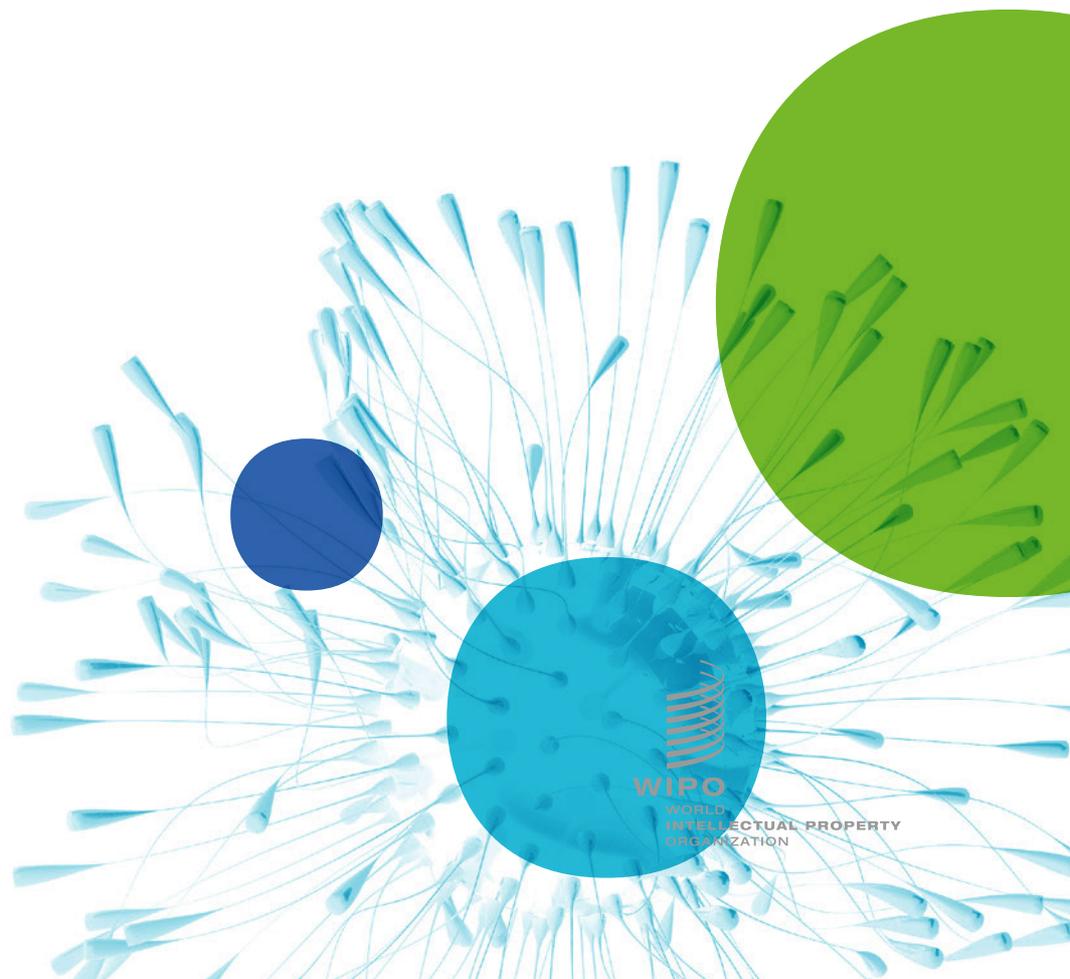


GII 2023 at a glance

The Global Innovation Index 2023 captures the innovation ecosystem performance of 132 economies and tracks the most recent global innovation trends.



