GII 2022 results

The GII reveals the most innovative economies in the world, ranking the innovation performance of 132 economies.

What follows are highlights of the *Global Innovation Index 2022* (GII) ranking. Appendix I provides details on how to interpret and analyze the results, particularly with regard to any year-on-year comparison of GII rankings, which requires cautious interpretation. Box 2 describes the process involved in using the GII to improve an economy's innovation performance.

The GII 2022 innovation leaders

Only a small number of economies have consistently delivered peak innovation performance

For a twelfth consecutive year, Switzerland ranks first in the GII (Figure 9). The United States of America (US) overtakes Sweden to climb to 2nd position, and continues to head the league table of scoring best in the world on 15 of the 81 GII 2022 innovation indicators (Box 1). Germany reaches 8th position, its highest ranking since 2009, after having entered the top 10 in 2016. Singapore bounces back to 7th position.

China continues its ascent toward the top 10, reaching 11th position in 2022. China remains the only middle-income economy within the top 30, keeping its 3rd place within the South East Asia, East Asia, and Oceania (SEAO) region and staying in 1st place in the upper middle-income group (see Figure 10 and Table 2). Canada (15th) returns to the top 15 for the first time since 2016 having dropped out of the top 10 in 2012.

Among the top 25 economies, Estonia (18th) makes notable progress this year, as do the United Arab Emirates (UAE) (31st) and Poland (38th).

Apart from China, there are only four other middle-income economies among the top 40 economies for innovation. Bulgaria (35th) and Malaysia (36th) keep the same rank as in 2021. In addition, Türkiye and India enter the top 40 for the first time, placed 37th and 40th, respectively. India overtakes Viet Nam (48th) as the top lower middle-income economy for innovation.

Chile (50th) makes it back into the top 50 – its best ranking since 2018 – making it first for innovation in Latin America and the Caribbean once again. For the first time ever, Brazil (54th) is among the top 3 for the region, scoring 2nd and displacing Mexico (58th), which drops to 3rd and losing three ranks in 2022. Costa Rica, in turn, exits the regional top 3, ranking 68th overall in innovation, down 12 ranks in 2022. Other notable improvers in the global innovation ranking for the region are Colombia (63rd), Peru (65th), Argentina (69th) and the Dominican Republic (90th). Peru positions itself as a global leader this year in the indicators availability of Loans from microfinance institutions (1st), Graduates in science and engineering (18th) and Utility models (22nd).

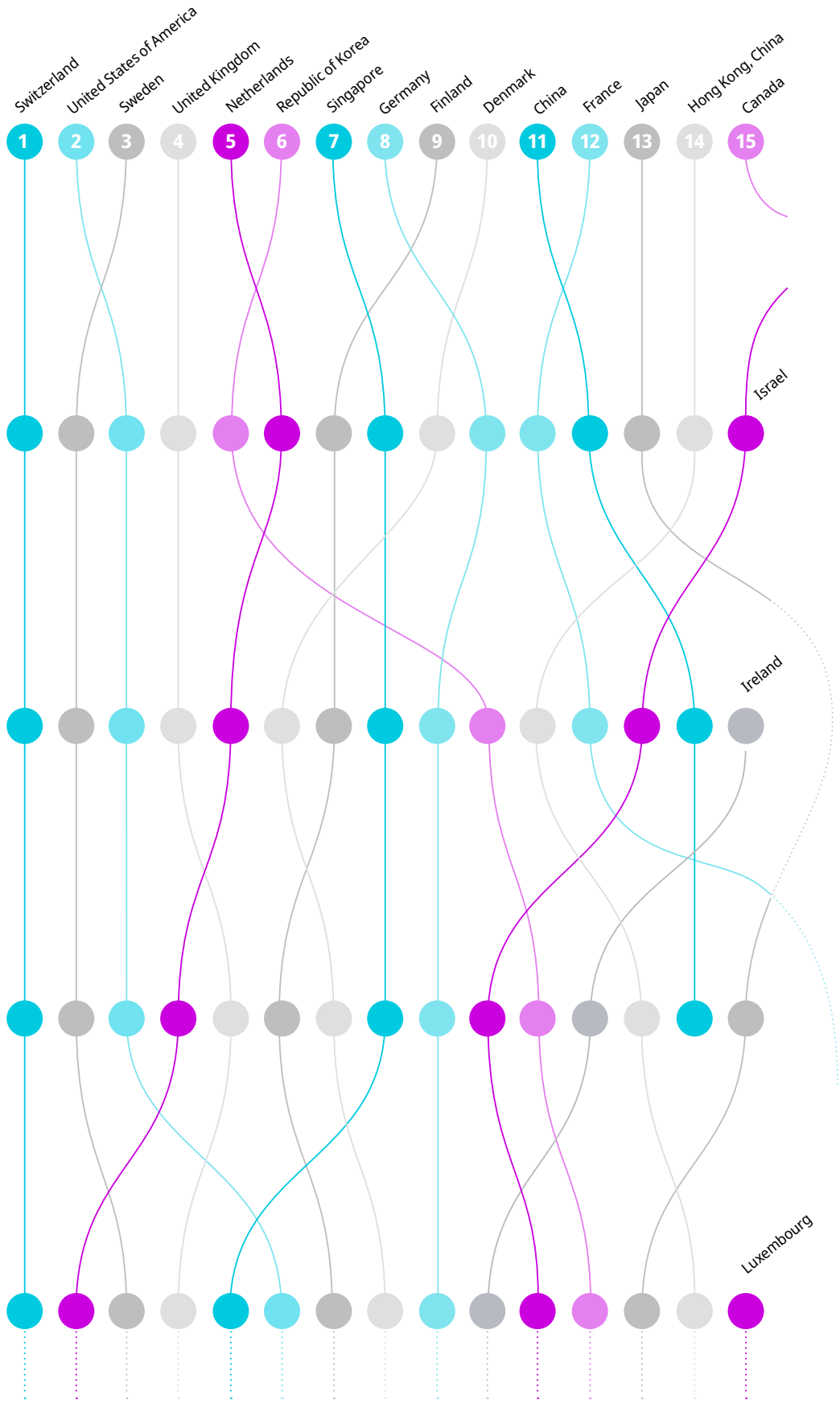
The Islamic Republic of Iran makes a big leap, reaching the 53rd position; it takes 3rd position among the lower middle-income group. Indonesia takes a big jump into the top 80 in 2022, ranking 75. Uzbekistan continues moving ahead and reaches the 82nd position in 2022, placing it among the top 3 economies for the Central and Southern Asia (CSA) region, having re-entered the GII only in 2020 due to its better innovation data availability.

