs	High focus on SDG 7 Affordable and Clean Energy and SDG 12 Responsible Consumption and Production. CNCI is above average at 1.12 in SDG 9 Industry, Innovation and Infrastructure and 1.11 in SDG 8 Decent Work and Economic Growth.
Open Access	Percentage of OA output remains relatively low at around 40% in 2025, having grown from around 30% in 2016.
Collaboration	Share of collaborations with Saudi Arabia has risen from 1.6% in 2016 to 6.3% in 2025, with these collaborations being roughly equally distributed between bilateral, trilateral and quadrilateral+. Collaborations with Mainland China and South Korea are particularly highly cited in Medical & Health Sciences, with Collab-CNCI at 1.96 and 2.07, respectively.

Indonesia

Output	Large increase in output between 2016 (5k papers) and 2025 (23k papers).
Disciplines	Above-G20-average focus (1.65 times) on Social Sciences, with around one-fifth of output (21.7%) and a strong upward trend since 2016: output in this field in 2025 is around 6.6 times that of 2016.
SDGs	Very high focus on SDG 1 No Poverty (3 times the G20 average) and SDG 4 Quality Education (2.11 times average).
Open Access	Growth in gold/hybrid/bronze OA has played an important role in lifting overall OA rates, increasing from 10.3% of output in 2016 to 23.1% in 2025, while total OA rose from 48.8% to 66.1% over the same period.
Collaboration	The highest level of collaboration is with Malaysia, although Japan was the leading partner until 2021. Since then, the positions have shifted, but collaborations remain strong with both countries, at 5.09% bilateral with Malaysia and 4.72% bilateral with Japan.

Italy

Output	High output per researcher (FTE) at 0.63.
Impact	CNCI remains consistently above average, increasing from 1.21 in 2016 to 1.27 in 2025.
Disciplines	Above-G20-average focus (1.25 times) on Medical & Health Sciences with 37.6% papers. CNCI in this field consistently outperforms the other fields, remaining above 1.33 since 2016, and averaging 1.47 over the period.
SDGs	High CNCI (1.51) and Collab-CNCI (1.38) in SDG 9 Industry, Innovation and Infrastructure.
Collaboration	Collaboration rates with the United States, United Kingdom, Germany, France, and Spain have increased slightly over the past decade, with most of this output in Medical & Health Sciences and Natural Sciences.

Japan

Patents	High patent applications per million PPP\$ BERD at ~2,280.
Efficiency	Low efficiency with around 0.15 papers per researcher (FTE) and 0.45 papers per million GERD (PPP\$).
Gender	In 2023, less than one-fifth (18.5%) of researchers by headcount were female.
SDGs	CNCI is slightly above average in SDG 9 Industry, Innovation and Infrastructure (1.08) and SDG 6 Clean Water and Sanitation (1.04).
Collaboration	Leading partners over the past decade have been the United States and Mainland China. However, in 2025, Mainland China took the lead position for the first time, at 11.4%, compared with 11.1% for the United States.

Mexico

Output	High output per million Gross Domestic Expenditure on R&D (PPP\$) at 2.52.
Disciplines	Above-G20-average focus (1.13 times) on Natural Sciences with 50.9% papers, with Biological Sciences comprising 38.9% of these papers.
SDGs	High focus on SDG 15 Life on Land (1.63 times G20 average) and SDG 2 Zero Hunger (1.5).
Collaboration	Reflecting geography and language, lead partners are the United States and Spain. In terms of Collab-CNCI, collaborations are most impactful in Medical & Health Sciences with France (2.76), United Kingdom (2.48) and Brazil (2.06).

Russia

Output	Output increased between 2016 (51k papers) and 2021 (72k papers) but has since fallen back (55k papers) with a current downward trend.
Disciplines	Focus on Natural Sciences is 1.32 times the G20 average (59.6% of papers), with an above-G20-average focus (1.68) in Physical Sciences (34.5% of these papers).
SDGs	High focus on SDG 17 Partnerships for the Goals (1.58 times G20 average), SDG 13 Climate Action (1.54) and SDG 7 Affordable and Clean Energy (1.52).
Collaboration	Collaboration with Mainland China has increased from 3.3% of papers in 2016 to 7.7% in 2025. While 70.5% of these collaborations are in Natural Sciences, Collab-CNCI is higher in Medical & Health Sciences at 2.36, compared with 1.10 in Natural Sciences.