Global leaders in innovation, 2023

Top three innovation economies by region

Latin America and the Caribbean

1. Brazil ↑
2. Chile ↓
3. Mexico

Sub-Saharan Africa*

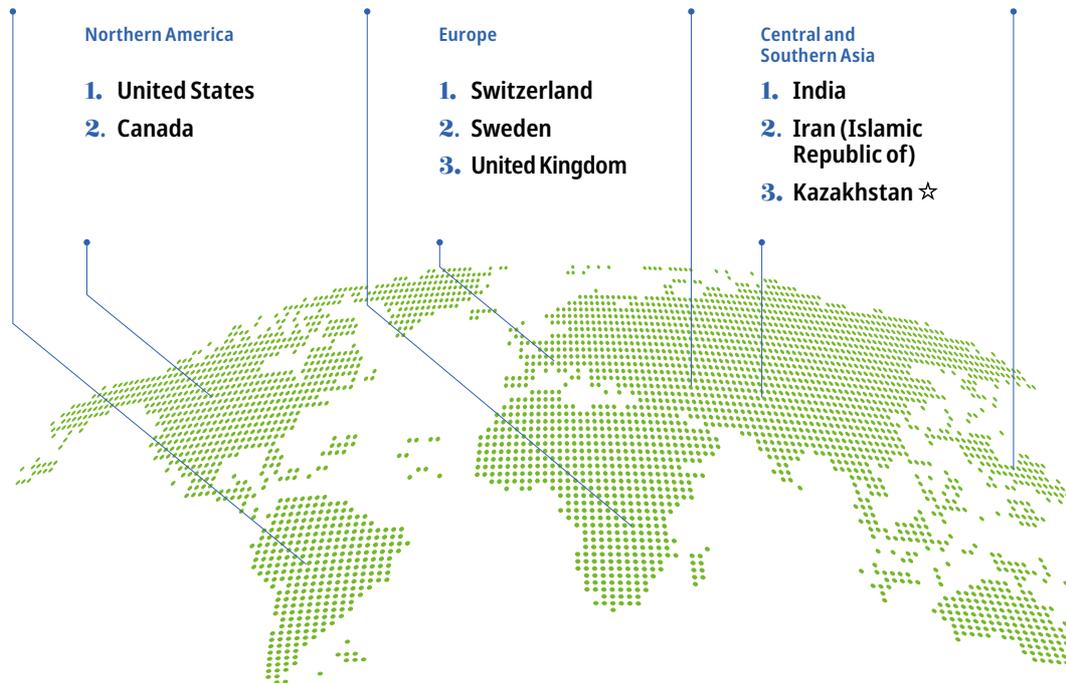
1. South Africa
2. Botswana
3. Senegal ☆

Northern Africa and Western Asia†

1. Israel
2. United Arab Emirates
3. Türkiye

South East Asia, East Asia, and Oceania

1. Singapore ↑
2. Republic of Korea ↓
3. China



☆ Indicates a new entrant into the top three in 2023.

↑↓ Indicates movement in ranking (up or down) within the top three, relative to 2022.

* Top three in Sub-Saharan Africa (SSA) – excluding island economies. The top five within the region, including all economies, comprise Mauritius (1st), South Africa (2nd), Botswana (3rd), Cabo Verde (4th) and Senegal (5th).

† Top three in Northern Africa and Western Asia (NAWA) – excluding island economies. The top four within the region, including all economies, comprise Israel (1st), Cyprus (2nd), United Arab Emirates (3rd) and Türkiye (4th).

Top three innovation economies by income group

High-income

1. Switzerland
2. Sweden ↑
3. United States ↓

Upper middle-income

1. China
2. Malaysia ↑
3. Bulgaria ↓

Lower middle-income

1. India
2. Viet Nam
3. Ukraine ☆

Low-income

1. Rwanda
2. Madagascar
3. Togo ☆

Source: Global Innovation Index Database, WIPO, 2023.

Notes: World Bank Income Group Classification (July 2022). Year-on-year changes in GII rank are influenced by performance and methodological considerations. Some economy data are incomplete (see Appendix I).