Pakistan is a prominent climber in the GII 2022 ranking, entering the top 90 at 87th place.

This year, Indonesia, Uzbekistan and Pakistan entered the group of Innovation Achievers for the first time by performing above expectation on innovation for their level of economic development (see Table 3 and Figure 11).

Sixteen out of the 25 economies from Sub-Saharan Africa covered this year improved their ranking. Botswana took the biggest leap forward, reaching 86th position, and in so doing overtaking Kenya (88th) among the top 3 for the region. Other notable improvers within the region are Mauritius (45th), Ghana (95th), Namibia (96th) and Senegal (99th). South Africa remains unchanged in 61st place – and continuing to fail to improve consistently over time.

Figure 9 Movement in the GII, top 10, 2018–2022



2022
The United States rises to 2nd, Singapore to 7th, Germany to 8th, while India and Türkiye enter the top 40.

2021
The Republic of Korea enters the top 5 in 2021, and China rises to 12th in 2021 and 11th in 2022.

2020
France breaks into the top 15 in 2020. The Philippines and India reach the top 50.

2019
Israel makes it into the top 10 in 2019. Rwanda tops the low-income group.

2018
Switzerland has ranked 1st from 2011 to 2022. Chile moves into the top 50, a position it has regained in 2022.

Source: Global Innovation Index Database, WIPO, 2022.
Note: Year-on-year comparisons of the GII ranks are influenced by changes in the GII model, as well as data availability.

Figure 10 Global leaders in innovation in 2022

Top three innovation economies by region

Europe
1. Switzerland
2. Sweden
3. United Kingdom

Northern America
1. United States
2. Canada

Latin America and the Caribbean
1. Chile
2. Brazil ☆
3. Mexico ↓

Central and Southern Asia
1. India
2. Iran (Islamic Republic of)
3. Uzbekistan ☆

South East Asia,East Asia, and Oceania
1. Republic of Korea
2. Singapore
3. China

Northern Africa and Western Asia†
1. Israel
2. United Arab Emirates
3. Türkiye

Sub-Saharan Africa*
1. South Africa
2. Botswana ☆
3. Kenya ↓

Top three innovation economies by income group

High-income
1. Switzerland
2. United States ↑
3. Sweden ↓

Upper middle-income
1. China
2. Bulgaria
3. Malaysia

Lower middle-income
1. India ↑
2. Viet Nam ↓
3. Iran (Islamic Republic of) ☆

Low-income
1. Rwanda
2. Madagascar ☆
3. Ethiopia ☆

☆ Indicates a new entrant into the top three in 2022.

↑↓ Indicates the movement of rank (up or down) within the top three, relative to 2021.

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

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

Source: Global Innovation Index Database, WIPO, 2022.

Notes: World Bank Income Group Classification (June 2021). Year-on-year GII rank changes are influenced by performance and methodological considerations; some economy data are incomplete (see Appendix I).

Box 1 **The United States continues to lead in several key innovation indicators. Singapore, China, Hong Kong (China) and Israel follow**

The United States still leads in terms of the number of GII innovation indicators for which it ranks top globally, ranking 1st in the world on 15 out of the 81 indicators used, two more than in 2021. It is number one in the world in indicators such as Global corporate R&D investors, Venture capital investors, the quality of its universities, the quality and impact of its scientific publications (H-index), the number of Patents by origin, computer software spending, and the value of corporate Intangible asset intensity.

Singapore follows the United States globally and is number one in the world on 11 indicators in total, one up from 2021, including leading in the indicators Government effectiveness, ICT access, Venture capital investors, High-tech manufacturing and GitHub commits. China, Hong Kong (China) and Israel tie jointly in 3rd place, attaining top ranking in Trademarks, High-tech imports and R&D expenditure, respectively. They are followed by Malta in 6th place, leading in Joint venture/strategic alliance deals. The Republic of Korea is in 7th, leading in number of researchers. Japan and Cyprus tie in 8th place, ranking 1st in Patent families and Mobile app creation. Finally, Switzerland, Estonia and Iceland share jointly the 10th position, leading in PCT patents, New businesses and ICT use, respectively.

Box Table 1 **Economies with the most top-ranked GII indicators, 2022**

	Innovation indicators that economies score best in worldwide		
Economy	Inputs	Outputs	Total
United States	9	6	15
Singapore	8	3	11
China	3	6	9
Hong Kong, China	6	3	9
Israel	7	2	9
Malta	4	4	8
Republic of Korea	4	3	7
Japan	3	3	6
Cyprus	4	2	6
Switzerland	2	3	5
Estonia	4	1	5
Iceland	3	2	5

Source: Global Innovation Index Database, WIPO, 2022.
Note: The GII methodology allows multiple economies to rank 1st on an indicator; see Economy profiles and Appendix I.

A changing global innovation landscape

Middle-income economies China, Türkiye and India continue to change the innovation landscape; others like the Islamic Republic of Iran and Indonesia show promising potential

Apart from group leaders China, Bulgaria and Malaysia, Türkiye (37th) and India (40th) are the two other middle-income economies to make it into the top 40. Thailand (43rd), Mauritius (45th), the Russian Federation (47th), Viet Nam (48th) and Romania (49th) make into the top 50, but with only Mauritius moving up the ranking this year.

Among the middle-income group, the Islamic Republic of Iran (53rd) and Indonesia (75th) have notably improved their ranking, not only this year but also over the past decade, and join Türkiye, Viet Nam and the Philippines (59th) in having an increasingly important potential for transforming the global innovation landscape.

Morocco (67th) has shown innovation potential for a number of years, whereas Pakistan (87th) and Cambodia (97th) are also starting to show signs of increased innovation potential.

India overtakes Viet Nam as leader of the lower middle-income group (Table 2). It continues to lead the world in the ICT services exports indicator (1st) and hold top rankings in other indicators, including Venture capital recipients' value (6th), Finance for startups and scaleups (8th), Graduates in science and engineering (11th), Labor productivity growth (12th) and Domestic industry diversification (14th).

Beyond the top 100, Bangladesh (102nd), Myanmar (116th) and Ethiopia (117th) have made the most progress in the rankings, increasing between nine and 14 positions overall. Bangladesh performs relatively well in Creative outputs, whereas Ethiopia does well in Knowledge and technology outputs – leading in Labor productivity growth (6th) and Utility models (19th).

Rwanda (105th) maintains in 1st position among the low-income group, while Madagascar (106th) and Ethiopia (117th) claim 2nd and 3rd position, respectively (Table 2). Tajikistan ranks 104th overall, and 22nd among the lower middle-income group, its new income classification.