Saudi Arabia

Output	Output nearly quadrupled from 17k papers in 2016 to 67k in 2025.
Impact	While CNCI in 2025 (1.38) is higher than in 2016 (1.28), this masks a dip between 2019 (1.16) and 2023 (1.25).
SDGs	Focus on SDG 7 Affordable and Clean Energy (1.8 times the G20 average) and SDG 6 Clean Water and Sanitation (1.53), while both CNCI and Collab-CNCI are very high in SDG 8 Decent Work and Economic Growth (1.77 and 1.30 respectively)
Open Access	Overall OA rate has increased from 37.6% in 2016 to 58.9% in 2025.
Collaboration	Rates of trilateral and quadrilateral+ collaboration have increased since 2020, while bilateral partnerships have declined. Egypt has been the leading collaborative partner over most of the decade, on around 19.9% of papers, albeit with a fall in collaboration since 2022. India overtook Egypt as lead partner in 2024.

South Africa

Efficiency	High papers per researcher output (FTE) at 0.91 and papers per million GERD (PPP\$) at 4.25.
Impact	CNCI remains consistently above 1, averaging 1.18, while Collab-CNCI remains consistently below at 0.87. The largest fluctuations are observed in Medical & Health Sciences and Humanities & the Arts, while the other disciplines remain relatively stable.
SDGs	Focus on SDG 1 No Poverty (2.13 times G20 average) and SDG 4 Quality Education (1.96), while the highest CNCI is in SDG 3 Good Health and Well-being (1.33).
Collaboration	Collaboration rates with the United States, United Kingdom and Mainland China have shown a steady, moderate increase (19.02%, 16.31% and 7.07% in 2025, respectively). Growth in collaborations with Australia and Germany have followed almost identical trends, with 7.34% and 7.77% of papers respectively in 2025.

South Korea

Researcher density	High at more than 9,400 FTE researchers per million people in 2023. However, less than a quarter (23.7%) of researchers by headcount were female.
Investment	GERD as a percentage of GDP is high at 4.94%. However, this isn't translating into increased output: papers per GERD is low at 0.54.
Disciplines	Above-G20-average focus on Engineering & Technology (1.67 times) with 41% of papers (35% of these papers are in Materials Engineering).
SDGs	Highest focus on SDG 7 Affordable and Clean Energy at 1.75 times G20 average.
Collaboration	Leading collaborative partner is the United States (13.5%), more than half of which is bilateral (58%), with around half (49.8%) concentrated in Natural Sciences. Collab-CNCI is high in Medical & Health Sciences with the United Kingdom (2.21), India (2.07) and Japan (1.97).

Türkiye

SDGs	Focus on SDG 8 Decent Work and Economic Growth is high at 1.67 times the G20 average, with high CNCI (1.58) and Collab-CNCI (1.30).
Open Access	In contrast with the norm where OA papers tend to be cited more than non-OA papers, 24.2% of OA papers published between 2016 and 2025 are uncited, compared with 17.7% of non-OA papers. Given the significant increase in paper output over the past decade (from around 40k in 2016 to 81k in 2025), this may partly reflect the fact that newer papers (which are more likely to be OA) have not yet started collecting citations.
Collaboration	Nearly three-quarters (73.2%) of output is domestic. The United States is the leading international partner, with an almost equal share of bilateral and quadrilateral+ collaborations (3.0% and 2.8%). Saudi Arabia and Iran also emerge as important collaboration partners, reflecting broader cultural and regional ties.

United Kingdom

Impact	Both CNCI and Collab-CNCI remain consistently high (averaging 1.46 and 1.14 respectively). This positive trend is also reflected across disciplines, where both CNCI and Collab-CNCI remain above average in every major OECD field.
Disciplines	Around one-fifth of papers (21.4%) are in Social Sciences, 1.6 times the G20 average.
SDGs	Very high focus on SDG 16 Peace, Justice and Strong Institutions (2.36 times the G20 average) with high average CNCI and Collab-CNCI in most SDGs.
Collaboration	Two-thirds (66.6%) of papers are international, with the United States, Mainland China and Germany as the leading partners, primarily in Natural Sciences. Collaboration with Mainland China also shows the strongest increase over the past decade, rising from 6.2% in 2016 to 15.3% in 2025.

United States

Impact	Both CNCI and Collab-CNCI show a slight downward trend between 2016 and 2025, with CNCI falling from 1.35 to 1.17 and Collab-CNCI falling from 1.25 to 1.05.
SDGs	Focus on SDG 16 Peace, Justice and Strong Institutions at 1.88 times the G20 average and SDG 10 Reduced Inequalities at 1.58 times average. CNCI is high across all SDGs, with a slightly higher value of 1.52 in SDG 9 Industry, Innovation and Infrastructure.
Collaboration	Largest collaborative partner is Mainland China, predominantly through bilateral partnerships. Neither Mainland China nor the other four major partners (United Kingdom, Germany, Canada and France) show substantial fluctuations in their share of collaboration with the United States over the past decade.

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