Global Innovation Index 2023 rankings

GII rank	Economy	Score	Income group rank	Region rank	GII rank	Economy	Score	Income group rank	Region rank
1	Switzerland	67.6	1	1	67	Bahrain	29.1	46	9
2	Sweden	64.2	2	2	68	Mongolia	28.8	7	13
3	United States	63.5	3	1	69	Oman	28.4	47	10
4	United Kingdom	62.4	4	3	70	Morocco	28.4	8	11
5	Singapore	61.5	5	1	71	Jordan	28.2	16	12
6	Finland	61.2	6	4	72	Armenia	28.0	17	13
7	Netherlands (Kingdom of the)	60.4	7	5	73	Argentina	28.0	18	6
8	Germany	58.8	8	6	74	Costa Rica	27.9	19	7
9	Denmark	58.7	9	7	75	Montenegro	27.8	20	36
10	Republic of Korea	58.6	10	2	76	Peru	27.7	21	8
11	France	56.0	11	8	77	Bosnia and Herzegovina	27.1	22	37
12	China	55.3	1	3	78	Jamaica	27.1	23	9
13	Japan	54.6	12	4	79	Tunisia	26.9	9	14
14	Israel	54.3	13	1	80	Belarus	26.8	24	38
15	Canada	53.8	14	2	81	Kazakhstan	26.7	25	3
16	Estonia	53.4	15	9	82	Uzbekistan	26.2	10	4
17	Hong Kong, China	53.3	16	5	83	Albania	25.4	26	39
18	Austria	53.2	17	10	84	Panama	25.3	48	10
19	Norway	50.7	18	11	85	Botswana	24.6	27	3
20	Iceland	50.7	19	12	86	Egypt	24.2	11	15
21	Luxembourg	50.6	20	13	87	Brunei Darussalam	23.5	49	14
22	Ireland	50.4	21	14	88	Pakistan	23.3	12	5
23	Belgium	49.9	22	15	89	Azerbaijan	23.3	28	16
24	Australia	49.7	23	6	90	Sri Lanka	23.3	13	6
25	Malta	49.1	24	16	91	Cabo Verde	23.3	14	4
26	Italy	46.6	25	17	92	Lebanon	23.2	15	17
27	New Zealand	46.6	26	7	93	Senegal	22.5	16	5
28	Cyprus	46.3	27	2	94	Dominican Republic	22.4	29	11
29	Spain	45.9	28	18	95	El Salvador	21.8	17	12
30	Portugal	44.9	29	19	96	Namibia	21.8	30	6
31	Czech Republic	44.8	30	20	97	Bolivia (Plurinational State of)	21.4	18	13
32	United Arab Emirates	43.2	31	3	98	Paraguay	21.4	31	14
33	Slovenia	42.2	32	21	99	Ghana	21.3	19	7
34	Lithuania	42.0	33	22	100	Kenya	21.2	20	8
35	Hungary	41.3	34	23	101	Cambodia	20.8	21	15
36	Malaysia	40.9	2	8	102	Trinidad and Tobago	20.7	50	15
37	Latvia	39.7	35	24	103	Rwanda	20.6	1	9
38	Bulgaria	39.0	3	25	104	Ecuador	20.5	32	16
39	Türkiye	38.6	4	4	105	Bangladesh	20.2	22	7
40	India	38.1	1	1	106	Kyrgyzstan	20.2	23	8
41	Poland	37.7	36	26	107	Madagascar	19.1	2	10
42	Greece	37.5	37	27	108	Nepal	18.8	24	9
43	Thailand	37.1	5	9	109	Nigeria	18.4	25	11
44	Croatia	37.1	38	28	110	Lao People's Democratic Republic	18.3	26	16
45	Slovakia	36.2	39	29	111	Tajikistan	18.3	27	10
46	Viet Nam	36.0	2	10	112	Côte d'Ivoire	18.2	28	12
47	Romania	34.7	40	30	113	United Republic of Tanzania	17.4	29	13
48	Saudi Arabia	34.5	41	5	114	Togo	16.9	3	14
49	Brazil	33.6	6	1	115	Nicaragua	16.9	30	17
50	Qatar	33.4	42	6	116	Honduras	16.7	31	18
51	Russian Federation	33.3	7	31	117	Zimbabwe	16.5	32	15
52	Chile	33.3	43	2	118	Zambia	16.4	4	16
53	Serbia	33.1	8	32	119	Algeria	16.1	33	18
54	North Macedonia	33.0	9	33	120	Benin	16.0	34	17
55	Ukraine	32.8	3	34	121	Uganda	16.0	5	18
56	Philippines	32.2	4	11	122	Guatemala	15.8	33	19
57	Mauritius	32.1	10	1	123	Cameroon	15.3	35	19
58	Mexico	31.0	11	3	124	Burkina Faso	14.5	6	20
59	South Africa	30.4	12	2	125	Ethiopia	14.3	7	21
60	Republic of Moldova	30.3	13	35	126	Mozambique	13.6	8	22
61	Indonesia	30.3	5	12	127	Mauritania	13.5	36	23
62	Iran (Islamic Republic of)	30.1	6	2	128	Guinea	13.3	9	24
63	Uruguay	30.0	44	4	129	Mali	12.9	10	25
64	Kuwait	29.9	45	7	130	Burundi	12.5	11	26
65	Georgia	29.9	14	8	131	Niger	12.4	12	27
66	Colombia	29.4	15	5	132	Angola	10.3	37	28

Source: Global Innovation Index Database, WIPO, 2023.