Table 2 10 best-ranked economies by income group (rank)

Rank	Global Innovation Index 2022
High-income economies (48 in total)	
1	Switzerland (1)
2	United States (2)
3	Sweden (3)
4	United Kingdom (4)
5	Netherlands (5)
6	Republic of Korea (6)
7	Singapore (7)
8	Germany (8)
9	Finland (9)
10	Denmark (10)

Rank	Global Innovation Index 2022
Upper middle-income economies (36 in total)	
1	China (11)
2	Bulgaria (35)
3	Malaysia (36)
4	Türkiye (37)
5	Thailand (43)
6	Mauritius (45)
7	Russian Federation (47)
8	Romania (49)
9	Brazil (54)
10	Serbia (55)

Lower middle-income economies (36 in total)	
1	India (40)
2	Viet Nam (48)
3	Iran (Islamic Republic of) (53)
4	Ukraine (57)
5	Philippines (59)
6	Morocco (67)
7	Mongolia (71)
8	Tunisia (73)
9	Indonesia (75)
10	Uzbekistan (82)

Low-income economies (12 in total)	
1	Rwanda (105)
2	Madagascar (106)
3	Ethiopia (117)
4	Uganda (119)
5	Burkina Faso (120)
6	Togo (122)
7	Mozambique (123)
8	Niger (125)
9	Mali (126)
10	Yemen (128)

Source: Global Innovation Index Database, WIPO, 2022.

Innovation overperformers

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

In the GII 2022, 26 economies are performing above expectation, relative to their level of development – these are the GII Innovation Achievers (Figure 11 and Table 3).

India, Kenya, the Republic of Moldova and Viet Nam continue as record holders by being Innovation Achievers for a 12th consecutive year. India's innovation performance is above average for the upper middle-income group in almost every innovation pillar, with the exception of Infrastructure, where it scores below average. Kenya (88th) scores above its income group in Institutions, Business sophistication, Knowledge and technology outputs, and Creative outputs. Viet Nam continues to score above the lower middle-income group average in all pillars, and even scores above average for the upper middle-income group in every pillar, apart from Human capital and research.

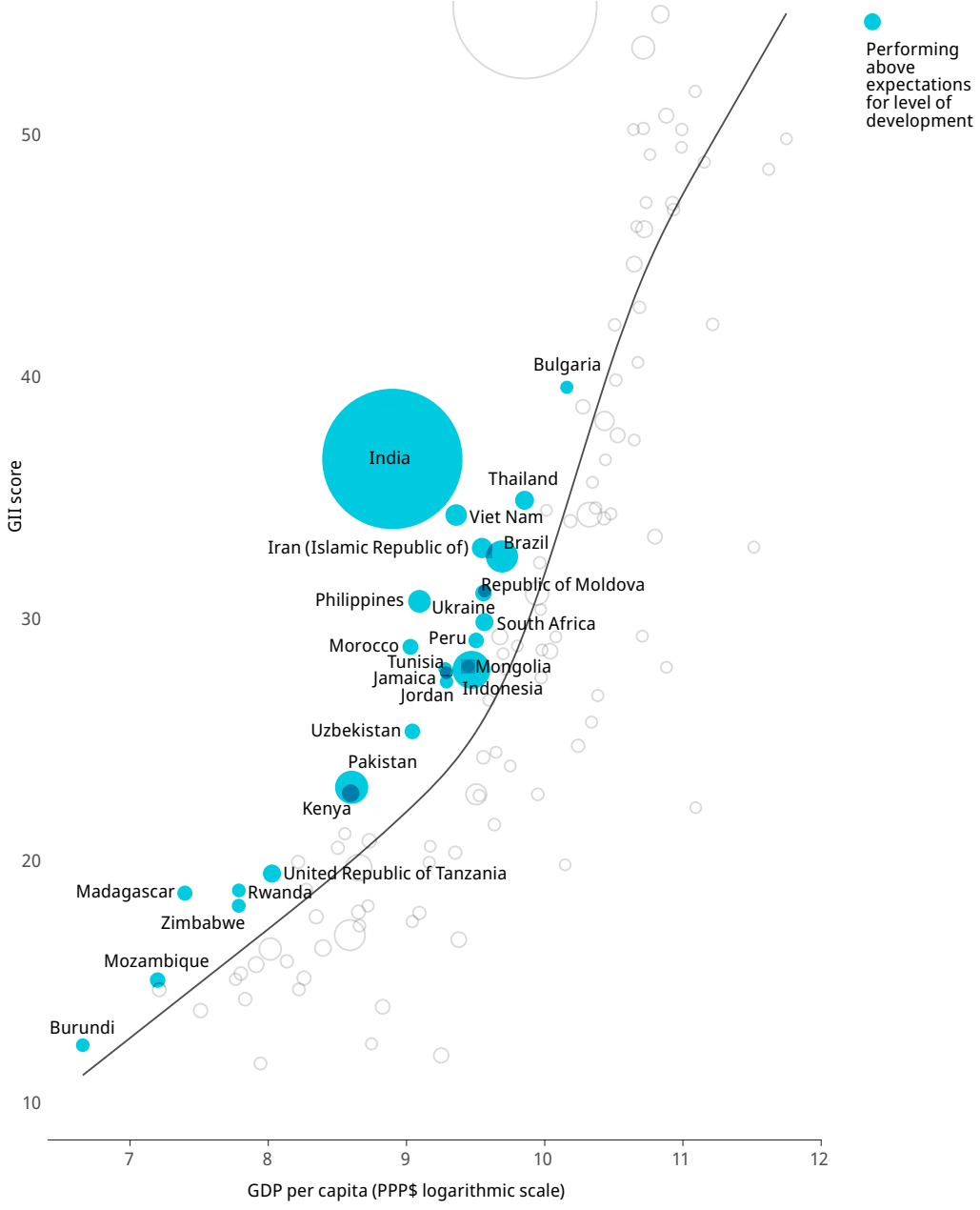
However, there is change too this year. Indonesia (75th), Uzbekistan (82nd) and Pakistan (87th) are Innovation Achievers in 2022 for the first time ever. For these three economies, this achievement coincides with an important shift in their rankings of between four and 12 positions. In addition, Jamaica (76th), Jordan (78th), Zimbabwe (107th), Mozambique (123rd) and Burundi (130th) all make it back into the select group of Innovation Achievers for 2022. Brazil (54th), the Islamic Republic of Iran (53rd) and Peru (65th) keep their achiever status for a second consecutive year. These three economies also gain between three and seven positions in the rankings, with Brazil moving forward since 2019. In 2022, Brazil makes marked improvements in innovation outputs, notably in Creative outputs, including in Intangible assets and Online creativity, as well as in the indicators Trademarks (19th) and Mobile app creation (34th).