Note: For an explanation of classifications, see Economy profiles, endnote 1.

High-income	Europe	South East Asia, East Asia, and Oceania
Upper middle-income	Northern America	Northern Africa and Western Asia
Lower middle-income	Latin America and the Caribbean	Sub-Saharan Africa
Low-income		Central and Southern Asia

Innovation performance at different income levels, 2023

	High-income group	Upper middle-income group	Lower middle-income group	Low-income group
Performance above expectation for level of development	<ul style="list-style-type: none"> Switzerland Sweden United States United Kingdom Finland Netherlands (Kingdom of the) Germany Denmark Republic of Korea France Japan Israel Canada Estonia 	<ul style="list-style-type: none"> China Thailand Brazil North Macedonia South Africa Republic of Moldova Jordan Jamaica 	<ul style="list-style-type: none"> India Viet Nam Ukraine Philippines Indonesia Mongolia Morocco Tunisia Uzbekistan Pakistan Senegal 	<ul style="list-style-type: none"> Rwanda Madagascar Burundi
Performance in line with level of development	<ul style="list-style-type: none"> Singapore Hong Kong, China Austria Norway Iceland Belgium Australia Malta Italy New Zealand Cyprus Spain Portugal Czech Republic Slovenia Lithuania Hungary Latvia Greece Croatia Chile 	<ul style="list-style-type: none"> Malaysia Bulgaria Türkiye Serbia Mauritius Mexico Georgia Colombia Armenia Peru Bosnia and Herzegovina Albania Namibia 	<ul style="list-style-type: none"> Iran (Islamic Republic of) Egypt Sri Lanka Cabo Verde Lebanon El Salvador Bolivia (Plurinational State of) Ghana Kenya Cambodia Bangladesh Kyrgyzstan Nepal Nigeria Tajikistan United Republic of Tanzania Zimbabwe 	<ul style="list-style-type: none"> Togo Zambia Uganda Burkina Faso Mozambique Niger
All other economies	<ul style="list-style-type: none"> Luxembourg Ireland United Arab Emirates Poland Slovakia Romania Saudi Arabia Qatar Uruguay Kuwait Bahrain Oman Panama Brunei Darussalam Trinidad and Tobago 	<ul style="list-style-type: none"> Russian Federation Argentina Costa Rica Montenegro Belarus Kazakhstan Botswana Azerbaijan Dominican Republic Paraguay Ecuador Guatemala 	<ul style="list-style-type: none"> Lao People's Democratic Republic Côte d'Ivoire Nicaragua Honduras Algeria Benin Cameroon Mauritania Angola 	<ul style="list-style-type: none"> Ethiopia Guinea Mali

Source: Global Innovation Index Database, WIPO, 2023.

Key takeaways

The GII 2023 tracks global innovation trends against a background of uncertainty caused by slow economic recovery from the COVID-19 pandemic, high interest rates and geopolitical conflict, but with the promise of Digital Age and Deep Science innovation waves and technological progress.

Results of the Global Innovation Tracker 2023

1. Innovation investments showed a mixed performance in 2022 within a context of many challenges and a downturn in innovation finance. The outlook for 2023 and 2024 is uncertain.

After a boom in 2021, investments in innovation showed a mixed performance in 2022. Scientific publications, R&D, venture capital (VC) deals and patents continued to increase to higher than ever. However, growth rates were lower than the exceptional increases seen in 2021. In addition, the value of VC investment declined and international patent filings stagnated in 2022.