Sub-Saharan Africa is the region with the greatest number of economies performing above expectation (eight in total). South East Asia, East Asia, and Oceania is 2nd (with five economies), Central and Southern Asia follow at 3rd (4 economies); and Europe, Northern Africa and Western Asia, and Latin America and the Caribbean tie at 4th (three economies each).

Conversely, 41 economies performed below expectation on innovation. Four are the European Union economies Lithuania (39th), Greece (44th), Slovakia (46th) and Romania (49th). In the upper middle-income group, six are the Latin American and Caribbean economies – Argentina (69th, despite it gaining 4 ranks this year), Panama (81st), the Dominican Republic (90th), Paraguay (91st), Ecuador (98th) and Guatemala (110th). In the lower middle-income group, 14 economies performed below expectation for their level of development, including the Sub-Saharan African economies Côte d'Ivoire (109th), Nigeria (114th), Zambia (118th), Cameroon (121st), Benin (124th), Angola (127th) and Mauritania (129th).

Relative to 2021, 27 economies switched performance groups. Four economies raised their performance status from below expectation to matching expectation, namely, Sri Lanka (85th), Bangladesh (102nd), Ethiopia (117th) and Yemen (128th). Conversely, 12 economies fell back from matching expectation to come below expectation, half of them the Latin America and Caribbean economies of Uruguay (64th), Paraguay (91st), Ecuador (98th), El Salvador (100th), Guatemala (110th) and Honduras (113th).

Figure 11 The positive relationship between innovation and development



Source: Global Innovation Index Database, WIPO, 2022.

Note: Bubbles sized by population. The cubic spline trendline shows the expected levels of innovation performance at different levels of GDP per capita for all economies covered in the GII 2022.

Table 3 Innovation Achievers in 2022: Income group, region and years as an innovation achiever

Economy	Income group	Region	Years as an innovation achiever (total)
India	Lower middle-income	Central and Southern Asia	2011–2022 (12)
Kenya	Lower middle-income	Sub-Saharan Africa	2011–2022 (12)
Republic of Moldova	Upper middle-income	Europe	2011–2022 (12)
Viet Nam	Lower middle-income	South East Asia, East Asia, and Oceania	2011–2022 (12)
Mongolia	Lower middle-income	South East Asia, East Asia, and Oceania	2011–2015, 2018–2022 (10)
Rwanda	Low-income	Sub-Saharan Africa	2012, 2014–2022 (10)
Ukraine	Lower middle-income	Europe	2012, 2014–2022 (10)
Mozambique	Low-income	Sub-Saharan Africa	2012, 2014–2020, 2022 (9)
Thailand	Upper middle-income	South East Asia, East Asia, and Oceania	2011, 2014–2015, 2018–2022 (8)
Bulgaria	Upper middle-income	Europe	2015, 2017–2018, 2020–2022 (6)
Madagascar	Low-income	Sub-Saharan Africa	2016–2018, 2020–2022 (6)
Jordan	Upper middle-income	Northern Africa and Western Asia	2011–2015, 2022 (6)
South Africa	Upper middle-income	Sub-Saharan Africa	2018–2022 (5)
Morocco	Lower middle-income	Northern Africa and Western Asia	2015, 2020–2022 (4)
Philippines	Lower middle-income	South East Asia, East Asia, and Oceania	2019, 2020–2022 (4)
Tunisia	Lower middle-income	Northern Africa and Western Asia	2018, 2020–2022 (4)
United Republic of Tanzania	Lower middle-income	Sub-Saharan Africa	2017, 2020–2022 (4)
Burundi	Low-income	Sub-Saharan Africa	2017, 2019, 2022 (3)
Brazil	Upper middle-income	Latin America and the Caribbean	2021–2022 (2)
Iran (Islamic Republic of)	Lower middle-income	Central and Southern Asia	2021–2022 (2)
Peru	Upper middle-income	Latin America and the Caribbean	2021–2022 (2)
Jamaica	Upper middle-income	Latin America and the Caribbean	2020, 2022 (2)
Zimbabwe	Lower middle-income	Sub-Saharan Africa	2012, 2022 (2)
Indonesia	Lower middle-income	South East Asia, East Asia, and Oceania	2022 (1)
Uzbekistan	Lower middle-income	Central and Southern Asia	2022 (1)
Pakistan	Lower middle-income	Central and Southern Asia	2022 (1)

Source: Global Innovation Index Database, WIPO, 2022.

Notes: Income group classification follows the World Bank Income Group Classification (June, 2021). Geographical regions correspond to the United Nations publication on standard country or area codes for statistical use (M49).

The persistent regional innovation divide

South East Asia, East Asia, and Oceania continues to narrow the gap with Northern America and Europe

For another year, there are no changes to how the world regions rank in innovation performance. Northern America and Europe continue to lead, followed by South East Asia, East Asia, and Oceania, and, more distantly, by Northern Africa and Western Asia, Latin America and the Caribbean, Central and Southern Asia, and Sub-Saharan Africa, respectively.[1]

Northern America

Northern America, composed of the United States and Canada, is the most innovative world region. Both economies gained one position this year in the global rankings, reaching the 2nd and 15th places, respectively. This region is the best performer in every GII pillar relative to all other world regions. The United States performs best in Market sophistication (1st worldwide), Business sophistication (3rd) and Knowledge and technology outputs (3rd).

Canada makes a comeback into the top 15, achieving its best rank (15th) since 2016, after having exited the top 10 in 2012. It scores best in indicators Venture capital recipients (1st), Joint venture/strategic alliances (1st) and computer Software spending (3rd).

Europe

Europe still hosts the largest number of innovation leaders – 15 in total – that rank among the top 25. Out of the 39 European economies covered, 12 move up the rankings this year: the Netherlands (5th), Germany (8th), Austria (17th), Estonia (18th), Luxembourg (19th), Malta (21st), Italy (28th), Spain (29th), Poland (38th), Greece (44th), the Republic of Moldova (56th) and Bosnia and Herzegovina (70th).

Switzerland has the most high-performing Institutions in the region (2nd worldwide), and is the regional and global leader in innovation outputs, ranking 1st in both Knowledge and technology outputs and Creative outputs. Germany leads in Human capital and research (2nd), while Sweden comes top in Infrastructure and Business sophistication worldwide (1st in both pillars).

Estonia (18th) heads the region in Market sophistication (3rd), and scores a global leading performance for the indicators E-participation (1st), Venture capital deals (1st), ICT services imports (1st), New businesses (1st), Government's online service (2nd), Entrepreneurship policies and culture (3rd), Mobile app creation (6th), Finance for startups and scaleups (7th) and Environmental performance (14th).

South East Asia, East Asia, and Oceania

The South East Asia, East Asia, and Oceania (SEAO) region continues to close the innovation performance gap with Northern America and Europe. Seven SEAO economies are world innovation leaders: the Republic of Korea (6th), Singapore (7th), China (11th), Japan (13th), Hong Kong, China (14th), New Zealand (24th) and Australia (25th). Singapore, China and New Zealand improved their rankings this year. Among the regional leaders, China, the Republic of Korea and Japan have made the greatest advances up the rankings over the past 10 years. The Republic of Korea held the 21st position in 2012, joined the top 10 in 2020 and moved further ahead to 6th position in 2022. Japan has moved from 25th position in 2012 to be within the vicinity of the top 10, this year retaining 13th place. China held the 34th position in 2012; it joined the innovation leaders in 2016, and has since steadily gained in the rankings every year until this year, in 2022, it is edging the top 10 at 11th place.

Within the region as a whole, Viet Nam (48th), the Philippines (59th), Indonesia (75th), Cambodia (97th) and the Lao People's Democratic Republic (112th) have made the greatest advances over the past decade, moving up more than 20 ranks. These economies continue to lead in key innovation indicators, too. Viet Nam ranks 1st worldwide in High-tech imports, the Philippines is 2nd in High-tech exports, and Indonesia holds 2nd position worldwide in Entrepreneurship policies and culture.

Indonesia (75th) makes a big leap, achieving its best position since 2012, when it ranked 100th. This year, it has made notable improvements in Innovation linkages and in Intangible assets, performing well in indicators such as Finance for startups and scaleups (4th), State of cluster development (9th), University–industry R&D collaboration (13th), and corporate Intangible asset intensity (13th).

Central and Southern Asia

Within Central and Southern Asia, India continues to lead in 40th position, moving further up the rankings, from its 46th position in 2021, and its 81st rank in 2015. The Islamic Republic of Iran is 2nd in the region once again, climbing to 53rd place, improving notably from the 104th place it held back in 2012 and establishing itself as a middle-income economy with the potential to transform the global innovation landscape. Uzbekistan rises to 3rd in the region, ranking 82nd overall, and displacing Kazakhstan to 4th in the region and the 83rd position globally.

Sri Lanka (85th), Pakistan (87th) and Bangladesh (102nd) jumped up the rankings notably this year. However, only Pakistan has steadily gained position over time (it ranked 133rd in 2012), whereas Sri Lanka has gone up and down the rankings, this year reclaiming the 85th position it first held back in 2015. Bangladesh improves this year, notably in Creative outputs, Intangible assets and Online creativity, performing especially well in corporate Intangible asset intensity (26th).

Northern Africa and Western Asia

Within Northern Africa and Western Asia, Israel (16th) continues far in advance of the region as a whole and in a consistent manner. It has been an innovation leader for the past 15 years. Israel leads the region in Market sophistication (7th), Business sophistication (6th), and Knowledge and technology outputs (7th). It is a world leader in the indicators Venture capital deals, Females employed with advanced degrees, PCT patents and ICT services exports, ranking 1st worldwide for each (see Box 1). Israel is also the only country that spends more than 5 percent of GDP on R&D, reaching 5.4 percent in 2020.

The United Arab Emirates (UAE) takes a big leap forward this year reaching 31st place, bringing it closer to the top 30. Türkiye makes it into the top 40, taking 37th spot. Türkiye tops the region in Creative outputs (15th) and ranks 4th worldwide in Intangible assets, becoming a global leader in the indicators Industrial designs (1st), Trademarks (6th), and Intangible asset intensity (15th). Given its recent performance, as middle-income economy, Türkiye has the potential to undergo innovation performance growth similar to that of China in future years.

An additional 10 economies within the region move up the rankings, including notable improvers Saudi Arabia (51st), Qatar (52nd), Kuwait (62nd), Morocco (67th) and Bahrain (72nd).

Table 4 Heatmap: GII 2022 rankings overall and by innovation pillar

Country/economy	Overall GII	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
Switzerland	1	2	4	4	8	7	1	1
United States	2	13	9	19	1	3	3	12
Sweden	3	19	3	1	13	1	2	8
United Kingdom	4	24	6	8	5	22	8	3
Netherlands	5	4	14	14	18	10	5	10
Republic of Korea	6	31	1	13	21	9	10	4
Singapore	7	1	7	11	4	2	13	21
Germany	8	20	2	23	14	19	9	7
Finland	9	11	8	3	17	5	4	18
Denmark	10	9	10	5	15	15	12	14
China	11	42	20	25	12	12	6	11
France	12	18	15	17	10	17	15	6
Japan	13	21	21	12	9	8	11	19
Hong Kong, China	14	10	13	6	2	27	60	5
Canada	15	15	12	30	6	20	24	20
Israel	16	41	24	42	7	6	7	36
Austria	17	8	11	9	38	18	19	26
Estonia	18	12	34	10	3	25	21	24
Luxembourg	19	5	32	40	31	4	33	9
Iceland	20	14	29	22	41	14	22	13
Malta	21	28	42	27	33	16	32	2
Norway	22	3	19	2	28	21	25	30
Ireland	23	16	23	15	55	13	14	29
New Zealand	24	7	18	21	24	31	29	22
Australia	25	17	5	18	20	24	37	27
Belgium	26	29	16	37	45	11	18	32
Cyprus	27	36	39	28	29	23	20	17
Italy	28	58	28	26	35	33	16	16
Spain	29	38	26	16	30	32	27	28
Czech Republic	30	43	33	20	76	28	17	37
United Arab Emirates	31	6	17	7	23	26	59	45
Portugal	32	47	22	39	42	34	35	25
Slovenia	33	37	25	24	68	29	26	56
Hungary	34	48	37	35	67	30	23	46
Bulgaria	35	67	68	34	62	40	30	23
Malaysia	36	34	38	51	26	41	39	41
Türkiye	37	101	41	48	37	47	47	15
Poland	38	65	36	43	61	38	38	38
Lithuania	39	26	44	45	32	37	48	47
India	40	54	43	78	19	54	34	52
Latvia	41	35	48	52	65	36	44	42
Croatia	42	77	46	31	56	46	45	39
Thailand	43	78	71	54	27	43	43	49
Greece	44	69	31	46	64	55	46	54
Mauritius	45	22	66	70	16	96	82	31
Slovakia	46	68	59	41	70	45	28	70
Russian Federation	47	89	27	62	48	44	51	48
Viet Nam	48	51	80	71	43	50	52	35
Romania	49	75	74	33	63	51	31	57
Chile	50	39	57	47	46	57	54	55
Saudi Arabia	51	50	30	53	22	53	65	66
Qatar	52	25	56	29	47	73	69	59
Iran (Islamic Republic of)	53	131	54	75	11	115	50	33
Brazil	54	102	50	65	49	35	55	51
Serbia	55	53	52	38	83	65	42	76
Republic of Moldova	56	98	62	84	58	79	49	43
Ukraine	57	97	49	82	102	48	36	63
Mexico	58	93	58	63	54	76	58	50
Philippines	59	90	86	81	78	39	41	58
Montenegro	60	59	61	44	53	58	72	71
South Africa	61	81	81	77	39	63	56	64
Kuwait	62	86	55	36	73	101	68	60
Colombia	63	72	79	59	66	42	67	75
Uruguay	64	32	73	60	77	62	62	85
Peru	65	61	47	79	40	49	90	65
North Macedonia	66	88	75	49	34	59	57	93