- Scientific publications grew moderately in 2022 by 1.5 percent to around 2 million articles, as health- and COVID-related research, which caused a boom in 2021, slowed.
- Global R&D grew strongly at a rate of 5.2 percent in 2021 – close to pre-pandemic growth in 2019; business R&D grew strongly by 7 percent – a rate unseen since 2014. Data for 2022 are not yet available.
- Global government R&D budgets are expected to have grown in real terms in 2022. Significant increases in real 2022 budgets were planned for Japan and the Republic of Korea, and a smaller one for Germany, making up for cuts in R&D budgets in 2022 by other top R&D spending governments such as the United States.
- Worldwide R&D expenditure by the highest R&D spending corporations reached USD 1.1 trillion in 2022 – a historic high. Top corporate R&D spenders increased expenditure nominally by around 7.4 percent in 2022 (down from 15 percent growth in 2021). Yet, it is hard to assess whether this nominal growth compensated for surging inflation. On a positive note, the ratio of R&D expenditure to revenue is on par with 2021 and at pre-pandemic level – meaning corporations are just as R&D-intensive as ever.
- Reflecting a deteriorating climate for risk finance, the value of VC investments declined sharply in 2022 from an exceptionally high level in 2021. Nevertheless, the number of VC deals still grew healthily in 2022 by close to 17.6 percent – reflecting activity that remained strong in the first half of the year. Asia Pacific is now, for the first time, on par with Northern America in terms of deal activity. However, total VC value fell sharply in 2022 by close to 40 percent. The only region not to see a decline in dollars invested was Africa, albeit at low levels. All in all, the VC outlook for 2023 and 2024 is uncertain, with tighter monetary conditions likely to continue impacting innovation finance.
- International patent filings stagnated in 2022 (0.3 percent growth), recording the slowest rate of increase since 2009, but still achieving a record of around 280,000 filings.

2. Technological progress is rampant, without many setbacks; technology adoption is growing, but the socioeconomic impact remains weak

- Indicators of *technological progress* in the fields of information technology, health and energy continue to show progress – the Digital Age and Deep Science innovation waves outlined in GII 2022 are well underway. Supercomputers are becoming faster and more energy efficient. The cost of genome sequencing and low-emission energy technologies, such as wind and solar power, are decreasing. Due to the price volatility of required inputs, the cost of electric batteries rose sharply in 2022, although the long-term trend is still downward. Having peaked in 2020, drug approvals in the United States fell in 2022 for the second year in a row.
- With one exception, *technology adoption* is developing positively: safe sanitation, connectivity, robots and electric vehicles are now more widespread, even though penetration for some technologies remains low (e.g., electric vehicles). The adoption of radiotherapy for cancer treatment also remains inadequate in many countries.
- The *socioeconomic impact* of innovation continues to be at a low point for the second year in a row, in part due to the short-term impact of COVID-19. Labor productivity is currently at a standstill. Life expectancy fell for a second consecutive year, while the increase in healthy

life expectancy slowed. Carbon dioxide emissions rose strongly in 2021, but less so in 2022. Although the first four months of 2023 point to only a modest rise, CO₂ emissions continue to increase. If this trend persists, there is no global reduction in CO₂ emissions on the horizon.

Global Innovation Tracker Dashboard

Science and innovation investment	Scientific publications	R&D investments	Venture capital deal numbers	Venture capital deal values	International patent filings
Technological progress	Computing power	Costs of renewable energy	Electric battery price	Cost of genome sequencing	Drug approvals
Technology adoption	Safe sanitation	Connectivity	Robots	Electric vehicles	Cancer radiotherapy
Socioeconomic impact	Labor productivity		Life expectancy	Carbon dioxide emissions	

Results of the Global Innovation Index 2023 rankings

The GII 2023 is unique in incorporating a significant amount of data from the pandemic and post-pandemic years. Country-specific policy responses to the pandemic, including differences in lockdowns, but also more recently the effects of armed conflict, have inevitably had a multifaceted effect on the innovation rankings that requires close scrutiny.

3. Switzerland, Sweden, the United States, the United Kingdom and Singapore lead; China, Türkiye, India, Viet Nam, the Philippines, Indonesia and the Islamic Republic of Iran are the middle-income economies making most headway in innovation over the last decade

- Switzerland – for a 13th year – ranks first in the GII 2023. Sweden is now 2nd and the United States 3rd, followed by the United Kingdom (4th) and Singapore (5th), which enters the top 5.
- Finland (6th) moves closer to the top 5, and every other Nordic (Denmark 9th and Sweden) and Baltic (Estonia, 16th, Lithuania 34th and Latvia 37th) economy is also on an upward trend, except for Iceland, which stays stable at 20th position.
- China – still the sole middle-income economy within the GII top 30, having entered the top echelon in 2014 – is ranked 12th in GII2023, while Japan is 13th.
- Israel (14th) makes it into the top 15.
- Saudi Arabia (48th), Brazil (49th) and Qatar (50th) make it into the top 50, and South Africa (59th) into the top 60.
- Indonesia (61st) joins China, Türkiye (39th), India (40th), Viet Nam (46th), the Philippines (56th), and the Islamic Republic of Iran (62nd) in the group of middle-income economies within the GII top 65. This is the group that has climbed the GII rankings fastest over the last decade.
- Outside the top 65 but within the top 100, the following middle- and low-income countries have progressed the most – by more than 20 ranks – within the last decade: Morocco (70th), Uzbekistan (82nd), Egypt (86th) and Pakistan (88th).
- In the last four years, and since the pandemic started, Mauritius (57th), Indonesia, Saudi Arabia, Brazil and Pakistan have risen the most in rank (in order of rank progression).