4th quartile (best performers, ranks 1st to 33rd) 3rd quartile (ranks 34th to 66th) 2nd quartile (ranks 67th to 99th) 1st quartile (ranks 100th to 132nd)

Table 4 Continued

Country/economy	Overall GII	Institutions	Human capital and research	Infrastructure	Market sophistication	Business sophistication	Knowledge and technology outputs	Creative outputs
Morocco	67	85	83	89	74	94	64	44
Costa Rica	68	44	77	66	88	60	61	81
Argentina	69	96	69	64	95	52	77	53
Bosnia and Herzegovina	70	94	67	55	25	98	63	83
Mongolia	71	76	64	92	97	61	85	40
Bahrain	72	27	78	32	75	93	73	98
Tunisia	73	92	45	85	98	116	53	61
Georgia	74	30	70	83	72	64	75	86
Indonesia	75	71	90	68	36	92	78	72
Jamaica	76	56	84	99	110	67	89	34
Belarus	77	130	35	67	96	72	40	91
Jordan	78	45	76	100	52	75	76	78
Oman	79	57	40	56	71	97	94	80
Armenia	80	55	91	80	85	84	71	73
Panama	81	70	94	50	89	105	86	62
Uzbekistan	82	63	65	74	60	74	80	102
Kazakhstan	83	52	60	58	90	68	81	118
Albania	84	84	89	57	91	56	96	82
Sri Lanka	85	119	120	73	108	71	66	69
Botswana	86	40	51	88	112	70	88	100
Pakistan	87	118	113	114	100	81	70	67
Kenya	88	82	119	107	111	80	74	79
Egypt	89	111	97	93	86	103	79	84
Dominican Republic	90	80	108	69	84	83	93	88
Paraguay	91	115	100	76	82	86	105	74
Brunei Darussalam	92	23	53	61	101	66	127	125
Azerbaijan	93	46	87	90	80	77	117	105
Kyrgyzstan	94	113	63	86	51	107	92	121
Ghana	95	100	101	96	119	88	103	77
Namibia	96	49	72	106	81	108	113	113
Cambodia	97	87	99	103	44	117	101	104
Ecuador	98	121	98	72	103	85	102	96
Senegal	99	60	103	105	69	124	97	112
El Salvador	100	107	107	97	99	87	108	90
Trinidad and Tobago	101	66	88	87	123	102	87	117
Bangladesh	102	109	127	94	92	125	95	87
United Republic of Tanzania	103	74	126	104	79	112	114	94
Tajikistan	104	91	85	121	94	128	84	116
Rwanda	105	33	106	95	115	113	111	126
Madagascar	106	120	105	132	109	118	115	68
Zimbabwe	107	128	92	126	114	90	99	89
Nicaragua	108	124	110	111	50	82	121	103
Côte d'Ivoire	109	73	122	98	122	95	104	108
Guatemala	110	122	121	119	107	89	91	99
Nepal	111	117	123	108	59	91	119	101
Lao People's Democratic Republic	112	103	111	118	57	104	122	114
Honduras	113	125	96	101	104	78	110	120
Nigeria	114	112	109	112	126	69	123	97
Algeria	115	99	82	102	125	120	118	109
Myanmar	116	123	102	128	93	130	100	106
Ethiopia	117	110	131	123	113	122	83	115
Zambia	118	126	118	116	106	100	116	110
Uganda	119	62	129	109	127	126	106	123
Burkina Faso	120	105	104	115	118	123	112	127
Cameroon	121	104	116	113	132	99	98	124
Togo	122	108	117	117	105	129	126	111
Mozambique	123	129	114	91	120	121	120	107
Benin	124	64	115	110	117	114	129	132
Niger	125	79	130	129	116	106	109	131
Mali	126	114	128	125	124	110	107	122
Angola	127	116	125	122	121	131	130	92
Yemen	128	132	124	120	87	127	124	95
Mauritania	129	83	112	127	129	111	132	130
Burundi	130	106	95	130	130	119	128	128
Iraq	131	127	93	124	128	132	125	129
Guinea	132	95	132	131	131	109	131	119

4th quartile (best performers, ranks 1st to 33rd) 3rd quartile (ranks 34th to 66th) 2nd quartile (ranks 67th to 99th) 1st quartile (ranks 100th to 132nd)

Source: Global Innovation Index Database, WIPO, 2022.

Latin America and the Caribbean

Within Latin America and the Caribbean, Chile (50th) re-enters the top 50, while Brazil continues to move forward at 54th spot. Mexico remains within the top 60 at 58th position, but drops three ranks from last year, its lowest position since 2017. Eight out of the 18 economies covered within the region go up the rankings, but in a relatively modest manner compared to other world regions, with Colombia (63rd), Peru (65th) and Argentina (69th) recording the most notable increases, and all making it into the top 70. Over the past decade, only Mexico, Peru and Jamaica (76th) have gained more than 10 ranks, while Brazil and Argentina have experienced a more accelerated ranking increase over the past five years.

Uruguay is the regional leader in Institutions (32nd), Peru leads in Human capital and research (47th) and Market sophistication (40th), and Chile in Infrastructure (47th) and Knowledge and technology outputs (54th). Brazil is top of the region for Business sophistication (35th).

Among Caribbean economies, only the Dominican Republic climbs the rankings to 90th position – although it continues to perform below expectation for its level of development. In 2022, Jamaica ranks best in the region in terms of Creative outputs (34th), including in indicators such as Trademarks (9th) and Industrial designs (14th).

This year, Peru, Brazil and Jamaica also performed on innovation above expectation for their level of development (Table 3). Conversely, six Latin American and Caribbean economies have declined in performance status, no longer meeting expectation but instead performing below expectation for their level of development, pointing to a possible innovation performance stagnation within the region.

Sub-Saharan Africa

In Sub-Saharan Africa, only Mauritius (45th) and South Africa (61st) rank among the top 80. Five of the region's other economies rank within the top 100 this year: Botswana (86th), Kenya (88th), Ghana (95th), Namibia (96th) and Senegal (99th) (Table 5). Sixteen economies move up the GII rankings, with Mauritius, Botswana, Ghana, Senegal, Zimbabwe (107th), Ethiopia (117th) and Angola (127th) making noteworthy improvements. Burundi (130th) makes a return to the GII this year thanks to improved data availability, after having held 128th position in the GII in 2019. Mauritania joins the GII for the first time at 129th place.

Mauritius ranks highest within the region in Institutions (22nd), Infrastructure (70th), Market sophistication (16th), and Creative outputs (31st). It leads worldwide in Venture capital deals (1st), and performs notably well in Trademarks (15th), ICT services imports (20th) and New businesses (20th). Botswana tops in Human capital and research (51st), and performs well in indicators such as Expenditure on education (2nd), New businesses (4th), Loans from microfinance institutions (15th) and Intellectual property payments (22nd). Namibia leads worldwide in Expenditure on education (1st) and performs well above the regional average on Human capital and research. South Africa heads the region in Business sophistication (63rd) and Knowledge and technology outputs (56th).

Table 5 GII 2022 rankings in Sub-Saharan Africa

Rank	Top 80	Rank	Top 100	Rank	Top 110	Rank	Top 120	Rank	Other
45	Mauritius	86	Botswana	103	United Republic of Tanzania	114	Nigeria	121	Cameroon
61	South Africa	88	Kenya	105	Rwanda	117	Ethiopia	122	Togo
		95	Ghana	106	Madagascar	118	Zambia	123	Mozambique
		96	Namibia	107	Zimbabwe	119	Uganda	124	Benin
		99	Senegal	109	Côte d'Ivoire	120	Burkina Faso	125	Niger
								126	Mali
								127	Angola
								129	Mauritania
								130	Burundi
								132	Guinea

Source: Global Innovation Index Database, WIPO, 2022.

Creating balanced and efficient innovation ecosystems

Several economies are still struggling to translate innovation inputs into outputs efficiently

Some economies are very efficient at converting innovation inputs into outputs. Among the high-income group, Switzerland (1st) produces considerably higher levels of outputs than other high-income economies, such as the United States (2nd), Sweden (3rd) and Singapore (7th), at comparable levels of innovation inputs (Figure 12). Germany (8th) produces the same levels of outputs as the United States and the Netherlands (5th), at lower levels of innovation inputs.

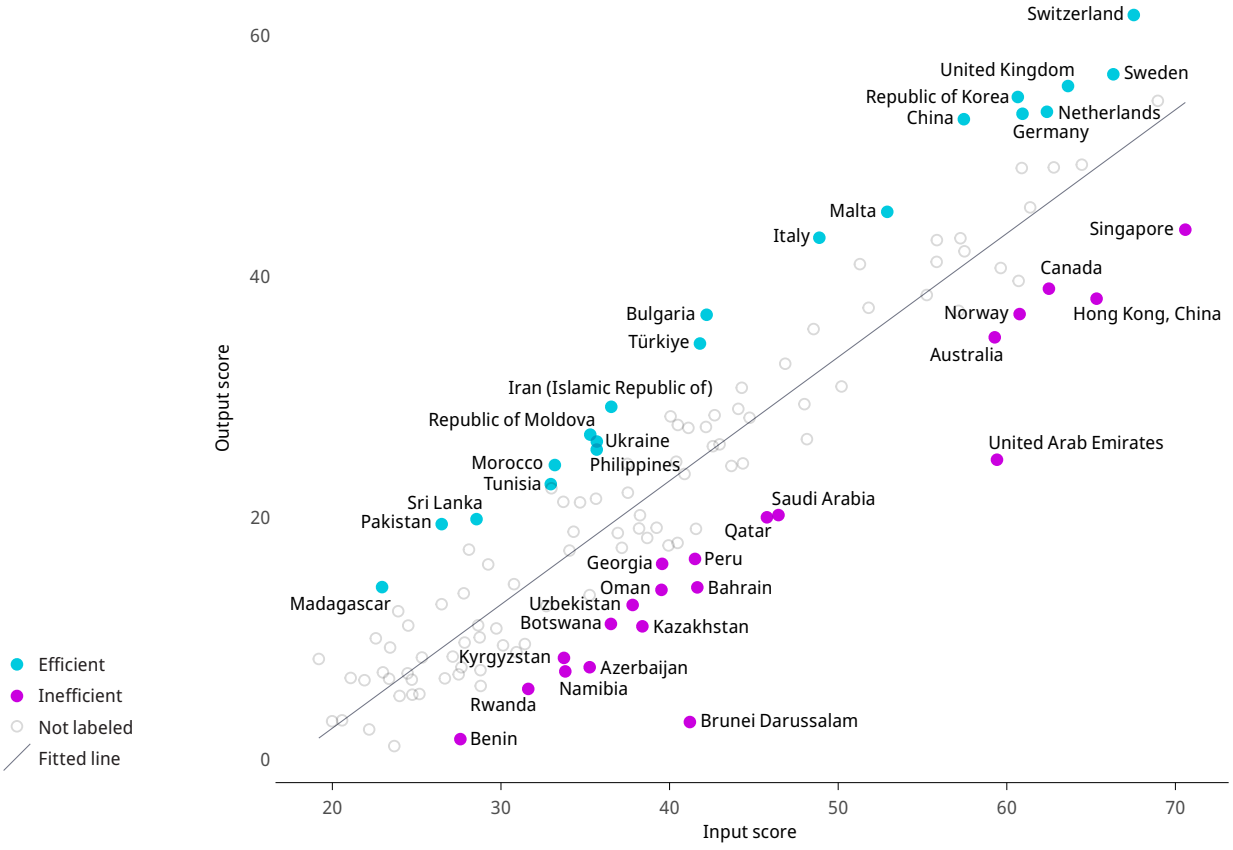
Among upper middle-income group economies, China (11th) ranks 8th overall in the Innovation Output Sub-Index, and its levels of outputs are comparable to those of high-income economies like the Netherlands and Germany, but at lower levels of innovation inputs. Türkiye (37th) has outputs comparable to high-income economies, such as Australia (25th), but with fewer inputs.

The Islamic Republic of Iran (53rd), among lower middle-income group economies, performs on innovation outputs at levels comparable to high-income European economies Latvia (41st) and Croatia (42nd). In addition, the Philippines (59th) does likewise, relative to Lithuania (39th) and Greece (44th), with a lower level of innovation inputs.