4. The United States, Singapore and Israel are scoring best in particular innovation indicators

- The United States continues to lead in terms of the number of GII innovation indicators in which it ranks top globally (13 out of 80 indicators).
- Singapore (11 out of 80) and Israel (9 out of 80) follow.
- Select middle- and low-income economies excel in various domains. Relative to other countries and their GDP or population, Mozambique ranks 1st in Gross capital formation, Cambodia and Nepal in Loans from microfinance institutions, Mauritius in Venture capital investors, and the Islamic Republic of Iran in Trademarks.

5. Regional GII leaders are Switzerland, the United States, Brazil, India, Singapore, Israel and Mauritius; India and Rwanda lead their income groups.

- In South East Asia, East Asia and Oceania, Singapore, the Republic of Korea (10th) and China lead.
- In Northern Africa and Western Asia, Israel leads and is followed by Cyprus (28th), the United Arab Emirates (UAE) (32nd) and Türkiye.

- In Latin America and the Caribbean, Brazil leads for the first time, followed by Chile (52nd) and Mexico (58th).
- In Central and Southern Asia, India continues to lead, and the Islamic Republic of Iran (62nd) and Kazakhstan (81st, a newcomer to the region's top 3) come next.
- In Sub-Saharan Africa, Mauritius (57th) is followed by South Africa (59th), Botswana (85th), Cabo verde (91st) and Senegal (93rd).
- India leads the lower middle-income group, followed by Viet Nam and Ukraine (55th). Ukraine is a newcomer to this income group's top 3, based on data that mostly predate 2022.
- Rwanda (103rd) leads the low-income group, followed by Madagascar (107th) and Togo (114th), a newcomer to this income group's top 3.

6. Several developing economies are performing above expectation on innovation relative to their level of economic development

- A total of 21 economies outperform on innovation relative to level of development, the majority located in Sub-Saharan Africa and South East Asia, East Asia, and Oceania.
- India, the Republic of Moldova (60th) and Viet Nam continue as record holders by being innovation overperformers for a 13th consecutive year.
- Indonesia, Uzbekistan and Pakistan keep their overperformer status for a second consecutive year, Brazil for a third.
- There are two notable comebacks in 2023, namely, Senegal and North Macedonia (54th).
- Conversely, 37 economies performed below expectation on innovation, the majority from Latin America and the Caribbean (11), followed by Sub-Saharan Africa (9), Northern Africa and Western Asia (8) and Europe (6).

Results of the global top 100 S&T cluster ranking

7. The world's five biggest science and technology clusters are all located in East Asia; Tokyo-Yokohama is the biggest S&T cluster globally, Cambridge the most S&T-intensive

- Tokyo-Yokohama (Japan) continues to lead, followed by Shenzhen-Hong Kong-Guangzhou (China and Hong Kong, China), Seoul (Republic of Korea) and then China's Beijing and Shanghai-Suzhou clusters.
- Cambridge in the United Kingdom and San Jose-San Francisco, CA, in the United States are the two most S&T-intensive clusters relative to population density. Oxford (United Kingdom), Eindhoven (Kingdom of the Netherlands) and Boston-Cambridge, MA (United States) follow. In Germany, Munich makes the top 10 most S&T-intensive clusters globally.
- For a first time, China tops the list of countries with the highest number of clusters among the top 100, having 24 in total. The United States follows, with 21 clusters, then Germany with nine.
- São Paulo (Brazil); Bengaluru, Delhi, Chennai and Mumbai (India); Tehran (Islamic Republic of Iran); Istanbul and Ankara (Türkiye); and Moscow (Russian Federation) are the only middle-income economy clusters outside China. Chennai and Bengaluru (India) see the biggest jump in ranking among this income group.

Top S&T cluster by economy or cross-border region ranked among the top 100, 2023