However, several high-income economies struggle to obtain a better balance between level of investment and results, often to the detriment of their overall innovation performance. This group of economies includes, notably, oil and natural gas producers and exporters Canada (15th), Norway (22nd), the United Arab Emirates (31st), Saudi Arabia (51st), Bahrain (72nd) and Brunei Darussalam (92nd). Other economies struggling to translate inputs into outputs include Singapore (7th), Australia (25th), Uzbekistan (82nd) and Rwanda (105th).

Among the top 25 (innovation leaders), Canada has managed to tilt the balance in its favor this year by becoming more productive in converting innovation inputs into outputs, making a comeback into the GII top 15.

Figure 12 Innovation input to output performance, 2022



Source: Global Innovation Index Database, WIPO, 2022.

A balanced and strong performance across all seven innovation pillars is most evident among the innovation leaders (top 25), but particularly the top 10. Only 15 economies in total – including Norway and New Zealand who are not in the GII top 20 – perform strongly across all seven GII pillars (Table 4).

However, certain economies ranked lower overall in the GII are nevertheless leaders in specific areas. Examples include Uruguay (32nd) and Rwanda (33rd) ranked highly for the quality of their Institutions; Bahrain (32nd) for its Infrastructure; and the Islamic Republic of Iran (11th), India (19th) and Malaysia (26th) for their Market sophistication. In addition, Slovakia (28th) and Romania (31st) score highly in Knowledge and technology outputs, and Türkiye (15th) in Creative outputs. Such imbalances in performance within economies hints at innovation systems that are changing, dynamic and have the potential for increased overall performance in the future.

Box 2 describes the process involved in using the GII to improve an economy's innovation performance.

Box 2 What is the recipe for improving an economy's innovation performance as measured by the GII?

For many years, governments around the world have used the GII to improve their innovation performance and shape evidence-based innovation policies. Every year since the GII first launched, numerous GII workshops and missions have taken place in collaboration with a number of different economies around the world – often in the presence of key ministers, ministries and innovation actors.

A survey carried out by WIPO in early 2022 shows that 70 percent of WIPO member states use the Global Innovation Index (GII). Out of the 110 responses received (one response per country), 68 countries had used the GII during the period 2020–2021 to improve their innovation ecosystems and policymaking, while 37 went so far as to use the GII as a specific reference in economic plans or policies.

While there is no recipe for moving up the GII rankings, this box discusses the process of using the GII to improve an economy's innovation performance.

A chief benefit of the GII is that it puts data-based evidence and metrics at the core of evaluating, crafting and deploying innovation policies. As a first step, countries begin by bringing together statisticians and decision-makers in order to understand the country's innovation performance, based on the GII metrics. In a second step, the policy discussion turns to leveraging domestic innovation opportunities, while at the same time overcoming country-specific weaknesses. Both steps are an exercise in careful coordination among different public and private innovation actors, as well as between government entities at the local, regional and national levels. Ideally, the GII becomes a tool for such coordination.

Some do's:

- Ensure innovation is embedded as a key priority in the country's pathway to national development and progress, possibly formulated within a clear innovation policy.
- Establish a cross-ministerial task force to pursue innovation policy and GII matters through a "whole of government approach," ideally reporting to the top tier of government, for instance, the Prime Minister's Office.
- Ensure any innovation policy task force interacts and consults with innovation actors from both the private and public sectors, including start-ups, deans of research universities and relevant innovation clusters.
- Ensure any national intellectual property (IP) policy is aligned with or even integrated into the above innovation policy.
- Ensure the targets or actions of innovation policy are quantifiable, and that they are regularly revisited and evaluated.

Some don'ts:

- Do not set over-ambitious and therefore unrealistic GII ranking targets – for example, by aiming to enter the top 20 by next year when the economy's ranking would suggest it is still far from achieving that goal. GII rankings rarely increase in large leaps from one year to the next, particularly at the top.
- Do not expect policy changes to result in improved GII indicator performance instantaneously. There are important lags between innovation policy formulation, execution and impact. The latest available innovation data is also rarely current, often lagging by a few years.

– Do not treat the GII as a mathematical exercise – that is, by attempting to collect or focus on specific indicators in order to climb the rankings. GII rank alone is only a partial reflection of national development and progress.
– Do not over focus on year-on-year changes to the GII alone. These are influenced by relative performance vis-à-vis other countries and other methodological considerations (see Appendix I), many of which lie outside the control of the economy in question. Setting objectives over a multi-year period – for example, three to five years – and looking at combined progress over several years is a more fitting use of the GII.

Conclusion

The aim of the GII is to provide insightful data on innovation, to track major innovation developments at the country and regional level and, in turn, to assist policymakers in evaluating their innovation performance and making informed innovation policy decisions.

The GII is not intended to be considered as representing the ultimate and definitive ranking of economies with respect to innovation. On the contrary, the GII best represents an ongoing endeavor to find metrics and approaches that capture the richness of innovation most effectively, with continuous refinements reflecting an improved availability of statistics and theoretical advances in the field, and paving the way for the adoption of better and more informed innovation policies worldwide.

Several key insights emerge from this year's GII report.

- The global innovation landscape is changing – both within the top 25 leading innovation economies, as well as more generally within the overall rankings and the league tables by income group or region. The most notable of these changes are: (i) a significant shift within this year's top 15 innovators, with the United States, Singapore, Germany and China moving up the ranking, the latter overtaking France, and with Canada moving back into the top 15 thanks to improved innovation efficiency; (ii) the continued strong progression of emerging innovation powerhouses Türkiye, India and to some extent the Islamic Republic of Iran, while that of Viet Nam and the Philippines has halted momentarily; and (iii) the early signs of innovation potential coming from Indonesia, Uzbekistan and Pakistan, which all overperformed on innovation performance relative to development for the first time in 2022.
- Despite such shifts, and despite the fact that Asia as a region is catching up rapidly on Northern America and Europe, the gap with other world regions, notably Latin America and the Caribbean and Sub-Saharan Africa, needs urgent attention. Importantly, the short and longer-term impacts of the COVID-19 pandemic, the current geopolitical turmoil, the tightening of monetary policies, and the repercussions of shocks to global supply chains and global innovation networks on nascent innovation systems in middle- and low-income economies all need close monitoring. The last two decades achieved great things in terms of putting innovation systems and innovation policies on the agenda of developing countries' policymakers, legislators and innovation actors. It would be a great shame were this attention, together with the accrued political will and experience, to come under threat due to ongoing crises.

Future editions of the GII will track developments closely and continue the journey toward enabling policy and business leaders through the fostering of a better understanding and measurement of innovation.

Note

1 The regional rankings correspond to the average unweighted scores of a region's economies.